SEETRU Product Information

Welcome to the Seetru Manual

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www.seetru.com

SEETRU LIMITED

Albion Dockside Works, Bristol, BS1 6UT, England.
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LLOYD'S REGISTER QUALITY ASSURANCE · ISO9001

Company profile

Seetru is the principal company of the Seetru Organization, a small integrated group of subsidiary and associated companies. The Organisation includes Ebtrade, which trades as Leser Valves, and Seetru Engineering Services, which specializes in safety valve test, maintenance and maintenance management services.

The group has a staff of over a hundred and twenty people and a turnover of in excess of £6 million. The Seetru Organization represents a comprehensive, vertically integrated engineering enterprise, comprising: Sales and Marketing, Design and Development, Production, Administration etc. The production department has the most up to date machining facilities and organizational practices. All aspects of operation are supported by extensive and up to date information technology systems.

The growth of the Company for over 50 years has depended upon the development and perfection of valve and gauge products, especially in the field of safety valves. The Company is supported by its ethos of engineering excellence and great attention to customer's needs. It operates a substantial approved development test plant for safety valves, and also has environmental test facilities for all its products.

Seetru operates comprehensive Quality Management, Safety and Environmental Protection Systems. It is approved to BS EN ISO9001:2000 by Lloyds Register of Quality Assurance (LRQA).

Seetru Limited has a special interest in export, an example, is liquid level gauges for marine and shipbuilding industries which are sold worldwide. The Company is active in strengthening and expanding its international position in Europe and elsewhere; it has, for example, an important Far East trade and has granted manufacturing licences in Japan.

Seetru products and services

Seetru are manufacturers of safety relief and other special purpose ancillary valves for a wide range of compressed air, industrial gas, refrigerants, powder, steam, liquid and liquefied gas applications. These valves meet important international standards, which include: the BS 6759 Parts 2 & 3, AD-Merkblatt A2, ISO 4126 and ASME Section VIII design codes, as well as type test approvals from TÜV and the National Board. The products comply with the requirements of the European Pressure Equipment Directive and are available both CE marked and UV stamped.

Seetru has a wide range of special purpose valves, which are largely for the compressed air industry and for medium sized industrial oil engines. These include minimum pressure maintaining valves for screw type compressors and air starting valves for medium size industrial and marine oil engines.

Seetru liquid level gauges are primarily of two types, sight gauges and magnetic float by-pass gauges. Many of the gauges are direct reading though most have optional electronic remote reading systems and computer interfaces.

The gauge range notably includes the Quickmount, Seemag and CPI gauges for industrial and chemical applications as well as the Seetol system for tall tanks (e.g. of 20 metres and above) incorporating optical and closed circuit TV viewing systems.

The Seetru ranges of gauges for marine applications have for many years been the great workhorse gauges in the marine industry. The current standard, the Seeflex gauge system, is approved by all important international classification societies, including Lloyds Register of Shipping, Germanischer Lloyd, NKK Japan, ABS, Det Norske Veritas etc. The Seemag magnetic float by-pass gauge is also widely approved for marine and off-shore applications.

Seetru Engineering Services provides on-site and/or off-site services specialising in safety valve testing, maintenance and maintenance management for all makes and types of safety valves. These services include in-situ on-line testing of safety valves as well as full safety valve inventory management services. In particular, the unique Seetru Condition Rating™ technology provides for health monitoring of safety valves in-situ in service and true calibration at overhaul. This division also provides outside engineering services for the installation and maintenance of other Seetru products.

The Company's substantial design and development department enables it to provide extensive bespoke design, advisory and manufacturing services to develop or adapt individual products to new applications.

Seetru provides training courses covering the use and maintenance of its own and similar products. In particular, these concern the specification, installation, operation and maintenance of safety valves.

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Safety Valves and The Pressure Equipment Directive

Edition E.

The European Pressure Equipment Directive 97/23/EC (PED) became mandatory legislation throughout the European Union on 29th May 2002.

The PED is applicable, with a few exceptions, to systems having a working pressure of **0.5 bar g**. or above.

The consequence of the PED is that, from 29th May 2002, it became **illegal** to **sell** or **purchase Safety Valves** for use within the European Union **unless they are PED compliant**. This applies to Safety Valves sold individually or as part of an equipment assembly.

Each valve or batch of valves must be supplied with a Declaration of Conformity in accordance with the Pressure Equipment Directive 97/23/EC, together with a Residual Hazard Warning Sheet.

It is permissible to maintain in service, or start to use, any old non-compliant Safety Valves which were purchased prior to 29th May 2002. It is also permissible to recondition/service and continue to use (but not to resell) such old, non-compliant, safety valves. It is, however, only legal to purchase replacements which are PED compliant.

Safety devices, such as Safety Valves, being sold on the open market must comply with the requirements of Category 4 of the PED, the highest level specified. **Seetru and Leser Safety and Relief Valves are approved to Category 4.**

Broadly, products will be CE marked to indicate their compliance with the PED. In order to put the CE mark on their products manufacturers must ensure that their products are PED compliant, and for products in Categories 2, 3 and 4 of the PED the manufacturer must have independent certification to this effect from a Notified Body. (Note, where a product meets the PED criteria for "Sound Engineering Practice" it will not be CE marked).

The PED is a complex piece of legislation with many interacting criteria for its application. This introductory document provides general information only; it must in no way be used as a definitive document. **The Pressure Equipment Directive itself is the definitive document and should be referred to in all instances. Its detailed implication for any particular circumstances must be deduced by competent persons. Seetru and Leser Valves can provide this service, as well as full assistance for queries and information.**

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LESER VALVES *The Safety Valve*

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SEETRU LIMITED

Safety Valves

Solutions to Pressure Relief and Safety Valve Requirements

Ebtrade LIMITED

LESER VALVES UK

SEETRU LIMITED

Solutions to Pressure Relief and Safety Valve Requirements

Seetru and Leser Valves UK provide complete solutions to pressure relief, pressure control and safety valve requirements

Seetru and Leser Valves UK are associate organisations, both are located at the same address in Bristol. Seetru are manufacturers of safety valves and related ancillary valves. Ebtrade incorporates the Leser Valves UK sales organisation and are the UK agents for Leser GmbH & Co KG who manufacture safety valves and changeover valves, Ebtrade are also agents for Kaneko Sangyo Co. Ltd. who manufacture breather valves, flame arresters and associated products.

Seetru has been designing and manufacturing safety valves for 50 years and Leser for over 100 years. Kaneko was founded in 1918. Together, they offer a uniquely extensive range of safety valves and related products.

- Worldwide product approvals including TÜV and National Board - ASME/API
- European pressure equipment directive compliant, CE marked safety valves
- Uniquely extensive range of safety valve types
- Extensive range of standard and specialist materials of construction
- Full lifecycle product support
- Associated support product ranges
- Over 50 years of safety valve experience
- Top quality products at competitive prices
- Expert support and advice
- Ex-stock delivery range
- Single point of supply to meet all valve requirements

Seetru and Leser Valves UK Provide a Uniquely Extensive Range of Safety Valves

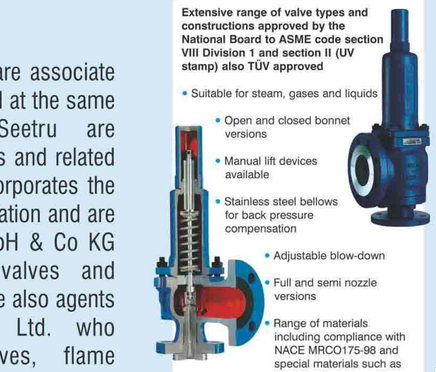
Quality Products for All Applications

Seetru and Leser Valves UK together provide a proven and uniquely extensive range of pressure relief and safety valves as well as associated products and services

API 526 SAFETY VALVES

Extensive range of valve types and constructions approved by the National Board to ASME code section VIII Division 1 and section II (UV stamp) also TÜV approved

- Suitable for steam, gases and liquids
- Open and closed bonnet versions
- Manual lift devices available
- Stainless steel bellows for back pressure compensation
- Adjustable blow-down
- Full and semi nozzle versions
- Range of materials including compliance with NACE MRO175-98 and special materials such as Hastelloy® and Iconel®



Orifice letter: D to T according to API
Set pressures: up to 414bar (6000psi)
Temperature range: -268°C to 538°C

HYGIENIC AND FOOD QUALITY SAFETY VALVES

Designed for the protection of systems with special cleanliness requirements

- Low dead space and crevice free
- Suitable for liquid, clean steam and gaseous duties
- Small, medium and large mass flow models
- Versions with integrated pipework
- Versions for the very highest aseptic requirements
- High surface quality
- EPDM sealing bellows
- Manual or pneumatically operated lift device
- CIP, SIP and COP capability
- Fully TÜV approved
- Accepted on FDA approved installations (FDA compliant elastomer materials)

Connections: wide range including Tri-clamp
Bore sizes available: up to DN100 or 4"
Set pressures: up to 16bar
Temperature range: -60°C to 120°C

ATMOSPHERIC DISCHARGE SAFETY VALVES

An extensive range of high quality safety valves with a range of seal types

These valves are characterised by outstanding economy, reliability and performance, and are used worldwide for compressed air, other inert gases and low pressure steam.

- Repeatable bubble-tight sealing performance using elastomer seals in a range of materials including:
  - Viton®
  - Nitrile
  - EPDM
  - Metal Ball
  - P.T.F.E.
  - Silicone
  - Neoprene
  - Others to suit duty
- Range of manual relieving devices and deflecting shrouds available
- Available materials of construction include:
  - Brass (dezincification resistant)
  - Stainless steel
- Approvals and standards include:
  - TÜV AD-Merkblatt A2
  - BS6759 Part 2 & 3
  - ISO 4126

Threads available: BSP, BSPT, NPT
Bore sizes available: DN3 to DN50
Set pressures: up to 110bar
Temperature range: up to 180°C (for elastomer seals, material dependent) up to 250°C (for metal seals)

THREADED VALVES FOR CRYOGENIC CONDITIONS

A selection of safety valves to meet the various requirements of use with liquefied gases

- Repeated reliable leak proof performance for arduous services
- Meets requirements for use with oxygen
- Approved degreasing for Oxygen service
- Range of construction materials available including materials to meet the German BAM requirements
- Worldwide approvals including: TÜV and ASME (UV Stamp)
- Range of seal materials available including:
  - P.T.F.E.
  - Nylon
  - Kalrez®
  - Supralene® (RCH1000)
  - Vespel®
  - Nylon

Threads available: BSP, BSPT, NPT
Bore sizes available: up to DN20
Set pressures: up to 700bar
Temperature range: down to -270°C

P.T.F.E. & KALREZ® SEALED SAFETY VALVES

Threaded and flanged enclosed discharge safety valves with P.T.F.E. or Kalrez® sealing

- Designed for a wide range of applications, especially: liquefied gases, aggressive chemicals and gases
- Repeated reliable leak tight performance for arduous services
- Compact and highly efficient
- Gastight and non-gastight versions
- Choice of manual relieving devices
- Available in a wide range of materials including Stainless Steel and dezincification resistant brass
- Materials of construction meet the German BAM (Bundesanstalt für Materialprüfung) requirements for use with Oxygen
- Available approvals and standards include:
  - TÜV
  - ASME (UV stamp)
  - BS6759 Part 2 & 3
  - ISO 4126

Connections: DIN,BS or ANSI flanges, threaded
Bore sizes available: DN10 to DN100 (larger sizes on request)
Set pressures: up to 55bar (P.T.F.E.), 160bar (Kalrez®)
Temperature range: -196°C to 250°C

P.T.F.E. LINED SAFETY VALVES

A highly cost effective alternative to valves in special materials of construction

Suitable for a wide range of applications.

- Semi or fully P.T.F.E. lined
- Sealing nozzles available in: P.T.F.E., Monel®, Inconel® and Hastelloy®
- P.T.F.E. or stainless steel bellows available
- P.T.F.E. or glass sealing disk
- Range of construction materials
- Worldwide approvals including: TÜV and ASME (UV stamp)

Connections: DIN, BS or ANSI flanges
Bore sizes available: up to DN100 or 4"
Set pressures: up to 16bar
Temperature range: -60°C to 200°C (dependant on materials)

SAFETY VALVES WITH THREADED CONNECTIONS

A very extensive range of pipe discharge safety valves with metal or soft sealing

- Compact, economic and highly efficient
- Excellent repeatable sealing performance, bubble-tight sealing with elastomer seals
- Suitable for many duties including applications in pneumatics, gases, chemicals, low pressure steam and liquids
- Range of manual relieving devices including levers and rota lift
- Extensive range of construction materials including: brass, stainless steel, chrome steel and cast iron
- Extensive range of seal materials

Inlet thread sizes: up to 2½"
Threads available: BSP, BSPT, NPT
Bore sizes: up to DN50
Set pressures: up to 700bar
Temperature range: -270°C to 400°C (seal material dependant)

RELIEF VALVES

A range of flanged proportional lift relief valves

- Angle or In-line pattern valves
- Open and closed bonnet versions
- Threaded versions available
- Stainless steel or elastomer bellows
- Heating jacket
- Stellited sealing surfaces available
- Extensive range of configurations, accessories and materials of construction
- Worldwide approvals including: TÜV and ASME (UV Stamp)

Connections: DIN,BS or ANSI flanges, threaded
Bore sizes available: up to DN150 or 6"
Set pressures: up to 160bar
Temperature range: -270°C to 450°C

FULL LIFT SAFETY VALVES

Extensive range of valve types and materials of construction

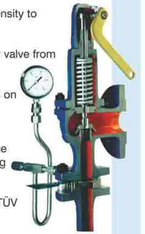
- Full and semi nozzle versions
- Open and closed bonnet versions
- Threaded versions available
- Extensive range of options and accessories including: •bellows, •test gags, •lift stops, •vibration dampers, •manual lifting devices
- Available with high temperature equipment
- Worldwide approvals including: TÜV and ASME (UV Stamp)

Connections: DIN,BS or ANSI flanges, threaded
Bore sizes available: up to DN400 or 16"
Set pressures: up to 300bar
Temperature range: -270°C to 550°C

SAFETY VALVE BURSTING DISK COMBINATION

Safety valves in combination with bursting disks to ensure no leakage

- Areas of application:
  - Toxic media
  - Pollutant
  - Media with a propensity to adhere
  - Expensive media
  - Protection of safety valve from media
  - Where there are financial limitations on materials or valve construction
- Space monitor device
- Requires no de-rating of safety valve performance
- The combination is TÜV type test approved



Connections: DIN, BS or ANSI flanges
Bore sizes available: up to DN400 or 16"
Set pressures: up to 120bar
Temperature range: -30°C to 550°C

DOUBLE CHAMBERED SAFETY VALVES

Safety valves to meet special rules and regulations

- Suitable for Steam and Gases
- Spring loaded or dead-weight versions
- Carbon Steel
- Open or closed bonnet
- Government ring available
- Worldwide approvals including TÜV

Connections: DIN, BS (can be drilled to ANSI)
Bore sizes available: up to DN100 or 4"
Set pressures: up to 40bar
Temperatures range: -85°C to 400°C

HIGH PRESSURE SAFETY VALVES

Full lift safety valves for high pressures

- Metal and soft seal versions
- Small, medium and large mass flow models
- Full and semi nozzle versions
- Open and closed bonnet versions
- Available with high temperature equipment
- Stellited sealing surfaces available
- Worldwide approvals including: TÜV and ASME

Connections: DIN,BS or ANSI flanges, threaded
Bore sizes available: up to DN150 or 6"
Set pressures: up to 700bar
Temperature range: up to 400°C

STEAM PRESSURE REDUCING VALVES

Highly reliable and sensitive regulation of downstream pressure

- Loading spring and diaphragm control
- Maximum upstream pressure 25bar

Connections: DIN or ANSI flanges
Bore sizes available: up to DN100 or 4"
Flange ratings: up to PN40
Temperature range: up to 250°C

DEAD WEIGHT LOADED SAFETY VALVES

Safety relief and full lift safety valves typically for boiler applications

- Single or double chambered
- Easy adjustment of set pressure

- Low height
- TÜV approved

Connections: DIN, BS or ANSI flanges
Sizes available: up to DN150 or 6"
Set pressures: up to 40bar
Temperature range: -85°C to 450°C

SAFETY VALVE TEST RIG

The Seetru portable Quicktester

- Provides rapid, accurate and safe checking of the set pressure for soft seal safety relief valves.

- Simplified valve testing for compliance with the EU Pressure Equipment Directive

SUPPLEMENTARY LOADING SYSTEM

Allows steam boilers to be used closer to design pressure

Safe system operation up to 97% of Safety Valve set pressure

- Cost saving through reduction in design pressure
- Loss of valuable media kept to a minimum
- Reduction of noise levels due to rapid operation
- An anti-simmer device

- Suitable for use with any TÜV approved safety valve
- Control up to 6 safety valves from a single unit
- Fully redundant design
- Protection category IP 54 or 68
- Fully TÜV Approved

Temperature range: -30°C to 60°C

SPECIAL PURPOSE SAFETY VALVES

An extensive range of special purpose valves, valves of special design and valves in special materials of construction

- Safety valves with inert gas shrouding system
- Safety valves with heating jackets
- Safety valves with cooling spools
- Safety valves in special materials of construction:
  - Titanium
  - Hastelloy®
  - Inconel®
  - Monel®

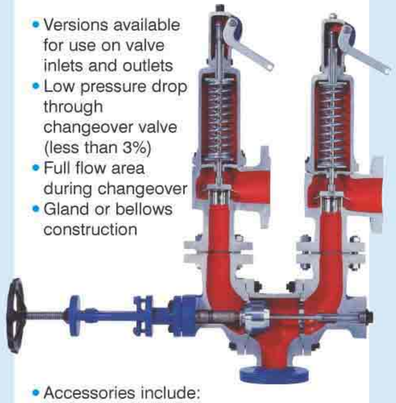
SAME DAY DESPATCH SERVICE

An extensive range of safety valves are available on same day despatch

CHANGEOVER VALVES

Allows removal of safety valves for maintenance work on safety valves without interruption to plant operation

- Versions available for use on valve inlets and outlets
- Low pressure drop through changeover valve (less than 3%)
- Full flow area during changeover
- Gland or bellows construction



- Accessories include: reducers, limit switches, bypass with non-return valves

Connections: DIN, BS or ANSI flanges
Sizes available: up to DN400 or 16"
Flange ratings: up to PN160 or #600
Temperature range: -270°C to 450°C

F/K/S DIAPHRAGM VALVES

TÜV approved under F/K/S Rules (Liquid, Granular and Powder Form Media)

- A substantial low pressure safety valve with a diaphragm which isolates the spring chamber and all sliding surfaces from the flowing medium.
- Rotalift manual lifting device
- Suitable for a wide range of low pressure applications such as:
  - Powder & dust laden air and gases
  - Turbo blowers
  - Vortex Separators
  - General industrial applications
  - Cement, flour and other transporters where the granular or dust material is stored and discharged under compressed air

Inlet Threads: 1" up to 1½"
Set pressures: up to 6.5bar
Temperatures range: -40°C to 180°C (seal material dependant)

CHECK VALVES

Air receiver check valves for fitting in pressure vessels

- Offered with male or female inlet thread from R or G 1/4" to 1"
- Versions available with vent hole for signal air
- Brass construction
- Elastomer seal

Inline check valves for fitting in pipework

- Connections: Female inlet and outlet threads from G 1/8" to G 1 1/4"
- Construction: Brass, Stainless Steel or Brass with Stainless Steel internal parts
- Maximum pressure: 420 Bar g. (138 Bar g. above 1/2" inlet thread)
- Elastomer seal

Minimum pressure check valves

- Does not allow flow until a minimum pressure is reached on screw compressors
- Fitted with an internal check valve to prevent return flow
- Connections: Female inlet and outlet threads G or R 3/4" to 2"
- Construction: Cast Iron or Aluminium with Aluminium internal parts
- Pressure: 13.8 bar g.
- Elastomer seal

DESIGN, DEVELOPMENT, TEST AND MANUFACTURE

A service for Original Equipment Manufacturers and other end users to meet individual specifications and requirements.

Typically ancillary valves for compressors but also for other applications:

- Air intake valves
- Regulator valves
- Regulator run-on valves
- Dump valves
- Control valves
- Anti-vacuum valves
- Emergency shutoff valve systems

Approved test facilities

ENGINE AIR START PRESSURE VESSEL VALVE

A manifold and control valve designed to control a two stage operation;

- The flow of air from the main air supply to an air receiver
- The flow of air from the air receiver to the engine

Inlet and discharge passages are completely separate and are fitted with individual double acting stop valves. Connections are provided for siphon drain valve and inspector's test gauge, all of which are direct to the receiver chamber pressure. The receiver pressure gauge connection has a separate stop valve

- Flanged connections
- Spheroidal graphite cast iron construction
- Brass and stainless steel internal parts
- Nitrile or Viton® seals

BREATHER VALVES AND FLAME ARRESTERS

An extremely extensive range of breather valves, flame arresters and emergency vents

- Breather valves: pressure and/or vacuum relief with full range of inlet and outlet configurations
- Gas seal units
- PVC breather valves
- All weather breather valves for temperatures down to -30°C
- Emergency vents with and without counter balances
- Modular flame arresters for use with breather valves or stand alone

- Size ranges:
  - Breather valves: 1.5" to 10" (model and configuration dependent)
  - Flame arresters: 1.5" to 18"
  - Emergency vents: 20" or 24"

BURSTING DISCS & EXPLOSION VENTS

Standard bursting disc range;

- Size: from DN3mm to DN600
- Pressure: from 0.03 to 10,000 bar g.

Reverse buckling pin bursting disc range;

- Size: from DN25mm to DN800
- Pressure: from 0.01 bar g.

Two way bursting disc range;

- Size: from DN50mm to DN400
- Overpressure: from 0.08 bar g.
- Underpressure: from 0.01 bar g.

Low pressure and explosion venting bursting disc range;

- Size: from DN50mm to DN3000
- Pressure: from 0.05 bar g.

Versions available for;

- Gas or liquid applications
- Sterile & Vacuum conditions

MAINTENANCE & RECONDITIONING SERVICE

The expertise and experience of a major safety valve manufacturer providing a safe, fast and cost effective solution

All makes of safety valve supported

- Safety valve reconditioning
- Same day service and emergency support
- Safety valve testing and certification
- On-site testing
- Site surveys, inventory evaluation and specification review
- Safety valve rental
- Tailored valve care programmes, inventory management

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Agents World-wide

EBTRADE LIMITED

Our Agent

Safety Relief Valves

With Tutchtite Seal Technology
Atmospheric Discharge for Compressed Air and Gases

- CE Marked
- PED Compliant

Seetru Atmospheric Discharge Safety Relief Valves are compact, highly efficient and incorporate the exclusive “Tutchtite” seal technology to give repeatable Bubbletight sealing performance.

Available in a wide range of materials and sizes, Seetru Atmospheric Discharge Safety Relief Valves are suitable for many duties and applications in pneumatic, gas, refrigerant, cryogenic, chemical and fluid carrying industrial applications.

Type approved and/or manufactured in conformance with national and international standards which include BS6759 Parts 2 and 3, I.S.O. 4126, and TÜV (Germany) in accordance with AD Merkblatt A2. Compliant with the requirements of the European Pressure Equipment Directive 97/23/EC and CE marked.

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LLOYD'S REGISTER QUALITY ASSURANCE · ISO9001

SAFETY RELIEF VALVES

Technical Information

Standard Inlet Thread BSP (T)	Pressure Range (bar g.)	Valve Type/Material: Brass	Brass/St. Steel	St. Steel	Bore (mm)	dim **A** (mm) A/F	dim **B** (mm) Height Lifted (1)
1/4"	20.0 - 110.0	**31180**			3	19	40
3/8"	48.0 - 241.0	**31210**			3	26	96
1/4"	2.8 - 31.0	**81806**			6	14	56
1/4"	0.27 - 17.5	**73008**		**74008**	7.9	19	49
3/8"	0.55 - 21.0	**81808**			8	19	69
3/8"	21.0 - 34.0	**61682**			8	26	81
1/2"	21.0 - 44.0	**61610**	**62610**		9.5	35	121
1/2"	3.0 - 21.0	**81810**			10	24	78
3/4"	21.0 - 41.4	**61613**	**62613**		12.9	43	129
3/4"	2.8 - 21.0	**81813**			13	27	95
3/4"	2.5 - 21.0	**81815**			15	36	116
1"	2.4 - 36.0	**61618**	**62618**		17.9	54	162
1"	2.0 - 18.0	**61620**	**62620**		20	60	166
1" or 1 1/4"	0.5 - 12.0	**10625**			25	60	178
2"	2.8 - 3.13, 4.3 - 4.5, 7.7 - 9.4	**31140**			37.5	76	226

(1) dim **B** is for guidance only and may vary according to top fitting selected.

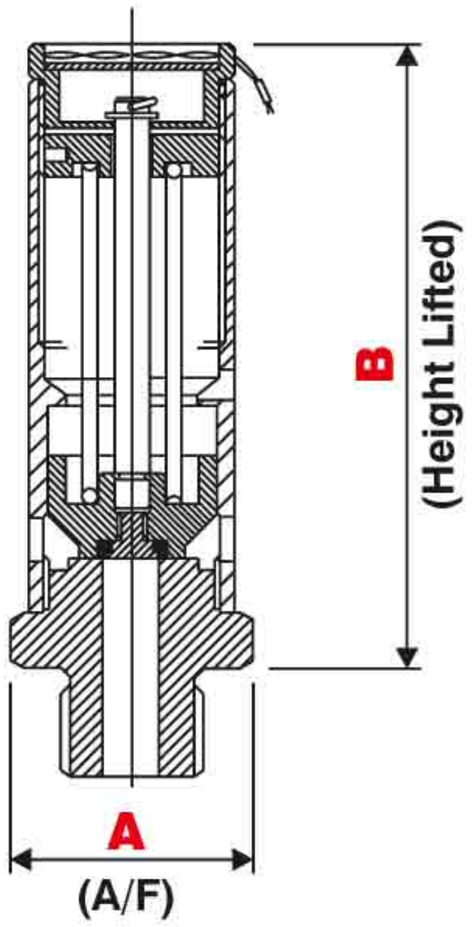
Materials	BRASS	BRASS / ST. STEEL	STAINLESS STEEL
BODY	Brass	Brass/Gunmetal	St. Steel
SEAT	Brass	St. Steel	St. Steel
SPRING	St. Steel	St. Steel	St. Steel
TRIM	Brass	Brass/St. Steel	St. Steel
SEAL	Viton* or Nitrile (other materials available on request)		

* Viton is a registered trademark of Dupont Elastomers

Deflecting shrouds are available on some valves as an optional extra.

Top fittings include:
Rotalift, Lever Lift, Spindle Lift and Basic (no lift device).
Gastight versions available.

Maximum temperature with Viton* seals = 200°C



TO ENSURE COMPLIANCE WITH THE EUROPEAN PRESSURE EQUIPMENT DIRECTIVE, PLEASE CONTACT SEETRU FOR PRODUCT SELECTION

Other products include:

- Enclosed Discharge Safety Relief Valves.
- Safety Relief Valves for Steam Applications.
- Safety Relief Valves for Liquid Applications.
- Refrigeration Safety Relief Valves.
- Metal Seal Safety Valves.
- Cryogenic Safety Valves.
- Check Valves.

SEETRU LIMITED

Safety Relief Valves

With Tutchtite Seal Technology
Enclosed Discharge for Compressed Air and Gases

PED Compliant

CE Marked

Seetru Enclosed Discharge Safety Relief Valves are compact, highly efficient and incorporate the exclusive “Tutchtite” seal technology to give repeatable Bubbletight sealing performance.

Available in a wide range of materials and sizes, Seetru Enclosed Discharge Safety Relief Valves are suitable for many duties and applications in pneumatic, gas, refrigerant, cryogenic, chemical and fluid carrying industrial applications.

Type approved and/or manufactured in conformance with national and international standards which include BS6759 Parts 2 and 3, I.S.O. 4126, and TÜV (Germany) in accordance with AD Merkblatt A2. Compliant with the requirements of the European Pressure Equipment Directive 97/23/EC and CE marked.

SEETRU LIMITED

Albion Dockside Works, Bristol, BS1 6UT, England.

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LLOYD'S REGISTER QUALITY ASSURANCE · ISO9001

SAFETY RELIEF VALVES

Technical Information

Standard Inlet Thread BSP (T)	Standard Outlet Thread BSP(T)	Pressure Range (bar g.)	Valve Type/Material			Bore (mm)	dim **A** (mm)	dim **B** (mm) [2]	dim **C** (mm)	dim **D** (mm)
			Brass	Brass/St. Steel	St. Steel					
3/8”	3/8”	48.0 - 241.0		**33110**	**34110**	3.66	25.4	87	30	25
3/8”	1/2”	55.0 - 104.0		**33020**	**34020**	7.14	25.4	86	37	25
1/4”	3/8”	1.40 - 13.2	**63608** [1]			7.9	N/A	57	40	17.5
1/2”	3/4”	0.48 - 55.2	**63610**	**35610**	**64610**	9.5	28	116	40	30
3/4”	1”	0.32 - 35.0	**63613**	**65613**	**64613**	13.7	33	147	49	34
1”	1 1/2”	1.00 - 35.0	**63618**	**65618**	**64618**	17	52	211	71	50.5
1 1/4”	2”	3.00 - 35.0	**63620**	**65620**	**64620**	20	61	227	85	57
1 1/2”	2”	5.65 - 30.0	**63625**	**65625**	**64625**	25	70	252	87	52

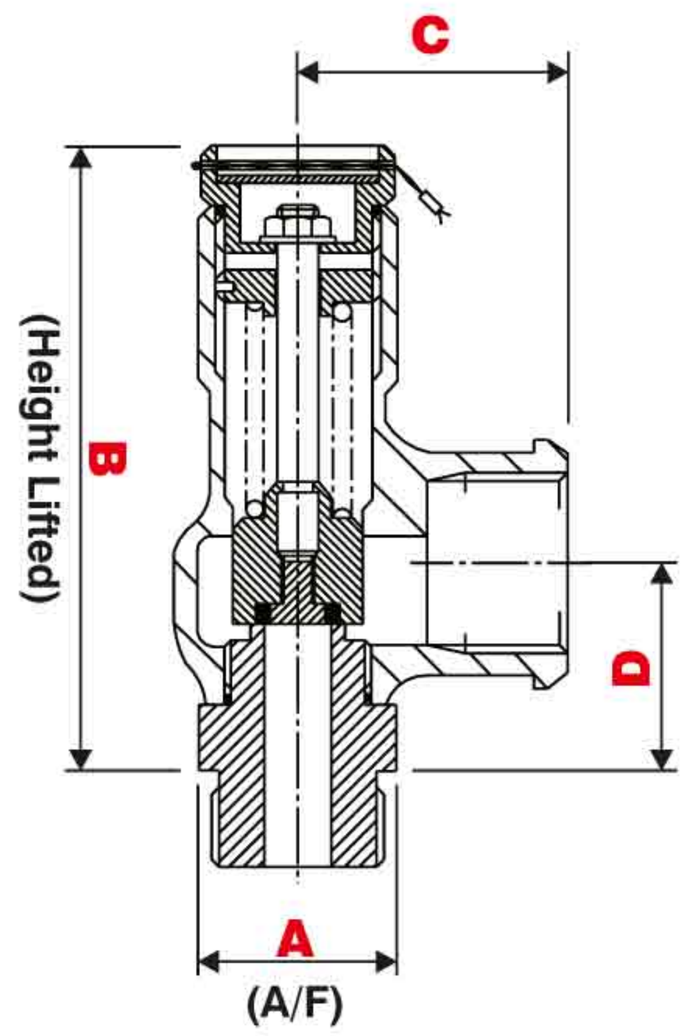
(1) PPS (40%) filled outlet body, (2) dim **B** is for guidance only and may vary according to top fitting selected.

Materials

	BRASS	**BRASS / ST. STEEL**	**STAINLESS STEEL**
BODY	Brass/Gunmetal	Brass/Gunmetal	St. Steel
SEAT	Brass	St. Steel	St. Steel
SPRING	St. Steel	St. Steel	St. Steel
TRIM	Brass	St. Steel	St. Steel
SEAL	Viton* or Nitrile (other materials available on request)		

Top fittings include:
Rotalift, Lever Lift and Basic (no lift device).
Gastight versions available.

Maximum temperature with Viton* seals = 200°C



TO ENSURE COMPLIANCE WITH THE EUROPEAN PRESSURE EQUIPMENT DIRECTIVE, PLEASE CONTACT SEETRU FOR PRODUCT SELECTION

Other products include:

- Atmospheric Discharge Safety Relief Valves.
- Safety Relief Valves for Steam Applications.
- Safety Relief Valves for Liquid Applications.
- Refrigeration Safety Relief Valves.
- Metal Seal Safety Valves.
- Cryogenic Safety Valves.
- Check Valves.

SEETRU LIMITED

Safety Relief Valves

Enclosed Discharge Safety Valves for Liquids, Steam, Compressed Air and Gases with **Metal to Metal** Sealing

Seetru Enclosed Discharge Metal Seal Safety Relief Valves are compact, highly efficient and incorporate a Unique Metal Sealing configuration for excellent sealing performance (better than API527).

These valves are suitable for a wide range of applications. They are available in stainless steel, dezincification resistant brass or a combination of dezincification resistant brass and stainless steel.

Type approved and/or designed in accordance with national and international standards which include BS6759 Parts 2 and 3, I.S.O. 4126, TÜV (Germany) in compliance with AD Merkblatt A2 and BAM (Germany) requirements for oxygen service.

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SAFETY RELIEF VALVES

Technical Information

STANDARD SIZES				PART CODE								
				Gases/Vapours Valve Type/Material		Liquids Valve Type/Material						
Inlet Thread (Male)	Inlet Thread (Female)	Outlet Thread (Male or Female)	Pressure Range (bar g.)	Brass	St.Steel	Brass	St. Steel	Bore (mm)	dim A (mm)	dim B (mm)	dim C (mm)	dim D (mm)
G1/2 or G3/4	G1/2 or G 3/4	G1	3.0 - 28.0	**93610**	**94610**	**97010**	**98010**	10	37.6	140	49	32.5
R1/2 or R3/4	-	G1	3.0 - 28.0	**93610**	**94610**	**97010**	**98010**	10	37.6	140	49	32.5
G3/4 or G1	G3/4 or G1	G1 1/2	3.0 - 28.0	**93615**	**94615**	**97015**	**98015**	15	50.8	191	63	47
R3/4 or R1	-	G1 1/2	3.0 - 28.0	**93615**	**94615**	**97015**	**98015**	15	50.8	191	63	47

G = Parallel BS Thread, R = Taper BS Thread.

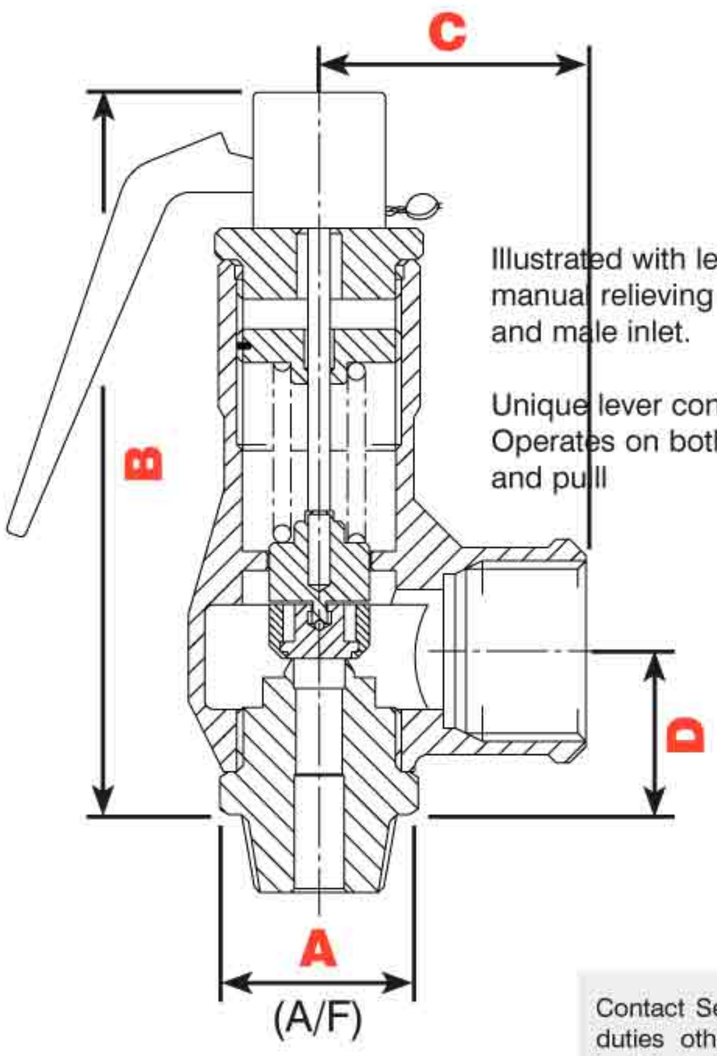
Other connection sizes available on request.

Male outlet adaptors available.

Temperature range: -196° to 250°C (subject to selection of materials for duty)

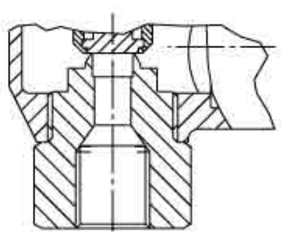
Materials	ALL BRASS (97010 & 93610)	BRASS (97015 & 93615)	STAINLESS STEEL (94610/15 & 98010/15)
BODY	Brass	St. Steel	St. Steel
SEAT	Brass	Brass	St. Steel
SPRING	St. Steel	St. Steel	St. Steel
TRIM	Brass	Brass	St. Steel
DISC	St. Steel	St. Steel	St. Steel
'O' RING	Material to suit application (Gastight valve construction only)		

Top fittings include: Basic (no lift device), manual relieving devices (Lever or Rota-lift). Gastight or non-gastight valve construction available.



Illustrated with lever manual relieving device and male inlet.

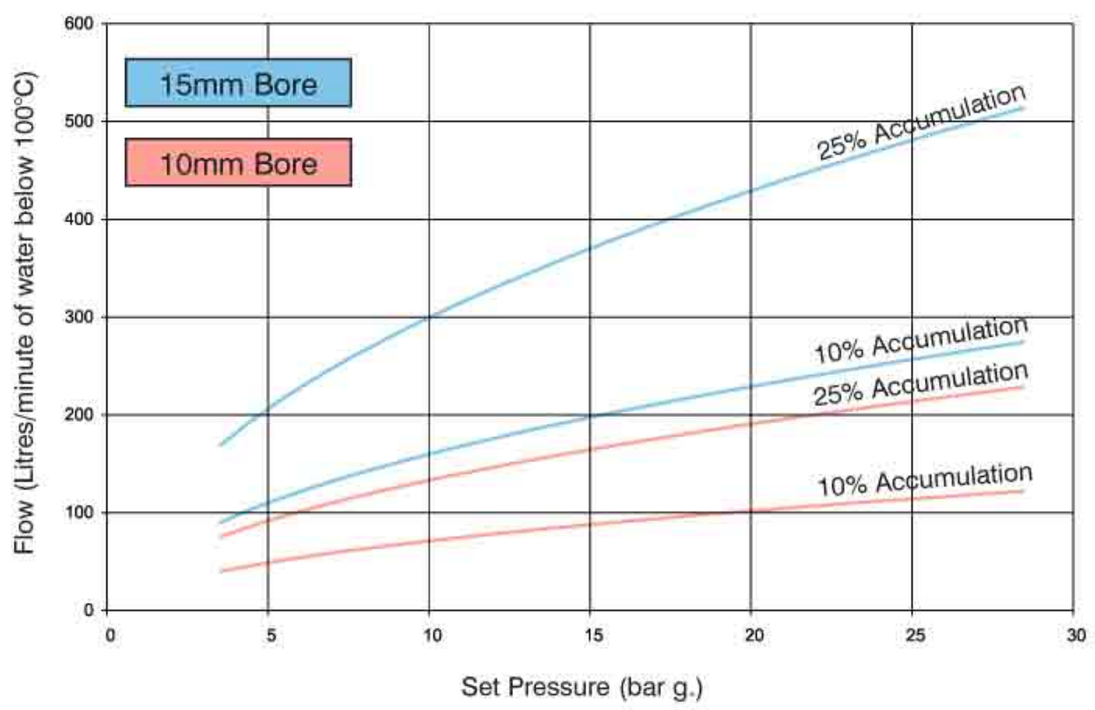
Unique lever construction. Operates on both push and pull



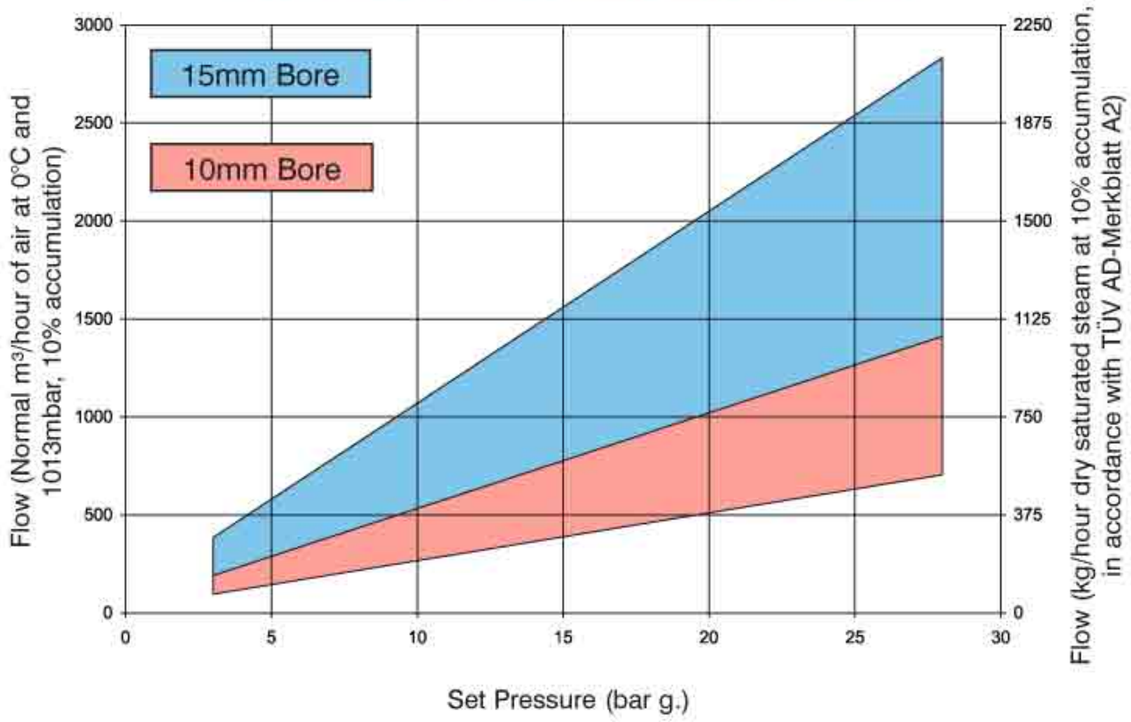
Female inlet.

Contact Seetru for information on duties other than those covered in this leaflet, e.g. for other flow capacities, other gases, different set pressures, different seal materials, different valve types etc.

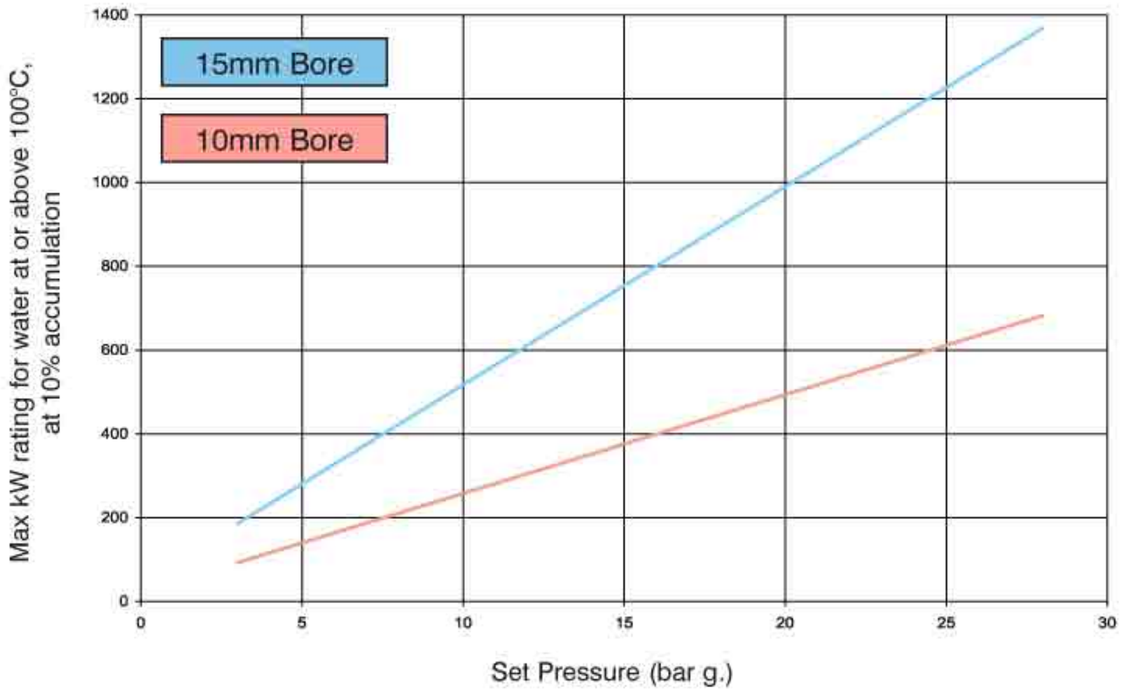
Flow Chart (Water below 100°C)



Flow Chart (Air & Saturated Steam)



Water at or above 100°C



REF: VA03.1

Other products include:

- Safety Relief Valves for Compressed Air & Gases.
- Safety Relief Valves with Elastomer Seals.
- Safety Relief Valves for Refrigerants & Cryogenics.
- Safety Valve Refurbishment Services (All Makes).
- Check Valves.
- Coded Security Pipe Couplings.
- Tubular Glass, Reflex Glass and Magnetic Liquid Level Gauges.

SEETRU LIMITED

Certified Safety Relief Valves

for the

Air Conditioning and Refrigeration Industries

Atmospheric, Enclosed 90° angle or Inline discharge configurations.

Seal material for all Refrigerant Gas & Oil combinations.

Repeatable Performance

To Comply with the European Pressure Equipment Directive 97/23/EC (PED). ASME, National Board and UL approvals planned.

SEETRU LIMITED

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Safety Relief Valves

Enclosed Discharge Safety Valves for Cryogenic, Process and Chemical Engineering Services with P.T.F.E. or Kalrez® Sealing

Seetru Enclosed Discharge Safety Relief Valves are compact and highly efficient. PTFE or FFKM materials such as Kalrez® and Perlast® offer excellent sealing performance.

These valves are suitable for a wide range of applications. They are available in stainless steel, dezincification resistant brass or a combination of dezincification resistant brass with stainless steel trim.

Type approved and/or designed in accordance with national and international standards which include BS6759 Parts 2 & 3, ISO4126-1:1991, TÜV (Germany) in compliance with AD Merkblatt A2 and BAM (Germany) requirements for oxygen. Compliant with the requirements of the European Pressure Equipment Directive 97/23/EC and CE marked.

SEETRU LIMITED

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SAFETY RELIEF VALVES

Technical Information

	Standard Inlet Thread	Standard Outlet Thread	Pressure Range (bar g.)	PART CODE Valve Type/Material: Brass	Brass/St/St	St. Steel	Bore(mm)	dim **A** (mm)	dim* **B** (mm)	dim **C** (mm)	dim **D** (mm)
PTFE	G1/2	G3/4	0.80 - 30.8	**63610**	**65610**	**64610**	9.5	28	93 - 106	40	30
PTFE	R1/2	G3/4	0.80 - 30.8	**63610**	**65610**	**64610**	9.5	28	93 - 106	40	30
FFKM	G1/2	G3/4	0.48 -55.20	**63610**	**65610**	**64610**	9.5	28	102 - 116	40	30
FFKM	R1/2	G3/4	0.48 -55.20	**63610**	**65610**	**64610**	9.5	28	102 - 116	40	30

G = Parallel BS Thread, R = Taper BS Thread.

* Basic fitting, dimension depends on pressure and model.

Other connection sizes and male outlet adaptors available on request.

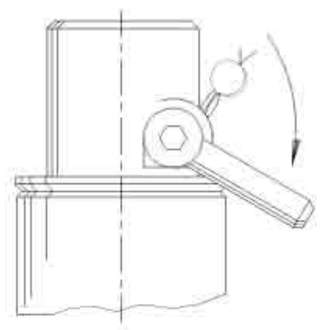
Temperature range: -196° to 250°C
(subject to selection of materials for duty)

Materials

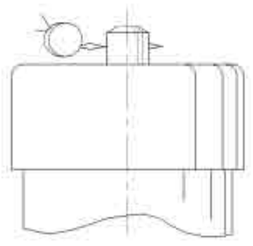
	BRASS	BRASS & ST.ST. TRIM	STAINLESS STEEL
BODY	Brass	Brass	St. Steel
SEAT	Brass	Brass	St. Steel
SPRING	St. Steel	St. Steel	St. Steel
TRIM	Brass	St. Steel	St. Steel
'O' RING	Material to suit application (Gastight valve construction only)		

Top fittings include: Basic (No Lift Device), Manual releiving devices (Lever-lift, Rota-lift). Gastight or non Gastight valve construction available.

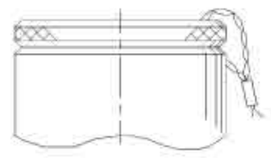
FFKM (Perfluoroelastomer) materials available include Kalrez® and Perlast®, Perlast® is supplied as standard.



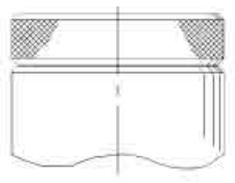
Lever-lift (Gastight or Non-Gastight)



Gastight Basic (No Lift Device)

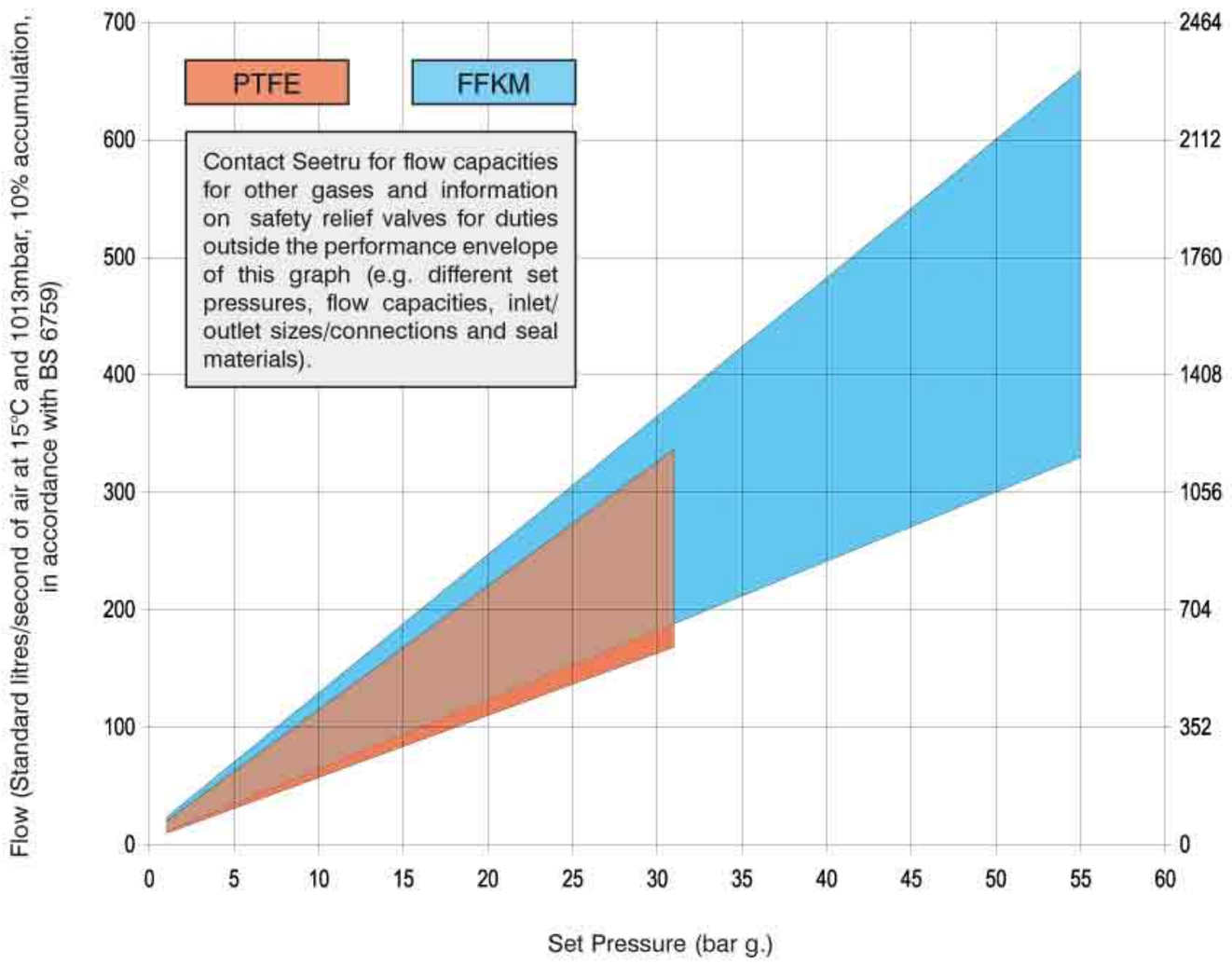


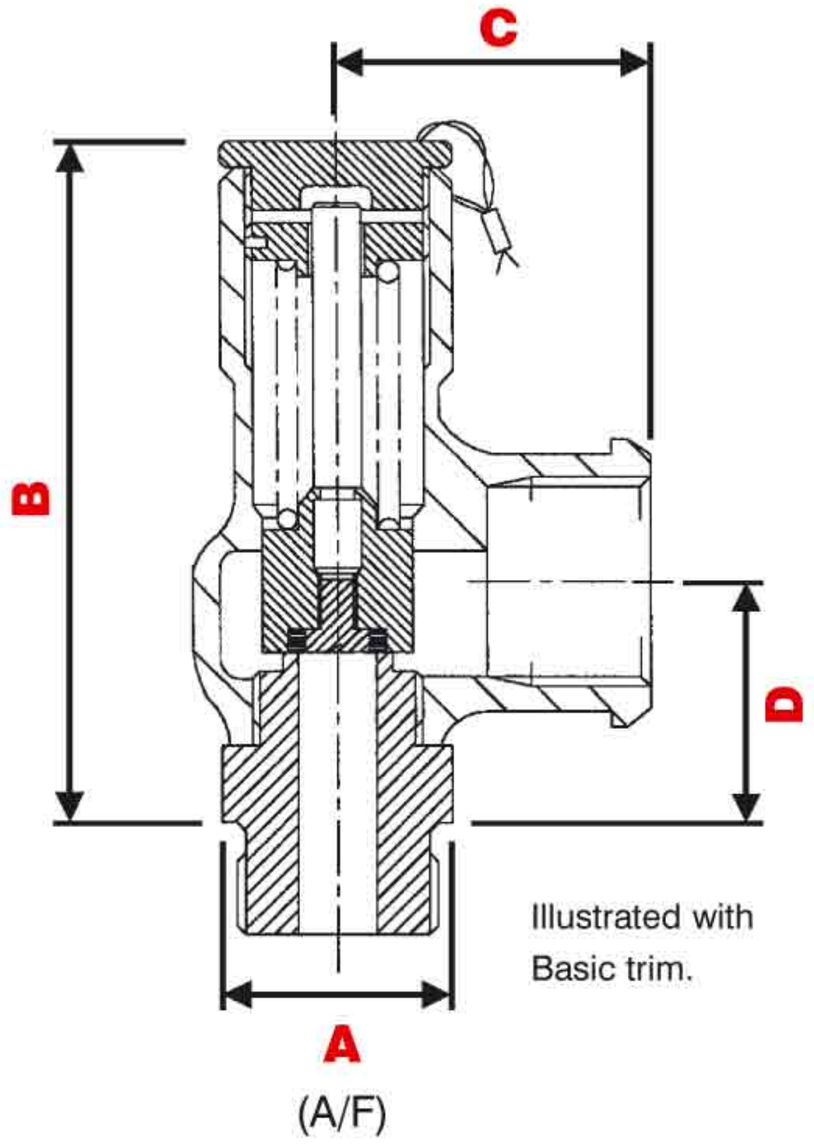
Basic (No Lift Device)



Rota-lift

Flow Chart (Air)





(A/F)

Perlast® is a registered trademark of Precision Polymer Engineering Ltd.
Kalrez® is a registered trademark of DuPont Dow Elastomers.

REF: VA04

Other producs include:

- Safety Relief Valves for Compressed Air & Gases.
- Safety Relief Valves with Resilient Seals.
- Safety Relief Valves with Metal Sealing.
- Safety Relief Valves for Refrigerants.
- Check Valves.
- Coded Security Pipe Couplings.
- Tubular Glass, Reflex Glass & Magnetic Liquid Level Gauges.

SEETRU LIMITED

Safety Valve
Refurbishment Service

TURNAROUND

- Same Day when your maintenance schedule dictates, otherwise within two days upon receipt of the valve (subject to availability of spares).
- On site testing facility.
- Same day delivery of new Seetru valves (standard range)

5 LEVELS OF SERVICE

1. Standard - Valve refurbished. Overhaul report details performance and component condition pre and post overhaul.
2. Emissions - as per standard with additional seat leakage rate data to help monitor and control fugitive emissions.
3. Full - as per emissions with external surfaces cleaned and treated as per your requirements.
4. Re-Set service.
5. Test Only service.

NON REPAIRABLE VALVES

Some valves just cannot be repaired. In which case:-

- We immediately e-mail or fax photographic images in support of our findings.

- By arrangement, we will stock original manufacturers spares.
- If all else fails we usually have a suitable alternative available (for hire if preferred).

PRICE

- We know our prices to be extremely competitive. This has been achieved by applying the assembly and test techniques of a manufacturing organisation to the valve refurbishment service.
- To this we are able to offer discounts for the annual quantity of valves refurbished and further discounts where batches of valves are processed at the same time.

COMPETENCE

- Over 40 years experience in valve design and manufacture.
- IQ approved test station.
- ISO 9001 approved Company.
- Test facilities - air, nitrogen, refrigerant, steam, vacuum, water.
- Machine and hand lapping facilities.
- Member of BVAMA Committee on valve refurbishment guidelines.
- Well defined component condition assessment criteria.

Case Study #1

A new customer with two identical safety valves for identical applications and from the same plant. Upon strip down we found them to be fitted with non-identical springs. Such an occurrence may or may not present a problem but none the less it should be reported, investigated and cleared .
In the case of this customer nothing was reported over the seven years refurbishment history by the previous refurbishment company.

Case Study #2

Whilst discharging its load, the safety valve fitted to a pressurised road tanker dramatically failed and ejected its internal components into the air. They finally came to rest on the front seat of a nearby parked car via the windscreen.
This 12 year old valve had been refurbished only 4 months before the incident. The refurbishment company had machined away the locking mechanism.

See overleaf for full details of standard service.

Refurbishment
Standard Service Definition

A. Pre Test

The valve is mounted on the test plant to determine the following performance characteristics:-

A.1 Blow off pressure.
A.2 Set pressure.
A.3 Re-seat pressure.
A.4 Additional test such as back pressure test or bellows test as requested by the customer.
A.5 If the blow off pressure is found not to be within +10% of set pressure, the likely reasons are recorded as either corrosion / contamination / component failure or incorrect setting.

B. Strip Down

The valve is stripped and the condition of the bonnet, body, spring, spindle, disc, seat and additional fittings are recorded as:-

B.1 V-Good No deposit or appreciable wear or pitting.
B.2 Good Minor deposits, wear and pitting which are easily cleaned.
B.3 Fair Moderate deposits, wear and pitting which may require mechanical cleaning.
B.4 Poor Excessive deposits, wear and pitting (replacement parts recommended).

C. Overhaul

The work carried out on each of the components is recorded as:-

C.1 None.
C.2 Cleaned.
C.3 Recommended for replacement next overhaul.
C.4 Component replaced.††

D. Rebuild and Re-set

The valve is re-built after the components have been cleaned. The valve is then re-set and the following characteristics are reported:-

D.1 Cold differential (set) pressure.
D.2 Re-seat pressure.
D.3 Seat leakage test is performed and results expressed in Bubbles Per Minute (as per BS6759 requirements).
D.4 Any additional test as specified by the customer (see A.4).

E. Condition Report

All bullet points denoted A to D are recorded on the Examination and Test report. In addition, the following is also recorded:-

E.1 Details of the valve such as customer reference number, valve type and size.
E.2 Customer name and reference customer document (i.e. purchase order number).
E.3 A refurbishment batch number is stamped on the valve and recorded on the report for traceability purposes.
E.4 The pre-test and re-test pressure test equipment reference numbers are recorded.
E.5 Any additional comments pertinent to the valve are recorded.
E.6 The test report is signed and dated by the Engineer responsible for the work carried out.
E.7 The test report is countersigned and dated by a Competent Person who has witnessed the re-test results.

†† Important Note: - Spare parts will only be fitted upon confirmation to proceed from the customer. All spare parts will be of original manufacturers parts. Stock of other manufacturers parts is not normally held unless agreed with the customer.

Safety Relief Valve Test Rig

Seetru Quicktester™

The Seetru Quicktester, for rapid, accurate and safe checking of the set pressure and leak tightness of soft seal safety relief valves.

SEETRU
LIMITED

THE SEETRU QUICKTESTER

Description

Connected to a suitable compressed air or inert gas supply, with the use of simple controls the set pressure and reseal pressure of the safety relief valve on test is quickly, safely and accurately displayed on the dial gauge.

Features & Benefits

- Simplified valve testing, for compliance with pressure systems safety & equipment regulations.
- Enables rapid valve testing in complete safety.
- Suitable for use on a wide range of valves.
- Accurate, unambigious pressure readout.
- Standard Quicktester operates up to 55 bar.
- Very low consumption of supply medium.
- Highly portable, compact design (subject to suitable compressed air supply).
- Bench top or carry case version available.
- Easy to use and maintain.
- Manufactured to a quality system, compliant with ISO9001.
- Supplied with comprehensive instructions.
- Supplied with a range of thread size adaptors.
- Pressure gauges supplied as optional extras.

A range of thread adaptors supplied as standard

Note: *Dial gauge and safety valve shown in illustration are not supplied as standard with the unit.*

Other Seetru Products and Services

- Safety relief valves
- Non return valves
- Liquid level gauges
- Oil level sight glasses
- Valve design and development
- Pressure control valves
- Vacuum relief valves
- Safety valve test & certification
- On-site test services
- Safety valve reconditioning

SEETRU LIMITED

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LLOYD'S REGISTER QUALITY ASSURANCE · ISO9001

Our Agent

EDITION B

Engine Air Start Pressure Vessel Manifold and Control Unit

CE marked *

GS56 Manifold and Control Unit

SEETRU LIMITED

GS56 - Engine Air Start Pressure Vessel Manifold Unit

High quality engine air start control valve
The Seetru GS56 is a high quality control valve designed to handle a two-stage operation for air starting of engines. Air starting is typically used for diesel engines. The GS56 is bolted onto the air receiver vessel and integrates all the necessary functions and connections into one highly effective unit. It controls charging of the pressure vessel with the air for starting and it controls the flow of the air to the engine to start the engine. Incoming air and outgoing air are kept separate to comply with regulations. The unit configuration is designed so that any oil or water in the air supply collects in the receiver, thus maximising the cleanliness of the air which flows to the engine.

Patented Tutchtite sealing technology is used to provide positive sealing with finger light control of the isolating valves.

Sturdy and proven construction
The Seetru GS56 manifold system is a single high quality spheroidal graphite cast iron unit, which brings together all the necessary elements into an single, effective, high quality manifold and control unit.

The unique double-lipped D-ring Tutchtite sealing system is used to provide highly effective bubble tight valve sealing with only finger tight operation of the valves.

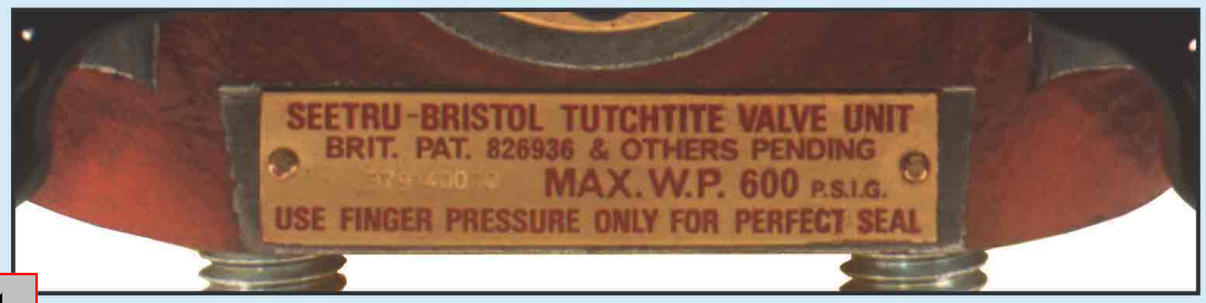
The airflow path is configured so that any oil or water in the air supply is fed to the bottom of the air receiver through a down pipe from the GS56 into the vessel. The cleaner air is then taken from the top of the vessel to start the engine, therefore maximising the cleanliness of the starting air. Oil and water can be siphoned out of the vessel using the drain valve.

All required features are provided with just one flange connection to the air receiver:

1. On-off valve for incoming air
2. On-off valve for outgoing air
3. Incoming & Outgoing air kept separate
4. Pressure gauge
5. Safety valve
6. Fusible plug
7. Drain valve
8. Inspectors test point

The GS56 is well proven, widely accepted and used across the world.

- ***Single unit, purpose designed to provide all necessary elements***
- ***Very well proven, widely used and accepted product***
- ***Exeptional ease of operation***
- ***Ease of installation***
- ***Ease of maintenance***
- ***Safe and Compact***



Economical in price and maintenance
Seetru is a high volume valve manufacturer and so is able to apply the latest large scale manufacturing technologies to ensure economic first costs. Economy in use is ensured by the ease of installation and simple maintenance procedure.

Safety valve
A threaded connection is provided on the manifold unit for a safety valve to protect the air receiver. Safety valves can be supplied as optional extras, contact Seetru for information on our range of safety valves. Note: an enclosed discharge valve may be prefered where equipment is protected by a fire control system.

Pressure gauge
A connection with shut-off valve is provided on the manifold unit for a pressure gauge, which can be fitted to monitor the pressure in the air receiver. Pressure gauges can be supplied as optional extras, contact Seetru for information on pressure gauges.

Fusible plug thermal protection
The GS56 has the facility for a fusible thermal plug to protect the air receiver from over-pressure due to heat (e.g. in the case of fire). The plug fuses at a defined temperature and releases the pressurized air in the receiver. Plugs are supplied as optional extras.

Siphon drain valve
An optional siphon drain valve can be supplied with the GS56. This valve is connected to a long tube, which reaches low into the receiver vessel; when opened, the pressure in the vessel forces any oil or water out through the tube.

Integrated inspectors test point
A connection is provided for connection of an inspectors pressure test gauge.

Enclosed discharge safety valve shown in illustration, a range of alternative safety valves available including atmospheric discharge

Accepted by Lloyds
Accepted by Lloyds for marine applications. Testing can be witnessed by marine approval authorities prior to despatch and certification provided at extra cost.

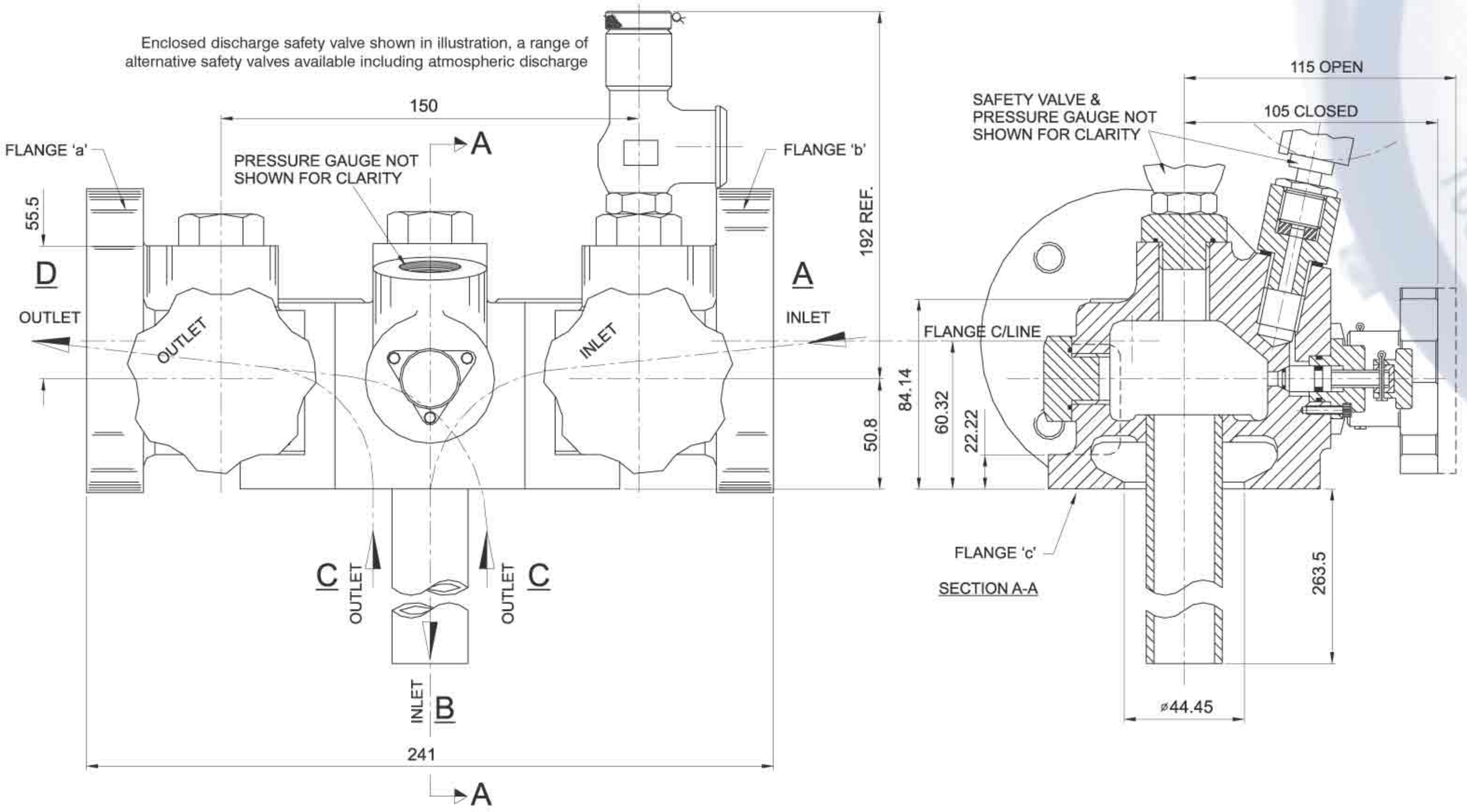
***Pressure Equipment Directive**
Compliant with the requirements of the European Pressure Equipment Directive (PED) 97/23/EC and CE Marked from 30th May 2002.

Specification

Air inlet and outlet connections	DIN or BS flange sizes or adapted to pipe fittings
Receiver connection	DIN or BS flange sizes
Materials of construction	Cast body in SG iron, brass and stainless steel internal parts Other body materials, e.g. gunmetal or aluminium bronze available on request
Seal material	Nitrile
Pressure range	Up to 600 psi g.
Temperature range	Up to 110°C

Recommended Spares
1. Fusible plug (**V1210551**)
2. Seal spares kit for complete overhaul (**V1510045**)
3. Replacement inlet or outlet (dual purpose) plunger sub-assembly (**V1510013**)
4. Safety valve (**specify type and set pressure, contact Seetru for information**)
5. Pressure gauge (**specify maximum pressure for red line marking**)

Operation and Dimensions



Operation

The valve unit controls a two-stage operation.

1. The flow of air from the main air supply to an air receiver
2. The flow of air from the air receiver to the engine

For stage 1

1. The "Outlet" valve is closed
2. The "Inlet" valve is opened
3. Air enters the valve through port A and exits though port B into a down pipe in the air receiver, so that any oil or water collects at the bottom of the receiver vessel.
4. The pressure levels in the air receiver can be monitored on the pressure gauge.
5. Once the air receiver reaches the required pressure the "Inlet" valve is closed

For stage 2

1. The "Outlet" valve is opened
2. Clean air from the top of the air receiver immediately flows from port C to port D and to the engine in order to turn over the engine and start it.
3. The pressure levels in the air receiver can be monitored on the pressure gauge.
4. Once the engine has started the "Outlet" valve is closed.

FLANGE SIZES TO BS10 1¼" TABLE 'R'			
FLANGE	'a'	'b'	'c'
DIAMETER	133 (5¼")		
PCD OF 4 HOLES	98 (3.875")		
HOLE SIZE	$^{5}/_{8}$" – 11 UNC–2B		Ø 18 ($^{23}/_{32}$")

EN1092-2:1997/DN32/PN40*			
FLANGE	'a'	'b'	'c'
DIAMETER	133 (5¼")		
PCD OF 4 HOLES	100 ($3^{15}/_{16}$")		
HOLE SIZE	M16		Ø 18

*SUPERSEDES BS4504-PN40-DN32

Installation and maintenance instructions available from Seetru

Seetru also supply a range of related products, including:

- Air start valves
- Safety and relief valves
- Regulator valves
- Other ancillary valves
- Circular window sight glasses
- Liquid level gauges and indicators
- Fusible plugs

SEETRU LIMITED
Albion Dockside Works,
Bristol, BS1 6UT, England.
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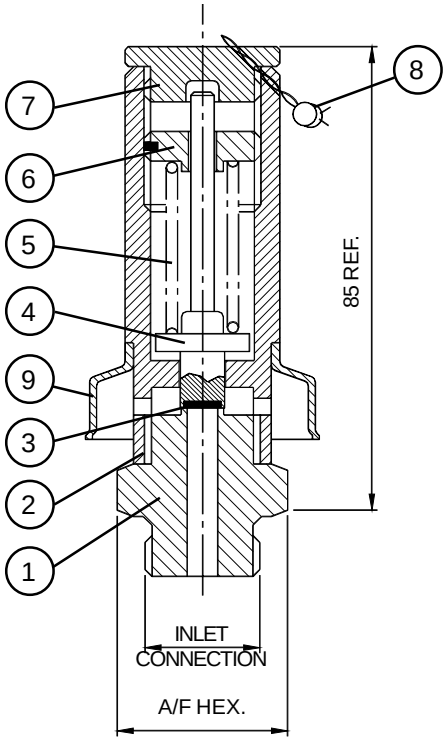
Web: www.seetru.com
Distributors world-wide

Our Distributor

EDITION A



ILLUSTRATED SHOWING
TYPE B
BASIC WIRELOCKED VALVE
WITH DOWNWARD SHROUD

PARTS LIST & MATERIAL SPECIFICATION

1	SEAT	ST.STL.
2	BODY	BRASS
3	DISC SEAL	SUIT APPLICATION
4	PLUNGER	ST.STL.
5	SPRING	ST.STL.
6	ADJUSTER	BRASS
7	CAP	BRASS
8	WIRE & SEAL	ST.STL. & WIRE
9	SHROUD	BRASS

APPROVALS

Designed in accordance with ISO 4126-1:1991
P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/035/8878/1
Quality management system module D, Cert. No. EDS 0002011/01

TECHNICAL DATA

Relieving pressure	= set pressure +10%
Reseating pressure	= set pressure -15%
Maximum set pressure	= 241.4 Bar.g.
Minimum set pressure	= 48.2 Bar.g.
Flow area	= 10.46mm^2
Inlet bore diameter	= 3.65mm
Derated coefficient of discharge K_{dr}	= 0.68
Minimum lift	= 0.91mm
Temperature range	= -50^O to 180^{O}C

FOR FURTHER TECHNICAL INFORMATION, CONVERSION FACTORS, INSTALLATION AND OPERATING INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

-TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION.

SET PRESSURE Bar.g	48.2	50	60	70	80	90	100	150	200	240	241.4
CERTIFIED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0^{O}C AND 1013mbar Normal m^3/h	261.8	271.5	324.8	378.1	431.4	484.7	538	804.6	1071.1	1284.1	1292.1

VALVE SELECTION CHART

INLET CONNECTION	ORDERING CODE	TOP FITTING	A/F HEX DIM'S mm
		B	
G 3/8 (3/8"BSP PARALLEL)	31210	0303	25.6
G 3/4 (3/4"BSP PARALLEL)		4303	33
G 1/2 (1/2" BSP PARALLEL)		1303	25.6
R 1/2 (1/2" BSP TAPER)		2303	
(1/2" NPT)		3303	

Seal Material:
Last digit of order code calls up Viton® seal.
When other material is required the last digit changes to:-
1. NITRILE 5. NEOPRENE
3. VITON® 6 ETHYLENE PROPYLENE

Example:
Ordering Code 31210 1303 is Basic valve with 1/2"BSP parallel inlet connection, Viton® seal and no easing gear wirelocked with downward facing shroud.

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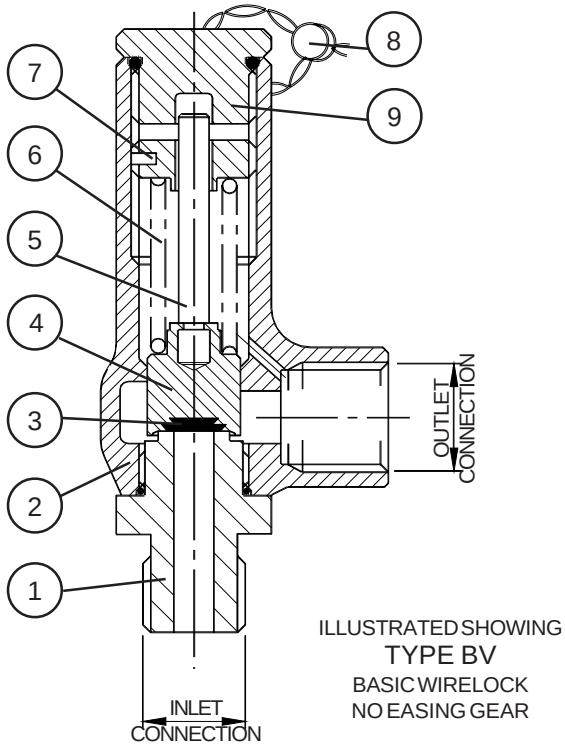
TELEPHONE +44 (0) 117 927 9204, FAX +44 (0) 117 929 8193
www.seetru.com enquiries@seetru.com

1/8" Nom. Bore BRASS CONSTRUCTION DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

ATMOSPHERIC DISCHARGE
1/8" NOM. BORE

TYPE 31210

EDITION A. 23.03.04



ILLUSTRATED SHOWING
TYPE BV
BASIC WIRELOCK
NO EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		33110	34110	34410
1	SEAT	ST.STL.		ST.STL. 316
2	BODY	BRASS	ST. STL.	ST.STL. 316
3	DISK SEAL	TO SUIT APPLICATION		
4	PLUNGER	ST.STL.		ST.STL. 316
5	SPINDLE	ST.STL.		ST.STL. 316
6	SPRING	ST.STL.		
7	ADJUSTER	BRASS	ST.STL.	ST.STL. 316
8	WIRELOCKING	ST.STL. & LEAD		
9	CAP	BRASS	ST.STL.	ST.STL. 316

APPROVALS

P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/037/8878/1
Quality management system module D, Cert. No. EDS 0002011/01
Designed in accordance with ISO 4126-1:1991 & BS 6759:1984, but not approved.

TECHNICAL DATA

Relieving pressure = Set pressure +10%
Reseating pressure = Set pressure -10%
Maximum set pressure = 241 Bar.g
Minimum set pressure = 48 Bar.g
Flow area = 10.52 mm²
Inlet bore diameter = 0.144" (3.66mm)
Derated coefficient of discharge in accordance with BS, K_{dr} AIR = 0.73,
Temperature range = -50°C to 200°C subject to seal material.

SHEET 1 OF 2 SHEETS

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1/8" Nominal Bore
BRASS CONSTRUCTION DIRECT SPRING
LOADED DISCHARGE SAFETY VALVE
FOR COMPRESSED AIR OR GASES

ENCLOSED DISCHARGE
1/8" NOMINAL BORE
TYPE 33110
TYPE 34110
TYPE 34410

EDITION D. 29.01.08

FLOW CHART

SET PRESSURE bar.g	48	49	50	51	52	53	54	55	100	120	200	241
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15^0C AND 1013 mbar Std.Litres/s	79	81	83	84	86	87	89	90	93	111	326	393

VALVE SELECTION CHART

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE BV	ORDERING CODE	TOP FITTING CODE BV
G 3/8 (3/8" BSP PARALLEL)	G 3/8 (3/8" BSP PARALLEL)	33110 34110	0201	34410	-
G 3/8 (3/8" BSP PARALLEL)	G 1/2 (1/2" BSP PARALLEL)		2202		-
G 1/2 (1/2" BSP PARALLEL)	G 1/2 (1/2" BSP PARALLEL)		3202		3201

Example:
Ordering code 33110 0201 is a 33110 basic valve with 3/8" BSP inlet and outlet connections, no easing gear, wirelocked.

SHEET 1 OF 2 SHEETS

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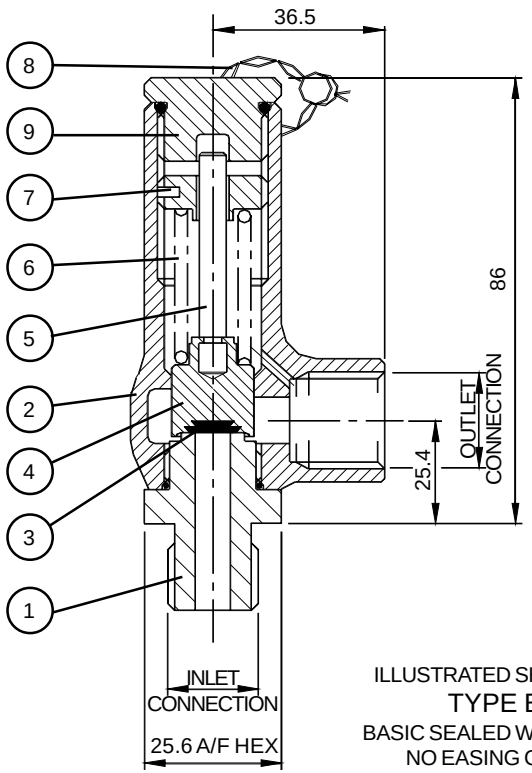
1/8" Nominal Bore
BRASS CONSTRUCTION DIRECT SPRING LOADED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

ENCLOSED DISCHARGE
1/8" NOMINAL BORE
TYPE 33110
TYPE 34110
TYPE 34410



ILLUSTRATED SHOWING
TYPE B
BASIC SEALED WIRELOCK
NO EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		33020	34020
1	SEAT	ST.STL.	
2	BODY	BRASS	ST.STL.
3	DISC SEAL	TO SUIT APPLICATION	
4	PLUNGER	ST.STL.	
5	SPINDLE	ST.STL.	
6	SPRING	ST.STL.	
7	ADJUSTER	BRASS	ST.STL.
8	WIRE & SEAL	ST.STL. & LEAD	
9	CAP	BRASS	ST.STL.

APPROVALS

P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/036/8878/1
Quality management system module D, Cert. No. EDS 0002011/01
Designed in accordance with ISO 4126-1:1991.

TECHNICAL DATA

Relieving pressure	= Set pressure + 10%
Reseating pressure	= Set pressure - 15%
Maximum set pressure	= 33020 / 34020 = 104 Bar.g
Minimum set pressure	= 33020 / 34020 = 55 Bar.g
Flow area	= 40.04 mm²
Inlet bore diameter	= 0.281" (7.14mm)
Derated coefficient of discharge, K_{dr} AIR	= 0.67

Temperature range = -50°C to 200°C subject to seal material.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION.

SET PRESSURE Bar.g	55	60	65	70	75	80	85	90	95	100	104
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15°C AND 1013 mbar Std.Litres/s	317	345	374	402	431	459	487	516	544	572	595

VALVE SELECTION CHART

STANDARD THREAD SIZES SHOWN, OTHER SIZES MAY BE AVAILABLE.

INLET CONNECTION	OUTLET CONNECTION	TYPE	TOP FITTING CODE
			B
G 3/8 (3/8" BSP PARALLEL)	G 1/2 (1/2" BSP PARALLEL)	33020 34020	0201
R 3/8 (3/8" BSP TAPER)	R 1/2 (1/2" BSP TAPER)		0182
G 1/2 (1/2" BSP PARALLEL)	G 1/2 (1/2" BSP PARALLEL)		1201
R 1/2 (1/2" BSP TAPER)	R 1/2 (1/2" BSP TAPER)		2202
1/2" NPT	1/2" NPT		3203

Example:
Ordering code 33020 0201 is a Basic wirelock with 3/8"BSP inlet connection & 1/2"BSP outlet connection.
Seal Materials:
Consult Seetru for full range of available seal materials.

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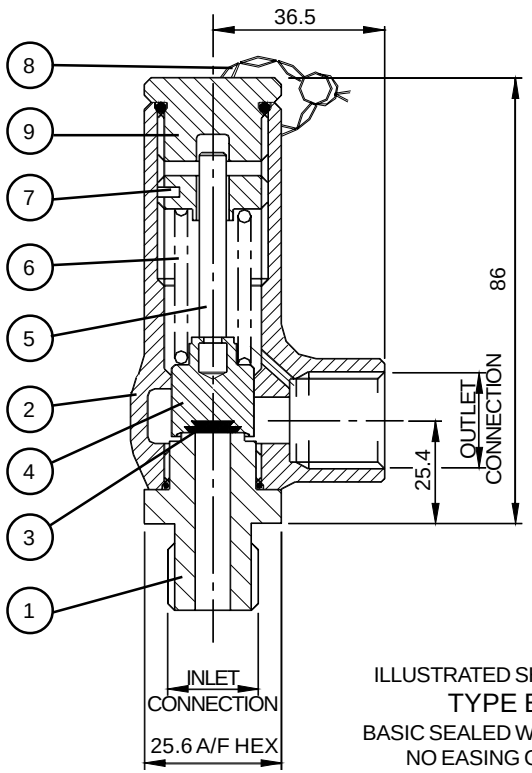
1/4" Nominal Bore BRASS CONSTRUCTION
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES

ENCLOSED DISCHARGE
1/4" NOMINAL BORE

TYPE 33020 BRASS/ST.STL.
TYPE 34020 ST.STL.

EDITION A. 08.07.03



ILLUSTRATED SHOWING
TYPE B
BASIC SEALED WIRELOCK
NO EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		33020	34020
1	SEAT	ST.STL.	
2	BODY	BRASS	ST.STL.
3	DISC SEAL	TO SUIT APPLICATION	
4	PLUNGER	ST.STL.	
5	SPINDLE	ST.STL.	
6	SPRING	ST.STL.	
7	ADJUSTER	BRASS	ST.STL.
8	WIRE & SEAL	ST.STL. & LEAD	
9	CAP	BRASS	ST.STL.

APPROVALS

P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/036/8878/1
Quality management system module D, Cert. No. EDS 0002011/01
Designed in accordance with ISO 4126-1:1991.

TECHNICAL DATA

Relieving pressure	= Set pressure + 10%
Reseating pressure	= Set pressure - 15%
Maximum set pressure	= 33020 / 34020 = 104 Bar.g
Minimum set pressure	= 33020 / 34020 = 55 Bar.g
Flow area	= 40.04 mm²
Inlet bore diameter	= 0.281" (7.14mm)
Derated coefficient of discharge, K_{dr} AIR	= 0.67

Temperature range = -50°C to 200°C subject to seal material.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION.

SET PRESSURE Bar.g	55	60	65	70	75	80	85	90	95	100	104
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15°C AND 1013 mbar Std.Litres/s	317	345	374	402	431	459	487	516	544	572	595

VALVE SELECTION CHART

STANDARD THREAD SIZES SHOWN, OTHER SIZES MAY BE AVAILABLE.

INLET CONNECTION	OUTLET CONNECTION	TYPE	TOP FITTING CODE
			B
G 3/8 (3/8" BSP PARALLEL)	G 1/2 (1/2" BSP PARALLEL)	33020 34020	0201
R 3/8 (3/8" BSP TAPER)	R 1/2 (1/2" BSP TAPER)		0182
G 1/2 (1/2" BSP PARALLEL)	G 1/2 (1/2" BSP PARALLEL)		1201
R 1/2 (1/2" BSP TAPER)	R 1/2 (1/2" BSP TAPER)		2202
1/2" NPT	1/2" NPT		3203

Example:
Ordering code 33020 0201 is a Basic wirelock with 3/8"BSP inlet connection & 1/2"BSP outlet connection.
Seal Materials:
Consult Seetru for full range of available seal materials.

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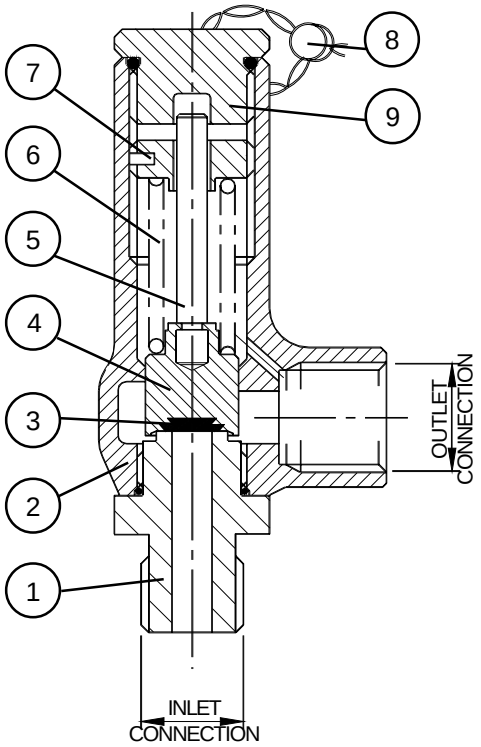
1/4" Nominal Bore BRASS CONSTRUCTION
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES

ENCLOSED DISCHARGE
1/4" NOMINAL BORE

TYPE 33020 BRASS/ST.STL.
TYPE 34020 ST.STL.

EDITION A. 08.07.03



ILLUSTRATED SHOWING
TYPE BV
BASIC WIRELOCK
NO EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		33110	34110
1	SEAT	ST.STL.	
2	BODY	BRASS	ST. STL.
3	DISK SEAL	TO SUIT APPLICATION	
4	PLUNGER	ST.STL.	
5	SPINDLE	ST.STL.	
6	SPRING	ST.STL.	
7	ADJUSTER	BRASS	ST.STL.
8	WIRELOCKING	ST.STL. & LEAD	
9	CAP	BRASS	ST.STL.

APPROVALS

P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/037/8878/1
Quality management system module D, Cert. No. EDS 0002011/01
Designed in accordance with ISO 4126-1:1991 & BS 6759:1984, but not approved.

TECHNICAL DATA

Relieving pressure = Set pressure +10%
Reseating pressure = Set pressure -10%
Maximum set pressure = 241 Bar.g
Minimum set pressure = 48 Bar.g
Flow area = 10.52 mm²
Inlet bore diameter = 0.144" (3.66mm)
Derated coefficient of discharge in accordance with BS, K_{dr} AIR = 0.73,
Temperature range = -50°C to 200°C subject to seal material.

FLOW CHART

SET PRESSURE bar.g	48	49	50	51	52	53	54	55	100	120	200	241
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15°C AND 1013 mbar Std.Litres/s	79	81	83	84	86	87	89	90	93	111	326	393

VALVE SELECTION CHART

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE
			BV
G 3/8 (3/8" BSP PARALLEL)	G 3/8 (3/8" BSP PARALLEL)	33110 34110	0201
G 3/8 (3/8" BSP PARALLEL)	G 1/2 (1/2" BSP PARALLEL)		2202
G 1/2 (1/2" BSP PARALLEL)	G 1/2 (1/2" BSP PARALLEL)		3202

Example:
Ordering code 33110 0201 is a 33110 basic valve with 3/8" BSP inlet and outlet connections, no easing gear, wirelocked.

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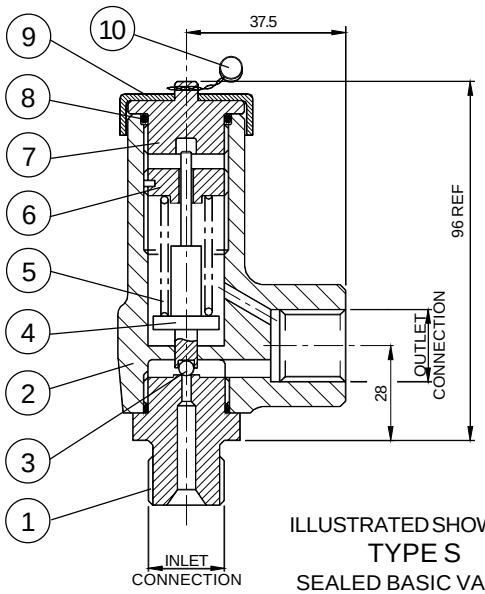
www.seetru.com enquiries@seetru.com

1/8" Nominal Bore
BRASS CONSTRUCTION DIRECT SPRING LOADED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

ENCLOSED DISCHARGE
1/8" NOMINAL BORE

TYPE 33110
TYPE 34110

EDITION C. 04.06.03



ILLUSTRATED SHOWING
TYPE S
SEALED BASIC VALVE

PARTS LIST & MATERIAL SPECIFICATION

1	SEAT	ST.STL.
2	BODY	ST.STL.
3	BALL	ST.STL.
4	PLUNGER	ST.STL.
5	SPRING	ST.STL.
6	ADJUSTER	ST.STL.
7	CAP	ST.STL.
8	O'RING	VITON
9	COVER	ST.STL.
10	WIRELOCKING	LEAD & ST.STL.

APPROVALS

Designed in accordance with ISO 4126-1:1991 & BS 6759-2:1984
P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/040/8969/1
Quality management system module D, Cert No. EDS 0002011/01

TECHNICAL DATA

Relieving pressure	= Set pressure +10%
Reseating pressure	= Set pressure -10%
Maximum set pressure	= 500 Bar.g.
Minimum set pressure	= 35 Bar.g.
Flow area	= 16.6mm²
Derated coefficient of discharge K_{dr}	= 0.402
Inlet bore diameter	= 4.6mm
Temperature range	= 0º to 200ºC
Maximum permissible built up back pressure	= 10% of set pressure.

FOR FURTHER TECHNICAL INFORMATION, CONVERSION FACTORS, INSTALLATION AND OPERATING INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

SET PRESSURE Bar.g.	35	50	100	150	200	250	300	350	400	450	500
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15°C AND 1013m bar. Std.Litres/sec.	50.7	72	142.6	213.2	283.8	354.5	425.2	495.8	566.4	637.1	707.7

VALVE SELECTION CHART

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE
G 3/8 (3/8"BSP PARALLEL)	G 1/2 (1/2"BSP PARALLEL)	359000009
G 1/2 (1/2"BSP PARALLEL)		359530000
R 1/2 (1/2"BSP TAPER)		359000040

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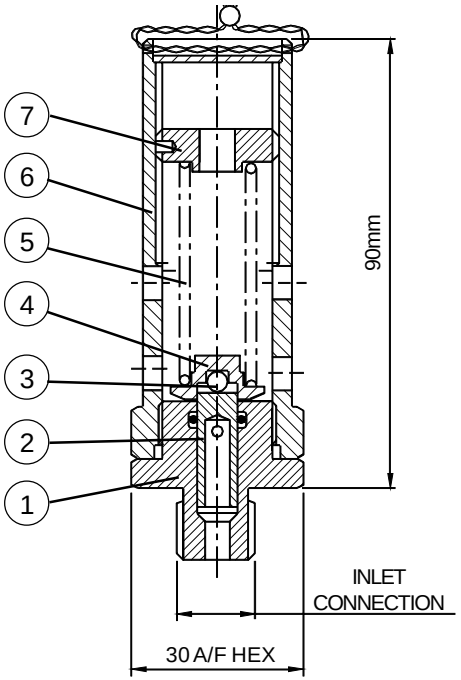
4.6mm Nom. Bore ST.STL. CONSTRUCTION
DIRECT SPRING LOADED ENCLOSED DISCHARGE
SAFETY VALVE FOR COMPRESSED AIR & GASES
TYPE 359000053

TYPE
359000009
359000040
359530000

EDITION B. 12.03.04



PARTS LIST & MATERIAL SPECIFICATION

1	SEAT	ST.STL.
2	PLUNGER	ST.STL.
3	BALL	ST.STL.
4	SPRING PAD	ST.STL.
5	SPRING	ST.STL.
6	BODY	BRASS
7	ADJUSTER	BRASS

APPROVALS

Designed in accordance with ISO 4126-1.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 2003/05/3962
Quality management system module D, Cert. No. EDS 0002011/01

TECHNICAL DATA

Relieving pressure	= Set pressure +10%
Reseating pressure	= Set pressure -15%
Set pressure range	= 69 Bar.g to 448.2 Bar.g [3/8"]
	= 69 Bar.g to 345 Bar.g [1/4"]
Flow area	= 10.95mm^2
Inlet bore diameter	= Equivalent to 3.73mm Dia.
Derated coefficient of discharge	= 0.082
Temperature range	= 0^{o}C to 100^{o}C

FOR FURTHER TECHNICAL INFORMATION, CONVERSION FACTORS, INSTALLATION AND OPERATING INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

SET PRESSURE	69	100	150	200	250	300	350	400	448
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS6759, AIR AT 15^{o}C AND 1013mbar Std.Litres/s	13.2	19.1	28.6	38.1	47.5	57.0	66.5	76.0	85.1

VALVE SELECTION CHART

Standard size shown, other sizes may be available.

INLET CONNECTION	ORDERING CODE	TOP FITTING CODE
R 1/4 [1/4" BSP PARALLEL]	55004	211
R 3/8 [3/8" BSP PARALLEL]		221

Example:
Ordering code 55004 211 is a 1/4"BSP Parallel inlet connection, wirelocked.
Consult Seetru for full range of available seal materials.

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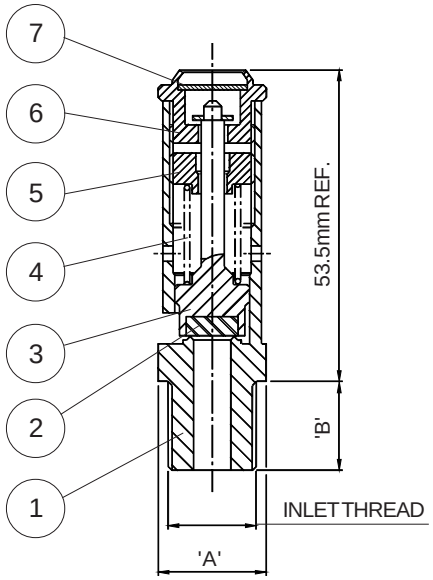
www.seetru.com enquiries@seetru.com

3.73mm Nom. Bore BRASS & ST.STL.
DIRECT SPRING LOADED ATMOSPHERIC
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES

ATMOSPHERIC DISCHARGE
3.73mm NOM. BORE SERIES

TYPE 55004

EDITION A. 26.02.04



ILLUSTRATED SHOWING
TYPE R
CRIMPED ROTA-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPEIFICATION

1	BODY	BRASS BS EN 12164 CW614N
2	ELASTOMER SEAL	SEE FLOW CHART *
3	PLUNGER	BRASS BS EN 12164 CW614N
4	SPRING	ST.STL BS EN 10270-3 1.4310 (302)
5	ADJUSTER	BRASS BS EN 12164 CW614N
6	CAP	BRASS BS EN 12164 CW614N
7	NAMEPLATE	AL. ALLOY

* DEPENDENT ON SET PRESSURE

APPROVALS

Ad - Merkblatt A2: (TÜV GERMANY) TÜV.SV.04-963.6,0.D/G.0,67.p.
Designed in accordance with BS 6759 Part 2 & BS EN ISO 4126-1, but not approved.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00015
Quality management system module D, Cert. No. EDS 0002011/01
Meeting the requirements of the A.S.M.E. Boiler & Pressure Vessel Code section VIII for air/gas.
UV Cert. of Authorisation: 35757
Capacities certified by the National Board of Boiler & Pressure Vessel Inspectors.

TECHNICAL DATA

Relieving pressure	= Set pressure +10%
Reseating pressure	= Set pressure -10%
Maximum set pressure	= 36.0 Bar.g
Minimum set pressure	= 2.8 Bar.g
Flow area	= 28.3 mm²
Inlet bore diameter	= 6mm
Temperature range	= -15°C to 200°C Viton®, -30°C to 110°C Nitrile.
TÜV Derated coefficient of discharge α_w	= 0.67
NB Rated discharge coefficient K_d	= 0.748

FOR FURTHER TECHNICAL INFORMATION, CONVERSION FACTORS, INSTALLTION AND OPERATING INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

SHT 1 OF 2 SHTS.

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www.seetru.com enquires@seetru.com

6mm Nom. Bore BRASS CONSTRUCTION
DIRECT SPRING LOADED ATMOSPHERIC
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES

SERIES E VALVE
TYPE 81806
TYPE 81706
TYPE 81106

FLOW CHART (P.E.D.)

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
- FOR GREATER FLOWS REFER TO 8mm BORE TYPE 81808 DATA SHEET.

SET PRESSURE Bar.g	2.8	4	5	6	7	8	9	10	15	20	25	30	31
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15°C AND 1013mbar Std.Litres/s	15	20	24	28	32	36	40	44	64	84	104	124	128
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013mbar Normal m^3/h	52.8	69.9	84	98.2	112.4	126.6	140.8	155	225.9	296.9	367.9	438.9	453.1
SEAL MATERIAL	NITRILE		VITON / NITRILE										

BS CALCULATIONS ARE FOR GUIDENCE ONLY

FLOW CHART (A.S.M.E.)

SET PRESSURE Psi.g	41	50	60	70	80	90	100	150	200	250	300	350	400	450
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH A.S.M.E., AIR AT 60°F AND 14.7 psia/scfm	36	42	48	55	62	68	75	108	141	174	207	240	273	306
SEAL MATERIAL	NITRILE		VITON / NITRILE											

VALVE TYPE OPTIONS:

81806 = TUV, B.S. (P.E.D.)
81706 = A.S.M.E. & N.B.
81106 = A.S.M.E. & N.B., TUV, B.S. (P.E.D.)

VALVE SELECTION CHART

	INLET CONECTION	ORDERING CODE	TOP FITTING CODE R	DIM'N 'A' A/F HEX (mm)	DIM'N 'B' THREAD LENGTH (mm)
#	G 1/4 (1/4" BSP PARALLEL)	81806 81706 81106	1213	17	12.5
#	R 1/4 (1/4" BSP TAPER)		1223	14	14
#	1/4" NPT		1233	14	12
	G 3/8 (3/8" BSP PARALLEL)		1243	20.6	12.5
	R 3/8 (3/8" BSP TAPER)		1253	17	16
	3/8" NPT		1263	18	14.2

Example: Ordering code 81806 1213 is Crimped, Rota-lift type construction with 6mm bore, 1/4" BSP Parallel inlet connection and Viton® seals.
Note: This range of products are available below 4.0 Bar.g. with Nitrile seals only.

Max. tightening torque 14Nm.

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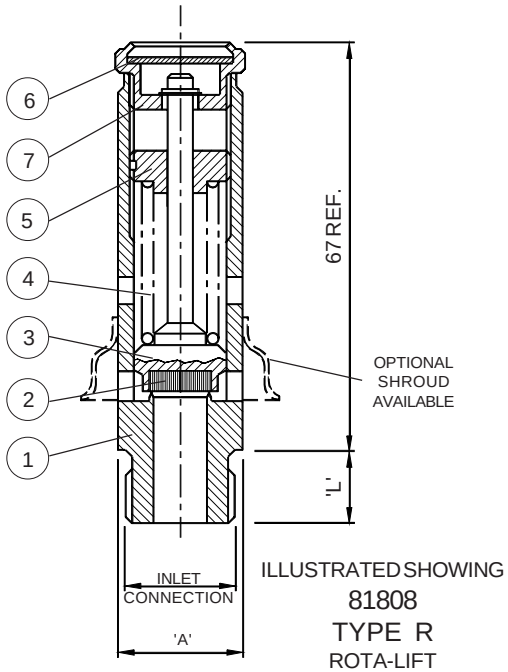
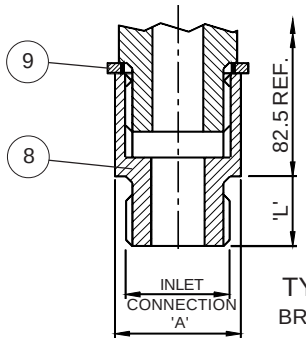
6mm Nom. Bore BRASS CONSTRUCTION
DIRECT SPRING LOADED ATMOSPHERIC
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES

SERIES E VALVE
TYPE 81806
TYPE 81706
TYPE 81106



ILLUSTRATED SHOWING
81808
TYPE R
ROTA-LIFT
EASING GEAR



TYPE 82808
BRASS/ST.STL.
ADAPTOR

PARTS LIST & MATERIAL SPECIFICATION

		81808, 81708, 81108	82808, 82708, 82108
1	BODY	BRASS BS EN 12164 CW614N	
2	ELASTOMER SEAL	VITON	
3	VALVE DISC	BRASS BS EN 12164 CW614N	
4	SPRING	ST.STL BS EN 10270-3 1.4310 (302)	
5	ADJUSTER	BRASS BS EN 12164 CW614N	
6	NAMEPLATE	AL.ALLOY	
7	CAP	BRASS BS EN 12164 CW614N	
8	ADAPTOR	N/A	ST.STL.
9	DOWTY SEAL	N/A	VITON

APPROVALS

Ad-Merkblatt A2: (TÜV GERMANY) TÜV.SV.02-893.8.D/G.*.p * = Variable α_w below 3 Bar.g
Designed in accordance with BS EN ISO 4126-1 & BS 6759 Part 2, but not approved.
P.E.D. 97/23/EC
Type examination module B, Cert No. 01202 111-B-00015
Quality management system module D, Cert . No. EDS 0002011/01
Meeting the requirements of the A.S.M.E. Boiler & Pressure Vessel Code section VIII for air/gas.
UV Cert. of Authorisation: 35757
Capacities certified by the National Board of Boiler & Pressure Vessel Inspectors.

TECHNICAL DATA

Relieving pressure	= Set pressure +10% (0.1 Bar.g below 1.0 Bar.g)
Reseating pressure	= Set pressure -10% (0.3 Bar.g below 3.0 Bar.g)
Maximum set pressure	= 21 Bar.g
Minimum set pressure	= 0.55 Bar.g (A.S.M.E. 3.0 Bar.g)
Flow area	= 50.27 mm²
Inlet bore diameter	= 8mm
Temperature range	= -15°C to 200°C
TÜV Derated coefficient of discharge α_w	= 0.67 From 3 Bar.g. Below 3 Bar.g see graph.
NB Rated discharge coefficient K_d	= 0.748
Minimum lift at 10% overpressure	= 1.4mm

FOR FURTHER TECHNICAL INFORMATION, CONVERSION FACTORS, INSTALLTION AND OPERATING INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

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8mm Nom. Bore BRASS CONSTRUCTION
DIRECT SPRING LOADED ATMOSPHERIC
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES.

SERIES E VALVE
TYPE 81808, 81708, 81108
BRASS
TYPE 82808, 82708, 82108
BRASS/ST.STL. ADAPTOR

EDITION O 09.05.06

FLOW CHART (P.E.D.)

- FOR PRESSURE RANGE BELOW 3 BAR.G.

SET PRESSURE Bar.g	0.55	1	2	3
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS EN 4126, AIR AT 15°C AND 1013 mbar Std.Litres/s	9	12	20	27
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013mbar Normal m³/h	31.6	44.5	70.7	94.9

BS CALCULATIONS ARE FOR GUIDANCE ONLY

FLOW CHART (P.E.D.)

- FOR PRESSURE RANGE ABOVE 3 BAR.G. TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
- (FOR GREATER FLOWS REFER TO 10mm BORE TYPE 81810 DATA SHEET, FOR LOWER FLOWS REFER TO 6mm BORE TYPE 81806 DATA SHEET).

SET PRESSURE Bar.g	3	4	5	6	7	8	9	10	11	12	13	14	15	17	21
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS EN 4126, AIR AT 15°C AND 1013 mbar Std.Litres/s	28	35	42	49	57	64	71	78	85	92	99	107	114	128	156
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013mbar Normal m³/h	98.9	124.1	149.4	174.7	199.8	225.1	250.3	275.5	300.8	326.0	351.2	376.5	401.7	452	553

BS CALCULATIONS ARE FOR GUIDANCE ONLY

FLOW CHART (A.S.M.E.)

SET PRESSURE Psig	44	50	60	70	80	90	100	110	120	130	140	150	200	250	300	305
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH A.S.M.E. AIR AT 60°F AND 14.7 psia/scfm	67	74	86	98	110	121	133	145	157	168	180	192	251	309	368	373

VALVE TYPE OPTIONS:

81808, 82808 = TUV, B.S. (P.E.D.)
81708, 82708 = A.S.M.E. & N.B.
81108, 82108 = A.S.M.E. & N.B., TUV, B.S. (P.E.D.)

VALVE SELECTION CHART

	INLET CONNECTION	ORDERING CODE	TOP FITTING CODE R	81 TYPE DIM'N 'A' A/F HEX (mm)	82 TYPE DIM'N 'A' A/F HEX (mm)	81 TYPE 82 TYPE INLET THR'D DIM'N 'L'
#	G 1/4 (1/4" BSP PARALLEL)	81808 81708 81108 82808 82708 82108	1213	19.0	20.6	10
#	R 1/4 (1/4" BSP TAPER)		1223			12
#	1/4" NPT		1233			12
	G 3/8 (3/8" BSP PARALLEL)		1243	20.6		10
	R 3/8 (3/8" BSP TAPER)		1253	19.0		12.5
	3/8" NPT		1263			15.3
	G 1/2 (1/2" BSP PARALLEL)		1273	24.0	24.0	12
	R 1/2 (1/2" BSP TAPER)		1283			19
	1/2" NPT		1293			19

Example: Ordering code 81808 1213 is a, Rota-lift type construction with 8mm bore, 1/4" BSP Parallel inlet connection and Viton® seals.
Note: Standard seal Viton®, other materials may be available.

Max. tightening torque 14Nm.

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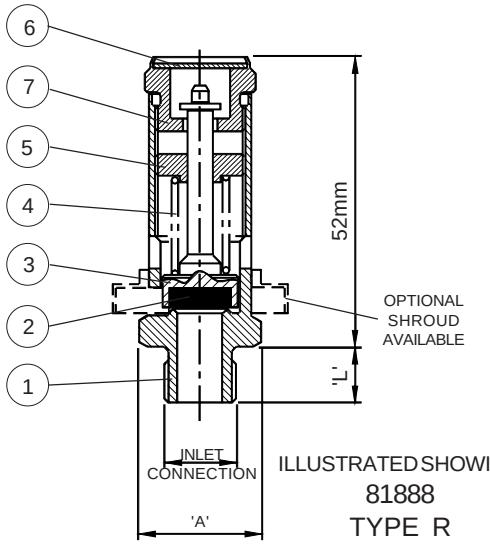
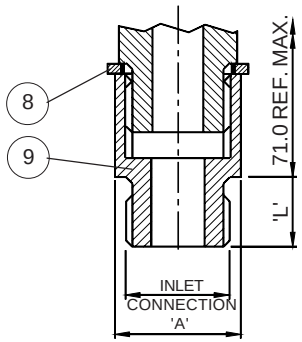
8mm Nom. Bore BRASS CONSTRUCTION DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES.

SERIES E VALVE
TYPE 81808, 81708, 81108
BRASS
TYPE 82808, 82708, 82108
BRASS/ST.STL. ADAPTOR

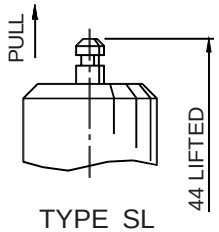
EDITION O 09.05.06



ILLUSTRATED SHOWING
81888
TYPE R
ROTA-LIFT
EASING GEAR



82888
ASS/ST.STL.
ADAPTOR



TYPE SL
SPINDLE-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		81888, 81788, 81188	82888, 82788, 82188
1	BODY	BRASS BS EN 12164 CW614N	
2	ELASTOMER SEAL	VITON	
3	VALVE DISC	BRASS BS EN 12164 CW614N	
4	SPRING	ST.STL BS EN 10270-3 1.4310 (302)	
5	ADJUSTER	BRASS BS EN 12164 CW614N	
6	NAMEPLATE	AL.ALLOY	
7	CAP	BRASS BS EN 12164 CW614N	
8	DOWTY SEAL	N/A	VITON
9	ADAPTOR	N/A	ST.STL.

APPROVALS

Ad-Merkblatt A2: (TÜV GERMANY) TÜV.SV.02-893.8.D/G.*.p (* = Variable α_w below 3 Bar.g)
Designed in accordance with BS EN ISO 4126-1 & BS 6759 Part 2, but not approved.
P.E.D. 97/23/EC
Type examination module B, Cert No. 01202 111-B-00015
Quality management system module D, Cert . No. EDS 0002011/01
Meeting the requirements of the A.S.M.E. Boiler & Pressure Vessel Code section VIII for air/gas.
UV Cert. of Authorisation: 35757
Capacities certified by the National Board of Boiler & Pressure Vessel Inspectors.

TECHNICAL DATA

Relieving pressure	= Set pressure +10% (0.1 Bar.g below 1.0 Bar.g)
Reseating pressure	= Set pressure -10% (0.3 Bar.g below 3.0 Bar.g)
Maximum set pressure	= 21 Bar.g
Minimum set pressure	= 0.55 Bar.g (A.S.M.E. 3.0 Bar.g)
Flow area	= 50.27 mm²
Inlet bore diameter	= 8mm
Temperature range	= -15°C to 200°C
TÜV Derated coefficient of discharge α_w	= 0.67 From 3 Bar.g Below 3 Bar.g see graph.
NB Rated discharge coefficient K_d	= 0.748
Minimum lift at 10% overpressure	= 1.4mm

FOR FURTHER TECHNICAL INFORMATION, CONVERSION FACTORS, INSTALLTION AND OPERATING INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

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8mm Nom. Bore BRASS CONSTRUCTION
DIRECT SPRING LOADED ATMOSPHERIC
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES.

SERIES E VALVE
TYPE 81888, 81788, 81188
BRASS
TYPE 82888, 82788,82188
BRASS/ST.STL.

EDITION D 09.05.06

FLOW CHART (P.E.D.)

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
- (FOR GREATER FLOWS REFER TO 10mm BORE TYPE 81810 DATA SHEET, FOR LOWER FLOWS REFER TO 6mm BORE TYPE 81806 DATA SHEET).

SET PRESSURE Bar.g	PRESSURE RANGE BELOW 3 BAR.G.				PRESSURE RANGE ABOVE3 BAR.G.														
	0.55	1	2	3	3	4	5	6	7	8	9	10	11	12	13	14	15	17	21
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS EN 4126, AIR AT 15°C AND 1013 mbar Std.Litres/s	9	12	20	27	28	35	42	49	57	64	71	78	85	92	99	107	114	128	156
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013mbar Normal m³/h	31.6	44.5	70.7	94.9	98.9	124.1	149.4	174.7	199.8	225.1	250.3	275.5	300.8	326.0	351.2	376.5	401.7	452	553

BS CALCULATIONS ARE FOR GUIDANCE ONLY

FLOW CHART (A.S.M.E)

SET PRESSURE Psig	44	50	60	70	80	90	100	110	120	130	140	150	200	250	300	305
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH A.S.M.E. AIR AT 60°F AND 14.7 psia/scfm	67	74	86	98	110	121	133	145	157	168	180	192	251	309	368	373

VALVE TYPE OPTIONS:

81888, 82888 = TUV, B.S. (P.E.D.)
81788, 82788 = A.S.M.E. & N.B.
81188, 82888 = A.S.M.E. & N.B., TUV, B.S. (P.E.D.)

VALVE SELECTION CHART

	INLET CONNECTION	ORDERING CODE	TOP FITTING CODE R	TOP FITTING CODE SL	81 TYPE DIM'N 'A' A/F HEX (mm)	82 TYPE DIM'N 'A' A/F HEX (mm)	81 TYPE 82 TYPE INLET THR'D DIM'N 'L'
#	G 1/4 (1/4" BSP PARALLEL)	81888 81788 81188 82888 82788 82188	1213	0413	19.0	25.6	10
#	R 1/4 (1/4" BSP TAPER)		1223	0423			12
#	1/4" NPT		1233	0433			12
	G 3/8 (3/8" BSP PARALLEL)		1243	0443	20.6		10
	R 3/8 (3/8" BSP TAPER)		1253	0453	19.0		12.5
	3/8" NPT		1263	0463			15.3
	G 1/2 (1/2" BSP PARALLEL)		1273	0473	24.0		12
	R 1/2 (1/2" BSP TAPER)		1283	0483			19
	1/2" NPT		1293	0493			19

Example: Ordering code 81888 1213 is a, Rota-lift type construction with 8mm bore, 1/4" BSP Parallel inlet connection and Viton® seals.
Note: Standard seal Viton®, other materials may be available.

= Max. tightening torque 14Nm.

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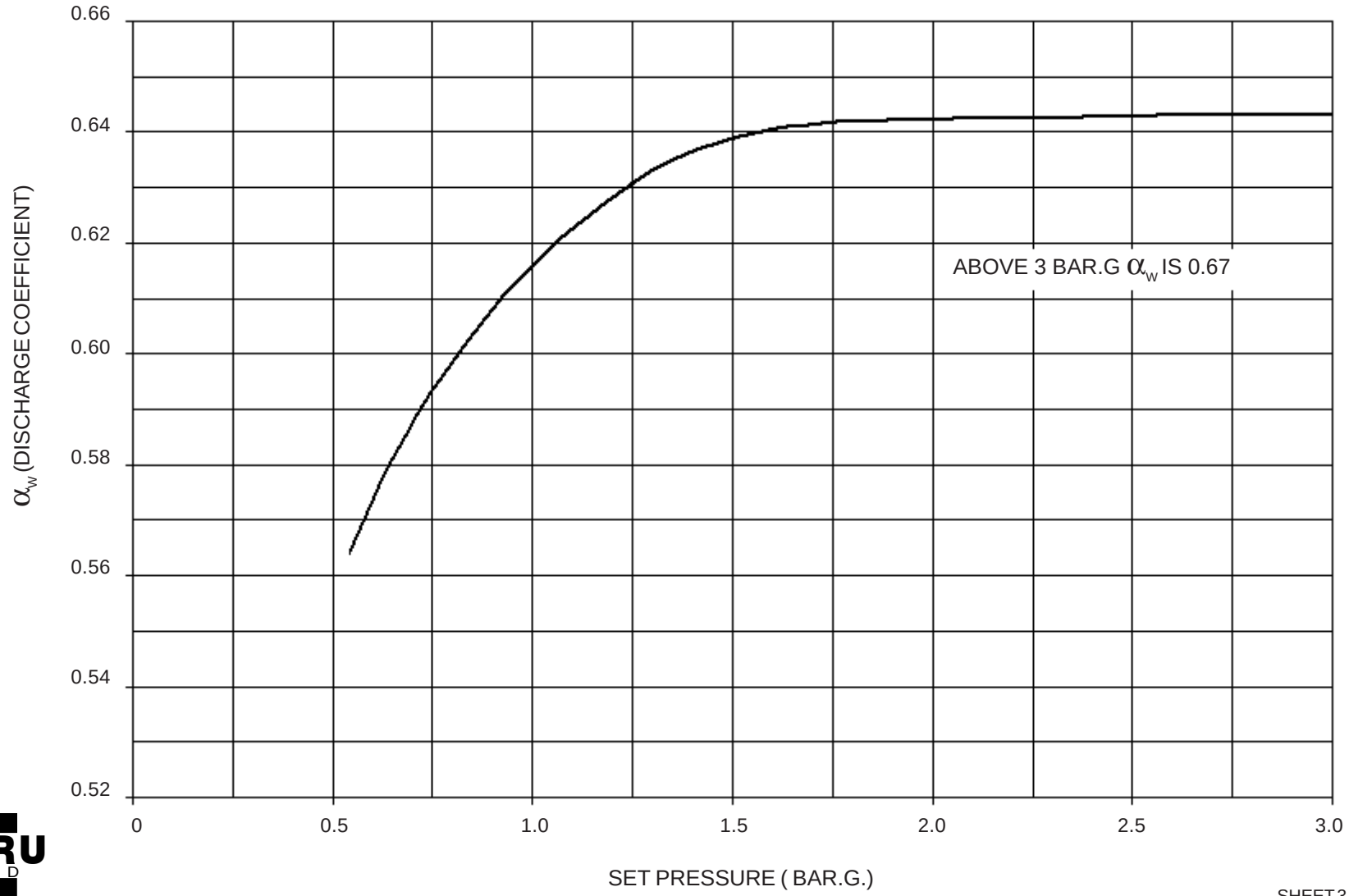
8mm Nom. Bore BRASS CONSTRUCTION DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES.

SERIES E VALVE
TYPE 81888, 81788, 81188
BRASS
TYPE 82888, 82788,82188
BRASS/ST.STL.

EDITION D 09.05.06

PRESSURE/DISCHARGE CURVE FOR VALVE 81888
0.55 - 3.0 BAR.G.



SHEET 3 OF 3 SHEETS

SEETRU LIMITED

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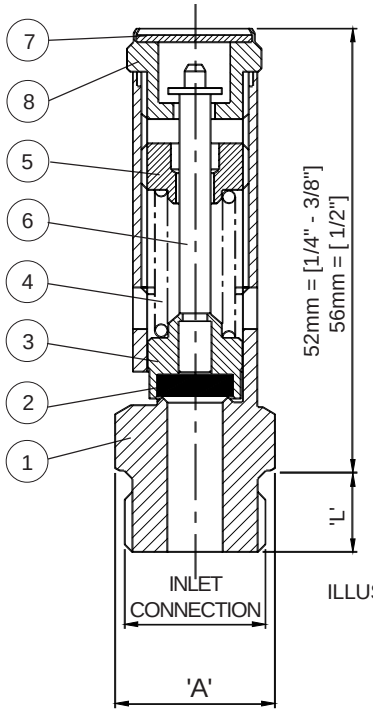
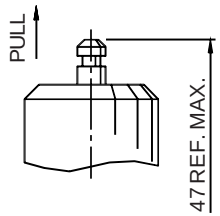
SERIES E VALVE
TYPE 81888, 81788, 81188
BRASS
TYPE 82888, 82788,82188
BRASS/ST.STL.

EDITION D 09.05.06



ILLUSTRATED SHOWING
84888
TYPE R
ROTA-LIFT
EASING GEAR



TYPE SL
SPINDLE-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		84888
1	BODY	ST.STL. BS EN 10088-3 1.4401 (316)
2	ELASTOMER SEAL	VITON
3	VALVE DISC	ST.STL. BS EN 10088-3 1.4401 (316)
4	SPRING	ST.STL BS EN 10270-3 1.4310 (302)
5	ADJUSTER	ST.STL. BS EN 10088-3 1.4401 (316)
6	SPINDLE	ST.STL. BS EN 10088-3 1.4057 (431)
7	NAMEPLATE	AL.ALLOY
8	CAP	ST.STL. BS EN 10088-3 1.4401 (316)

APPROVALS

Ad - Merkblatt A2: (TÜV GERMANY) TÜV.SV.02-893.8.D/G.*.p * = Variable α_w below 3 Bar.g
Designed in accordance with BS EN ISO 4126 & BS 6759.
P.E.D. 97/23/EC
Type examination module B, Cert No. 01202 111-B-00015
Quality management system module D, Cert . No. EDS 0002011/01
Meeting the requirements of the A.S.M.E. Boiler & Pressure Vessel Code section VIII for air/gas.
UV Cert. of Authorisation: 35757
Capacities certified by the National Board of Boiler & Pressure Vessel Inspectors.

TECHNICAL DATA

Relieving pressure	= Set pressure +10%, (0.1 Bar.g below 1.0 Bar.g)
Reseating pressure	= Set pressure -10%, (0.3 Bar.g below 3.0 Bar.g)
Maximum set pressure	= 21 Bar.g
Minimum set pressure	= 0.55 Bar.g (3.0 Bar.g A.S.M.E.)
Flow area	= 50.27 mm²
Inlet bore diameter	= 8mm
Temperature range	= -15°C to 180°C
TÜV Derated coefficient of discharge α_w	= 0.67 From 3 Bar.g. Below 3 Bar.g see graph.
NB Rated discharge coefficient K_d	= 0.748
Minimum lift at 10% overpressure	= 1.4mm

FOR FURTHER TECHNICAL INFORMATION, CONVERSION FACTORS, INSTALLTION AND OPERATING INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

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8mm Nom. Bore ST.STL. CONSTRUCTION DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES.

SERIES E VALVE

TYPE 84888, 84788, 84188
ST.STL.

EDITION B 09.05.06

FLOW CHART (P.E.D.)

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION

SET PRESSURE Bar.g	PRESSURE RANGE BELOW 3 BAR.G.				PRESSURE RANGE ABOVE3 BAR.G.														
	0.55	1	2	3	3	4	5	6	7	8	9	10	11	12	13	14	15	17	21
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS EN 4126, AIR AT 15°C AND 1013 mbar Std.Litres/s	9	12	20	27	28	35	42	49	57	64	71	78	85	92	99	107	114	128	156
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013mbar Normal m³/h	31.6	44.5	70.7	94.9	98.9	124.1	149.4	174.7	199.8	225.1	250.3	275.5	300.8	326.0	351.2	376.5	401.7	452	553

BS CALCULATIONS ARE FOR GUIDANCE ONLY

FLOW CHART (A.S.M.E.)

SET PRESSURE Psig	44	50	60	70	80	90	100	110	120	130	140	150	200	250	300	305
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH A.S.M.E. AIR AT 60°F AND 14.7 psia/scfm	67	74	86	98	110	121	133	145	157	168	180	192	251	309	368	373

VALVE TYPE OPTIONS:

84888 = TUV, B.S. (P.E.D.)
84788 = A.S.M.E. & N.B.
84188 = A.S.M.E. & N.B., TUV, B.S. (P.E.D.)

VALVE SELECTION CHART

	INLET CONNECTION	ORDERING CODE	TOP FITTING CODE		DIM'N 'A' A/F HEX (mm)	INLET THR'D DIM'N 'L'
			R	SL		
#	G 1/4 (1/4" BSP PARALLEL)	84888 84788 84188	1213	0413	19.0	10
#	R 1/4 (1/4" BSP TAPER)		1223	0423		12
#	1/4" NPT		1233	0433		12
	G 3/8 (3/8" BSP PARALLEL)		1243	0443	20.6	10
	R 3/8 (3/8" BSP TAPER)		1253	0453	19.0	12.5
	3/8" NPT		1263	0463		15.3
	G 1/2 (1/2" BSP PARALLEL)		1273	0473	24.0	12
	R 1/2 (1/2" BSP TAPER)		1283	0483		19
	1/2" NPT		1293	0493		19

Example: Ordering code 84888 1213 is a, Rota-lift type construction with 8mm bore, 1/4" BSP Parallel inlet connection and Viton® seals.

Note: Standard seal Viton®, other materials may be available.
= Max. tightening torque 14Nm.

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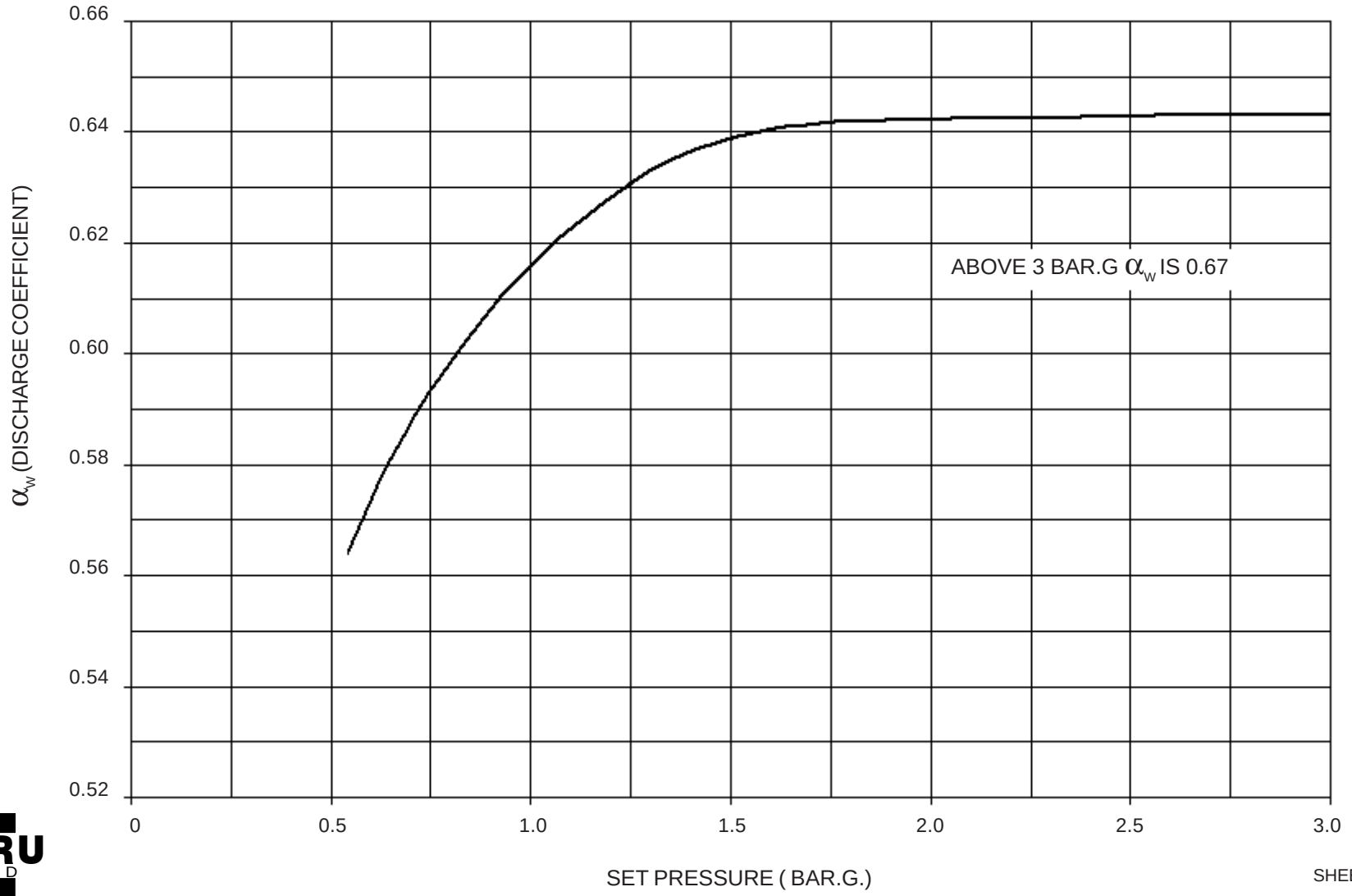
8mm Nom. Bore ST.STL. CONSTRUCTION DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES.

SERIES E VALVE

TYPE 84888, 84788, 84188 ST.STL.

EDITION B 09.05.06

PRESSURE/DISCHARGE CURVE FOR VALVE 84888
0.55 - 3.0 BAR.G.



SHEET 3 OF 3 SHEETS

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8mm Nom. Bore ST.STL. CONSTRUCTION
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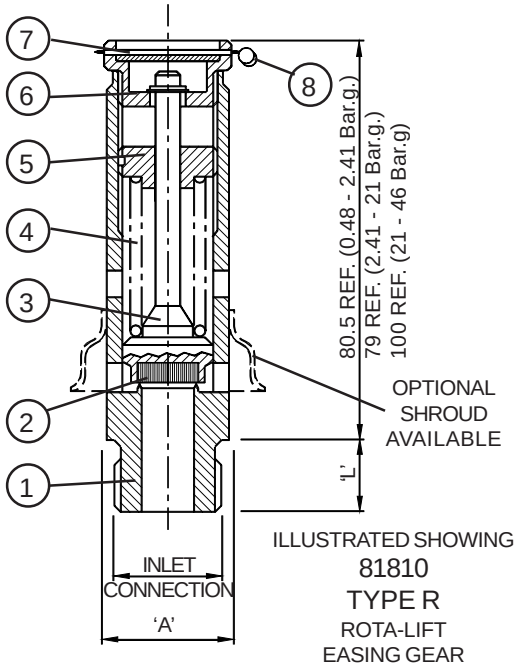
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES.

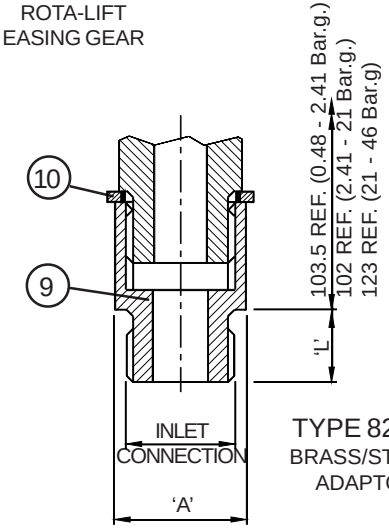
SERIES E VALVE

TYPE 84888, 84788, 84188
ST.STL.

EDITION B 09.05.06



ILLUSTRATED SHOWING
81810
TYPE R
ROTA-LIFT
EASING GEAR



TYPE 82810
BRASS/ST.STL.
ADAPTOR

PARTS LIST & MATERIAL SPECIFICATION

		81810, 81710, 81110	82810, 82710, 82110
1	BODY	BRASS BS EN 12164 CW614N	
2	ELASTOMER SEAL	VITON	
3	PLUNGER	BRASS BS EN 12164 CW614N	
4	SPRING	ST.STL BS EN 10207-3 1.4310 (302)	
5	ADJUSTER	BRASS BS EN 12164 CW614N	
6	LIFTING CAP	BRASS BS EN 12164 CW614N	
7	NAMEPLATE	AL.ALLOY	
8	WIRE & SEAL	ST.STL & LEAD	
9	ADAPTOR	N/A	ST.STL.
10	DOWTY SEAL	N/A	VITON

APPROVALS

Ad-Merkblatt A2: (TÜV GERMANY) TÜV.SV.02-893.10.D/G. * .p. [* = Variable α_w below 3 Bar.g.]
Designed in accordance with BS EN ISO 4126-1 & BS 6759 Part 2 but not approved.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00015
Quality management system module D, Cert. No. EDS 0002011/01
Meeting the requirements of the A.S.M.E Boiler & Pressure Vessel code section VIII for air/gas.
UV Cert. of Authorisation: 35757
Capacities certified by the National Board of Boiler & Pressure Vessel Inspectors.

TECHNICAL DATA

Relieving pressure	= Set pressure +10% (0.1 Bar.g below 1.0 Bar.g.)
Reseating pressure	= Set pressure -10% (0.3 Bar.g below 3.0 Bar.g.)
Maximum Set pressure	= 46.0 Bar.g
Minimum Set pressure	= 0.48 Bar.g (A.S.M.E. 2.4 Bar.g.)
Flow area	= 78.54 mm²
Inlet bore diameter	= 10 mm
Temperature range	= -15°C to 200°C
Derated coefficient of discharge α_w	= 0.67 From 2.4 Bar.g. Below 2.4 Bar.g see graph.
NB Certified rated slope	= 1.66 scfm/psia
Minimum lift at 10% over pressure	= 2.1mm

FOR FURTHER TECHNICAL INFORMATION, CONVERSION FACTORS, INSTALLATION AND OPERATING INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

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10mm Nom. Bore BRASS CONSTRUCTION
DIRECT SPRING LOADED ATMOSPHEREIC
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES

SERIES E VALVE
TYPE 81810, 81710, 81110
BRASS
TYPE 82810, 82710, 82110
BRASS/ST.STL. ADAPTOR

FLOW CHART (P.E.D.)

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
- FOR GREATER FLOWS REFER TO 13mm BORE TYPE 81813 DATA SHEET,FOR LOWER FLOWS REFER TO 8mm BORE TYPE 81808 DATA SHEET

SET PRESSURE (Bar.g)	PRESSURE RANGE																							
	BELOW 2.4 BAR.G			ABOVE 2.4 BAR.G.																				
	0.48	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	20	25	30	35	40	45	46
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS EN 4126, AIR AT 15°C AND 1013 mbar Std.Litres/s	18	23	33	43	54	65	77	88	100	111	122	133	144	155	167	178	232	288	344	400	455	511	522
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013mbar Normal m³/h	28.5	66.7	108	154.6	194.0	233.5	272.8	312.3	351.7	391.2	430.6	470.0	509.4	548.9	588.3	627.7	824.9	1022	1219	1416	1613	1811	1850

FLOW CHART (A.S.M.E.)

SET PRESSURE Psig	35	40	50	60	70	80	90	100	150	200	250	300	350	400	450	500	550	600	650	667
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH A.S.M.E. AIR AT 60°F AND 14.7 psia/scfm	88	97	116	134	152	170	189	207	298	390	481	572	664	755	846	937	1029	1120	1211	1242

VALVE TYPE OPTIONS:

81810, 82810 = TUV, B.S. (P.E.D.)
81710, 82710 = A.S.M.E. & N.B.
81110, 82110 = A.S.M.E. & N.B., TUV, B.S. (P.E.D.)

VALVE SELECTION CHART

INLET CONNECTION	ORDERING CODE	TOP FITTING CODE R	81 TYPE DIM'N 'A' A/F HEX (mm)	81 TYPE HIGH P DIM'N 'A' A/F HEX (mm)	82 TYPE DIM'N 'A' A/F HEX (mm)	82 TYPE HIGH P DIM'N 'A' A/F HEX (mm)	81 TYPE 82 TYPE INLET THR'D DIM'N 'L'
G 1/2 (1/2" BSP PARALLEL)	81810 81710 81110	0873	24	27.9	25.6	27.9	14
R 1/2 (1/2" BSP TAPER)		0883					15
1/2" NPT		0893					
G 3/4 (3/4" BSP PARALLEL)	82810 82710 82110	0903	30	30	30	30	14
R 3/4 (3/4" BSP TAPER)		0913					19
3/4" NPT		0923					

Example: Ordering code 81810 0913 is:- Wirelocked Rota-Lift type construction, with 10mm bore, 3/4"BSP Taper inlet connection and Viton® seals.
Note: This range of products are available with Viton® seals only.

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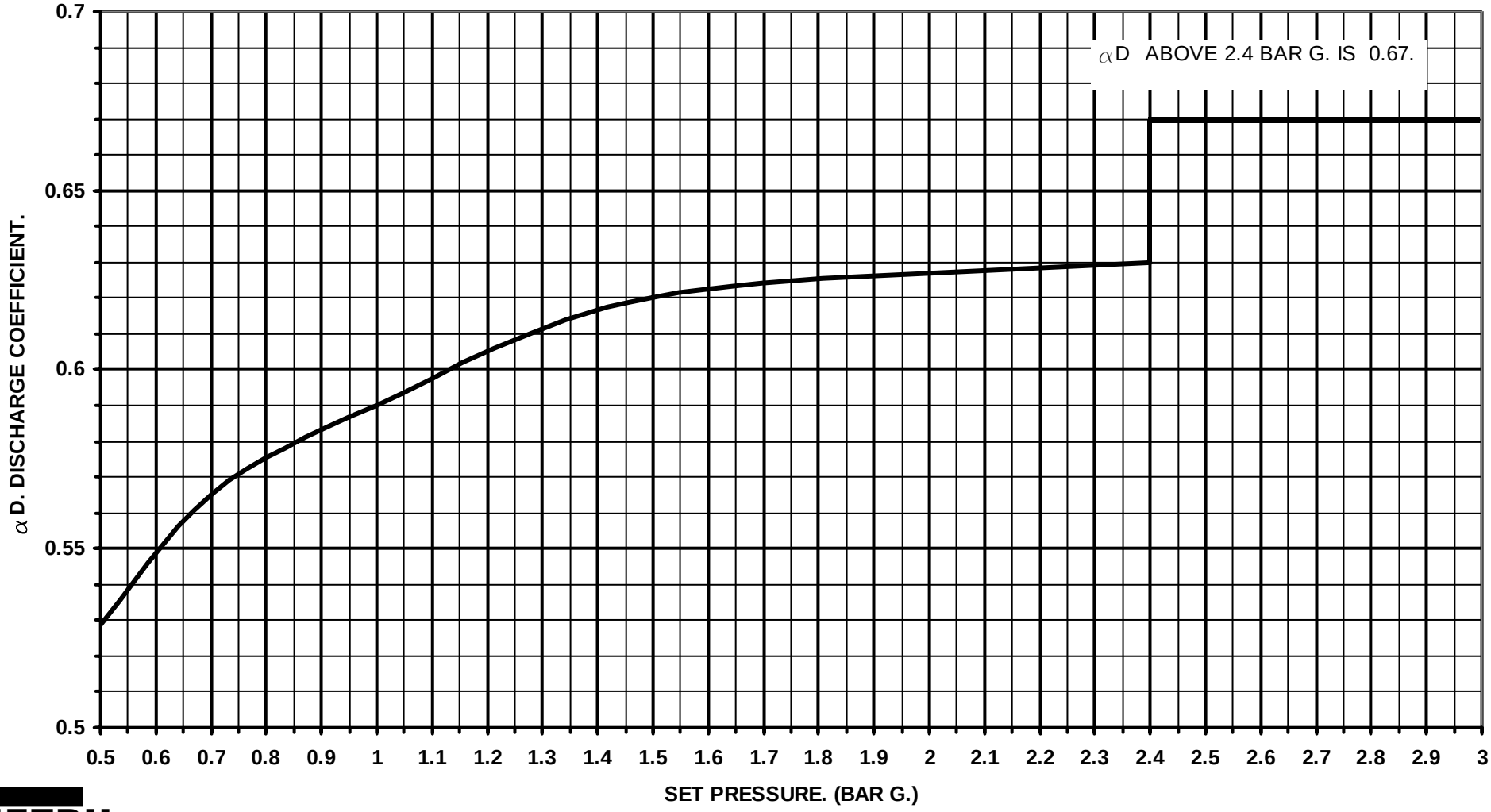
10mm Nom. Bore BRASS CONSTRUCTION
DIRECT SPRING LOADED ATMOSPHEREIC
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES

SERIES E VALVE
TYPE 81810, 81710, 81110
BRASS
TYPE 82810, 82710, 82110
BRASS/ST.STL. ADAPTOR

DISCHARGE COEFFICIENT FOR VALVE 81810 BELOW 2.4 BAR G. SET PRESSURE.



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SHEET 3 OF 3 SHEETS

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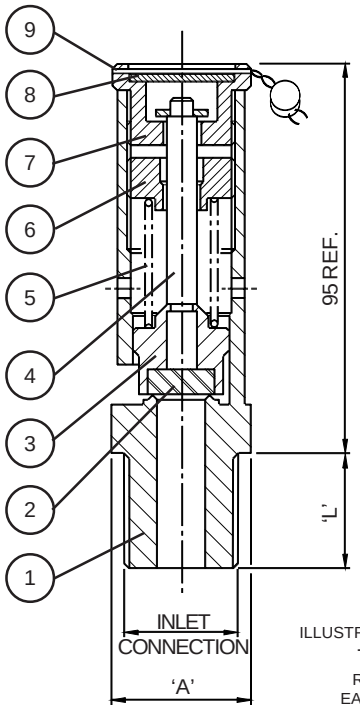
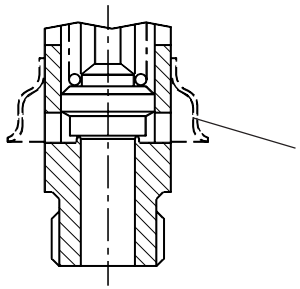
SERIES E VALVE
TYPE 81810, 81710, 81110
BRASS
TYPE 82810, 82710, 82110
BRASS/ST.STL. ADAPTOR



ILLUSTRATED SHOWING
TYPE R
ROTA-LIFT
EASING GEAR



VIEW SHOWING
OPTIONAL SHROUD
AVAILABLE

PARTS LIST & MATERIAL SPECIFICATION

1	BODY	BRASS BS EN 12164 CW614N
2	ELASTOMER SEAL	VITON
3	VALVE DISC	BRASS BS EN 12164 CW614N
4	SPINDLE	ST.STL. BS EN 10088-3 1.4057 (431)
5	SPRING	ST.STL BS EN 10270-3 1.4310 (302)
6	ADJUSTER	BRASS BS EN 12164 CW614N
7	LIFTING CAP	BRASS BS EN 12164 CW614N
8	NAMEPLATE	AL.ALLOY
9	WIRE & SEAL	ST.STL & LEAD

APPROVALS

Ad-Merkblatt A2: TÜV.SV.07-893.13.D/G.0,64.p.
Designed in accordance with BS6759 & BS EN ISO 4126-1.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00015
Quality management system module D, Cert No. EDS 0002011/01
Meeting the requirements of the A.S.M.E. Boiler & Pressure Vessel Code section VIII for air.
UV Cert. of Authorisation: 35757
Capacities certified by the National Board of Boiler & Pressure Vessel Inspectors.

TECHNICAL DATA

Relieving pressure	= Set pressure +10%
Reseating pressure	= Set pressure -10%
Maximum set pressure	= 21 Bar.g.
Minimum set pressure	= 2.8 Bar.g.
Flow area	= 132.7mm^2
Inlet bore diameter	= 13mm
Temerature range	= -15^{O}C to 200^{O}C
TÜV derated coefficient of discharge α_w	= 0.64
NB Certified rated slope	= 2.94 scfm/psia
Minimum lift at 10% over pressure	= 2.73mm

FOR FURTHER TECHNICAL INFORMATION, CONVERSION FACTORS, INSTALLATION AND OPERATING INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

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13mm Nom. Bore BRASS CONSTRUCTION
DIRECT SPRING LOADED ATMOSPHERIC
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES

SERIES E VALVE
TYPE 81813, 81713, 81113

FLOW CHART (P.E.D.)

-TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION

- FOR LOWER FLOWS REFER TO 10mm BORE TYPE 81810 DATA SHEET, FOR GREATER FLOWS REFER TO 15mm BORE TYPE 81815 DATA SHEET.

SET PRESSURE (Bar.g)	2.8	3	4.4	5	6	7	8	9	10	11	12	13	14	15	16.6	21
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS EN 4126, AIR AT 15°C AND 1013 mbar Std.Litres/s	66	70	96	107	125	143	161	179	197	215	233	251	269	287	316	395
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013mbar Normal m³/h	236.8	249.5	338.6	376.8	440.5	504.1	567.8	631.5	695.1	758.8	822.4	886.1	949.7	1013.4	1115.2	1395.3

BS CALCULATIONS ARE FOR GUIDANCE ONLY

FLOW CHART (A.S.M.E.)

SET PRESSURE Psig	41	50	60	70	80	90	100	150	200	250	300	305
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH A.S.M.E. AIR AT 60°F AND 14.7 psia/scfm	176	205	237	270	302	334	367	528	690	852	1013	1030

VALVE TYPE OPTIONS:

81813 = TUV, B.S. (P.E.D.)
81713 = A.S.M.E. & N.B.
81113 = A.S.M.E. & N.B., TUV, B.S. (P.E.D.)

VALVE SELECTION CHART

INLET CONNECTION	ORDERING CODE	TOP FITTING CODE R	DIM'N 'A' A/F HEX (mm)	THREAD LENGTH 'L'
G 1/2 (1/2" BSP PARALLEL)	81813 81713 81113	0873	27	14
R 1/2 (1/2" BSP TAPER)		0883	27	15
1/2" NPT		0893	30	19
G 3/4 (3/4" BSP PARALLEL)		0903	30	14
R 3/4 (3/4" BSP TAPER)		0913	30	19
3/4" NPT		0923	30	18.5

Example: Ordering code 81813 0913 is:- Wirelocked Rota-lift type construction with 13mm bore, 3/4" BSP Taper inlet connection and Viton® seals.

Note: This range of products are available with Viton® seals only.

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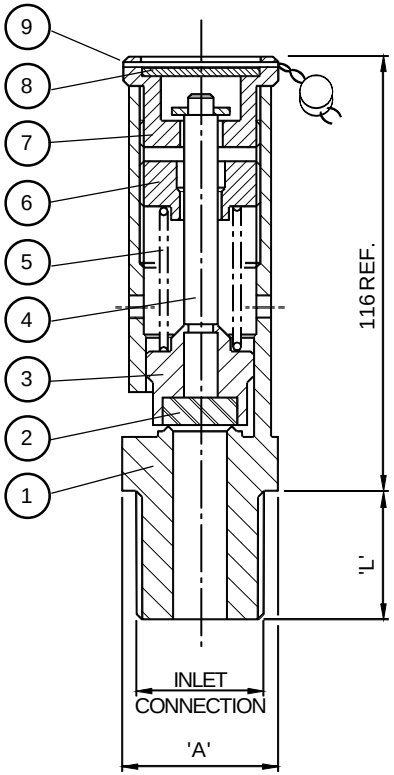
13mm Nom. Bore BRASS CONSTRUCTION DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

SERIES E VALVE
TYPE 81813, 81713, 81113



ILLUSTRATED SHOWING
TYPE R
ROTA-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

1	BODY	BRASS BS2874 CZ121
2	ELASTOMER SEAL	VITON®
3	VALVE DISC	BRASS BS2874 CZ121
4	SPINDLE	ST.STL. BS970 431S29
5	SPRING	ST.STL BS2056 302S26
6	ADJUSTER	BRASS BS2874 CZ121
7	LIFTING CAP	BRASS BS2874 CZ121
8	NAMEPLATE	AL.ALLOY
9	WIRE & SEAL	ST.STL & LEAD

APPROVALS

Ad-Merkblatt A2 1993: TÜV SV.02-893.15.2.D/G.0,72.p. Designed in accordance with BS6759 Part 2 & ISO 4126.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00015
Quality management system module D, Cert No. EDS 0002011/01

TECHNICAL DATA

Relieving pressure	= Set pressure +10%
Reseating pressure	= Set pressure -10%
Maximum set pressure	= 21 Bar.g
Minimum set pressure	= 2.5 Bar.g
Flow area	= 181.5 mm²
Inlet bore diameter	= 15.2 mm
Temperature range	= -15°C to 200°C
TÜV Derated coefficient of discharge α_w	= 0.72
Minimum lift at 10% over pressure	= 4.1 mm

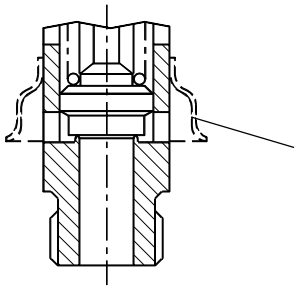
FOR FURTHER TECHNICAL INFORMATION, CONVERSION FACTORS, INSTALLATION AND OPERATING INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
- FOR LOWER FLOWS REFER TO 13mm BORE TYPE 81813 DATA SHEET.

SET PRESSURE (Bar.g)	2.5	3	4	5	6	7	8	9	10	11	12	13	14	15	16	21
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15°C AND 1013 mbar Std.Litres/s	94.5	108	136	163.5	191	218.8	246.5	274	301.7	329.4	357	384.6	412.3	440	467.5	605.7
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013mbar Normal m³/h	334.9	383.8	481.7	579.6	677.5	775.4	873.3	971.2	1069.1	1167	1264.9	1362.8	1460.7	1558.6	1656.5	2146

BS CALCULATIONS ARE FOR GUIDANCE ONLY



VIEW SHOWING
OPTIONAL SHROUD
AVAILABLE

VALVE SELECTION CHART

INLET CONNECTION	ORDERING CODE	TOP FITTING CODE R	DIM'N 'A' A/F HEX (mm)	DIM'N 'L' THREAD LENGTH (mm)
G 3/4 (3/4" BSP PARALLEL)	81815	0903	36	14
R 3/4 (3/4" BSP TAPER)		0913	36	16
G 1 (1" BSP PARALLEL)		0933	41	18
R 1 (1" BSP TAPER)		0943	36	19

Example:
Ordering code 81815 0913 is :- Wirelocked Rota-lift type construction with 15mm bore, 3/4" BSP Taper inlet connection and Viton® seals.
Note: This range of products are available with Viton® seals only.

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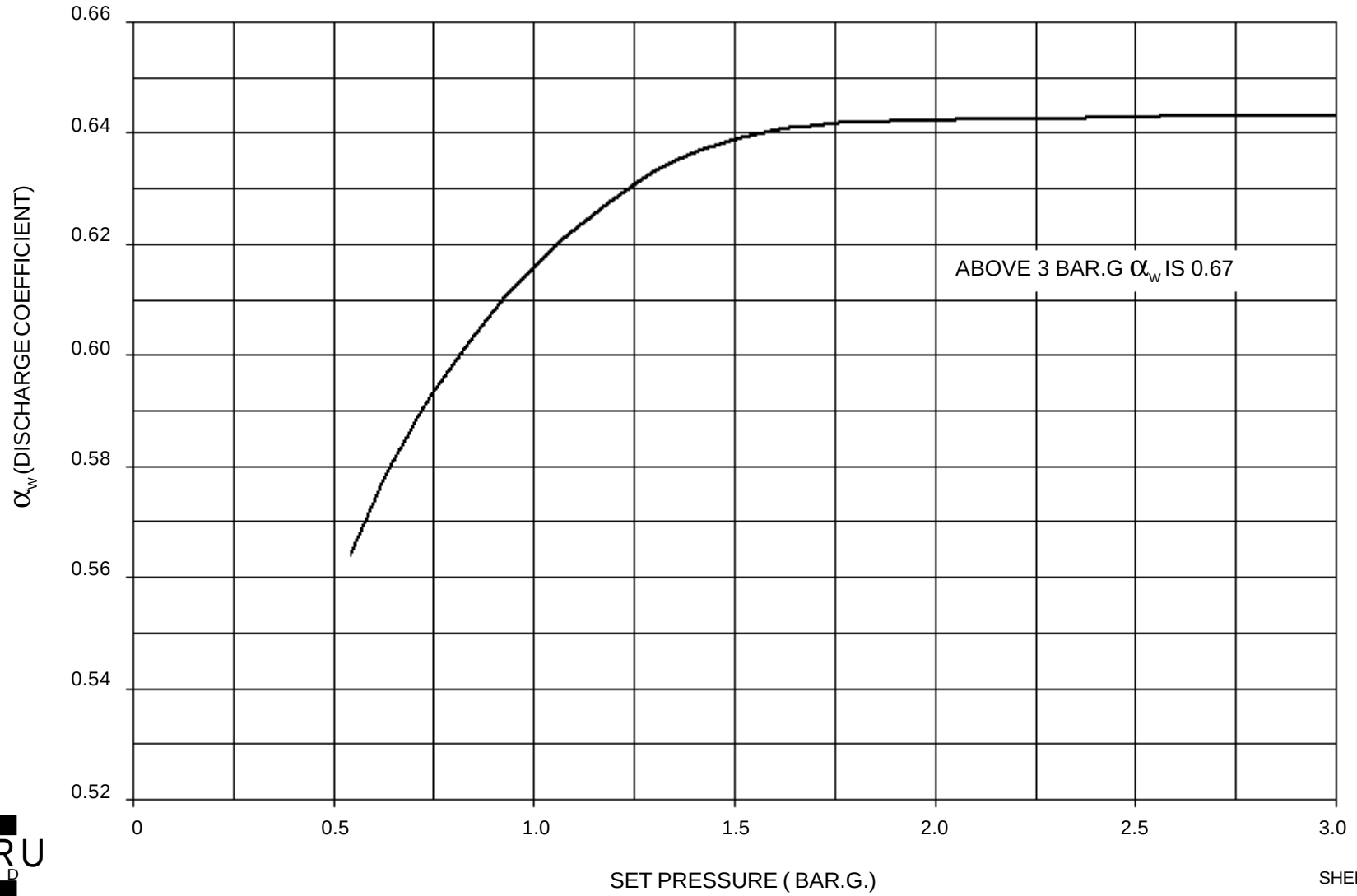
15mm Nom. Bore BRASS CONSTRUCTION
DIRECT SPRING LOADED ATMOSPHERIC
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES.

SERIES E VALVE

TYPE 81815

EDITION F. 16.02.04

PRESSURE/DISCHARGE CURVE FOR VALVE 81888
0.55 - 3.0 BAR.G.



SHEET 2 OF 2 SHEETS

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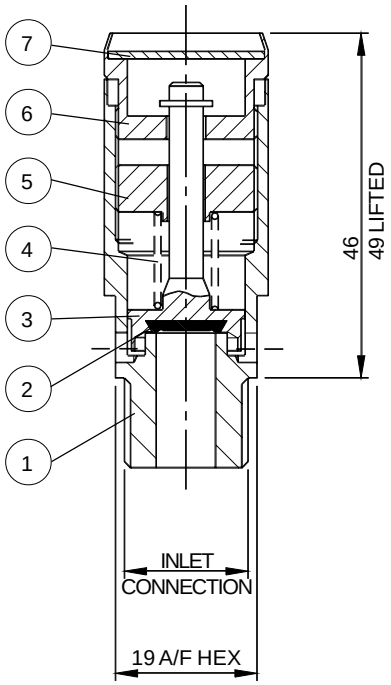
8mm Nom. Bore BRASS CONSTRUCTION
DIRECT SPRING LOADED ATMOSPHERIC
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES.

SERIES E VALVE

TYPE 81888 BRASS
TYPE 82888 BRASS/ST.STL.

EDITION A 01.05.03



ILLUSTRATED SHOWING
TYPE R
CRIMPED ROTA-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		73008	74008	75008
1	BODY	BRASS BS2874 CZ121	ST.STL.	BRASS BS2874 CZ132
2	TUTCHTITE SEAL	TO SUIT APPLICATION		
3	SPINDLE/ PLUNGER	BRASS BS2874 CZ121	ST.STL.	BRASS BS2874 CZ132
4	SPRING	ST.STL BS2056 302S26		
5	ADJUSTER	BRASS BS2874 CZ121	ST.STL.	BRASS BS2874 CZ132
6	CAP	BRASS BS2874 CZ121	ST.STL.	-
7	NAMEPLATE	AL.ALLOY		-

NOTE: WIRELOCK AVAILABLE ON TYPE 74008 ONLY.

APPROVALS

Ad - MERKBLATT A2 1998: (TÜV GERMANY), REF.- T.Ü.V.SV.01-276.7,9.D/G.0,63.p.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00015
Quality management system module D, Cert. No. EDS0002011/01
Designed in accordance with BS6759:1984 & I.S.O. 4126-1:1991

TECHNICAL DATA

Relieving pressure	= set pressure +10% (0.1 Bar.g below 1.0 Bar.g)
Reseating pressure	= set pressure -10% (0.3 Bar.g below 3.0 Bar.g)
Maximum set pressure	= 17.5 Bar.g
Minimum set pressure	= 0.27 Bar.g
Flow area	= 49mm^2
Inlet bore diameter	= 7.9mm
T.Ü.V. Derated coefficient of discharge α_d	= 0.63 below 3.0 Bar.g see 'α_dVs set pressure chart'.
Temperature range	= -20^{O}C TO 200^{O}C subject to normal seal materials.

FOR FURTHER INFORMATION, INSTALLATION AND OPERATIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
- FOR GREATER FLOWS REFER TO 8mm BORE TYPE 81808 DATA SHEET, FOR LOWER FLOW REFER TO 6mm BORE TYPE 81806 DATA SHEET.

SET PRESSURE Bar.g	0.27	0.5	1.0	1.5	2	3	4	5	6	7	8	9	10	11	12	15	17.5
CERTIFIED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0^{o}C AND 1013 mbar Normal m^3/h	19.8	27.5	40.9	54.2	66.5	90.7	113.8	137.0	160.1	183.3	206.4	229.5	252.7	275.8	298.9	368.4	426.2
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15^{o}C AND 1013 mbar Std. Litres/s	5.6	7.75	11.5	15.3	18.8	25.6	32.1	38.6	45.2	51.7	58.2	64.8	71.3	77.8	84.4	103.9	120.3

VALVE SELECTION CHART

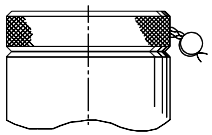
STANDARD THREADS SIZES SHOWN, OTHER SIZES MAY BE AVAILABLE.

INLET CONNECTION	ORDERING CODE	TOP FITTING CODE			
		73008 R	74008 RW	73008 SL	75008 SL
R 1/4 (1/4" BSP TAPER)	73008 74008 75008	1223	0823	0423	0423
R 3/8 (3/8" BSP TAPER)		1253	0853	0453	0453

Example:
Order code 73008 1223 is Rota-lift type easing gear. 1/4"BSPTR inlet connection, with Viton® seals and crimped locking.
Seal Material:
Last digit of ordering code calls up Viton® seal (since this is the most universal type).
When other material is required, last digit changes to:-

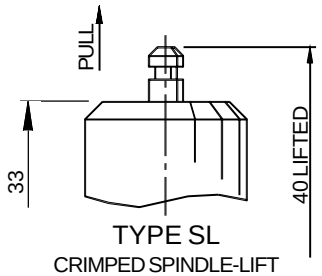
1. Nitrile
3. Viton®
5. Neoprene
6. Ethylene Propylene.

ALTERNATIVE
TOP FITTING



TYPE RW
WIRELOCKED ROTA-LIFT
EASING GEAR

NON PREFERED TYPE



TYPE SL
CRIMPED SPINDLE-LIFT
EASING GEAR

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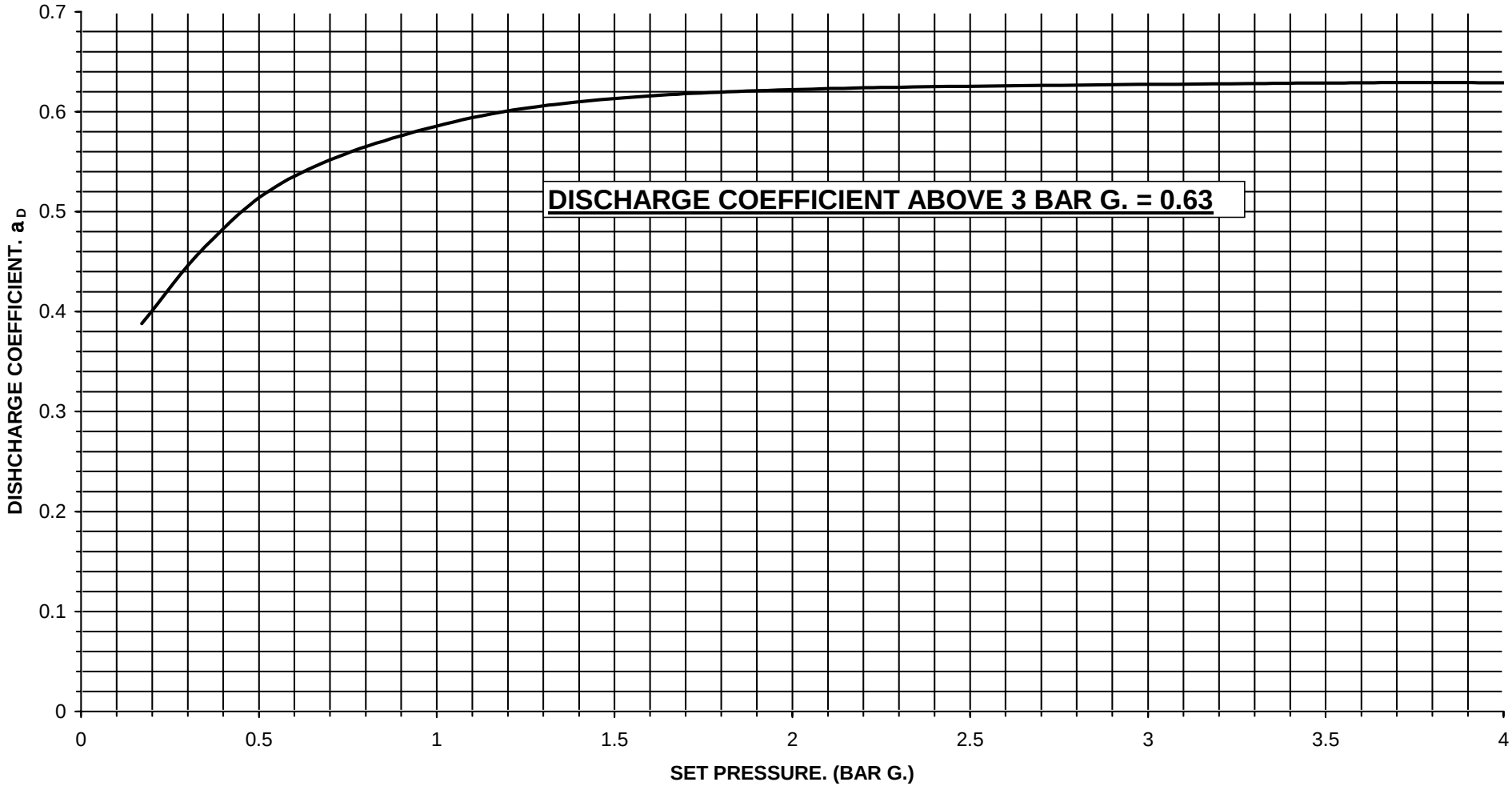
www.seetru.com enquires@seetru.com

8mm Nominal Bore
DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

SERIES
TYPE 73008 BRASS
TYPE 74008 ST.STL.
TYPE 75008 BRASS

EDITION D. 26.09.02

PRESSURE / DISCHARGE COEFFICIENT CURVE FOR VALVE 73008. 0.27 - 4.0 BAR G.



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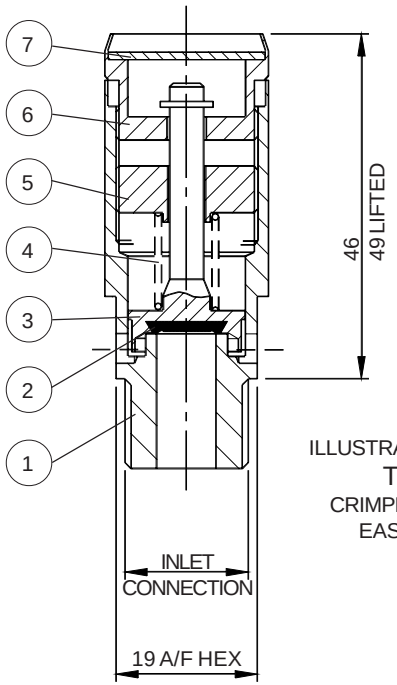
8mm Nominal Bore
DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

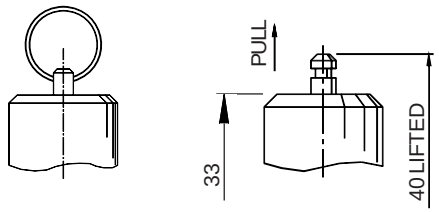
SERIES

TYPE 73008 BRASS
TYPE 74008 ST.STL.
TYPE 75008 BRASS



ILLUSTRATED SHOWING
TYPE R
CRIMPED ROTA-LIFT
EASING GEAR

ALTERNATIVE TOP FITTING



TYPE PR
PULL RING
EASING GEAR

TYPE SL
CRIMPED SPINDLE-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		75008	75108	75708
1	BODY	BRASS BS EN 12164 CW602N	BRASS BS EN 12164 CW614N	
2	TUTCHTITE SEAL	TO SUIT APPLICATION		
3	PLUNGER	BRASS BS EN 12164 CW602N		
4	SPRING	ST.STL. BS EN 10270-3 1.4310 (302)		
5	ADJUSTER	BRASS BS EN 12164 CW602N		
6	CAP	BRASS BS EN 12164 CW602N		
7	NAMEPLATE	AL.ALLOY		

APPROVALS

Ad - MERKBLATT A2: (TÜV GERMANY), REF.- T.Ü.V.SV.06-276.7,9.D/G.0,63.p.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00015
Quality management system module D, Cert. No. EDS0002011/01
Designed in accordance with BS 6759:1984 & BS EN I.S.O. 4126-1
Meeting the requirements of the A.S.M.E. Boiler & Pressure Vessel Code section VIII for steam.
UV Cert. of Authorisation: 35757
Capacities certified by the National Board of Boiler & Pressure Vessel Inspectors.

TECHNICAL DATA

Relieving pressure	= Set pressure +10% (0.1 Bar.g below 1.0 Bar.g)
Reseating pressure	= Set pressure -10% (0.3 Bar.g below 3.0 Bar.g)
Maximum set pressure	= 5 Bar.g
Minimum set pressure	= 0.27 Bar.g (1 Bar.g A.S.M.E.)
Flow area	= 49mm^2
Inlet bore diameter	= 7.9mm
T.Ü.V. Derated coefficient of discharge α_d	= 0.63 below 3.0 Bar.g see 'α_dVs set pressure chart'.
NB Certified rated slope	= 3.06 pph/psia
Temperature range	= -0^{O}C to 150^{O}C subject to seal materials.

FOR FURTHER INFORMATION, INSTALLATION AND OPERATIONS, CONVERSION FACTORS ETC.
SEE TECHNICAL INFORMATION SECTION.

SEETRU LIMITED

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8mm Nominal Bore BRASS
DIRECT SPRING LOADED ATMOSPHERIC
DISCHARGE SAFETY VALVE
FOR STEAM

SERIES

TYPE 75008
TYPE 75108
TYPE 75708

EDITION A. 14.09.06

FLOW CHART (T.U.V.)

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION

SET PRESSURE Bar.g	0.27	0.5	1.0	1.5	2	3	4	5
CERTIFIED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV STEAM Kg/hr	14.68	20.9	32.2	42.4	51.6	71.0	88.4	105.3

FLOW CHART (A.S.M.E)

SET PRESSURE Psig	14.5	15	20	30	40	50	60	70	72.5
CERTIFIED DISCHARGE CAPACITY IN ACCORDANCE WITH A.S.M.E. lb/hr	93.8	95.5	112.3	146	179.6	213.3	247	280.6	289

FLOW CHART (EN 4126-1)

SET PRESSURE Bar.g	0.27	0.5	1.0	1.5	2	3	4	5
CERTIFIED DISCHARGE CAPACITY IN ACCORDANCE WITH EN 4126-1 Kg/hr	14.0	20.0	31.25	41.0	50	68.4	85.1	102

VALVE TYPE OPTIONS:

75008 = TUV, B.S. (P.E.D.)
75708 = A.S.M.E. & N.B.
75108 = A.S.M.E. & N.B., TUV, B.S. (P.E.D.)

VALVE SELECTION CHART

STANDARD THREADS SIZES SHOWN, OTHER SIZES MAY BE AVAILABLE.

INLET CONNECTION	ORDERING CODE	TOP FITTING CODE		
		R	SL	PR
R 1/4 (1/4" BSP TAPER)	75008 75108 75708	1224	0424	2024
1/4" NPT		1234	0434	2034
R 3/8 (3/8" BSP TAPER)		1254	0454	2054
3/8" NPT		1264	0464	2064

Example: Order code 73008 1234 is Rota-lift type easing gear.
1/4"BSP.TR inlet connection, with Silicone seals and crimped locking.
Seal Material: Last digit of ordering code calls up Silicone seal.
When other material is required, last digit changes to:-
4. Silicone.
6. Ethylene Propylene.

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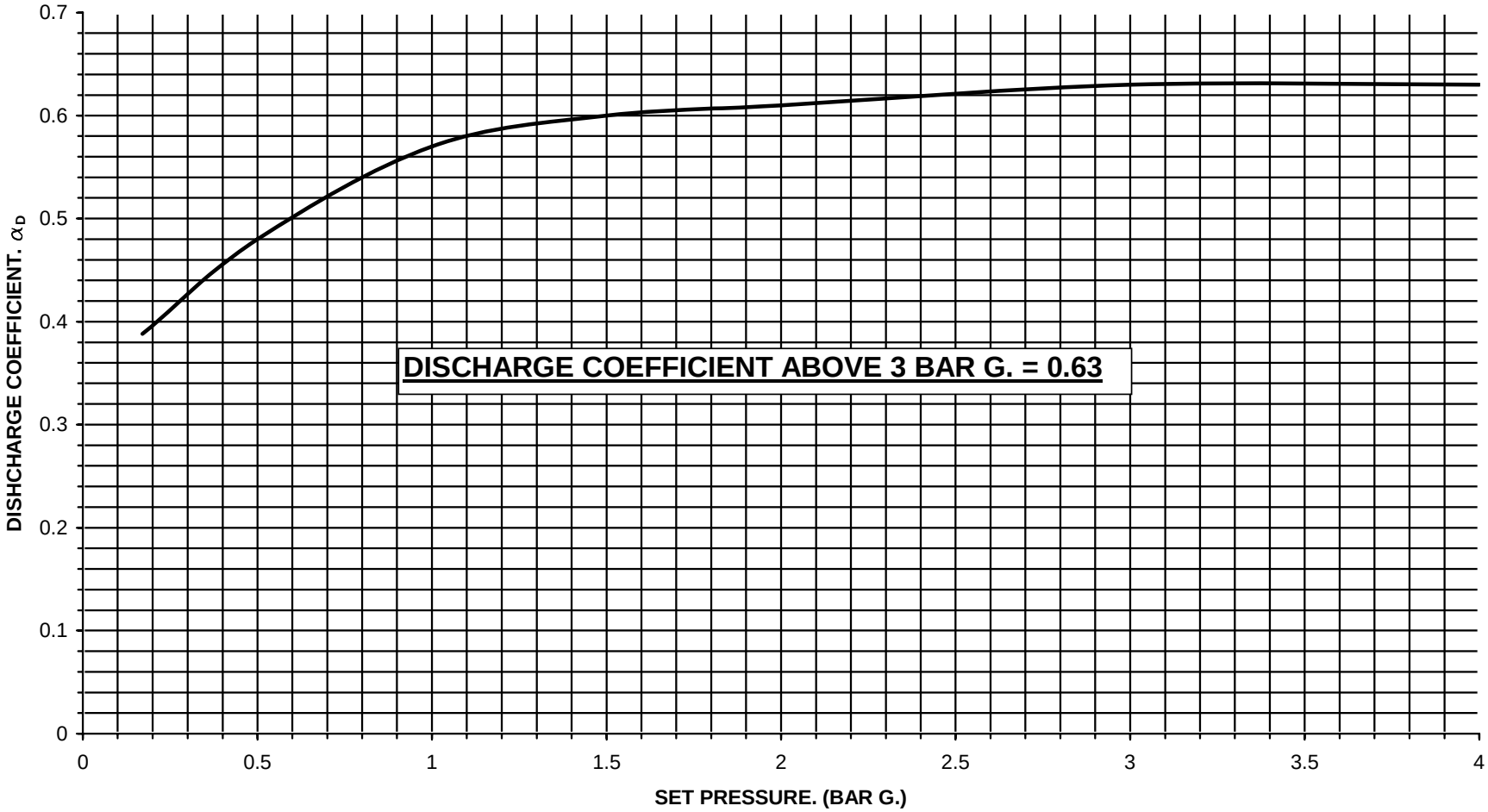
8mm Nominal Bore BRASS
DIRECT SPRING LOADED ATMOSPHERIC
DISCHARGE SAFETY VALVE
FOR STEAM

SERIES

TYPE 75008
TYPE 75108
TYPE 75708

PRESSURE / DISCHARGE COEFFICIENT CURVE FOR VALVE 75008. 0.27 - 4.0 BAR G.



SHEET 3 OF 3 SHEETS

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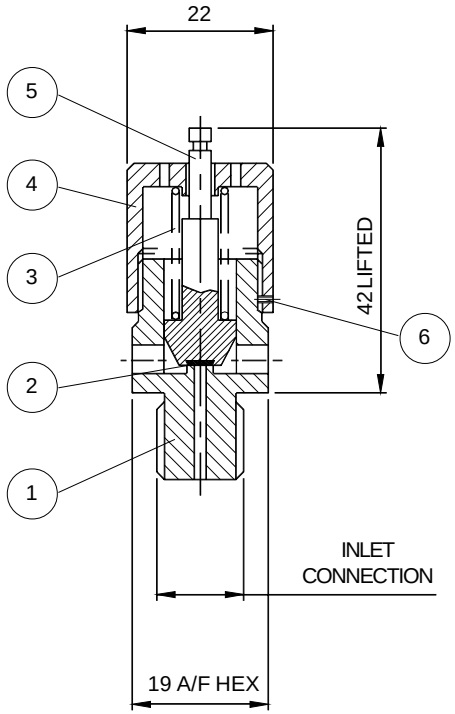
8mm Nominal Bore BRASS
DIRECT SPRING LOADED ATMOSPHERIC
DISCHARGE SAFETY VALVE
FOR STEAM

SERIES

TYPE 75008
TYPE 75108
TYPE 75708



ILLUSTRATED SHOWING
TYPE SL
SPINDLE LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

1	BODY	BRASS
2	TUTCHTITE SEAL	TO SUIT APPLICATION
3	SPRING	ST.STL.
4	CAP	BRASS
5	PLUNGER	BRASS
6	SET SCREW	STEEL

APPROVALS

Designed in accordance withISO 4126-1:1991
P.E.D. 97/23/EC
Type examination module B, Cert No. 2002/034/8878/2
Quality management system module D, Cert. No. EDS0002011/01

TECHNICAL DATA

Relieving pressure	= Set pressure + 10%
Reseating pressure	= Set pressure - 15%
Maximum set pressure	= 134.5 Bar.g
Minimum set pressure	= 20.6 Bar.g
Flow area	= 8.0 mm²
Inlet bore diameter	= 3.2 mm
Derated coefficient of discharge K_{dr}	= 0.54
Temperature Range	= -50°C to 200°C subject to seal material.

FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
FOR GREATER FLOWS REFER TO 8mm BORE LOW PRESSURE TYPE 61682 or 33110 DATA SHEETS, FOR LOWER FLOWS REFER TO SEETRU

SET PRESSURE Bar.g	20.6	30	40	50	60	70	80	90	100	110	120	130	134.5
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15°C AND 1013 mbar Std.Litres/s	19.7	28.4	37.6	46.8	56.0	65.1	74.3	83.5	92.7	101.9	111.0	120.2	124.4

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available

INLET CONNECTION	ORDERING CODE	TOP FITTING CODE
		SL
R 1/4 (1/4" BSP TAPER)	31180	0603
G 1/4 (1/4" BSP PARALLEL)		0103

Example:
Ordering code 31180 0603 is Spindle lift type easing gear.
1/4" BSP taper inlet connection with Viton seals.
Seal material:
Last digit of ordering code calls up viton seal (since this is the most universal type). When other material is required last digit changes to:-

1. NITRILE 5. NEOPRENE
3. VITON 6. ETHYLENE PROPYLENE

For advice on seal selection refer to Technical Information Section A.

SEETRU LIMITED

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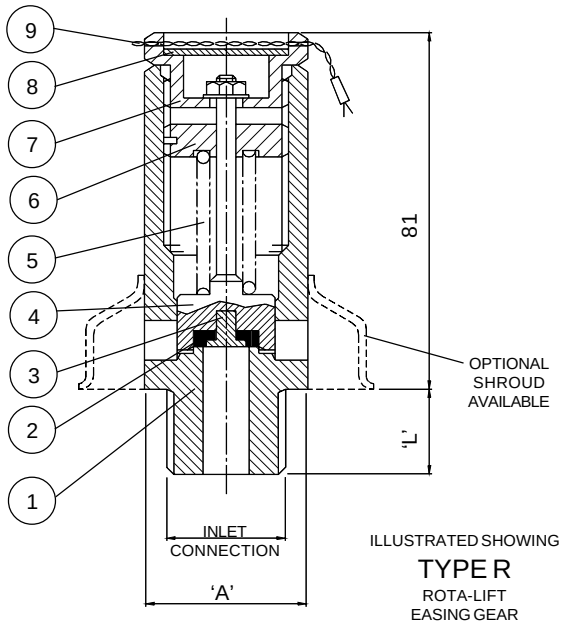
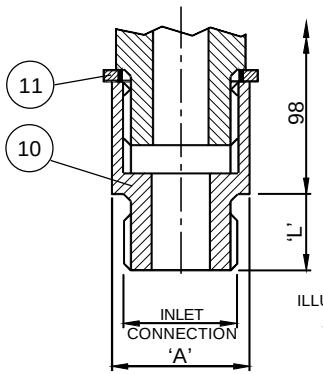
3mm Nom. Bore BRASS CONSTRUCTION
DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

ATMOSPHERIC DISCHARGE
MINI SERIES
HIGH PRESSURE
TYPE 31180

EDITION D. 27.05.03



ILLUSTRATED SHOWING
TYPE R
ROTA-LIFT
EASING GEAR



ILLUSTRATED SHOWING
ST.STL. ADAPTOR

PARTS LIST & MATERIAL SPECIFICATION

1	BODY	BRASS BS2874 CZ121
2	TUTCHTITE SEAL	SUIT APPLICATION
3	SEAL RETAINER	BRASS BS2874 CZ121
4	SPINDLE/PLUNGER	BRASS BS2874 CZ121
5	SPRING	ST.STL BS2056 302S26
6	ADJUSTER	BRASS BS2874 CZ121
7	CAP	BRASS BS2874 CZ121
8	NAMEPLATE	AL. ALLOY
9	WIRE & SEAL	ST.STL & LEAD
10	ADAPTOR	ST.STL.
11	DOWTY SEAL	NITRILE

APPROVALS

Ad-Merkblatt A2 1993: (TÜV Germany) Ref - TÜV.SV .97- 685.8,0.D/G.0,70.p.
P.E.D. 97/23/EC
Type Examination Module B, Cert. No. 01 202 111-B-00015
Quality Management System Module D, Cert. No. EDS 0002011/01
Designed in accordance with I.S.O. 4126 & BS 6759 Part 2 & Part 3 1984 for Steam & Gas.

TECHNICAL DATA

Relieving pressure = Set pressure + 10%
Reseating pressure = Set pressure - 10%
Maximum set pressure = 55 Bar.g
Minimum set pressure = 14.5 Bar.g
Flow area = 50.27 mm^2
Inlet bore diameter = 8.0 mm
BS Derated coefficient of discharge K_{dr} = 0.78
TÜV Derated coefficient of discharge α_w = 0.70
BS Minimum lift at 10% overpressure = 2.5 mm
Temperature Range = -20°C to 200°C subject to seal material.
Stable operation on flows down to 80% of valve rated capacity.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION.
- FOR GREATER FLOWS REFER TO 10mm BORE TYPE 61610 DATA SHEET.

SET PRESSURE Bar.g	14.5	15	16	17	18	19	20	25	30	35	40	45	50	55
CERTIFIED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15°C AND 1013 mbar Std.Litres/s	128	132	140	149	157	165	173	215	256	298	339	380	422	463
CERTIFIED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013 mbar Normal m^3/h	406.5	420.0	446.1	472.4	498.8	525.2	551.5	683.4	815.2	947.0	1079	1211	1343	1474

VALVE SELECTION CHART

Standard sizes shown, other sizes may be available.

	INLET CONNECTION	ORDERING CODE	TOP FITTING CODE		DIM'N 'A' A/F HEX (mm)	DIM'N 'A' A/F HEX (mm) ADAPTOR	INLET THR'D DIM'N 'L'
			R	WITH ST.STL. ADAPTOR			
*	R 1/4 (1/4" BSP TAPER)	61682	0023	5153	26.0	25.6	10
*	1/4" NPT		0033	5163			12
*	G 3/8 (3/8" BSP PARALLEL)		0043	5173			10
	R 3/8 (3/8" BSP TAPER)		0053	5183			12.5
	3/8" NPT		0063	5193			15.3
	G 1/2 (1/2" BSP PARALLEL)		0073	5203			12
	R 1/2 (1/2" BSP TAPER)		0083	5483			19
	1/2" NPT		0093	5493			

Example: Ordering code 61682 0083 is Rotalift easing gear. 1/2" BSP taper inlet connection Viton seals and wirelocked.
Seal Material: Last digit of order code calls up viton seal (since this is the most universal type). When other material is required last digit changes to:-
1. NITRILE
3. VITON®
5. NEOPRENE
6. ETHYLENE PROPYLENE

For advice on seal selection refer to Technical Information Section A.

* MAX TIGHTENING TORQUE 14Nm

SEETRU LIMITED

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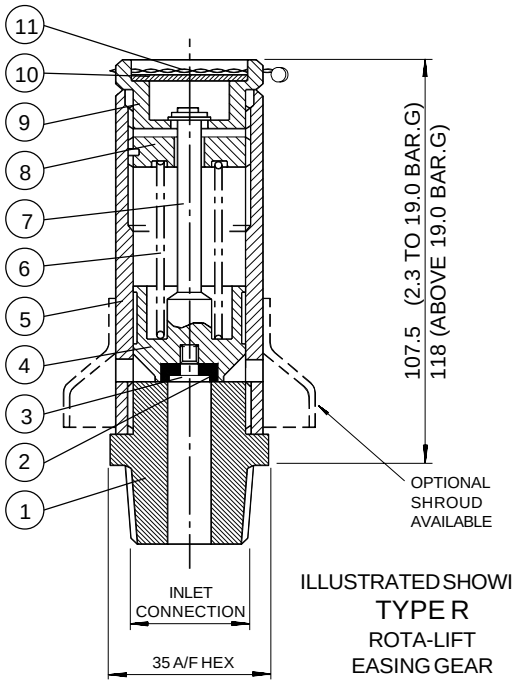
8mm Nom. Bore BRASS CONSTRUCTION DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

ATMOSPHERIC DISCHARGE SERIES M/1

TYPE 61682



ILLUSTRATED SHOWING
TYPE R
ROTA-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		61610	62610
1	INLET SEAT	BRASS	ST.STL.
2	TUTCHTITE SEAL	SEE SELECTION CHART	
3	SEAL RETAINER	BRASS	ST.STL.
4	PLUNGER	BRASS	
5	BODY	BRASS	
6	SPRING	ST.STL.	
7	SPINDLE	ST.STL.	
8	ADJUSTER	BRASS	
9	LIFTING CAP	BRASS	
10	NAMEPLATE	AL. ALLOY	
11	WIRE AND SEAL	ST.STL & LEAD	

APPROVALS

BS 6759 Part 2 & Part 3 1984 For steam & gas.
Ad-Merkblatt A2 1993: (TÜV Germany) Ref - TÜV.SV .01 - 622.9,6.D/G.0,71.p. I.S.O. 4126
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00015
Quality management system module D, Cert. No. EDS 0002011/01

TECHNICAL DATA

Relieving pressure	= Set pressure + 10%
Reseating pressure	= Set pressure - 10% (0.3 Bar.g minimum)
Maximum set pressure	= 44 Bar.g
Minimum set pressure	= 2.3 Bar.g
Flow area	= 72.4 mm^2
Inlet bore diameter	= 9.6 mm
BS Derated coefficient of discharge K_{dr}	= 0.78
TÜV Derated coefficient of discharge α_w	= 0.71
BS Minimum lift at 10% overpressure	= 2.7 mm
Temperature Range	= -20ºC to 200ºC subject to seal material.

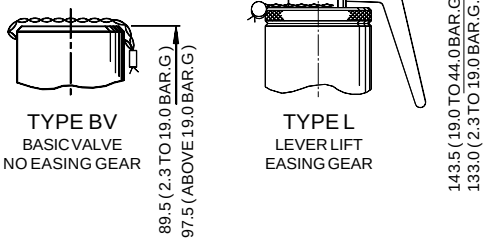
Stable operation on flows down to 50% of valve rated capacity.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
- FOR GREATER FLOWS REFER TO 13mm BORE TYPE 61613 DATA SHEET, FOR LOWER FLOWS REFER TO 8mm BORE TYPE 81808/61682 DATA SHEETS

SET PRESSURE Bar.g (CURRENT APPROVED RANGE)	2.3	3	4	5	6	7	8	9	10	15	20	25	30	31	35	40	44
CERTIFIED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15ºC AND 1013 mbar Std.Litres/s	38	47	59	71	82	94	106	118	130	190	250	309	369	381	429	489	536
CERTIFIED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0ºC AND 1013 mbar Normal m^3/h	124.0	151	189.5	228.0	266.5	305.0	343.5	382.0	420.5	613.0	805.5	998	1190.5	1229	1383	1576	1730

ALTERNATIVE TOP FITTINGS



TYPE BV
BASIC VALVE
NO EASING GEAR

TYPE L
LEVER LIFT
EASING GEAR

VALVE SELECTION CHART

Standard sizes shown, other sizes may be available.

INLET CONNECTION	ORDERING CODE	TOP FITTING CODE		
		R	BV	L
R 1/2 (1/2" BSP TAPER)	61610 62610	0083	0483	7683
R 3/4 (3/4" BSP TAPER)		0113	0513	7713

Example:
Ordering code 61610 0083 is Rotalift easing gear. 1/2" BSP taper inlet connection Viton® seals and wirelocked.
Seal Material:
Last digit of order code calls up Viton® seal (since this is the most universal type). When other material is required last digit changes to:-

1. NITRILE
3. VITON®
5. NEOPRENE
6. ETHYLENE PROPYLENE

For advice on seal selection refer to Technical Information Section A.

SEETRU LIMITED

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ALBION DOCKSIDE WORKS, BRISTOL. BS1 6UT
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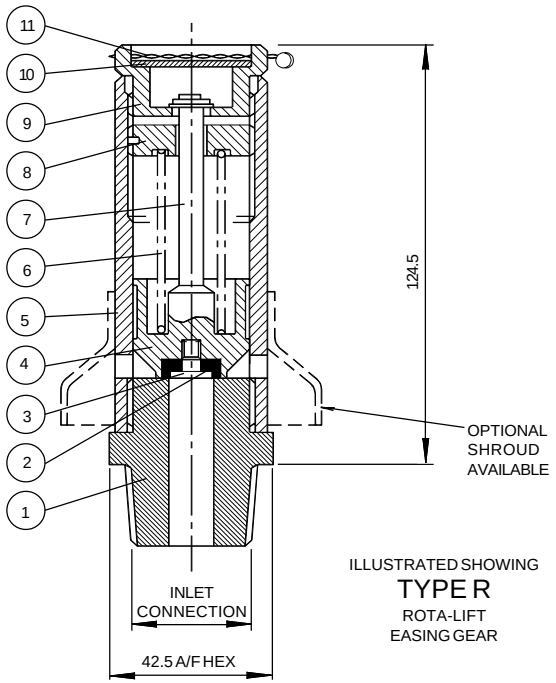
www.seetru.com enquires@seetru.com

10mm Nom. Bore BRASS CONSTRUCTION
DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES.

ATMOSPHERIC DISCHARGE
SERIES M/1

TYPE 61610 BRASS
TYPE 62610 BRASS / ST.STL.



ILLUSTRATED SHOWING
TYPE R
ROTA-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		61613	62613
1	INLET SEAT	BRASS	ST.STL.
2	TUTCHTITE SEAL	SEE SELECTION CHART	
3	SEAL RETAINER	BRASS	ST.STL.
4	PLUNGER	BRASS	
5	BODY	BRASS	
6	SPRING	ST.STL.	
7	SPINDLE	ST.STL.	
8	ADJUSTER	BRASS	
9	LIFTING CAP	BRASS	
10	NAMEPLATE	AL. ALLOY	
11	WIRE AND SEAL	ST.STL & LEAD	

APPROVALS

BS 6759 Part 2 & Part 3 1984 For steam & gas.
Ad-Merkblatt A2 1993: (TÜV Germany) Ref - TÜV.SV .01 - 622.13,0.D/G.0,81.p. I.S.O. 4126
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00015
Quality management system module D, Cert. No. EDS 0002011/01

TECHNICAL DATA

Relieving pressure	= Set pressure + 10%
Reseating pressure	= Set pressure - 10% (0.3 Bar.g minimum)
Maximum set pressure	= 41.4 Bar.g
Minimum set pressure	= 2.8 Bar.g
Flow area	= 132.7 mm^2
Inlet bore diameter	= 13.0 mm
BS Derated coefficient of discharge K_{dr}	= 0.78
TÜV Derated coefficient of discharge α_w	= 0.81
BS Minimum lift at 10% overpressure	= 4.2 mm
Temperature Range	= -20°C to 200°C subject to seal material.

Stable operation on flows down to 50% of valve rated capacity.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION

FLOW CHART - TO CALCULATE INTRMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION

-FOR GREATER FLOWS REFER TO 18mm BORE TYPE 61618 DATA SHEET, FOR LOWER FLOWS REFER TO 10mm BORE TYPE 61610 DATA SHEETS

SET PRESSURE Bar.g	2.8	3	4	5	6	7	8	9	10	15	20	25	30	35	40	41.4
CERTIFIED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15°C AND 1013 mbar Std.Litres/s	81	86	107	129	151	173	195	217	239	348	458	567	677	786	896	926
CERTIFIED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013 mbar Normal m^3/h	300	316	396.5	477	557.5	638	718.5	799	880	1282.5	1685	2088	2491	2849	3296.5	3409

VALVE SELECTION CHART

Standard sizes shown, other sizes may be available.

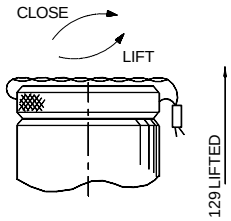
INLET CONNECTION	ORDERING CODE	TOP FITTING CODE		
		R	BV	L
R 3/4 (3/4" BSP TAPER)	61613 62613	0113	0513	7713
R 1 (1" BSP TAPER)		0143	0543	7743

Example:
Ordering code 61613 0113 is Rotalift easing gear. 3/4" BSP taper inlet connection Viton seals and wirelocked.
Seal Material:
Last digit of order code calls up viton seal (since this is the most universal type). When other material is required the last digit changes to:-

1. NITRILE
3. VITON®
5. NEOPRENE
6. ETHYLENE PROPYLENE

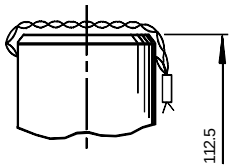
For advise on seal selection refer to Technical Information Section A.

PREFERRED TYPE

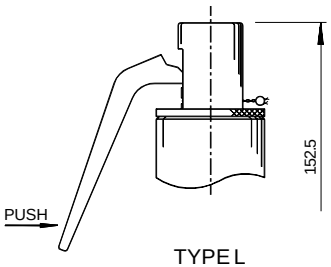


TYPE R
ROTA-LIFT
EASING GEAR

ALTERNATIVE TOP FITTINGS



TYPE BV
BASIC VALVE
NO EASING GEAR



TYPE L
LEVER LIFT
EASING GEAR

SEETRU LIMITED

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ALBION DOCKSIDE WORKS, BRISTOL. BS1 6UT
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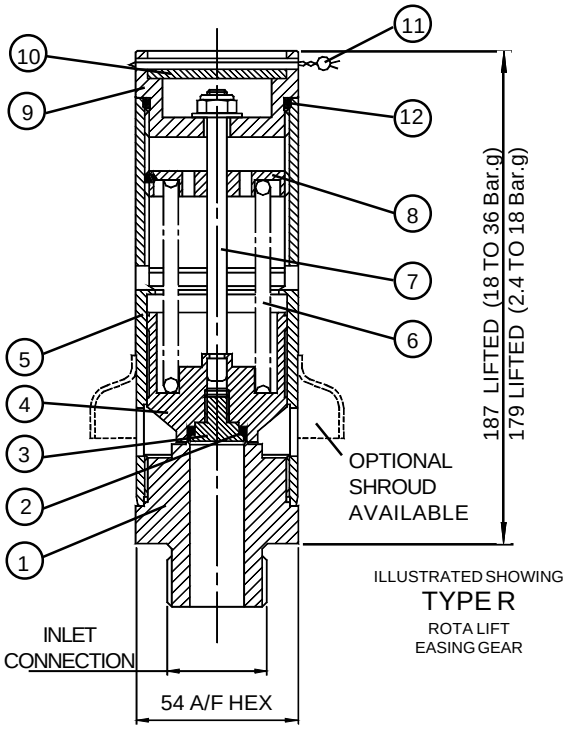
www.seetru.com enquires@seetru.com

13mm Nom. Bore BRASS CONSTRUCTION DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

ATMOSPHERIC DISCHARGE
SERIES M/1
TYPE 61613 BRASS
TYPE 62613 BRASS / ST.STL.



ILLUSTRATED SHOWING
TYPE R
ROTA LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		61618	62618
1	INLET SEAT	BRASS	ST.STL.
2	TUTCHTITE SEAL	SUIT APPLICATION	
3	SEAL RETAINER	BRASS	ST.STL.
4	PLUNGER	BRASS	
5	BODY	BRASS	
6	SPRING	ST.STL.	
7	SPINDLE	ST.STL.	
8	ADJUSTER	BRASS	
9	CAP	BRASS	
10	NAMEPLATE	AL.ALLOY	
11	WIRE & SEAL	ST.STL & LEAD	
12	O'RING	TO SUIT APPLICATION	

APPROVALS

Designed in accordance with BS 6759 Part 2 & Part 3 1984.
Ad-Merkblatt A2 1998: (TÜV Germany) TÜV.SV.01-622.18,0.D/G.0,81.p. I.S.O. 4126
P.E.D. 97/23/EC
Type examination module B, Cert No. 01 202 111-B-00015
Quality management system module D, Cert No. EDS 0002011/01

TECHNICAL DATA

Relieving pressure	= Set pressure +10%
Reseating pressure	= Set pressure -10% (0.3 Bar.g minimum)
Maximum set pressure	= 36 Bar.g
Minimum set pressure	= 2.1 Bar.g
Flow area	= 254.5mm^2
Inlet bore diameter	= 18.0mm
TÜV Derated coefficient of discharg α_w	= 0.81
BS Minimum lift at 10% overpressure	= 6 mm
Temperature Range	= -20ºC to 180ºC subject to seal material.

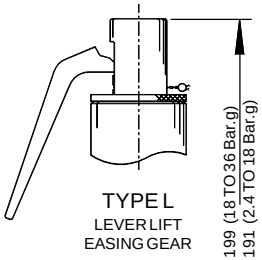
Stable operation on flows down to 50% of valve rated capacity.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
- FOR GREATER FLOWS REFER TO 61620 OR 63620 DATA SHEET, FOR LOWER FLOWS REFER TO 13mm BORE TYPE 61613 DATA SHEET

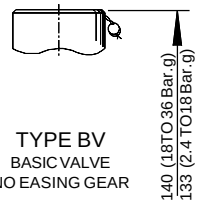
SET PRESSURE Bar.g	2.1	3	4	5	6	7	8	9	10	15	20	25	30	35	36
CERTIFIED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0ºC AND 1013 mbar Normal m^3/h	466.5	605.5	760	914.5	1069	1223	1378	1532	1686.5	2459	3231	4003	4775.5	5548	5702

PREFERRED TYPE



TYPE L
LEVER LIFT
EASING GEAR

ALTERNATIVE
TOP FITTINGS



TYPE BV
BASIC VALVE
NO EASING GEAR

VALVE SELECTION CHART

Standard sizes shown, other sizes may be available.

INLET CONNECTION	ORDERING CODE	TOP FITTING CODE		
		L	R	BV
R 1 (1" BSP TAPER)	61618 62618	7743	0143	0543
R 1 1/2 (1 1/2" BSP TAPER)		7803	0203	0603

Example:
Ordering code 61618 0143 is Rota-Lift easing gear. 1" BSP taper inlet connection Viton® seals and wirelocked.
Seal Material:
Last digit of order code calls up Viton® seal (since this is the most universal type). When other material is required the last digit changes to:-
1. NITRILE 5. NEOPRENE
3. VITON® 6. ETHYLENE PROPYLENE
For advice on seal selection refer to Technical Information Section A.

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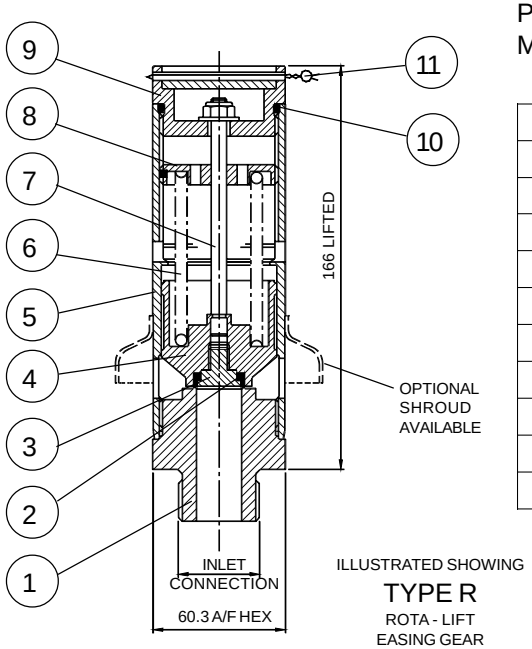
18mm Nom. Bore BRASS CONSTRUCTION
DIRECT SPRING LOADED ATMOSPHERIC
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES

ATMOSPHERIC DISCHARGE
SERIES M/1

TYPE 61618 BRASS
TYPE 62618 BRASS / ST.STL.

EDITION I. 25.02.04



ILLUSTRATED SHOWING
TYPE R
ROTA - LIFT EASING GEAR

PARTS LIST& MATERIAL SPECIFICATION

		61620	62620
1	INLET SEAT	BRASS	ST.STL.
2	TUTCHTITE SEAL	TO SUIT APPLICATION	
3	SEAL RETAINER	BRASS	ST.STL.
4	PLUNGER	BRASS	
5	BODY	BRASS	
6	SPRING	ST.STL.	
7	SPINDLE	ST.STL.	
8	ADJUSTER	BRASS	
9	CAP	BRASS	
10	O'RING	TO SUIT APPLICATION	
11	WIRE & SEAL	ST.STL & LEAD	

APPROVALS

Ad-Merkblatt A2 1993: (TÜV Germany) Ref - TÜV.SV.01 - 622.20.D/G.0,76.p.
Designed in accordance with BS 6759 Part 2 & I.S.O. 4126 .
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00015
Quality management system module D, Cert. No. EDS 0002011/01

TECHNICAL DATA

Relieving pressure	= Set pressure + 10%
Reseating pressure	= Set pressure - 10% (0.3 Bar.g minimum)
Maximum set pressure	= 18.0 Bar.g
Minimum set pressure	= 2.0 Bar.g
Flow area	= 314 mm^2
Inlet bore diameter	= 20 mm
TÜV Derated coefficient of discharge α_w	= 0.76
Temperature Range	= -20°C to 200°C subject to seal material.

FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

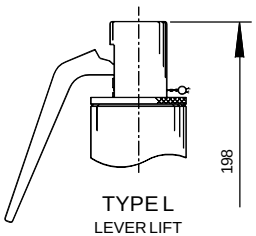
FLOW CHART

-TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
-FOR GREATER FLOWS REFER TO 25mm TYPE 63625 DATA SHEET, FOR LOWER FLOWS REFER TO 18mm BORE TYPE 61618 DATA SHEET

SET PRESSURE Bar.g	2	3	4	5	6	7	8	9	10	15	18
DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15°C AND 1013 mbar Std.Litres/s	147	198	249	300	350	401	452	502	553	806	958
CERTIFIED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013 mbar Normal m^3/h	522.5	701.3	880.3	1059.2	1238.2	1417.1	1595.9	1774.9	1953.8	2848.3	3385.0

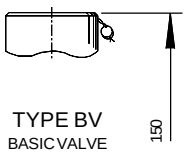
BS CALCULATIONS ARE FOR GUIDENCE ONLY

PREFERRED TYPES



TYPE L
LEVER LIFT EASING GEAR

ALTERNATIVE TOP FITTINGS



TYPE BV
BASIC VALVE NO EASING GEAR

VALVE SELECTION CHART

Standard sizes shown, other sizes may be available.

INLET CONNECTION	ORDERING CODE	TOP FITTING CODE		
		L	R	BV
R 1 (1" BSP TAPER)	61620 62620	7743	0143	0543
R 1 1/2 (1 1/2" BSP TAPER)		7803	0203	0603

Example:
Ordering code 61620 0143 is Rota-lift easing gear. 1" BSP taper inlet connection Viton seals and wirelocked.
Seal Material:
Last digit of order code calls up Viton seal (since this is the most universal type). When other material is required, last digit changes to:-

1. NITRILE
3. VITON®
5. NEOPRENE
6. ETHYLENE PROPYLENE

For advice on seal selection refer to Technical Information Section A.

SEETRU LIMITED

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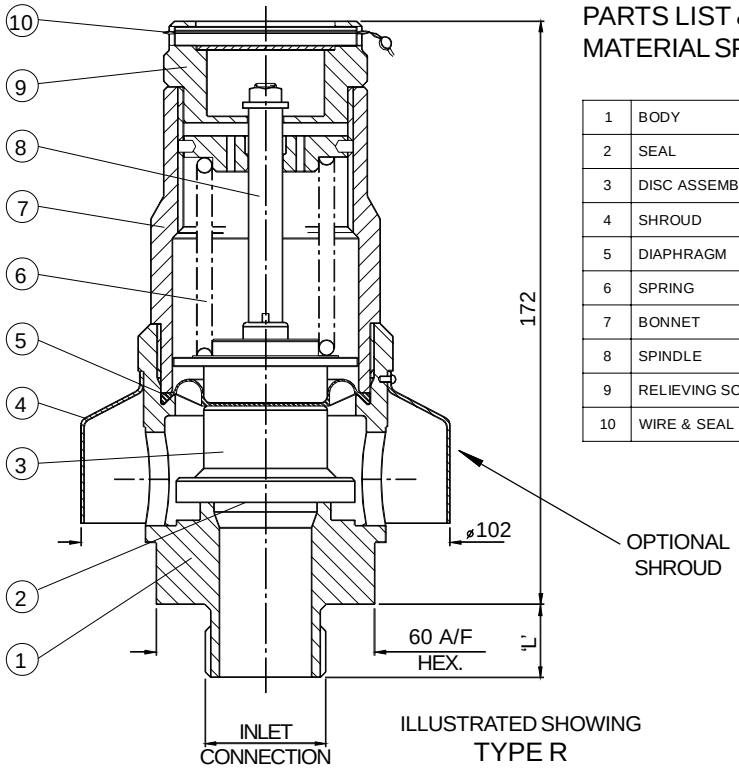
20mm Nom. Bore BRASS CONSTRUCTION DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

ATMOSPHERIC DISCHARGE SERIES M/1

TYPE 61620 BRASS
TYPE 62620 BRASS/ST.STL.



ILLUSTRATED SHOWING
TYPE R
ROTA-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		10625
1	BODY	BRASS
2	SEAL	VITON
3	DISC ASSEMBLY	BRASS
4	SHROUD	AL.ALLOY
5	DIAPHRAGM	VITON
6	SPRING	ST.STL.
7	BONNET	BRASS
8	SPINDLE	ST.STL.
9	RELIEVING SCREW	BRASS
10	WIRE & SEAL	ST.STL. & LEAD

APPROVALS

Ad - MERKBLATT A2 1998: (TÜV GERMANY) TÜV.SV.03-926.25.F/K/S. * .p [* = Variable α_D below 3 Bar.g.]
P.E.D. 97/23/EC
TYPE EXAMINATION MODULE B, CERT. No. 01 202 111-B-00007
QUALITY MANAGEMENT SYSTEM MODULE D, CERT. No. EDS 002011/01.

TECHNICAL DATA

Relieving pressure	= Set pressure +10% (Below 1 Bar.g set pressure +0.1 Bar.g)
Reseating pressure	= Set pressure -15% (Below 2 Bar.g set pressure -0.3 Bar.g)
Maximum set pressure	= 12.0 Bar.g
Minimum set pressure	= 0.5 Bar.g
Flow area	= 491mm^2
Inlet bore diameter	= 25mm
TÜV derated coefficient of discharge α_D	= 0.78 (Above 3.6 Bar.g set pressure. See flow chart for lower pressures.)
Minimum lift at 10% overpressure	= 6.5mm
Temperature range	= up to 180°C subject to seal material

FOR FURTHER INFORMATION, CONVERSION FACTORS, INSTALLATION AND OPERATION INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION.

TÜV kdr	0.57	0.66	0.74	0.77	0.78								
SET PRESSURE Bar.g	0.50	1	2	3	4	5	6	7	8	9	10	11	12
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15°C AND 1013 mbar Std. Litres/s	86	131	224	314	398	479	560	641	722	803	884	965	1046
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TUV, AIR AT 0°C AND 1013 mbar Normal m^3/h	308	466	795	1110	1411	1698	1985	2272	2559	2846	3133	3420	3707

VALVE SELECTION CHART

INLET CONNECTION	LENGTH 'L' (mm)	ORDERING CODE	ROTA-LIFT TOP FITTING SHROUD	ROTA-LIFT TOP FITTING NO SHROUD
G 1 1" BSP Parallel	20	10625	333 3	013 3
G 1 1/4 1 1/4" BSP Parallel	20		336 3	016 3
R 1 1/4 1 1/4" BSP Taper	23		337 3	017 3
G 1 1/2 1 1/2" BSP Parallel	20		339 3	019 3
G 2 2" BSP Parallel	TBA		345 3	025 3

ALTERNATIVE CONNECTION THREADS UPON REQUEST.

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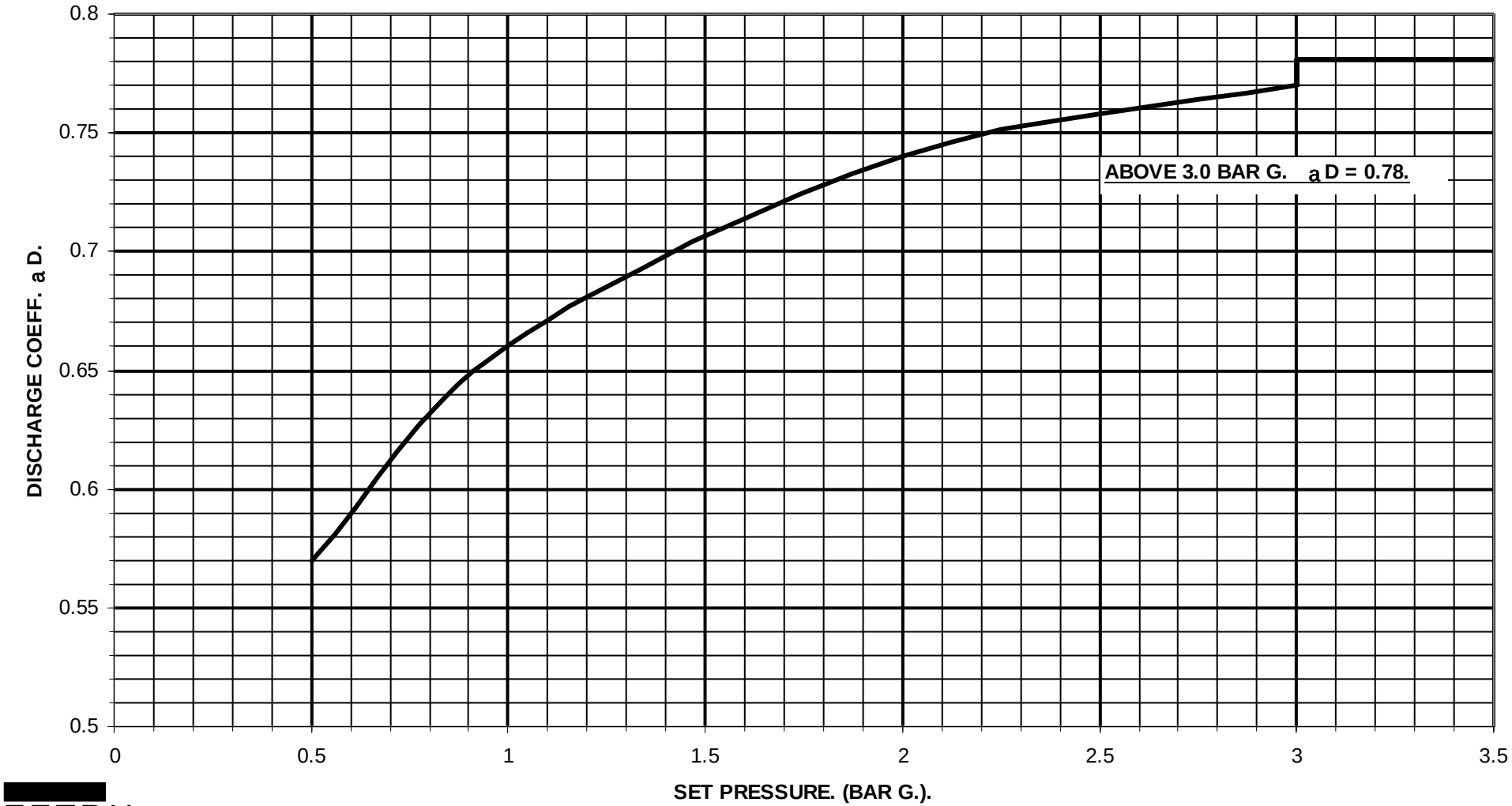
25mm Nominal Bore
ATMOSPHERIC DISCHARGE SAFETY VALVE
FOR CLEAN & PARTICLE LADEN GASES.

ATMOSPHERIC DISCHARGE
25mm NOMINAL BORE

TYPE 10625

DISCHARGE COEFFICIENT FOR VALVE 10625 BELOW 3.0 BAR G.



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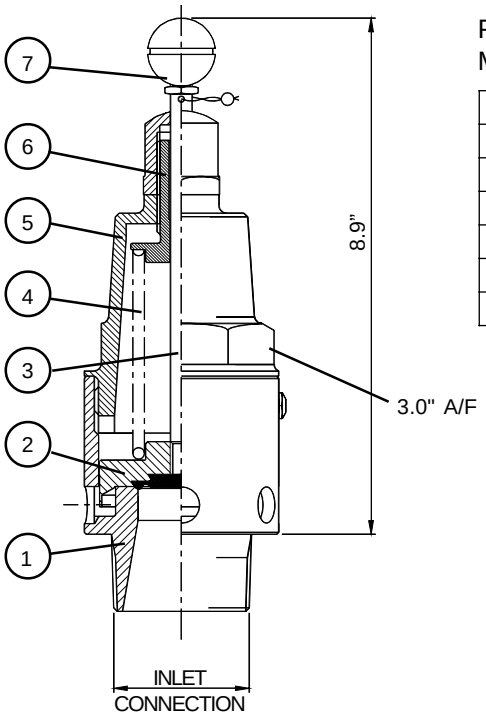
25mm Nominal Bore
ATMOSPHERIC DISCHARGE SAFETY VALVE
FOR CLEAN & PARTICLE LADEN GASES.

ATMOSPHERIC DISCHARGE
25mm NOMINAL BORE

TYPE 10625



PARTS LIST AND MATERIAL SPECIFICATION

1	BODY	BRASS
2	PLUNGER	BRASS
3	SPINDLE	ST.STL.
4	SPRING	ST.STL.
5	CAP	BRASS
6	ADJUSTER	BRASS
7	KNOB	PLASTIC

APPROVALS

Designed in accordance with ISO 4126-1 & BS 6759 Part 2 1984.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/042/8969/2
Quality management system module D, Cert No. EDS 0002011/01

TECHNICAL DATA

Relieving pressure	= Set pressure +10% (0.3 Bar.g min.)
Reseating pressure	= Set pressure -10% (0.3 Bar.g min.)
Set pressure range	= 2.8 to 3.8, 4.3 to 4.5, 7.7 to 9.4 Bar.g.
Flow area	= 1104.5 mm²
Inlet bore diameter	= 1.475" (37.5mm)
Derated coefficient of discharge in accordance with BS, K_{dr}	= 0.74
Temperature range	= -20°C to 200°C subject to seal material.

FOR FURTHER TECHNICAL INFORMATION, CONVERSION FACTORS, INSTALLATION AND OPERATING INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

- FOR HIGHER FLOWS CONSULT SEETRU LTD. FOR LOWER FLOWS SEE TYPE 10625 DATA SHEET.

* SET PRESSURE Bar.g	2.8	3	3.8	4.3	4.5	7.7	8	9	9.4
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15°C AND 1013mbar Std.Litres/s	643	677	815	902	936	1490	1542	1715	1784

* SEE SET PRESSURE RANGE IN TECHNICAL DATA.

VALVE SELECTION CHART

OTHER INLET SIZES AND TOP FITTING OPTIONS MAY BE AVAILABLE

INLET CONNECTION	ORDERING CODE	TOP FITTING CODE
R 2 (2" BSP TAPER)	31140	6900
G 2 1/2 (2 1/2" BSP PARALLEL)		8400

Example:
Ordering code 31140 6900 is 2"BSP Taper inlet connection with knob lifting gear and wirelock.
Consult Seetru for full range of available seal materials and non standard set pressures.

SEETRU LIMITED

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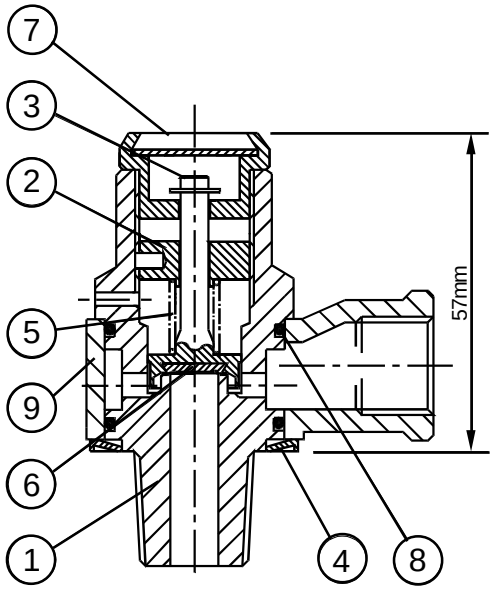
1 1/2" Nom. Bore BRASS CONSTRUCTION DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

ATMOSPHERIC DISCHARGE
1 1/2"NOM. BORE SERIES

TYPE 31140

EDITION E. 08.03.05



ILLUSTRATED SHOWING
TYPE R
CRIMPED ROTA-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

1	BODY	BRASS BS2874 CZ132
2	ADJUSTER	BRASS BS2874 CZ132
3	PLUNGER	BRASS BS2874 CZ132
4	RETAINING CLIP	ZINC PLATED
5	SPRING	ST.STL BS2056 302S26
6	DISC SEAL	SEE ORDERING CODE
7	RELIEVING SCREW	BRASS BS2874 CZ132
8	'O' RING	MATERIAL AS DISC SEAL
9	PIPE COLLAR	PPS 40% GLASS FILLED

APPROVALS

Ad-Merkblatt A2 1993: (TÜV Germany) TÜV.SV.03-925.7,9.D/G.α_w.p
In accordance with I.S.O. 4126 and BS6759 [but not approved].
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00015
Quality management system module D, Cert No. EDS 0002011/01

TECHNICAL DATA

Relieving pressure	= Set pressure +10% (Below 1 Bar.g = 0.1 Bar.g)
Reseating pressure	= Set pressure -10% (0.3 Bar.g minimum)
Maximum set pressure	= 13.2 Bar.g
Minimum set pressure	= 0.3 Bar.g
Flow area	= 49.02 mm²
Inlet bore diameter	= 7.9 mm
TÜV Derated coefficient of discharge (α_w)	= 0.46 from 0.3 to 0.8 Bar.g. = 0.56 from 1.4 to 3.24 Bar.g. = 0.63 from 3.24 to 13.2 Bar.g.
Minimum Lift as 10% overpressure	= 2.43mm
Temperature Range	= -20°C to 180°C subject to seal material.

Maximum permissible built up back pressure = 10% of set pressure at or below which flow is not reduced.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

-TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION

SET PRESSURE Bar.g	0.3	0.8	1.4	2	3	4	5	6	7	8	9	10	13.2
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013 mbar normal m³/h	20.6	29.1	47.7	60.0	80.6	113.8	137	160.1	183.2	206.4	229.5	252.7	326.6

VALVE SELECTION CHART

Standard sizes shown, other sizes may be available.

	INLET CONNECTION	OUTLET CONNECTION	ORDERING PREFIX CODE	TOP FITTING CODE R
#	G 1/4 (1/4" BSP PARALLEL)	G 3/8 (3/8" BSP PARALLEL)	63608A	521
#	R 1/4 (1/4" BSP TAPER)			522
#	1/4" NPT			523
	G 3/8 (3/8" BSP PARALLEL)			524
	R 3/8 (3/8" BSP TAPER)			525
	G 1/2 (1/2" BSP PARALLEL)			527
	R 1/2 (1/2" BSP TAPER)			528

Example:
Ordering code 63608A 528 3 is Crimped Rota-Lift, 1/2" BSP taper inlet connection with Viton® seals.

Seal material:
Last digit of ordering code calls up Viton® seals (since this is the most universal type). When other material is required last digit changes to:-

1. NITRILE
2. VITON®
3. SILICONE [use for W.R.A.S.]
4. NEOPRENE
5. ETHYLENE PROPYLENE

For advice on seal selection refer to Technical Information Section A.

Max. Tightening torque 14Nm.

NOTE:

This valve is available for use with steam or hot water at or above 100°C, [evaporation from water @ 100°C to steam @ 100°C] up to 4.0 Bar.g. It complies with the requirements of UK Water Regulation/Byelaws, for use with 'wholesome water'.
W.R.A.S. [Water Regulation Advisory Scheme]
Certificate No. 001 0021.

SEETRU LIMITED

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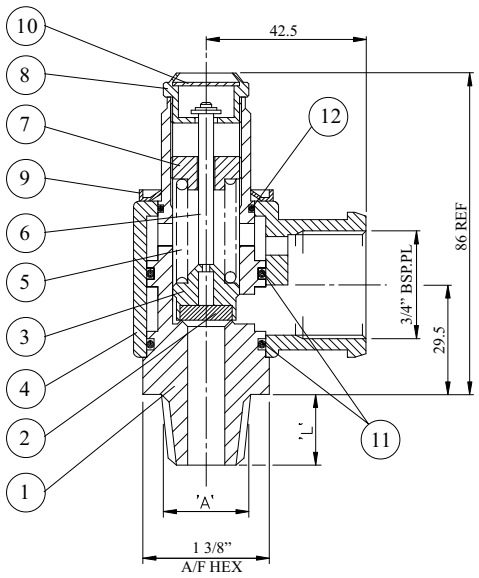
8mm Nominal Bore
ENCLOSED DISCHARGE SAFETY VALVE
FOR COMPRESSED AIR OR GASES

ENCLOSED DISCHARGE
8mm NOMINAL BORE SERIES
TYPE 63608 BRASS



ILLUSTRATED SHOWING
TYPE R
CRIMPED ROTA-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

1	BODY	BRASS BS2874 CZ121
2	SEAL	VITON
3	PLUNGER	BRASS BS2874 CZ121
4	SHROUD	PPS
5	SPRING	ST.STL BS2056 302S26
6	SPINDLE	ST.STL BS970 431S29
7	ADJUSTER	BRASS BS2874 CZ121
8	LIFTING CAP	BRASS BS2874 CZ121
9	RETAINING CLIP	STL ZINC PLATE
10	NAME PLATE	AL. ALLOY
11	'O' RING	VITON
12	'O' RING	VITON

APPROVALS

Ad - Merkblatt A2 1998: (TÜV Germany)
Ref - TÜV.SV.99-962.10.D/G.0,78.p
In accordance with ISO 4126 & BS6759 Part 2
but not approved

ENCLOSED DISCHARGE
10mm NOMINAL BORE SERIES

TYPE 86810 BRASS

TECHNICAL DATA

Relieving pressure	= Set pressure + 10%
Reseating pressure	= Set pressure - 10%
Maximum set pressure	= 16 bar.g
Minimum set pressure	= 7 bar.g
Flow area	= 78.5 mm^2
Inlet bore diameter	= 10 mm
TÜV Derated coefficient of discharge α_w	= 0.78
Minimum lift at 10% overpressure	= 3.3mm
Temperature range	= -15°C to 200°C
Maximum permissible built up back pressure	= 10% of set pressure at or below which flow is not reduced.

FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

SET PRESSURE bar.g	7	8	9.3	10	10.5	11	11.5	14.5	16
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013 mbar Flow in Nm^3/hour	363	409	468	500	524	547	570	707	776

Valve only available at the above pressures.

VALVE SELECTION CHART

Standard sizes shown, other sizes may be available.

INLET CONNECTION	OUTLET CONNECTION	ORDERING PREFIX CODE	TOP FITTING CODE R	Dimension 'L' thread length
G 1/2 (1/2" BSP Parallel)	G 3/4 (3/4" BSP Parallel)	86810A	527	14
R 1/2 (1/2" BSP Taper)			528	15
G 3/4 (3/4" BSP Parallel)			530	14
R 3/4 (3/4" BSP Taper)			531	19

Seal material: Last digit of ordering code defines the seal material.
3. VITON

This product is only available with Viton seals.
For advice on seal selection refer to Technical Information Section A.

Example: Ordering code 86810A 527 3 is Crimped Set, Rota-Lift type construction with 10mm bore, 1/2" BSP Taper inlet connection, 3/4" BSP Parallel outlet connection and viton seals.

Note: This product is only available with Viton seals.

SEETRU LIMITED

SEETRU LIMITED ALBION DOCKSIDE WORKS,
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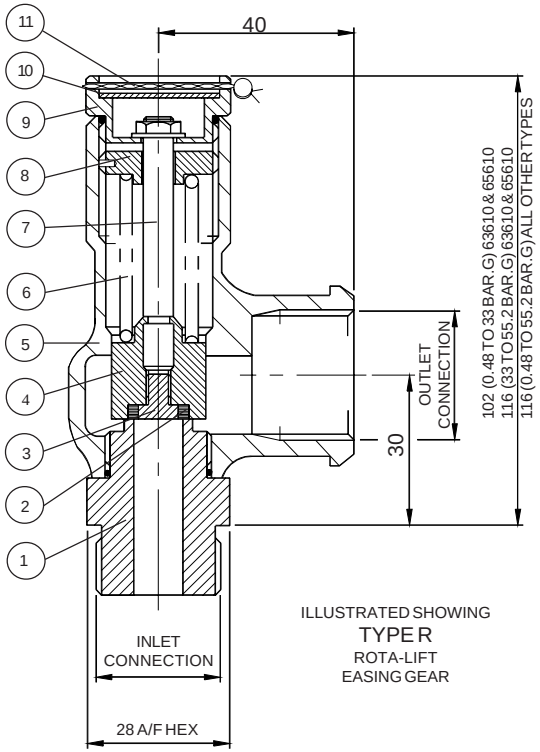
10mm Nominal Bore
ENCLOSED DISCHARGE SAFETY
VALVE FOR COMPRESSED
AIR OR GASES

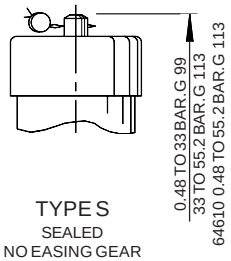
ENCLOSED DISCHARGE
10mm NOMINAL BORE SERIES
TYPE 86810 BRASS

EDITION B. 14.06.00

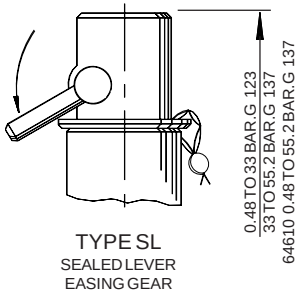


ILLUSTRATED SHOWING
TYPE R
ROTA-LIFT
EASING GEAR

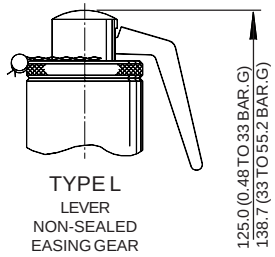
ALTERNATIVE TOP FITTINGS



TYPE S
SEALED
NO EASING GEAR



TYPE SL
SEALED LEVER
EASING GEAR



TYPE L
LEVER
NON-SEALED
EASING GEAR

PARTS LIST AND MATERIAL SPECIFICATION

		63610	63710, 63110	64610, 64710, 64110	65610	65710, 65110
1	INLET SEAT	BRASS BS EN 12164 CW614N		ST.STL. BS EN 10088-3 1.4401 (316) SA-479 S31600	ST.STL. BS EN 10088-3 1.4401 (316) SA-479 S31600	
2	TUTCHTITE SEAL	TO SUIT APPLICATION				
3	SEAL RETAINER	BRASS BS EN 12164 CW614N		ST.STL. BS EN 10088-3 1.4401 (316)	ST.STL. BS EN 10088-3 1.4401 (316)	
4	PLUNGER	BRASS BS EN 12164 CW602N		ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW602N	
5	BODY	BRONZE / GUNMETAL BS EN 1982 CC491K SB-62 C83600		ST.STL. BS EN 10283 1.4408 (316) SA-351 CF8M	BRONZE / GUNMETAL BS EN 1982 CC491K SB-62 C83600	
6	SPRING	ST.STL. BS EN 10270-3 1.4310 (302)				
7	SPINDLE	ST.STL. BS EN 10088-3 1.4057 (431)				
8	ADJUSTER	BRASS BS EN 12164 CW614N		ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW614N	
9	CAP	BRASS BS EN 12164 CW614N		ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW614N	
10	NAMEPLATE	AL. ALLOY				
11	WIRE & SEAL	ST. STL & LEAD				

APPROVALS

Ad-Merkblatt A2: (TÜV Germany), Ref- TÜV.SV.03-728.9,5.D/G.0,78.p.
P.E.D. 97/23/EC.
Type examination module B, Cert. No. 01 202 11-B-00016
Quality management system, module D, Cert. No. EDS 0002011/01
Designed in accordance with BS6759 & BS EN ISO 4126-1
Meeting the requirements of the A.S.M.E. Boiler & Pressure Vessel Code section VIII for air/gas.
UV Cert. of Authorisation: 35757
Capacities certified by the National Board of Boiler & Pressure Vessel Inspectors.

TECHNICAL DATA

Relieving pressure	= Set pressure +10%	(0.3 Bar.g. below 1.55 Bar.g)
Reseating pressure	= Set pressure -10%	(0.3 Bar.g minimum)
Maximum set pressure	= 55.2 Bar.g	(12 Bar.g Steam)
Minimum set pressure	= 0.48 Bar.g	(TÜV & A.S.M.E. 1.55 Bar.g)
Flow area	= 70.9 mm²	
Inlet bore diameter	= 9.5 mm	
BS Derated coefficient of discharge K_{dr}	= 0.78	
TÜV Derated coefficient of discharge α_d	= 0.78	
NB Certified rated slope	= 1.71 scfm/psia	
BS Minimum lift at 10% overpressure	= 3.5 mm	
Temperature Range	= -20°C to 200°C subject to seal material.	
Maximum permissible built up back pressure	= 10% of set pressure at or below which flow is not reduced.	

Stable operation on flows down to 50% of valve rated capacity.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

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10mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
10mm NOMINAL BORE SERIES M/2

TYPE 63610, 63710, 63110 BRASS
TYPE 64610, 64710, 64110 ST.STL.
TYPE 65610, 65710, 65110 BRASS/ST.STL.

EDITION H. 12.05.06

FLOW CHART (P.E.D.) AIR

TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION

FOR GREATER FLOWS REFER TO 13mm BORE TYPE 63613 DATA SHEET, FOR LOWER FLOWS REFER TO SEETRU.

	NOT TÜV APPROVED		PRESSURE RANGE												
SET PRESSURE Bar.g	0.48	1	1.55	2	3	4.5	5	10	15	20	30	33	40	50	55.2
RATED DISCHARGE * CAPACITY INACCORDANCE WITH BS EN 4126, AIR AT 15°C AND 1013 mbar Std. Litres/s	16	22	29	34	46	63	69	128	187	245	363	398	480	598	659
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013 mbar Normal m³/h	55	79.5	102	121	162.4	224.5	245.3	452.4	659.5	866.7	1280.9	1405.2	1695.2	2109.5	2325

FLOW CHART (A.S.M.E.) AIR

SET PRESSURE Psig	23	30	40	50	75	100	150	200	300	400	500	600	700	800
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH A.S.M.E. AIR AT 60°F AND 14.7 psia/scfm	70	82	100	119	166	213	307	401	589	777	966	1154	1342	1530

* DISCHARGING TO ATMOSPHERE

FLOW CHART (P.E.D.) SATURATED STEAM

SET PRESSURE Bar.g	0.48	1	1.55	2	3	4	5	6	7	8	9	10	11	12
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS EN 4126 STEAM Kg/hr	45	61	76	95	126	158	189	220	251	282	313	344	374	405
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TUV STEAM Kg/hr	-	-	79	93	125	157	189	220	253	285	316	348	380	412

VALVE TYPE OPTIONS:

63610, 64610, 65610 = TUV, B.S. (P.E.D.)
63710, 64710, 65710 = A.S.M.E. & N.B.
63110, 64110, 65110 = A.S.M.E. & N.B., TUV, B.S. (P.E.D.)

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE			
			R	S	SL	L
G 1/2 (1/2" BSP PARALLEL)	G 3/4 (3/4" BSP PARALLEL)	63610A 63710A 63110A	2073	1273	4073	3273
R 1/2 (1/2" BSP TAPER)			2083	1283	4083	3283
1/2" NPT		64610A 64710A 64110A	2093	1293	4093	3293
G 3/8 (3/8" BSP PARALLEL)			2043	1243	4043	3243
R 3/8 (3/8" BSP TAPER)		65610A 65710A 65110A	2053	1253	4053	3253
3/8" NPT			2063	1263	4063	3263

Example: Ordering code 63610A 2073 is brass construction. Rota lift type R, with 1/2" BSP parallel inlet connection, 3/4" BSP parallel outlet connection with Viton® seals and wirelocked.
Seal material: Last digit of ordering code calls up Viton® seal (since this is the most universal type).
When other material is required last digit changes to:

1. NITRILE
3. VITON®
5. NEOPRENE
6. ETHYLENE PROPYLENE
8. PERFLUOROELASTOMER

For advice on seal material selection refer to Technical Information Section A.

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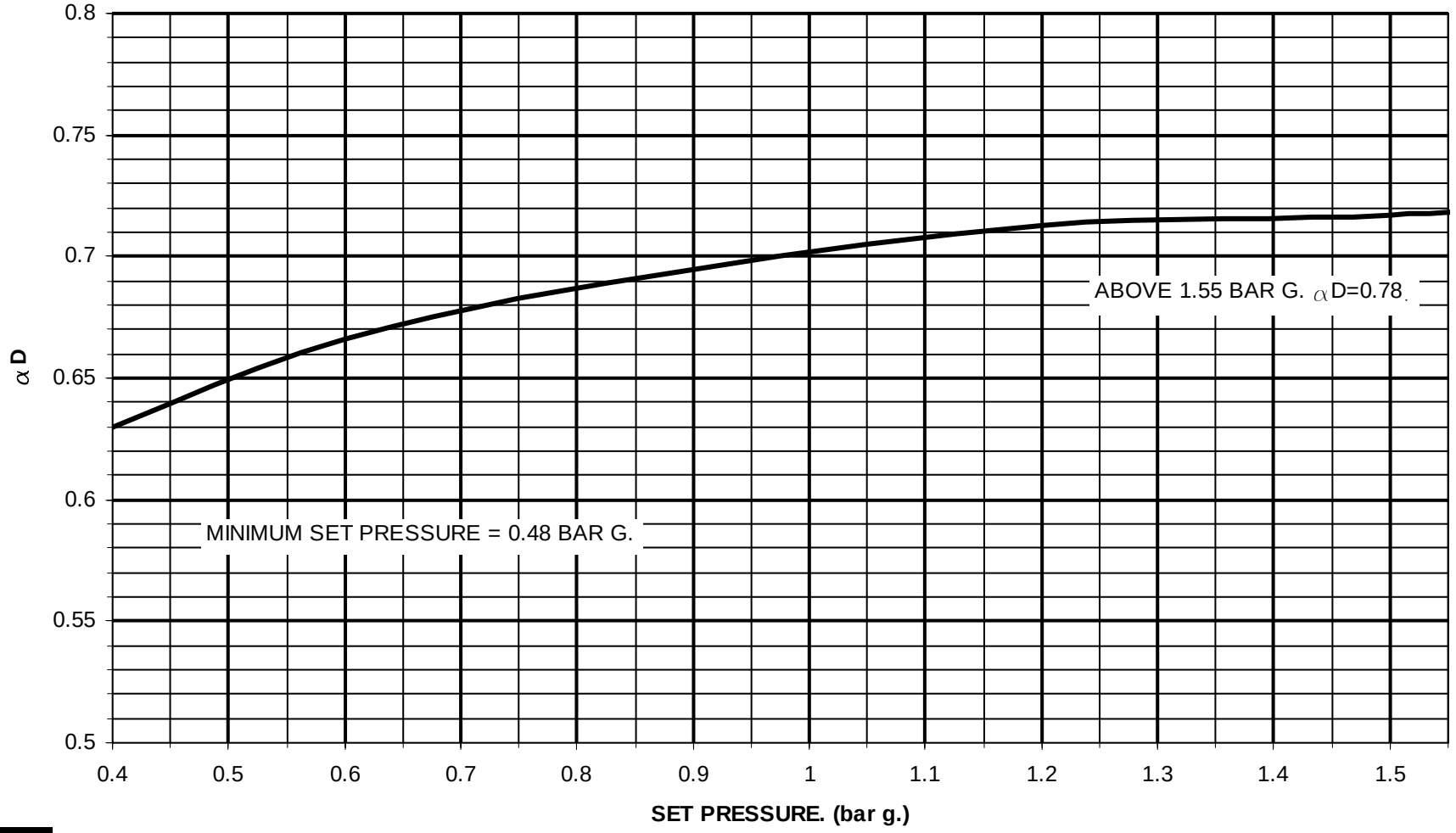
10mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
10mm NOMINAL BORE SERIES M/2

TYPE 63610, 63710, 63110 BRASS
TYPE 64610, 64710, 64110 ST.STL.
TYPE 65610, 65710, 65110 BRASS/ST.STL.

EDITION H. 12.05.06

DERRATED DISCHARGE COEFFICIENT FOR SET PRESSURES BELOW 1.55 BAR G.



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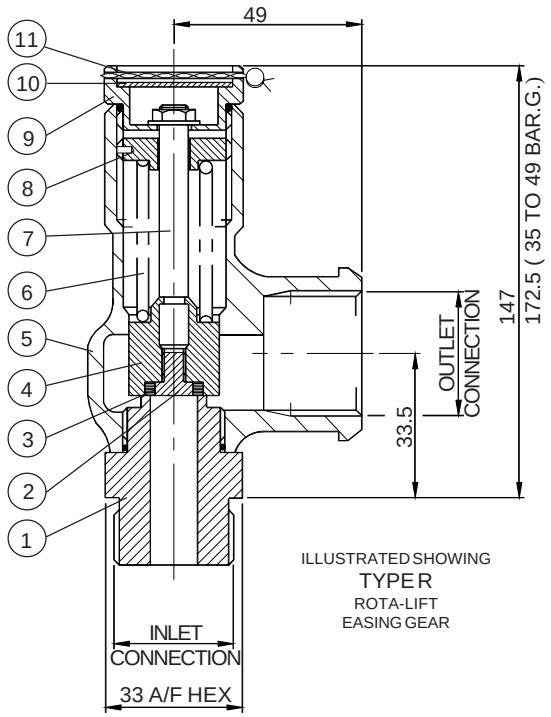
10mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
10mm NOMINAL BORE SERIES M/2

TYPE 63610, 63710, 63110 BRASS
TYPE 64610, 64710, 64110 ST.STL.
TYPE 65610, 65710, 65110 BRASS/ST.STL.

EDITION H. 12.05.06



ILLUSTRATED SHOWING
TYPE R
ROTA-LIFT
EASING GEAR

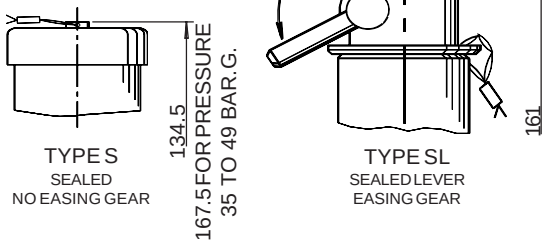
PARTS LIST & MATERIAL SPECIFICATION

		63613	63713, 63113	64613, 64713, 64113	65613	65713, 65113
1	INLET SEAT	BRASS BS EN 12164 CW614N		ST.STL. BS EN 10088-3 1.4401 (316) SA-479 S31600	ST.STL. BS EN 10088-3 1.4401 (316) SA-479 S31600	
2	TUTCHTITE SEAL	TO SUIT APPLICATION				
3	SEAL RETAINER	BRASS BS EN 12164 CW614N		ST.STL. BS EN 10088-3 1.4401 (316)	ST.STL. BS EN 10088-3 1.4401 (316)	
4	PLUNGER	BRASS BS EN 12164 CW602N		ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW602N	
5	BODY	BRONZE / GUNMETAL BS EN 1982 CC491K SB-62 C83600		ST.STL. EN 10283 1.4408 (316) SA-351 CF8M	BRONZE / GUNMETAL BS EN 1982 CC491K SB-62 C83600	
6	SPRING	ST.STL. BS EN 10270-3 1.4310 (302)				
7	SPINDLE	ST.STL. BS EN 10088-3 1.4057 (431)				
8	ADJUSTER	BRASS BS EN 12164 CW614N		ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW614N	
9	CAP	BRASS BS EN 12164 CW614N		ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW614N	
10	NAMEPLATE	ALUMINIUM ALLOY				
11	WIRE & SEAL	ST.STL. & LEAD				

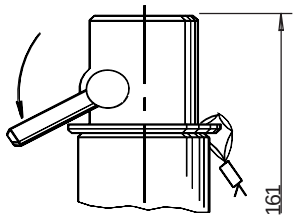
APPROVALS

Ad-Merkblatt A2: (TÜV Germany) Ref - TÜV.SV.04-761.13,7.D/G.0,71.p.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00016
Quality management system module D, Cert. No. EDS 0002011/01
Designed in accordance with BS6759 & BS EN ISO 4126-1
Meeting the requirements of the A.S.M.E. Boiler & Pressure Vessel code section VIII for air/gas.
UV Cert. of Authorisation: 35757
Capacities certified by the National Board of Boiler & Pressure Vessel Inspectors.

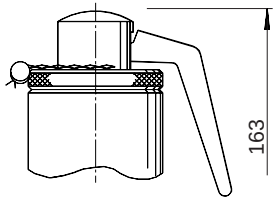
ALTERNATIVE TOP FITTINGS



TYPE S
SEALED
NO EASING GEAR



TYPE SL
SEALED LEVER
EASING GEAR



TYPE L
LEVER LIFT
EASING GEAR

TECHNICAL DATA

Relieving pressure	= Set pressure + 10% (0.3 Bar.g. below 1.4 Bar.g)
Reseating pressure	= Set pressure - 10% (0.3 Bar.g. minimum)
Maximum set pressure	= 49 Bar.g (12 Bar.g. Steam)
Minimum set pressure	= 0.32 Bar.g (TÜV & A.S.M.E. 1.4 Bar.g)
Flow area	= 147.4 mm²
Inlet bore diameter	= 13.7 mm
BS Derated coefficient of discharge K_{dr}	= 0.78
TÜV Derated coefficient of discharge α_w	= 0.71
BS Minimum lift at 10% overpressure	= 5.7 mm
NB Certified rated slope	= 3.47 scfm/psia
Temperature Range	= -20°C to 200°C subject to seal material.
Maximum permissible built up back pressure	= 10% of set pressure at or below which flow is not reduced.

Stable operation on flows down to 50% of valve rated capacity.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

SHEET 1 OF 2 SHEETS.

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13mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
13mm NOMINAL BORE SERIES M/2

TYPE 63613, 63713, 63113 BRASS
TYPE 64613, 64713, 64113 ST.STL.
TYPE 65613, 65713, 65113 BRASS/ST.STL.

FLOW CHART (P.E.D.)

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION.
- FOR GREATER FLOWS REFER TO 18mm BORE TYPE 63618 DATA SHEET, FOR LOWER FLOWS REFER TO 63610 DATA SHEET

	NOT APPROVED		APPROVED PRESSURE RANGE													
SET PRESSURE Bar.g	0.32	1	1.4	2	3	4	5	6	7	8	9	10	20	30	40	49
RATED DISCHARGE * CAPACITY INACCORDANCE WITH BS EN 4126 AIR AT 15°C AND 1013 mbar Std. Litres/s	27	47	56	71	95	120	144	169	193	217	242	266	508	752	995	1214
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013 mbar Normal m³/h	86	150.6	182	229	307.5	385.9	464.3	542.7	621.2	699.6	778	856.5	1641	2425	3209	3915

FLOW CHART (P.E.D.) SATURATED STEAM

SET PRESSURE Bar.g	0.32	1	1.4	2	3	4	5	6	7	8	9	10	11	12
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS EN 4126 STEAM Kg/hr	71	116	140	179	239	298	358	417	475	534	592	651	709	767
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TUV STEAM Kg/hr	-	116	140	176	237	297	358	418	478	539	599	660	720	780

FLOW CHART (A.S.M.E.)

SET PRESSURE Psig	20	30	40	50	60	70	80	90	100	150	200	250	300	400	500	600	700	710
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH ASME AIR AT 60°F AND 14.7 psia/scfm	131	166	204	242	280	318	356	395	433	624	814	1005	1196	1578	1960	2341	2723	2761

* DISCHARGING TO ATMOSPHERE

VALVE TYPE OPTIONS:

63613, 64613, 65613 = TUV, B.S. (P.E.D.)
63713, 64713, 65713 = A.S.M.E. & N.B.
63113, 64113, 65113 = A.S.M.E. & N.B., TUV, B.S. (P.E.D.)

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available.

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE				
			R	S	SL	BV	L
G 3/4 (3/4" BSP PARALLEL)	G 1 (1" BSP PARALLEL)	63613A 63713A 63113A	2103	1303	4103	0503	3303
R 3/4 (3/4" BSP TAPER)		64613A 64713A 65713A	2113	1313	4113	0513	3313
3/4" NPT		65613A 65713A 65113A	2123	1323	4123	0523	3323

Example: Ordering code 63613A 2103 is brass construction Rota lift type R, with 3/4" BSP parallel inlet connection, 1" BSP parallel outlet connection with Viton® seals and wirelocked.
Seal material: Last digit of ordering code calls up Viton® seal (since this is the most universal type).
When other material is required last digit changes to:

1. NITRILE
3. VITON®
5. NEOPRENE
6. ETHYLENE PROPYLENE
8. PERFLUOROELASTOMER

For advice on seal material selection refer to Technical Information Section A.

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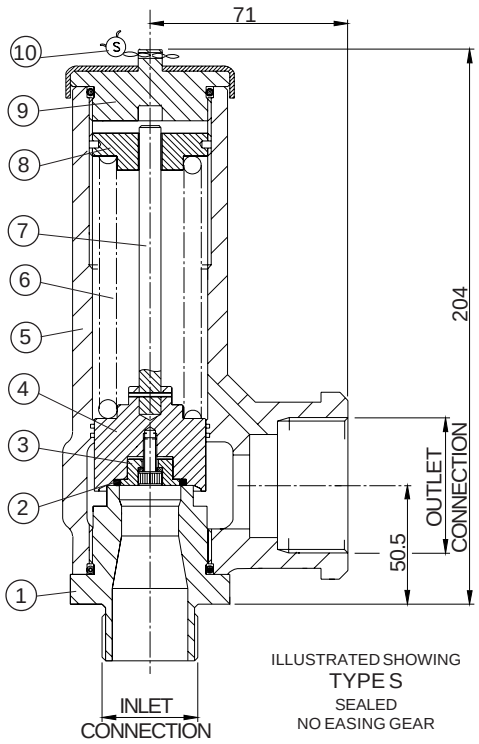
13mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
13mm NOMINAL BORE SERIES M/2

TYPE 63613, 63713, 63113 BRASS
TYPE 64613, 64713, 64113 ST.STL.
TYPE 65613, 65713, 65113 BRASS/ST.STL.



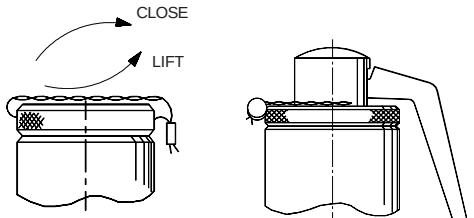
PARTS LIST & MATERIAL SPECIFICATION

		63618, 63718, 63118	64618, 64718, 64118	65618,65718, 65118
1	INLET SEAT	BRASS BS EN 12164 CW614N	ST.STL. BS EN 10088-3 1.4401 (316) SA-479 S31600	ST.STL. BS EN 10088-3 1.4401 (316) SA-479 S31600
2	'O' RING	SEE SELECTION CHART		
3	SEAL RETAINER	BRASS BS EN 12164 CW614N	ST.STL. BS EN 10088-3 1.4401 (316)	ST.STL. BS EN 10088-3 1.4401 (316)
4	PLUNGER	BRASS BS EN 12164 CW602N	ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW602N
5	BODY	BRONZE / GUNMETAL BS EN 1982 CC491K SB-62 C83600	ST.STL. BS EN 10283 1.4408 (316) SA-351 CF8M	BRONZE / GUNMETAL BS EN 1982 CC491K SB-62 C83600
6	SPRING	ST.STL. BS EN 10270-3 1.4310 (302)		
7	SPINDLE	ST.STL. BS EN 10088-3 1.4057 (431)		
8	ADJUSTER	BRASS BS EN 12164 CW614N	ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW614N
9	CAP	BRASS BS EN 12164 CW614N	ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW614N
10	WIRE & SEAL	ST.STL. & LEAD		

APPROVALS

Ad-Merkblatt A2: (TÜV GERMANY) TÜV.SV.03-916.17.D/G.α_w.p,
Designed in accordance with BS EN ISO 4126-1 & BS 6759 Part 2 but not approved.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00016
Quality management system module D, Cert. No. EDS 0002011/01
Meeting the requirements of the A.S.M.E. Boiler & Pressure Vessel Code section VIII for air/gas.
UV Cert. of Authorisation: 35757
Capacities certified by the National Board of Boiler & Pressure Vessel Inspectors.

ALTERNATIVE TOP FITTINGS



TYPE R
ROTA-LIFT
EASING GEAR

TYPE L
LEVER LIFT
EASING GEAR

TECHNICAL DATA

Relieving pressure	= Set pressure + 10%	
Reseating pressure	= Set pressure - 10%	(0.3 Bar.g minimum)
Maximum set pressure	= 35 Bar.g	(12 Bar.g Steam)
Minimum set pressure	= 1.0 Bar.g	(A.S.M.E. 2.4 Bar.g)
Flow area	= 227mm²	
Inlet bore diameter	= 17mm	
Derated coefficient of discharge α_w	= 0.74 from 1.0 to 2.4 Bar.g, α_w = 0.84 from 2.4 to 35.0 Bar.g.	
NB Certifed rated slope	= 5.60 scfm/psia	
Temperature Range	= -20°C to 200°C Subject to seal material.	
Maximum permissible built up back pressure	= 10% of set pressure at or below which flow is not reduced.	

Stable operation on flows down to 50% of valve rated capacity.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

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18mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
18mm NOMINAL BORE SERIES M/2
TYPE 63618, 63718, 63118 BRASS
TYPE 64618, 64718, 64118 ST.STL.
TYPE 65618, 65718, 65118 BRASS / ST.STL.

FLOW CHART (P.E.D.)

-TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION B

- FOR GREATER FLOWS REFER TO 20mm BORE TYPE 63620 DATA SHEET, FOR LOWER FLOWS REFER TO 13 mm BORE 63613 DATA SHEET

SET PRESSURE Bar.g	1	2	3	4	5	6	7	8	9	10	15	20	25	30	35
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS EN 4126, AIR AT 15°C AND 1013 mbar Std. Litres/s	68	104	159	200	241	280	320	361	401	442	644	846	1049	1251	1454
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013 mbar normal m^3/h	241.7	367.6	560.1	703.0	845.9	988.7	1131.6	1274.4	1417.3	1560.2	2274.5	2988.8	3703.1	4417.4	5131.8

FLOW CHART (P.E.D.) SATURATED STEAM

SET PRESSURE Bar.g	1	2	3	4	5	6	7	8	9	10	11	12
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS EN 4126 STEAM Kg/hr	186	288	435	544	652	759	866	972	1079	1186	1291	1397
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TUV STEAM Kg/hr	186	283	431	541	651	761	871	981	1091	1201	1311	1421

FLOW CHART (A.S.M.E.)

SET PRESSURE Psig	35	40	50	60	70	80	90	100	150	200	250	300	400	500	507
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH A.S.M.E AIR AT 60°F AND 14.7 psia/scfm	298	329	390	452	514	575	637	698	1006	1314	1622	1930	2546	3162	3205

* DISCHARGING TO ATMOSPHERE
BS CALCULATIONS ARE FOR GUIDENCE ONLY.

VALVE TYPE OPTIONS:

63618, 64618, 65618 = TUV, B.S. (P.E.D.)
63718, 64718, 65718 = A.S.M.E. & N.B.
63118, 64118, 65118 = A.S.M.E. & N.B., TUV, B.S. (P.E.D.)

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE			
			L	R	S	BV
G 1 (1" BSP PARALLEL)	G 1 1/2 (1 1/2" BSP PARALLEL)	63618A 63718A 63118A 64618A 64718A 64118A 65618A 65718A 65118A	3333	2133	1333	0533
R 1 (1" BSP TAPER)			3343	2143	1343	0543
1" NPT			3353	2153	1353	0553

Example: Ordering code 63618A 1333 is Sealed, Type S with 1" BSP Parallel inlet connection. 1 1/2" BSP Parallel outlet connection with Viton® seals and wirelocked.
Seal material: Last digit of ordering code calls up Viton® 'O' ring seal (since this is the most universal type).
When other material is required this changes to :

1. NITRILE
3. VITON®
5. NEOPRENE
6. EHTYLENE PROPYLENE
8. PERFLUOROELASTOMER

For advice on seal material selection refer to Technical Information Section A.

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18mm Nominal Bore
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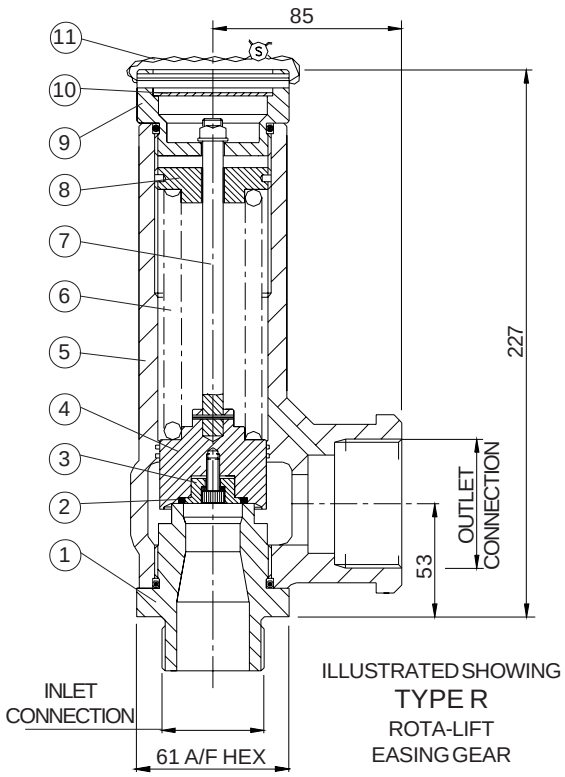
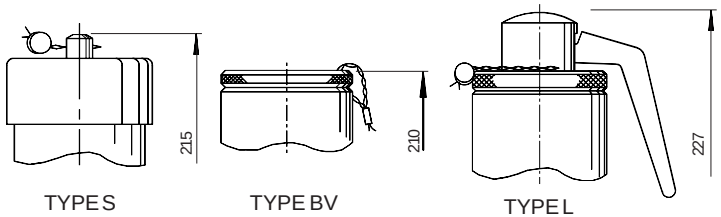
ENCLOSED DISCHARGE
18mm NOMINAL BORE SERIES M/2
TYPE 63618, 63718, 63118 BRASS
TYPE 64618, 64718, 64118 ST.STL.
TYPE 65618, 65718, 65118 BRASS / ST.STL.



ILLUSTRATED SHOWING
TYPE R
ROTA-LIFT
EASING GEAR

ALTERNATIVE TOP FITTINGS



TYPE S
SEALED
NO EASING GEAR

TYPE BV
BASIC VALVE
NO EASING GEAR

TYPE L
LEVER LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		63620, 63720, 63120	64620, 64720, 64120	65620, 65720, 65120
1	INLET SEAT	BRASS BS EN 12164 CW614N	ST.STL. BS EN 10088-3 1.4401 (316) SA-479 S31600	ST.STL. BS EN 10088-3 1.4401 (316) SA-479 S31600
2	'O' RING	SEE SELECTION CHART		
3	SEAL RETAINER	BRASS BS EN 12164 CW614N	ST.STL. BS EN 10088-3 1.4401 (316)	ST.STL. BS EN 10088-3 1.4401 (316)
4	PLUNGER	BRASS BS EN 12164 CW602N	ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW602N
5	BODY	BRONZE / GUNMETAL BS EN1982 CC491K SB-62 C83600	ST.STL. BS EN 10283 1.4408 (316) SA-351 CF8M	BRONZE / GUNMETAL BS EN1982 CC491K SB-62 C83600
6	SPRING	ST.STL. BS EN 10270-3 1.4310 (302)		
7	SPINDLE	ST.STL. BS EN 10088-3 1.4057 (431)		
8	ADJUSTER	BRASS BS EN 12164 CW614N	ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW614N
9	CAP	BRASS BS EN 12164 CW614N	ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW614N
10	NAMEPLATE	ALUMINIUM	ST.STL.	ALUMINIUM
11	WIRE & SEAL	ST.STL. & LEAD		

APPROVALS

Ad-Merkblatt A2: (TÜV GERMANY) Ref - TÜV.SV.03-892.20.D/G. α_w .p
Designed in accordance with BS EN ISO 4126-1 & BS 6759 Part 2.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00016
Quality management system module D, Cert. No. EDS 0002011/01
Meeting the requirements of the A.S.M.E. Boiler & Pressure Vessel code section VIII for air/gas.
UV Cert. of Authorisation: 35757
Capacities certified by the National Board of Boiler & Pressure Vessel Inspectors.

TECHNICAL DATA

Relieving pressure	= set pressure +10%	
Reseating pressure	= set pressure -10%	(0.3 Bar.g minimum)
Maximum set pressure	= 35 Bar.g	(12 Bar.g. Steam)
Minimum set pressure	= 3 Bar.g	
Flow area	= 314mm²	
Inlet bore diameter	= 20mm	
Derated coefficient of discharge K_{dr}	= 0.8	
TÜV Derated coefficient of discharge α_w	= 0.76 from 3.0 to 22.0 Bar.g	
α_w	= 0.80 from 22.0 to 35.0 Bar.g	
NB Certified rated slope	= 7.77 scfm/psia	
Minimum lift at 10% overpressure	= 5.0 mm	
Temperature Range	= -20°C to 200°C subject to seal material.	
Maximum permissible built up back pressure	= 10% of set pressure at or below which flow is not reduced.	

Stable operation on flows down to 50% of valve rated capacity.
FOR FURTHER INFORMATION, CONVERSION FACTORS, INSTALLATION AND OPERATION INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

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20mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
20mm NOMINAL BORE SERIES M/2
TYPE 63620, 63720, 63120 BRASS
TYPE 64620, 64720, 64120 ST.STL.
TYPE 65620, 65720, 65120 BRASS / ST.STL.

EDITION K. 22.05.06

FLOW CHART (P.E.D.)

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
- FOR GREATER FLOWS REFER TO 25mm BORE TYPE 63625 DATA SHEET, FOR LOWER FLOWS REFER TO 18 mm BORE 63618 DATA SHEET

SET PRESSURE Bar.g	3	4	5	6	7	8	9	10	20	22	22.1	30	35
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS EN 4126, AIR AT 15°C AND 1013 mbar Std. Litres/s	208	262	315	368	422	475	528	582	1115	1222	1227	1648	1915
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013 mbar Normal m³/h	701.4	880.3	1059.2	1238.2	1417.0	1596.0	1774.9	1953.8	3742.8	4100.6	4335.3	5823.0	6764.6

FLOW CHART (P.E.D.) SATURATED STEAM

SET PRESSURE Bar.g	3	4	5	6	7	8	9	10	11	12
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS EN 4126 STEAM Kg/hr	545	681	816	950	1084	1218	1351	1485	1617	1749
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TUV STEAM Kg/hr	540	678	816	953	1091	1229	1367	1505	1642	1780

FLOW CHART (A.S.M.E.)

SET PRESSURE Psig	44	50	60	70	80	90	100	150	200	300	400	500	507
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH A.S.M.E. AIR AT 60°F AND 14.7 psia/scfm	490	542	627	713	798	883	969	1396	1824	2678	3533	4388	4448

* DISCHARGING TO ATMOSPHERE

VALVE TYPE OPTIONS:

63620, 64620, 65620 = TUV, B.S. (P.E.D.)
63720, 64720, 65720 = A.S.M.E. & N.B.
63120, 64120, 65120 = A.S.M.E. & N.B., TUV, B.S. (P.E.D.)

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE			
			L	R	S	BV
G 1 1/4 (1 1/4" BSP PARALLEL)	G 2 (2" BSP PARALLEL)	63620A 63720A 63120A	3363	2163	1363	0563
R 1 1/4 (1 1/4" BSP TAPER)		64620A 64720A 64120A	3373	2173	1373	0573
1 1/4" NPT		65620A 65720A 65120A	3383	2183	1383	0583

Example: Ordering code 63620A 2163 is Rotalift, Type R with 1 1/4" BSP Parallel inlet connection.
2" BSP Parallel outlet connection with Viton® seals and wirelocked.
Seal material: Last digit of ordering code calls up Viton® 'O' ring seal (since this is the most universal type).
When other material is required this changes to :

1. NITRILE
3. VITON®
5. NEOPRENE
6. ETHYLENE PROPYLENE
8. PERFLUOROELASTOMER

For advice on seal material selection refer to Technical Information Section A.

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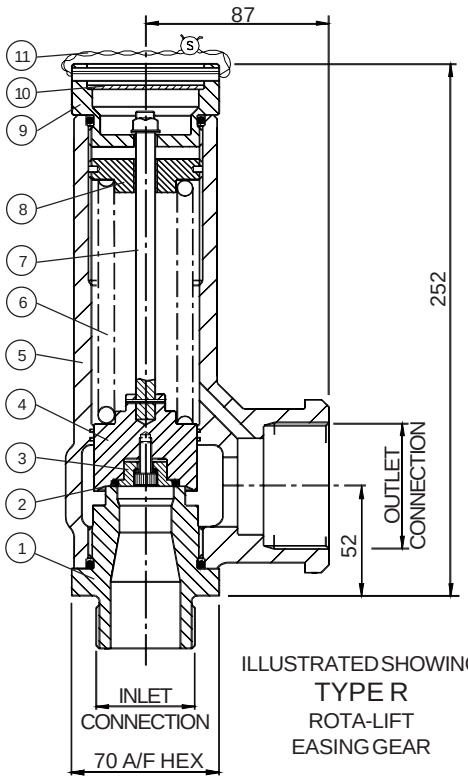
ENCLOSED DISCHARGE
20mm NOMINAL BORE SERIES M/2
TYPE 63620, 63720, 63120 BRASS
TYPE 64620, 64720, 64120 ST.STL.
TYPE 65620, 65720, 65120 BRASS / ST.STL.

EDITION K. 22.05.06



ILLUSTRATED SHOWING
TYPE R
ROTA-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		63625	63725, 63125	64625, 64725, 64125	65625	65725, 65125
1	INLET SEAT	BRASS BS EN 12164 CW614N		ST.STL. BS EN 10088-3 1.4401 (316) SA-479 S31600	ST.STL. BS EN 10088-3 1.4401 (316) SA-479 S31600	
2	'O' RING	SEE SELECTION CHART				
3	SEAL RETAINER	BRASS BS EN 12164 CW614N		ST.STL. BS EN 10088-3 1.4401 (316)	ST.STL. BS EN 10088-3 1.4401 (316)	
4	PLUNGER	BRASS BS EN 12164 CW602N		ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12165 CW614N	
5	BODY	BRONZE / GUNMETAL BS EN1982 CC491K SB-62 C83600		ST.STL. BS EN 10283 1.4408 (316) SA-351 CF8M	BRONZE / GUNMETAL BS EN1982 CC491K SB-62 C83600	
6	SPRING	ST.STL. BS EN 10270-3 1.4310 (302)				
7	SPINDLE	ST.STL. BS EN 10088-3 1.4057 (431)				
8	ADJUSTER	BRASS BS EN 12164 CW614N		ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW614N	
9	CAP	BRASS BS EN 12164 CW614N		ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW614N	
10	NAMEPLATE	ALUMINIUM	ST.STL.	ST.STL.	ALUMINIUM	ST.STL.
11	WIRE & SEAL	ST.STL. & LEAD				

APPROVALS

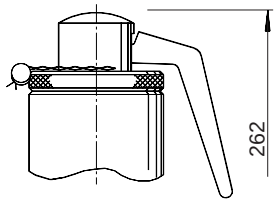
Ad-Merkblatt A2: (TÜV Germany) Ref - TÜV.SV.03-830.25.D/G.0,85.p. I.S.O. 4126
P.E.D. 97/23/EC.
Type examination module B, Cert. No. 01 202 111-B-00016
Quality management system module D, Cert. No. EDS 0002011/01
Designed in accordance with BS6759 & BS EN ISO 4126-1
Meeting the requirements of the A.S.M.E. Boiler & Pressure Vessel code section VIII for air/gas.
UV Cert. of Authorisation: 35757
Capacities certified by the National Board of Boiler & Pressure Vessel Inspectors.

TECHNICAL DATA

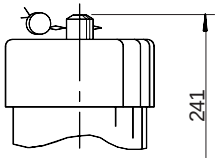
Relieving pressure		= Set pressure +10%
Reseating pressure		= Set pressure -10%
Maximum set pressure		= 30 Bar.g (12 Bar.g. Steam)
Minimum set pressure		= 5.65 Bar.g
Flow area		= 490.4 mm²
Inlet bore diameter		= 25 mm
BS Derated coefficient of discharge	K_{dr}	= 0.88
TÜV Derated coefficient of discharge	α_w	= 0.85
BS Minimum lift at 10% overpressure		= 9.5mm
NB Certified rate slope		= 12.26 scfm/psia
Temperature Range		= -20°C to 200°C subject to seal material.
Maximum permissible built up back pressure		= 10% of set pressure at or below which flow is not reduced.

Stable operation on flows down to 50% of valve rated capacity.
FOR FURTHER INFORMATION, CONVERSION FACTORS, INSTALLTION AND OPERATION INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

ALTERNATIVE TOP FITTING



TYPE L
LEVER LIFT
EASING GEAR



TYPE S
SEALED
NO EASING TYPE

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25mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
25mm NOMINAL BORE SERIES M/2
TYPE 63625, 63725, 63125 BRASS
TYPE 64625, 64725, 64125 ST.STL.
TYPE 65625, 65725, 65125 BRASS/ST.STL.

FLOW CHART (P.E.D.)

-TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION.

- FOR GREATER FLOWS REFER TO SEETRU, FOR LOWER FLOWS REFER TO 20mm BORE 63620 DATA SHEET.

SET PRESSURE Bar.g	5.65	6	7	8	9	10	15	20	25	30
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS EN 4126, AIR AT 15^{0}C AND 1013 mbar Std. Litres/s	602	634	725	817	909	1000	1459	1918	2376	2835
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0^{0}C AND 1013 mbar Normal m^3/h	2054.3	2163.7	2476.4	2789	3101.7	3414.3	4977.5	6540.7	8103.9	9667.1

FLOW CHART (P.E.D.) SATURATED STEAM

SET PRESSURE Bar.g	5.65	6	7	8	9	10	11	12
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS EN 4126 STEAM Kg/hr	1579	1661	1895	2128	2361	2595	2826	3057
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TUV STEAM Kg/hr	1582	1666	1907	2148	2389	2629	2870	3111

FLOW CHART (A.S.M.E.)

SET PRESSURE Psig	82	90	100	150	200	250	300	350	400	435
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH A.S.M.E. AIR AT 60^{0}F AND 14.7 psia/scfm	1286	1394	1529	2203	2877	3552	4226	4900	5575	6047

* DISCHARGING TO ATMOSPHERE

VALVE TYPE OPTIONS:

63625, 64625, 65625 = TUV, B.S. (P.E.D.)
63725, 64725, 65725 = A.S.M.E. & N.B.
63125, 64125, 65125 = A.S.M.E. & N.B., TUV, B.S. (P.E.D.)

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE				
			L	R	S	BV	SL
G 1 1/2 (1 1/2" BSP PARALLEL)	G 2 (2" BSP PARALLEL)	63625A 63725A 63125A 64625A 64725A 64125A 65625A 65725A 65125A	3393	2193	1393	0593	4193
R 1 1/2 (1 1/2" BSP TAPER)			3403	2203	1403	0603	4203
1 1/2" NPT			3413	2213	1413	0613	4213

Example: Ordering code 63625A 2193 is Rota-lift, with 1 1/2" BSP parallel inlet connection, 2" BSP parallel outlet connection with Viton® seals and wirelocked.

Seal material: Last digit of ordering code calls up Viton® seal (since this is the most universal type).

When other material is required last digit changes to:

1. NITRILE
3. VITON®
5. NEOPRENE
6. ETHYLENE PROPYLENE
8. PERFLUOROELASTOMER

For advice on seal material selection refer to Technical Information Section A.

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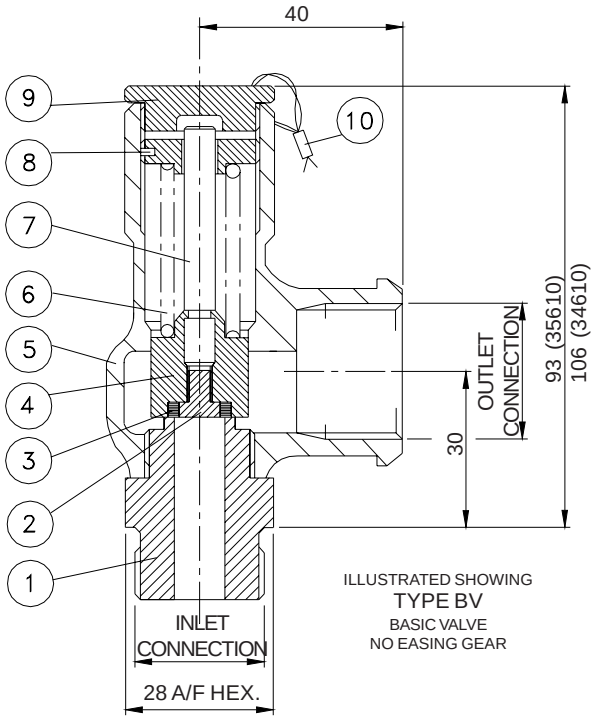
25mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR, GASES & STEAM

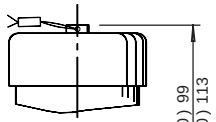
ENCLOSED DISCHARGE
25mm NOMINAL BORE SERIES M/2
TYPE 63625, 63725, 63125 BRASS
TYPE 64625, 64725, 64125 ST.STL.
TYPE 65625, 65725, 65125 BRASS/ST.STL.



ILLUSTRATED SHOWING
TYPE BV
BASIC VALVE
NO EASING GEAR

VALVES WITH EASING GEAR AVAILABLE, REFER TO SEETRU.

ALTERNATIVE TOP FITTING



TYPE S
SEALED
NO EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		34610, 34710, 34110	35610	35710, 35110
1	INLET SEAT	ST.STL. BS EN 10088-3 1.4401 (316) SA-479 S31600		
2	SEAL RETAINER	ST.STL. BS EN 10088-3 1.4401 (316)		
3	TUTCHTITE SEAL	P.T.F.E.		
4	PLUNGER	ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW602N	
5	BODY	ST.STL. BS EN 10283 1.4408 (316) SA-351 CF8M	BRASS BS EN 121645 CW602N	GUNMETAL SB-62 C83600
6	SPRING	ST.STL. BS EN 10270-3 1.4310 (302)		
7	SPINDLE	ST.STL. BS EN 10088-3 1.4057 (431)		
8	ADJUSTER	ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW614N	
9	CAP	ST.STL. BS EN 10088-3 1.4401 (316)	BRASS BS EN 12164 CW614N	
10	WIRE & SEAL	ST.STL. & LEAD		

APPROVALS

Ad-Merkblatt A2: (TÜV GERMANY), Ref- TÜV.SV.03-728.9,5.D/G.α_w.p
Materials meet the requirement of BAM (Germany) for Oxygen Service.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00016
Quality management system module D, Cert. No. EDS 0002011/01
Designed in accordance with BS 6759 & BS EN ISO 4126-1.
Meeting the requirements of the A.S.M.E. Boiler & Pressure Vessel Code section VIII for air/gas.
UV Cert. of Authorisation: 35757
Capacities certified by the National Board of Boiler & Pressure Vessel Inspectors.

TECHNICAL DATA

Relieving pressure	= Set pressure +10% (0.1 Bar.g. below 1.0 Bar.g.)
Reseating pressure	= Set pressure -10% (0.3 Bar.g. below 3.0 Bar.g.)
Maximum set pressure	= 30.76 Bar.g.
Minimum set pressure	= 0.83 Bar.g. (A.S.M.E. 3.0 Bar.g)
Flow area	= 70.9mm^2
Inlet bore diameter	= 9.5mm
TÜV derated coefficient of discharge α_w	= 0.7 (3.0 to 30.8 Bar.g.), α_w = 0.6 (0.8 to 3.0 Bar.g.)
NB Certified rated slope	= 1.70 scfm/psia
Temperature range	= -196^{0}C to 50^{0}C
Minimum lift	= 2.4mm

Maximum permissible built up back pressure = 10% of set pressure at or below which flow is not reduced.
Stable operation on flows down to 50% of valve rated capacity.
FOR FUTHER INFORMATION, INSTALLATION AND OPERATING INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

FOR CRYOGENIC SERVICE

1. DESIGNED FOR THE PROTECTION OF PIPING, EQUIPMENT AND CRYOGENIC STORAGE TANKS AGAINST OVERPRESSURE CAUSED BY THE EXPANSION OF LIQUEFIED GASES.
2. OUTLET PIPEWORK SHOULD BE ARRANGED TO PREVENT THE INGRESS OF MOISTURE WHICH MAY FREEZE AND AFFECT THE CORRECT OPERATION OF THE VALVE. VALVES CAN BE SUPPLIED WITH SUITABLE POSITIONED DRAIN HOLES TO HELP PREVENT THIS OCCURRING.
3. CAN BE SUPPLIED CLEANED DEGREASED AND SEALED TO APPROPRIATE SPECIFICATIONS.

SAFETY

4. IT IS STRONGLY RECOMMENDED THAT ALL OPERATORS OF CRYOGENIC EQUIPMENT FAMILIARISE THEMSELVES FULLY WITH ALL SAFETY ASPECTS OF HANDLING LIQUIDS AND GASES.

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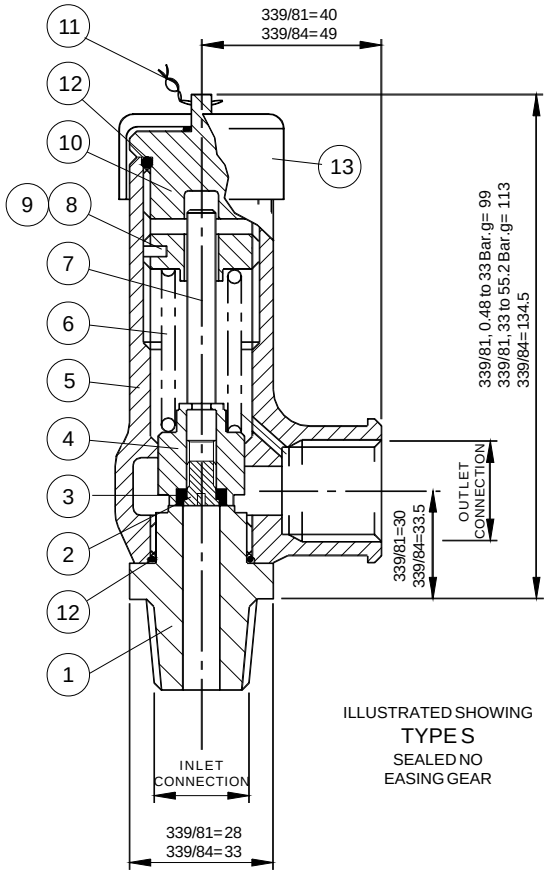
10mm Nominal Bore P.T.F.E SEAL
ENCLOSED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR, GASES & LIQUEFIED GASES.
TYPE 636107

ENCLOSED DISCHARGE
10mm NOMINAL BORE SERIES M/2
P.T.F.E. SEALED
TYPE 34610, 34710, 34110 ST.STL.
TYPE 35610, 35710, 35110 BRASS/ST.STL.

EDITION F. 12.05.06



ILLUSTRATED SHOWING
TYPE S
SEALED NO
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

1	INLET SEAT	ST. STL
2	SEAL RETAINER	BRASS
3	SEAL	NITRILE
4	PLUNGER	ST. STL.
5	BODY	BRASS
6	SPRING	ST. STL.
7	SPINDLE	ST. STL.
8	ADJUSTER	BRASS
9	NYLON SLUG	NYLON 66
10	CAP	BRASS
11	WIRE &SEAL	ST. STL. & LEAD
12	'O' RING	NITRILE
13	COVER	BRASS

APPROVALS

BS6759 Part 2 & Part 3 1984 For steam & gas. Ad - Merkblatt A2 1998: TÜV (West Germany)
I.S.O. 4126

P.E.D. 97/23/EC
Type examination, module B, Cert. No. 01 202 11-B-00016
Quality management system, module D, Cert. No. EDS 0002011/01

TYPE
339000081 & 339000109, Ref - TÜV.SV.03-728.9,5.D/G.0,78.p.

TYPE
339000084 & 339000110, Ref - TÜV.SV.99-761.13,7.D/G.0,71.p.

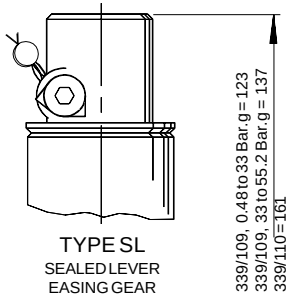
TECHNICAL DATA	10mm	13mm
Maximum Set Pressure (Bar.g)	55.2	35
Minimum Set Pressure (Bar.g)	0.48	0.7
Flow Area (mm²)	70.9	147.4
Inlet Bore Diameter (mm)	9.5	13.7
Derated coefficient of discharge	0.78	0.71
Temperature range	-20°C to 130°C	
Maximum permissable built up back pressure = 10% of set pressure		

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
- FLOW RATES HAVE BEEN CALCULATED FOR CARBON DIOXIDE AT 15°C (kg/hr).

	SET PRESSURE (BAR.G)														
VALVE TYPE	0.48	0.7	1.4	3	4.5	5	10	15	20	30	33	35	40	50	55.2
339000081 (10mm) 339000109	86.8	100.6	144.4	244.5	338.2	369.5	682.2	994.8	1307.5	1932.9	2120.5	2245.6	2558.3	3183.6	3508.8
339000084 (13mm) 339000110	-	190.5	273.3	462.7	640.3	699.5	1291.4	1883.3	2475.3	3659.1	4014.2	4251	-	-	-

ALTERNATIVE TOP FITTINGS



TYPE SL
SEALED LEVER
EASING GEAR

VALVE SELECTION CHART

NOMINAL BORE DIA.	INLET CONNECTION	OUTLET CONNECTION	TOP FITTING ORDERING CODES	
			TYPE S	TYPE SL
10mm	R 1/2 (1/2" BSP TAPER)	G 3/4 (3/4" BSP PARALLEL)	339000081	339000109
13mm	R 3/4 (3/4" BSP TAPER)	G1 (1" PARALLEL)	339000084	339000110

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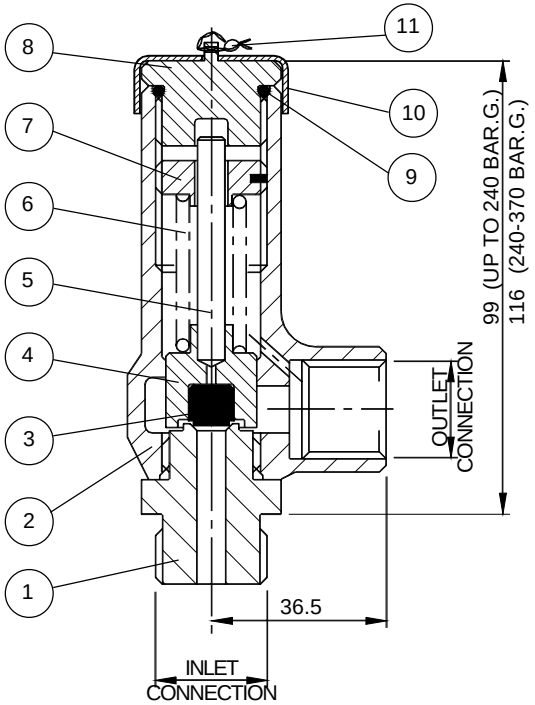
10mm/13mm Nom. Bore BRASS CONSTRUCTION DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR CARBON DIOXIDE (CO_2) GAS ONLY.

SERIES M/2
TYPE 339000081
TYPE 339000084
TYPE 339000109
TYPE 339000110



ILUSTRATED SHOWING
TYPE S
SEALED
NO EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		329330000 TO 329360000 & 329400000	329380000 & 329390000
1	SEAT	ST.STL.	
2	BODY	BRASS	ST.STL.
3	SEALING PLUG	TO SUIT	
4	PLUNGER	ST.STL.	
5	SPINDLE	ST.STL.	
6	SPRING	ST.STL.	
7	ADJUSTER	BRASS	ST.STL.
8	CAP	BRASS	ST.STL.
9	O' RING	NITRILE	
10	COVER	BRASS	ST.STL.
11	WIRELOCKING	ST.STL. & LEAD	

APPROVALS

Designed in accordance with ISO4126-1:1991 & BS6759-2:1984
P.E.D. 97/23/EC
Type Examination Module B, Cert. No. 2002/038/8878/1
Quality Management System Module D, Cert No. EDS 0002011/01

TECHNICAL DATA

Relieving pressure	= Set pressure +10%
Reseating pressure	= Set pressure -10% (*)
Maximum pressure	= 370 Bar.g
Minimum set pressure	= 53 Bar.g
Flow area	= 28.2 mm²
Derated coefficient of discharge K_{dr}	= 0.77
Inlet bore diameter	= 6.0 mm
Temperature range	= -196°C to 70°C
Maximum permissible built up back pressure	= 10% of set pressure

FLOW DETAILS

SET PRESSURE Bar.g	53	60	63	83	90	100	150	200	202	240	250	300	350	370
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15°C AND 1010m bar. Kg/hr.	1106	1250	1311	1722	1866	2071	3097	4123	4164	4944	5149	5765	7201	7611

* NOTE: ABOVE 240 BAR.G. RESEATING PRESSURE = SET PRESSURE -15%. DESIGNED IN ACCORDANCE WITH ISO4126-1:1991 ONLY.

VALVE SELECTION GUIDE

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	
		BRASS	ST.STL.
G 3/8 (3/8" BSP PARALLEL)	G 3/4 (3/4" BSP PARALLEL)	329340000	-
R 3/8 (3/8" BSP TAPER)		329330000	329380000
G 1/2 (1/2" BSP PARALLEL)		329360000	329390000
R 1/2 (1/2" BSP TAPER)		329400000	-
G 3/4 (3/4" BAP PARALLEL)		329350000	-

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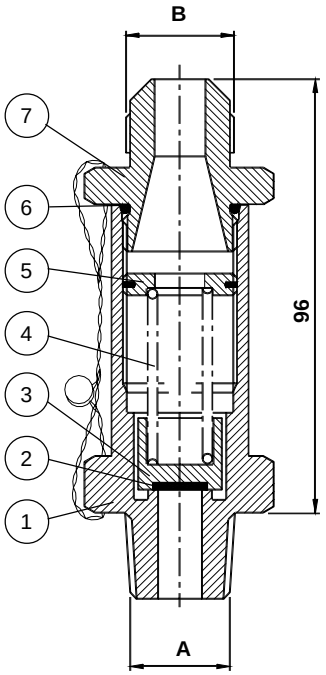
6.0mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED DISCHARGE
SAFETY VALVE FOR COMPRESSED GASES
TYPE 329310000

TYPE 329330000
329340000, 329350000
329360000, 329380000
329390000, 329400000



PARTS & MATERIAL LIST

1	BODY	BRASS
2	SEAL	RUBBER
3	PLUNGER	BRASS
4	SPRING	ST.STL.
5	ADJUSTER	BRASS
6	'O' RING	NITRILE
7	ADAPTOR	BRASS

APPROVALS

P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/033/8878
Quality management system module D, Cert No. EDS 0002011/01
Designed in accordance with ISO 4126-1:1991

TECHNICAL DATA

Relieving pressure = Set pressure +10%
Reseating pressure = Set pressure -15%
Maximum set pressure = 31 BAR.G.
Minimum set pressure = 13.5 BAR.G.
Flow area = 71mm²
Inlet bore diameter = 9.5mm
Temperature range = -30°C TO 200°C Perfluoroelastomer.
Derated coefficient of discharge K_{dr} = 0.485
FOR FURTHER TECHNICAL INFORMATION, CONVERSION FACTORS, INSTALLATION AND OPERATING INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION.

SET PRESSURE BAR.G.	13.5	14	16	18	20	24	26	28	31
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR @ 0°C & 1.013 BAR Kg/min	7.9	8.2	9.3	10.4	11.5	13.7	14.8	15.9	17.6
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR @ 0°C & 1.013 BAR lb/min	17.4	18.0	20.5	22.9	25.4	30.2	32.6	35.0	38.8

VALVE SELECTION CHART

SEETRU No.	CONNECTION		SEAL MATERIAL.
	A	B	
319000253	3/8" NPT	1/2" FLARE	PERFLUOROELASTOMER
319000254	1/2" NPT	5/8" FLARE	

FOR ALTERNATIVE CONNECTIONS, CONSULT SEETRU.

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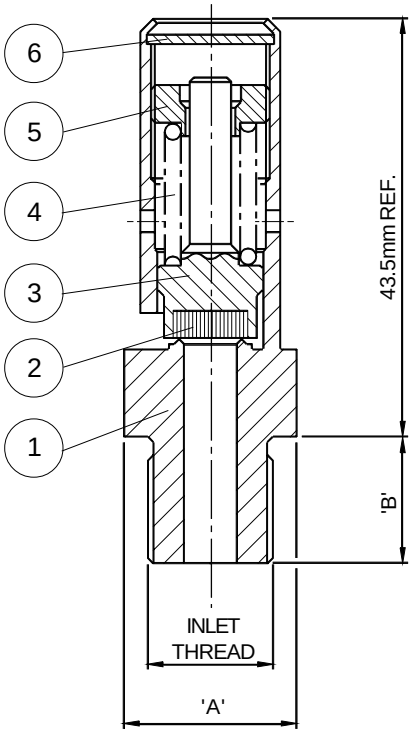
INLINE REFRIGERANT VALVE
TYPE APPROVAL
TYPE 319000251

319 TYPE
REFRIGERATION



ILLUSTRATED SHOWING
TYPE BV
BASIC VALVE
NO EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

1	BODY	BRASS BS2874 CZ121
2	SEAL	PERFLUOROELASTOMER
3	PLUNGER	BRASS BS2874 CZ121
4	SPRING	ST.STL. BS2056 302S26
5	ADJUSTER	BRASS BS2874 CZ121
6	NAMEPLATE	AL.ALLOY

VALVE SELECTION CHART

INLET CONECTION	ORDERING CODE	TOP FITTING CODE	DIM'N 'A' A/F HEX (mm)	DIM'N 'B' THREAD LENGTH (mm)
		BV		
G 1/4 (1/4" BSP PARALLEL)	81806	3218	17	10
R 1/4 (1/4" BSP TAPER)		3228	14	12
1/4" NPT		3238	14	12
G 3/8 (3/8" BSP PARALLEL)		3248	20.6	10
R 3/8 (3/8" BSP TAPER)		3258	17	12.5
3/8" NPT		3268	18	14.2

Example:
Ordering code 81806 3218 is Crimped, Basic type construction, 1/4" BSP Parallel inlet, with Perfluoroelastomer seal.

FOR ALTERNATIVE SEAL MATERIALS CONSULT SEETRU.

APPROVALS

Ad - Merkblatt A2 1998: (TÜV GERMANY) TÜV.SV.99-963.6,0.D/G.0,67.p.
Designed in accordance with ISO4126-1:1991
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00015
Quality management system module D, Cert. No. EDS 0002011/01

TECHNICAL DATA

Relieving pressure	= Set pressure + 10%
Reseating pressure	= Set pressure - 10%
Maximum set pressure	= 36.0 Bar.g
Minimum set pressure	= 7.0 Bar.g
Flow area	= 28.3 mm^2
Inlet bore diameter	= 6 mm
Temperature range	= -40°C to 200°C subject to duty.
TÜV Derated coefficient of discharge α_w	= 0.67

FOR FURTHER TECHNICAL INFORMATION, CONVERSION FACTORS, INSTALLTION AND OPERATING INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

OTHER SET PRESSURES ARE AVAILABLE.

SET PRESSURE Bar.g	7	8	9	10	15	20	25	30	31	36
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013mbar (Kg/h)	144	162.5	181	199	290	381	472	563	582	673

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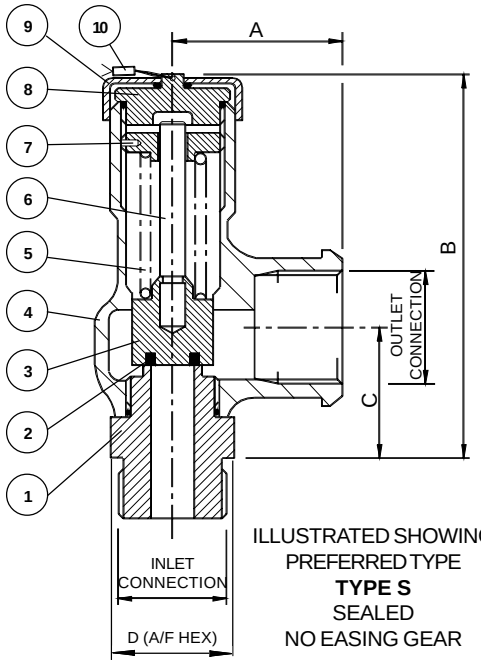
6mm Nom. Bore BRASS CONSTRUCTION DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR REFRIGERANTS

81806
REFRIGERATION



ILLUSTRATED SHOWING
PREFERRED TYPE
TYPE S
SEALED
NO EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		63610/63613	63618
1	INLET SEAT	BRASS	
2	SEAL	MATERIAL TO SUIT	
3	PLUNGER	BRASS	
4	BODY	BRASS	ST.STL
5	SPRING	ST.STL.	
6	SPINDLE	ST.STL.	
7	ADJUSTER	BRASS	
8	CAP	BRASS	
9	COVER	BRASS	
10	WIRELOCKING	ST.STL. & LEAD	

APPROVALS

ALL VALVES: Ad-Merkblatt A2 1998: TÜV Designed in accordance with ISO 4126-1:1991.
For 63610 Ref. - TÜV.SV.98-728.9,5.D/G.0,78.p. ISO 4126 - 1991
For 63613 Ref. - TÜV.SV.99-761.13,7.D/G.0,71.p. ISO 4126 - 1991
For 63618 Ref. - TÜV.SV.98-916.17.D/G.0,84.p. ISO 4126 - 1991
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00016
Quality management system module D, Cert. No. EDS0002011/01

DIMENSION TABLE

VALVE TYPE	EASING GEAR	DIMENSION				
		A	B (0.48 TO 33 BAR.G)	B (33 TO 55.2 BAR.G)	C	D
63610	TYPE S SEALED BASIC	40	99	113	30	28
63613		49	134.5		33.5	33
63618		71	204		50.5	51

VALVE SELECTION CHART

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE
			S
G 1/2 (1/2"BSP PARALLEL)	G 3/4 (3/4"BSP PARALLEL)	63610A	4878
R 1/2 (1/2"BSP TAPER)			4888
1/2" NPT	3/4" NPT	63610C	4898
G 3/4 (3/4"BSP PARALLEL)	G 1 (1"BSP PARALLEL)	63613A	4908
R 3/4 (3/4"BSP TAPER)			4918
3/4" NPT	1" NPT	63613C	4928
G 1 (1"BSP PARALLEL)	G 1 1/2 (1 1/2"BSP PARALLEL)	63618A	4938
R 1 (1"BSP TAPER)			4948
1" NPT	1 1/2" NPT	63618C	4958

TECHNICAL DATA

PROPERTY	VALVE TYPE		
	63610	63613	63618
Max. set pressure (Bar.g.) *	33	35	35
Min. set pressure (Bar.g.) *	7	7	7
Flow area (mm^2)	70.9	147.4	227
Inlet bore diameter (mm)	9.5	13.7	17
TÜV derated coefficient of discharge (a_d)	0.78	0.71	0.84
Min. % of valve rated capacity for stable flow	50%		
Relieving pressure	set pressure +10%		
Reseating pressure	set pressure -10%		
Max. permissable built up back pressure	10% of set pressure at or below which flow is not reduced		
Temperature range	-40°C to 200°C subject to duty		

* OTHER SET PRESSURES ARE AVAILABLE.

Example:
Order code 63610A4878 is Sealed Basic, type S, with 1/2"BSP parallel inlet connection, 3/4"BSP parallel outlet connection with perfluoroelastomer seal & wirelocked.
Last digit of ordering code calls up perfluoroelastomer. (since this is the standard material for most refrigerants).
When other material is required this changes to:

1. Nitrile
5. Neoprene
6. EthylenePropylene
8. Perfluoroelastomer

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10mm/13mm/18mm Nominal Bore
DIRECT SPRING LOADED SAFETY VALVES
ENCLOSED DISCHARGE
FOR REFRIGERANTS

63610
63613
63618
REFRIGERATION

EDITION C. 23.10.02

FLOW CHART

- In accordance with TUV Ad-Merkblatt A2 1990.

	SET PRESSURE (BAR.G.)										
TYPE	7	8	9	10	15	20	22	22.1	25	30	33
64610	424.1	476.9	530.8	584.7	852.0	1119.3	1226.0	1231.5	1387.7	1655.0	1814.5
64613	802.5	904.8	1006.0	1106.1	1612.1	2118.1	2320.5	2330.4	2624.1	3130.1	3434.8
64618	1459.2	1644.0	1827.7	2012.5	2935.4	3858.3	4226.8	4245.5	4780.1	5703.0	6256.3

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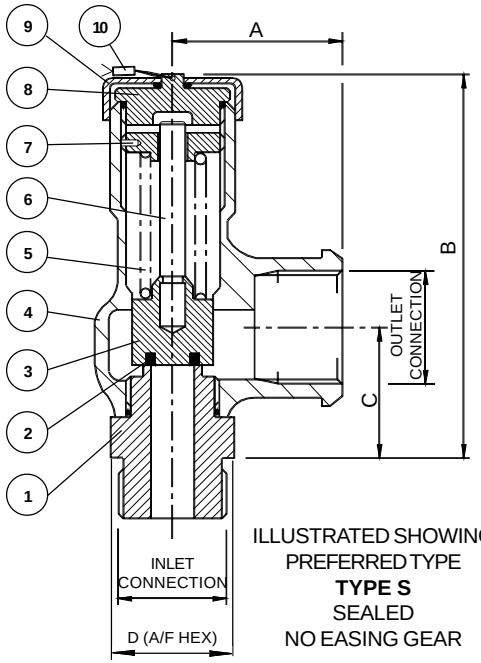
10mm/13mm/18mm Nominal Bore
DIRECT SPRING LOADED SAFETY VALVES
ST.STL. ENCLOSED DISCHARGE
FOR REFRIGERANTS & AMMONIA

64610
64613
64618
REFRIGERATION



ILLUSTRATED SHOWING
PREFERRED TYPE
TYPE S
SEALED
NO EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		64610 / 64613 / 64618
1	INLET SEAT	ST.STL
2	SEAL	PERFLUOROELASTOMER
3	PLUNGER	ST.STL
4	BODY	ST.STL
5	SPRING	ST.STL.
6	SPINDLE	ST.STL.
7	ADJUSTER	ST.STL
8	CAP	ST.STL
9	COVER	ST.STL
10	WIRELOCKING	ST.STL. & LEAD

APPROVALS

ALL VALVES: Ad-Merkblatt A2 1998: TÜV Designed in accordance with ISO 4126-1:1991.
For 64610 Ref. - TÜV.SV.98-728.9,5.D/G.0,78.p. ISO 4126 - 1991
For 64613 Ref. - TÜV.SV.99-761.13,7.D/G.0,71.p. ISO 4126 - 1991
For 64618 Ref. - TÜV.SV.98-916.17.D/G.0,84.p. ISO 4126 - 1991
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00016
Quality management system module D, Cert. No. EDS0002011/01

DIMENSION TABLE

VALVE TYPE	EASING GEAR	DIMENSION				
		A	B (0.48 TO 33 BAR.G)	B (33 TO 55.2 BAR.G)	C	D
64610	TYPE S SEALED BASIC	40	99	113	30	28
64613		49	134.5		33.5	33
64618		71	204		50.5	51

VALVE SELECTION CHART

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE
			S
G 1/2 (1/2"BSP PARALLEL)	G 3/4 (3/4"BSP PARALLEL)	64610A	4878
R 1/2 (1/2"BSP TAPER)			4888
1/2" NPT	1/2" NPT	64610C	4898
G 3/4 (3/4"BSP PARALLEL)	G 1 (1"BSP PARALLEL)	64613A	4908
R 3/4 (3/4"BSP TAPER)			4918
3/4" NPT	3/4" NPT	64613C	4928
G 1 (1"BSP PARALLEL)	G 1 1/2 (1 1/2"BSP PARALLEL)	64618A	4938
R 1 (1"BSP TAPER)			4948
1" NPT	1" NPT	64618C	4958

TECHNICAL DATA

PROPERTY	VALVE TYPE		
	64610	64613	64618
Max. set pressure (Bar.g.) *	33	35	35
Min. set pressure (Bar.g.)	7	7	5.4
Flow area (mm^2)	70.9	147.4	227
Inlet bore diameter (mm)	9.5	13.7	17
TÜV derated coefficient of discharge (a_w)	0.78	0.71	0.84
Min. % of valve rated capacity for stable flow	50%		
Relieving pressure	set pressure +10%		
Resating pressure	set pressure -10%		
Max. permissable built up back pressure	10% of set pressure at or below which flow is not reduced		
Temperature range	-30°C to 200°C subject to duty		

* OTHER SET PRESSURES ARE AVAILABLE.

Example:
Order code 64610 A 487 8 is Sealed Basic, Type S, with 1/2"BSP parallel inlet connection, 3/4"BSP parallel outlet connection with Perfluoroelastomer seal & wirelocked.
Last digit of ordering code calls up Perfluoroelastomer.

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www.seetru.com enquiries@seetru.com

10mm/13mm/18mm Nominal Bore
DIRECT SPRING LOADED SAFETY VALVES
ST.STL. ENCLOSED DISCHARGE
FOR REFRIGERANTS & AMMONIA

64610
64613
64618
REFRIGERATION

EDITION C. 23.11.05

FLOW CHART

- In accordance with TUV Ad-Merkblatt A2 1990.

		SET PRESSURE (BAR.G.)											
	TYPE	7	8	9	10	15	20	22	22.1	25	30	33	35
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TUV, AIR AT 0°C AND 1.013 Bar in (Kg/hr)	63610	424.1	476.9	530.8	584.7	852.0	1119.3	1226.0	1231.5	1387.7	1655.0	1814.5	-
	63613	802.5	904.8	1006.0	1106.1	1612.1	2118.1	2320.5	2330.4	2624.1	3130.1	3434.8	3637.2
	63618	1459.2	1644.0	1827.7	2012.5	2935.4	3858.3	4226.8	4245.5	4780.1	5703.0	6256.3	6625.9
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH TUV, AIR AT 0°C AND 1.013 Bar in (lb/min)	63610	15.6	17.5	19.5	21.5	31.3	41.1	45.0	45.2	51.0	60.8	66.7	-
	63613	29.5	33.2	36.9	40.6	59.2	77.8	85.2	85.6	96.4	115.0	126.2	133.6
	63618	53.6	60.4	67.1	73.9	107.8	141.8	155.3	156.0	175.6	209.6	229.9	243.5

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10mm/13mm/18mm Nominal Bore
DIRECT SPRING LOADED SAFETY VALVES
ENCLOSED DISCHARGE
FOR REFRIGERANTS

63610
63613
63618
REFRIGERATION

TYPE 593

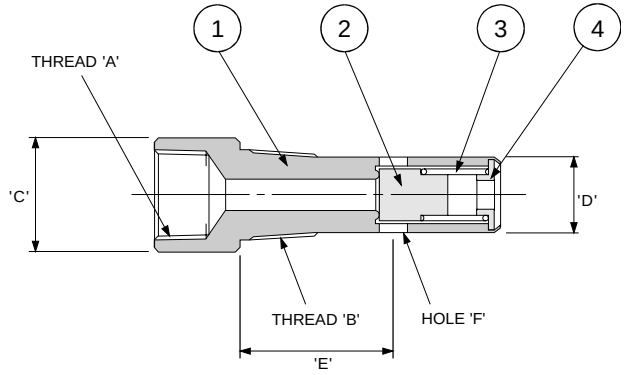
PARTS LIST AND MATERIAL SPECIFICATION

1	BODY	BRASS BS 2874 CZ121
2	PLUNGER	VITON 90°
3	SPRING	ST.STL. BS2056 301S81 AG
4	RETAINER	STAINLESS STL. BS 970 316S31

TECHNICAL DATA

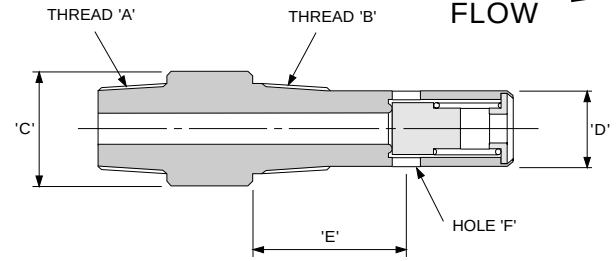
MAXIMUM OPERATING PRESSURE = 15 bar.g
MAXIMUM OPERATING TEMPERATURE = 2OO° C
SEAL MATERIAL = VITON

FEMALE TO MALE FITTING



FLOW

MALE TO MALE FITTING



OPTIONAL CONNECTIONS

STANDARD CONNECTION WITH VENT

CONED CONNECTION WITH VENT

VALVE SELECTION CHART

(Standard sizes shown, other sizes may be available.)

FITTING	THREAD FORM	CHECK VALVE REF. No.	INLET Thread A BSP. (inch)	OUTLET Thread B BSP. (inch)	Hexagon C A/F (mm)	Diameter D (mm)	Length E (mm)	Hole F DIA (mm)
FEMALE TO MALE	Parallel	593213000	1/4	1/2	27	18.3	36	7
	Taper	593214000						
	Parallel	593215000	3/8	3/4	30	23	38.5	8
	Taper	593216000						
	Parallel	593217000	1/2	3/4	30	23	48.5	8
	Taper	593218000					49.5	
	Parallel	593219000	3/4	1	38	29	72	9
	Taper	593220000						
MALE TO MALE	Parallel	593227000	1/2	3/4	30	23	38.5	8
	Taper	593228000						
	Parallel	593229000	3/4	3/4	30	23	38.5	8
	Taper	593230000						
	Parallel	593231000	3/4	1	38	29	47	9
	Taper	593232000						

OPTION : MALE TO MALE STD CONNECTION WITH 1/8" BSP.T. VENT

Parallel	593248000	1/2	3/4	30	23	38.5	8
Taper	593249000						
Parallel	593250000	3/4	3/4	30	23	38.5	8
Taper	593251000						
Parallel	593252000	3/4	1	35	29	47	9
Taper	593247000						

OPTION : MALE TO MALE CONED CONNECTION WITH 1/8" BSP.T. VENT

Coned	593269000	1/2	3/4	30	23	48.5	8
Coned	593268000	3/4	3/4	30	23	48.5	8

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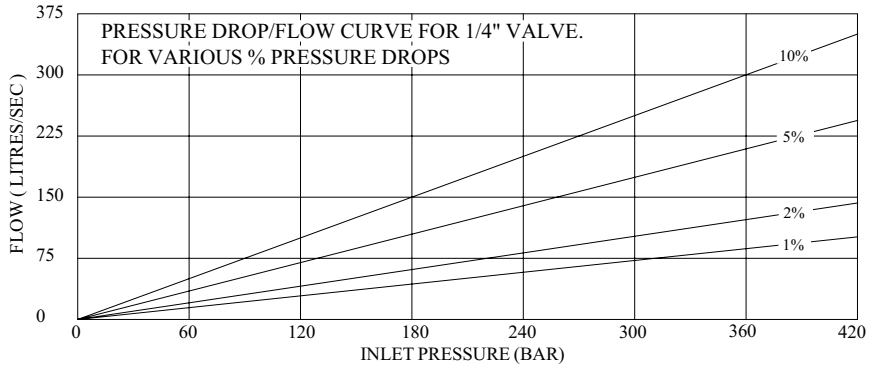
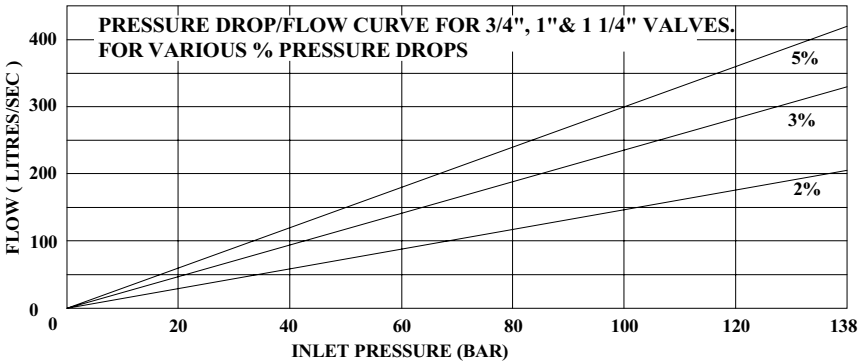
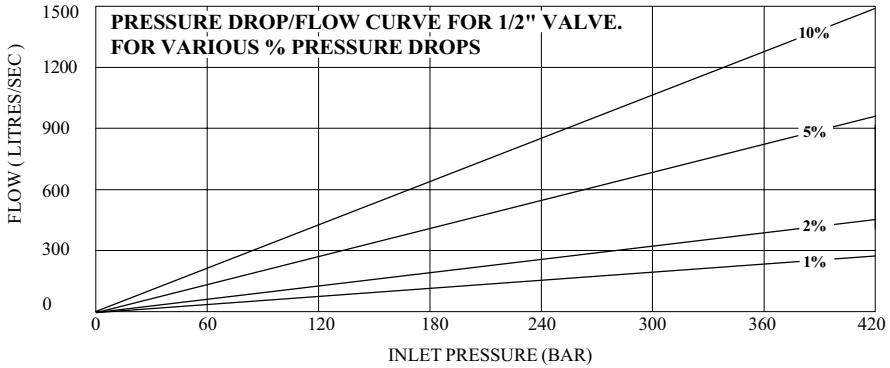
AIR RECEIVER CHECK VALVE

TYPE 593

EDITION C. 31.08.00







PLEASE NOTE THAT THESE CURVES SHOULD BE TAKEN AS A GUIDE ONLY. PRESSURE DROP % VALUES CAN VARY SIGNIFICANTLY DURING VALVE USAGE.
FLOW CHARACTERISTICS ESTABLISHED USING AIR AT 15°C 1013 mbar AND ARE MEASURED IN Std. litres/s.

FOR ALL OTHER DETAILS SEE SHEET 1.

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INLINE
CHECK VALVE

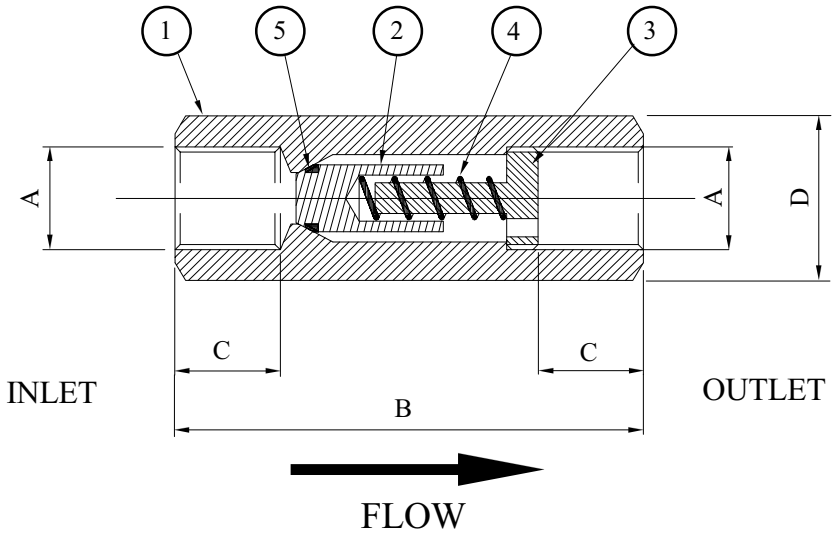
TYPE
595

EDITION C. 04/04/97

TYPE
595

PARTS LIST AND MATERIAL SPECIFICATION

		5951	5952	5953
1	BODY	BRASS BS 2874 CZ121	BRASS BS 2874 CZ121	ST.STL BS 970 316S31
2	PLUNGER	BRASS BS 2874 CZ121	ST.STL BS 970 316S31	ST.STL BS 970 316S31
3	ADJUSTER	BRASS BS 2874 CZ121	ST.STL BS 970 316S31	ST.STL BS 970 316S31
4	SPRING	ST.STL BS 2056 302S26	ST.STL BS 2056 302S26	ST.STL BS 2056 302S26
5	'O' RING	TO SUIT APPLICATION		



VALVE SELECTION CHART

CONNECTION SIZE BOTH INLET & OUTLET 'A' (inch)	ORDER CODE PREFIX (SEE PARTS LIST)	CONNECTION THREAD TYPE (BOTH INLET & OUTLET)		
		BSP.F	BSP.TAPER	NPT
1/4"	5951 5952 5953	01030	OPTIONAL. MAY BE AVALIABLE ON REQUEST	
1/2"		02030		
3/4"		03030		
1"		04030		
1 1/4"		05030		

Example: Ordering code 5953 05030 is Stainless Steel construction. Inlet and outlet thread 1 1/4" BSP.F Inline check valve.

Seal material: This digit calls up viton seal (since this is the most universal type). When other material is required this digit changes to :-

1. NITRILE
3. VITON
5. NEOPRENE
6. ETHYLENE PROPYLENE

For advice on seal selection refer to Technical Information Section A.

VALVE SPECIFICATIONS

CONNECTION SIZE INLET & OUTLET 'A' (inch)	MAXIMUM PRESSURE (BAR.G)	OVERALL LENGTH 'B' (mm)	DEPTH OF THREAD 'C' (mm)	ACROSS FLATS 'D' (mm) 5951, 5952
1/4"	420	70	11	25.4
1/2"		90	18	31
3/4"	138	110		38
1"		130	26	50.8
1 1/4"		141		63.5

FOR VALVE FLOW PERFORMANCE CURVES SEE SHEET 2.

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HANOVER PLACE, BRISTOL. BS1 6UT
TELEPHONE (0117) 927 9204, FAX (0117) 929 8193

INLINE
CHECK VALVE

TYPE
595

EDITION C. 04/04/97

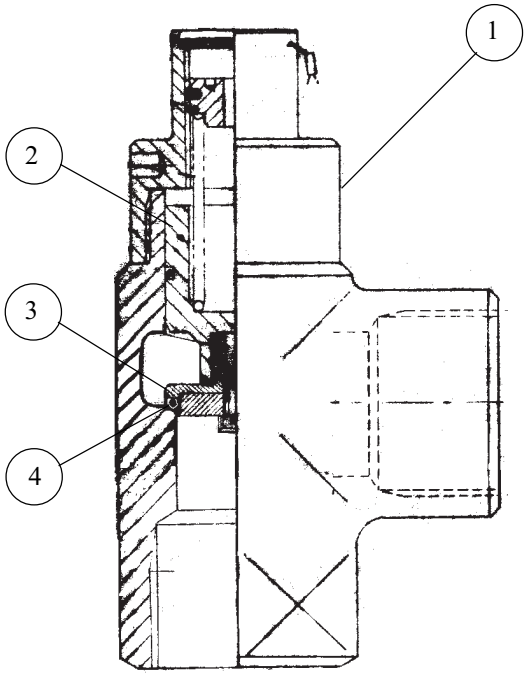

DIAGRAM IS REPRESENTATIVE OF VALVE NUMBERS 419280000 AND 419310000

PARTS LIST AND
MATERIAL SPECIFICATION

1	BODY	GREY CAST IRON or ALUMINIUM
2	PISTON	ALUMINIUM ALLOY
3	PLUNGER	ALUMINIUM ALLOY
4	SEAL	VITON

FLOW CHART - FULL LIFT FLOW OF AIR AT 100 p.s.i.g. (SCFM)

	VALVE SPECIFICATION NUMBER			
	419280000	419290000	419300000	419310000
AT 1 p.s.i.g. PRESSURE DROP	FLOW NOT TESTED	465	1500	320

TECHNICAL INFORMATION TABLE

VALVE SPECIFICATION NUMBER	INLET CONNECTION	OUTLET CONNECTION	MINIMUM PRESSURE (P.S.I.G.)	COMMENTS
419280000	1 1/4" BSP TAPER FEMALE	1 1/4" BSP PARALLEL	RANGE 35 - 75	SUITABLE FOR WORKING PRESSURE UP TO 200 P.S.I.G.
419290000	2" NPT FEMALE	2" NPT FEMALE	60 - 75 ONLY	-
419300000	3" FLANGED	3" FLANGED	46	SINGLE SET PRESSURE, BUT CAN BE ADJUSTED
419310000	1 1/2" BSP PARALLEL FEMALE	1 1/2" BSP PARALLEL FEMALE	RANGE 33 - 75	SUITABLE FOR WORKING PRESSURE UP TO 200 P.S.I.G.

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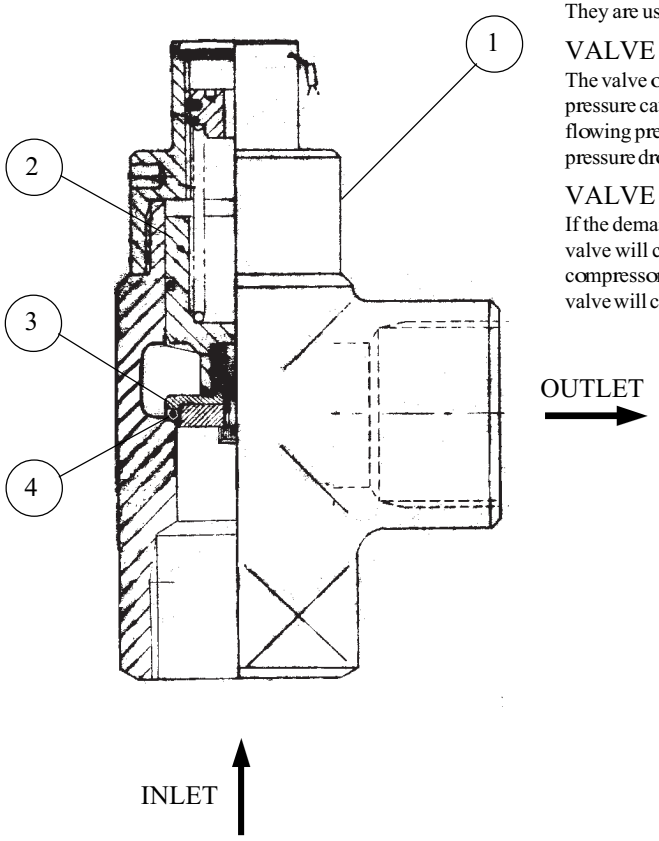
CURRENTLY AVAILABLE RANGE OF MINIMUM PRESSURE VALVES

MINIMUM PRESSURE VALVES



DESCRIPTION DESIGN

Minimum pressure check valves are spring loaded pressure control valves with an inbuilt check (non-return) valve. They are usually fitted to the AIR/OIL separator tank.

VALVE OPENING

The valve opens when the increasing inlet pressure exceeds the adjusted opening pressure. Further increasing the pressure causes the piston to progressively open until the output of the compressor flows through the valve at the flowing pressure required. The valve size is selected to suit the flow required at the specified flowing pressure and pressure drop.

VALVE CLOSING

If the demand for air is such that the pressure at the valve inlet decreases to the specified minimum pressure, the valve will close to a position such that the flow through the valve will be equal to the flow produced by the compressor. If there is a back pressure down stream of the valve which is greater than the inlet pressure, the check valve will close.

PARTS LIST AND MATERIAL SPECIFICATION

1	BODY	GREY CAST IRON OR ALUMINIUM
2	PISTON	ALUMINIUM ALLOY
3	PLUNGER	ALUMINIUM ALLOY
4	SEAL	VITON

PRESSURE & FLOW DETAILS

Operating pressure range = 2.4 - 5.2 bar.g
Maximum pressure = 13.8 bar.g
Pressure drop as little as 0.07 bar.g

Flow up to 2548.5 m³/hr

CONNECTION DETAILS

THREAD TYPES AVAILABLE - BSP, BSP.T, NPT.									
INLET SIZE					OUTLET SIZE				
3/4"	1"	1 1/4"	1 1/2"	2"	3/4"	1"	1 1/4"	1 1/2"	2"
FLANGED CONNECTIONS ALSO AVAILABLE									

SEETRU LIMITED

CONTACT SEETRU FOR FURTHER INFORMATION AND ASSISTANCE WITH PRODUCT SELECTION.

SEETRU LIMITED ALBION DOCKSIDE WORKS,
HANOVER PLACE, BRISTOL. BS1 6UT
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CURRENTLY AVAILABLE RANGE OF MINIMUM PRESSURE VALVES

MINIMUM PRESSURE VALVES

ITEM No.	No. OFF	NAME	MATL OR PART No.	
1	1	BODY	BRASS BS2874 CZ132	V0310451
2	1	ADJUSTER	BRASS BS2874 CZ132	V0710211
3	1	PLUNGER	BRASS BS2874 CZ132	V0410145
4	1	NAMEPLATE	ALUMINIUM ALLOY	V1210476
5	1	SPRING	ST.STL.	SEE TABLE
6	1	DISC SEAL	SILICONE	V1410943
7	1	PULL RING	ST.STL.	V1210454
8	1	LOCKING SLUG	NYLON	V1210057

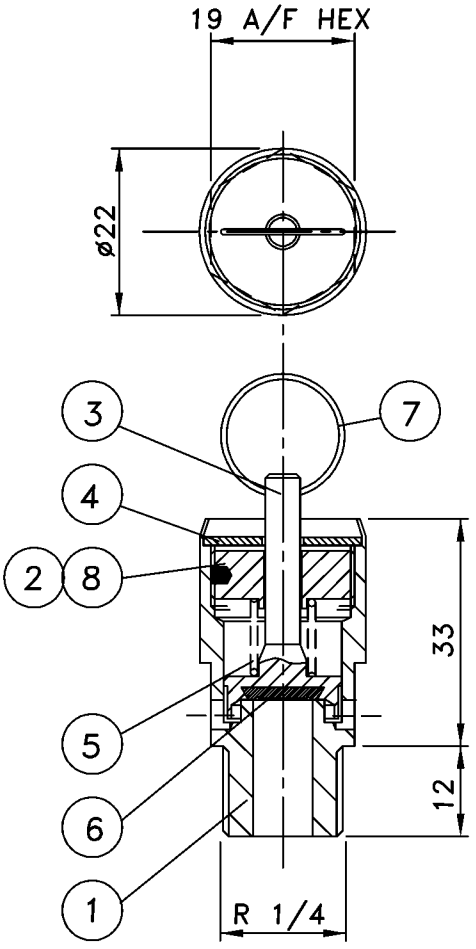


TABLE 1

PRESSURE RANGE BAR.G.	SPRING
0.27 – 0.4	V1310041
0.4 – 0.9	V1310235
0.9 – 1.4	V1310042
1.4 – 3.25	V1310735
3.25 – 4.0	V1310736

COLD SET PRESSURE SET 0.07 BAR.G HIGHER THAN REQUIRED SET PRESSURE.

ISSUE	DATE	MODIFICATION	MOD. No.
2	09.05.03	ITEM 8, V1210057, ADDED.	4516

CASTINGS ±1/32" OR 0.8MM MACHINE AT ▽ LIMITS UNLESS STATED ±.010" OR 0.25MM

TITLE
MINI VALVE
– CRIMPED RING PULL–

DRG No. 319000247

SEETRU LTD.
ALBION DOCKSIDE WORKS,
HANOVER PLACE,BRISTOL BS1 6UT
ENGLAND

MATL	SEE L.O.P	DRAWN	JCF
FINISH		DATE	18.12.01
		SCALE	1:1

U/O STANDARD VALVE 750082024

ISSUE 2

ITEM No.	No. OFF	NAME	MATL OR PART No.	
1	1	BODY	BRASS BS2874 CZ132	V0310412
2	1	ADJUSTER	BRASS BS2874 CZ132	V0710211
3	1	PLUNGER	BRASS BS2874 CZ132	V0410145
4	1	NAMEPLATE	ALUMINIUM ALLOY	V1210476
5	1	SPRING	ST.STL.	SEE TABLE
6	1	DISC SEAL	SILICONE	V1410943
7	1	PULL RING	ST.STL.	V1210454
8	1	LOCKING SLUG	NYLON	V1210057

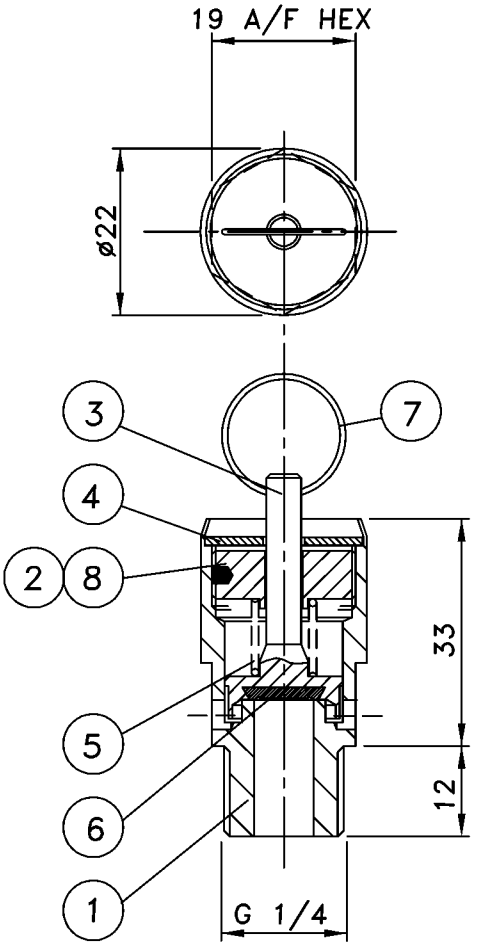


TABLE 1

PRESSURE RANGE BAR.G.	SPRING
0.27 – 0.4	V1310041
0.4 – 0.9	V1310235
0.9 – 1.4	V1310042
1.4 – 3.25	V1310735
3.25 – 4.0	V1310736

COLD SET PRESSURE SET 0.07 BAR.G HIGHER THAN REQUIRED SET PRESSURE.

ISSUE	DATE	MODIFICATION	MOD. No.
2	09.05.03	ITEM 8, V1210057, ADDED.	4516

CASTINGS ±1/32" OR 0.8MM MACHINE AT ▽ LIMITS UNLESS STATED ±.010" OR 0.25MM

TITLE
MINI VALVE
– CRIMPED RING PULL–

DRG No. 319000276

SEETRU LTD.
ALBION DOCKSIDE WORKS,
HANOVER PLACE,BRISTOL BS1 6UT
ENGLAND

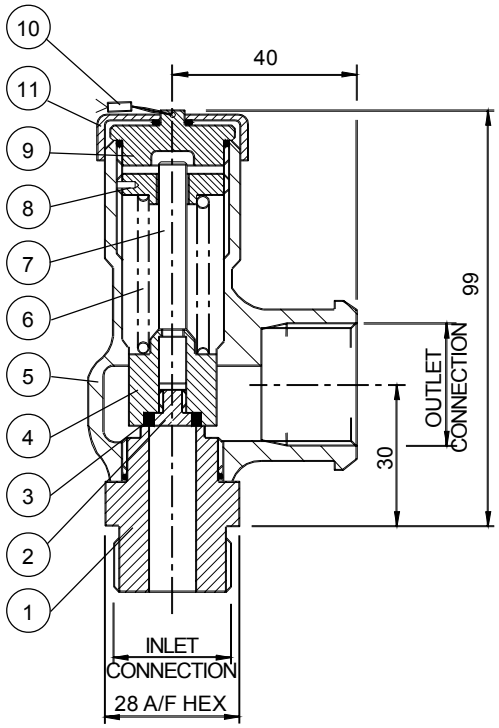
MATL SEE L.O.P

FINISH

DRAWN	RNW
DATE	21.01.03
SCALE	1:1

U/O STANDARD VALVE 750082014

ISSUE 2



ILLUSTRATED SHOWING
TYPE S
NO EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		67010	68010	69010
1	INLET SEAT	BRASS	ST.STL.	
2	SEAL RETAINER	BRASS	ST.STL.	
3	SEAL	TO SUIT APPLICATION		
4	PLUNGER	BRASS	ST.STL.	BRASS
5	BODY	BRASS	ST.STL.	BRASS
6	SPRING	ST.STL.		
7	SPINDLE	ST.STL.		
8	ADJUSTER	BRASS	ST.STL.	BRASS
9	CAP	BRASS	ST.STL.	BRASS
10	WIRELOCKING	ST.STL. & LEAD		
11	COVER	BRASS	ST.STL.	BRASS

APPROVALS

P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/048/8923
Quality management system module D, Cert. No. EDS 0002011/01.
Designed in accordance with BS 6759 Part 3 & ISO 4126-1:1991.

TECHNICAL DATA

Relieving pressure = Set pressure +25%
Reseating pressure = Set pressure max -20% down to 3 Bar.g.
= Below 3 Bar.g = 0.6 Bar.g.
Maximum set pressure = 30 Bar.g
Minimum set pressure = 0.76 Bar.g
Flow area = 70.9 mm²
Inlet bore diameter = 9.5 mm
Derated coefficient of discharge K_{dr} = 0.59
Temperature Range = -20°C to 200°C subject to seal material.
FOR FURTHER INFORMATION, CONVERSION FACTORS, INSTALLATION AND OPERATION INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

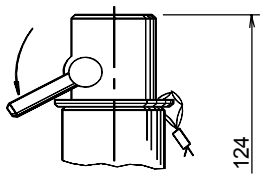
FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION C
- FOR GREATER FLOWS REFER TO 13mm BORE TYPE 67013 DATA SHEET, FOR LOWER FLOWS REFER TO SEETRU

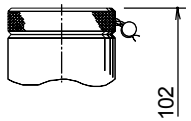
SET PRESSURE Bar.g	0.76	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
RATED DISCHARGE *CAPACITY IN ACCORDANCE WITH BS6759 WATER AT 15°C (kg/hr)	2075	3367	4761	5831	6733	7528	8246	8907	9522	10100	10650	11170	11660	12140	12600	13040

* DISCHARGING TO ATMOSPHERE

ALTERNATIVE TOP FITTING



TYPE SL
SEALED LEVER
EASING GEAR



TYPE R
ROTA-LIFT
EASING GEAR

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE CODE	TOP FITTING CODE		
			S	R	SL
G 1/2 (1/2" BSP PARALLEL)	G 3/4 (3/4" BSP PARALLEL)	67010A 68010A 69010A	1273	2073	4073
R 1/2 (1/2" BSP TAPER)	G3/4 (3/4" BSP PARALLEL)		1283	2083	4083

Example:
Ordering code 67010A 1273 is brass construction sealed valve, with 1/2" BSP parallel inlet connection, 3/4" BSP parallel outlet connection with Viton® seals, wirelocked, no easing gear.
Seal material:
Last digit of ordering code calls up Viton® seal (since this is the most universal type).
When other material is required last digit changes to:

1. NITRILE
3. VITON®
5. NEOPRENE
6. ETHYLENE PROPYLENE

For advice on seal material selection refer to Technical Information Section A.

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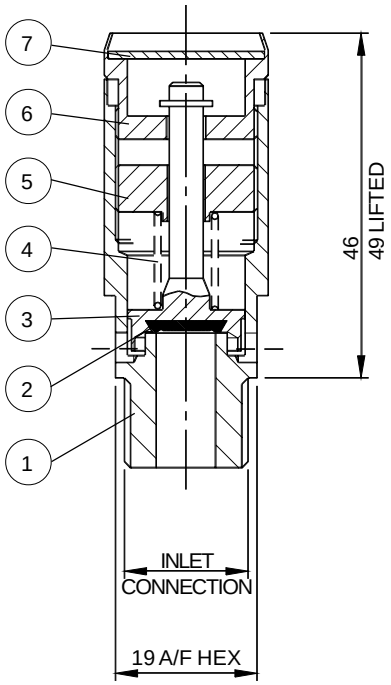
www.seetru.com enquiries@seetru.com

10mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR LIQUIDS

ENCLOSED DISCHARGE
10mm NOM. BORE SERIES M/2
TYPE 67010 BRASS.
TYPE 68010 ST.STL.
TYPE 69010 BRASS/ST.STL.

EDITION C. 24.09.02



ILLUSTRATED SHOWING
TYPE R
CRIMPED ROTA-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		73008	74008	75008
1	BODY	BRASS BS2874 CZ121	ST.STL.	BRASS BS2874 CZ132
2	TUTCHTITE SEAL	TO SUIT APPLICATION		
3	SPINDLE/ PLUNGER	BRASS BS2874 CZ121	ST.STL.	BRASS BS2874 CZ132
4	SPRING	ST.STL BS2056 302S26		
5	ADJUSTER	BRASS BS2874 CZ121	ST.STL.	BRASS BS2874 CZ132
6	CAP	BRASS BS2874 CZ121	ST.STL.	-
7	NAMEPLATE	AL.ALLOY		-

NOTE: WIRELOCK AVAILABLE ON TYPE 74008 ONLY.

APPROVALS

Ad - MERKBLATT A2 1998: (TÜV GERMANY), REF.- T.Ü.V.SV.01-276.7,9.D/G.0,63.p.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00015
Quality management system module D, Cert. No. EDS0002011/01
Designed in accordance with BS6759:1984 & I.S.O. 4126-1:1991

TECHNICAL DATA

Relieving pressure	= set pressure +10% (0.1 Bar.g below 1.0 Bar.g)
Reseating pressure	= set pressure -10% (0.3 Bar.g below 3.0 Bar.g)
Maximum set pressure	= 17.5 Bar.g
Minimum set pressure	= 0.27 Bar.g
Flow area	= 49mm^2
Inlet bore diameter	= 7.9mm
T.Ü.V. Derated coefficient of discharge α_d	= 0.63 below 3.0 Bar.g see 'α_dVs set pressure chart'.
Temperature range	= -20^{O}C TO 200^{O}C subject to normal seal materials.

FOR FURTHER INFORMATION, INSTALLATION AND OPERATIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
- FOR GREATER FLOWS REFER TO 8mm BORE TYPE 81808 DATA SHEET, FOR LOWER FLOW REFER TO 6mm BORE TYPE 81806 DATA SHEET.

SET PRESSURE Bar.g	0.27	0.5	1.0	1.5	2	3	4	5	6	7	8	9	10	11	12	15	17.5
CERTIFIED DISCHARGE CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0^{o}C AND 1013 mbar Normal m^3/h	19.8	27.5	40.9	54.2	66.5	90.7	113.8	137.0	160.1	183.3	206.4	229.5	252.7	275.8	298.9	368.4	426.2
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15^{o}C AND 1013 mbar Std. Litres/s	5.6	7.75	11.5	15.3	18.8	25.6	32.1	38.6	45.2	51.7	58.2	64.8	71.3	77.8	84.4	103.9	120.3

VALVE SELECTION CHART

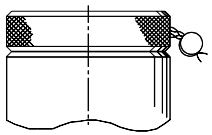
STANDARD THREADS SIZES SHOWN, OTHER SIZES MAY BE AVAILABLE.

INLET CONNECTION	ORDERING CODE	TOP FITTING CODE			
		73008 R	74008 RW	73008 SL	75008 SL
R 1/4 (1/4" BSP TAPER)	73008 74008 75008	1223	0823	0423	0423
R 3/8 (3/8" BSP TAPER)		1253	0853	0453	0453

Example:
Order code 73008 1223 is Rota-lift type easing gear. 1/4"BSPTR inlet connection, with Viton® seals and crimped locking.
Seal Material:
Last digit of ordering code calls up Viton® seal (since this is the most universal type).
When other material is required, last digit changes to:-

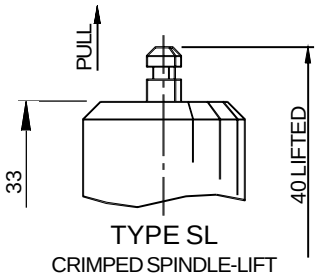
1. Nitrile
3. Viton®
5. Neoprene
6. Ethylene Propylene.

ALTERNATIVE
TOP FITTING



TYPE RW
WIRELOCKED ROTA-LIFT
EASING GEAR

NON PREFERED TYPE



TYPE SL
CRIMPED SPINDLE-LIFT
EASING GEAR

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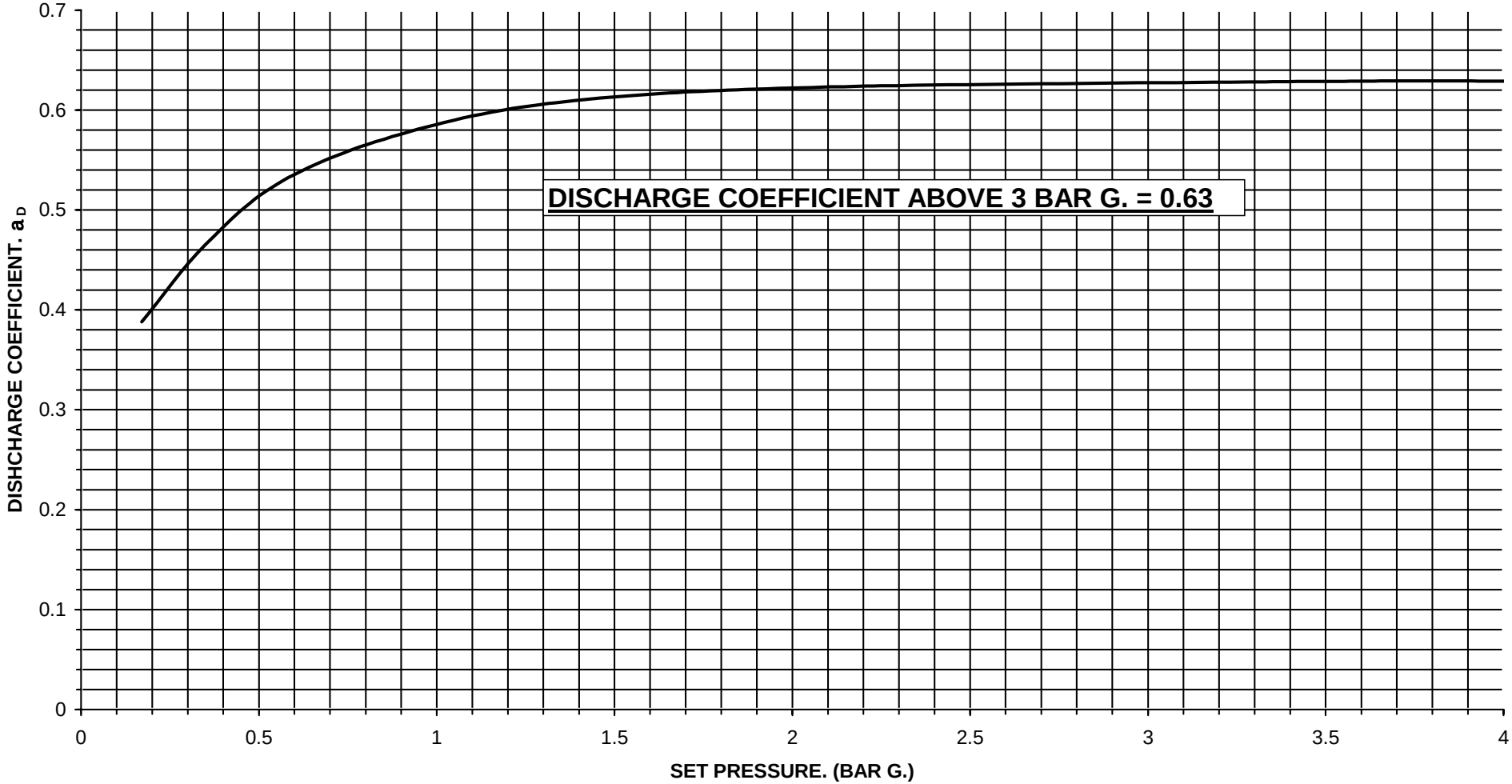
8mm Nominal Bore
DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

SERIES
TYPE 73008 BRASS
TYPE 74008 ST.STL.
TYPE 75008 BRASS

EDITION D. 26.09.02

PRESSURE / DISCHARGE COEFFICIENT CURVE FOR VALVE 73008. 0.27 - 4.0 BAR G.



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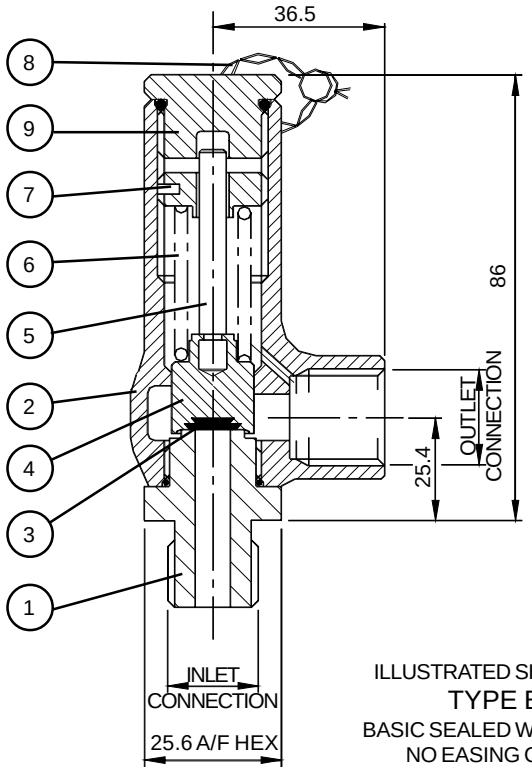
8mm Nominal Bore
DIRECT SPRING LOADED ATMOSPHERIC DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

SERIES

TYPE 73008 BRASS
TYPE 74008 ST.STL.
TYPE 75008 BRASS



ILLUSTRATED SHOWING
TYPE B
BASIC SEALED WIRELOCK
NO EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		33020	34020
1	SEAT	ST.STL.	
2	BODY	BRASS	ST.STL.
3	DISC SEAL	TO SUIT APPLICATION	
4	PLUNGER	ST.STL.	
5	SPINDLE	ST.STL.	
6	SPRING	ST.STL.	
7	ADJUSTER	BRASS	ST.STL.
8	WIRE & SEAL	ST.STL. & LEAD	
9	CAP	BRASS	ST.STL.
10	KNOB	PLASTIC	PLASTIC

APPROVALS

P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/036/8878/1
Quality management system module D, Cert. No. EDS 0002011/01
Designed in accordance with ISO 4126-1:1991.

TECHNICAL DATA

Relieving pressure	= Set pressure + 10%
Reseating pressure	= Set pressure - 15%
Maximum set pressure	= 33020 / 34020 = 104 Bar.g
Minimum set pressure	= 33020 / 34020 = 55 Bar.g
Flow area	= 40.04 mm²
Inlet bore diameter	= 0.281" (7.14mm)
Derated coefficient of discharge, K_{dr} AIR	= 0.67,

Temperature range = -50°C to 200°C subject to seal material.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION.

SET PRESSURE Bar.g	55	60	65	70	75	80	85	90	95	100	104
RATED DISCHARGE CAPACITY IN ACCORDANCE WITH BS 6759, AIR AT 15°C AND 1013 mbar Std.Litres/s	317	345	374	402	431	459	487	516	544	572	595

VALVE SELECTION CHART

STANDARD THREAD SIZES SHOWN, OTHER SIZES MAY BE AVAILABLE.

INLET CONNECTION	OUTLET CONNECTION	TYPE	TOP FITTING CODE
			B
G 3/8 (3/8" BSP PARALLEL)	G 1/2 (1/2" BSP PARALLEL)	33020 34020	0201
R 3/8 (3/8" BSP TAPER)	R 1/2 (1/2" BSP TAPER)		0182
G 1/2 (1/2" BSP PARALLEL)	G 1/2 (1/2" BSP PARALLEL)		1201
R 1/2 (1/2" BSP TAPER)	R 1/2 (1/2" BSP TAPER)		2202
1/2" NPT	1/2" NPT		3203

Example:
Ordering code 33020 0201 is a Basic wirelock with 3/8"BSP inlet connection & 1/2"BSP outlet connection.
Seal Materials:
Consult Seetru for full range of available seal materials.

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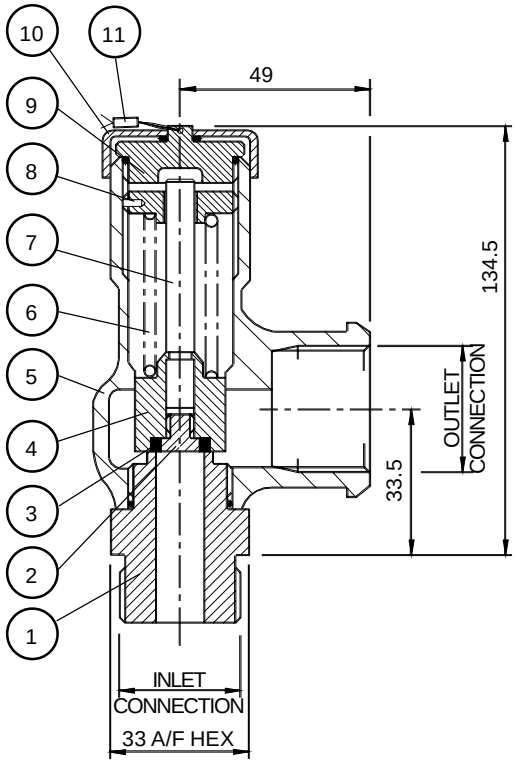
1/4" Nominal Bore BRASS CONSTRUCTION
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES

ENCLOSED DISCHARGE
1/4" NOMINAL BORE

TYPE 33020 BRASS/ST.STL.
TYPE 34020 ST.STL.

EDITION A. 08.07.03



ILLUSTRATED SHOWING
TYPE S
NO EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		67013	68013	69013
1	INLET SEAT	BRASS	ST.STL	
2	SEAL RETAINER	BRASS	ST.STL	
3	SEAL	TO SUIT APPLICATION		
4	PLUNGER	BRASS	ST.STL	BRASS
5	BODY	BRASS	ST.STL	BRASS
6	SPRING	ST.STL		
7	SPINDLE	ST.STL		
8	ADJUSTER	BRASS	ST.STL	BRASS
9	CAP	BRASS	ST.STL	BRASS
10	WIRE & SEAL	ST.STL. & LEAD		
11	COVER	BRASS	ST.STL	BRASS

TECHNICAL DATA

P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/043/8923.
Quality management system module D, Cert. No. EDS 0002011/01.
Designed in accordance with BS 6759 Part 3 & ISO 4126-1:1991.

TECHNICAL DATA

Relieving set pressure	= +25%
Reseating set pressure	= - max 20% down to 3 Bar.g
	= Below 3 Bar.g = 0.6 Bar.g
Maximum set pressure	= 27 Bar.g
Minimum set pressure	= 0.7 Bar.g
Flow area	= 147.4 mm²
Inlet bore diameter	= 13.7 mm
Derated coefficient of discharge K_{dr}	= 0.57
Temperature Range	= -20°C to 200°C subject to seal material.

FOR FURTHER INFORMATION, CONVERSION FACTORS INSTALLATION AND OPERATION INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION C.
- FOR GREATER FLOWS REFER TO 20mm BORE TYPE 67020 DATA SHEET, FOR LOWER FLOWS REFER TO 10mm BORE TYPE 67010 DATA SHEET

SET PRESSURE Bar.g	0.7	2	4	6	8	10	12	14	16	18	20	22	24	26	27
RATED DISCHARGE * CAPACITY INACCORDANCE WITH BS 6759, WATER AT 15°C (kg/hr)	3764	6759	9560	11708	13519	15116	16558	17885	19119	20279	21376	22419	23416	24372	24837

* DISCHARGING TO ATMOSPHERE

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available.

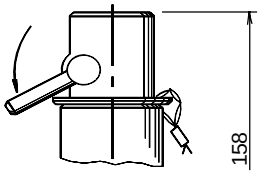
INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE		
			S	R	SL
G 3/4 (3/4" BSP PARALLEL)	G 1 (1" BSP PARALLEL)	67013A 68013A 69013A	1303	2103	4103
R 3/4 (3/4" BSP TAPER)	G1 (1" BSP PARALLEL)		1313	2113	4113

Example:
Ordering code 67013A 1303 is brass construction Sealed valve, with 3/4"BSP parallel inlet connection, 1"BSP parallel outlet connection with Viton® seals wirelocked no easing gear.
Seal material:
Last digit of ordering code calls up Viton® seal (since this is the most universal type).
When other material is required last digit changes to:

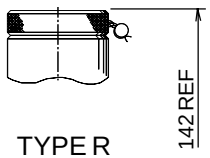
1. NITRILE
3. VITON®
5. NEOPRENE
6. ETHYLENE PROPYLENE

For advice on seal material selection refer to Technical Information Section A.

ALTERNATIVE TOP FITTING



TYPE SL
SEALED LEVER
EASING GEAR



TYPE R
ROTA-LIFT
EASING GEAR

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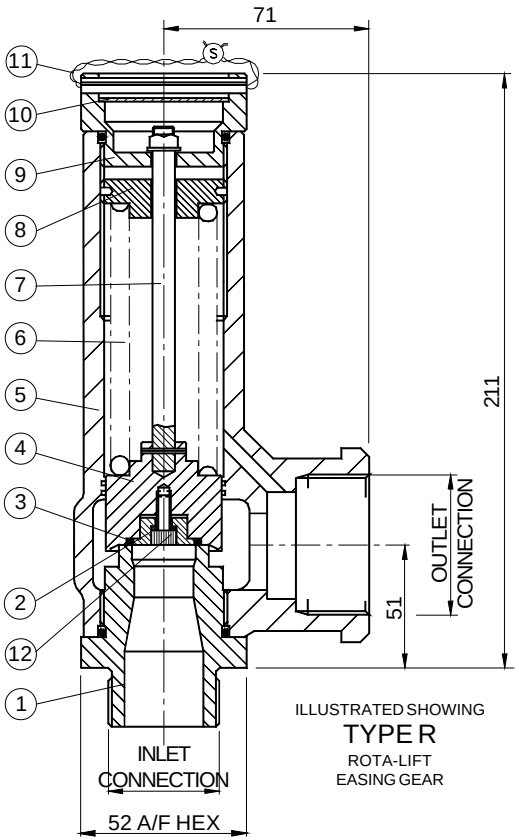
www.seetru.com enquiries@seetru.com

13mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR LIQUIDS

ENCLOSED DISCHARGE
13mm NOM. BORE SERIES M/2
TYPE 67013 BRASS
TYPE 68013 ST.STL.
TYPE 69013 BRASS/ST.STL.

EDITION C. 25.09.02



ILLUSTRATED SHOWING
TYPE R
ROTA-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		67018	69018
1	INLET SEAT	BRASS	ST. STL.
2	SEAL RETAINER	BRASS	ST. STL.
3	'O' RING	TO SUIT APPLICATION	
4	PLUNGER	BRASS	ST. STL.
5	BODY	BRONZE	ST.STL.
6	SPRING	ST.STL.	
7	SPINDLE	ST.STL.	
8	ADJUSTER	BRASS	
9	CAP	BRASS	
10	NAMEPLATE	ALUMINIUM	
11	WIRE & SEAL	ST.STL AND LEAD	
12	SCREW	ST.STL.	

APPROVALS

P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/044/8923
Quality management system module D, Cert. No. EDS 0002011/01
Designed in accordance with BS6759 Part 3 & ISO 4126-1:1991, but not approved.

TECHNICAL DATA

Relieving pressure	= Set pressure + 25%
Reseating pressure	= Set pressure - max 20% down to 3 Bar.g; Below 3 Bar.g = 0.6 Bar.g
Maximum set pressure	= 25.7 Bar.g
Minimum set pressure	= 5.4 Bar.g
Flow area	= 227mm²
Inlet bore diameter	= 17mm
Derated coefficient of discharge K_{dr}	= 0.55
Temperature Range	= Subject to seal material.

FOR FURTHER INFORMATION, CONVERSION FACTORS, INSTALLATION AND OPERATION INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

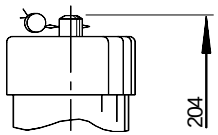
FLOW CHART

-TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION C.
- FOR GREATER FLOWS REFER TO 20mm BORE TYPE 67020 DATA SHEET, FOR LOWER FLOWS REFER TO 13mm BORE 67013 DATA SHEET

SET PRESSURE (Bar.g)	5.4	6	7	8	9	10	12	14	16	18	20	22	24	25.7
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS 6759, WATER AT 15°C (kg/hr)	16504	17397	18791	20089	21307	22460	24604	26574	28410	30133	31763	33314	34795	36006

* DISCHARGING TO ATMOSPHERE

ALTERNATIVE TOP FITTING



TYPE S
SEALED
NO EASING GEAR

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE	
			S	R
G 1 (1" BSP PARALLEL)	G1 1/2 (1 1/2" BSP PARALLEL)	67018A 69018A	1333	2133
R 1 (1" BSP TAPER)	G1 1/2 (1 1/2" BSP PARALLEL)		1343	2143

Example:
Ordering code 67018A 1333 is Sealed valve with 1" BSP Parallel inlet connection. 1 1/2" BSP Parallel outlet connection with Viton seals, wirelocked no easing gear.
Seal material:
Last digit of ordering code calls up Viton 'O' ring seal (since this is the most universal type).
When other material is required this changes to :

1. NITRILE
3. VITON ®
5. NEOPRENE
6. ETHYLENE PROPYLENE

For advice on seal material selection refer to Technical Information Section A.

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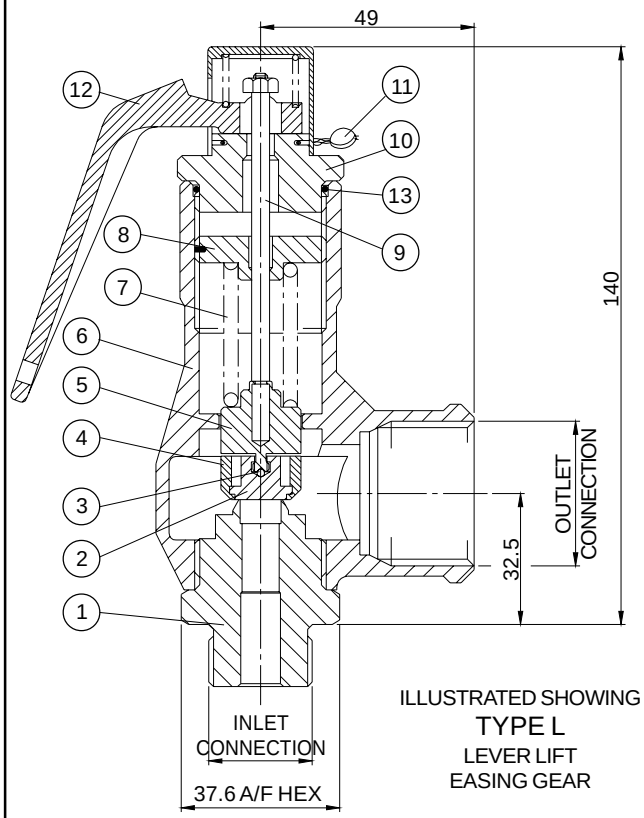
18mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR LIQUIDS

ENCLOSED DISCHARGE
18mm NOMINAL BORE SERIES M/2
TYPE 67018
TYPE 69018

EDITION C. 07.08.02



ILLUSTRATED SHOWING
TYPE L
LEVER LIFT
EASING GEAR

PARTS LIST AND MATERIAL SPECIFICATION

		93610	94610
1	SEAT	BRASS	ST.STL.
2	DISC	ST.STL. 316	ST.STL. 440B
3	BALL	ST.STL.	
4	DISC HOLDER	ST.STL.	
5	PLUNGER	ST.STL.	
6	BODY	BRASS	ST.STL.
7	SPRING	ST.STL.	
8	ADJUSTER	BRASS	ST.STL.
9	SPINDLE	ST.STL.	
10	CAP	BRASS	ST.STL.
11	WIRE & SEAL	ST.STL. & LEAD	
12	LEVER	BRASS	ST.STL. *
13	O'RING	TO SUIT APPLICATION	

* TYPE SL ONLY

APPROVALS

TÜV Approved:-
Ref- TÜV.SV.03-1016.10.D/G.0,83.p. For 3-28 Bar.g. Below 3 Bar.g. see 'α_D vs Set Pressure' chart.
93610 type materials meet the requirements of BAM (Germany) for oxygen service.
Designed in accordance with BS 6759 (but not approved) & ISO 4126 .
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B00017
Quality management system module D, Cert. No. EDS 002011/01.

TECHNICAL DATA

Relieving pressure = Set pressure +10%, 0.1 Bar.g. below 1.0 Bar.g.
Reseating pressure = Set pressure -10%, 0.3 Bar.g. below 3.0 Bar.g.
Maximum set pressure = 28 Bar.g.
Minimum set pressure = 0.3 Bar.g.
Flow area = 78.5 mm^2
Inlet bore diameter = 10 mm
TÜV Derated coefficient of discharge α_D = 0.83. Below 3.0 Bar.g. see 'α_D vs set pressure' chart.
Leak tightness at 90% set pressure to API 527 and in accordance with BS6759 Part 3 1984, Table 9 Grade 2. Greater leak tightness may be achieved on request.
Maximum temperature = 250°C Note: For sealed top fittings, max. temp. dependent on seal material.
Minimum temperature = -196°C subject to material specification.
Maximum permissible built up back pressure =10% of set pressure at or below which flow is not reduced.
Stable operation on flows down to 50% of valve rated capacity.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

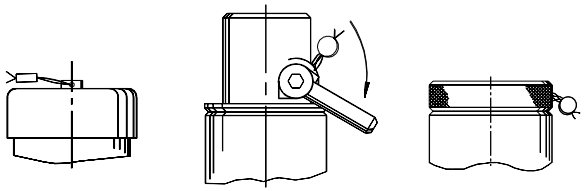
FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
- FOR GREATER FLOWS REFER TO 15mm BORE TYPE 93615 DATA SHEET.

SET PRESSURE Bar.g	0.3	0.5	1.0	2.0	3	4	5	6	7	8	9	10	15	20	25	28
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS6759, AIR AT 15°C AND 1013 mbar std. Litres/s	11.7	15.8	23.7	31.1	54	67	81	95	109	122	136	150	219	288	357	398
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS6759, PART 1, STEAM Kg/h	31.4	42.9	64.8	104.4	147	185	222	260	298	335	373	411	599	787	975	1089
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TUV, AIR AT 0°C AND 1013 mbar Normal m^3/h	39.1	56.3	83.5	134.8	191	240	289	338	386	435	484	533	777	1021	1266	1412
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TUV, STEAM Kg/h	32.5	44.5	66.1	106.2	149	186	222	259	295	332	368	405	585	765	947	1055

* DISCHARGING TO ATMOSPHERE

ALTERNATIVE TOP FITTINGS



TYPE S
SEALED
NO EASING GEAR

TYPE SL
SEALED LEVER
EASING GEAR

TYPE R
ROTA-LIFT
EASING GEAR

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10mm Nominal Bore METAL SEAL
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
10mm NOMINAL BORE SERIES
TYPE 93610 BRASS
TYPE 94610 ST.STL.

EDITION K. 26.09.02

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE			
			R	S	SL	L #
G 1/2 (1/2" BSP PARALLEL MALE)	G 1 (1" BSP PARALLEL)	93610A 94610A	207	127	407	327
R 1/2 (1/2" BSP TAPER MALE)			208	128	408	328
G 1/2 (1/2" BSP PARALLEL FEMALE)		93610D 94610D	207	127	407	327

Example 1: Ordering code 93610A 207 3 is brass seated,
Rota lift type R, with 1/2"BSP parallel MALE inlet connection,
1"BSP parallel outlet connection, with Viton® 'O'ring.

Example 2: Ordering code 93610D 207 3 is brass seated,
Rota lift type R, with 1/2"BSP parallel FEMALE inlet connection,
1"BSP parallel outlet connection, with Viton® 'O'ring.

NOT AVAILABLE ON 94610

O'RING SEAL CHART

	O'RING MATERIAL	10th DIGIT	MAX. STATIC TEMP. °C	MIN. STATIC TEMP. °C
	NITRILE	1	150	-30
	VITON®	3	250	-20
	SILICONE	4	250	-50
	NEOPRENE	5	120	-40
	E.PROPYLENE	6	150	-40
*	P.T.F.E.	7	250	-196

Note: Digits '1 - 7' indicates the required o'ring material dependent on the maximum / minimum static temperature.

Example: Ordering code 93610A 407 3 is a brass seated, Sealed lever lift type SL, 1/2"BSP parallel MALE inlet connection, 1"BSP parallel outlet connection, with Viton® 'O'ring seals.

* For cryogenic service type 'S' valves only.
TYPE 94610 VALVES ARE NOT SUITABLE FOR CRYOGENIC SERVICE. USE 93610 TYPE 'S'

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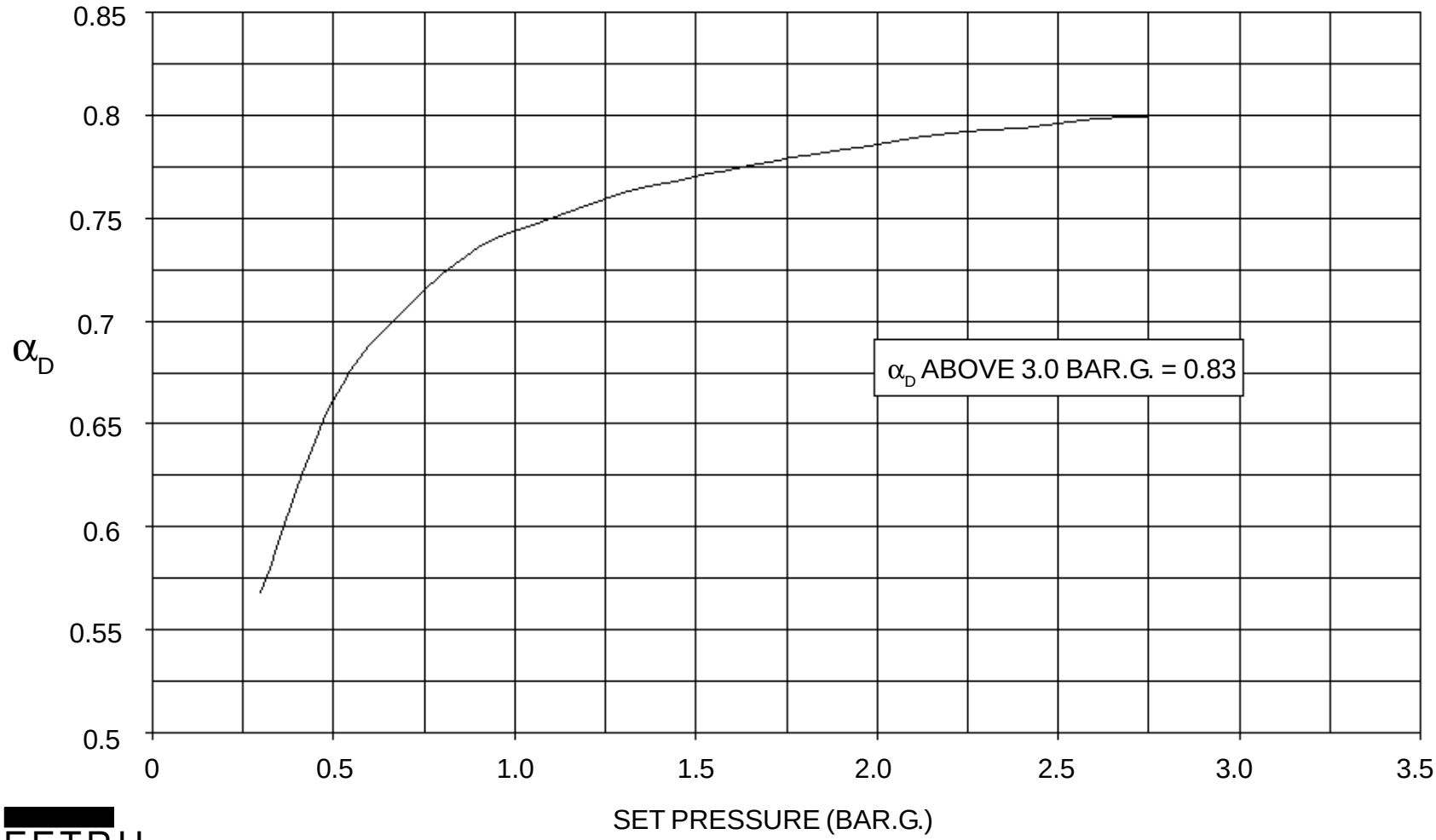
10mm Nominal Bore METAL SEAL DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
10mm NOMINAL BORE SERIES
TYPE 93610 BRASS
TYPE 94610 ST.STL.

EDITION K. 26.09.02

α_D vs SET PRESSURE CHART
SEETRU SAFETY RELIEF VALVE 93610 / 94610
0.3 to 3.0 BAR.G.



SEETRU LIMITED

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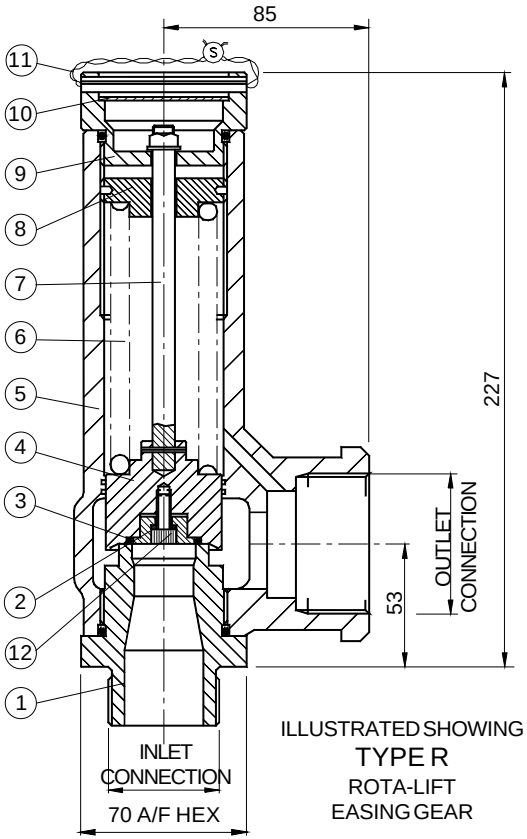
10mm Nominal Bore METAL SEAL
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
10mm NOMINAL BORE SERIES
TYPE 93610 BRASS
TYPE 94610 ST.STL.

EDITION K. 26.09.02



ILLUSTRATED SHOWING
TYPE R
ROTA-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		67020	68020	69020
1	INLET SEAT	BRASS	ST.STL.	ST.STL.
2	SEAL RETAINER	BRASS	ST.STL.	ST.STL.
3	'O' RING	TO SUIT APPLICATION		
4	PLUNGER	BRASS	ST.STL.	ST.STL.
5	BODY	BRONZE	ST.STL.	BRONZE
6	SPRING	ST.STL		
7	SPINDLE	ST.STL		
8	ADJUSTER	BRASS		
9	CAP	BRASS		
10	NAMEPLATE	ALUMINIUM		
11	WIRE & SEAL	ST.STL AND LEAD		
12	SCREW	ST.STL.		

APPROVALS

P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/045/8923
Quality management system module D, Cert. No. EDS 0002011/01
Designed in accordance with BS 6759 Part 3 & ISO 4126-1:1991

TECHNICAL DATA

Relieving pressure	= Set pressure + 25%
Reseating pressure	= Set pressure - max 20%
Maximum set pressure	= 22 Bar.g
Minimum set pressure	= 3.3 Bar.g
Flow area	= 314mm²
Inlet bore diameter	= 20mm
Derated coefficient of discharge K_{dr}	= 0.57
Temperature Range	= Subject to seal material.

FOR FURTHER INFORMATION, CONVERSION FACTORS, INSTALLATION AND OPERATION INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION C.
- FOR GREATER FLOWS REFER TO 25mm BORE TYPE 67025 DATA SHEET, FOR LOWER FLOWS REFER TO 18mm BORE 67018 DATA SHEET

SET PRESSURE (Bar.g)	3.3	4	6	8	10	12	14	16	18	20	22
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS 6759, WATER AT 15°C (kg/hr)	18512	20384	24966	28828	32231	35308	38137	40770	43244	45583	47807

* DISCHARGING TO ATMOSPHERE

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available

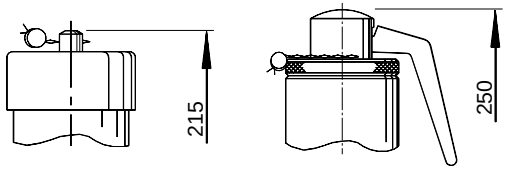
INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE		
			S	R	L
G 1 1/4 (1 1/4" BSP PARALLEL)	G2 (2" BSP PARALLEL)	67020A 69020A	1363	2163	3363
R 1 1/4 (1 1/4" BSP TAPER)	G2 (2" BSP PARALLEL)		1373	2173	3373

Example:
Ordering code 67020A 1363 is Sealed valve with 1 1/4" BSP Parallel inlet connection. 2" BSP Parallel outlet connection with Viton® seals, wirelocked no easing gear.
Seal material:
Last digit of ordering code calls up Viton® 'O' ring seal (since this is the most universal type).
When other material is required this changes to :

1. NITRILE
3. VITON®
5. NEOPRENE
6. ETHYLENE PROPYLENE
8. PERFLUOROELASTOMER

For advice on seal material selection refer to Technical Information Section A.

ALTERNATIVE TOP FITTING



TYPE S
SEALED
NO EASING GEAR

TYPE L
LEVER LIFT
EASING GEAR

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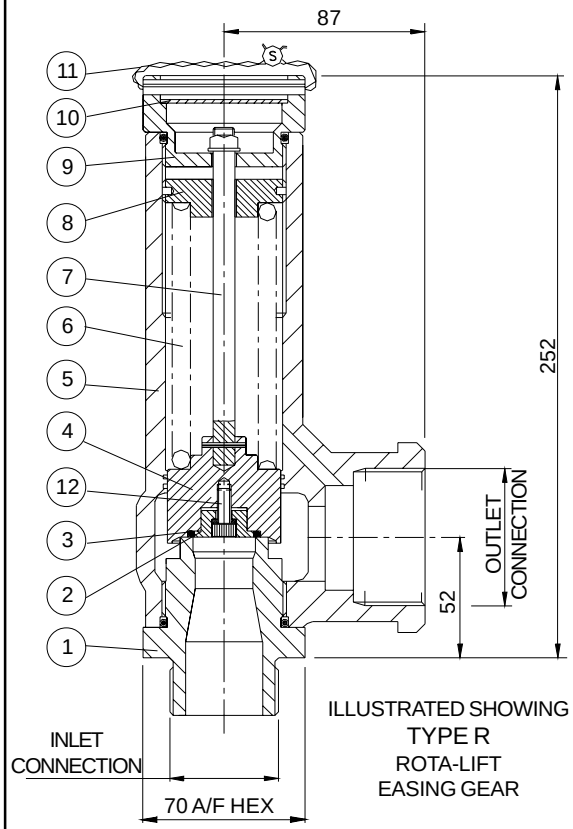
20mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR LIQUIDS

ENCLOSED DISCHARGE
20mm NOM. BORE SERIES M/2
TYPE 67020
TYPE 68020
TYPE 69020

EDITION E. 25.09.02



ILLUSTRATED SHOWING
TYPE R
ROTA-LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		67025	68025	69025
1	INLET SEAT	BRASS	ST.STL.	ST. STL.
2	SEAL RETAINER	BRASS	ST.STL.	ST. STL.
3	'O' RING	TO SUIT APPLICATION		
4	PLUNGER	BRASS	ST.STL.	ST. STL.
5	BODY	BRONZE	ST.STL.	BRONZE
6	SPRING	ST.STL		
7	SPINDLE	ST.STL		
8	ADJUSTER	BRASS	ST.STL	BRASS
9	CAP	BRASS	ST.STL	BRASS
10	NAMEPLATE	ALUMINIUM		
11	WIRE & SEAL	ST.STL AND LEAD		
12	SCREW	ST.STL AND LEAD		

APPROVALS

P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/046/8923
Quality management system module D, Cert. No. EDS 0002011/01
Designed in accordance with BS 6759 Part 3 & ISO 4126-1:1991

TECHNICAL DATA

Relieving set pressure	= + 25%
Reseating set pressure	= - max 20% down to 3 Bar.g
	= Below 3 Bar.g = 0.6 Bar.g
Maximum set pressure	= 21.0 Bar.g
Minimum set pressure	= 5.65 Bar.g
Flow area	= 490.4 mm²
Inlet bore diameter	= 25 mm
Derated coefficient of discharge K_{dr}	= 0.56
Temperature Range	= -20°C to 200°C subject to seal material.

FOR FURTHER INFORMATION, CONVERSION FACTORS, INSTALLATION AND OPERATION INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION C.
- FOR GREATER FLOWS REFER TO SEETRU, FOR LOWER FLOWS REFER TO 20 mm BORE 67020 DATA SHEET

SET PRESSURE Bar.g	5.65	6	8	10	12	14	16	18	20	21
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS 6759, WATER AT 15°C (kg/hr)	37155	38289	44212	49431	54149	58487	62526	66319	69906	71701

* DISCHARGING TO ATMOSPHERE

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available

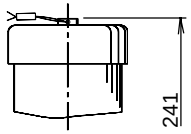
INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE		
			S	R	L
G 1 1/2 (1 1/2" BSP PARALLEL)	G 2 (2" BSP PARALLEL)	67025A 68025A 69025A	1393	2193	3393
R 1 1/2 (1 1/2" BSP TAPER)	G2 (2" BSP PARALLEL)		1403	2203	3403

Example:
Ordering code 67025A 1393 is Sealed Valve with 1 1/2"BSP parallel inlet connection, 2"BSP parallel outlet connection with Viton® seals, wirelocked no easing gear.
Seal material:
Last digit of ordering code calls up Viton® seal (since this is the most universal type).
When other material is required last digit changes to:

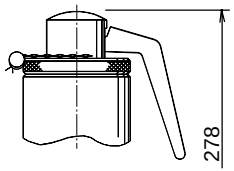
1. NITRILE
3. VITON®
5. NEOPRENE
6. ETHYLENE PROPYLENE

For advice on seal material selection refer to Technical Information Section A.

ALTERNATIVE TOP FITTING



TYPE S
SEALED
NO EASING GEAR



TYPE L
LEVER LIFT
EASING GEAR

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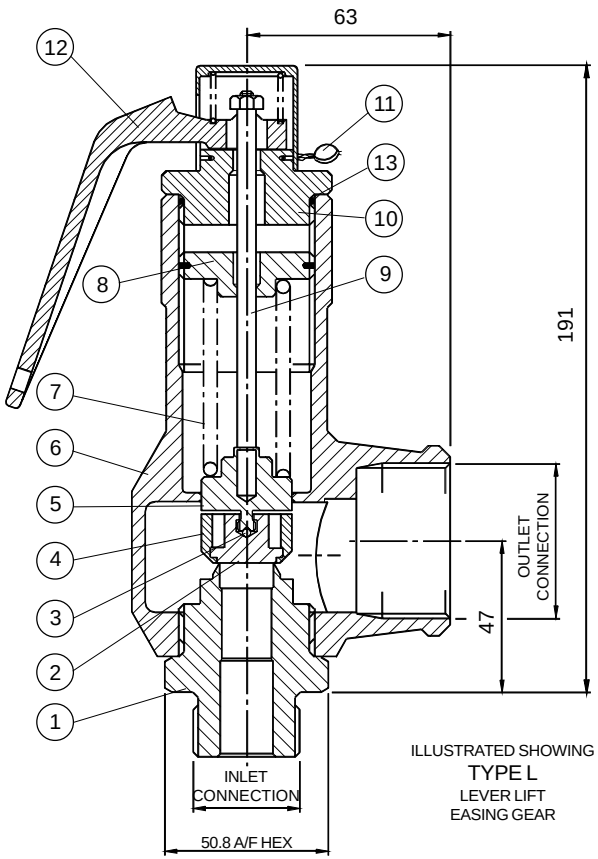
25mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR LIQUIDS

ENCLOSED DISCHARGE
25mm NOM. BORE SERIES M/2
TYPE 67025
TYPE 68025
TYPE 69025

EDITION E. 25.09.02



ILLUSTRATED SHOWING
TYPE L
LEVER LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		93615	94615
1	SEAT	BRASS	ST.STL.
2	DISC	ST.STL. 316	ST.STL. 440B
3	BALL	ST.STL.	
4	DISC HOLDER	ST.STL.	
5	PLUNGER	ST.STL.	
6	BODY	ST.STL.	
7	SPRING	ST.STL.	
8	ADJUSTER	BRASS	ST.STL.
9	SPINDLE	ST.STL.	
10	CAP	BRASS	ST.STL.
		TYPE SL - ST.STL.	
11	WIRE & SEAL	ST.STL. & LEAD	
12	LEVER	BRASS	ST.STL.*
13	O'RING	TO SUIT APPLICATION	

* TYPE SL ONLY

APPROVALS

Designed in accordance with BS6759 (but not approved) & ISO 4126.
TÜV Approved:- Ref- TÜV.SV.98-1016.15.D/G.0,74p ; For 3-28 Bar.g. Below 3 Bar.g. see 'α_D vs Set Pressure' chart.
93615 type materials meet the requirements of BAM (Germany) for oxygen service.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00017
Quality management system module D, Cert. No. EDS 002011/01

TECHNICAL DATA

Relieving pressure	= Set pressure +10%, 0.1Bar.g. BELOW 1.0 Bar.g.
Reseating pressure	= Set pressure - 10%, 0.3 BAR.G. BELOW 3.0 BAR.G.
Maximum set pressure	= 28 Bar.g.
Minimum set pressure	= 0.3 Bar.g.
Flow area	= 177mm^2
Inlet bore diameter	= 15 mm
TÜV Derated coefficient of discharge α_D	= 0.74, BELOW 3.0 BAR.G. SEE 'α_D vs SET PRESSURE' CHART.

Leak tightness at 90% set pressure to API 527 and in accordance with BS6759 Part 3 1984, Table 9 Grade 2.
Greater leak tightness may be achieved on request.

Maximum temperature	= 250ºC Note: For sealed top fittings, max. temp. dependent on seal material.
Minimum temperature	= -196ºC subject to material specification.
Maximum permissible built up back pressure	= 10% of set pressure at or below which flow is not reduced.

Stable operation on flows down to 50% of valve rated capacity.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

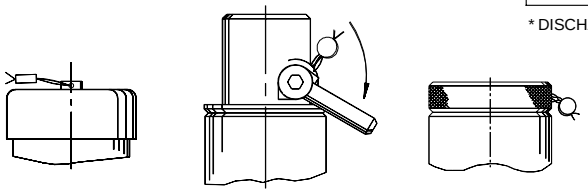
FLOW CHART

-TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
- FOR LOWER FLOWS REFER TO 10mm BORE TYPE 93610 DATA SHEET. FOR GREATER FLOWS REFER TO 20mm BORE TYPE 93620 DATA SHEET.

SET PRESSURE Bar.g	0.3	0.5	1.0	2.0	3	4	5	6	7	8	9	10	15	20	25	28
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS6759, AIR AT 15ºC AND 1013 mbar std. Litres/s	22.5	29.2	42.2	76.6	108	136	163	191	219	246	274	302	440	578	716	799
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS6759 PART 1, STEAM Kg/h	61.3	79.7	120.8	204.2	296	372	447	523	598	674	749	825	1202	1580	1958	2184
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TUV, AIR AT 0ºC AND 1013 mbar Normal m^3/h	75.8	103.8	155.3	270.1	384	482	580	678	776	874	972	1070	1560	2049	2539	2833
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TUV, STEAM Kg/h	63.3	82.5	121.7	213.4	299	373	446	520	592	666	738	812	1174	1535	1900	2116

* DISCHARGING TO ATMOSPHERE

ALTERNATIVE TOP FITTINGS



TYPE S
SEALED
NO EASING GEAR

TYPE SL
SEALED LEVER
EASING GEAR

TYPE R
ROTA-LIFT
EASING GEAR

SEETRU LIMITED

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15mm Nominal Bore METAL SEAL
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
15mm NOMINAL BORE SERIES
TYPE 93615 BRASS
TYPE 94615 ST.STL.

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE			
			R	S	SL	L
G 3/4 (3/4" BSP PARALLEL MALE)	G 1 1/2 (1 1/2" BSP PARALLEL)	93615A 94615A	210	130	410	330
R 3/4 (3/4" BSP TAPER MALE)			211	131	411	331
G 3/4 (3/4" BSP PARALLEL FEMALE)		93615D 94615D	210	130	410	330

Example 1:
Ordering code 93615A 210 3 is brass seated, Rota lift type R, with 3/4" BSP parallel MALE inlet connection, 1 1/2" BSP parallel outlet connection, with Viton® o'ring.

Example 2:
Ordering code 93615D 210 3 is brass seated, Rota lift type R, with 3/4" BSP parallel FEMALE inlet connection, 1 1/2" BSP parallel outlet connection, with Viton® o'ring.

O'RING SEAL CHART

O'RING MATERIAL	10th DIGIT	MAX. STATIC TEMP. °C	MIN. STATIC TEMP. °C
NITRILE	1	150	-30
VITON®	3	250	-20
SILICONE	4	250	-50
NEOPRENE	5	120	-40
E.PROPYLENE	6	150	-40
* P.T.F.E.	7	250	-196

Note:
Digits '1 - 7' indicates the required o'ring material dependent on the maximum / minimum static temperature.

Example:
Ordering code 93615A 410 3 is brass seated, Sealed leverlift type SL, with 3/4"BSP parallel MALE inlet connection, 1 1/2" BSP parallel outlet connection, with Viton® o'ring seals.

* For cryogenic service type 'S' valves only.
TYPE 94615 VALVES ARE NOT SUITABLE FOR CRYOGENIC SERVICE. USE 93615 TYPE 'S'.

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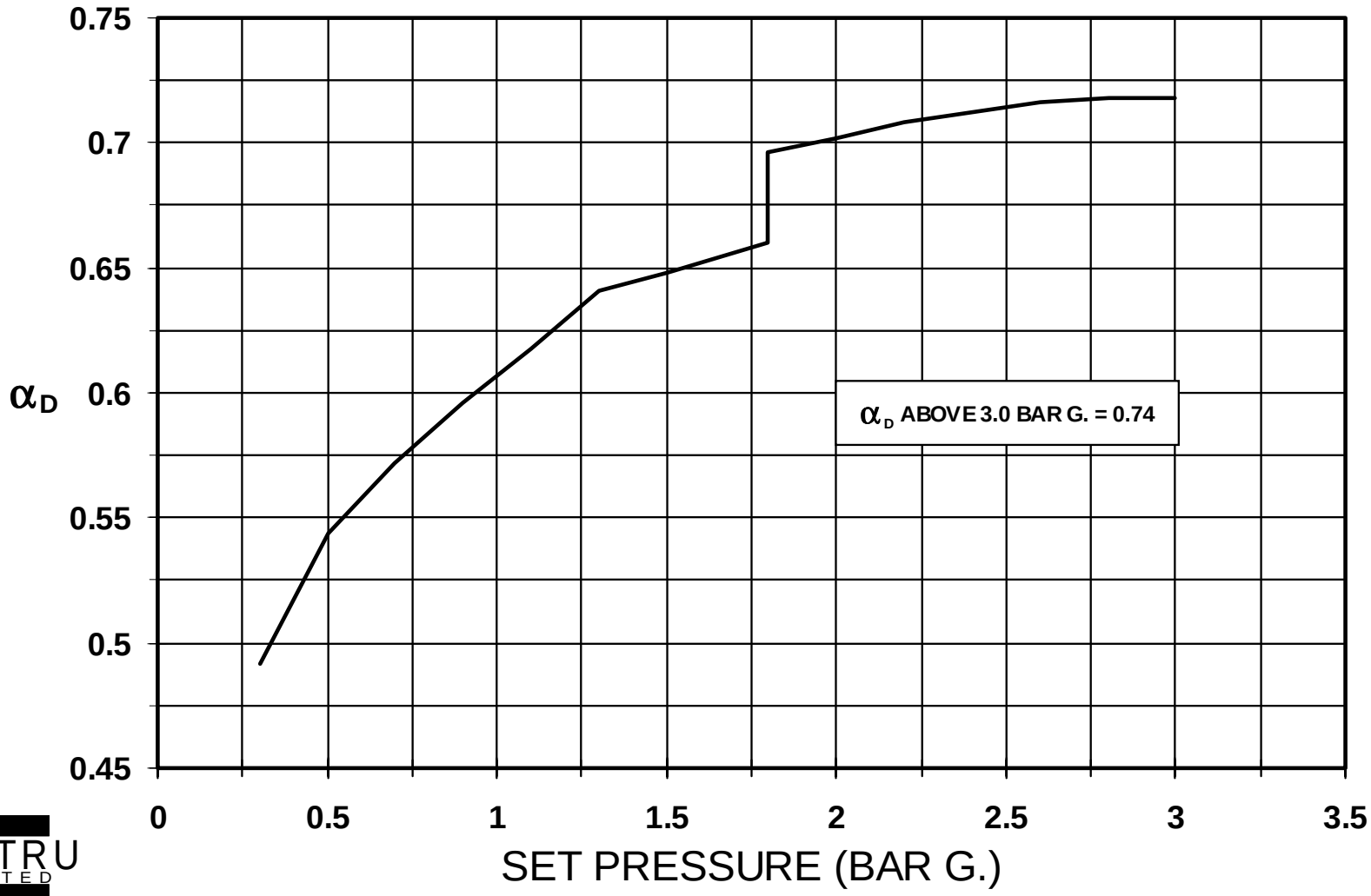
15mm Nominal Bore METAL SEAL DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
15mm NOMINAL BORE SERIES
TYPE 93615 BRASS
TYPE 94615 ST.STL.

α_D vs SET PRESSURE CHART

SEETRU SAFETY RELIEF VALVE 93615 / 94615.

0.3 to 3.0 BAR G.



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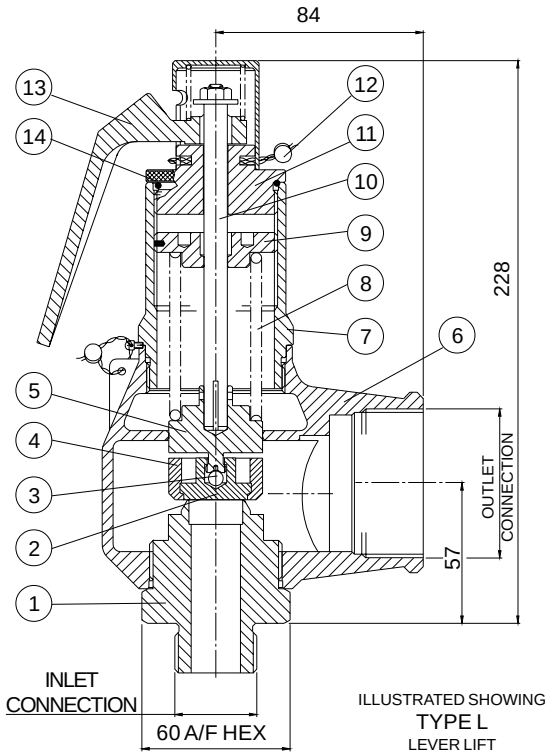
15mm Nominal Bore METAL SEAL
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
15mm NOMINAL BORE SERIES

TYPE 93615 BRASS
TYPE 94615 ST.STL.



ILLUSTRATED SHOWING
TYPE L
LEVER LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		93620	94620
1	SEAT	BRASS	ST.STL.
2	DISC	ST.STL. 316	ST.STL. 440B
3	BALL	ST.STL.	
4	DISC HOLDER	ST.STL.	
5	PLUNGER	ST.STL.	
6	BODY	ST.STL.	
7	SPRING HOUSING	BRASS	ST.STL.
8	SPRING	ST.STL.	
9	ADJUSTER	BRASS	ST.STL.
10	SPINDLE	ST.STL.	
11	CAP	BRASS	ST.STL.
12	WIRE & SEAL	ST.STL. & LEAD	
13	LEVER	BRASS	ST.STL. *
14	'O'RING	TO SUIT APPLICATION	

* TYPE SL ONLY.

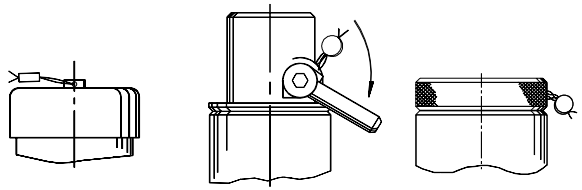
APPROVALS

Designed in accordance with BS 6759 (but not approved) & ISO 4126. TÜV Approved:-
Ref- TÜV.SV.98-1016.20.D/G.0,80.p ; For 4-28 Bar.g. Below 4 Bar.g. see 'α_D vs Set Pressure' chart.
93620 type materials meet the requirements of BAM (Germany) for oxygen service.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00017
Quality management system module D, Cert No. EDS 0002011/01

TECHNICAL DATA

Relieving pressure = Set pressure +10%, 0.1 Bar.g. below 1.0 Bar.g.
Reseating pressure = Set pressure - 10%, 0.3 Bar.g. below 3.0 Bar.g.
Maximum set pressure = 28.0 Bar.g.
Minimum set pressure = 0.3 Bar.g.
Flow area = 314 mm^2
Inlet bore diameter = 20 mm
TÜV Derated coefficient of discharge α_D = 0.80, Below 4.0 Bar.g. see 'α_D vs Set Pressure' chart.
Leak tightness at 90% set pressure to API 527 and in accordance with BS6759 Part 3 1984, Table 9 Grade 2. Greater leak tightness may be achieved on request.
Maximum temperature = 250°C Note: For sealed top fittings, max. temp. dependent on seal material.
Minimum temperature = -196°C subject to material specification.
Maximum permissible built up back pressure =10% of set pressure at or below which flow is not reduced.
Stable operation on flows down to 50% of valve rated capacity.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

ALTERNATIVE TOP FITTINGS



TYPE S
SEALED
NO EASING GEAR

TYPE SL
SEALED LEVER
EASING GEAR

TYPE R
ROTA-LIFT
EASING GEAR

FLOW CHART

-TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION

- FOR GREATER FLOWS REFER TO 25mm BORE TYPE 93625 DATA SHEET. FOR LOWER FLOWS REFER TO 15mm BORE TYPE 93615 DATA SHEET.

SET PRESSURE Bar.g	0.3	0.5	1.0	2.0	3	4	5	6	7	8	9	10	15	20	25	28
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS6759, AIR AT 15°C AND 1013 mbar std. Litres/s	52.2	66.8	95	157.6	208	262	315	368	421	474	527	580	846	1112	1378	1537
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS6759 PART 1, STEAM Kg/h	140	182	275.7	429.8	569	714.2	859.3	1004.5	1149.6	1294.8	1439.9	1585	2310.8	3036.5	3762.2	4197.6
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TUV, AIR AT 0°C AND 1013 mbar Normal m³/h	174.4	238	354	553.8	738.4	926.7	1115	1303.3	1491.6	1679.9	1868.3	2056.6	2998.2	3939.8	4881.4	5446.4
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TUV, STEAM Kg/h	145.3	188.7	278.4	437.8	576.3	718	859.8	1000	1141.8	1282.8	1423.1	1562.6	2261.3	2956.8	3654.5	4077.6

* DISCHARGE TO ATMOSPHERE

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20mm Nominal Bore METAL SEAL
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES

ENCLOSED DISCHARGE
20mm NOMINAL BORE SERIES

TYPE 93620 BRASS
TYPE 94620 ST.STL.

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE			
			S	SL	L	R
G 1 (1" BSP PARALLEL MALE)	G 2 (2" BSP PARALLEL)	93620A 94620A	133	413 #	333 #	213
R 1 (1" BSP TAPER MALE)			134	414 #	334 #	214
G 3/4 (3/4" BSP PARALLEL FEMALE)		93620D 94620D	130	410 #	330 #	210

Example 1: Ordering code 93620A 333 0 is brass seated,
Lever lift type 'L', with 1" BSP parallel MALE inlet connection,
2" BSP parallel outlet connection.

Example 2: Ordering code 93620D 330 0 is brass seated,
Lever lift type 'L', with 3/4" BSP parallel FEMALE inlet connection,
2" BSP parallel outlet connection.

O'RING SEAL CHART

O'RING MATERIAL	10th DIGIT	MAX. STATIC TEMP. °C	MIN. STATIC TEMP. °C
NITRILE	1	150	-30
VITON®	3	250	-20
SILICONE	4	250	-50
NEOPRENE	5	120	-40
E.PROPYLENE	6	150	-40
* P.T.F.E.	7	250	-196

Note: For valve type 'L', o'rings not fitted. '0' indicates that no o'rings are required.
For valve types 'S' & 'SL', digits '1 - 7' indicates the required o'ring material dependent on the maximum / minimum static temperature.

Example: Ordering code 93620A 413 3 is brass seated, Sealed leverlift type 'SL', with 1"BSP parallel MALE inlet connection, 2" BSP parallel outlet connection, with Viton® o'ring seals.

LEVER LIFTING VALVES

FOR 94620 VALVES, SEALED LEVER TYPE 'SL' AVAILABLE ONLY.
FOR 93620 VALVES, OPEN LEVER TYPE 'L' AVAILABLE ONLY.

* FOR CRYOGENIC SERVICE TYPE 'S' VALVES ONLY.

TYPE 94620 VALVES ARE NOT SUITABLE FOR CRYOGENIC SERVICE. USE 93620 TYPE 'S'.

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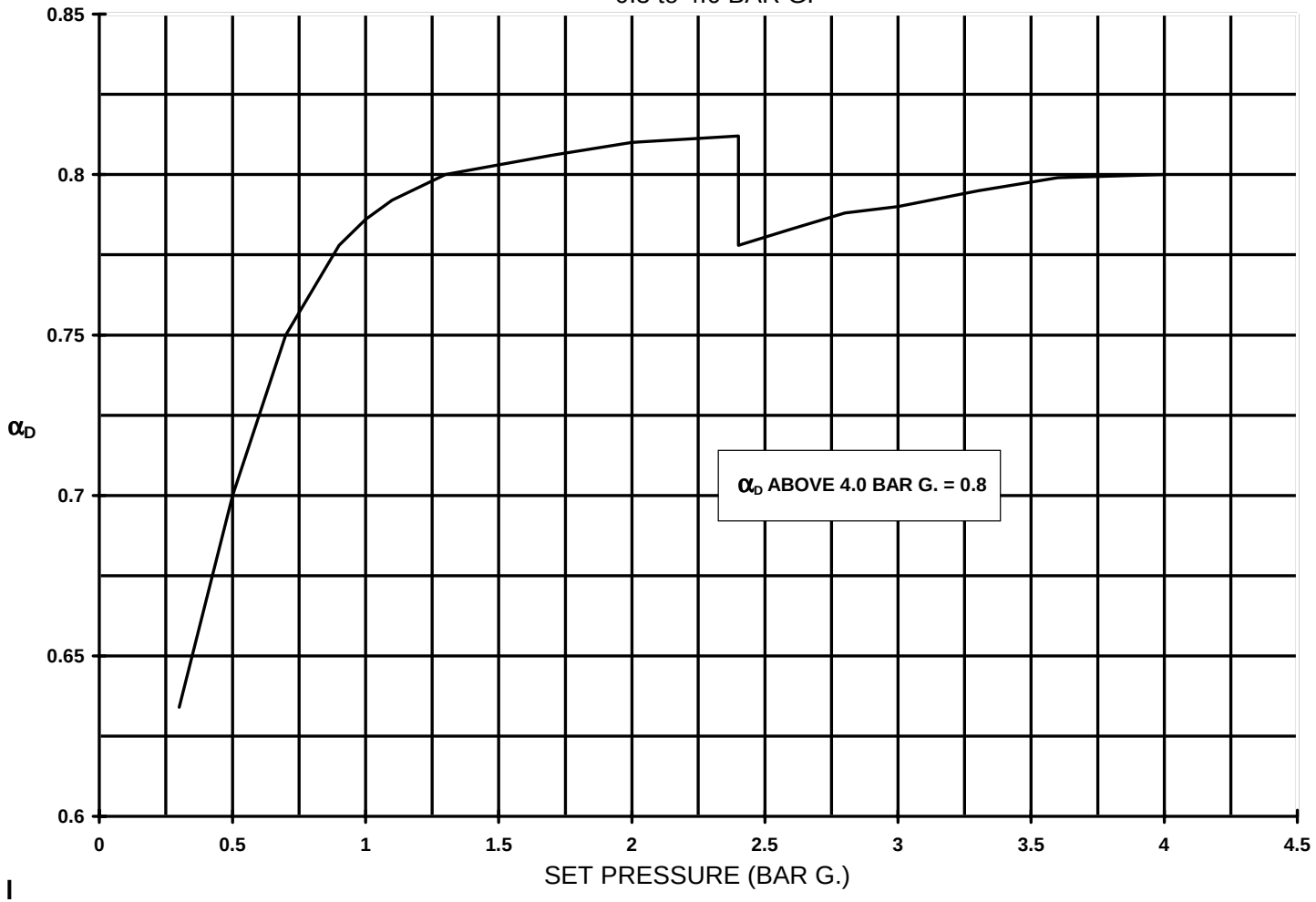
20mm Nominal Bore METAL SEAL DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

ENCLOSED DISCHARGE
20mm NOMINAL BORE SERIES

TYPE 93620 BRASS
TYPE 94620 ST.STL.

α_D vs SET PRESSURE CHART
SEETRU SAFETY RELIEF VALVE 93620 / 94620
0.3 to 4.0 BAR G.



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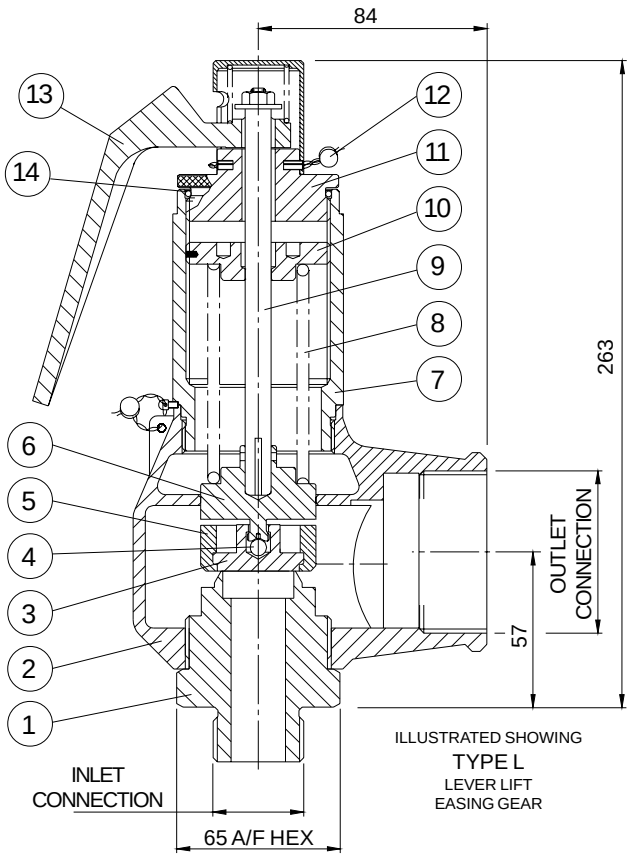
20mm Nominal Bore METAL SEAL
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES

ENCLOSED DISCHARGE
20mm NOMINAL BORE SERIES

TYPE 93620 BRASS
TYPE 94620 ST.STL.



ILLUSTRATED SHOWING
TYPE L
LEVER LIFT
EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		93625	94625
1	SEAT	BRASS	ST.STL.
2	BODY	ST.STL.	
3	DISC	ST.STL. 316	ST.STL. 440B
4	BALL	ST.STL.	
5	DISC HOLDER	ST.STL.	
6	PLUNGER	ST.STL.	
7	SPRING HOUSING	BRASS	ST.STL.
8	SPRING	ST.STL.	
9	SPINDLE	ST.STL.	
10	ADJUSTER	BRASS	ST.STL.
11	CAP	BRASS	ST.STL.
12	WIRE & SEAL	ST.STL. & LEAD	
13	LEVER	BRASS	ST.STL. *
14	'O'RING	TO SUIT APPLICATION	

* TYPE SL ONLY.

APPROVALS

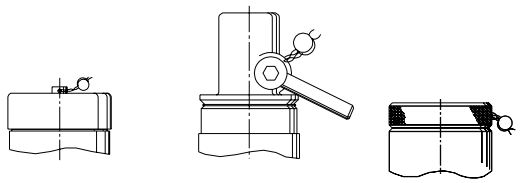
Designed in accordance with BS6759 (but not approved) & ISO 4126. TÜV Approved:-
Ref.- TÜV.SV.98-1016.25.D/G.0,80.p = 4 - 19 BAR.G.
Ref.- TÜV.SV.98-1016.25.D/G.0,76.p = 19 - 20 BAR.G. Below 4 Bar.g. see 'α_D vs Set Pressure' chart.
93625 type materials meet the requirements of BAM (Germany) for oxygen service,
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00017
Quality management system module D, Cert. No. EDS 0002011/01.

TECHNICAL DATA

Relieving pressure	= Set pressure +10%, 0.1 Bar.g. below 1.0 Bar.g.
Reseating pressure	= Set pressure -10%, 0.3 Bar.g. below 3.0 Bar.g.
Maximum set pressure	= 20.0 Bar.g.
Minimum set pressure	= 0.3 Bar.g.
Flow area	= 491 mm^2
Inlet bore diameter	= 25 mm
TÜV Derated coefficient of discharge α_D	= 0.8 From 4 - 19 Bar.g. 0.76 From 19 - 20 Bar.g. = Below 4 Bar.g. see 'α_D vs Set Pressure' chart.

Leak tightness at 90% set pressure to API 527 and in accordance with BS 6759 Part 3 1984, Table 9 Grade 2.
Greater leak tightness may be achieved on request.
Maximum temperature = 250°C Note: For sealed top fittings, max. temp. dependent on seal material.
Minimum temperature = -196°C subject to material specification.
Maximum permissible built up back pressure =10% of set pressure at or below which flow is not reduced.
Stable operation on flows down to 50% of valve rated capacity.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION.

ALTERNATIVE TOP FITTINGS



TYPE S
SEALED
NO EASING GEAR

TYPE SL
SEALED LEVER
EASING GEAR

TYPE R
ROTA-LIFT
EASING GEAR

FLOW CHART

-TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
-FOR LESSER FLOWS REFER TO 20mm BORE TYPE 93620 DATA SHEET.

SET PRESSURE Bar.g	0.3	0.5	1.0	2.0	3	4	5	6	7	8	9	10	15	20
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS6759, AIR AT 15°C AND 1013 mbar std. Litres/s	66.0	85.6	128.8	238.3	325.6	408.6	491.7	574.7	657.8	740.8	823.9	906.9	1322.2	1650.6
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS6759 PART 1, STEAM Kg/h	176.8	233.2	351.8	650.9	889.2	1115.9	1342.7	1569.5	1796.3	2023.1	2249.9	2476.6	3610.6	4507.3
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TUV, AIR AT 0°C AND 1013 mbar Normal m^3/h	220.2	304.8	458.7	837.9	1153.7	1447.9	1742.2	2036.4	2330.7	2624.9	2919.2	3213.4	4684.7	5848.1
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TUV, STEAM Kg/h	182.3	242.2	361.9	663	900.6	1121.9	1343.4	1562.5	1784.0	2004.4	2223.6	2441.6	3533.3	4388.9

* DISCHARGE TO ATMOSPHERE

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25mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

ENCLOSED DISCHARGE
25mm NOMINAL BORE SERIES

TYPE 93625 BRASS
TYPE 94625 ST.STL.

EDITION C. 11.09.02

VALVE SELECTION CHART

Standard thread sizes shown, other sizes mat by available.

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE			
			S	SL	L	R
G 1 (1" BSP PARALLEL MALE)	G 2 (2" BSP PARALLEL)	93625A 94625A	133	413 #	333 #	213
R 1 (1" BSP TAPER MALE)			134	414 #	334 #	214
G 1 (1" BSP PARALLEL FEMALE)		93625D 94625D	133	413 #	333 #	213

Example 1: Ordering code 93625A 333 0 is brass seated,
Lever lift type 'L', with 1" BSP parallel MALE inlet connection,
2" BSP parallel outlet connection.

Example 2: Ordering code 93625D 333 0 is brass seated,
Lever lift type 'L', with 1" BSP parallel FEMALE inlet connection,
2" BSP parallel outlet connection.

LEVER LIFTING VALVES

FOR 94625 VALVES, SEALED LEVER TYPE 'SL' AVAILABLE ONLY.
FOR 93625 VALVES, OPEN LEVER TYPE 'L' AVAILABLE ONLY.

O'RING SEAL CHART

	O'RING MATERIAL	10th DIGIT	MAX. STATIC TEMP. °C	MIN. STATIC TEMP. °C
	NITRILE	1	150	-30
	VITON®	3	250	-20
	SILICONE	4	250	-50
	NEOPRENE	5	120	-40
	E.PROPYLENE	6	150	-40
*	P.T.F.E.	7	250	-196

Note: For valve type 'L', o'rings not fitted. '0' indicatesthat no o'rings are required.
For valve type 'S' &' SL', digits '1 -7' indicates the required o'ring material dependent on the maximum /minimum static temperature.

Example: Ordering code 93625A 413 3 is brass seated,
Sealed leverlift type 'SL', with 1" BSP parallel MALE inlet connection,
2" BSP parallel outlet connection, with Viton® o'ring seals.

* FOR CRYOGENIC SERVICE TYPE 'S' VALVES ONLY.
TYPE 94625 VALVES ARE NOT SUITABLE FOR CRYOGENIC SERVICE. USE 93625 TYPE 'S'.

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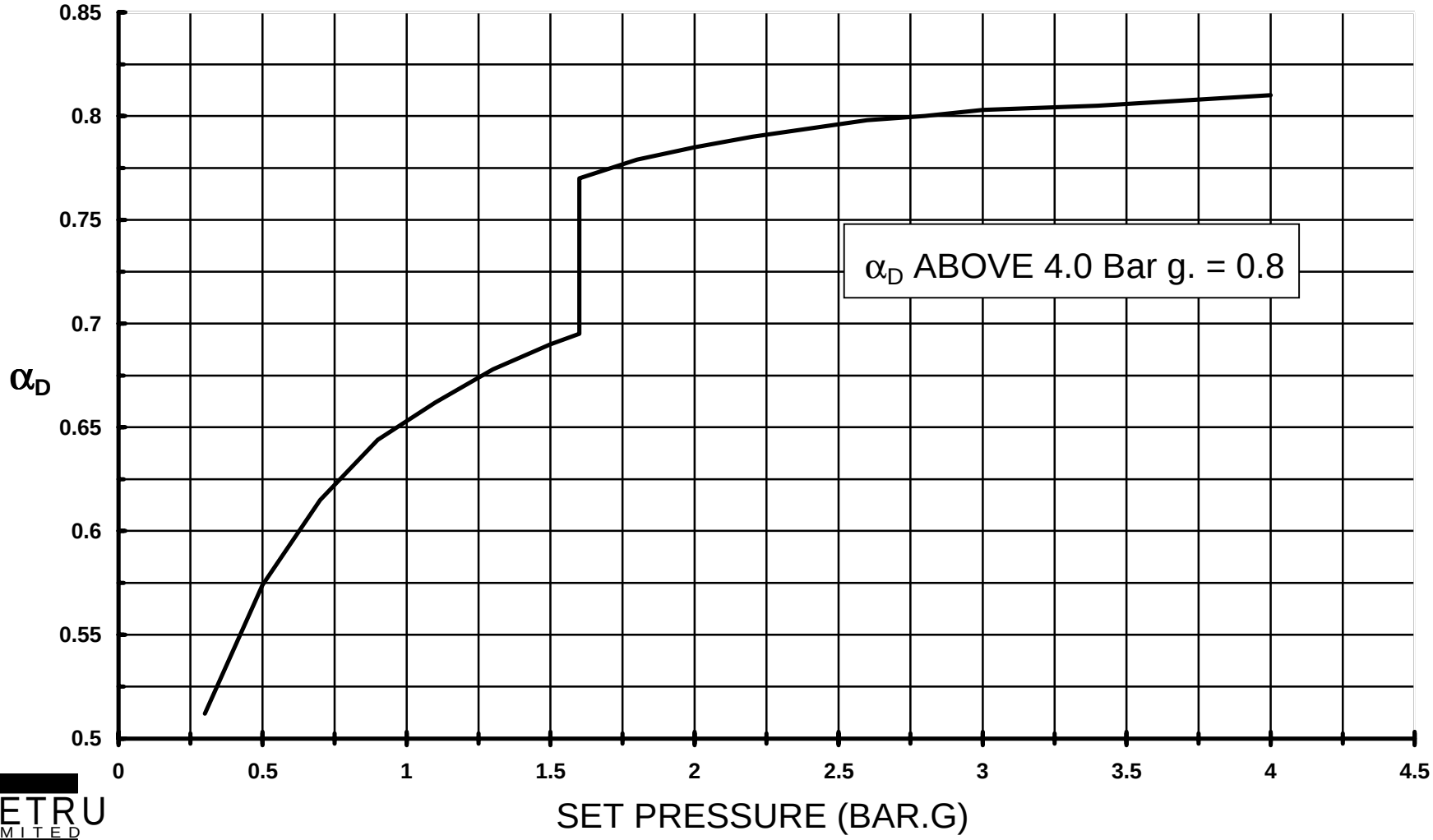
25mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED DISCHARGE SAFETY VALVE FOR COMPRESSED AIR OR GASES

ENCLOSED DISCHARGE
25mm NOMINAL BORE SERIES

TYPE 93625 BRASS
TYPE 94625 ST.STL.

EDITION C. 11.09.02

α_D vs SET PRESSURE CHART
SEETRU SAFETY RELIEF VALVE 93625/94625.
0.3 to 4.0 BAR G.



SHEET 3 OF 3 SHEETS

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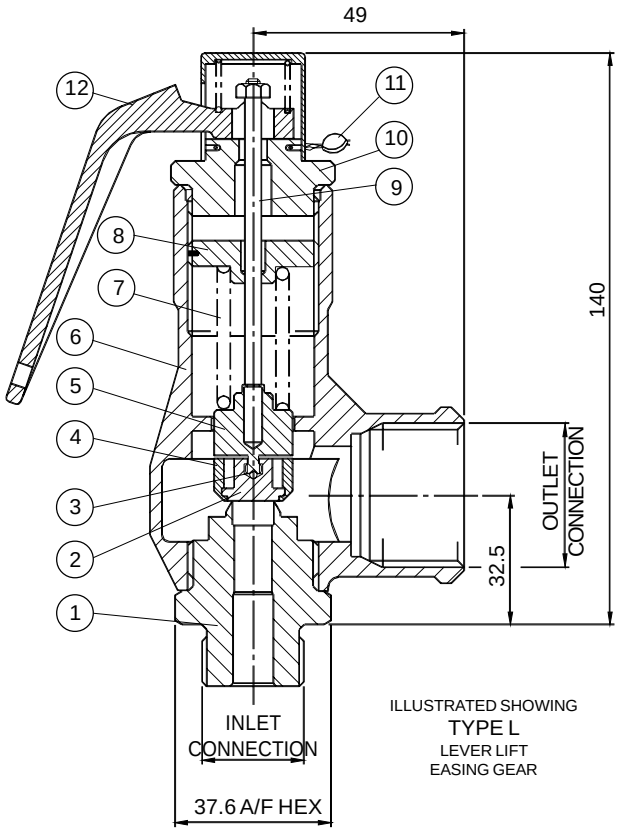
25mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR
COMPRESSED AIR OR GASES

ENCLOSED DISCHARGE
25mm NOMINAL BORE SERIES

TYPE 93625 BRASS
TYPE 94625 ST.STL.



ILLUSTRATED SHOWING
TYPE L
LEVER LIFT
EASING GEAR

PARTS LIST AND MATERIAL SPECIFICATION

		97010	98010
1	SEAT	BRASS	ST.STL.
2	DISC	ST.STL. 316	ST.STL. 440B
3	BALL	ST.STL.	
4	DISC HOLDER	ST.STL.	
5	PLUNGER	ST.STL.	
6	BODY	ST.STL.	
7	SPRING	ST.STL.	
8	ADJUSTER	BRASS	ST.STL.
9	SPINDLE	ST.STL.	
10	CAP	BRASS	ST.STL.
11	WIRE & SEAL	ST.STL. & LEAD	
12	LEVER	BRASS	ST.STL.*

* TYPE SL ONLY

APPROVALS

P.E.D. 97/23/EC
Type examination module B, Cert No. 2003/04/9274
Quality examination system module D, Cert No. EDS 0002011/01
Designed in accordance with BS 6759 and ISO 4126-1:1991.

TECHNICAL DATA

Relieving pressure	= Set Pressure +10%
Reseating pressure	= Set Pressure -20% or 0.6 below 3 Bar.g.
Maximum set pressure	= 28 Bar.g.
Minimum set pressure	= 0.3 Bar.g.
Flow area	= 78.5 mm^2
Inlet bore diameter	= 10 mm

Derated coefficient discharge of water below 100°C K_{dr} = @ 10% = 0.48
Leak tightness at 90% set pressure to API 527 and in accordance with BS6759 Part 3 1984, Table 9 Grade 2. Greater leak tightness may be achieved on request.
Maximum temperature = 250°C Note: For sealed top fittings, max. temp. dependent on seal material.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

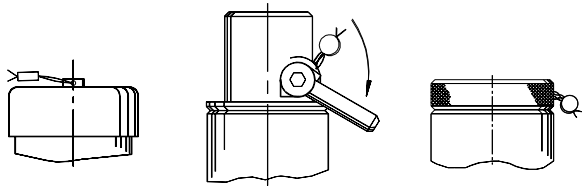
FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
- FOR GREATER FLOWS REFER TO 15mm BORE TYPE 97015 DATA SHEET .

SET PRESSURE Bar.g	3	4	5	6	7	8	9	10	15	20	25	28
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS6759, WATER BELOW 100°C AT 10% ACCUMULATION (Litres/min)	58	67	74	82	89	95	100	106	130	150	167	177

* DISCHARGING TO ATMOSPHERE

ALTERNATIVE TOP FITTINGS



TYPE S
SEALED
NO EASING GEAR

TYPE SL
SEALED LEVER
EASING GEAR

TYPE R
ROTA-LIFT
EASING GEAR

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10mm Nominal Bore METAL SEAL
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR LIQUIDS

ENCLOSED DISCHARGE
10mm NOMINAL BORE SERIES
TYPE 97010 BRASS
TYPE 98010 ST.STL.

EDITION E. 24.09.04

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE			
			R	S	SL	L
G 1/2 (1/2" BSP PARALLEL MALE)	G 1 (1" BSP PARALLEL)	97010A 98010A	207	127	407	327
R 1/2 (1/2" BSP TAPER MALE)			208	128	408	328
G 1/2 (1/2" BSP PARALLEL FEMALE)		97010D 98010D	207	127	407	327

Example 1: Ordering code 97010A 207 0 is Brass seated, Rota lift type R, with 1/2" BSP parallel MALE inlet connection, 1" BSP parallel outlet connection.

Example 2: Ordering code 97010D 207 0 is Brass seated, Rota lift type R, with 1/2" BSP parallel FEMALE inlet connection, 1" BSP parallel outlet connection.

O'RING SEAL CHART

O'RING MATERIAL	10th DIGIT	MAX. STATIC TEMP. ^{O}C	MIN. STATIC TEMP. ^{O}C
NITRILE	1	150	-30
VITON®	3	250	-20
SILICONE	4	250	-50
NEOPRENE	5	120	-40
E.PROPYLENE	6	150	-40

Note: For valve types 'L' & 'R' O'rings not fitted. '0' indicates that no 'O'rings are required. For valve types 'S' & 'SL', digits '1 - 6' indicates the required 'O'ring material dependent on the maximum / minimum static temperature.

Example: Ordering code 97010A 4073 is a brass seated, Sealed lever lift type SL, 1/2" BSP parallel MALE inlet connection, 1" BSP parallel outlet connection, with Viton® 'O'ring seals.

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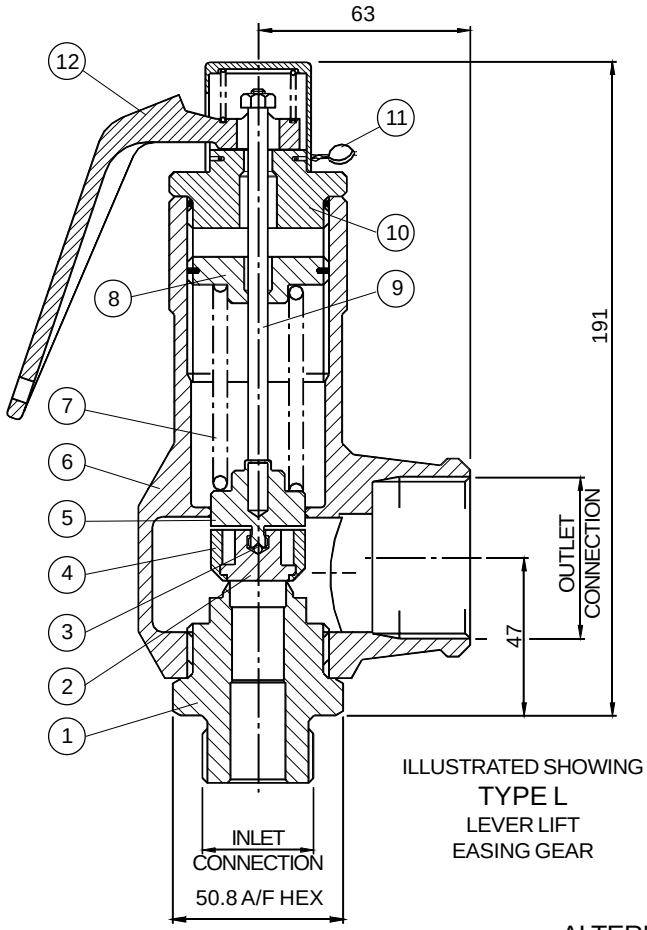
10mm Nominal Bore METAL SEAL
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR LIQUIDS

ENCLOSED DISCHARGE
10mm NOMINAL BORE SERIES
TYPE 97010 BRASS
TYPE 98010 ST.STL.



ILLUSTRATED SHOWING
TYPE L
LEVER LIFT
EASING GEAR

PARTS LIST AND MATERIAL SPECIFICATION

		97015	98015
1	SEAT	BRASS	ST.STL.
2	DISC	ST.STL. 316	ST.STL. 440B
3	BALL	ST.STL.	
4	DISC HOLDER	ST.STL.	
5	PLUNGER	ST.STL.	
6	BODY	ST.STL.	
7	SPRING	ST.STL.	
8	ADJUSTER	BRASS	ST.STL.
9	SPINDLE	ST.STL.	
10	CAP	BRASS	ST.STL.
11	WIRE & SEAL	ST.STL. & LEAD	
12	LEVER	BRASS	ST.STL.*

* TYPE SL ONLY

APPROVALS

P.E.D. 97/23/EC
Type examination module B, Cert. No. 2003/03/9274
Quality examination system module D, Cert. No. EDS 0002011/01
Designed in accordance with BS6759 and ISO 4126.

TECHNICAL DATA

Relieving pressure	= Set pressure +10%
Reseating pressure	= Set pressure -20% or 0.6 Bar.g below 3 Bar.g.
Maximum set pressure	= 33 Bar.g.
Minimum set pressure	= 0.3 Bar.g.
Flow area	= 177mm^2
Inlet bore diameter	= 15 mm
Derated coefficient discharge of water below 100°C K_{dr}	= @ 10% = 0.54

Leak tightness at 90% set pressure to API 527 and in accordance with BS6759 Part 3 1984, Table 9 Grade 2. Greater leak tightness may be achieved on request.
Maximum temperature = 250°C Note: For sealed top fittings, max. temp. dependent on seal material.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

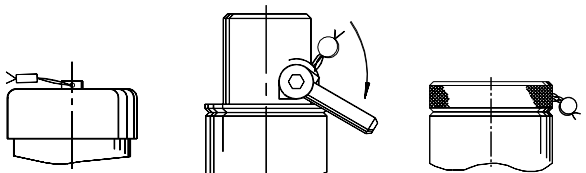
FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION
- FOR LOWER FLOWS REFER TO 10mm BORE TYPE 97010 DATA SHEET.

SET PRESSURE Bar.g	3	4	5	6	7	8	9	10	15	20	25	28
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS6759, WATER BELOW 100°C AT 10% ACCUMULATION (Litres/min)	58	67	74	82	89	95	100	106	130	150	167	177

* DISCHARGING TO ATMOSPHERE

ALTERNATIVE TOP FITTINGS



TYPE S
SEALED
NO EASING GEAR

TYPE SL
SEALED LEVER
EASING GEAR

TYPE R
ROTA-LIFT
EASING GEAR

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15mm Nominal Bore METAL SEAL
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR LIQUIDS

ENCLOSED DISCHARGE
15mm NOMINAL BORE SERIES
TYPE 97015 BRASS
TYPE 98015 ST.STL.

VALVE SELECTION CHART

Standard thread sizes shown, other sizes may be available

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE			
			R	S	SL	L#
G 3/4 (3/4" BSP PARALLEL MALE)	G 1 1/2 (1 1/2" BSP PARALLEL)	97015A 98015A	210	130	410	330
R 3/4 (3/4" BSP TAPER MALE)			211	131	411	331
G 3/4 (3/4" BSP PARALLEL FEMALE)		97015D 98015D	210	130	410	330

Example 1: Ordering code 97015A 210 0 is brass seated,
Rota lift type R, with 3/4" BSP parallel MALE inlet connection,
1 1/2" BSP parallel outlet connection.

Example 2: Ordering code 97015D 210 0 is brass seated,
Rota lift type R, with 3/4" BSP parallel FEMALE inlet connection,
1 1/2" BSP parallel outlet connection.

NOT AVAILABLE ON 98015

O'RING SEAL CHART

O'RING MATERIAL	10th DIGIT	MAX. STATIC TEMP. ^{O}C	MIN. STATIC TEMP. ^{O}C
NITRILE	1	150	-30
VITON®	3	250	-20
SILICONE	4	250	-50
NEOPRENE	5	120	-40
E.PROPYLENE	6	150	-40

Notes: For valve types 'L' & 'R', 'O'rings not fitted. '0' indicates that no 'O'rings are required.
For valve types 'S' & 'SL' digits '1 - 6' indicates the required 'O'ring material dependent on the maximum / minimum static temperature.

Example: Ordering code 97015A 4103 is brass seated,
Sealed leverlift type SL, with 3/4" BSP parallel MALE inlet connection, 1 1/2" BSP parallel outlet connection, with Viton® 'O'ring seals.

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15mm Nominal Bore METAL SEAL
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR LIQUIDS

ENCLOSED DISCHARGE
15mm NOMINAL BORE SERIES
TYPE 97015 BRASS
TYPE 98015 ST.STL.

TECHNICAL INFORMATION INDEX

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SEETRU LIMITED ALBION DOCKSIDE WORKS,
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TECHNICAL INFORMATION INDEX

EDITION G. 14/04/98

UNITS OF PRESSURE

Basic units

1 bar = 10^6 *dyn/cm²*
= 10^5 *Pa*

where

1 Pa (Pascal) = 1 *N/m²*
= 1 *kg/m/s²*
= 10 *dyn/cm²*

Technical units

1 *kg/cm²* = 98066.5 *Pa*
= 0.980665 *bar*

1 *lb/in²* = 6894.76 *Pa*
= 0.068948 *bar*

1 *bar* = 14.5 lb/in²

Pressure related to Atmosphere.

1 *atm.* = 1.01325 x 10^5 *Pa*
= 1.013 *bar*
= 14.69 *lb/in²*

The bar in context of atmosphere as above is termed bar absolute P. Pressure above atmospheric pressure is termed gauge pressure and is frequently denoted p. In general technical terms it is understood that

$P = p + 1$

UNITS OF VOLUME

1 *m³* = 1000 *litres*
= 10^6 *cm³*

1 *cu ft* = 0.0283168 *m³*
= 28.3168 *litres*

1 *m³* = 35.315 *cu ft*

UNITS OF TEMPERATURE

1 *° C* = 1.8 *°F*
= 1 *° K (absolute temperature)*

Relation of scales
t° C = (1.8 *t* + 32) *°F*

Absolute scale
T°K = (273 + *t°C*) *°K*

UNITS OF MASS

1 *kg* = 1000 *g*
= 2.20462 *lb*

1 *lb* = 0.4536 *kg*

NOTE

The SI unit of temperature is *kelvin*, with symbol *K* not *°K*.
In this manual, however, *°K* is used for clarity.
Certain other non standard symbols are used for clarity and to conform to engineering practice.

SEETRU LIMITED
LIMITED

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SEAL CHARACTERISTICS FOR STANDARD SEAL RANGES

NITRILE

Resistant to water, air, inert gases, acid salt solutions and mineral based fluids. Low temperature resistance, is adequate for most applications. Not suitable for ester based synthetic lubricants.
Best general purpose sealing polymer with excellent sealing and resilient properties.

TEMPERATURE RANGE:
-40 °C to +130 °C. SUBJECT TO APPLICATION.

VITON

Resistant to air and oxygen, ester based synthetic lubricants, hydraulic oils, fuels with high aromatic contents, inorganic solvents, detergents, natural gas, petroleum products and many other chemicals.
Good high temperature capability. Limited low temperature use.

TEMPERATURE RANGE:
-15 °C to +200 °C. SUBJECT TO APPLICATION.

NEOPRENE

Resistant to Freon 22 refrigerant, air, oxygen and gases. Fair resistance to mineral oils.

TEMPERATURE RANGE:
-40 °C to +100 °C. SUBJECT TO APPLICATION

ETHYLENE PROPYLENE

Good resistance to water and steam. Good performance in castor and some phosphate ester based fluids. Good low and high temperature capabilities. Good general chemical resistance. It should never be used in contact with mineral based fluids or di-ester lubricants. Ideal for boiling water and steam.

TEMPERATURE RANGE:
-45 °C to + 140 °C. SUBJECT TO APPLICATION.

FOR SPECIFIC APPLICATIONS AND OTHER SEAL MATERIALS CONSULT SEETRU LIMITED.

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	M	k	C	f	F
Acetylene	26	1.23	2.59	1.013	0.909
Air	29	1.4	2.7	1	1
Argon	39.9	1.65	2.86	0.903	1.243
Carbon Dioxide	44	1.3	2.63	0.791	1.20
Ethane	30	1.2	2.56	0.932	0.965
Ethylene	28	1.25	2.61	0.984	0.95
Helium	4	1.63	2.85	2.842	0.392
Hydrogen	2	1.4	2.7	3.808	0.263
Krypton	83.7	1.65	2.86	0.624	1.8

	M	k	C	f	F
Methane	16	1.3	2.63	1.311	0.724
Natural Gas	17	1.3	2.63	1.272	0.746
Neon	20.2	1.64	2.85	1.265	0.881
Nitrogen	28	1.4	2.7	1.018	0.983
Oxygen	32	1.4	2.7	0.952	1.05
Propane	44	1.13	2.51	0.755	1.145
R12	121	1.13	2.51	0.455	1.90
R22	86.5	1.18	2.55	0.547	1.632
Xenon	131.3	1.65	2.86	0.498	2.255

TABLE OF GAS PROPERTIES

M = Molecular mass in *kg/k* mol
k = Isentropic exponent of expansion
C = Dimensionless factor
f = Dimensionless factor
F = Dimensionless factor

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	Chemincal Formula	Boiling Point	Relative Density
Acetic Acid	$C_2H_4O_2$	118	1.049
Acetone	C_3H_3O	56	0.78
Benzene	C_6H_6	80	0.879
Bromide	Br	59	3.1
Carbon Disulphide	CS_2	46	1.293
Carbon Tetrachloride	CCL_4	77	1.632
Chloroform	$CHCL_3$	61	1.49
Diesel Oil		175	0.88
Diethylether	$C_2H_5OC_2H_5$	35	0.719

	Chemincal Formula	Boiling Point	Relative Density
Freon 12	CF_2CL_2	-29.8	1.33
Fuel Oil (Light)		175	0.85
Fuel Oil (Heavy)		220 to 350	0.95
Glycerol	$C_3H_8O_3$	290	1.262
Methanol	CH_3OH	65	0.792
Methyl Alcohol	CH_4O	64	0.791
Mineral Oil			0.7 to 1.04
Propylene	C_3H_6	-47.8	0.55
Water	H_2	100	0.998

TABLE OF LIQUID PROPERTIES

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INSTALLATION AND OPERATION INSTRUCTIONS FOR SEETRU SAFETY VALVES

INTRODUCTION

Due consideration should be taken of climatic, process or other conditions which might adversely affect the performance of the safety valve. Installation must be undertaken by qualified technicians and to good engineering practice. In addition, user's attention is drawn to our joint responsibility to ensure that the Health and Safety at Work Act is not contravened by incorrect installation, commissioning or servicing.
It is important that the valve to be installed is correct in every aspect, i.e. set pressure, size, material and type etc. for the application.

STORAGE OF VALVE BEFORE INSTALLATION

Valves should be stored preferably between 5 *°C* and 25 *°C* and at a relative humidity of less than 75%. Very moist or very dry conditions should be avoided. If a safety valve is installed after six months, or more, of storage, it must be subjected to a functional test before commissioning.
Thread protectors should not be removed until immediately prior to testing or installation, as they also prevent the ingress of foreign matter which could harm the valve.

INSTALLATION

VALVE INLET: Under no circumstances should it be possible to isolate the safety valve from the protected system. Safety valves should be mounted as close as possible to the protected system. The connecting pipe should be straight and as short as possible. The inlet line to the safety valve should have an effective area of flow at least equal to that of the safety valve inlet. Seetru Limited should be consulted if the safety valve is to be mounted in any position other than vertically. The maximum pressure drop through the inlet line to the safety valve should not exceed 3% of the set pressure when the valve is discharging at its rated capacity.

VALVE OUTLET: No isolating devices shall be fitted to the outlet pipe. Discharge pipes should be as short as possible and of such a size that the pressure developed therein will not reduce the relieving capacity. Ensure arrows indicating the direction of flow are pointing in the correct direction. The cross-sectional area of the discharge pipe should not be less than the area of the safety valve outlet.
Where safety valves are discharged into a manifold, the manifold must be capable of accommodating simultaneous discharge of all valves connected to the manifold. Atmospheric discharge or discharge pipes should terminate at a location which will not cause a hazard to personnel, particular attention being given to hazardous fluids or particles.

GENERAL: Inlet and outlet piping should be capable of supporting the safety valve so that no unacceptable mechanical load or vibration is transmitted to the valve, and be sufficiently strong to withstand the effects of the reaction forces when the valve is discharging.
All pipework or pressure vessels to which the safety valve is connected should be thoroughly cleaned before fitting the safety valve, to ensure that foreign matter does not pass through the valve. Particular care should be taken with the use of sealing compounds and P.T.F.E. tape to ensure that they do not enter the valve.
Atmospheric discharge valves should not be painted or coated with any substance which could possibly obstruct or restrict free and full discharge through the valve. Suitable protection should be provided to prevent environmental build up of ingress of foreign matter. Any condition that could lead to a blockage of discharge piping or discharge ports on safety valves must be avoided.

Where appropriate, discharge pipes should be provided to allow the discharge of fluid or gas to be piped away to a place where it does not present a hazard.

Where there is a possibility of a liquid head forming in a discharge pipe, a drain should be provided which leads to a safe discharge location.

To prevent unnecessary lifting of the safety valve it is recommended that there is a margin of at least 10% between the maximum operating pressure and the set pressure of the safety valve.

FUNCTIONAL TESTING

Once installed in service, valves should be tested at least once every six months to ensure free movement of parts. This should be carried out by operating the easing gear when the valve is under a pressure of not less than 75% of the set pressure. Where valves are supplied without easing gear, the test should be in accordance with the full functional test described below.
Due regard must be paid to the safety of personnel. Testing should not create a hazard, particular attention being given to foreign matter located in discharge outlets and other locations.
When valves are installed in extreme operating environments, e.g.:

(a) hot, dry, dusty or high humidity areas;
(b) oil, tar or gummed deposits;
(c) sand, grit, earth, cement (construction, quarry or similar sites);
(d) pollution laden atmosphere (chemical works);
(e) any area where the valve can become contaminated with foreign matter likely to obstruct free and full discharge through the valve;

the frequency of testing must be increased.

THE FREQUENCY OF TEST MUST BE ESTABLISHED BY THE USER TO SUIT EACH INSTALLATION OR PROCESS. IT IS IMPORTANT THAT DISCHARGE OUTLETS OF THE SAFETY VALVE BE KEPT IN A CLEAN CONDITION, FREE FROM DEPOSITS OR BUILD UP OF FOREIGN MATTER.

FULL FUNCTIONAL TEST

Safety valves should be checked every 12 months for correct function and test of set pressure, full flow and reseat pressures. Ideally the valve should be removed from the system and tested on specific test equipment. Before dismantling any pressurized components the system must be effectively isolated from all sources of pressure and completely vented to atmosphere. When safety valves are taken out of service, care must be taken that the plant remains secure. Parallel or replacement safety devices of at least the same capacity must be provided. Where a safety valve does not meet the specification it must be refurbished, or replaced. If the valve is not functioning correctly, i.e. noisy or 'hammering' refer to Seetru Limited.

WE RECOMMEND THAT ADJUSTMENTS, MAINTENANCE AND REPAIR OF SAFETY VALVES, INCLUDING CHANGES IN SET PRESSURE, SHOULD ONLY BE PERFORMED BY SEETRU OR AN AUTHORISED REPRESENTATIVE.

Notes for section B.

The following notation is used in the formulae in the section:

- A = Flow area (i.e. valve seat bore) in mm^2
- C = Function of k (Isentropic exponent of expansion) taken from BS 6759, and varying from a maximum of 2.8 for monatomic gases down to 2.4 for polyatomic vapours. See page A3
- d_o = Safety valve seat bore in mm
- f = Tabulated factor, See page A3
- F = Tabulated factor, See page A3
- K_{dr} = Derated coefficient of discharge (declared on data sheets). For type tests according to German TÜV rules the working coefficient of discharge is designated α_w and is also declared
- M = Molecular mass of gas in *kg/k mol.* See page A3
- p = Set pressure in bar gauge
- P = Actual flowing (inlet) pressure (in bar absolute). $P = (1.1p+1)$. The actual flow pressure being given at 10% pressure accumulation (i.e. $1.1p$).
- q = Mass flow of gas in *kg/hr*
- Q = Volumetric flow of gas in *Std. litres/sec.*
- t = Temperature in *°C* of flowing gas at valve inlet
- T = Absolute flow temperature in *°K* given by (273 + *t°C*)
- Z = Compressibility factor, which may be taken as approximately 1 for significantly superheated vapours
- v = Specific volume at actual flowing temperature and pressure m^3/kg

The rated flow of gases is often given in standard litres per second, which is the volume occupied by the mass per second at 1 atmosphere pressure (1.013 *bar absolute*) and 15*°C*. SCFM (or CFM) is an alternative measure also used, it denotes Standard Cubic Feet per Minute, again at 15°C and 1 atmosphere.

If for a given range of safety valves the value of the coefficient of discharge (K_{dr}) is not uniform, then by putting the lowest value into formulae **(b)** & **(d)**, the minimum safe seat diameter (d_o) will be obtained.

For a detailed explanation of how the formulae are derived please see pages B2 to B5.

Worked examples can be found on pages B6 to B8.

(a) To find the MASS FLOW of gas, q, discharged by a safety valve use the formula;

$$q = A \cdot K_{dr} \cdot P \cdot C \cdot \sqrt{\frac{M}{ZT}} = 0.2883 \cdot A \cdot K_{dr} \cdot C \cdot \sqrt{\frac{P}{v}} \qquad (kg/hr) \qquad \textbf{(a)}$$

(b) To find the minimum safety valve seat bore, d_o, for a given MASS FLOW, q, (taking Z=1) use the formula;

$$d_o \geq \sqrt{\frac{0.08756}{F \cdot K_{dr} \cdot (11p+1)} \cdot \sqrt{273+t} \cdot q} \qquad (mm) \qquad \textbf{(b)}$$

(c) To find the VOLUMETRIC FLOW of gas, Q, discharged by a safety valve use the formula;

$$Q = 6.566 \cdot \frac{K_{dr} \cdot A \cdot C \cdot (11p+1)}{\sqrt{M \cdot Z \cdot (273+t)}} \qquad (std.\ litres/s) \qquad \textbf{(c)}$$

(d) To find the minimum safety valve seat bore, d_o, for a given VOLUMETRIC FLOW, Q, (taking Z=1) use the formula;

$$d_o \geq \sqrt{\frac{0.38665\sqrt{273+t}}{f \cdot K_{dr} \cdot (11p+1)} \cdot Q} \qquad (mm) \qquad \textbf{(d)}$$

If volumetric flow is given in European *std. litres/s*, Q_e, then in equation **(d)**, Q must be replaced by (see page B4)

$$Q = \frac{Q_e}{0.948}$$

If the volumetric flow is given in European Nm^3/hr units, V, then in equation **(d)**, Q must be replaced by (see page B4)

$$Q = \frac{V}{3.6 \times 0.948} = \frac{V}{3.413}$$

In both these cases the coefficient 1.1 of p in denominator of equation **(d)** should be replaced by unity if required to conform to German standard calculations.

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SUMMARY OF
VALVE SIZING
FOR GASES & VAPOURS

SAFETY VALVE CAPACITY DETERMINATION FOR GASES AND VAPOURS AND VALVE SELECTION.

The Seetru safety valve capacity determination expressions below are based on BS 6759: Part 2: 1984. They apply to critical flow conditions, which occur when

$$r = \frac{P_b}{P} \leq \left(\frac{2}{k+1}\right)^{\frac{k}{k-1}} \qquad \textbf{(1)}$$

where P = Actual flowing pressure in bar absolute
P_b = Back pressure in bar absolute
k = Isentropic exponent of expansion at actual flowing inlet conditions
r = Dimensionless ratio

For air k = 1.4, and r becomes

$$r \leq 0.53$$

Hence critical flow for air occurs broadly above 1 bar gauge set pressure, when discharging to atmosphere.

The mass flow of gas, q_{mg}, being discharged by the safety valve is then given by

$$q_{mg} = A \cdot K_{dr} \cdot P \cdot C \cdot \sqrt{\frac{M}{ZT}} \qquad (kg/hr) \qquad \textbf{(2)}$$

where A = Flow area (i.e. valve seat bore) in mm^2
K_{dr} = Derated coefficient of discharge declared on valve data sheets. (For type tests according to German TÜV rules the working coefficient of discharge is designated α_w and is also declared)
P = Actual flowing (inlet) pressure (in bar absolute). $P = (1.1p+1)$ where p is set pressure in bar gauge, the actual flow pressure being given at 10% pressure accumulation.
C = Function of k (isentropic exponent of expansion) taken from BS 6759, and varying from a maximum of 2.8 for monatomic gases down to 2.4 for polyatomic vapours. See page A3.
M = Molecular mass of gas in kg/k mol
T = Absolute flow temperature in $°K$ given by $(273 + t°C)$
Z = Compressibility factor, given by

$$Z = \frac{vPM}{RT} \qquad \textbf{(3)}$$

where v = Specific volume of gas at P & T in (m^3/kg)
R = Universal gas constant equal to 0.08314 for units of measure employed here

Any departure of the value Z from 1 is a measure of the departure of the vapour properties from that of a gas. Z can be calculated from vapour tables, but may be taken as approximately 1 for significantly superheated vapours. BS 6759 provides curves of Z as a function of vapour conditions.

By substituting (3) in (2) a modified expression is obtained

$$q_{mg} = 0.2883 \cdot A \cdot K_{dr} \cdot C \cdot \sqrt{\frac{P}{v}} \qquad (kg/hr) \qquad \textbf{(2a)}$$

which can be convenient if the specific volume, v, of a vapour is known.

For air $M = 29$, C = 2.7, $Z = 1$. Thus from (2) the mass flow of air, q_{ma}, is given by

$$q_{ma} = 14.54 \cdot K_{dr} \cdot A \cdot \frac{(11p+1)}{\sqrt{273+t}} \qquad (kg/hr) \qquad \textbf{(4)}$$

For standard rating flow temperature of $15°C$ and a valve seat bore diameter of d_o mm

$$q_{ma} = 0.673 \cdot K_{dr} \cdot d_o^2 \cdot (11p+1) \qquad (kg/hr) \qquad \textbf{(5)}$$

This is the mass flow given on the Seetru safety valve data sheets.

To convert a critical mass flow of air q_{ma} at 15 *°C* for a given valve to that of another gas of molecular mass *M*, value Z_{gas}, and flowing at *t°C*, this follows as

$$q_{mg} = \sqrt{\frac{M}{29}} \cdot \frac{C_{gas}}{2.7} \cdot \sqrt{\frac{288}{273+t}} \cdot \sqrt{Z_{gas}} \cdot q_{ma} \qquad (kg\ /\ hr) \qquad \textbf{(6)}$$

$$= F \cdot \sqrt{\frac{288}{273+t}} \cdot \sqrt{Z_{gas}} \cdot q_{ma}$$

where

$$F = 0.0688 \cdot C_{gas} \cdot \sqrt{M} \qquad \textbf{(7)}$$

The factor *F* is tabulated for a range of gases on sheet A3.

(6) can be transposed

$$q_{ma} = \sqrt{\frac{273+t}{288}} \cdot \frac{q_{mg}}{F \cdot \sqrt{Z_{gas}}} \qquad \textbf{(6a)}$$

This form is useful to give the mass flow of air equivalent to a known mass flow of gas. It will allow a safety valve sizing to be checked against tabulation of air mass flow in *kg/hr*.

From (5) & (6), for a given mass flow q_{mg} of a gas, the required safety valve bore d_o can be found using

$$d_o \geq \sqrt{\sqrt{\frac{273+t}{288}} \cdot \frac{q_{mg}}{F \cdot \sqrt{Z_{gas}} \cdot 0.673 \cdot K_{dr} \cdot (11p+1)}} \qquad (mm)$$

Taking Z_{gas}=1

$$d_o \geq \sqrt{\frac{0.08756}{F \cdot K_{dr} \cdot (11p+1)} \cdot \sqrt{237+t} \cdot q_{mg}} \qquad (mm) \qquad \textbf{(8)}$$

As an alternative, the rated flow of gases is often given in *standard litres per second,* which is the volume occupied by the mass per second at 1 atmosphere pressure (1.013 *bar absolute*) and *15°C*.

The general expression according to the gas laws for the volume *V* litres of a mass *W kg* of gas of molecular mass *M* at pressure *P bar absolute* and temperature *T °K* absolute is

$$V \geq 83.14 \cdot \frac{WT}{MP} \qquad (litres) \qquad \textbf{(9)}$$

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For standard litres $T = 288°K$, $P = 1.013$ *bar*

$$\therefore \quad V = \frac{23637 \cdot W}{M} \qquad (std.litres/s) \qquad \textbf{(10)}$$

It may be noted that for European standards the standard litre is defined at $0°C$, and hence it must be reduced in the ratio

$$\frac{273}{288} = 0.948$$

Multiplied by 3.6, this standard litre per second converts to European normal cubic metre per hour: *N m³/hr.*

Hence a mass flow of q_{mg} kg/hr is equivalent to

$$Q_{gas} = \frac{23637}{3600 \cdot M} \cdot q_{mg} = \frac{6.566}{M} q_{mg} \qquad (std.\ litres/s) \qquad \textbf{(11)}$$

where Q_{gas} = Volumetric flow at standard conditions

By substituting from (2)

$$Q_{gas} = 6.566 \cdot \frac{k_{dr} \cdot A \cdot C_{gas} \cdot (1.1p+1)}{\sqrt{M \cdot Z_{gas} \cdot (273+t)}} \qquad (std.\ litres/s) \qquad \textbf{(12)}$$

For air flowing at $t = 15°C$

$$Q_{air} = \frac{6.566 \cdot 2.7}{\sqrt{29 \cdot 288}} \cdot k_{dr} \cdot A \cdot (1.1p+1) \qquad (std.\ litres/s)$$

$$= 0.193 \cdot k_{dr} \cdot A \cdot (1.1p+1) \qquad (std.\ litres/s) \qquad \textbf{(13)}$$

In terms of flow diameter d_o

$$Q_{air} = 0.1524 \cdot K_{dr} \cdot d_o^2 \cdot (11p+1) \qquad (std.litres/s)$$

Hence to convert to Q_{gas} *std. litres/s* flowing at $t°C$ from tabulated values of Q_{air} *(e.g. In Seetru data sheets)*

$$Q_{gas} = \sqrt{\frac{29}{M}} \cdot \frac{C_{gas}}{2.7} \cdot \sqrt{\frac{288}{273+t}} \cdot \frac{Q_{air}}{\sqrt{Z_{gas}}}$$

$$= 19945 \cdot \frac{C_{gas}}{\sqrt{M}} \cdot \sqrt{\frac{288}{273+t}} \cdot \frac{Q_{air}}{\sqrt{Z_{gas}}}$$

continued...

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$$= f \cdot \sqrt{\frac{288}{273+t}} \cdot \frac{Q_{air}}{\sqrt{Z_{gas}}} \qquad \textit{(std.litres / s)} \qquad \textbf{(14)}$$

where

$$f = \frac{1.9945 \cdot C_{gas}}{\sqrt{M}} \qquad \textbf{(15)}$$

is also shown in the table on page A3; (14) can also be transposed.

$$Q_{air} = \sqrt{\frac{273+t}{288}} \cdot \frac{\sqrt{Z_{gas}} \cdot Q_{gas}}{f} \qquad \textbf{(14a)}$$

This form is useful to give the air flow in *std. litres/sec* equivalent to a known gas flow in *std. litres/s.* It will allow a safety valve sizing to be checked against tabulation of standard volumetric air flow.

Using (12) and (14), for a given flow of gas Q_{gas} *Std litres/s*, the required safety valve d_o can be found.

$$d_o \geq \sqrt{\sqrt{\frac{273+t}{288}} \cdot \frac{\sqrt{Z_{gas}} \cdot Q_{gas}}{0.1524 \cdot f \cdot k_{dr} \cdot (1.1p+1)}} \qquad \textit{(mm)}$$

For $Z_{gas} = 1$,

$$d_o \geq \sqrt{\frac{0.38665\sqrt{237+t}}{f \cdot k_{dr} \cdot (1.1p+1)}} \cdot Q_{gas} \qquad \textit{(mm)} \qquad \textbf{(16)}$$

If for a given range of safety valves the value of the coefficient of discharge is not uniform, then by putting the lowest value into (16), the minimuum safe seat diameter will be obtained.

Example 1.

Given a safety valve of seat diameter d_o = 13mm, set at 7.5 *bar.g* with coefficient of discharge k_{dr} = *0.78.*
Question :

(i) What mass of air will it discharge, when flowing at 40*°C* ?

(ii) What will be the discharge expressed in standard litres/sec. ?

The flow area will be

$$A = \frac{\pi}{4} \cdot 13^2 = 132.7 \quad (mm^2)$$

From expression (4)

$$q_{ma} = 14.54 \cdot 0.78 \cdot 132.7 \cdot \frac{9.25}{\sqrt{313}}$$

$$= 786.86 \quad (kg/hr)$$

Also from expression (13) and converting from 15*°C* to 40*°C*

$$Q_{air} = 0.193 \cdot 0.78 \cdot 132.7 \cdot 9.25 \cdot \sqrt{\frac{288}{313}}$$

$$= 177.25 \quad (std.\ litres\ /\ s)$$

N.B.
For Seetru valves the accurate value of the flow area is given in the data Sheets.

Example 2.

Given Carbon Dioxide (CO_2) stored at 24 *bar gauge*, and -20 *°C*. Given also a safety valve of seat bore d_o = 10*mm*, and coefficient of discharge k_{dr} = 0.78, and set to 25 bar gauge pressure.
Question:

(i) What is the mass of gas discharging when flowing, in *kg/hr.* ?

(ii) What is the volume of gas discharging expressed at standard conditions, i.e. 1.013 *bar abs.* and 15*°C*, in *std. litres/s.* ?

(iii) What is the volume of gas discharging at the actual flowing conditions, 27.5 *bar gauge* at -20*°C*. ?

The flow area will be

$$\frac{\pi}{4} \cdot 10^2 = 78.54 \quad (mm^2)$$

From expression (2) and gas data in table, C = 2.63, M = 44, and taking Z = 1

$$q_{mg} = 0.78 \cdot 78.54 \cdot 28.5 \cdot 2.63 \cdot \sqrt{\frac{44}{253}}$$

$$= 1915 \quad (kg/hr)$$

Furthermore, from (12)

$$Q_{gas} = 6.566 \cdot \frac{0.78 \cdot 2.63 \cdot 28.5 \cdot 78.54}{\sqrt{44} \cdot \sqrt{253}}$$

$$= 285.8 \quad (std.\ litres\ /\ s)$$

Finally by using the gas law (9), the above value converts to *litres/sec* at 28.5 *bar absolute* and -20*°C*

$$285.8 \cdot \frac{1.013}{28.5} \cdot \frac{253}{288} = 8.924 \quad (litres\ /\ s)$$

Example 3.

Given a required discharge of R22 Freon gas of 7000 *kg/hr* at 28.5 *bar gauge* safety valve set pressure and 140 *°C*

Question:

What is the minimum safety valve seat bore diameter for a coefficient of discharge k_{dr} of 0.73. ?

Turning to expression (8), and using the gas data F = 1.632

$$d_o \geq \sqrt{\frac{0.08756}{1.623 \cdot 0.7 \cdot 32.35} \cdot \sqrt{413} \cdot 7000}$$

$$\geq 18.36 \quad (mm)$$

Example 4

Required to discharge Helium gas at 1500 *lb/in²* *gauge* pressure and 0 *°C*. Minimum volume to flow 2.45 *cu ft/min*

Question:

What is the minimum safety valve seat bore for a coefficient of discharge k_{dr} = 0.55

Converting to metric units.

$$2.45 \ cuft/min = \frac{2.45 \cdot 28.3168}{60}$$

$$= 1.156 \quad (litres/s)$$

Also

$$1500 \ lb/in^2 = 1500 \cdot 0.068948$$

$$= 103.4 \quad (bar\ gauge)$$

$$= 104.4 \quad (bar\ absolute)$$

The volume flow needs now to be converted to standard conditions of 1.013 *bar absolute* and 15 *°C*, by using the gas laws (9)

$$1156 \ litres/s = 1.156 \cdot \frac{(103.4+1)}{1.013} \cdot \frac{288}{273}$$

$$= 125.7 \quad (std.\ litres/s)$$

The given discharge pressure (104.4 *bar absolute*) is taken as the actual flowing pressure *P*. Hence to obtain the set pressure *p* of the valve

$$P = 104.4 = (1.1p+1)$$

$$\therefore \ p = \frac{(104.4-1)}{1.1} = 94 \quad (bar)$$

Using expression (16) and taking from the gas data *f* = 2.842

$$d_o \geq \sqrt{\frac{0.38665 \cdot \sqrt{273}}{2.842 \cdot 0.55 \cdot 104.4} \cdot 125.7}$$

$$\geq 2.2 \quad (mm)$$

Example 5

Given a safety valve of d_o = 8*mm* set at 105 *bar gauge*, discharging hydrogen gas at 20*°C*

Question:

What is the discharge in *Nm³/hr*, given according to DIN AD-Merkblatt A2 (TÜV)

where, for expression (2) the following values should be used,

$k_{dr} = a_w = 0.66$
P = 105 x 1.1 + 1 = 116.5 *bar abs.*
C = 2.7
M = 2
Z = 1
T = 293*°K*

and

$$A = \frac{\pi}{4} \cdot 6.4 = 50.27 \quad (mm^2)$$

$$\therefore \quad q_{mg} = 50.27 \cdot 0.66 \cdot 116.5 \cdot 2.7 \cdot \sqrt{\frac{2}{293}}$$

$$= 862.23 \quad (kg / hr)$$

From gas equation (9) converted to *m³*

where

W = 784.52
T = 273*°K* (*std. temperature*)
M = 2
P = 1.013 *bar abs.* (*std. pressure*)

$$\therefore \quad V = \frac{83.14}{1000} \cdot \frac{862.23 \cdot 273}{2 \cdot 1.013} = 9659.5 \quad (Nm^3 / hr)$$

DISCHARGE OF LIQUIDS

The expression for the mass of liquid w_f ,*kg/hr*, flowing through a safety valve of seat area A, mm^2, is,

$$w_f = 36 \cdot A \cdot c_f \cdot \sqrt{2 \cdot p \cdot sg} \qquad (kg / hr) \qquad \textbf{(1)}$$

where

- p = flowing pressure in *bar gauge*
- sg = specific gravity of liquid (relative to 1 for water)
- c_f = coefficient of discharge of valve seat (may depend upon value of flowing pressure)
- w_f = mass flow of liquid in *kg/hr*
- d_o = safety valve seat bore in *mm*
- v_f = volumetric flow of liquid in *litres /min*
- p_t = safety valve relieving set pressure

If d_o = valve seat diameter in *mm*, (1) becomes

$$w_f = 40 \cdot d_o^2 \cdot c_f \cdot \sqrt{p \cdot sg} \qquad (kg / hr) \qquad \textbf{(2)}$$

Expressed in flowing liquid volume v_f , *litres /min*,

$$v_f = \frac{40}{60} \cdot d_o^2 \cdot c_f \cdot \sqrt{\frac{p}{sg}} \qquad (litres / min)$$

$$= 0.667 \cdot d_o^2 \cdot c_f \cdot \sqrt{\frac{p}{sg}} \qquad (litres / min) \qquad \textbf{(3)}$$

The coefficient of discharge is often found to be dependant upon the pressure accumulation above set pressure p_t . Two levels of accumulation are envisaged in BS 6759 part 3, 10% and 25%. If the respective coefficients of discharge are denoted c_{f10} and c_{f25} , (2) & (3) become,

$$w_f = 40 \cdot d_o^2 \cdot c_{f10} \cdot \sqrt{1.1 p_t \cdot sg} \qquad (kg / hr) \qquad \textbf{(2a)}$$

and

$$w_f = 40 \cdot d_o^2 \cdot c_{f25} \cdot \sqrt{1.25 p_t \cdot sg} \qquad (kg / hr) \qquad \textbf{(2b)}$$

also

$$v_f = 0.677 \cdot d_o^2 \cdot c_{f10} \cdot \sqrt{\frac{1.1 p_t}{sg}} \qquad (litres / min) \qquad \textbf{(3a)}$$

and

$$v_f = 0.677 \cdot d_o^2 \cdot c_{f25} \cdot \sqrt{\frac{1.25 p_t}{sg}} \qquad (litres / min) \qquad \textbf{(3b)}$$

Conveniently, the expessions (2b) and (3b) may be transposed to determine the minimum safety valve seat diameters for a required flow at a given set pressure,

$$d_o \geq \sqrt{\frac{0.025 \cdot w_f}{c_{f25} \cdot \sqrt{1.25 p_t \cdot sg}}} \qquad (mm) \qquad \geq \sqrt{\frac{0.02236 \cdot w_f}{c_{f25} \cdot \sqrt{p_t \cdot sg}}} \qquad (mm) \qquad \textbf{(4)}$$

and

$$d_o \geq \sqrt{\frac{1.50 \cdot v_f \cdot \sqrt{sg}}{c_{f25} \cdot \sqrt{1.25 p_t}}} \qquad (mm) \qquad \geq \sqrt{\frac{1.3416 \cdot v_f \cdot \sqrt{sg}}{c_{f25} \cdot \sqrt{p_t}}} \qquad (mm) \qquad \textbf{(5)}$$

EXAMPLE 1

Given a liquid relief valve of d_o = 10*mm* at a set pressure p_t = 8 *bar gauge*.
Question:

i) What will be its discharge of water *sg* = 1 in *kg/hr*, at an accumulation of 10% with a discharge coefficient of $c_{f\,10}$ = 0.45 ?
ii) What will be its flow in *litres /min* ?

From (2a)

$$w_f = 40 \cdot 100 \cdot 0.45 \cdot \sqrt{1.1 \cdot 8}$$

$$= 5339.7 \quad (kg / hr)$$

and

$$v_f = \frac{2}{3 \cdot 40} \cdot 5339.7 = 89 \quad (litres / min)$$

EXAMPLE 2

Given a mineral oil of specific gravity *sg* = 0.89, and it is desired to relieve 35 *litres /min* at a flowing pressure of 30 *lb / in²*.

Question:

What is the minimum size of safety valve seat assuming the valve can work at 25% set pressure accumulation, and has a coefficient of discharge of 0.6.

A flowing pressure of 30 *lb / in²* corresponds to

$$\frac{30}{14.5} = 2.069 \quad (bar\ gauge)$$

Hence set pressure p_t

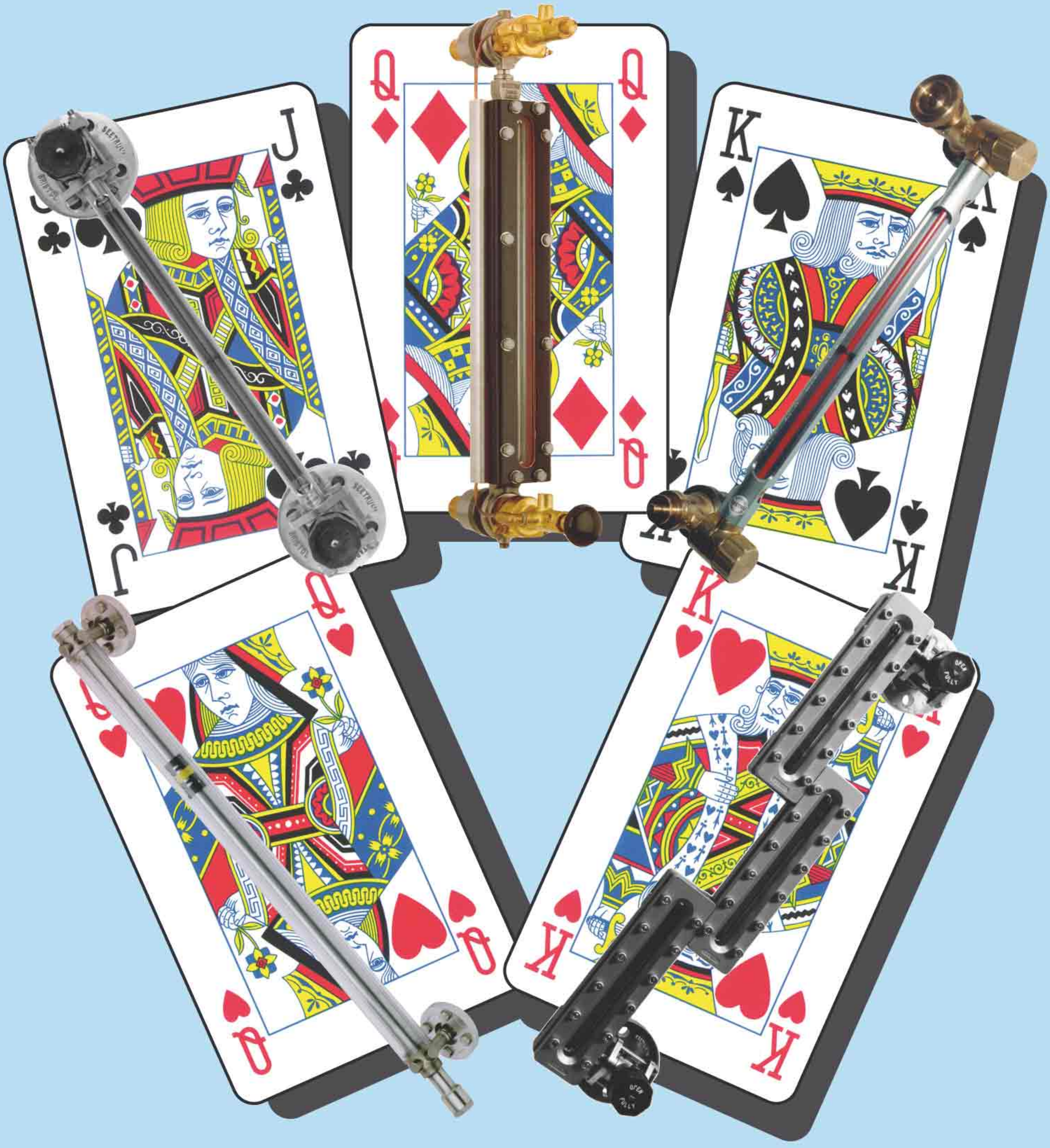
$$= \frac{2.069}{1.25} = 1.665 \quad (bar\ gauge)$$

From (5)

$$d_o \geq \sqrt{\frac{1.3416 \cdot 35 \cdot \sqrt{0.89}}{0.6 \cdot \sqrt{1.665}}} \quad (mm)$$

$$\geq 7.56 \quad (mm)$$

Liquid Level Gauges & Indicators



Take your pick from our pack

SEETRU

SEETRU GAUGES

The ideal solution for liquid level indication

Seetru gauges are available with:

Electronic remote reading, computer interfaces & High/Low level alarms

see feature list on back page

The CPI Gauge (Chemical & Process Industry)

ASK FOR THE CPI GAUGE LEAFLET

Heavy duty, general purpose design, all stainless steel construction with P.T.F.E. sealing.

- Handwheel operated isolating valves incorporating automatic safety shut-off valve.
- Sampling and drain valves available.
- Column assembly can be removed without draining vessel.

Tubular glass model

- Manufactured to required length.
- Borosilicate glass sight tube, protected in stainless steel guard, additional outer polycarbonate guard also available.
- Magnification strip for ease of reading even with colourless liquids.

Flat reflex glass model

- Standard manufactured lengths, but with uninterrupted continuous viewing.
- Robust bolted column with reflex glass viewing window.

The Quickmount and Quickflex Gauges

ASK FOR THE QUICKMOUNT GAUGE LEAFLET

General purpose elegant industrial design, unique ease of fitting.

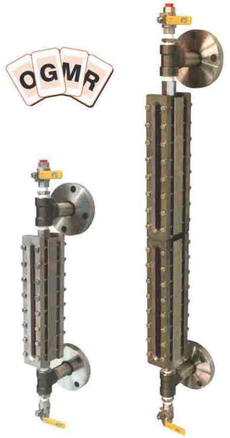
- Range of construction materials: brass, stainless steel or polypropylene.
- Automatic safety shut-off valve available.
- Manual screw-down isolating valves.
- Sampling and drain valves available.
- Column assembly can be removed without draining vessel - by hand operation only.

Quickmount - the tubular glass model

- Manufactured to required length.
- Borosilicate glass sight tube, protected in metal guard, additional outer polycarbonate guard also available.
- Magnification strip for ease of reading even with colourless liquids.

Quickflex - the flat reflex glass model

- Standard manufactured lengths.
- Unique lightweight bolted column with reflex glass viewing window.



The Reflex Gauge (Standard model)

ASK FOR THE REFLEX GAUGE LEAFLET

Heavy duty direct reading reflex glass gauge for high pressure and extreme temperature applications.

- Assemblies for uninterrupted centre to centre viewing available.
- Modular construction.
- Stainless steel ultra compact construction.
- Special ball isolating valve execution with integral automatic safety shut-off and P.T.F.E. sealing.
- Wide range of materials of construction and seals available on request.
- Wide variety of standard fittings and connections.

The Reflex Gauge (Refrigeration model)

Gauge for refrigerants and liquefied gases.

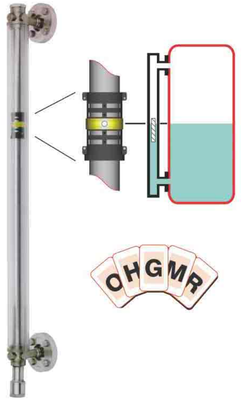
- Complies with BS4434, Institute of Refrigeration codes and European EN standards (EN378 & prEN12178).
- Range of construction materials: brass, stainless steel and glass or borosilicate glass.
- Auto safety shut-off valve.
- Manual screw-down isolating valves with anti-tamper gas-tight caps.
- Column assembly can be removed without draining vessel.
- Tubular version also available (not to BS4434).

The Seetru Transparent Gauge

ASK FOR THE TRANSPARENT GAUGE LEAFLET

Heavy duty, general purpose Transparent Gauge for high pressure and extreme temperature applications.

- Unique modular design allows construction to required length.
- One piece liquid chamber with large flow area.
- Robust bolted column with flat Borosilicate glass (mica shields available).
- Stainless steel construction with seals to suit duty.
- Heating and illumination options.
- Uninterrupted centre-to-centre viewing construction available.
- Isolating valves incorporating automatic safety shut-off valve or a range of standard valve connections.
- Acrylic (non-frost) blocks permit viewing through frost build-up.



The Seemag® Gauge

ASK FOR THE SEEMAG GAUGE LEAFLET

Entirely innovative & patented robust magnetic level indicator with all round clear viewing. High visibility ring rises and falls in unison with a float. The Seemag meets the requirements of SOLAS and has international approvals for marine application.

- Float in a stainless steel tube connected to the tank (enquire for plastic tube).
- Unique stepless indication.
- Simpler and more reliable than conventional magnetic gauges.
- Heating system for high viscosity liquid.
- Can be fully rodded or flushed for cleaning.
- Can be fitted close to the ground with minimal loss of level indication.
- Follower can be viewed through see-through scale graduated in millimetres, side mounted scaleplate also available.
- Isolation valves optional.

The Seeflex® Gauge

ASK FOR THE SEEFLEX GAUGE LEAFLET

Unique lightweight reflex glass and stainless steel gauge for marine & industrial use. The Seeflex meets the requirements of SOLAS and has international approvals for marine application.

- Hand operated push-button self-closing isolating valves.
- System for hydraulic actuation of all valves available for local or remote operation.
- Column assembly can be removed without draining vessel.
- Tank seals proof against all external damage.

The Seebio Hygienic Gauge

ASK FOR THE SEEBIO GAUGE LEAFLET

Tubular glass gauge for food products and high quality chemicals.

- Materials of construction stainless steel with polycarbonate or borosilicate sight tube.
- Smooth crevasse free piping.
- International Dairy Federation seals.
- Suitable for cleaning in place (CIP).
- Unique gland design at top of sight tube for efficient entry and even distribution of CIP fluid.
- Butterfly isolation valves available.
- Magnification strip for ease of reading even with colourless liquids.

Seetru manufacture a comprehensive range of liquid level gauges. Detailed literature on each model is available.

O OEM, special purpose & custom design

H Hygienic, brewing, distilling & pharmaceutical industries

G General, chemical and process industries

M Marine, shipbuilding & off-shore industries

R Refrigeration & liquefied gases

The Seetol Gauge

A totally unique tubular sight gauge for accurate (to fraction of mm) level indication on tanks up to 20m tall.

ASK FOR THE SEETOL GAUGE LEAFLET

- Level reading taken from ground level using an optical telescope.
- Reading accuracy to better than 1mm over entire vessel height.
- Accuracy accepted by UK Customs and Excise.
- Available with full weather protection.
- Food quality construction available.
- Suitable for cleaning in place (CIP).

Seetru Seemulti Gauge

Robust capsule manometer, easily adjusted on-site for different specific gravities. So can be fitted to tanks which may be used for liquids of different specific gravities. Suitable for general industrial and marine applications.

ASK FOR THE SEEMULTI GAUGE LEAFLET

- Materials of construction 304 or 316 stainless steel.
- Fully sealed, self energising.
- Readout gauge can be mounted remotely.

Externally Mounted Version

- Hand operated push-button self-closing isolating valves.
- Hydraulic actuation system available for local or remote operation.

The Mini Gauge

Simple and economic direct reading tubular sight glass without valves. Designed for use on small tanks, sumps and reservoirs.

ASK FOR THE MINI GAUGE LEAFLET

- Simple to fit.
- Can be read from any angle.
- Options available include:
  - Outer guard tube • Magnification strip • Scale plate • Electronic Level Alarm

Circular Window Sight Glasses

Pressure resisting viewing glasses to provide visual indication of the presence of liquid. Extensive range of sizes and configurations available.

ASK FOR THE SIGHT GLASS LEAFLET

- Flat glasses, domed glasses and circular internal reflex corrugation glasses.
- Internal metal reflector.
- Wide range of construction materials available.
- Cushioned against shock.
- Frost shield available.

GUIDE TO THE SEETRU RANGE OF

Liquid Level Gauges

	QUICKMOUNT	CPI	SEEMAG	SEEFLEX	SEETOL	SEEBIO	REFLEX	SEEMULTI	TRANSPARENT
Application									
Water, oil, general industrial fluids	✓	✓	✓	✓			✓	✓	✓
Petro-chemicals		✓	✓				✓	✓	✓
Chemicals and solvents	✓	✓	✓				✓	✓	✓
Hazardous or flammable liquids		✓	✓				✓	✓	✓
Brewing, wine and spirits			✓		✓	✓		✓	
Heated liquids	✓	✓	✓	✓			✓	✓	✓
Food products and high purity chemicals			✓		✓	✓			
Pressurised vessels	✓	✓	✓	✓			✓	✓	✓
Vacuum conditions	✓	✓	✓	✓			✓		✓
Shipboard lube and fuel oils to SOLAS requirements			✓	✓					
Refrigerant and air conditioning fluids			✓				✓		✓
Waste			✓					✓	
Features									
Direct viewing of liquids in a protected tubular sight glass	✓	✓			✓	✓			
Direct viewing of liquids in a robust column with flat or reflex glass window	✓			✓			✓		✓
Indirect indication of fluid level in a stainless steel by-pass tube			✓						
Indirect reading of fluid level via a dial gauge								✓	
Systems providing level switches and alarms	✓	✓	✓	✓	✓	✓	✓		✓
Dual electronic/computer readout	✓	✓	✓	✓	✓	✓	✓		✓
Scaleplate graduated in millimeters available	✓	✓	✓	✓	✓	✓	✓		✓
Emergency auto safety shut-off system	✓	✓		✓			✓		✓
Indicating and reading accuracy accepted by UK Customs and Excise					✓				
Suitable for cleaning in place (CIP)			✓		✓	✓			
Guard tubes available	✓	✓			✓	✓			
International marine approvals			✓	✓					
Hydraulic actuation available				✓				✓	
Heating jacket available for viscous fluids	✓	✓	✓	✓			✓		✓
Specific gravity can be set on site			✓					✓	

SEETRU

SEETRU LIMITED
Albion Dockside Works,
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Telephone No: 0117 927 9204
Fax No: 0117 929 8193
Email: enquiries@seetru.com
Web: www.seetru.com
Agents World-wide

Our Distributor

EDITION C

Tubular Borosilicate Glass Pressure/Temperature Chart

Standard Quickmount, Marine, Admiralty & CPI Gauges are supplied as follows:

Up to 1000mm centres with a single length of glass.
From 1001mm to 2000mm with two lengths of glass with an intermediate joint/support.
From 2001mm to 3000mm with three lengths of glass with two intermediate joint/supports.

The maximum temperature and pressure for the gauges is shown on the below chart.

e.g. A gauge 500mm centres is suitable for 20.5 bar at 15°C.
A gauge 1000mm centres is suitable for 14 bar at 15°C.
A gauge 1500mm centres is two sections each 750mm therefore suitable for 16 bar at 15°C.

To achieve a higher temperature/Pressure rating for a gauge:

Higher temperatures and pressures can be achieved by introducing additional intermediate joint/support brackets. This will reduce the length of each section of glass.

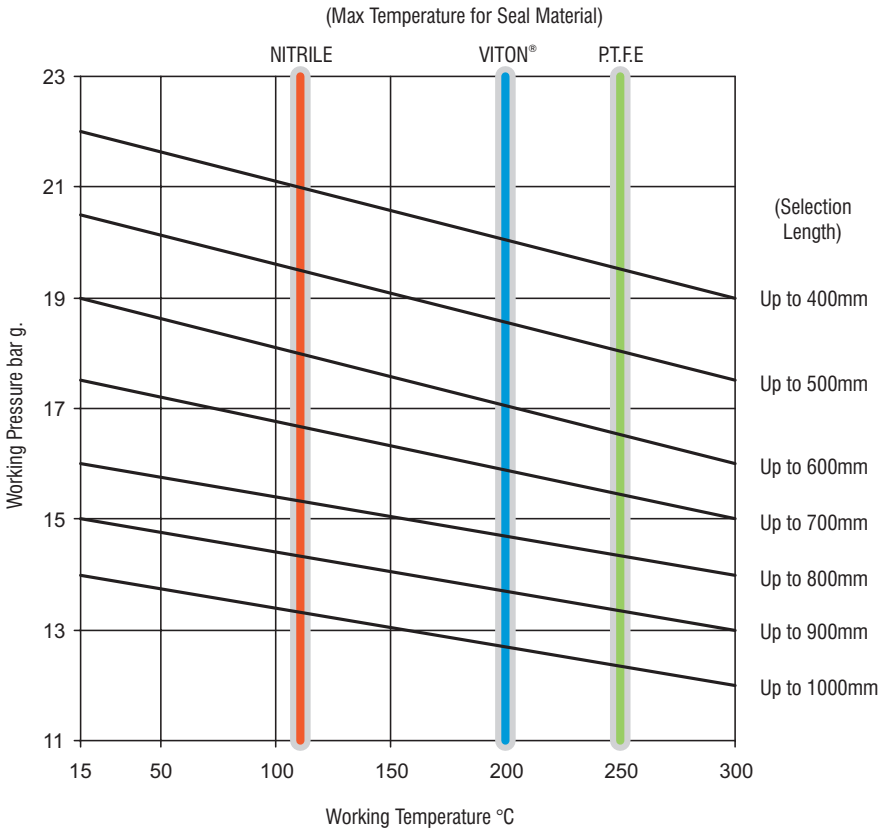
Example: Gauge 1800mm centres in 2 sections of 900mm is suitable for the range 15 bar at 15°C to13.5 bar at 250°C.

By introducing 1 extra intermediate joint / support bracket each section becomes 600mm and therefore is suitable for the range 19 bar at 15°C to 16.5 bar at 250°C.

By introducing 2 extra intermediate joint / support brackets each section becomes 450mm and therefore is suitable for the range 21 bar at 15°C to 18.5 bar at 250°C.

The rating for "up to 400mm" is the maximum achievable.

The above assumes temperature suitability of the seal material used.



® Viton is a registered trademark of DuPont Elastomers

This information must be used within the maximum pressures/temperatures of the gauge concerned.

SEETRU LIMITED
Albion Dockside Works, Bristol BS1 6UT, England.
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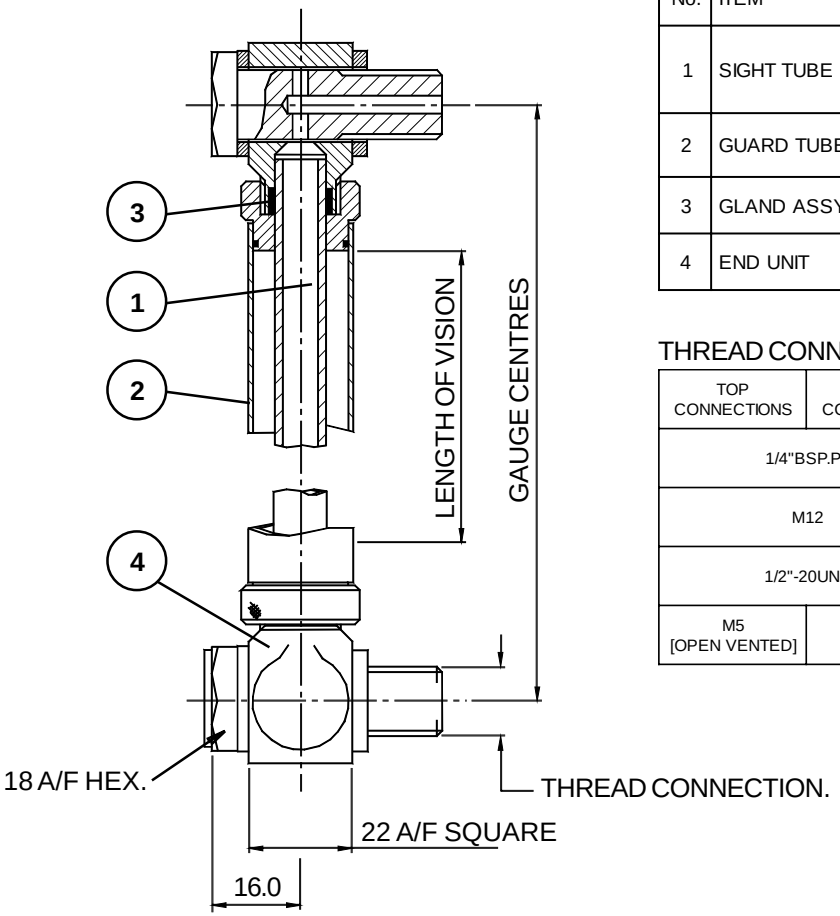


PARTS & MATERIAL LIST

No.	ITEM	MATERIAL
1	SIGHT TUBE	ANNEALED BOROSILICATE HEAT RESISTING GLASS OR POLYCARBONATE PLASTIC
2	GUARD TUBE	POLYCARBONATE PLASTIC OR ST.STL.
3	GLAND ASSY	VITON & P.T.F.E.
4	END UNIT	BRASS OR ST.STL.

THREAD CONNECTIONS

TOP CONNECTIONS	BOTTOM CONNECTIONS
1/4"BSP.PL	
M12	
1/2"-20UNF.	
M5 [OPEN VENTED]	ABOVE OPTIONS

MINI GAUGE

When ordering please state:-
Distance between gauge centres,
Fluid operating temperature and pressure.

Quotation for scale plates, on request.
Standard gauges have level marker strips.

WORKING PRESSURE:

Standard working pressure 19 Bar.g.
Up to 30 Bar.g. High Pressure Type G2712T211, available, subject to application.

OPERATING TEMPERATURE:

Up to 180°C, subject to application.

SEETRU LIMITED

SEETRU LIMITED
ALBION DOCKSIDE WORKS, BRISTOL. BS1 6UT
TELEPHONE +44 (0) 117 927 9204, FAX +44 (0) 117 929 8193
www.seetru.com enquiries@seetru.com

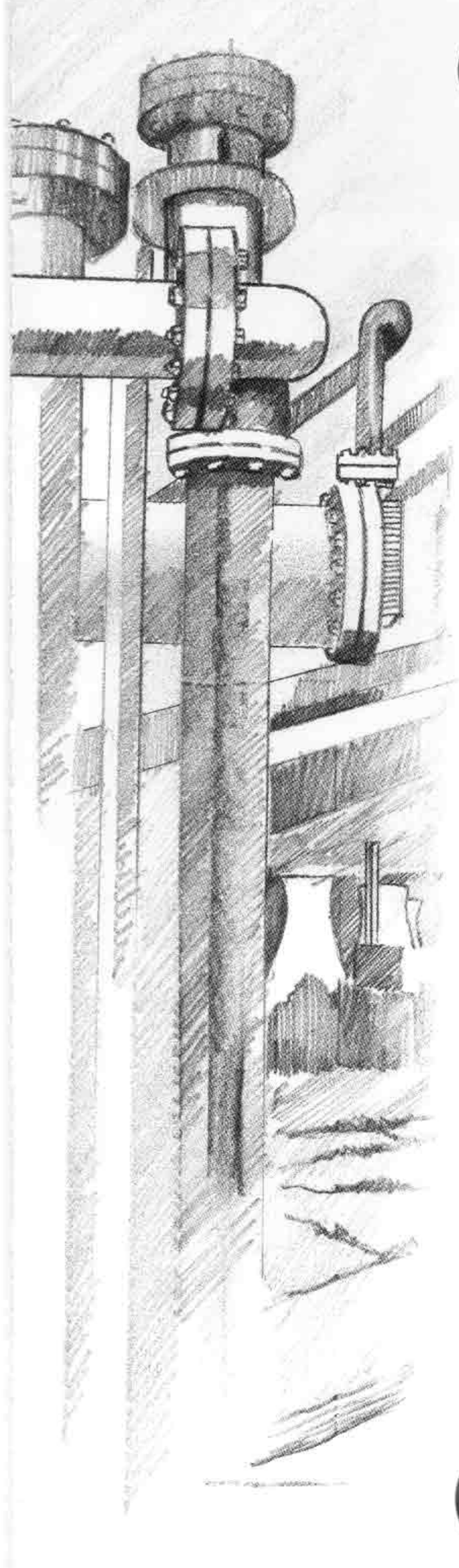
MINI GAUGE

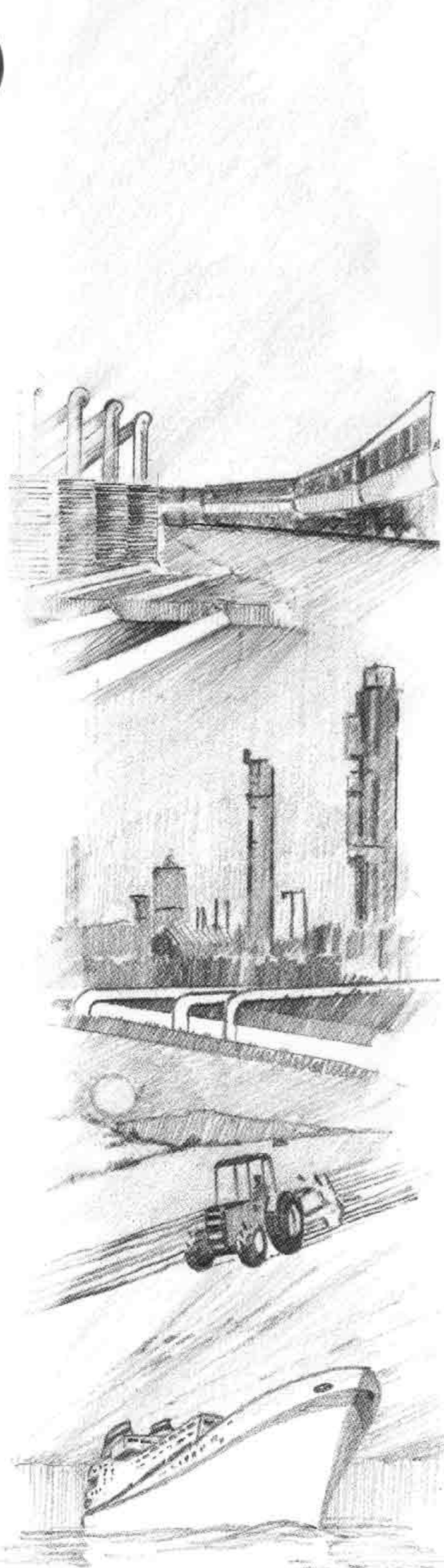
MINI GAUGE
TYPE G27

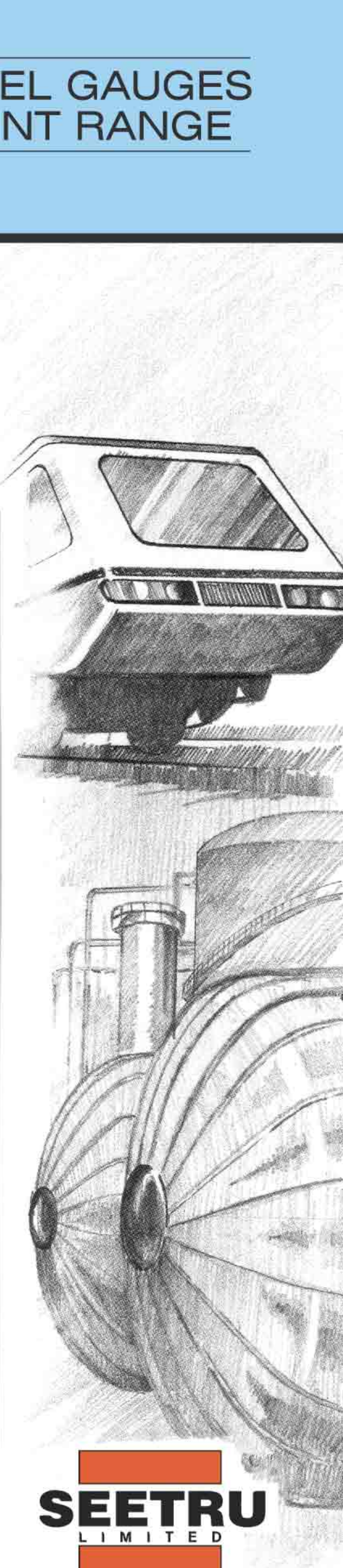
EDITION A. 05.04.05

SEETRU

LIQUID LEVEL GAUGES
QUICKMOUNT RANGE







CE Marked*

For fuels, oils, water and chemicals

Universally used and proven for applications where accuracy and reliability are essential requirements.

Seetru Quickmount Liquid Level Gauges

Accurate and reliable. Easily maintained. Robust and safe. Available with Tubular or Reflex sight glass.

- **EASE OF INSTALLATION & MAINTENANCE**
  The QUICKMOUNT gauge can be installed without the use of special tools. Threaded end units are screwed into female tank bosses. The gauge collars slip over these units and are secured by hand tightening the retaining nuts. 'O' ring sealing is used throughout.
- **SYSTEM ACCURACY**
  The QUICKMOUNT range of liquid level gauges provide direct viewing of the actual tank contents at a level corresponding to that in the tank.
- **ELECTRONIC & DIGITAL READOUT**
  Remote reading system and/or computer interface options provide a dual system with the advantages of both electronic and sight glass systems. Level alarms can also be implemented.
- **CLOSED CIRCUIT DESIGN**
  Used for pressurised applications or those where the liquid level may rise above the top connection. The QUICKMOUNT closed circuit design incorporates top and bottom valve assemblies for tank connections.
- **OPEN CIRCUIT DESIGN**
  Used for non pressurised systems and those where the liquid level does not rise above the top of the gauge. The QUICKMOUNT open circuit design incorporates a bottom valve assembly for tank connection with the top of the sight glass being open to atmosphere.
- **GAUGE LENGTHS**
  Lengths can be 'TAILOR MADE' to suit any tank size.
- **SCALEPLATES**
  Standard scaleplates marked each mm and figured every cm can be provided on request. Special calibrated scaleplates to customer specification are available.
- **TANK CONNECTIONS**
  Standard connection sizes are G½ & G¾ (½" and ¾" BSP parallel.) Alternative threads, flanges and tank bosses can be provided.
- **DRAIN VALVE**
  Available on request. The crain valve is incorporated in the bottom collar assembly.
- **AUTOMATIC SAFETY SHUT-OFF VALVE**
  Operated by abnormal flow of liquid. These valves will minimise loss of tank contents if the gauge is accidentally damaged. Only available with G¾ (¾" BSP) connections.

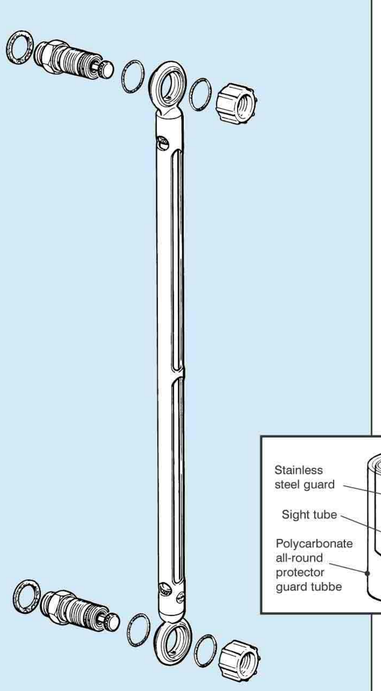
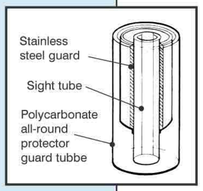


Illustration of single section gauge up to 1m high

MODEL G22 WITH **TUBULAR** SIGHT GLASS



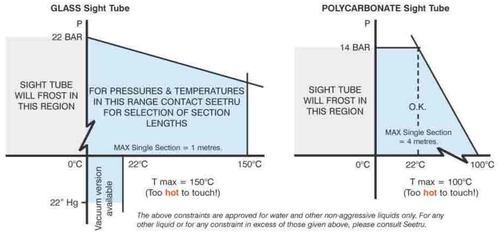
DOUBLE SKIN GUARD

For additional protection and to prevent spillage in the event of a glass breakage the column assembly (glass tube & guard tube) are completely housed in an additional outer clear polycarbonate tube.

Recommended for use with media at higher temperatures and pressures or with media of a hazardous nature.

- **EASY OF VIEWING**
  A narrow coloured marker strip is etched onto the rear of the sight tube. As light is refracted through the liquid in the sight tube the coloured strip appears to be full width thus readily indicating the exact level in the tank.
- **SIGHT TUBE MATERIALS**
  Annealed Borosilicate Glass
  Thermally shock-proof glass suitable for most applications (see graph for pressure and temperature information).
  Available in single lengths up to 1000mm beyond which a glanded joint is provided. As the operating temperature and pressure increase it is necessary to reduce section lengths.
  Polycarbonate Plastic
  High impact resistance and toughness make this material virtually unbreakable. Used as an alternative to glass where single lengths of tube up to 4000mm are required. This tubing does have a limited temperature and pressure range (see graph for information).
- **SIGHT TUBE GLANDS**
  The purpose designed double 'O' ring glanding system provides excellent sealing between the viewing column and the end units.
- **GAUGE LENGTH ADJUSTMENT**
  The gland system will allow for 3mm adjustment on the length of each tubular sight tube section.
- **TANK BOSSES**
  Welded and non-welded tank bosses are available as optional extras.
- **INTERMEDIATE SUPPORT**
  Tubular model gauges will be supplied with intermediate support brackets for securing to the tank face at not greater than 1000mm intervals.
- **PRESSURE EQUIPMENT DIRECTIVE**
  *Compliant with the requirements of the European Pressure Equipment Directive 97/23/EC & CE Marked from 30th May 2002.

LENGTH, TEMPERATURE AND PRESSURE CONSTRAINTS
QUICKMOUNT WITH TUBULAR SIGHT TUBE



The above constraints are approved for water and other non-aggressive liquids only. For any other liquid or for any constraint in excess of those given above, please consult Seetru.

- *A hazard/risk analysis should be carried out where the gauge is being considered for use with a medium which, due to temperature, pressure or hazardous nature, could cause injury. Contact Seetru for advice.*
- *The higher temperatures and pressures are achieved by introducing additional intermediate joints and supports, contact Seetru for information on pressures up to 22 bar g. and temperatures up to 150°C and above.*
- *For vacuum conditions greater than 22"Hg a special design is available.*
- *The normal automatic safety shut-off valves will not prevent the loss of vacuum in the event of accidental sight tube breakage, however, a special design is available if this feature required.*
- *Standard seals are Nitrile (max temp 110°C) or Viton® (max temp 150°C), other seal materials are available for special applications.*

HOW TO ORDER

TO ORDER, PLEASE SPECIFY:

- Tubular or Reflex type
- Gauge length (centre to centre for closed circuit or centre to top for open circuit)
- Type of valve units, end assemblies
- Materials of construction for: end assemblies, column assembly, sight tube, guard tube, intermediate support bracket and packing pads
- Operating temperature and pressure
- Identify liquids to be gauged
- Options, e.g. double skin guard tube, drain valve, tank bosses, electronic level sensor/alarms, digital readout, scaleplate

MODEL G32 WITH **REFLEX** SIGHT GLASS

- **ROBUST CONSTRUCTION**
- **STANDARD MANUFACTURED LENGTHS**
  Standard lengths, between centres, of 360mm to 5060mm (see table). Adjustment of ± 5mm on standard lengths is provided at the upper connection. Alternative lengths may be supplied.
- **AUTOMATIC SAFETY SHUT-OFF VALVES ARE SUPPLIED AS STANDARD**
- **EASE OF VIEWING**
  When viewed through the reflex glass window all liquids, including colourless ones, are indicated as black on the normally silver coloured background.
- **TANK BOSSES**
  Welded and non-welded tank bosses are available as optional extras.
- **COLUMN SUPPORT**
  Reflex model gauges having a length greater than 1150mm will be supplied with column support brackets. For lengths greater than 3105mm, the column will be in sections and joining butt joints will be provided.
- **PRESSURE EQUIPMENT DIRECTIVE**
  *Compliant with the requirements of the European Pressure Equipment Directive 97/23/EC and CE Marked from 30th May 2002.

LENGTH, TEMPERATURE & PRESSURE CONSTRAINTS
QUICKMOUNT WITH REFLEX SIGHT GLASS

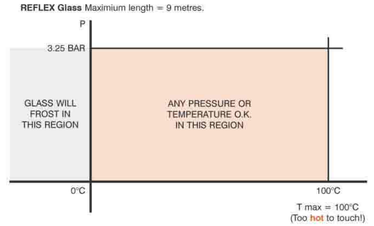


TABLE OF STANDARD LENGTHS

Closed Circuit Design (dimensions in millimetres)
Length between centres of top and bottom valves.

	mm		mm		mm		mm
1	360	16	1780	31	3105	46	4435
2	450	17	1870	32	3200	47	4525
3	620	18	1950	33	3290	48	4615
4	710	19	2040	34	3370	49	4710
5	800	20	2130	35	3460	50	4790
6	885	21	2220	36	3550	51	4880
7	975	22	2305	37	3640	52	4970
8	1070	23	2395	38	3725	53	5060
9	1160	24	2490	39	3815		
10	1240	25	2580	40	3910		
11	1330	26	2660	41	4000		
12	1420	27	2750	42	4080		
13	1515	28	2840	43	4170		
14	1595	29	2930	44	4260		
15	1685	30	3015	45	4350		

Additional sizes are available utilising extension pieces.

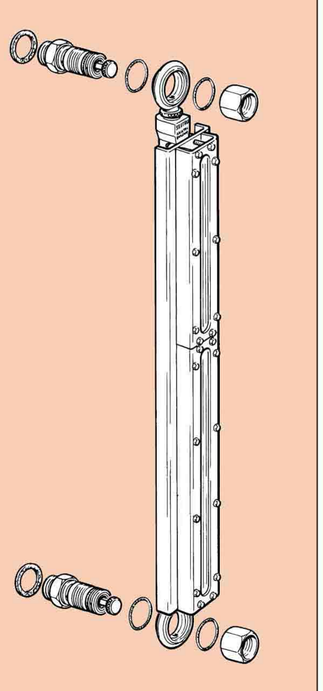


Illustration of Reflex model

MATERIAL SPECIFICATIONS

'BRASS' (COPPER ALLOYS) CONSTRUCTION:
END COLLAR: ALUMINIUM BRONZE BS2872 CA104
MAIN BODY: BRONZE (GUN METAL) BS1400 LG2
SPINDLE: BRASS BS2874 CZ121
GLAND NUT: BRASS BS2874 CZ121

STAINLESS STEEL CONSTRUCTION:
END COLLAR: BS3100 316C16F
MAIN BODY, SPINDLE & GLAND NUT: BS970 316S31

SIGHT TUBE:
BOROSILICATE GLASS BS3463 OR
POLYCARBONATE

GUARD TUBE:
ANODISED ALUMINIUM: BS1474 6063 OR
BRASS: BS2871 CZ121 OR
STAINLESS STEEL: BS6323/4 304C12 OR
ZINC PLATED MILD STEEL: BS6323/4 CDS2

POLYPROPYLENE CONSTRUCTION
END COLLAR, MAIN BODY, SPINDLE AND GLAND NUTS
(ALL WETTED PARTS) IN POLYPROPYLENE

INTERMEDIATE SUPPORT & PACKING PAD
INTERMEDIATE SUPPORT BRACKET: STAINLESS STEEL BS3100 316C16F OR
ALUMINIUM BRONZE BS2872 CA104 OR
POLYPROPYLENE
PACKING PAD: STAINLESS STEEL BS970 316S31 OR
MILD STEEL BS970 230M07 OR
POLYPROPYLENE

MATERIAL SPECIFICATIONS

'BRASS' (COPPER ALLOYS) CONSTRUCTION:
END COLLAR: STAINLESS STEEL BS3100 304C15
MAIN BODY: BRONZE (GUN METAL) BS1400 LG2
SPINDLE: BRASS BS2874 CZ121
GLAND NUT: BRASS BS2874 CZ121

STAINLESS STEEL CONSTRUCTION:
END COLLAR: BS3100 304C15
MAIN BODY, SPINDLE AND GLAND NUT: BS970 316S31

COLUMN ASSEMBLY:
BACKING PLATE: STAINLESS STEEL BS1449 304S12
FRONT COVER: RUST PROTECTED MILD STEEL BS1449 CR4GP
PRE-TREATED & ETCH-PRIMED WITH POLYESTER POWDER COATING OR
STAINLESS STEEL BS1449 304S12

SIGHT GLASS:
BOROSILICATE REFLEX GLASS DIN 7080/7081 BS3463

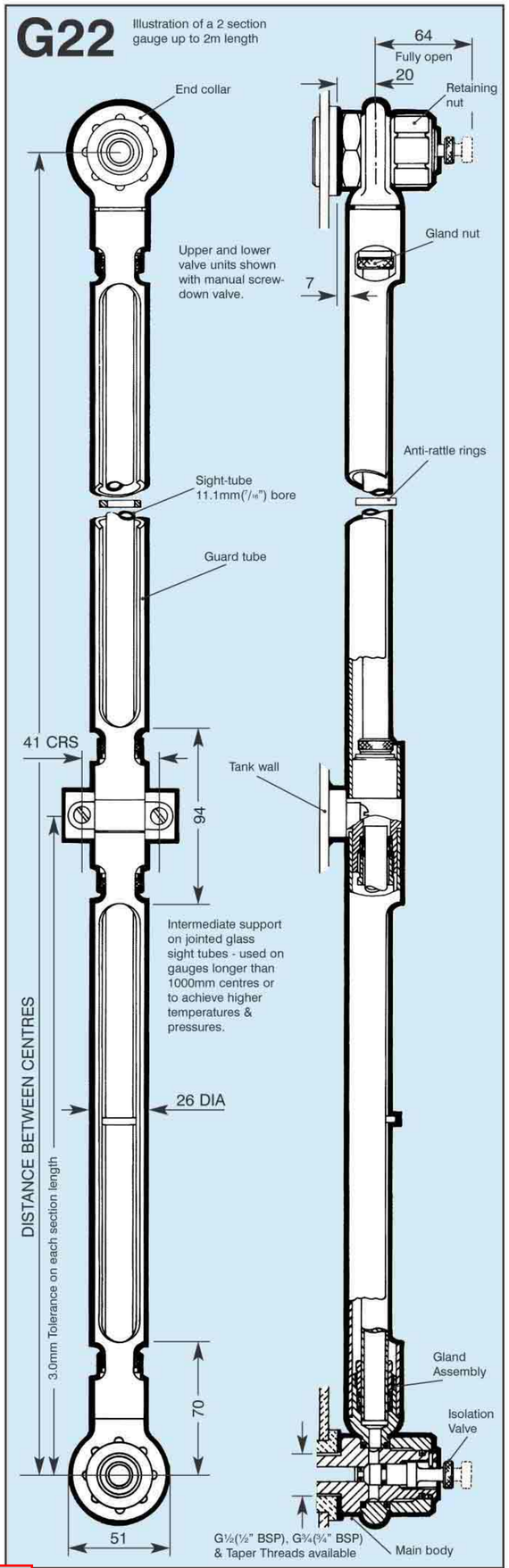
COLUMN SUPPORT & PACKING PAD
COLUMN SUPPORT BRACKET: STAINLESS STEEL BS1449 304S12
PACKING PAD: STAINLESS STEEL BS970 316S31 OR
MILD STEEL BS970 230M07

® Viton is a registered trademark of Du Pont Elastomers

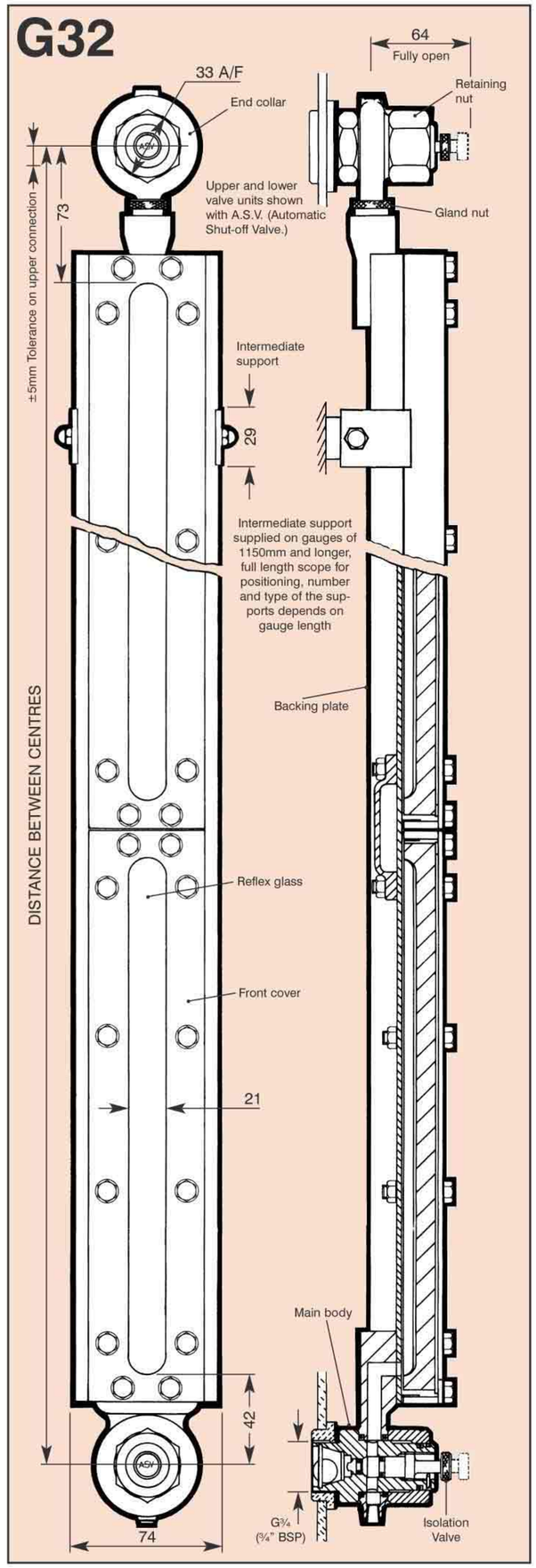
QUICKMOUNT - Standard

G22

Illustration of a 2 section gauge up to 2m length



G32

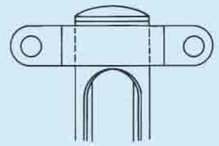


PLEASE NOTE A.S.V.'s only available with G¾ connection.

Optional End Fittings

G22

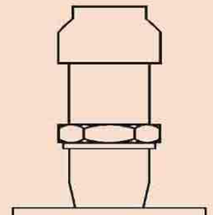
Manual Screwdown Valve (top and/or bottom)



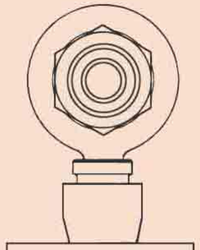
Open Circuit Atmospheric (top only)

Manual Screwdown Valve + Automatic Shut-off Valve (top and/or bottom)

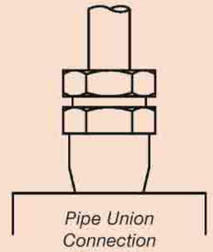
G32



Automatic Safety Vent Valve (top only)



Manual Screwdown valve (top and/or bottom)



Pipe Union Connection (top only)

Manual Screwdown Valve + Automatic Shut-off Valve as standard (top and/or bottom)

A drain or sampling valve is available and can be fitted to any QUICKMOUNT gauge if specified.

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS AVAILABLE FROM SEETRU

NOTE - Fully open manual screwdown valves for correct reading.

Other SEETRU Products

Liquid Level Gauges

- C.P.I. for chemical and process industry.
- SEEFLEX approved for marine application.
- REFLEX for high pressures and temperatures.
- SEEBIO for food and brewing industry.
- SEETOL for food, brewing & distilling industry, wines & spirits.
- MINI small bore, valveless economy gauge.
- WINDOW SIGHT GLASSES.
- TANK CONTENTS INDICATORS.
- TRANSPARENT GAUGE for high pressures & temperatures

- SEETRU SEEMAG Unique magnetic float tank by-pass liquid level indicator. Dual electronic level indicator and level switches/alarms available. Suitable for aggressive liquids and atmospheric or pressurised tanks. Heating jacket available for highly viscous liquids.

- DIAPHRAGM VALVE. Safety relief valve for dust/powder applications utilising a diaphragm to protect the moving parts. Approved by TÜV to F/K/S specification.

Valves

- Non return/check valves.
- Minimum pressure/check valves.
- Vacuum relief valves.
- Pressure control valves

Type Tested Approved Seetru Safety Relief Valves

- Atmospheric Discharge.
- Enclosed Discharge threaded or flanged connections.
- Pressure reducing valves for steam.
- Food quality safety valves.

- SEETRU SEEMULTI Robust self energised factory filled and sealed capsule gauge with capillary line to dial gauge read out. Designed for easy on site adjustment for varying liquid density.

SEETRU LIMITED
Albion Dockside Works,
Bristol, BS1 6UT, England.
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Fax: 0117 929 8193
Email: enquiries@seetru.com
Web: www.seetru.com

Our Distributor

EDITION C

Liquid Level Gauges

CPI Range
For Chemical and Process Industries

SEETRU LIMITED

THE SEETRU C.P.I. LIQUID LEVEL GAUGE

Designed and constructed to provide direct level observation of chemicals and solvents

SIMPLE INSTALLATION
Seetru gauges are supplied complete with column assembly and stainless steel valves for installation onto tank fittings.

CLEAR AND ACCURATE INDICATION
Clear level indication of even colourless liquids is provided, and the liquid level viewed in the gauge column corresponds to the liquid level in the tank.

ELECTRONIC AND DIGITAL READOUT
Remote reading system and/or computer interface options provide a dual system with the advantages of both electronic and sight glass systems.

COLUMN REMOVAL WITHOUT EMPTYING THE TANK
Unique design isolating valves when closed allow the column to be removed from the tank even when the tank is full or under pressure.

GAUGE ISOLATING VALVES
Purpose designed Seetru handwheel operated isolating valves, incorporating an auto safety ball check valve, are supplied for maximum safety.

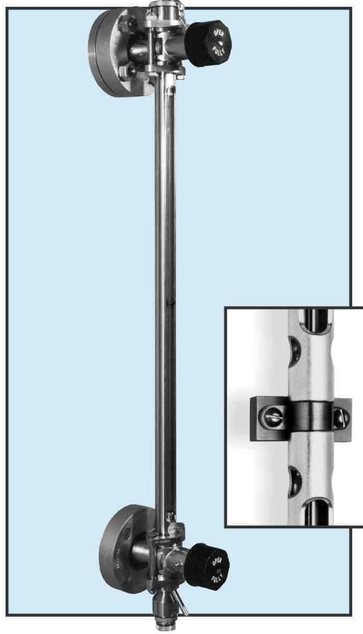
STAINLESS STEEL CONSTRUCTION
All wetted parts are manufactured in 316 stainless steel.

P.T.F.E. SEALS
P.T.F.E. Seals allow for a wide range of liquids to be gauged.

TANK CALIBRATION
Where precise measurement of the liquid content is required a graduated scaleplate can be attached to the column assembly.

CPI TUBULAR MODEL G231

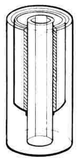
A liquid level gauge with tubular glass sight tube protected in a milled stainless steel guard tube.



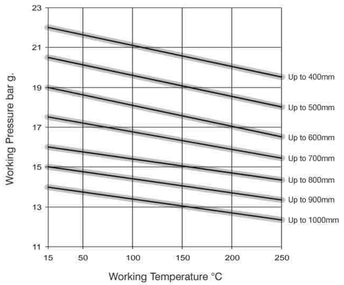
- Manufactured to required length.
- Toughened borosilicate glass tube (Polycarbonate tube available on request).
- 'O' ring sealed sight tube gland.
- The level of colourless liquids is indicated by magnification of a coloured strip.
- Electronic remote reading system and/or computer interface options available.

INTERMEDIATE SUPPORT
Maximum column section length is 1000mm, longer gauges are supplied with intermediate supports which divide the column into sections.

DOUBLE SKIN GUARD MODEL G232
For additional protection and to prevent spillage in the event of a glass breakage the column assembly (glass tube & guard tube) are completely housed in an additional outer clear polycarbonate tube.



CONSTRUCTION MATERIALS	
Sight Tube	Borosilicate glass BS3463.
Guard Tube	316 Stainless steel
Glands	P.T.F.E.

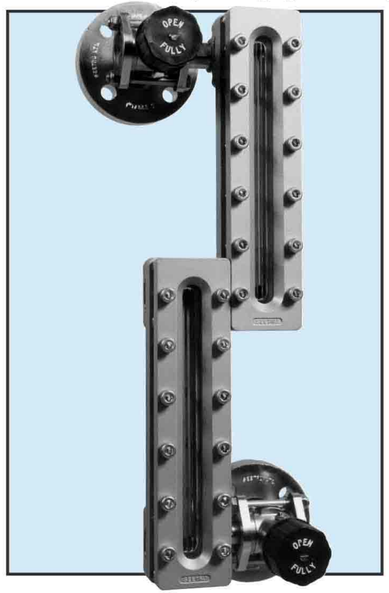


The maximum operating temperature and pressure are dependent on the length of the gauge column glass sections. Additional intermediate joints and supports can be used to reduce the length of the glass column sections and so achieve higher pressures and temperatures.

Example: A gauge with centres of 1800mm in two sections of 900mm is suitable for the range 15bar g. at 15°C to 13.5 bar g. at 250°C.
By introducing an extra intermediate joint and support bracket each section becomes 600mm and therefore is suitable for the range 19 bar g. at 15°C to 16.5 bar g. at 250°. Additional intermediate supports can be used, the maximum rating achievable is for "up to 400mm", see graph.

CPI REFLEX MODEL G34C

A robust bolted column liquid level gauge with reflex glass viewing windows.

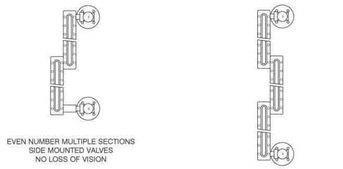


- Suitable for arduous duty applications.
- Side-mounted valves for maximum visibility.
- Black/White indication of colourless liquids.
- Staggered column gives total liquid visibility.
- Standard modular construction.
- Longer gauges are supplied with intermediate support brackets.
- Electronic remote reading system and/or computer interface options available.

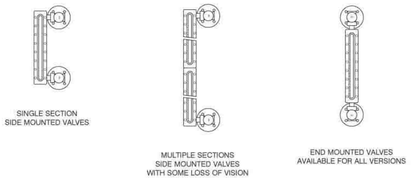
Minimum LENGTHS	Maximum TEMP.	Maxiumum PRESSURE
216mm	250°C	35 Bar g.
A frost guard is required for applications where frosting may occur, minimum temperature is -30°C. Contact Seetru for information on availability.		

CONSTRUCTION MATERIALS	
Viewing Window	Toughened borosilicate reflex glass to BS3463.
Column	Liquid chamber - 316 stainless steel.

STAGGERED COLUMN

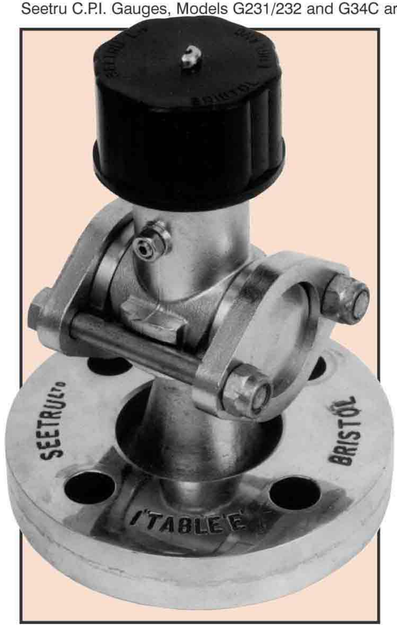


IN LINE COLUMN



GAUGE ISOLATING VALVES

Seetru C.P.I. Gauges, Models G231/232 and G34C are supplied complete with valve units.



- Purpose designed handwheel operated isolating valves.
- Auto safety ball check to prevent liquid loss in the event of glass breakage.
- Sampling valves or drain/vent plugs are available. In-place cleaning of the gauge column is possible using the drain/vent connections.
- A valveless unit providing continuous tank return is available (this should not be specified for pressurized tanks, or for installation below the highest liquid level).

FLANGE CONNECTIONS	
SIZES AVAILABLE	
1" BS10 1926 Table D and Table J 25mm BS4504: 1969 Table 16 and Table 40 1" ASA 150RF and ASA 300RF 25mm DIN PN16 and PN40	
1½" or 2" Flanges can be supplied at extra cost.	
Max Temp: 250°C	Max Pressure: 35 Bar g.

CONSTRUCTION MATERIALS
316 Stainless steel P.T.F.E. Seals

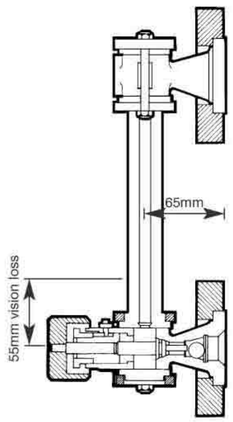
Sampling Valve

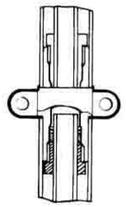
Drain/Vent Plug

Note: This isolating valve is not suitable for steaming applications. For such boiler applications please see the Seetru Reflex Gauge leaflet or contact Seetru.

DIMENSIONS

G231 and G232

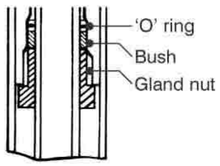




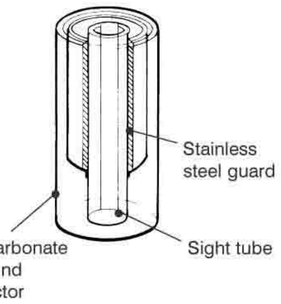
Intermediate Support

2 off 6mm holes for fixing screws on 41mm centres. Padding required to tank 52mm thick.

G232

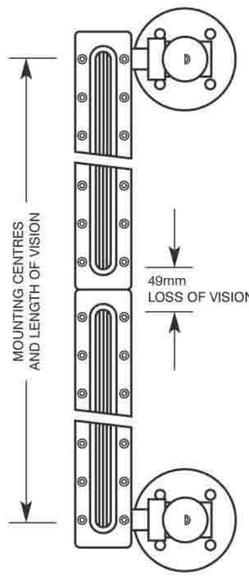


Sight tube gland assembly

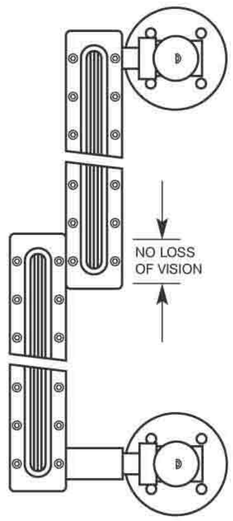


CPI REFLEX G34C

Gauge isolating valves can be connected to the left or right of column or to column ends.

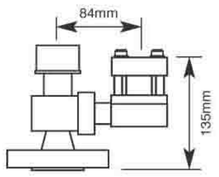


Side Mounted

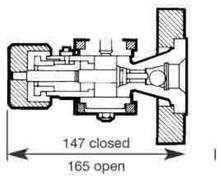


Side Mounted Staggered (No loss of vision)

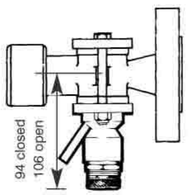
GAUGE ISOLATING VALVES



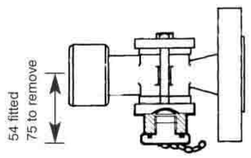
Side mounted valve



Handwheel operated isolating valve



Incorporating sampling valve



Incorporating ½" BSP drain/vent plug

ORDERING SPECIFICATION

When ordering please specify the following:

1	2	3	4
Column type: • **Tubular Model G231** (Tubular column) • **Tubular Model G232** (Double skin guard) • **Reflex Model G34C**	Valve mounting centres: • **Models G231/G232** Specify length required to suit tank. • **Reflex Model G34C** Specify length required (note modular lengths).	Connections: • Flange size and specification. • Valve units / additional fittings required.	Operating conditions: • Fluid. • Operating temperature. • Operating pressure.

OTHER SEETRU PRODUCTS

Liquid level gauges

- SEETRU QUICKMOUNT for general purpose industrial applications.
- SEETRU SEEFLEX for marine application.
- SEETRU REFLEX for high pressures and temperatures.
- SEETRU SEEBIO for food and brewing industry.
- SEETRU SEETOL tall gauge for food, brewing and distilling industry wines and spirits.
- SEETRU MINI small bore, valveless economy gauge.
- SEETRU WINDOW SIGHT GLASSES.
- SEETRU TANK CONTENTS INDICATORS.

Valves

- Non return / check valves.
- Minimum pressure / check valves.
- Vacuum relief valves.
- Pressure control valves.
- Pressure reducing valves for steam.

Type Tested Approved Seetru Safety Relief Valves

- Atmospheric discharge.
- Enclosed discharge threaded or flanged connections.
- Food quality safety valves.

- **SEETRU SEEMAG** Unique magnetic float tank by-pass level indicator. Dual electronic level indicator and level switches/alarms available. Suitable for aggressive liquids and atmospheric or pressurised tanks. Heating jacket available for highly viscous liquids.

- **SEETRU SEEMULTI** Robust self energised factory filled and sealed capsule gauge with capillary line to dial gauge read out. Designed for easy on site adjustment for varying liquid density.

- **DIAPHRAGM VALVE** Safety relief valve for dust/powder applications using a diaphragm to protect the moving parts. Approved by TÜV to F/K/S specification.

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Web: www.seetru.com
Agents World-wide

Our Agent

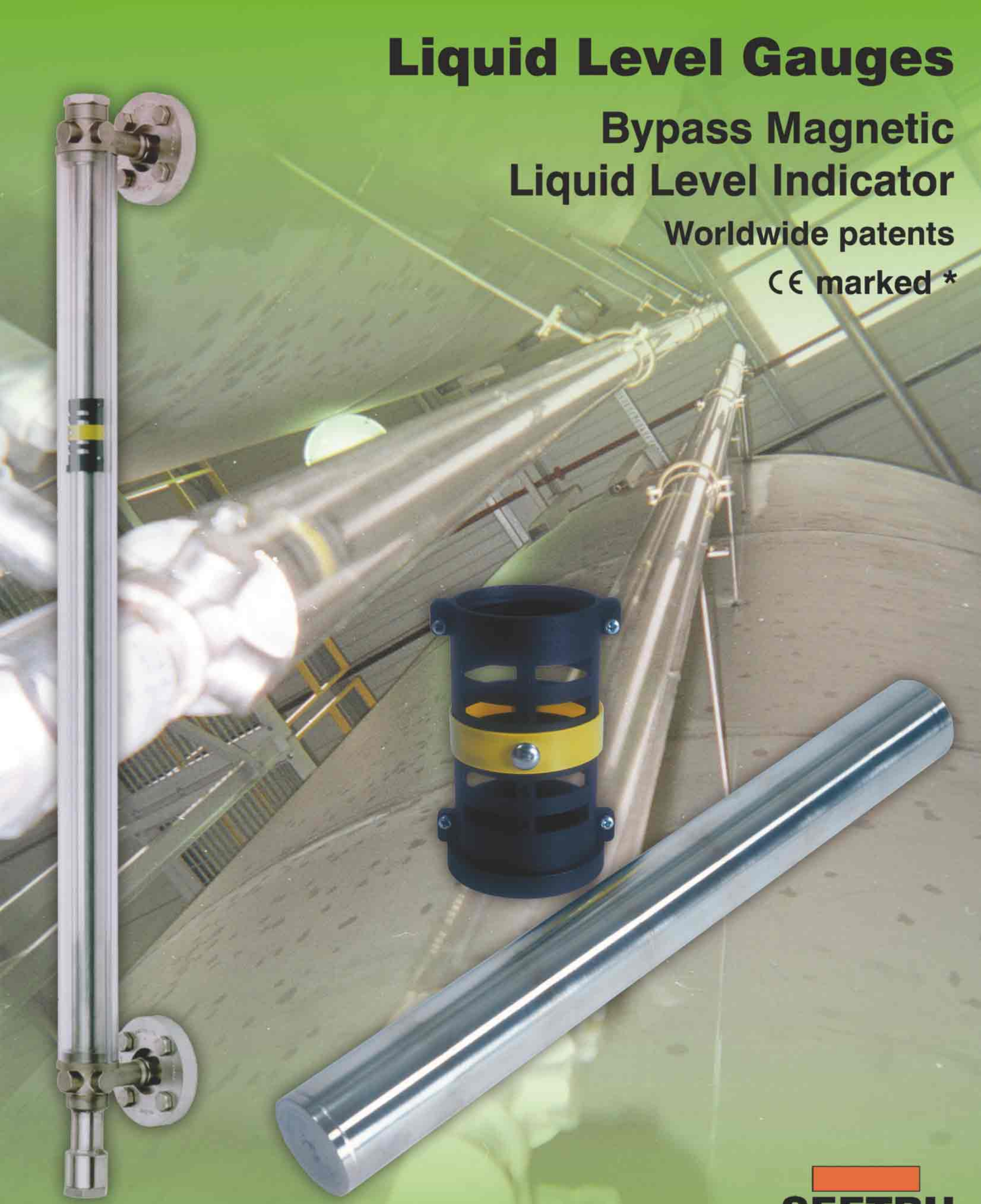
EDITION C

Liquid Level Gauges

Bypass Magnetic Liquid Level Indicator

Worldwide patents

CE marked *

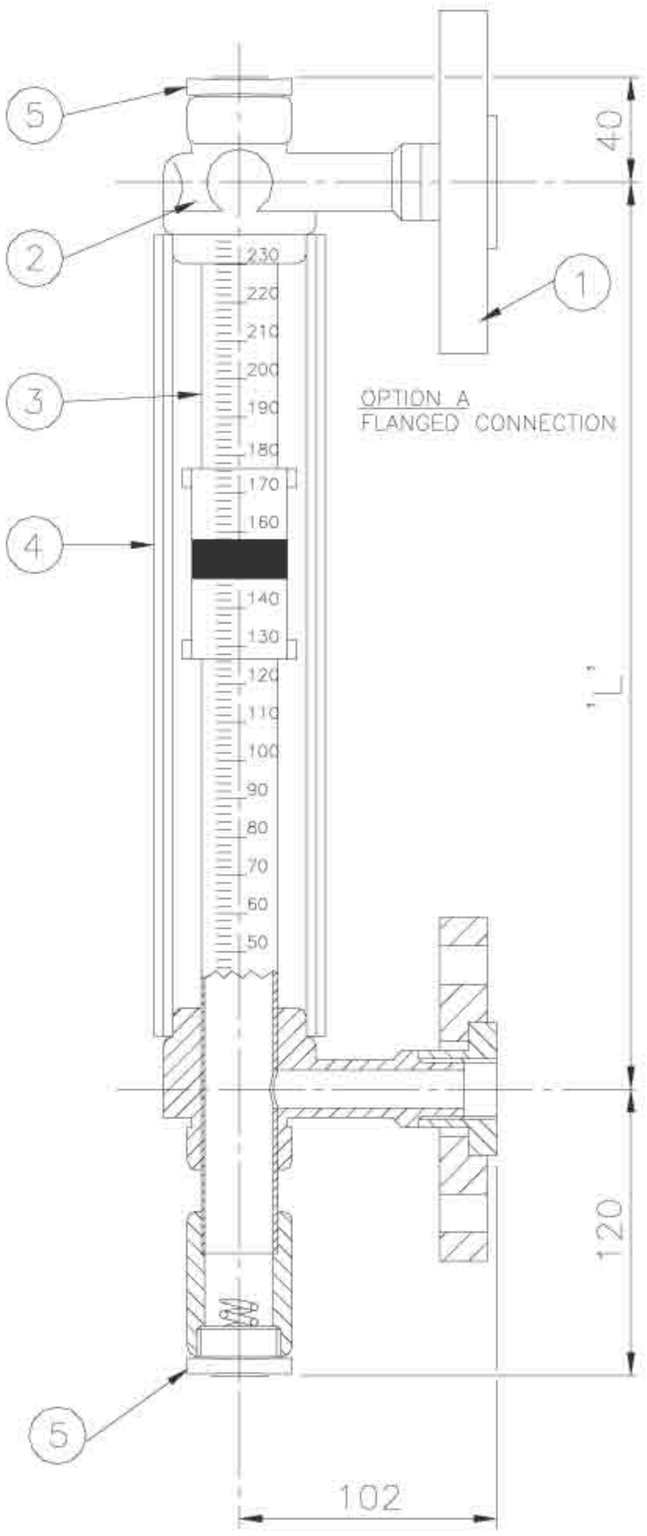


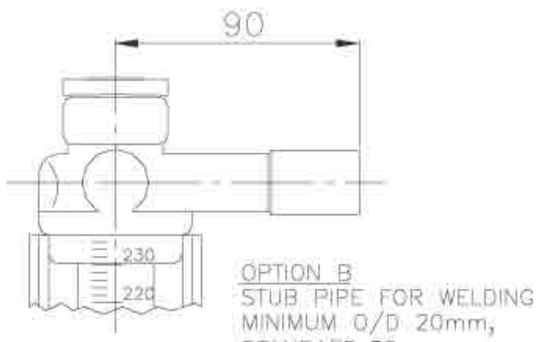
The superior alternative to traditional roller displays – clear all-round viewing, no sticking rollers or flaps

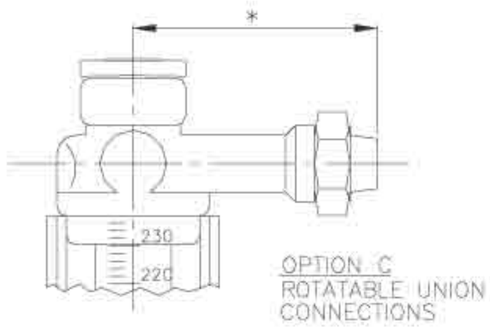
SEETRU LIMITED

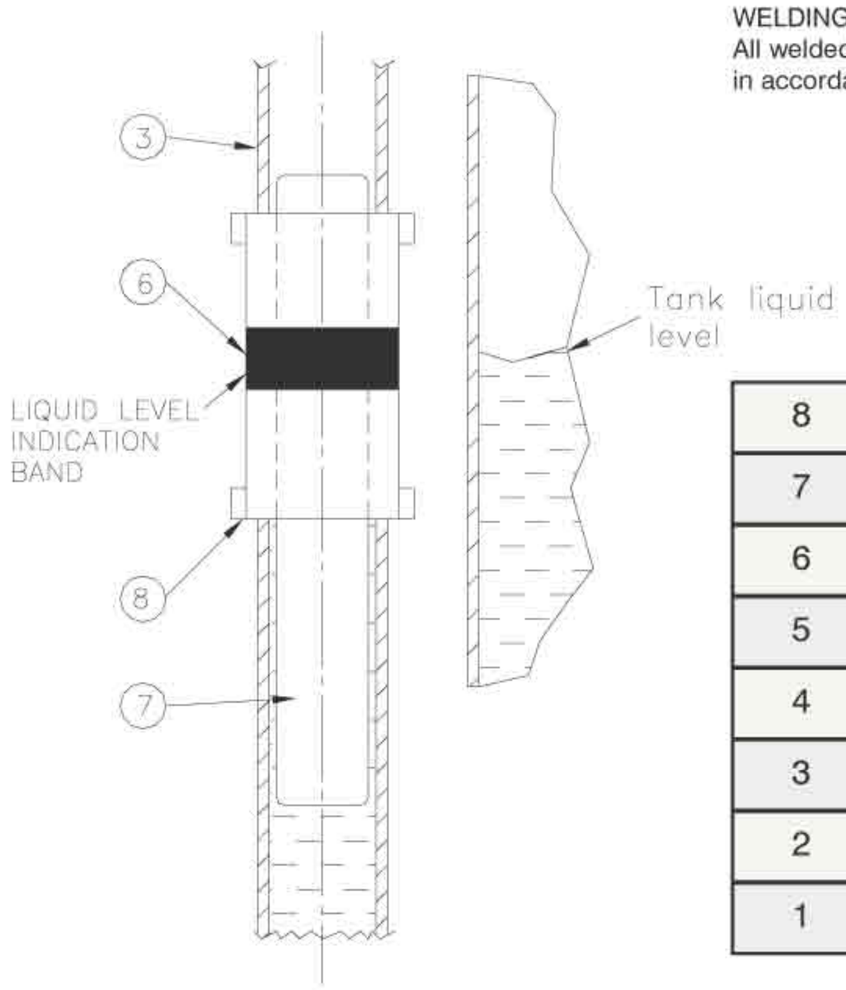
S, INSTALLATION & MAINTENANCE

INSTALLATION & MAINTENANCE









WELDING SPECIFICATION
All welded assemblies are socket welds
in accordance with BS3799

8	FOLLOWER
7	FLOAT
6	LEVEL INDICATING BAND
5	SCREWED PLUG
4	GUARD TUBE
3	BY-PASS TUBE
2	COLLAR
1	FLANGE

Installation and Maintenance

The Seemag is attached to the side of the tank to be monitored with the appropriatly sealed process connections. Isolation valves may be used where required. Minimum clearance below the drain tube must be 220mm (specific gravities 0.85 - 1.2) and 350mm (specific gravities 0.45 - 0.85) to allow for float removal.

To clean the Seemag by-pass tube it will need to be drained and, where appropriate, isolated and depressurised (an optional drain valve is available). The top and bottom plugs can be removed and the tube can then be rodded.

In the unlikely event of the follower becoming detached from the float while in service, it can be simply reset by inserting a locking pin to hold the follower at the bottom of the tube (full details given in the installation, operation and maintenance instructions) and then draining and refilling the by-pass tube. It is also possible to re-position the follower to the float by hand without draining the tube – a clear click-in aids this process.

Comprehensive Installation, Operation & Maintenance instructions are provided with each Seemag Indicator and there is also available Technical Service at Seetru for further advice and the creation of special executions if needed.

SEETRU LIMITED

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Email: enquiries@seetru.com
Web: www.seetru.com
Distributors world-wide

LLOYD'S REGISTER QUALITY ASSURANCE · ISO9001

Our Distributor

Edition A

Simple installation
The Seemag gauge is supplied complete and ready for installation onto the tank fittings

Clear and accurate indication
High visibility band provides clear all round visibility

Electronic and digital readout
Remote reading system and/or computer interface options provide a dual system with local mechanical display and remote electronic indication

Level alarms
Optional level alarms can be arranged singly or doubly along the length of the tube

Ease of maintenance
Simple and robust construction makes for ease of maintenance and low maintenance costs

Fully roddable for cleaning in place

Tank calibration
Gauge is supplied with a graduation to provide precise indication of content

Heating for high viscosity liquids
An insulating jacket and electrical heating trace can maintain liquids at temperatures of up to 70°C

Crevice free execution
High quality surface finishes and crevice free execution available

Marine approvals
Ideally suited for use on board ships, with approvals from major marine authorities

THE SEETRU SEEMAG

*The **Seetru Seemag** is a magnetic float by-pass liquid level indicator for a wide range of service conditions and applications, it offers:*

- *greatly improved **visibility** over conventional types*
- *improved **reliability** with ease of re-setting where appropriate*
- *elegant appearance with unique **transparent** scale for direct viewing of liquid level*
- *effective high/low level **electronic switches** and/or dual transducer driven digital remote level indication*

The special and unique feature of the Seemag is the follower, which surrounds the indicator tube and follows the rise and fall of the float inside the tube. This offers an unparalleled all round visibility in contrast to the sole front-on view for existing magnetic indicators. A high visibility indicator band is fitted to the follower, which can be positioned at various levels to allow for liquids of different densities.

The operation of the Seemag is based on an entirely new magnetic coupling system in which the follower on the stainless steel gauge tube follows the position of magnets in the float inside the gauge tube. The result is a follower system of unequalled reliability and which gives a user friendly service.

Construction
The Seemag indicator consists of an austenitic stainless steel tube of 33.4mm o/d; at the top and bottom are welded stainless steel precision cast connecting heads, which provide the link to the container or vessel to be monitored. A specially designed float of stainless steel, plastic or other suitable material (according to application) is displaced inside the by-pass tube following the level of the liquid. The follower, a light plastic cage carrying the follower magnetic ring and high visibility level indicating band, rides on the outside of the tube. This follower is magnetically coupled to the float. The tube and follower are inside a transparent protective polycarbonate cover made up of two half round sections clipped together along narrow flanged edges. The gauge tube protrudes beyond the top and bottom connecting heads and terminates in removable screwed plugs. These plugs can be removed to allow rodding through of the gauge tube. The bottom plug can also be provided with a drain valve.

Float & Follower

unparalleled nearly all-round visibility (the tank or receiver to which the gauge is fitted presents the only inaccessible viewing angle)

ready viewing adjustable coloured marker band, adjustable to cover a wide range of liquid densities

great security of reliable level indication without the possibility of confusing indications

ease of re-setting where appropriate

direct through-view scale

short sump tube length below bottom connection head for execution with standard float, providing closer installation to bottom of tank and needing less height below bottom of tank

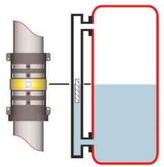
elegant and appealing appearance

FEATURES

Polycarbonate Covers
Polycarbonate covers are normally fitted to prevent oil and dirt from settling on the gauge tube and to allow the application of a highly effective transparent scale on the inside of the front cover. Where service conditions indicate the Seemag Indicator will readily function without the covers, providing the tube can be kept clean.
For gauges in excess of 1.8m length the covers must be supported by means of special brackets fixed to the tank or receiver wall, so that no flexing can occur which might impede the movement of the follower.

Level Indicating Follower
The follower is a two piece design to allow for its removal for maintenance.

High Visibility Indicator Band
The follower cage is designed to allow the positioning of the indicator band at various positions along its length. This allows adjustment for varying liquid densities, by allowing for the varying levels at which the follower might ride in relation to the liquid level.



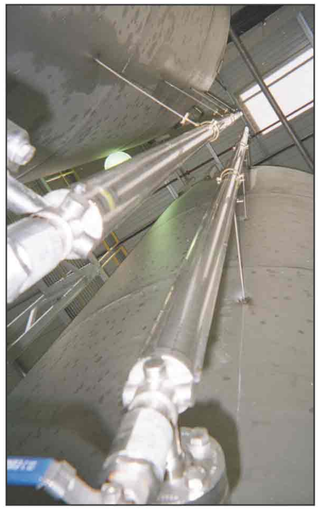
Green Security Band
A green visibility band provides a guarantee of correct operation. This green band is at the bottom of the gauge by-pass tube. Under all normal operating circumstances this band will be visible. If, due to excessive shock, the follower gets dislodged from its magnetic coupling with the float it will fall to the bottom of the gauge tube and cover up the green band. This immediately indicates that the follower has fallen from its position and needs to be re-set using the simple reset procedure (see maintenance instructions on reverse). Resetting instructions are shown on unit.

Electronic High/Low Level Alarms
Specially developed sensors in metallic pods can be positioned at any level on a rod mounted along the gauge tube. These sensors operate with a 12 - 24V DC supply and simple relay switches to provide triggers for any desired use. The alarms can be arranged as an arbitary multiple array of level signals to be used as desired (See reverse for additional information, also request datasheet).

Transducer for Digital Readout
An optional pressure transducer can be fitted to the Seemag to provide an additional independent electronic readout. The transducer provides a 4-20mA signal to operate a digital readout or for direct connection to a computer. The readout can be provided with level alarm flags and can be calibrated to provide a volumetric readout.
This dual system provides the advantages of both a local direct indication and a remote electronic signal.

Heating For High Viscosity Liquids Such As Heavy Fuel Oils
Where required, the Seemag Gauge can be shrouded with an insulating mantle and fitted with a self regulating electric heating trace which will heat the gauge contents to a temperature between 50°C - 70°C. At this temperature heavy fuel oils will readily flow and allow reliable level indication.

Optional drain and shut-off valves
A drain valve can be supplied as an optional extra. The gauge can also be supplied with shut-off ball valves - screwed or flanged to suit requirements. Certain marine approval authorities require the use of shut-off valves, contact Seetru for information.



SPECIFICATIONS

Tank connections
1. Wide range of loose flanges retained on 5/8" BSP threaded connection with P.T.F.E. seal. Flanges ranging from ¾" to 2" nominal size according to International Standards or customers requirements.
2. 30mm o/d stub pipe for welding.
3. 5/8" threaded end linking to 1" union connector for threaded connections.

Densities:	0.45 to 2.0 with further possible adjustments of float for heavier liquids, standard float covers densities 0.85 to 1.2, lower densities require longer floats
Pressure range:	up to 20 bar service pressure with standard float and up to 50 bar with special construction
Temperature range:	up to 180°C equivalent to 9 bar saturated steam
Viscosities:	up to 2000 centistokes and with heating mantle available for more viscous liquids such a heavy fuel oil
Indicating accuracy:	± 1cm from centre of high visibility viewing band
Min/max lengths:	500mm to 5000mm centre distance of tank connections Subject to application it may be possible to equip longer tanks
O.D. of gauge tube:	33.4mm
O.D. of Polycarbonate guard:	63.4mm
Width of guards across clamping wings:	75mm
Standard sump tube:	length 120mm below bottom connection head, additional 220mm height required for withdrawing float

Full details on separate data sheet matrix which can be extended to customers requirements.

Range of liquids
Water, oils, chemicals, refrigerants and process fluids.

Crevice Free Execution
Where required high quality surface finishes and crevice free executions are available.

Power Supply
Power supply packs can be supplied to provide the DC voltage from any desired AC supply.

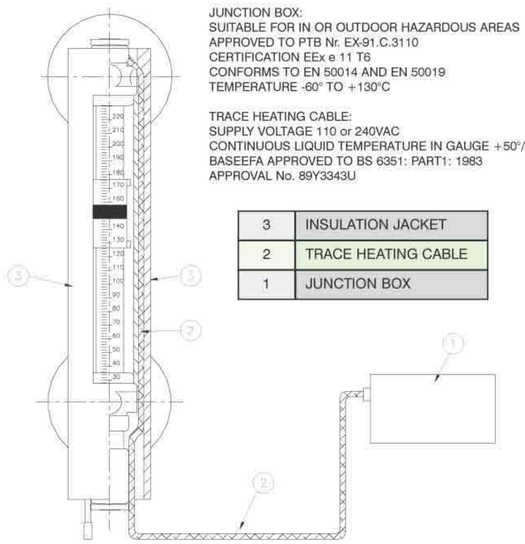
Uninterruptible Power Supply
If required, uninterruptible electrical power supply can be provided for alarms and/or electronic readouts.

Marine and Off-shore Approvals
The Seemag Indicator is ideally suited for use on board ship. It is covered by approvals from major classification societies including: Lloyds Register of Shipping, Det Norske Veritas, American Bureau of Shipping as well as Italian State Marine organisations RINA. At customer request Seetru may submit the Seemag Indicator to any other approval authority needed. Contact Seetru for detailed information on approved operating temperature, pressure ratings and registration requirements for shut-off valves.

Industrial Approvals
The Seemag is approved by Lloyds Register for industrial applications.

***Pressure Equipment Directive**
Compliant with the requirements of the European Pressure Equipment Directive (PED) 97/23/EC and CE Marked from 30th May 2002.

CONFIGURATIONS, DIMENSIONS, INSTALLATION & MAINTENANCE

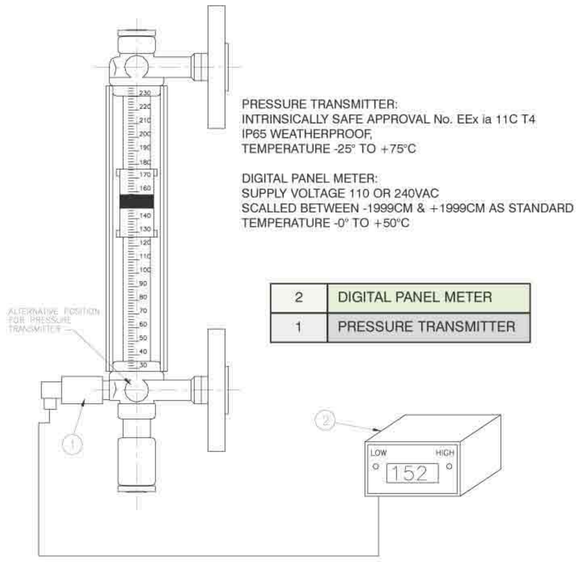


JUNCTION BOX:
SUITABLE FOR IN OR OUTDOOR HAZARDOUS AREAS
APPROVED TO PTB Nr. EX-91.C.3110
CERTIFICATION EEx e 11 T6
CONFORMS TO EN 50014 AND EN 50019
TEMPERATURE -60° TO +130°C

TRACE HEATING CABLE:
SUPPLY VOLTAGE 110 or 240VAC
CONTINUOUS LIQUID TEMPERATURE IN GAUGE +50°/+70°C
BASEEFA APPROVED TO BS 6351: PART1: 1983
APPROVAL No. 89Y3343U

3	INSULATION JACKET
2	TRACE HEATING CABLE
1	JUNCTION BOX

TRACE HEATING ELEMENT AND INSULATION JACKET

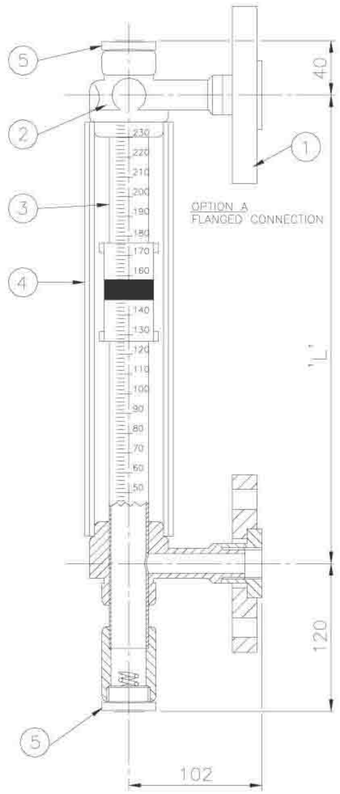


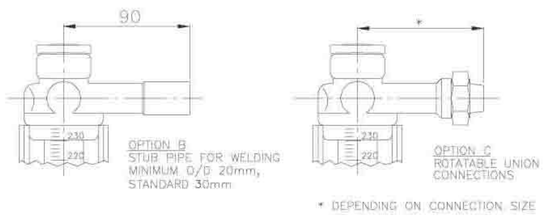
PRESSURE TRANSMITTER:
INTRINSICALLY SAFE APPROVAL No. EEx ia 11C T4
IP65 WEATHERPROOF,
TEMPERATURE -25° TO +75°C

DIGITAL PANEL METER:
SUPPLY VOLTAGE 110 OR 240VAC
SCALLED BETWEEN -1999CM & +1999CM AS STANDARD
TEMPERATURE -0° TO +50°C

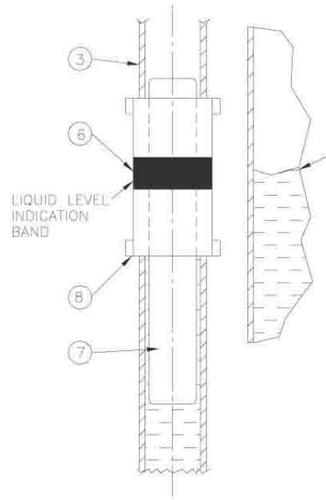
2	DIGITAL PANEL METER
1	PRESSURE TRANSMITTER

ELECTRONIC PRESSURE TRANSDUCER AND DIGITAL READOUT

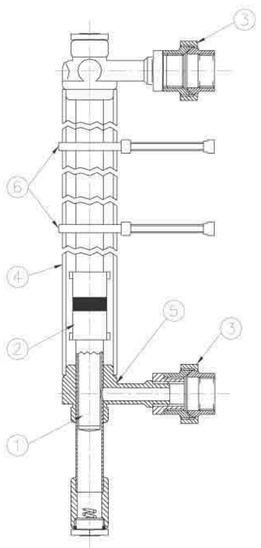




WELDING SPECIFICATION
All welded assemblies are socket welds in accordance with BS3799

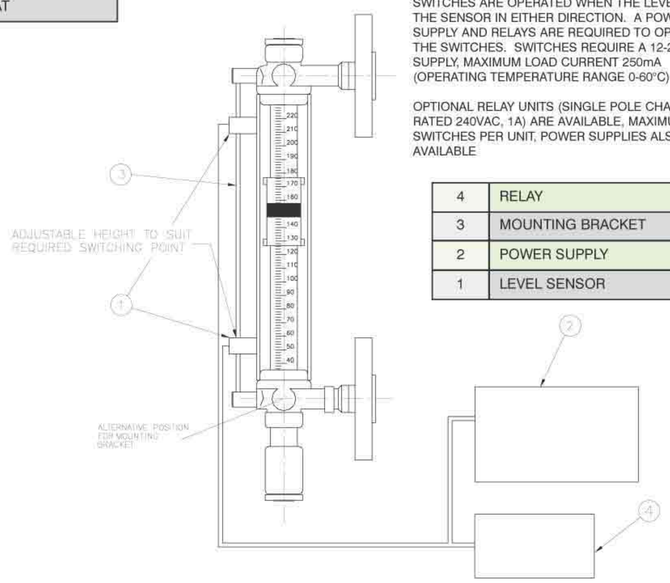


8	FOLLOWER
7	FLOAT
6	LEVEL INDICATING BAND
5	SCREWED PLUG
4	GUARD TUBE
3	BY-PASS TUBE
2	COLLAR
1	FLANGE



6	FIXING BRACKET
5	TUBE/COLLAR ASSY
4	GUARD TUBE
3	END FITTINGS
2	FOLLOWER
1	FLOAT

FIXING BRACKET FOR CENTRES OF 1.8m OR GREATER



LEVEL ALARM SWITCHING
MULTIPLE SWITCHING POINTS AVAILABLE

SWITCHES ARE OPERATED WHEN THE LEVEL PASSES THE SENSOR IN EITHER DIRECTION. A POWER SUPPLY AND RELAYS ARE REQUIRED TO OPERATE THE SWITCHES. SWITCHES REQUIRE A 12-24VDC SUPPLY, MAXIMUM LOAD CURRENT 250mA (OPERATING TEMPERATURE RANGE 0-60°C)

OPTIONAL RELAY UNITS (SINGLE POLE CHANGEOVER RATED 240VAC, 1A) ARE AVAILABLE, MAXIMUM 2 SWITCHES PER UNIT, POWER SUPPLIES ALSO AVAILABLE

4	RELAY
3	MOUNTING BRACKET
2	POWER SUPPLY
1	LEVEL SENSOR

LEVEL ALARM SENSORS

Installation and Maintenance

The Seemag is attached to the side of the tank to be monitored with the appropriatly sealed process connections. Isolation valves may be used where required. Minimum clearance below the drain tube must be 220mm (specific gravities 0.85 - 1.2) and 350mm (specific gravities 0.45 - 0.85) to allow for float removal.

To clean the Seemag by-pass tube it will need to be drained and, where appropriate, isolated and depressurised (an optional drain valve is available). The top and bottom plugs can be removed and the tube can then be rodded.

In the unlikely event of the follower becoming detached from the float while in service, it can be simply reset by inserting a locking pin to hold the follower at the bottom of the tube (full details given in the installation, operation and maintenance instructions) and then draining and refilling the by-pass tube. It is also possible to re-position the follower to the float by hand without draining the tube – a clear click-in aids this process.

Comprehensive Installation, Operation & Maintenance instructions are provided with each Seemag Indicator and there is also available Technical Service at Seetru for further advice and the creation of special executions if needed.

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Bristol BS1 6UT, England.
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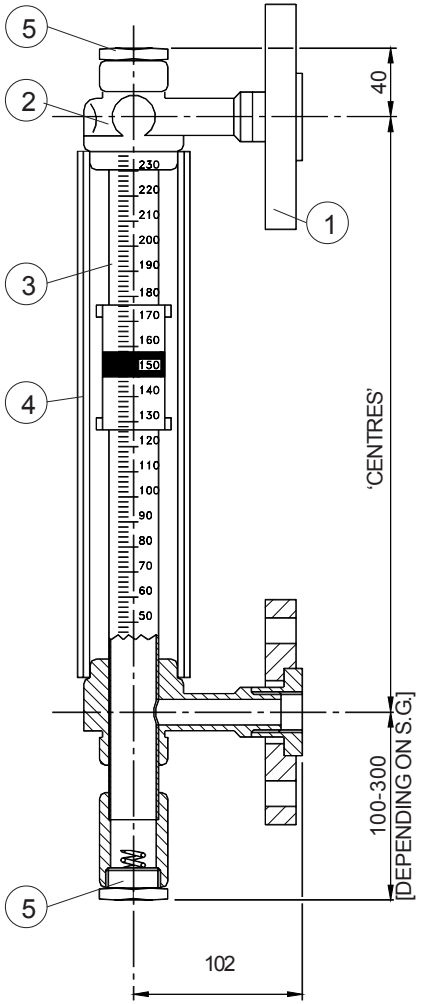
Distributors world-wide

Our Distributor

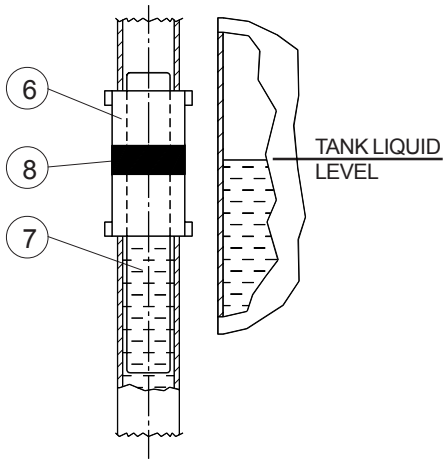
Edition A



OPTION A
FLANGED CONNECTION

PARTS LIST

1	FLANGE	ST.STL. 316
2	COLLAR	ST.STL. 316
3	BY-PASS TUBE	ST.STL. 316
4	GUARD TUBE	POLYCARBONATE
5	DRAIN PLUG	ST.STL. 316
6	LEVEL INDICATOR	NYLON
7	FLOAT	ST.STL. 316
8	FOLLOWER	NYLON



MAGNETIC OPERATION

A vertical pipe column contains a fully sealed float. The float contains a set of permanent magnets which drives the follower, giving indication of the liquid level in the pipe.

TECHNICAL SPECIFICATION

Specific gravity = 0.7 - 1.3
Maximum working viscosity = 2000 cSt.
Indicator is suitable for more viscous fluids, with trace heating, see sheet 3.
Maximum working pressure = 22 Bar.g (Industrial Applications)
= 16.5 Bar.g (Marine Applications)
Maximum working liquid temperature = 180^{O}C

By-pass tube assembly hydraulic test pressure = 36 Bar.g at 20^{O}C
By-pass tube dimensions 30.1 I/D x 1.65 thick (1" schedule 5s).
'CENTRES' = to suit individual tank. 0.5m minimum, 5m maximum.
No indicator reading below 75mm.

LEVEL MEASUREMENT

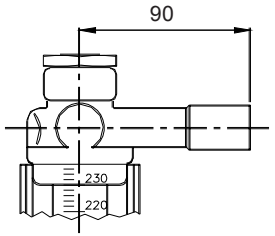
Transparent scale plate.

WELDING SPECIFICATION

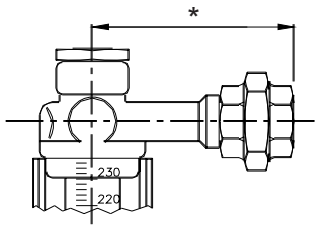
All welding assemblies are socket welds in accordance with BS3799.

MARINE APPLICATION APPROVALS

Lloyds, ABS, RINA, DNV.



OPTION B
STUB PIPE FOR WELDING
MINIMUM O/D 20mm



OPTION C
UNION CONNECTIONS
* DEPENDING ON CONNECTION SIZE

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MAGNETIC LIQUID LEVEL INDICATOR
BASIC VERSION

SEEMAG G35

EDITION C. 24.06.05

New Guard Tube for Seemag Gauge

Seetru have enhanced the guard tube design with a new hexagonal transparent front and extruded aluminium back.

The aluminium finish of the back provides a light capture mechanism to give even higher visibility for the level follower.

The extruded aluminium back provides a new robust mounting for the electronic level sensors.

This enhanced design provides high rigidity; it also provides new strong anchoring for the support brackets on long gauges. Each mounting bracket has been enhanced into one universal design which provides anchorage as well as housing for the electronic level sensors.

Extruded polycarbonate front guard provides strength, rigidity and a clear scale on a flat surface

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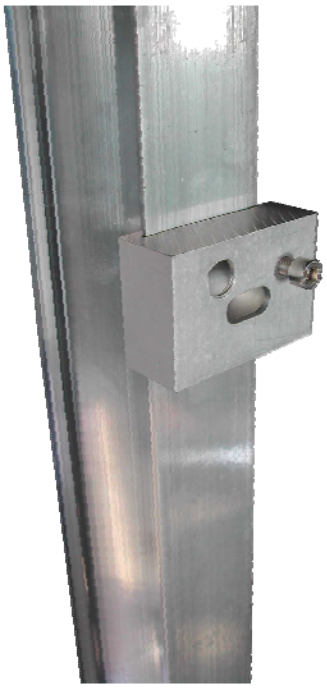
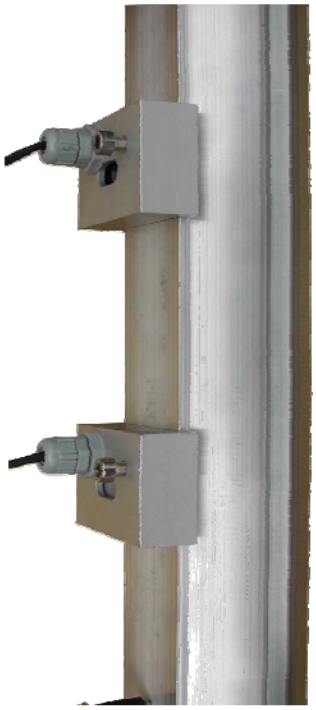
Albion Dockside Works, Bristol, BS1 6UT, England.

TEL: 0117 927 9204 **FAX:** 0117 929 8193 **WEB:** www.seetru.com **EMAIL:** enquiries@seetru.com

Rear extruded aluminium light weight guard tube with dovetailed runner for fully adjustable mounting bracket.





Universal mounting brackets with integrated electronic level alarm sensors.

New locating pin arrangement for installation and start-up.

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BS1 6UT, England.

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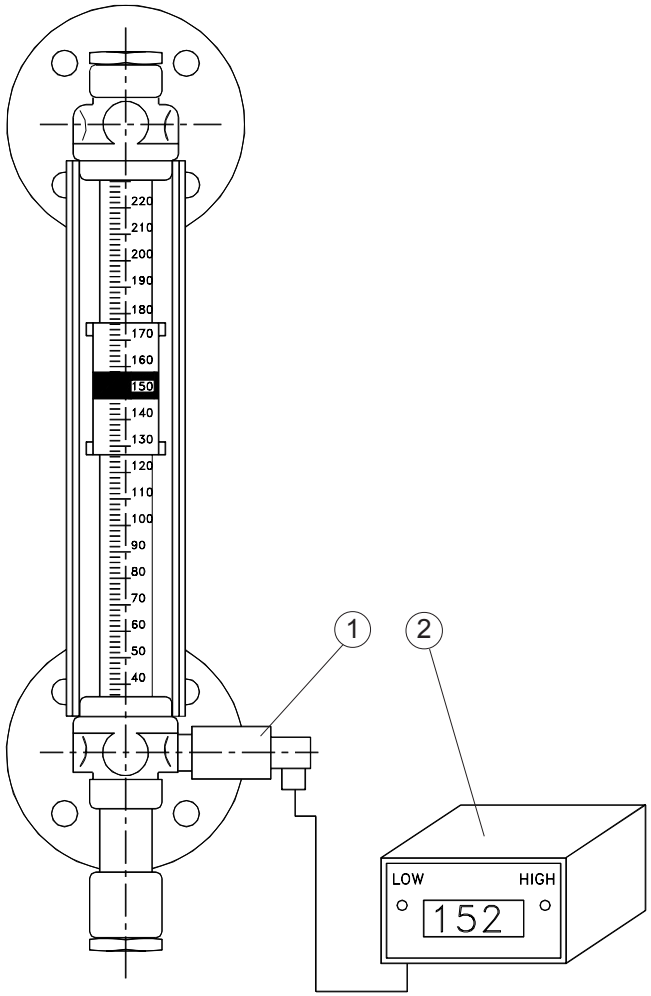

PARTS LIST

1	PRESSURE TRANSMITTER
2	DIGITAL PANEL METER

PRESSURE TRANSMITTER

[Marine & intrinsically safe versions available]

Pressure transmitter should only be used on atmospheric systems.

The pressure transmitter works independently from the Seemag and can be used for continuous reading and switching points.

Output signal: 4-20mA
Supply voltage: 12-28 Vdc

Operating temperature range:
Ambient: -25 +85^{0}C
Fluid: -25 +100^{0}C

DIGITAL READOUT

[Optional]

Digital linearised panel meter which requires a d.c. current input usually driven by a pressure transmitter. High & low switching points incorporated within panel meter.

Transmitter input: 4-20mA
Power supply: 240Vac 50Hz
Internal supply: 24V to power transmitter
Environmental: Operating temp. 0-50 Deg. C

SHEET 2 OF 5 SHEETS

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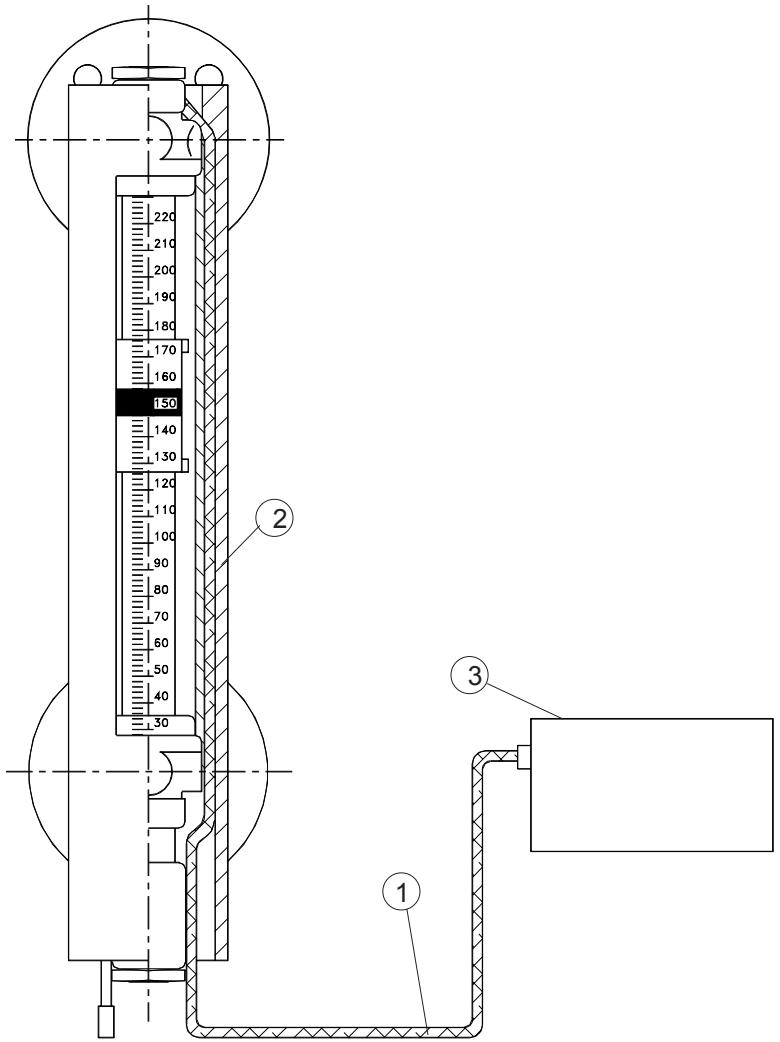
MAGNETIC LIQUID LEVEL INDICATOR
WITH PRESSURE TRANSMITTER
& DIGITAL READOUT

SEEMAG G35



PARTS LIST

1	TRACE HEATING CABLE
2	INSULATION
3	JUNCTION BOX

JUNCTION BOX

Suitable for in or outdoor hazardous areas.

Approved to:	PTB Nr. EX-91.C.3110
Certification:	EEX e 11 T6
Conform:	EN 50014 & EN 50019
Temperature:	-60^{O}C to +130^{O}C

TRACE HEATING CABLE

Supply voltage:	110/240 Vac
Continuous liquid temperature in indicator:	+50^{O}C/+70^{O}C.

BASEEFA approved to BS6351: PART 1: 1983
Approval No. Ex 89Y3343U

SEETRU LIMITED

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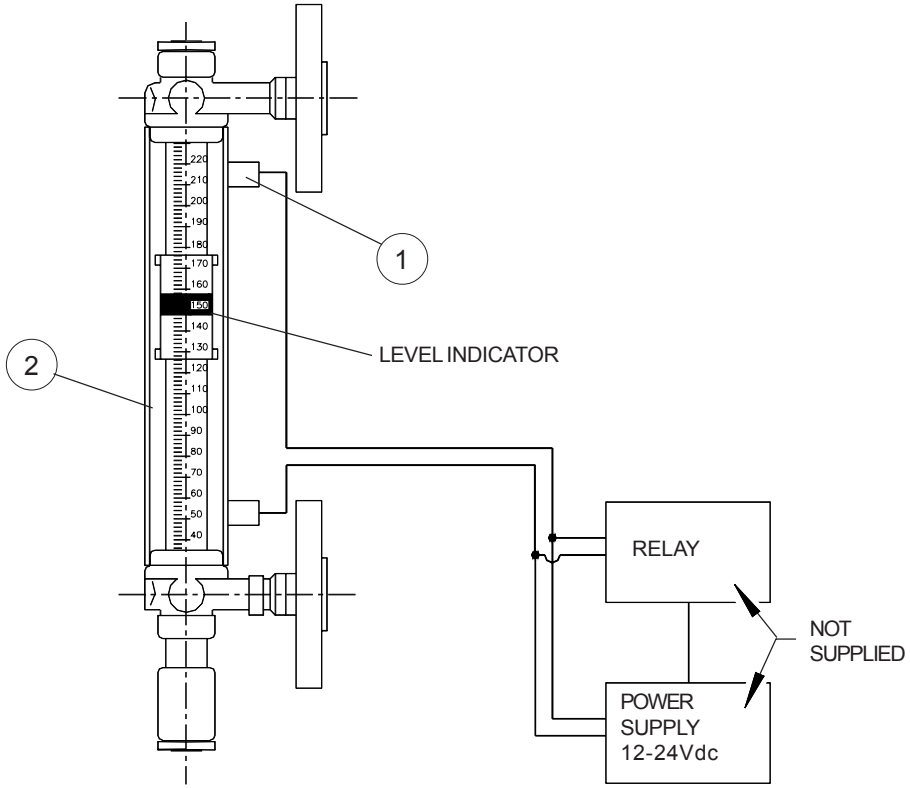
MAGNETIC LIQUID LEVEL INDICATOR
WITH TRACE HEATING & INSULATION

SEEMAG G35



PARTS LIST

1	LEVEL TRANSDUCER
2	SEEMAG

SWITCHING OPERATION

Level switches are of a magnetic hall effect design.
Switches are operated when the magnet in the base of the level indicator passes the switch, in either direction, causing it to be in one or the other state.

A power supply and relay are required to operate the switches (not supplied). Relays can then be terminated to pumps, alarms, switches or to a PC interface.

Switches are attached to rear guard tube and can be moved up or down to suit the required switching point.
Two switches are shown, but any number can be supplied.

TECHNICAL SPECIFICATION

Switches require a 12-24 Vdc supply and suitable relay.
For suggested supply and relay combinations, see sheet 5.

Max. load current:	250mA
Operating conditions:	0-60^{o}C

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MAGNETIC
LIQUID LEVEL INDICATOR
WITH LEVEL SWITCHING

SEEMAG G35

Number of Sensors	DC Output Level	PSU Input Voltage	Power Supply Stockist	Relay Stockist	Relay Contacts	Relay Coil Current	Relay Socket Stockist
2	+12Vdc	85-264Vac	RS 347-7138	RS 376-206	12A SPCO	55mA	RS 802-890
2	+24Vdc	85-264Vac	RS 347-7144	RS 376-212	12A SPCO	21mA	RS 802-890
2	+13Vdc	220-240Vac	RS 591-916	RS 376-206	12A SPCO	55mA	RS 802-890
2	+24Vdc	100-240Vac	RS 173-1654	RS 376-212	12A SPCO	21mA	RS 802-890
4	+12Vdc	85-264Vac	RS 347-7138	RS 376-206	12A SPCO	55mA	RS 802-890
4	+24Vdc	85-264Vac	RS 347-7144	RS 376-212	12A SPCO	21mA	RS 802-890
4	+13Vdc	220-240Vac	RS 591-916	RS 376-206	12A SPCO	55mA	RS 802-890
4	+24Vdc	100-240Vac	RS 173-1654	RS 376-212	12A SPCO	21mA	RS 802-890
2	+12Vdc	85-264Vac	RS 347-7138	RS 348-756	10A DPCO	136mA	RS 352-553
2	+24Vdc	85-264Vac	RS 347-7144	RS 384-784	10A DPCO	50mA	RS 352-553
2	+13Vdc	220-240Vac	RS 591-916	RS 348-756	10A DPCO	136mA	RS 352-553
2	+24Vdc	100-240Vac	RS 173-1654	RS 384-784	10A DPCO	50mA	RS 352-553
4	+12Vdc	85-264Vac	RS 347-7166	RS 348-756	10A DPCO	136mA	RS 352-553
4	+24Vdc	85-264Vac	RS 347-7144	RS 384-784	10A DPCO	50mA	RS 352-553
4	+13Vdc	220-240Vac	RS 591-916	RS 348-756	10A DPCO	136mA	RS 352-553
4	+24Vdc	100-240Vac	RS 173-1654	RS 384-784	10A DPCO	50mA	RS 352-553
2	+12Vdc	120 or 240Vac	FAR 200-931	FAR 466-670	5A 4PCO	75mA	FAR 466-736
2	+24Vdc	100-240Vac	FAR 768-431	FAR 466-682	5A 4PCO	38mA	FAR 466-736
2	+12Vdc	100-240Vac	FAR 768-420	FAR 735-498	20A 2NO	200mA	N/A
2	+24Vdc	100-240Vac	FAR 768-431	FAR 735-504	20A 2NO	100mA	N/A
4	+12Vdc	100-240Vac	FAR 768-420	FAR 466-670	5A 4PCO	75mA	FAR 466-736
4	+24Vdc	100-240Vac	FAR 768-431	FAR 466-682	5A 4PCO	38mA	FAR 466-736
4	+12Vdc	100-240Vac	FAR 768-420	FAR 735-498	20A 2NO	200mA	N/A
4	+24Vdc	100-240Vac	FAR 768-431	FAR 735-504	20A 2NO	100mA	N/A

RS = RS Componets

FAR = Farnell

SUGGESTED SUPPLY & RELAY COMBINATIONS

SEETRU LIMITED

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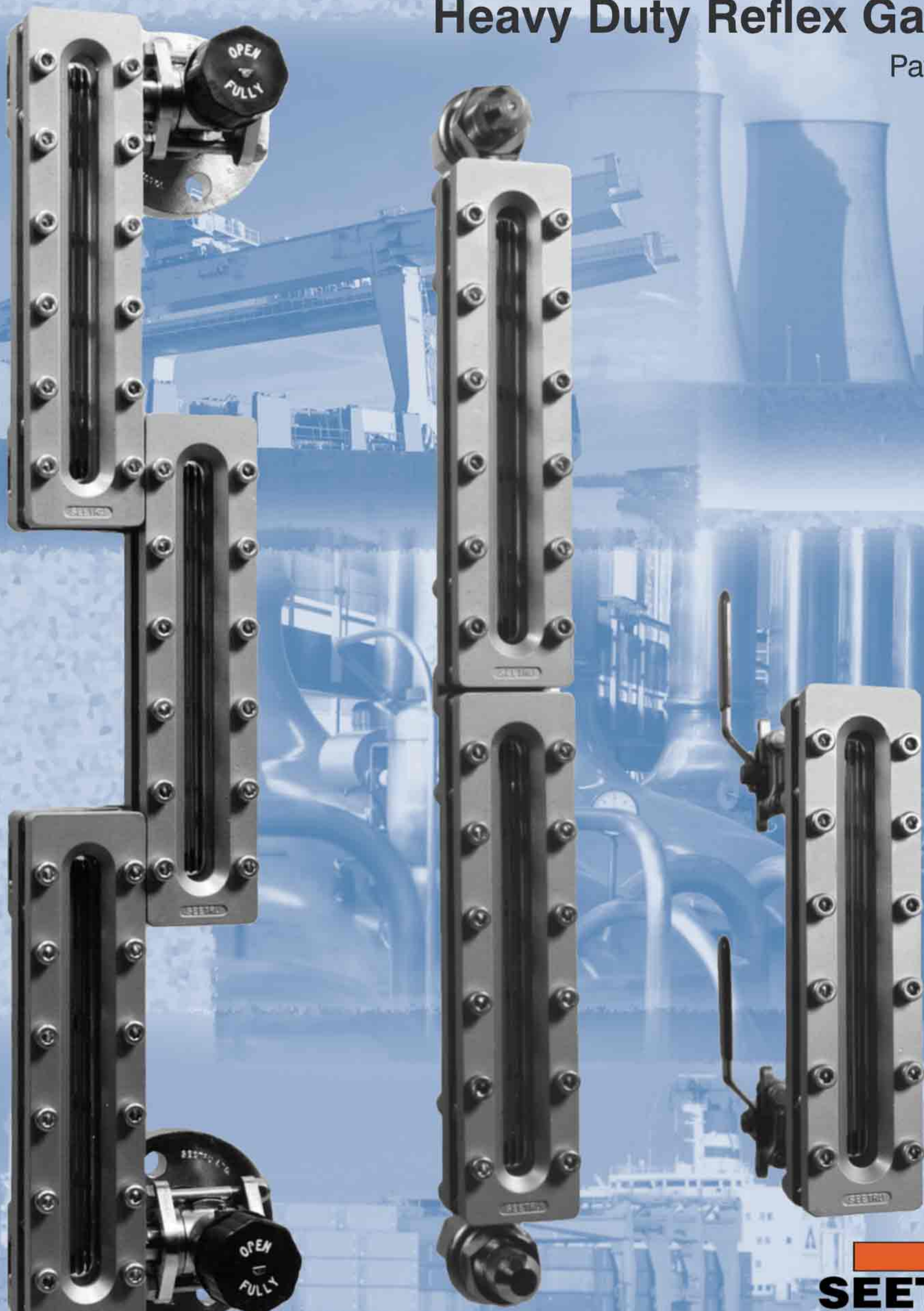
MAGNETIC LIQUID LEVEL INDICATOR

SEEMAG G35

Liquid Level Gauges

Heavy Duty Reflex Gauge

Patented



Robust Modular construction allowing selection to suit the application

SEETRU
LIMITED

REFLEX GAUGE

To achieve rapid response to customer requirements the gauge has been designed around modular components. This also enables the gauge to be configured to meet exacting requirements. Gauge configuration is determined by the industry standard end fittings and connections. For full details and prices contact Seetru.

The Seetru Reflex Gauge

- Robust design for all applications
- High contrast indication of colourless liquids
- Use of standard Reflex glass units ensures internationally available spares
- Simple methods of construction for quick and easy maintenance
- Gauge assemblies available to provide uninterrupted centre to centre liquid level indication
- Suitable for arduous duty applications
- Frost shield available for applications below 0°C
- Modular component design allows flexibility in selection and construction
- Minimum length 216mm
- Wide variety of industry standard end fittings
- Flanged and screwed connections
- Remote reading digital/electronic system and/or computer interface options available
- Manufactured to a quality system approved in accordance with BS EN ISO 9001

User Industries

- General Industrial use
- Chemical and Process Industry
- Marine / Offshore
- Refrigeration
- Boiler (Steam and Hot Water)
- Power Generation

End Fittings

- Ball Valves: supplied with screw or flange fitting
- Flanges available nominal size 1" or larger, in all patterns
- Self Closing Valves
- Refrigeration Industry Valves
- Handwheel Operated Valves
- Drain Valves

Operating Conditions

- Maximum operating pressure = 75 bar g.
- Maximum operating temperature = +250°C
- Minimum operating temperature = -32°C

Note: Maximum operating temperature and pressure conditions must be traded off against each other and may be limited by end fittings or the seal material used. Consult Seetru for further information.

Materials of Construction

Column:	316 Stainless Steel back plate and bezel, other materials, e.g. Hastelloy, available on request
Bolts:	High Strength Stainless Steel
Valves:	To suit application
Reflex Glass:	Borosilicate Glass
Available Seals:	P.T.F.E., Nitrile, Viton® & Neoprene

Viton® is a registered trademark of DuPont Dow Elastomers.

SEETRU quality liquid level indicators are suitable for diverse industrial applications. These products, manufactured to strict quality standards, provide accurate and safe level indication of most liquids. Seetru also design and manufacture a range of remote indicating liquid level gauges and a comprehensive range of safety relief valves for use with liquids and gases.

SEETRU LIMITED

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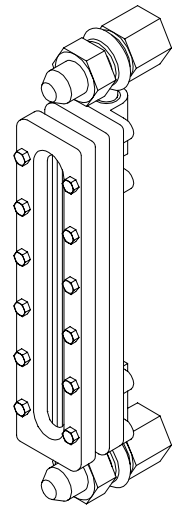
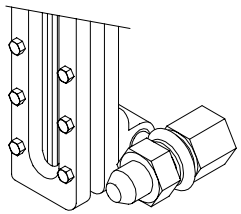
Web: www.seetru.com

LLOYD'S REGISTER QUALITY ASSURANCE · ISO9001 · UKAS QUALITY MANAGEMENT 001

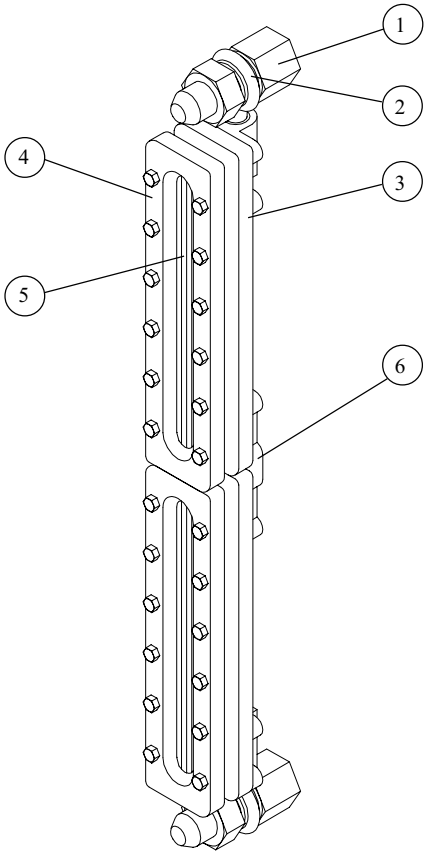
REFLEX COLUMN SUITABLE FOR USE WITH LIQUIFIED REFRIGERANTS



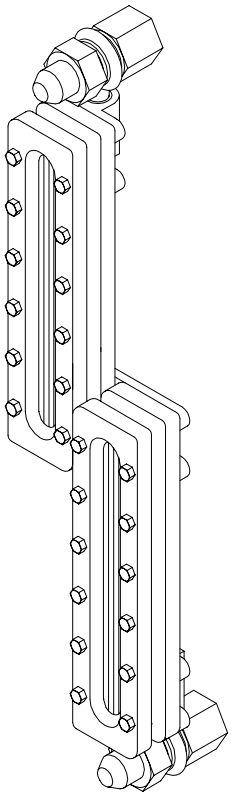
Single Section Reflex Column with valves end mounted



Example showing valve side mounted for maximum visibility



Multiple Reflex Column (Interrupted vision)



Multiple Reflex Column (Un-Interrupted vision)

PARTS LIST AND MATERIAL SPECIFICATION.

1	VALVE ASSEMBLY *	PLATED MILD STL.
2	COLLAR	STAINLESS STEEL
3	COLUMN BACK PLATE	STAINLESS STEEL
4	COLUMN FRONT PLATE	STAINLESS STEEL
5	REFLEX GLASS	TOUGHENED BOROSILICATE REFLEX GLASS TO BS 3463. 1975
6	COLUMN CONNECTION PLATE	STAINLESS STEEL

* Valve assembly comprises;
Manual screw down valve with auto safety shut off valve
Standard seal material; Neoprene.
Alternative seal material; P.T.F.E.

APPROVALS

Meets the requirements of BS 4434 1989.
Complies with the Institute of Refrigeration safety codes.

TECHNICAL SPECIFICATION

Suitable for use with Freon 12, 22, 500, 502, and Ammonia.
Maximum working pressure = 25 bar.g
Maximum design pressure = 40 bar.g
Operating temperature range, Neoprene seals = 0°C to 100°C
P.T.F.E.= up to 180°C

OPTIONS

Column can be supplied with valves end mounted or side mounted. Valve units are available with drain plugs or sample take off valves. Minimum valve centre distance for single column section, using side mounted valves is 216mm, using end mounted valves is 338mm.

Connection types:

Threaded; 1/2" NPT female.
Weld type; 33mm diameter for socket welding.
DIN flange; To DIN PN 40 DN 20 with grooves to DIN 2512

To achieve rapid response to customers requirements, the gauge has been designed around modular components. This enables a wide range of gauge lengths to be assembled from standard parts ex. stock.

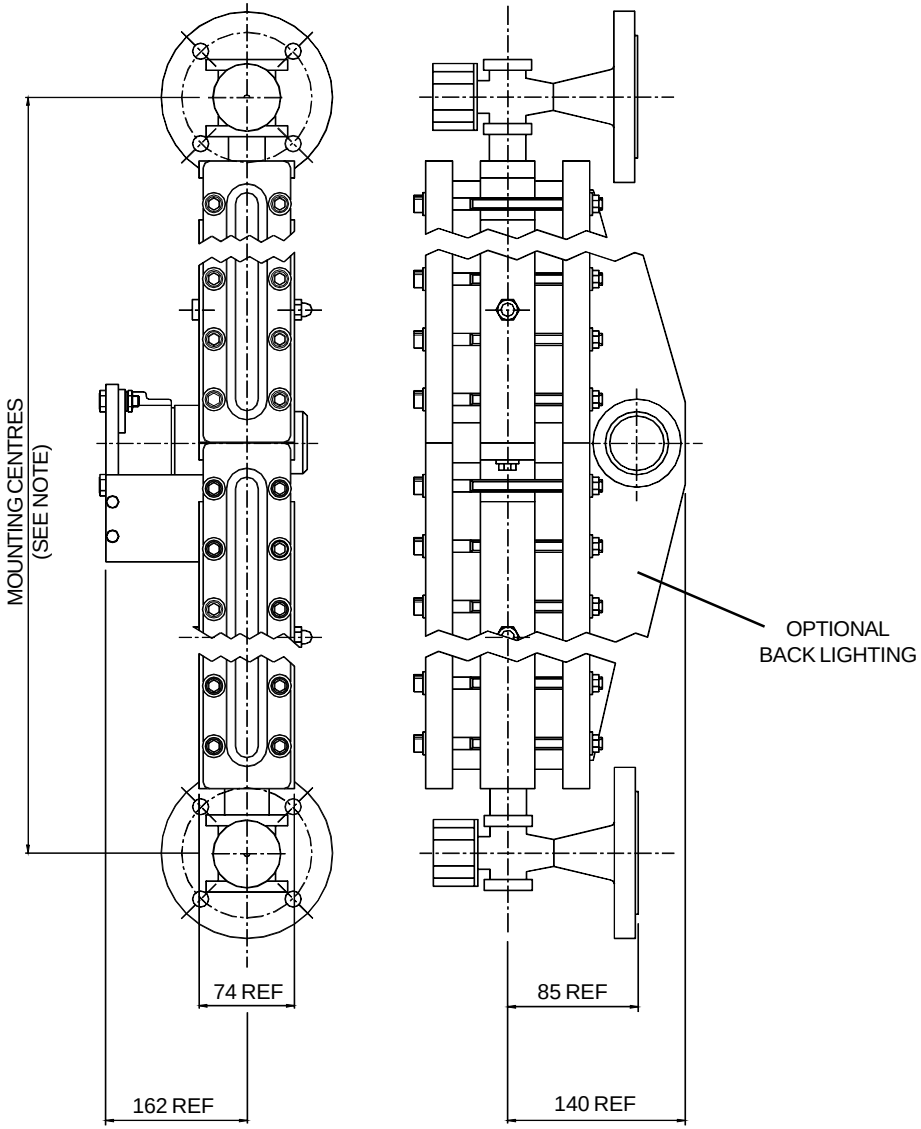
SEETRU LIMITED

SEETRU LIMITED ALBION DOCKSIDE WORKS,
HANOVER PLACE, BRISTOL. BS1 6UT
TELEPHONE (0117) 927 9204, FAX (0117) 929 8193

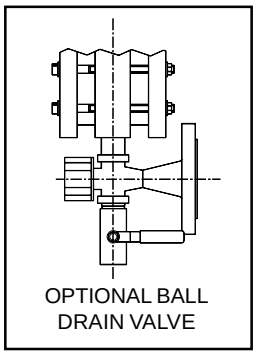
REFLEX COLUMN LIQUID LEVEL GAUGE SUITABLE FOR USE WITH LIQUIFIED REFRIGERANTS.

TYPE NUMBER
G 28 R

EDITION D. 20.04.98



STRAIGHT
FLANGED



SHEET 1 OF 3 SHEETS

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TRANSPARENT GAUGE DETAILS
CPI ISOLATION VALVES
TC0103

TRANSPARENT
GAUGE

TYPE G29

NOTES:-

STANDARD GAUGE CENTRES ARE AS PER TABLES GIVEN.
SPECIFIC CENTRES CAN BE ACHIEVED BY A SUITABLE LENGTH ADAPTOR POST, BETWEEN THE TOP OF THE COLUMN AND THE TOP VALVE.

OPTIONAL ACCESSORIES:-

1. BACK LIGHTING: TO PROVIDE CLEAR THROUGH VISION IN LOW LIGHT CONDITIONS.
2. NON-FROST BLOCKS: TO PERMIT VIEWING THROUGH FROST BUILD UP.
3. MICA SHIELDS: AVAILABLE ON REQUEST.

CONNECTION TYPES:-

LOOSE FLANGES FITTED AS SHOWN, ANY PATTERN CAN BE SUPPLIED FROM 1" OR 25mm UPWARDS.

TECHNICAL DATA:-

MAXIMUM OPERATING PRESSURE = 35 Bar.g.
MAXIMUM OPERATING TEMPERATURE = 250^{O}C
MINIMUM OPERATING TEMPERATURE = 0^{O}C (WITHOUT FROST-GUARD)
= 0^{O}C TO -30^{O}C WITH FROST-GUARD.

ALL TEMPERATURES ARE SUBJECT TO SEAL MATERIAL & PRESSURE.

MATERIALS:-

GAUGE CHAMBER = STAINLESS STEEL 316
GLASS = BOROSILICATE BS3463
CHAMBER SEALS AVAILABLE = P.T.F.E. (OTHERS AVAILABLE)
GLASS TO CHAMBER SEAL = ASBESTOS FREE GASKET
VALVE BODY = STAINLESS STEEL 316
VALVE SEAL = P.T.F.E.

INLINE COLUMN MOUNTING CENTRES

TABLE SHOWING GAUGE MOUNTING CENTRES FOR STANDARD INLINE COLUMN ASSEMBLIES.

	LENGTH OF VISION								
	216	308	497	589	681	778	870	962	1054
STRAIGHT MOUNTED	384	476	665	757	849	946	1038	1130	1222
No. OF CHAMBERS	1	1	2	2	2	3	3	3	3

	LENGTH OF VISION								
	1059	1151	1243	1335	1340	1427	1432	1524	1616
STRAIGHT MOUNTED	1227	1319	1411	1503	1508	1595	1600	1692	1784
No. OF CHAMBERS	4	4	4	4	5	4	5	5	5

	LENGTH OF VISION								
	1621	1708	1713	1800	1805	1897	1902	1989	1994
STRAIGHT MOUNTED	1789	1876	1881	1968	1973	2065	2070	2157	2162
No. OF CHAMBERS	6	5	6	5	6	6	7	6	7

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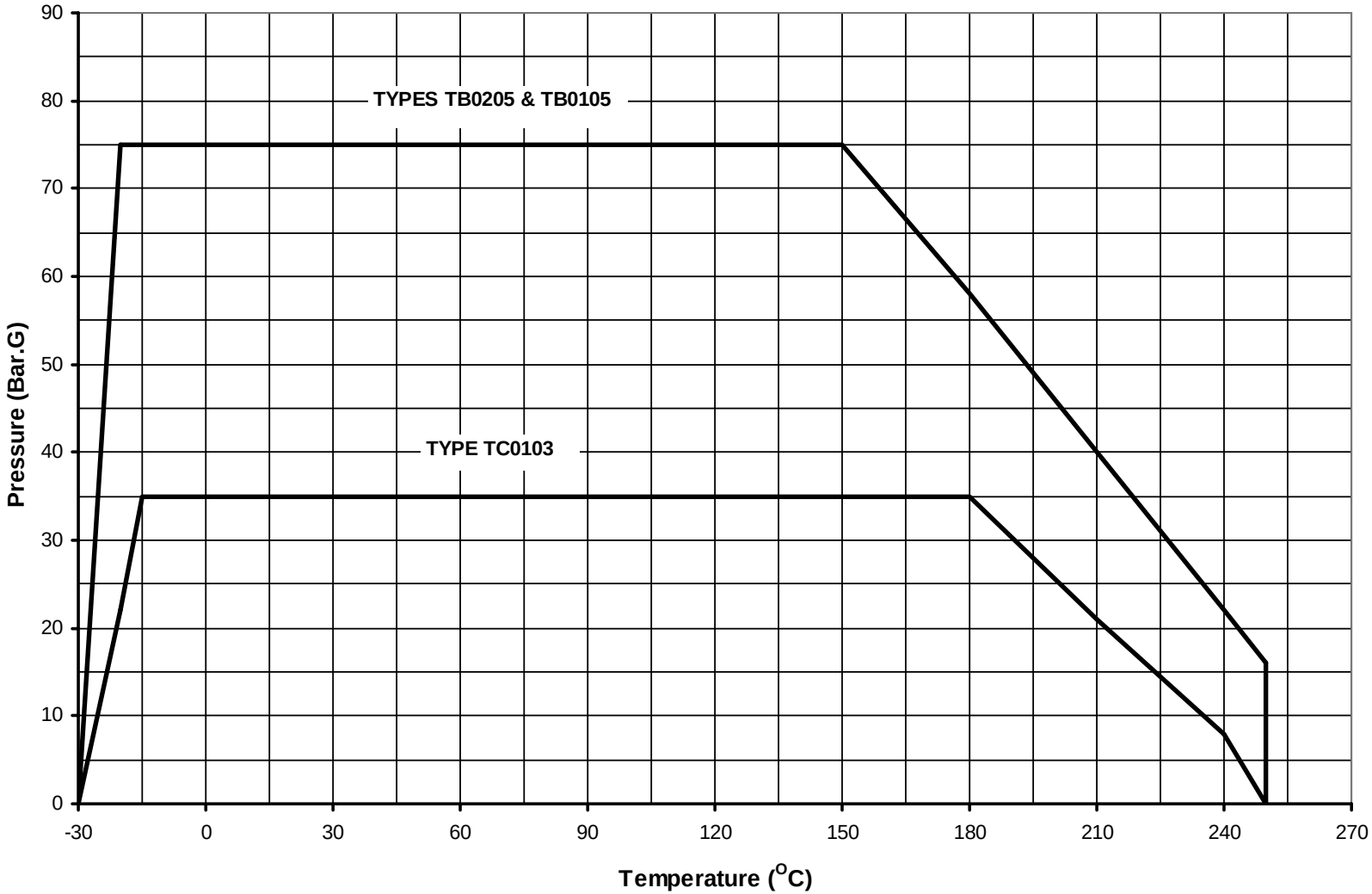
TRANSPARENT GAUGE DETAILS
CPI ISOLATION VALVES
TC0103

TRANSPARENT GAUGE
TYPE G29

PRESSURE-TEMPERATURE GRAPH
TRANSPARENT GAUGE TYPE G29



SHEET 3 OF 3 SHEETS

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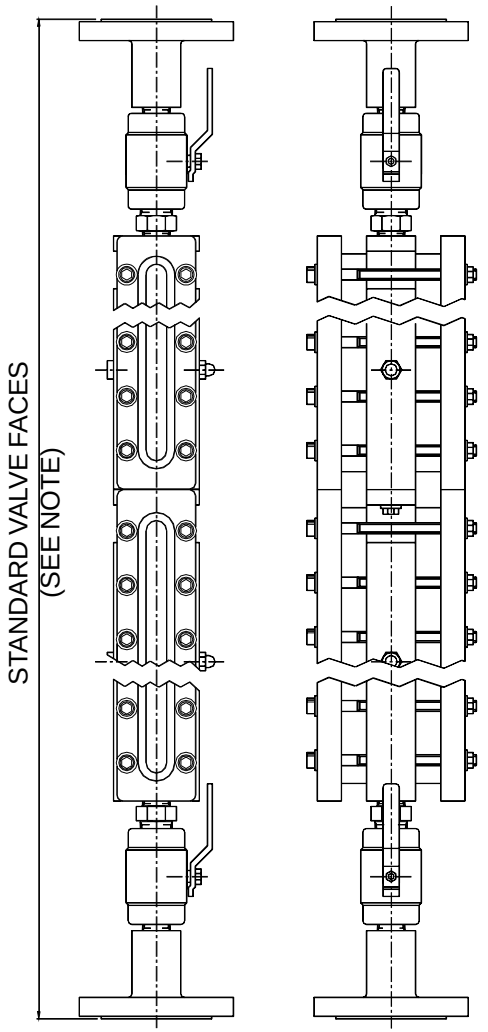
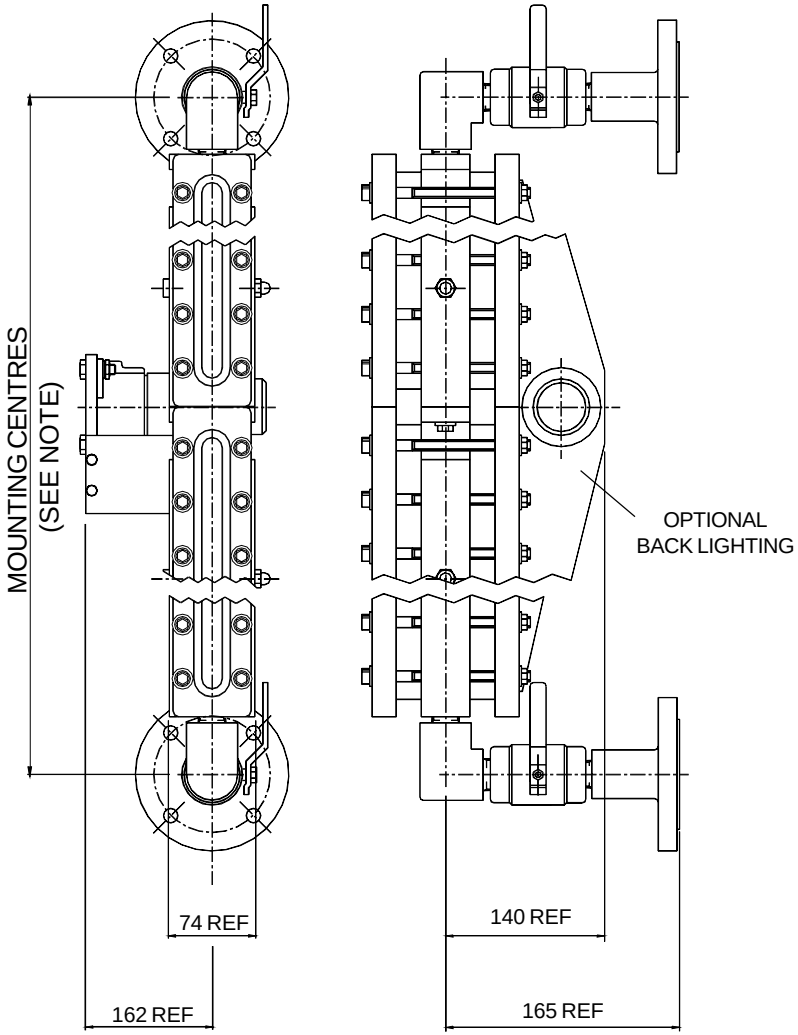
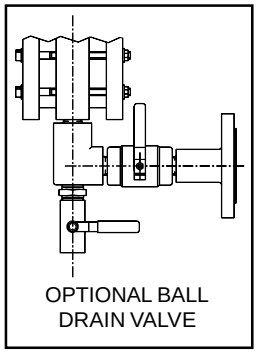
TYPE G29



END
FLANGED



STRAIGHT
FLANGED



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TRANSPARENT GAUGE DETAILS
BALL TYPE ISOLATION VALVES
TB0205

TRANSPARENT
GAUGE

TYPE G29

NOTES:-

STANDARD GAUGE CENTRES ARE AS PER TABLES GIVEN.
SPECIFIC CENTRES CAN BE ACHIEVED BY A SUITABLE LENGTH ADAPTOR POST, BETWEEN THE TOP OF THE COLUMN AND THE TOP VALVE.

OPTIONAL ACCESSORIES:-

1. BACK LIGHTING: TO PROVIDE CLEAR THROUGH VISION IN LOW LIGHT CONDITIONS.
2. NON-FROST BLOCKS: TO PERMIT VIEWING THROUGH FROST BUILD UP.
3. MICA SHIELDS: AVAILABLE ON REQUEST.

CONNECTION TYPES:-

SUITABLE LOOSE FLANGES FITTED AS SHOWN IN PLACE OF FEMALE THREAD.
ANY PATTERN CAN BE SUPPLIED FROM 1" OR 25mm UPWARDS.

TECHNICAL DATA:-

MAXIMUM OPERATING PRESSURE = 75 Bar.g.
MAXIMUM OPERATING TEMPERATURE = 250^{O}C
MINIMUM OPERATING TEMPERATURE = 0^{O}C (WITHOUT FROST-GUARD)
= 0^{O}C TO -30^{O}C WITH FROST-GUARD.
ALL TEMPERATURES ARE SUBJECT TO SEAL MATERIAL & PRESSURE.

MATERIALS:-

GAUGE CHAMBER = STAINLESS STEEL 316
GLASS = BOROSILICATE BS3463
CHAMBER SEALS AVAILABLE = P.T.F.E. (OTHERS AVAILABLE)
GLASS TO CHAMBER SEAL = ASBESTOS FREE GASKET
VALVE BODY = STAINLESS STEEL 316
VALVE SEAL
P.T.F.E. FOR = HIGH PRESSURE UP TO 150^{O}C
= LOW PRESSURE UP TO 250^{O}C
POLYIMID FOR = HIGH PRESSURE BETWEEN 150^{O}C & 250^{O}C.

INLINE COLUMN MOUNTING CENTRES

TABLE SHOWING GAUGE MOUNTING CENTRES FOR STANDARD INLINE COLUMN ASSEMBLIES.

	LENGTH OF VISION								
	216	308	497	589	681	778	870	962	1054
END MOUNTED	536	628	817	909	1001	1098	1190	1282	1374
STRAIGHT MOUNTED	348	440	629	721	813	910	1002	1094	1186
No. OF CHAMBERS	1	1	2	2	2	3	3	3	3

	LENGTH OF VISION								
	1059	1153	1243	1335	1340	1427	1432	1524	1616
END MOUNTED	1379	1471	1563	1655	1660	1747	1752	1844	1936
STRAIGHT MOUNTED	1191	1283	1375	1467	1472	1559	1564	1656	1748
No. OF CHAMBERS	4	4	4	4	5	4	5	5	5

	LENGTH OF VISION								
	1621	1708	1713	1800	1805	1897	1902	1989	1994
END MOUNTED	1941	2028	2033	2120	2125	2217	2222	2309	2314
STRAIGHT MOUNTED	1753	1840	1845	1932	1937	2029	2034	2121	2126
No. OF CHAMBERS	6	5	6	5	6	6	7	6	7

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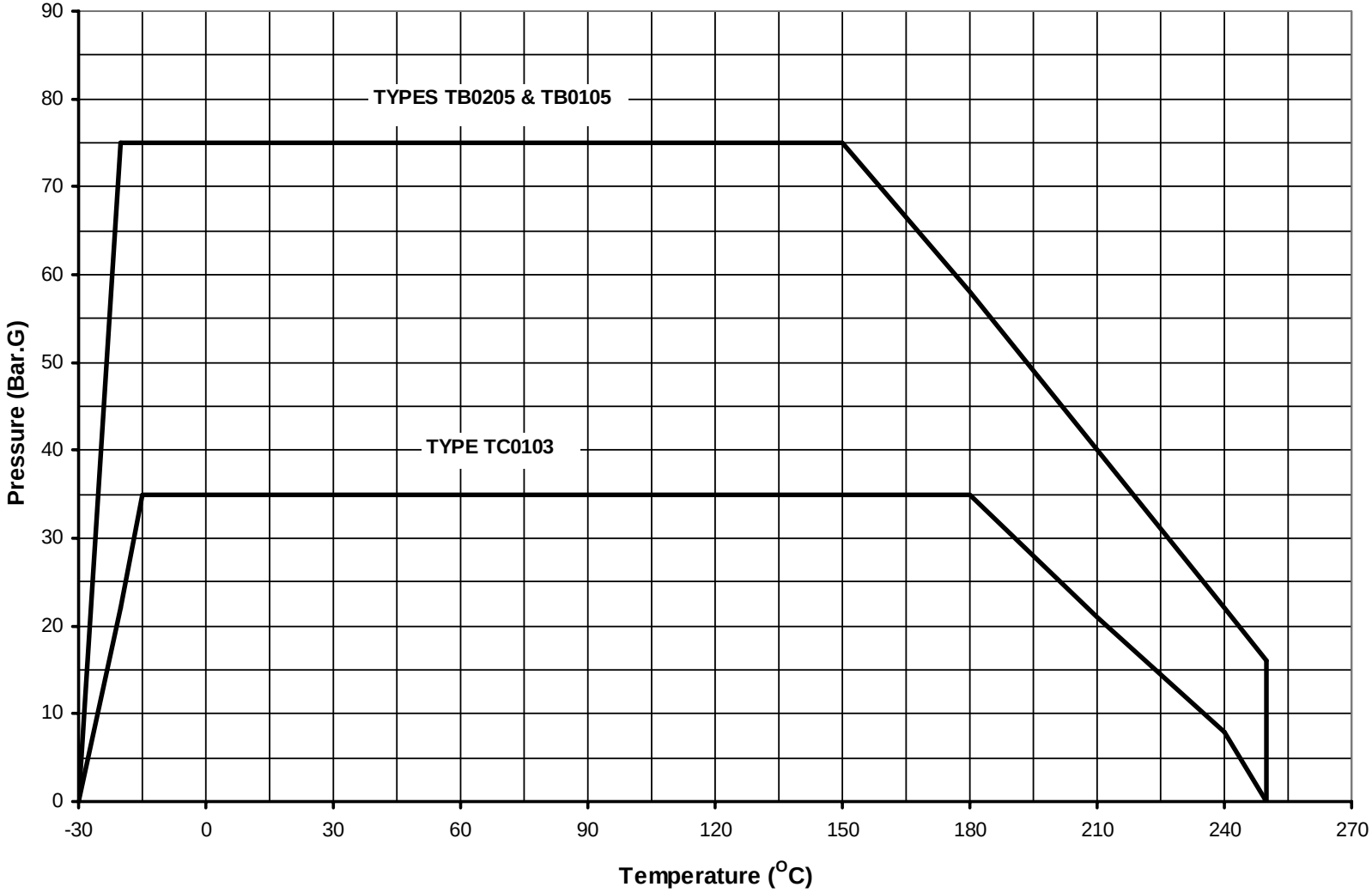
TRANSPARENT GAUGE DETAILS
BALL TYPE ISOLATION VALVES
TB0205

TRANSPARENT GAUGE
TYPE G29

EDITION B. 02.01.03

PRESSURE-TEMPERATURE GRAPH
TRANSPARENT GAUGE TYPE G29



SHEET 3 OF 3 SHEETS

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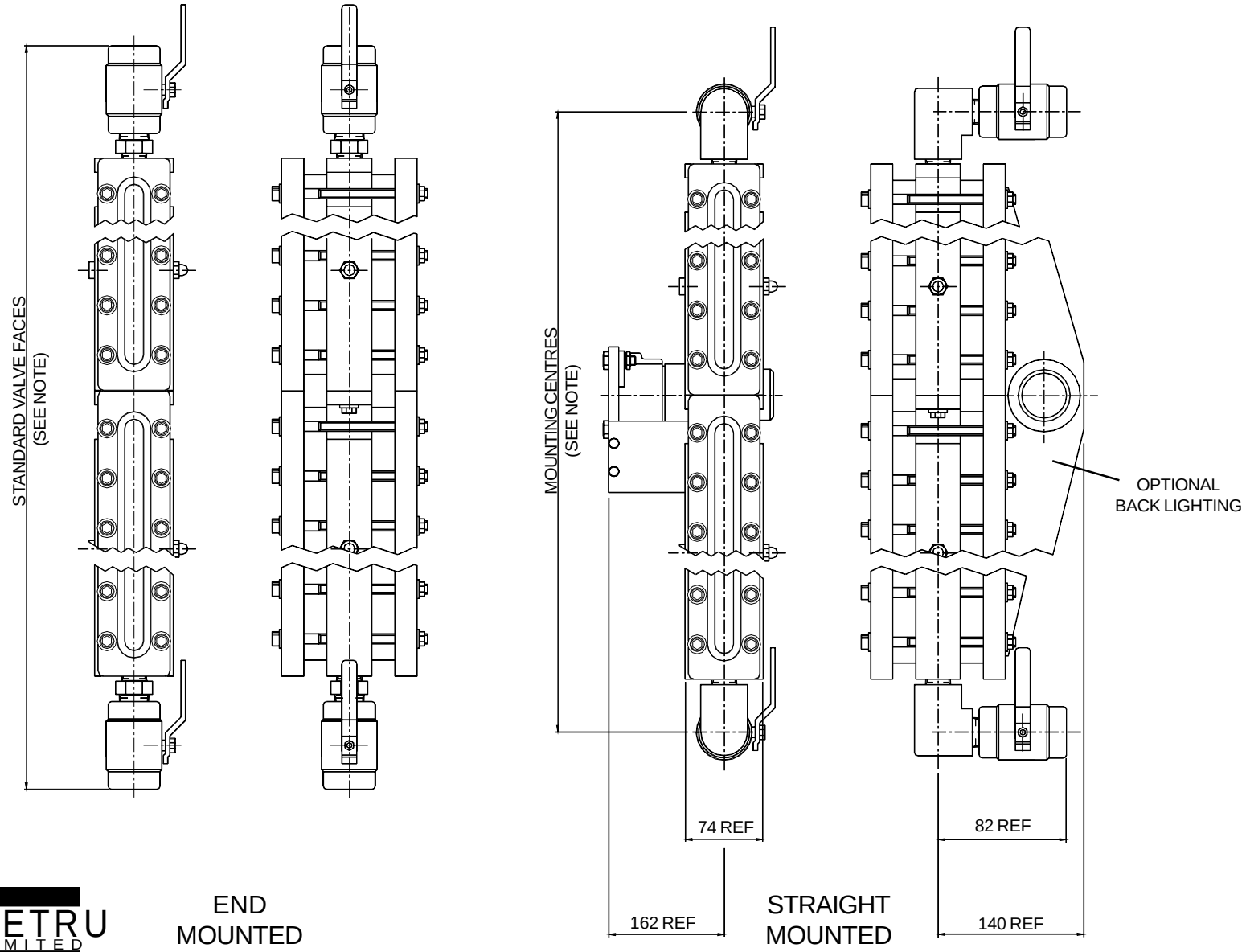
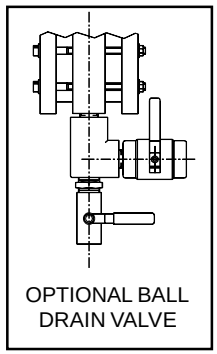
BALL TYPE ISOLATION VALVES
TB0205

TRANSPARENT GAUGE
TYPE G29



END
MOUNTED

STRAIGHT
MOUNTED



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TRANSPARENT GAUGE DETAILS
BALL TYPE ISOLATION VALVE
TB0105

TRANSPARENT
GAUGE

TYPE G29

EDITION A. 27.02.03

NOTES:-

STANDARD GAUGE CENTRES ARE AS PER TABLES GIVEN.
SPECIFIC CENTRES CAN BE ACHIEVED BY A SUITABLE LENGTH ADAPTOR POST, BETWEEN THE TOP OF THE COLUMN AND THE TOP VALVE.

OPTIONAL ACCESSORIES:-

1. BACK LIGHTING: TO PROVIDE CLEAR THROUGH VISION IN LOW LIGHT CONDITIONS.
2. NON-FROST BLOCKS: TO PERMIT VIEWING THROUGH FROST BUILD UP.
3. MICA SHIELDS: AVAILABLE ON REQUEST.

CONNECTION TYPES:-

3/4"BSP FEMALE THREAD (FITTED AS STANDARD)
3/4" & 1"BSP MALE THREADS & NPT THREADS ALSO AVAILABLE.

TECHNICAL DATA:-

MAXIMUM OPERATING PRESSURE = 75 Bar.g.
MAXIMUM OPERATING TEMPERATURE = 250^{O}C
MINIMUM OPERATING TEMPERATURE = 0^{O}C (WITHOUT FROST-GUARD)
= 0^{O}C TO -30^{O}C WITH FROST-GUARD.
ALL TEMPERATURES ARE SUBJECT TO SEAL MATERIAL & PRESSURE.

MATERIALS:-

GAUGE CHAMBER = STAINLESS STEEL 316
GLASS = BOROSILICATE BS3463
CHAMBER SEALS AVAILABLE = P.T.F.E. (OTHERS AVAILABLE)
GLASS TO CHAMBER SEAL = ASBESTOS FREE GASKET
VALVE BODY = STAINLESS STEEL 316
VALVE SEAL
P.T.F.E. FOR = HIGH PRESSURE UP TO 150^{O}C
= LOW PRESSURE UP TO 250^{O}C
POLYIMID FOR = HIGH PRESSURE BETWEEN 150^{O}C & 250^{O}C.

INLINE COLUMN MOUNTING CENTRES

TABLE SHOWING GAUGE MOUNTING CENTRES FOR STANDARD INLINE COLUMN ASSEMBLIES.

	LENGTH OF VISION								
	216	308	497	589	681	778	870	962	1054
END MOUNTED	454	546	735	827	919	1016	1108	1200	1294
STRAIGHT MOUNTED	348	440	629	721	813	910	1002	1094	1186
No. OF CHAMBERS	1	1	2	2	2	3	3	3	3

	LENGTH OF VISION								
	1059	1153	1243	1335	1340	1427	1432	1524	1616
END MOUNTED	1297	1389	1481	1573	1578	1665	1670	1762	1854
STRAIGHT MOUNTED	1191	1283	1375	1467	1472	1559	1564	1656	1748
No. OF CHAMBERS	4	4	4	4	5	4	5	5	5

	LENGTH OF VISION								
	1621	1708	1713	1800	1805	1897	1902	1989	1994
END MOUNTED	1859	1946	1951	2038	2043	2135	2140	2227	2232
STRAIGHT MOUNTED	1753	1840	1845	1932	1937	2029	2034	2121	2126
No. OF CHAMBERS	6	5	6	5	6	6	7	6	7

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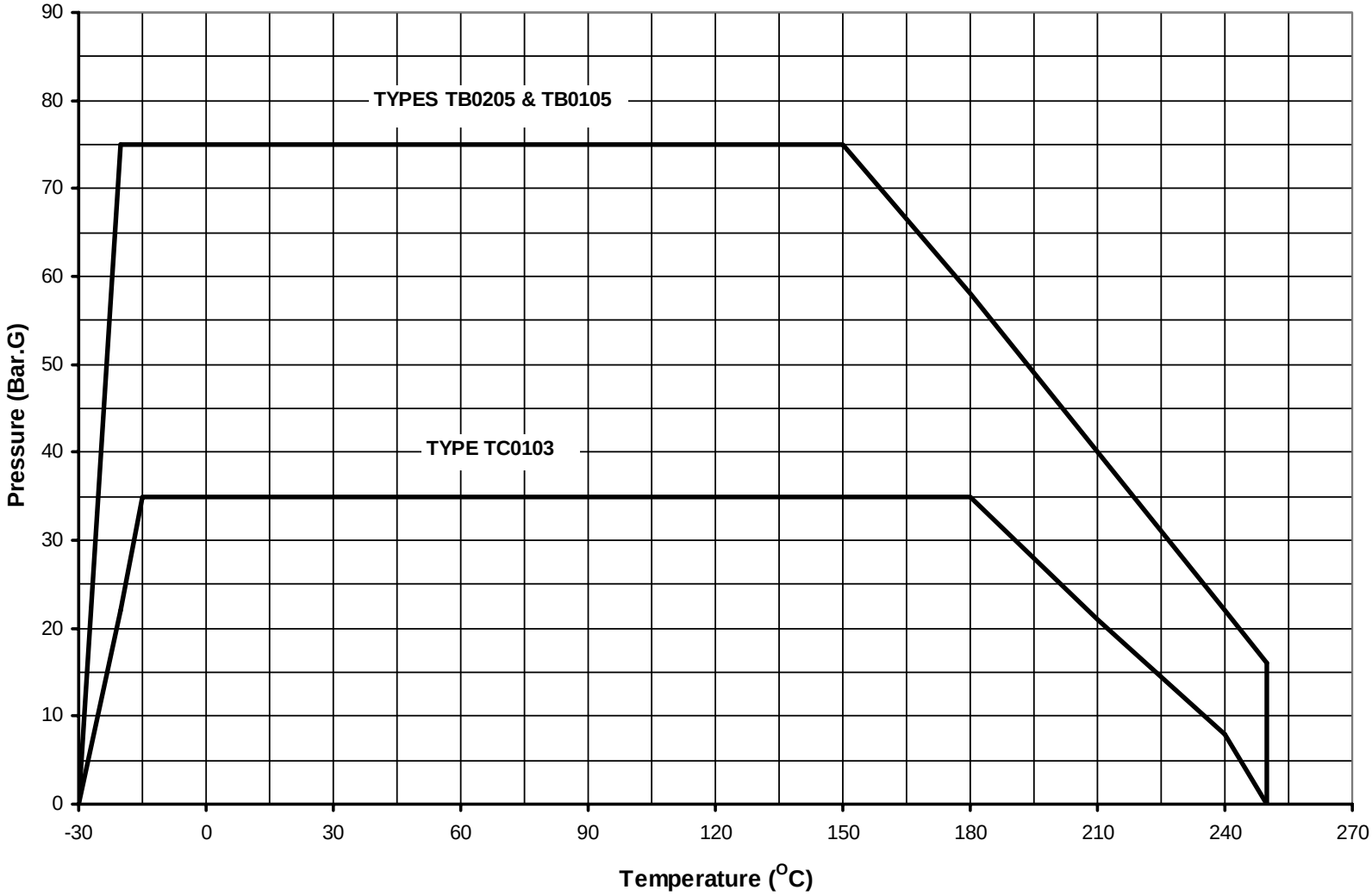
TRANSPARENT GAUGE DETAILS
BALL TYPE ISOLATION VALVE
TB0105

TRANSPARENT GAUGE
TYPE G29

PRESSURE-TEMPERATURE GRAPH
TRANSPARENT GAUGE TYPE G29



SHEET 3 OF 3 SHEETS

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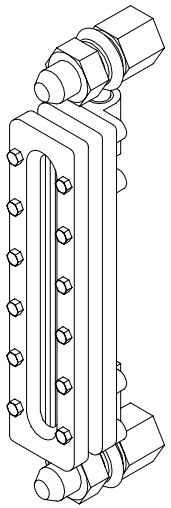
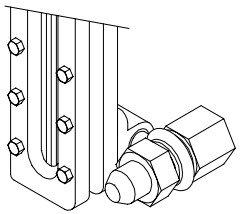
TRANSPARENT GAUGE DETAILS
BALL TYPE ISOLATION VALVE
TB0105

TRANSPARENT GAUGE
TYPE G29

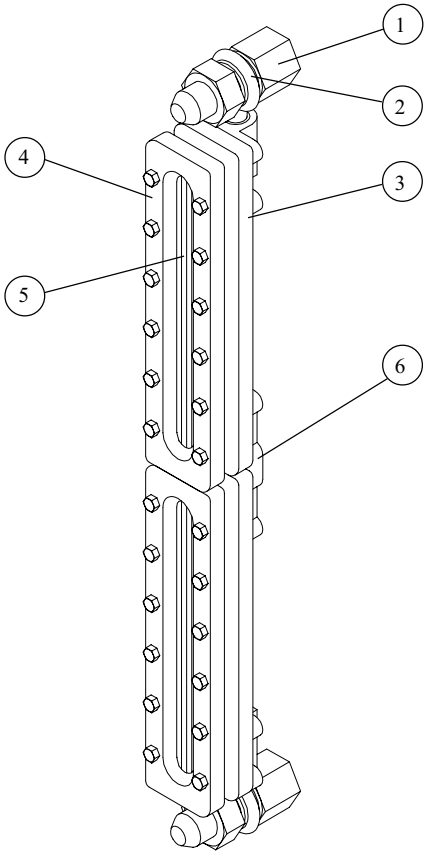
REFLEX COLUMN SUITABLE
FOR USE WITH LIQUIFIED
REFRIGERANTS



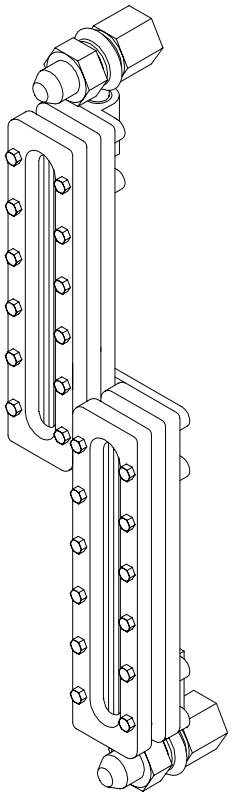
Single Section Reflex Column
with valves end mounted



Example showing valve side
mounted for maximum
visibility



Multiple Reflex Column
(Interrupted vision)



Multiple Reflex Column
(Un-Interrupted vision)

PARTS LIST AND MATERIAL SPECIFICATION.

1	VALVE ASSEMBLY *	PLATED MILD STL.
2	COLLAR	STAINLESS STEEL
3	COLUMN BACK PLATE	STAINLESS STEEL
4	COLUMN FRONT PLATE	STAINLESS STEEL
5	REFLEX GLASS	TOUGHENED BOROSILICATE REFLEX GLASS TO BS 3463. 1975
6	COLUMN CONNECTION PLATE	STAINLESS STEEL

* Valve assembly comprises;
Manual screw down valve with auto safety shut off valve
Standard seal material; Neoprene.
Alternative seal material; P.T.F.E.

APPROVALS

Meets the requirements of BS 4434 1989.
Complies with the Institute of Refrigeration safety codes.

TECHNICAL SPECIFICATION

Suitable for use with Freon 12, 22, 500, 502, and Ammonia.
Maximum working pressure = 25 bar.g
Maximum design pressure = 40 bar.g
Operating temperature range, Neoprene seals = 0°C to 100°C
P.T.F.E.= up to 180°C

OPTIONS

Column can be supplied with valves end mounted or side mounted.
Valve units are available with drain plugs or sample take off valves.
Minimum valve centre distance for single column section, using side mounted valves is 216mm, using end mounted valves is 338mm.

Connection types:

Threaded; 1/2" NPT female.
Weld type; 33mm diameter for socket welding.
DIN flange; To DIN PN 40 DN 20 with grooves to DIN 2512

To achieve rapid response to customers requirements, the gauge has been designed around modular components. This enables a wide range of gauge lengths to be assembled from standard parts ex. stock.

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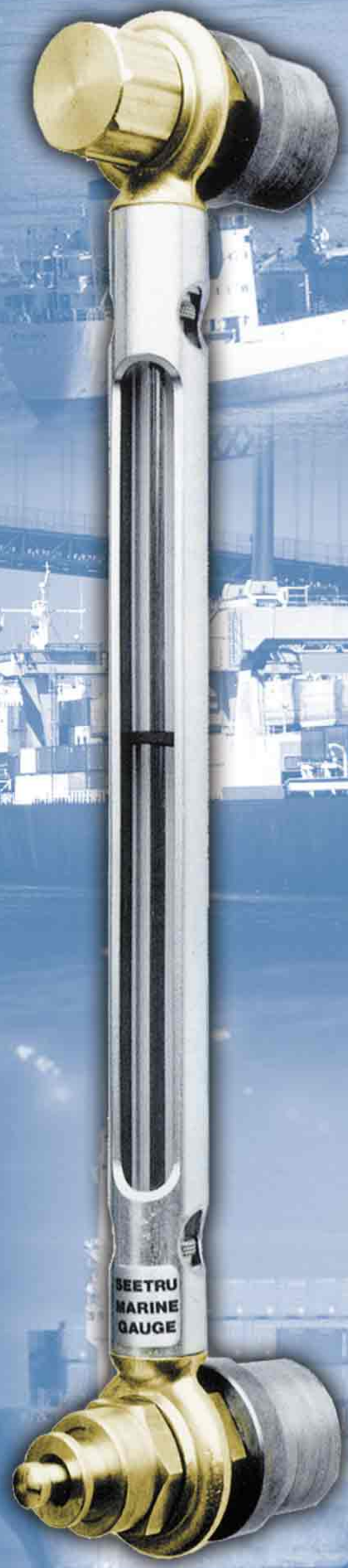
REFLEX COLUMN LIQUID LEVEL
GAUGE SUITABLE FOR USE WITH
LIQUIFIED REFRIGERANTS.

TYPE NUMBER
G 28 R

EDITION D. 20.04.98

Liquid Level Gauges

Tubular Patent Marine Gauge



Meeting modern requirements for Non-Flammable liquids

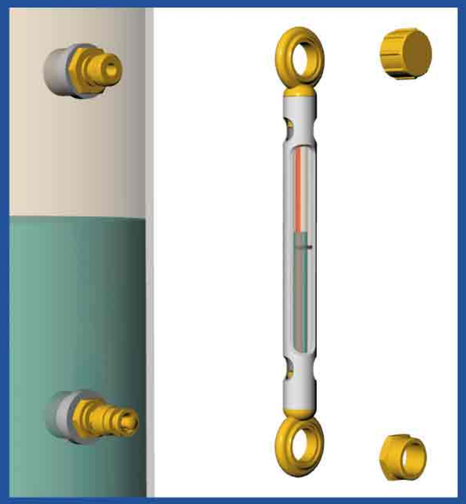
SEETRU
LIMITED

THE SEETRU MARINE GAUGE PROVIDES

Easily dismantled and reassembled without draining the tank

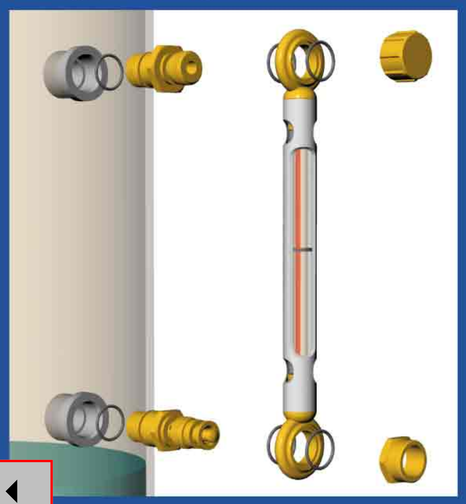
Sealed against external damage

Pushbutton reading



Gauge removed from tank fittings, tank remaining sealed and in service.

Gauge and fittings removed from tank

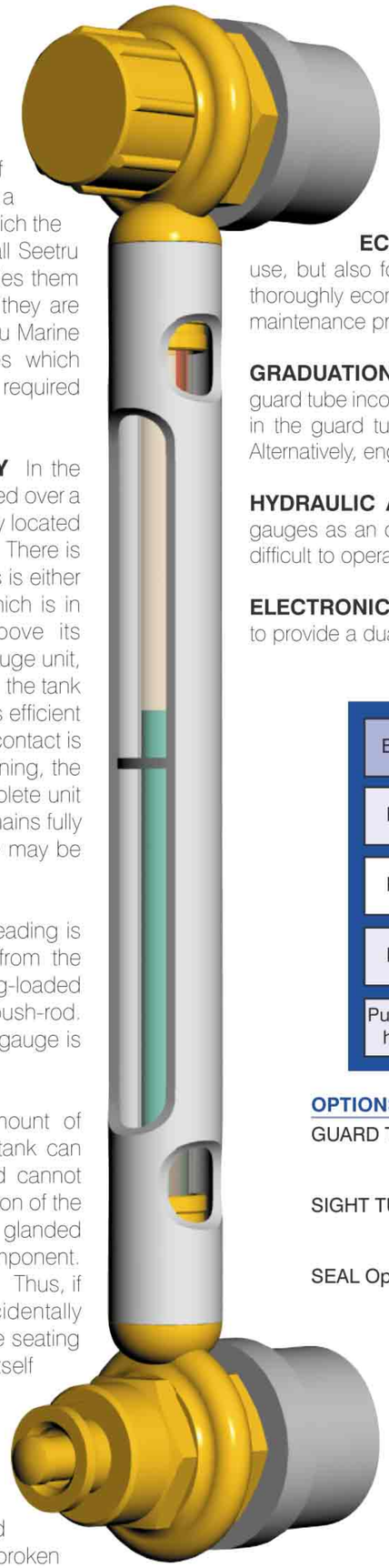


THE SEETRU MARINE GAUGE is the original sight-tube contents gauge to meet the requirements for non-flammable liquids in tanks, aboard ship. In common with the standard range of Seetru gauges, the Seetru Marine gauge comprises a flange type narrow gauge collar construction into which the sight tube is glanded. The gauge collar renders all Seetru gauges exceptionally neat and compact and enables them to be mounted very close to the tank wall where they are largely protected from external damage. The Seetru Marine gauge includes special additional safety features which enable it to achieve the high standards of reliability required on board ship.

INSTANT DISMANTLING AND RE-ASSEMBLY In the Seetru Marine gauge, the bottom gauge collar is fitted over a compact cylindrical valve body which is permanently located in a special tank boss near the bottom of the tank. There is also an identical collar at the top of the gauge. This is either fitted over a similar valve body or over a union which is in permanent liquid connection with the tank above its maximum liquid level. Retaining nuts secure the gauge unit, complete with collars, to the valve bodies housed in the tank bosses. Retaining nuts need only be finger-tight, as efficient O-rings seal the joints. Only gentle metal-to-metal contact is required at the collar faces. For servicing and cleaning, the gauge is withdrawn from the tank fittings as a complete unit merely by releasing the retaining nuts. The tank remains fully sealed, without draining. Subsequently, the gauge may be re-fitted for use within a few moments.

PUSH-BUTTON OPERATION Except when a reading is being taken, the gauge is permanently isolated from the contents of the tank. To take a reading, the spring-loaded gauge valve(s) is opened manually by pressing a push-rod. When released, the connection between tank and gauge is automatically re-sealed.

SAFE FROM EXTERNAL DAMAGE No amount of damage to the gauge or external fittings on the tank can break the liquid seals: in such an event, the fluid cannot escape. The gauge valve is housed in the rear portion of the valve body, which projects deep into the tank. The glanded push-rod, used to open the valve, is a separate component. It is not even in contact with the valve when sealed. Thus, if the exposed portion of the push-rod is accidentally damaged or broken, it cannot interfere with the safe seating of the valve. The special construction of the valve itself provides absolute sealing against even the most searching liquids. The seal between the valve body and the tank boss is situated near the end of the boss, itself projecting appreciably into the tank. By virtue of the deep-seating of the seal within the very robust tank boss, the seal would remain intact even if the entire external fitting were broken off.



THE HIGHEST SAFETY FACTOR

STURDY CONSTRUCTION The gauge fittings are of the finest quality brass and of substantial yet compact proportions. The sight tube is protected throughout by a metal guard tube.

MAGNIFIED LIQUID LEVEL The rear of the sight tube incorporates a special red marker stripe which is magnified by the liquid contents, clearly indicating the level, even if the liquid itself is colourless.

ECONOMICAL IN PRICE AND MAINTENANCE As Seetru gauges are supplied not only for marine use, but also for all branches of the manufacturing and service industries, large scale production methods enable thoroughly economical first costs to be achieved. Economy in use is ensured by their ease of installation and simple maintenance procedure.

GRADUATION Where a measure of the precise storage volume is required, graduated gauges can be supplied. The guard tube incorporates marked bridges indicating major intervals in gallons or other capacity units. Fine slots are milled in the guard tube to indicate intermediate intervals, thus providing an accurate scale readily visible at a distance. Alternatively, engraved brass scale plates can be provided for affixing alongside the gauge.

HYDRAULIC ACTUATION Remote-controlled or integral hydraulic actuation can be provided for Seetru Marine gauges as an optional extra. This facility is particularly helpful in the case of tall gauges where it would otherwise be difficult to operate the upper and lower push-button valves simultaneously.

ELECTRONIC AND DIGITAL READOUT Remote reading system and/or computer interface options are available to provide a dual system with the advantages of electronic and sight tube systems.

PRODUCT SELECTION

BOTTOM FITTING	TOP FITTING	MATERIAL OF CONSTRUCTION	FITTINGS PART NUMBER
Pushbutton valve	Valveless tank return	Brass	G21113121
		Stainless Steel	G21122121
Pushbutton valve	Pushbutton valve	Brass	G21113122
		Stainless Steel	G21122122
Pushbutton valve	Pipe Union Connection	Brass	G21113123
		Stainless Steel	G21122123
Push button valve with hydraulic actuation	Push button valve with hydraulic actuation	Brass	G21113144
		Stainless Steel	G21122144

OPTIONS

GUARD TUBE Options: Zinc plated mild steel, Stainless steel

SIGHT TUBE Options: Borosilicate glass, Polycarbonate tube

SEAL Options: Nitrile rubber, Viton rubber

GAUGE SELECTION EXAMPLE

LENGTH: Customer to specify centre to centre length required (minimum length of 150mm)

FITTINGS: G21113121

OPTION SELECTION:

GUARD TUBE: Zinc plated mild steel

SIGHT TUBE: Borosilicate glass

SEAL MATERIAL: Nitrile rubber

OTHER SEETRU MODELS FOR THE MARINE INDUSTRY

SEEFLEX - Pushbutton tank contents gauge for oil tanks with reflex glass to comply with the requirements of Solas.

QUICKMOUNT - Continuous reading tubular tank contents gauge for water with manual isolating valves.

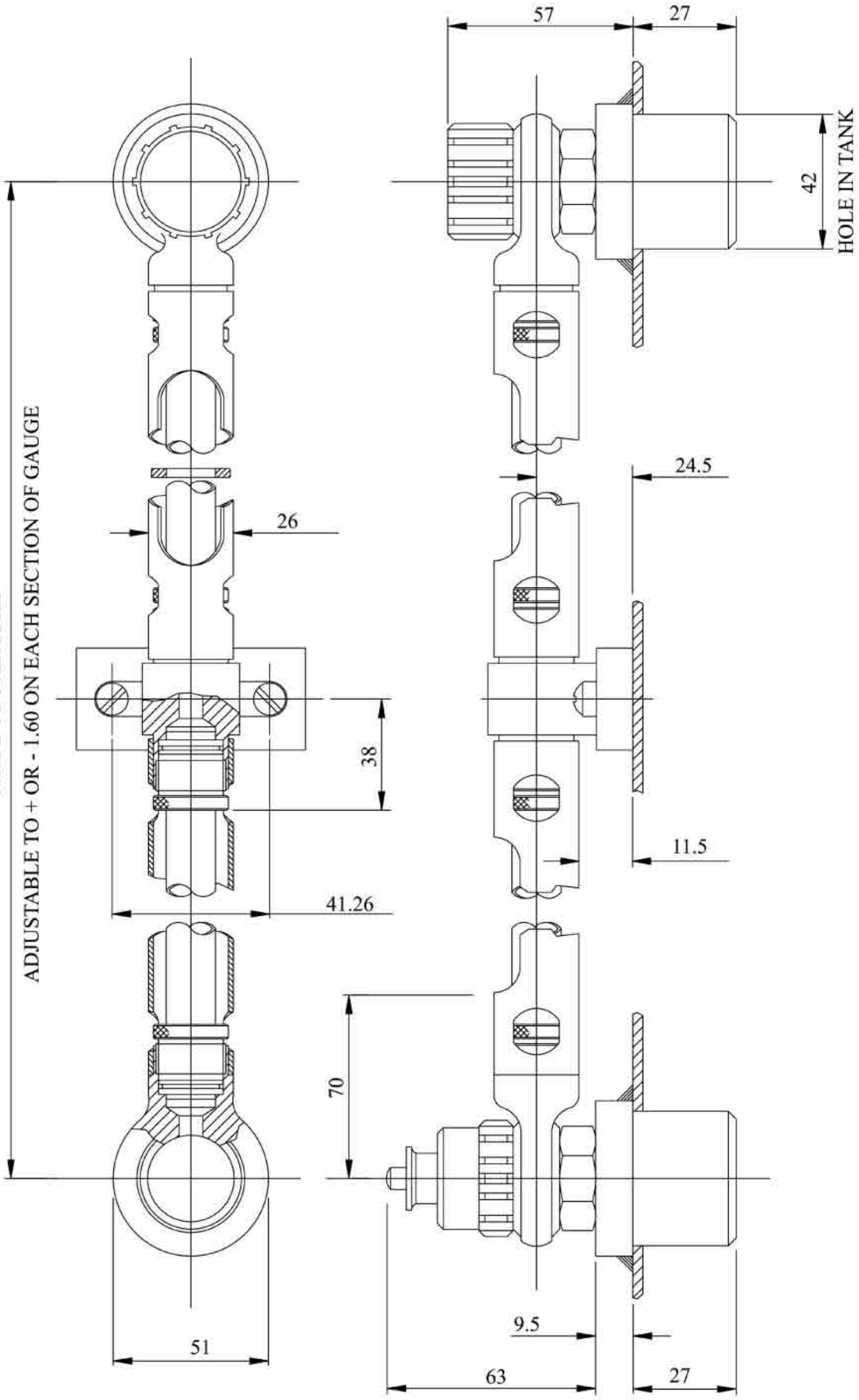
SEEMAG - Unique and economic magnetic float by-pass indicator. Options include: electrical level switches, electronic readout, computer interface, heating jacket.

ADMIRALTY - Designed for arduous requirements such as underwater shock loads and tank deflection, this gauge can accommodate connection misalignment along vertical and two horizontal axes.

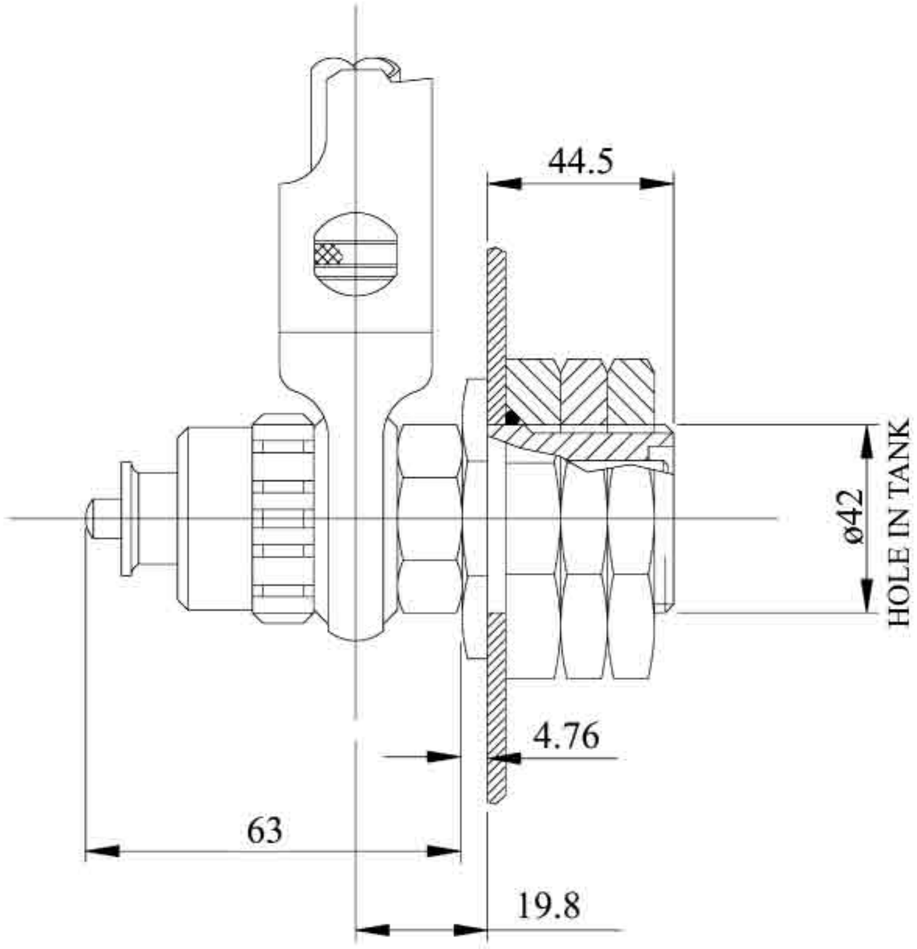
Seetru also manufacture: Pressure vessel control valves for engine air start, Safety relief valves, Check valve

INSTALLATION DIMENSIONS

SUGGESTIONS FOR FITTING THE MARINE GAUGE The Seetru Marine gauge is supplied complete with tank bosses either for welding in position or for fitting by means of special sealing nuts without welding. Where the welded pattern bosses are used it is suggested that the gauge, complete with the bosses, be offered to the holes in the tank wall. The bosses can then be tack-welded to ensure correct positioning. The gauge and mounting fittings can then be removed and the inside of the bosses protected with graphite grease to prevent oxidation during final welding. After welding the grease should be removed, and the fittings and gauge can then be reassembled to the tank. Where the alternative non-weld pattern bosses are supplied, these can be positioned and tightened without removing the gauge. If, after fitting the tank bosses, a length adjustment of the gauge is still required, this can be achieved by slackening the sight tube gland nuts and re-tightening after the gauge collars have been correctly aligned. For gauges exceeding 1 metre in length, intermediate support brackets are supplied which divide the sight tubes into lengths not exceeding 1metre. In such cases the gauge is supplied in sections, marked for easy assembly. In this way, Seetru gauges are also safeguarded against damage in transit.



Meeting requirements for non-flammable liquids



Alternative tank boss secured to tank by sealed retaining nut. Requires no welding.

SEETRU LIMITED

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Our Agent

EDITION B

Admiralty Pattern

Sight Gauges

Meeting modern requirements for liquid level gauging

SEETRU
LIMITED

THE SEETRU ADMIRALTY GAUGE

Designed and constructed to provide direct level observation of liquid levels.

Simple Installation

Seetru gauges are supplied complete with column assembly, valves and self sealing tank bosses for installation into tanks.

Tank Calibration

Where precise measurement of the liquid content is required a graduated scaleplate can be attached to the column assembly.

Clear and Accurate Indication

Clear level indication of even colourless liquids is provided, and the liquid level viewed in the gauge column corresponds to the liquid level in the tank.

Electronic and Digital Readout

Remote reading systems and/or computer interface options provide a dual system with the advantages of both electronic and sight glass systems.

Column Removal without Emptying the Tank

Unique design isolating valves when closed allow the column to be removed from the tank even when the tank is full or under pressure.

The Seetru Admiralty Pattern Liquid Level Gauge

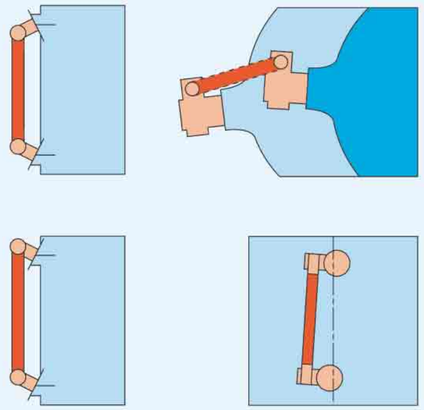
has been designed and developed to meet arduous UK Ministry of Defence requirements, such as for tank deflection and underwater shock loads.

This unique gauge allows installation on malaligned tank connections as may, for example, be found on marine or other storage tanks of light walled construction which can deform or bulge. The tank connection valve fittings can accommodate misalignment vertically and along two mutually perpendicular axes horizontally through an adjustable fitting which enables correction of misalignment at the time of fitting or subsequently*. The valve fittings each form, in fact, a universal joint which gives the gauge its adaptability for difficult conditions of installation.

In the pushbutton version, the self closing valve is situated in the rear portion of the valve body which projects into the tank. This ensures leakproof protection whatever damage occurs to the gauge parts on the outside of the tank.

This robust direct reading sight tube gauge has substantial passages and is suitable for use on any storage tanks or bunkers for up to medium heavy fuel oil.

Typical misalignments accommodated



Economical in price and maintenance

Seetru gauges are supplied for marine use and in all branches of industry. Large scale production methods enable highly economical first costs to be achieved. Economy in use is ensured by their ease of installation and simple maintenance procedures.

Simple retaining nuts secure the gauge column, complete with collars, to the valve bodies housed in the tank bosses. These retaining nuts need only be finger-tight, as efficient O-rings seal the joints. Only gentle metal-to-metal contact is required at the collar faces.

For servicing and cleaning, the gauge column can, in a few moments, be withdrawn from the isolated tank fittings as a complete unit, merely by releasing the retaining nuts. It is not necessary to drain the tank as it can remain fully sealed.

Sturdy construction

The gauge fittings are of substantial yet compact proportions in bronze or all stainless steel. The sight tube is normally of Polycarbonate high-resistance plastic, but can be supplied in other materials such as heat resisting (Borosilicate) glass. The sight tube is protected throughout by a metal guard tube which is normally of zinc plated mild steel, though other materials such as stainless steel are available. A variety of seals are available to suit the duty, Nitrile is supplied as standard and alternatives include Viton®. Where tanks are not subject to shock or distortion after installation gauges can be provided with intermediate support brackets.

Top and bottom valve connections are either screwdown or pushbutton operation, these are available in combinations to meet requirements. A valveless unit is available for the top connection. As an optional extra, sampling valves can be provided with the gauge valves, these enable samples of the tank contents to be drawn off

When fitted with pushbutton valves the gauge column is permanently isolated from the contents of the tank except when a reading is being taken. To take a reading; the spring-loaded gauge valve(s) is opened manually by pressing a push rod. When released, the connection between the tank and gauge is automatically re-sealed.

* The admiralty gauge can only accommodate misalignments which occur subsequent to installation if no intermediate support brackets are fitted.

® Viton is a registered trademark of DuPont Dow Elastomers.

Hydraulic actuation

Remote-controlled hydraulic actuation can be provided as an optional extra when pushbutton valves are fitted at both ends. This facility is particularly helpful in the case of tall gauges where it would otherwise be difficult to operate the upper and lower pushbutton valves simultaneously. Seetru pushbutton isolating valves require no modification to enable them to be used with hydraulic actuation.

Magnified liquid level

The rear of the sight tube has a special red marker strip which is magnified by the liquid contents, clearly indicating the level, even if the liquid itself is colourless.

Guard Tube

A zinc plated mild steel guard tube provides protection for the Borosilicate or Polycarbonate sight tube, stainless steel guard tubes are also available. Anti-rattle rings are fitted between the guard tube and sight tubes.

Minimum length

200mm centres.

Calibration

Where a measure of the precise storage volume is required the guard tube can be supplied graduated or an engraved scale plate can be affixed alongside the gauge.

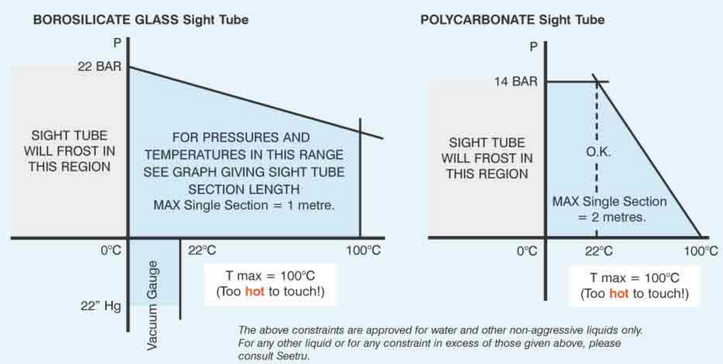
Electronic and digital readout

Electronic remote reading system and/or computer interface options are available to provide a dual system providing the advantages of both electronic and sight glass systems. Level alarms are also available.

Tank connections

Self sealing steel bosses for welding into the tank are supplied as standard. Non-weld boss option also available. Stainless steel versions of each are also available.

Length, temperature and pressure constraints



The above constraints are approved for water and other non-aggressive liquids only. For any other liquid or for any constraint in excess of those given above, please consult Seetru.

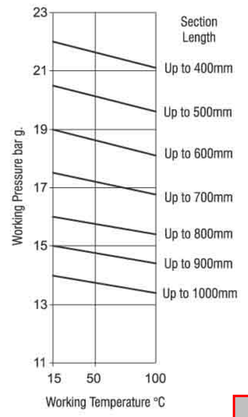
- *A hazard/risk analysis should be carried out where the gauge is being considered for use with a medium which, due to temperature, pressure or hazardous nature, could cause injury. Contact Seetru for advice.*
- *Contact Seetru for information on pressures and temperatures outside ranges shown.*
- *Standard seals are Nitrile (max temp 110°C), other seal materials, such as Viton® are available for special applications.*
- *For vacuum conditions greater than 22"Hg a special design is available.*

Borosilicate sight tube section length

The maximum operating temperature and pressure are dependent on the length of the gauge column glass sections. Additional intermediate joints and supports can be used to reduce the length of the borosilicate glass column sections and so achieve higher pressures and temperatures (see graph).

Example: A gauge with centres of 1800mm in two sections of 900mm is suitable for the range 15 bar g. at 15°C to 14.4 bar g. at 100°C.

By introducing an extra intermediate joint and support bracket each section becomes 600mm and therefore is suitable for the range 19 bar g. at 15°C to 18.1 bar g. at 100°C. Additional intermediate supports can be used, the maximum rating achievable is for "up to 400mm".

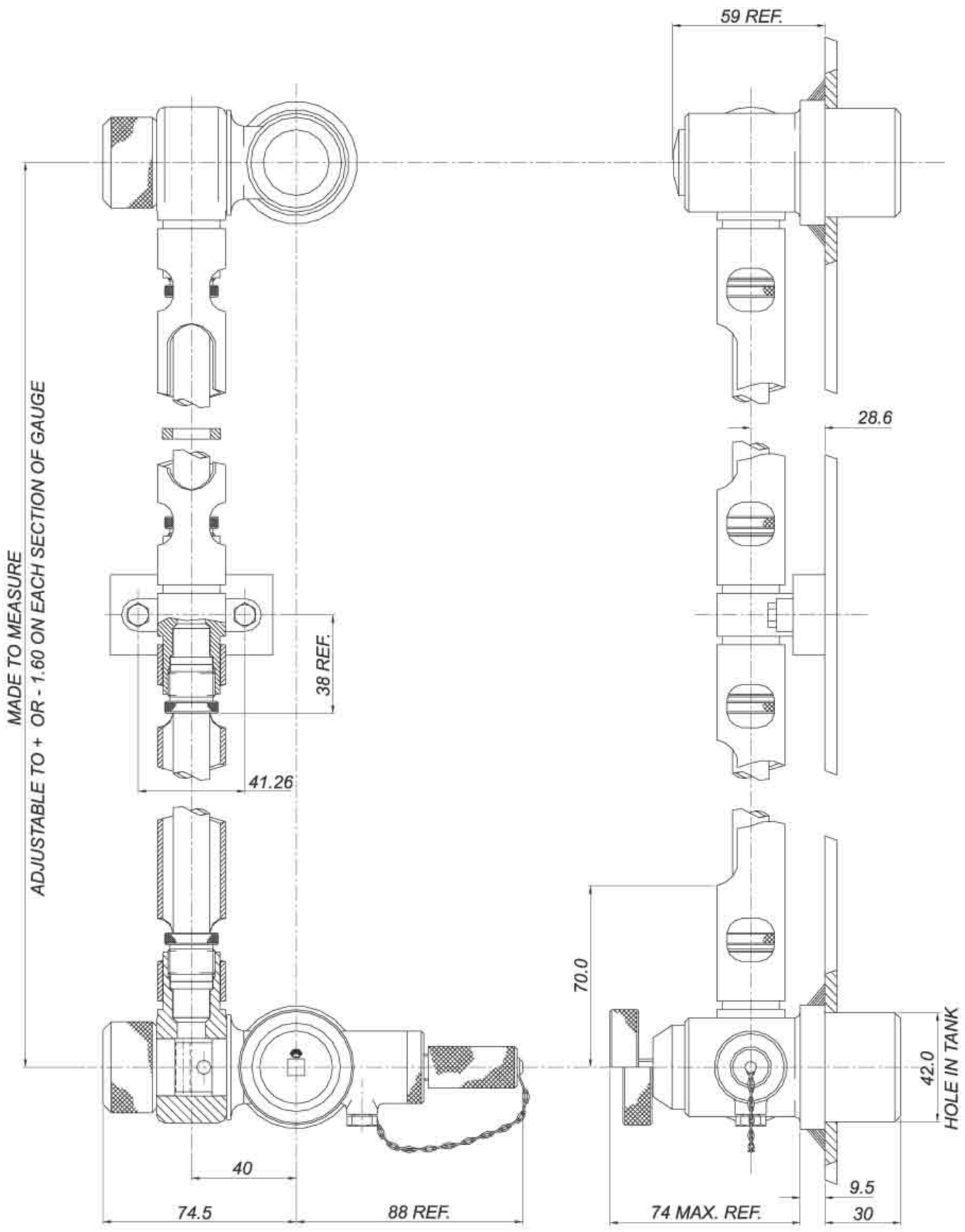


Installation and Dimensions

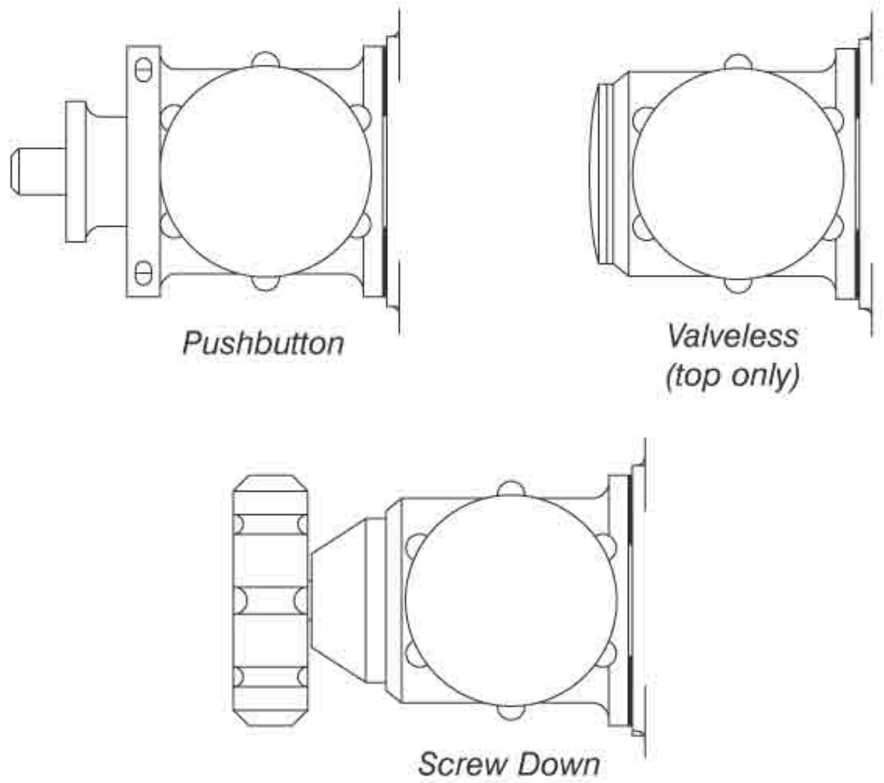
Suggestions for fitting the Admiralty gauge

The Seetru Admiralty gauge is supplied complete with tank bosses either for welding in position or for fitting by means of special sealing nuts without welding. Where the welded pattern bosses are used it is suggested that the gauge, complete with the bosses, be offered to the holes in the tank wall. The bosses can then be tack-welded to ensure correct positioning. The gauge and mounting fittings can then be removed and the inside of the bosses protected with graphite grease to prevent oxidation during final welding. After welding the grease should be removed, and the fittings and gauge can then be re-assembled to the tank. Where the alternative non-weld pattern bosses are supplied, these can be positioned and tightened without removing the gauge. If, after fitting the tank bosses, a length adjustment of the gauge is still required, this can be achieved by slackening the sight tube gland nuts and re-tightening after the gauge collars have been correctly aligned. The intermediate support brackets shown in the diagram are supplied typically for gauges longer than 1m when fitted with Borosilicate glass sight tubes. The intermediate support brackets may not be necessary when Polycarbonate sight tubes are fitted (contact Seetru for further information).

When fitted with support brackets the gauge is supplied in sections, marked for easy assembly. In this way Seetru gauges are also safeguarded against damage in transit.

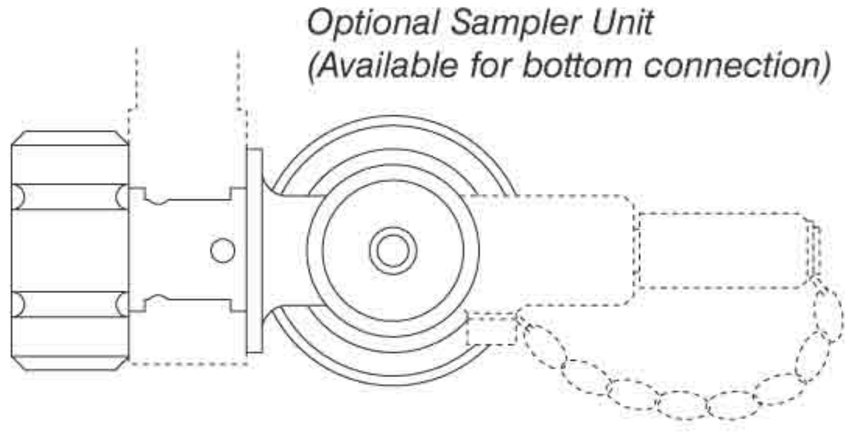


Connection Options (Top and Bottom)



Contact Seetru for detailed advice on selection of gauge and configuration options to meet application requirements

Optional Sampler Unit (Available for bottom connection)



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Our Distributor

EDITION B

Liquid Level Gauges

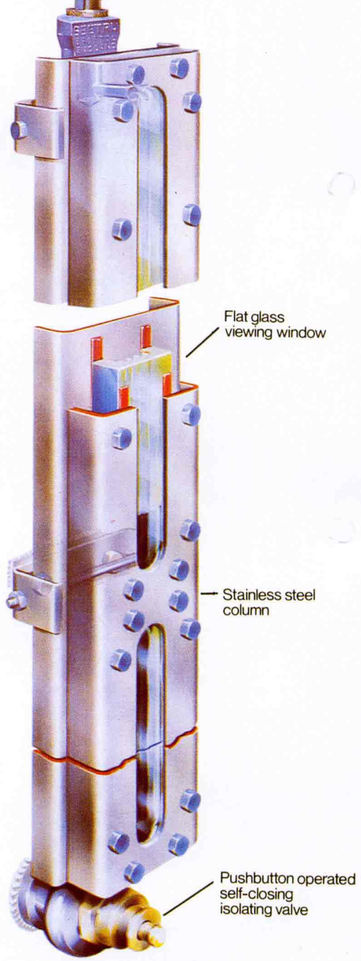
Seetru Marine Gauge
Seeflex® model
with flat glass

SEETRU

for flammable tank contents in cargo ships

SEEFLEX®

Worldwide patents pending.



The Seetru Marine Gauge – Seeflex® model has been developed to comply with the requirements of the SOLAS 1981 amendments. The gauge has been reviewed and in a suitable construction is accepted by marine classification authorities throughout the world.

Flat glass design
Excellent level indication even of colourless liquids is provided by reflex glass viewing windows.
The toughened borosilicate glass window is housed and protected in a robust stainless steel column.
The construction provides a modern gauge which fits close to the tank wall and is aesthetically pleasing.

Self Closing Isolating Valves
Seetru pushbutton operated, self-closing isolating valves have been used on marine installations for many years. The Seeflex® gauge incorporates this well-proven design, which provides full safety in preventing liquid loss from the tank. The tank will remain sealed by the self-closing valve even if the gauge column is totally destroyed.
A tank boss is supplied with each isolating valve. The standard boss is suitable for welding to the tank, but bosses for non-weld installation are available.
Certain classification authorities require that the pushbutton valves are always fitted with the approved Seetru Hydraulic actuating system – Seetru will advise when this applies.

Easily maintained
When required, the liquid chambers can be cleaned with the gauge on the tank, alternatively the isolating valves will allow column removal without need to drain the tank.

Tank calibration
For precise measurement of the liquid content, a graduated scaleplate can be supplied. The scaleplate is attached to the column, providing a direct observation of the liquid level against the units of graduation.

liquid level gauges with flat glass

meets SOLAS requirements

Tank connections
Information on the gauge connections accepted by individual Marine Classification Authorities is shown on the back cover of this leaflet.
The self-closing, pushbutton-operated valve is always fitted at the lower connection of the gauge. Subject to acceptance by the Marine Authority, a closed circuit or open circuit pattern may be selected for the gauge top connection.

Standard manufactured lengths
Two sizes of viewing window are combined to provide a wide range of manufactured lengths. A standard manufactured length must be selected to suit each tank.

Refitting of ships to comply with SOLAS 1981 amendments
Seetru gauges with cylindrical glass sight tube can be replaced by the Seeflex® model fitting onto the existing tank bosses.
Where a Standard Manufactured Length is not suitable, an open circuit pattern gauge can be supplied complete with a plug to seal the existing top tank boss.

Closed circuit pattern
Direct connection from the top of the gauge to the tank can be made with a pushbutton operated self-closing valve or, alternatively, a valveless unit.
When two pushbutton-operated self-closing valves are fitted, it is essential that both valves are open to obtain the correct liquid level reading. An approved hydraulic actuating system is available to operate both valves from a single actuator.
NOTE: The valveless tank return unit must not be installed below the highest level of a flammable liquid.

Open circuit pattern
When it is possible for the gauge column to extend above the top of the tank, by a minimum of 160mm or maximum 250mm, a gauge requiring connection into the tank at the lower end only can be selected. The upper end of the gauge can be supplied with an automatic safety vent valve or, alternatively, a pipe union connection. The automatic safety vent valve will allow air to pass, but will seal against a liquid level. In the case of the pipe union connection design, a 10mm o/d steel vent pipe is returned to the tank or into the tank vent pipe.

Hydraulic Actuation – one lever operates up to 4 isolating valves simultaneously.

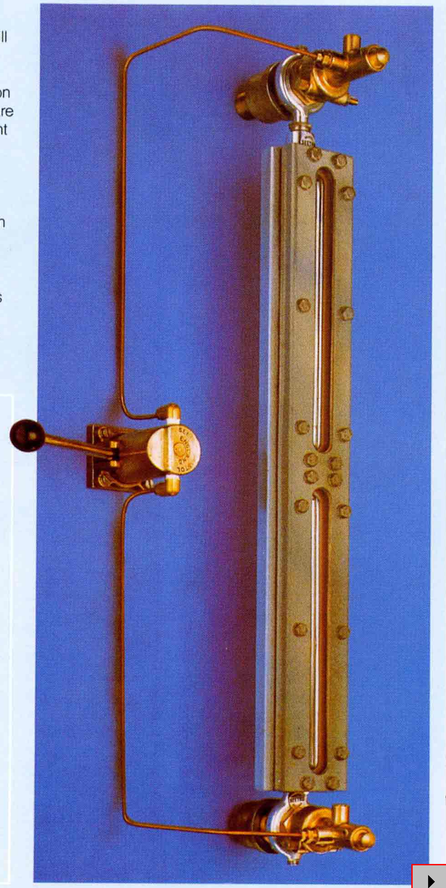
The Seetru Marine Gauge – Seeflex® model can be opened from a remote position by an operator using hydraulic actuation.
May be used when pushbutton valves are installed at the top and lower end of the gauge, as both must be open to obtain correct liquid level.
Certain classification societies require that the hydraulic actuation is always fitted to the isolating valves. Seetru will advise when this is applicable.

Seetru pushbutton isolating valves require no modification to convert them to hydraulic actuation. Hydraulic heads are attached to the valve units by cotter-pins, providing instant installation or dismantling.
Direct operation of the pushbutton valve is still possible when an hydraulic head is fitted.

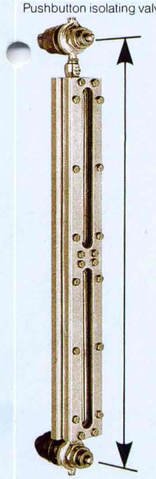
The hand pump can be placed in any convenient position and connected to the hydraulic head on the isolating valves by 1/8 inch diameter half hard copper tube.

Thermal expansion of the oil caused by normal increases in temperatures are accommodated in the pump unit. A fusible plug protects the system in the event of excessive temperature.

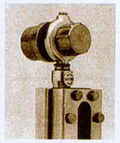
Number of isolating valves operated by single hand pump	Total allowable length of piping
1	60 metres
2	30 metres
3	20 metres
4	15 metres



Pushbutton isolating valves top and bottom.



Standard Manufactured Lengths

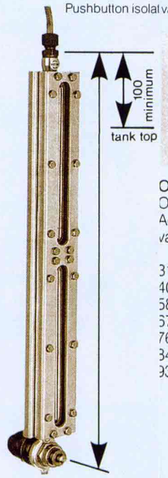


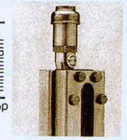
Valveless tank return top.

CLOSED CIRCUIT DESIGN *(dimensions in millimetres)*
Length between centres of top and bottom valves.
(Adjustment of ± 5mm available)

360	1070	2040	3015	4000	
450	1160	2130	3105	4080	
620	1240	2220	3200	4170	Manufactured
710	1330	2305	3290	4260	Lengths
800	1420	2395	3370	4350	for
885	1515	2490	3460	4435	longer
975	1595	2580	3550	4525	column
	1685	2660	3640	4615	on request
	1780	2750	3725	4710	
	1870	2840	3815	4790	
	1950	2930	3910	4880	
				4970	
				5060	Max length 9m

Pushbutton isolating valve bottom and pipe union connection top.





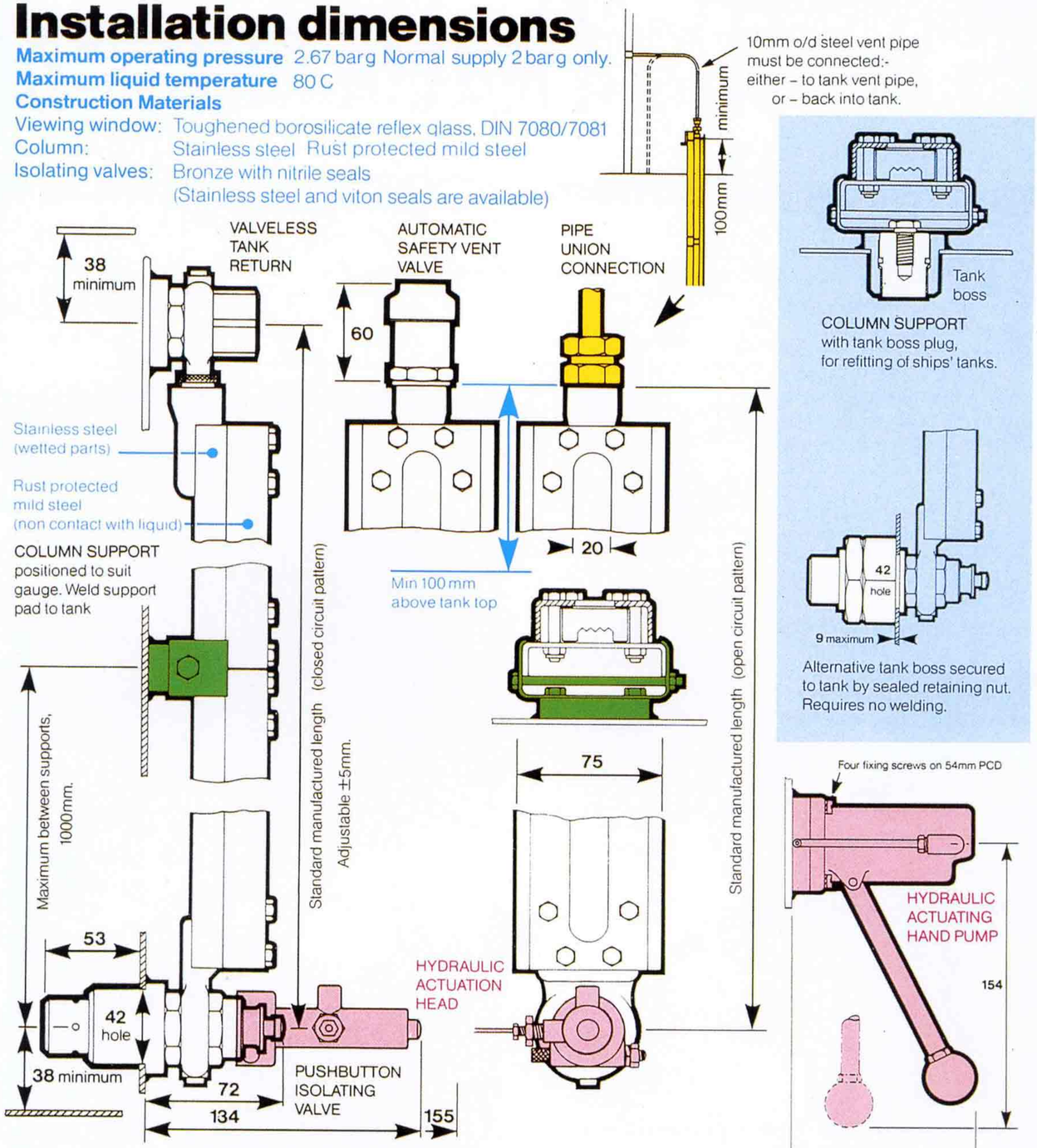
Automatic safety vent valve top.

OPEN CIRCUIT DESIGN *(dimensions in millimetres)*
Overall gauge column length.
Add 60mm for total height when automatic safety vent valve is fitted.

315	1025	2000	3065	4040	
405	1115	2090	3155	4130	
580	1200	2180	3245	4220	Manufactured
670	1290	2265	3330	4310	Lengths
760	1380	2355	3420	4395	for
845	1470	2445	3510	4485	longer
935	1555	2535	3600	4575	column
	1645	2620	3685	4665	on request
	1735	2710	3775	4750	
	1825	2800	3865	4840	
	1910	2890	3955	4930	
		2975		5020	

Installation dimensions

Maximum operating pressure 2.67 barg Normal supply 2 barg only.
Maximum liquid temperature 80 C
Construction Materials
Viewing window: Toughened borosilicate reflex glass, DIN 7080/7081
Column: Stainless steel Rust protected mild steel
Isolating valves: Bronze with nitrile seals
(Stainless steel and viton seals are available)



COLUMN SUPPORT with tank boss plug, for refitting of ships' tanks.

Alternative tank boss secured to tank by sealed retaining nut. Requires no welding.

Suggestions for fitting the marine gauge – Seeflex® model

The gauge is supplied complete with tank bosses either for welding in position of fitting by means of special sealed internal nuts without welding. Both require 42mm diameter holes.

Where welded type bosses are used –

1 Assemble gauge complete with tank bosses.
2 Position assembly on to tank and tack weld the bosses.
3 Tack weld column support pad(s) to tank.
4 Remove gauge assembly leaving tank bosses and column support(s) in position.
5 Protect inside of tank boss with graphite grease.
6 Weld tank boss and pads.
NOTE: On mild steel tanks use Electrode Arosta 316L-150 or equivalent welding rod.
7 Remove protective grease and reassemble gauge to tank.

Length adjustment on closed circuit gauges

1 Slacken gland nut at the top of column.
2 Move top connection for adjustment ±5mm.
3 Re-tighten gland nut.

Marine Authorities that have reviewed and advised product acceptance for cargo ships' tanks containing lubricating or other flammable oils (subject to installation to the ships surveyors' satisfaction).

Lower Connection	CLOSED CIRCUIT Pushbutton		Pushbutton		OPEN CIRCUIT Pushbutton		Pushbutton	
Upper Connection	Pushbutton		Valveless [1]		Pipe union		Auto safety vent	
Hydraulic Actuation	Fitted	None	Fitted	None	Fitted	None	Fitted	None
Lloyd's Register of Shipping *(UK)*	✓	✓	✓	✓	✓	✓	✓	✓
Department of Transport *(UK)*	✓ [2]	✓ [2]	X	X	X	X	X	X
Department of Transport *(Hong Kong)*	✓ [2]	✓ [2]	X	X	X	X	X	X
Germanischer Lloyd *(W Germany)*	✓	✓	✓	✓	✓	✓	✓	✓
RINA *(Italy)*	✓	✓	X	X	✓	✓	✓	✓
American Bureau of Shipping *(USA)*	✓	✓	X	X	X	X	✓	✓
US Coastguard *(USA)*	☆	☆	X	X	X	X	☆	☆
Bureau Veritas *(France)*	✓	✓	✓	✓	✓	✓	✓	✓
Det Norske Veritas *(Norway)*	✓	✓	✓	✓	✓	✓	✓	✓
Direktoratet for Statens Skibstilsyn *(Denmark)*	✓	X	X	X	✓	✓	X	X
Siglingamalastofnun Rikisins *(Iceland)*	✓	✓	✓	✓	✓	✓	✓	✓
Ministerie Van Verkeer Waterstaat *(Holland)* (NSI)	✓	✓	✓	✓	✓	✓	✓	✓
Canadian Coastguard *(Canada)*	✓	✓	X	X	✓	✓	✓	✓
NKK *(Japan)*	✓	✓	✓	✓	✓	✓	✓	✓
Register of Shipping *(Russia)*	✓	✓	✓	✓	✓	✓	✓	✓

✓ Approved X Not acceptable ☆ Accepted and supplied on a ship by ship basis.

NOTES

[1] The valveless tank return must be installed above the highest possible level of a flammable liquid.

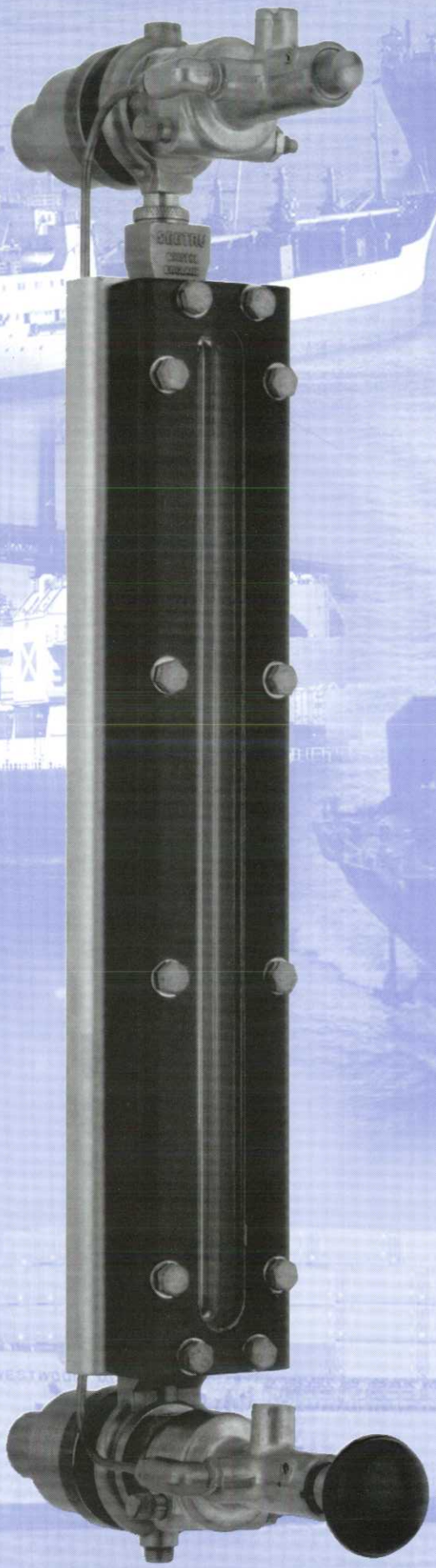
[2] Department of Transport-approved for lubricating and other flammable oils, except fuel oil. Fitting of Hydraulic Actuation is optional on small tanks requiring gauge up to, and including, 1330mm centres.

SEETRU Limited
Albion Dockside Works
Hanover Place
Bristol BS1 6UT
England

Telephone 0117 927 9204
Fax: 0117 929 8193

Liquid Level Gauges

Seetru Marine Gauge



Seeflex Model

now with integral hydraulic actuation system.

for flammable tank contents in cargo ships

SEETRU LIMITED

SEEFLEX GAUGE WITH INTEGRAL HYDRAULIC ACTUATION

The Seetru Marine Gauge Seeflex model has been developed to comply with the requirements of SOLAS, including the 1981 amendments. The gauge, proven in use over many years, is now available with integral hydraulic actuation. Using this system both top and bottom self sealing valves are operated by a single push button.

- Hydraulic system supplied fully fitted and working on new gauges
- Hydraulic system can be fitted to existing Seeflex or Tubular Marine Gauges
- Hydraulic system operates both top and bottom self closing valves using a single push button. The button may be fitted on either the top or bottom self closing valve
- Use of standard Reflex glass units ensures internationally available spares
- In addition to meeting SOLAS rules, the gauge is formally approved for cargo ship use by LRS, MSA, DNV, ABS, Canadian Coastguard, RINA and Germanischer Lloyd. Approvals by other authorities can be requested.
- High contrast indication of colourless liquids
- Self closing isolating valves remain closed unless button is pushed
- Isolating valves allow gauge column removal without the need to drain the tank
- The gauge sealing system ensures that the tank remains leak tight even if the gauge is accidentally smashed off.
- Standard manufactured lengths up to 9m
- Isolating valves available in bronze or stainless steel with a variety of seal materials
- Manufactured to a quality system approved in accordance with BS EN ISO 9001
- Each hydraulic end fitting contains a fusible plug which protects the system in the event of excessive temperature
- Separate extended hydraulic actuating system available to allow simultaneous opening of actuating valves on several gauges from remote observation position.
- Lloyds and DNV approved for mobile offshore units, also Lloyds approved for fixed offshore installations.

The SEETRU range of quality liquid level indicators are suitable for wide industrial, process and marine applications. These products, manufactured to strict quality standards, provide clear and safe level indication of most liquids. Seetru also design and manufacture a range of remote indicating liquid level gauges and a comprehensive range of safety relief valves for use with liquids and gases.

SEETRU LIMITED

SEETRU LIMITED

Albion Dockside Works, Hanover Place,
Bristol, BS1 6UT, England.

Telephone 0117 927 9204. Fax 0117 929 8193.

SEETRU LTD
Window Sight Glasses

Compact assemblies that provide reliable level indication at low cost. Both the window sightglass and Seetru Mini gauge are fitted with quality glass and are constructed suitable for elevated temperature and pressurized applications.

Window Sightglass
A convenient indicator

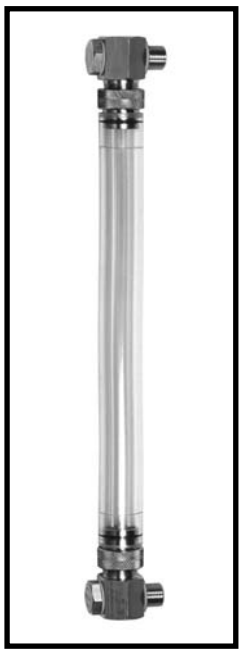
Two designs are available offering a flat or domed glass viewing window. Cushioned against shock, the glass window is fully sealed in a steel body as standard, alternative materials can be considered.

Flat Glass Window

Positive indication when liquid present.
Reflector provides visual enhancement of coloured liquids.
Reflex glass version gives black/silver indication with colourless liquids.

Domed Glass Window

Presence of liquid can be checked from any forward viewing position.



Seetru Mini Gauge
A sight tube for level indication

Protected by a clear polycarbonate plastic guard tube, the glass sight tube provides liquid level indication over the required height of the vessel.
Colourless liquids are indicated by a coloured tape that is magnified when viewed through the liquid. The required maximum and minimum fluid levels can be indicated on a scale plate supplied to suit individual applications.
The valveless end units with screwed vessel connections are sealed to the sight tube by a unique 'O' ring gland system to ensure ease of installation and trouble free operation. The gland system will allow for adjustment of the gauge ±2mm on the fitting centres.

Other Products

- Safety Relief Valves for Compressed Air & Gases.
- Safety Relief Valves with Resilient Seals.
- Safety Relief Valves with Metal Sealing.
- Check Valves.
- Tubular Glass, Reflex Glass & Magnetic
- Safety Relief Valves for Refrigerants.
- Liquid Level Gauges.

Seetru Limited, Albion Dockside Works, Bristol BS1 6UT

Tel: 0117 927 9204 **Fax: 0117 929 8193**
Email: enquiries@seetru.com **Web: www.seetru.com**

WINDOW SIGHT GLASS

When ordering please state part number, thread size, fluid, operating temperature and pressure.

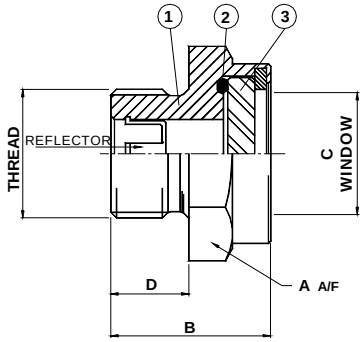
WORKING PRESSURE:
(See Size Chart)

OPERATING TEMPERATURE:
Subject to application
Nitrile seals up to 120°C
Viton seals up to 180°C.

No.	ITEM	MATERIAL
1	BODY	MILD STL. ZINC PLATED & PASSIVATED
2	SEAL	NITRILE OR VITON
3	VIEWING WINDOW	SERIES 'SF' : SIZES 1/2", 3/4" & 1". ANNEALED BOROSILICATE HEAT RESISTING GLASS. 1 1/2", 1 1/4" & 2". TOUGHENED SODA LIME GLASS. SERIES 'SD' : ANNEALED BOROSILICATE HEAT RESISTING GLASS.

Series 'SF' - Flat Glass Window

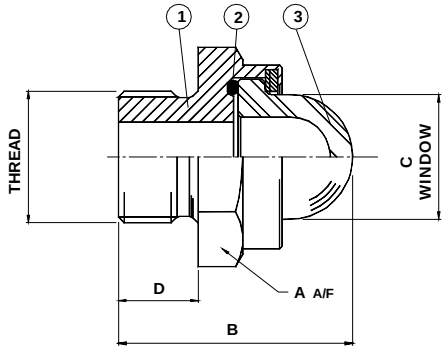
Standard construction shown. Alternative threads, sizes, pressures, reflex glass and temperatures may be available.



CONNECTION BSP	PART NUMBER CLEAR GLASS WITHOUT A REFLECTOR	PART NUMBER CLEAR GLASS WITH REFLECTOR	DIMENSIONS mm				STANDARD WORKING PRESSURE BAR.G.
			A	B	C	D	
1/2"	SFG04135*	SGG04135*	33	30	19	14	16
3/4"	SFG06135*	SGG06135*	33	31	19	16	16
1"	SFG08135*	SGG08135*	38.1	34.5	21	19	16
1 1/4"	SFG10135*	SGN10035*	52	37	31	22	24
1 1/2"	SFG12135*	SGG12135*	52	36.5	31	22	24
2"	SFG16135*	SGG16135*	65	40	45	27	14.5

Series 'SD' - Domed Glass Window

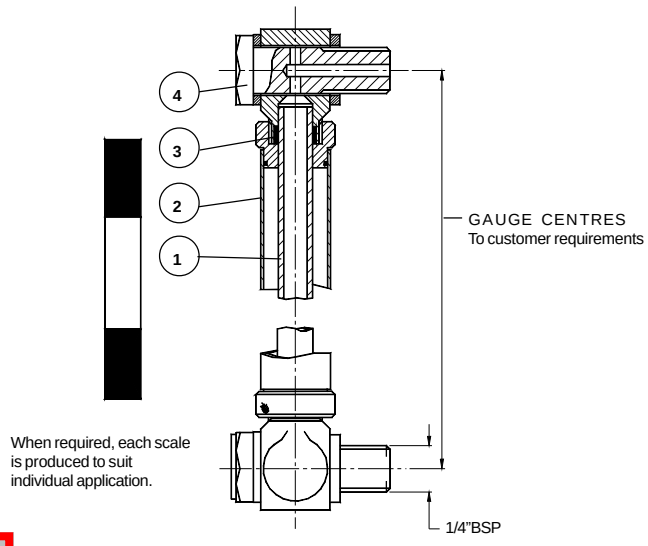
Standard construction shown. Alternative threads, sizes, pressures and temperatures may be available.



CONNECTION BSP	PART NUMBER DOMED GLASS	DIMENSIONS mm				STANDARD WORKING PRESSURE BAR.G.
		A	B	C	D	
1/2"	SDG04135*	38.1	45	25	14	16
3/4"	SDG06135*	38.1	47	25	16	16
1"	SDG08135*	38.1	50	25	19	16

SEETRU MINI GAUGE ***(Ref: No. G27)***

When ordering please state distance between gauge centres, fluid operating temperature and pressure.
Quotation for scale plate on request.

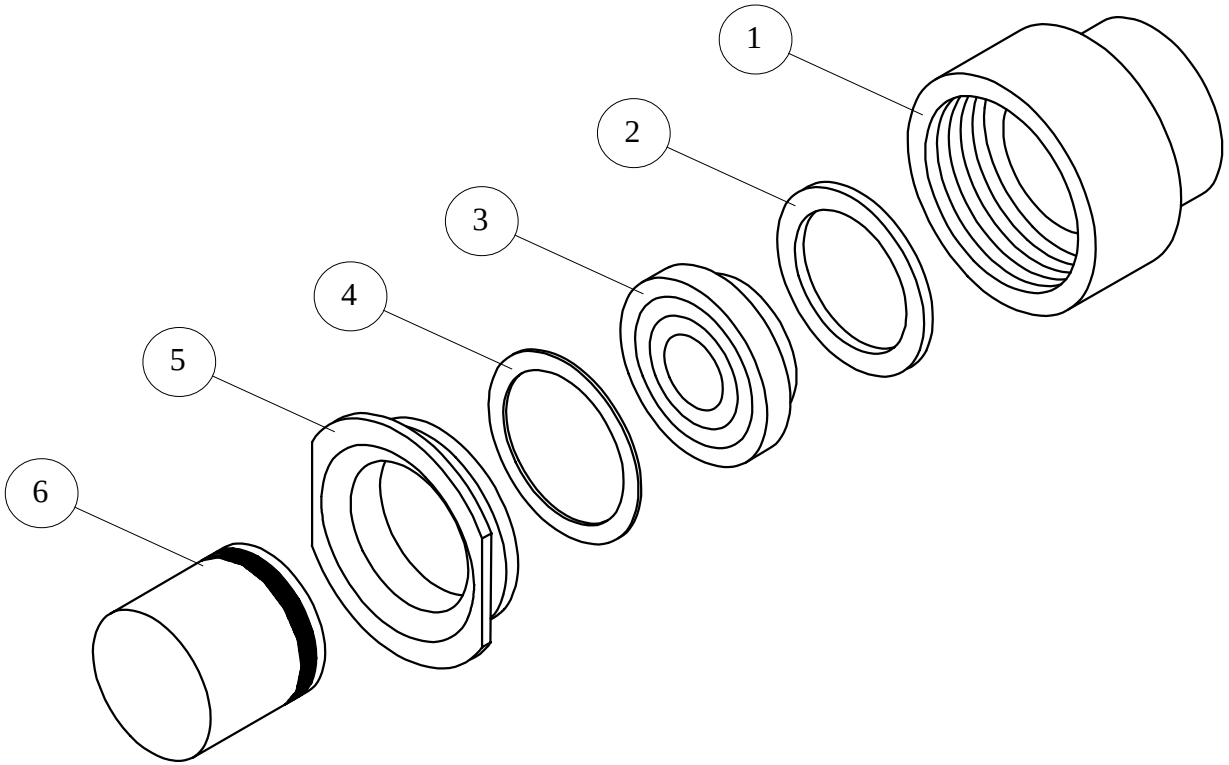


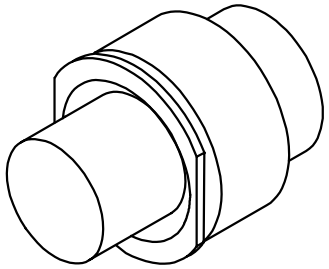
No	ITEM	MATERIAL
1	SIGHT TUBE	ANNEALED BOROSILICATE HEAT RESISTING GLASS
2	GUARD TUBE	POLYCARBONATE PLASTIC
3	GLAND ASSY	VITON & P.T.F.E.
4	END UNIT	BRASS

WORKING PRESSURE:
19 Bar.g. standard working pressure, up to 30 Bar.g. available, subject to application.

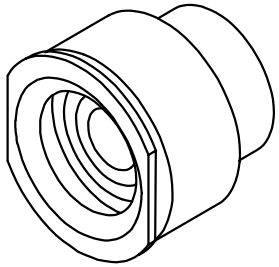
OPERATING TEMPERATURE:
Up to 180°C, subject to application.

SIGHT GLASS UNIT SUITABLE FOR USE WITH LIQUIFIED REFRIGERANTS





Assembly with optional Frost Shield



Assembly without Frost Shield

PARTS LIST AND MATERIAL SPECIFICATION.

1	BODY	PLATED MILD STEEL
2	SEALING WASHER	NEOPRENE
3	REFLEX GLASS	BOROSILICATE GLASS
4	CUSHION WASHER	P.T.F.E.
5	LOCKING RING	PLATED MILD STEEL
6	FROST SHIELD	ACRYLIC

TECHNICAL SPECIFICATION

Suitable for use with Freon 12, 22, 500, 502, and Ammonia.
Maximum working pressure = 25 bar.g
Operating temperature range = 0°C to 100°C.
Tank connection, 48mm diameter for welding into a 50mm diameter hole, or over a 40mm diameter hole.

OPTIONS

Available with frost shield. This component prevents build-up of frost on the face of the reflex glass.

ASSEMBLY NOTES

Locking ring (item 5) to be tightened to a torque of 30lbs ft. (40.68 Nm).
The sight glass assembly MUST be tested for pressure tightness BEFORE fitting the optional frost shield.
When fitting frost shield, a thin layer of mineral oil must be applied to the 'O' ring. This permits air trapped between the shield and the reflex glass to escape.

Ebtrade LIMITED

EBTRADE LIMITED

ALBION DOCKSIDE WORKS, HANOVER PLACE, BRISTOL BS1 6UT
TELEPHONE (0117) 9279204, FAX (0117) 9298193

SIGHT GLASS UNIT SUITABLE FOR USE WITH LIQUIFIED REFRIGERANTS

TYPE NUMBER A1-700-5R

EDITION B. 12/3/92

PARTS & MATERIAL LIST

No.	ITEM	MATERIAL
1	BODY	MILD STL. ZINC PLATED & PASSIVATED. ST.STL. 316. BRASS CHROME PLATED.
2	SEAL	TO SUIT APPLICATION
3	VIEWING WINDOW	SERIES 'SF' SIZES: 1/2", 3/4" & 1" ANNEALED BOROSILICATE HEAT RESISTING GLASS. SIZES: 1 1/2", 1 1/4" & 2" TOUGHENED SODA LIME GLASS.
		SERIES 'SD' ANNEALED BOROSILICATE HEAT RESISTING GLASS.
		SERIES 'SR' SIZES: 1/2", 3/4" & 1" ANNEALED BOROSILICATE HEAT RESISTING GLASS.

SERIES 'SF' & 'SR'

FLAT GLASS WINDOWS & REFLEX GLASS WINDOWS

CONNECTION BSP	PART NUMBER CLEAR GLASS WITHOUT A REFLECTOR	PART NUMBER CLEAR GLASS WITH REFLECTOR	PART NUMBER REFLEX GLASS	DIMENSIONS mm				STANDARD WORKING PRESSURE BAR.G.
				A	B	C	D	
1/2"	SFG04135*	SGG04135*	SRG04135*	33	30	19	14	16
3/4"	SFG06135*	SGG06135*	SRG06135*	33	31	19	16	16
1"	SFG08135*	SGG08135*	SRG08135*	38.1	34.5	21	19	16
1 1/4"	SFG10135*	SGN10035*	N/A	52	37	31	22	24
1 1/2"	SFG12135*	SGG12135*	N/A	52	36.5	31	22	24
2"	SFG16135*	SGG16135*	N/A	65	40	45	27	14.5

SERIES 'SD'

DOMED GLASS WINDOWS

CONNECTION BSP	PART NUMBER DOMED GLASS	DIMENSIONS mm				STANDARD WORKING PRESSURE BAR.G.
		A	B	C	D	
1/2"	SDG04135*	38.1	45	25	14	16
3/4"	SDG06135*	38.1	47	25	16	16
1"	SDG08135*	38.1	50	25	19	16

WINDOW SIGHT GLASS

WHEN ORDERING PLEASE STATE PART NUMBER, THREAD SIZE, FLUID, OPERATING TEMPERATURE & PRESSURE.

ORDERING CODE

Example: SFG04135* is a Sight Glass Flat, 1/2"BSP Parallel connection with ISO undercut, in Mild Stl. with [* = o'ring material to suit].

WORKING PRESSURE:

See tables.

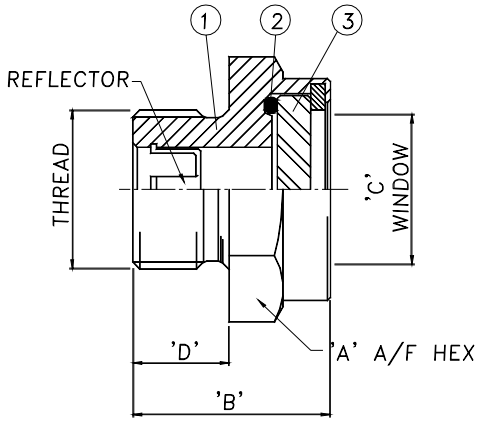
OPERATING TEMPERATURE:

Subject to seal material.

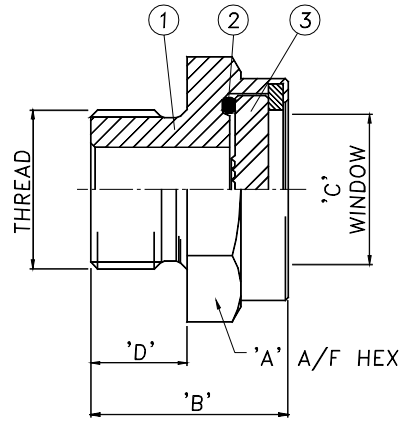
CONNECTIONS:

Alternative thread sizes may be available.

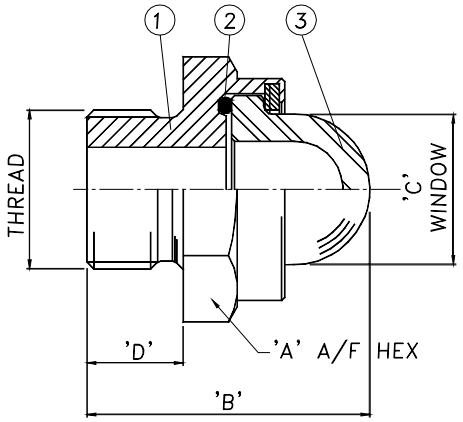
SERIES 'SF'



SERIES 'SR'



SERIES 'SD'



SEETRU LIMITED

SEETRU LIMITED

ALBION DOCKSIDE WORKS, BRISTOL. BS1 6UT
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www.seetru.com enquiries@seetru.com

WINDOW SIGHT GLASS

SIGHT GLASS SERIES
TYPE 'SD'
TYPE 'SF'
TYPE 'SR'

Liquid Level Gauges

Seetru SeeBio range

suitable for food products
or high quality chemicals
where equipment cleaning is
of paramount importance.

SEETRU

for food, brewing, chemical and process industries

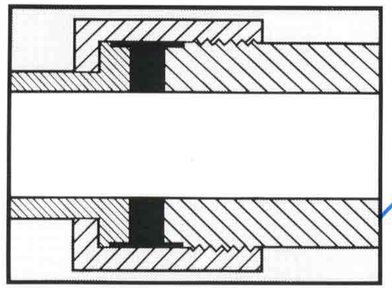
SeeBio

the hygienic liquid level gauge

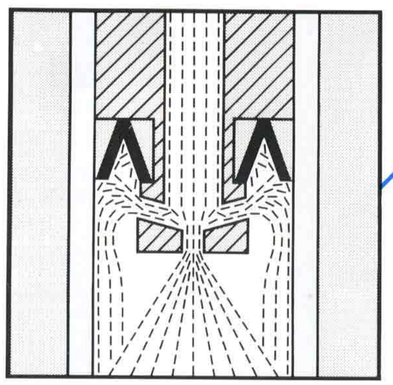
A high quality liquid level gauge that allows the total accuracy and reliability of a sight tube system to be used on storage and process vessels containing food products or high purity chemicals where equipment cleaning is of paramount importance.

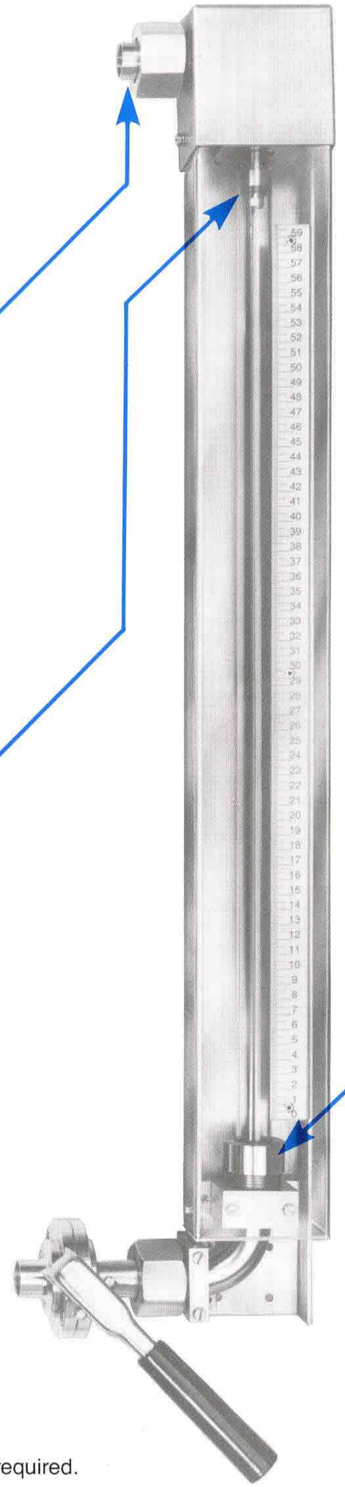
- **Accuracy**
- **Reliability**
- **Hygienic construction**
- **Suitable for colourless liquids**
- **Suitable for in-place cleaning**
- **Manufactured to required length**

Pipework and connections used throughout are stainless steel type 304. Fittings in stainless steel type 316 can be supplied.



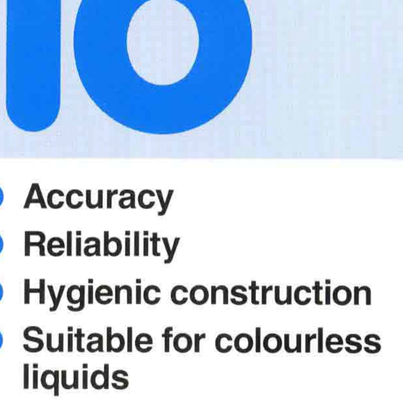
Purpose designed upper sight tube gland to allow for sight tube expansion/ contraction and ensures cleaning fluid enters directly onto the sight tube bore for effective, thorough cleaning.

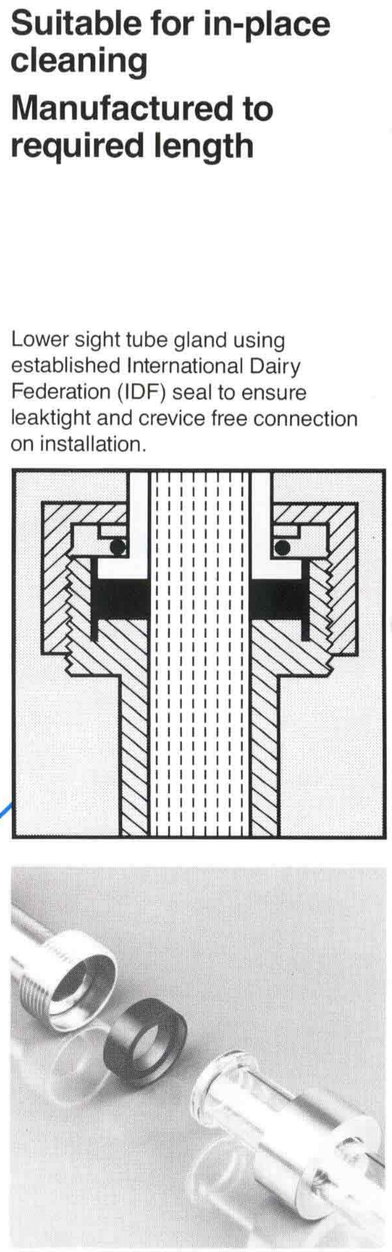




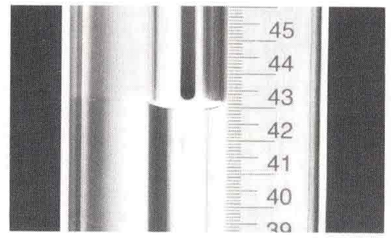
Food quality isolation valves available if required.

Lower sight tube gland using established International Dairy Federation (IDF) seal to ensure leaktight and crevice free connection on installation.

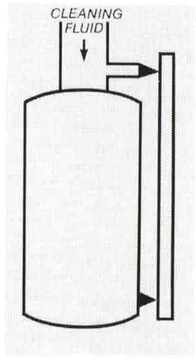




SYSTEM ACCURACY
The gauge is direct reading. The liquid level in the sight tube corresponds to the liquid level within the tank and can be read against the scale plate with graduations every 1mm over the entire sight tube length. Accurate reading of the liquid level can be easily taken at any time.



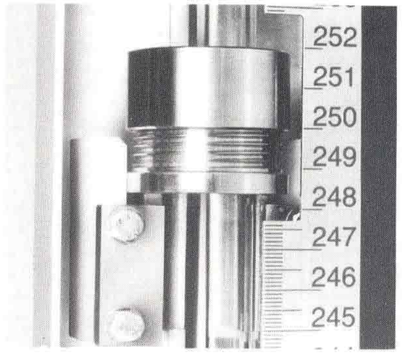
VIEWING THE LIQUID
The clear 19mm bore sight tube provides positive viewing of the liquid. Colourless liquid is indicated by a coloured marker strip fitted behind the sight tube that is magnified when viewed through the liquid.



CLEANING THE GAUGE
The gauge is designed to be permanently connected to the in-place cleaning (CIP) system of the tank and will then be automatically cleaned in-situ. Standard construction suitable for hot wash up to 80°C, construction suitable for steam cleaning on request. The use of IDF (International Dairy Federation) food quality fittings throughout ensures crevice free passages through which the liquid will flow whilst excellent sealing is maintained.

MATERIALS OF CONSTRUCTION
The seals are selected to suit each application to be taste free or chemically compatible. All end fittings are manufactured from type 304 stainless steel to be suitable for liquid contact and the installation environment (fittings in stainless steel type 316 can be supplied). The sight tube is a 19mm bore borosilicate glass protected in a stainless steel channel with a clear plastic front cover.

GAUGE LENGTHS
Suitable for installing on new or existing vessels the SeeBio is manufactured to suit individual requirements. The glass sight tube will be supplied as a single length up to 3000mm long. Longer gauges are provided by using an intermediate support to join the glass lengths.

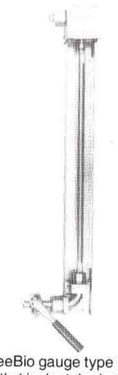


TANK CONNECTIONS
1 inch o/d stub pipe for welding to connecting pipe with or without food quality butterfly type isolation valves.

Data sheets are available for each gauge type upon request. (Please indicate gauge type required.)

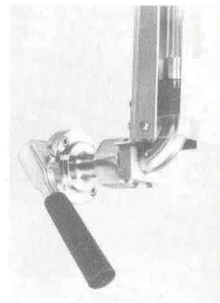
	1 inch BUTTERFLY VALVE		1 inch STUB PIPE
	TOP AND BOTTOM	BOTTOM ONLY (STUB PIPE AT TOP)	TOP AND BOTTOM
SIDE ENTRY	TYPE Bio/101	TYPE Bio/102	TYPE Bio/103
BACK ENTRY	TYPE Bio/201	TYPE Bio/202	TYPE Bio/203

FLANGED TANK FITTINGS ON REQUEST



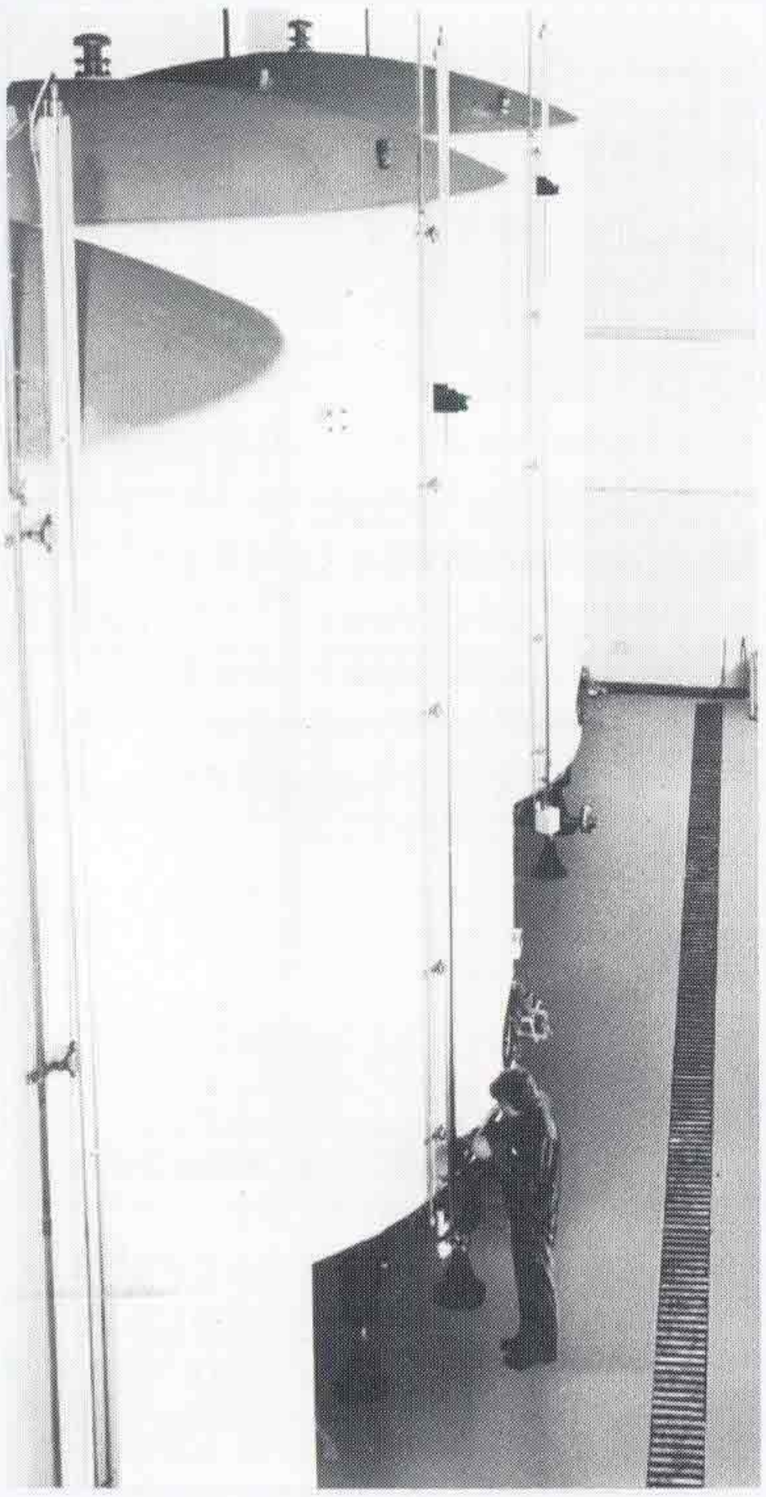
SeeBio gauge type Bio/102 with 1 inch stub pipe fitting at top and 1 inch food quality butterfly valve fitting at bottom.

The SeeBio gauge type Bio/103 with 1 inch stub pipe fitting top and bottom.



SeeBio gauge with back entry 1 inch food quality butterfly valve fitting.

Seetru specialise in the manufacture of a comprehensive range of liquid level gauges, remote reading tank contents indicators and safety relief valves. *Full details will be sent on request.*



◄ The SEETOL range

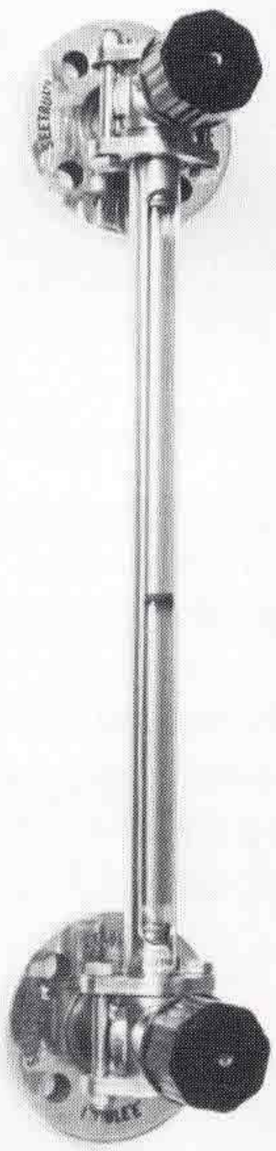
For tanks up to 20 metres tall – hygienic construction and accuracy accepted by HM Customs & Excise . . . the SEETOL system.

Maintaining the hygienic features of the SeeBio and incorporating a unique viewing system for providing tank measurement at 1mm intervals over entire height on tall tanks.

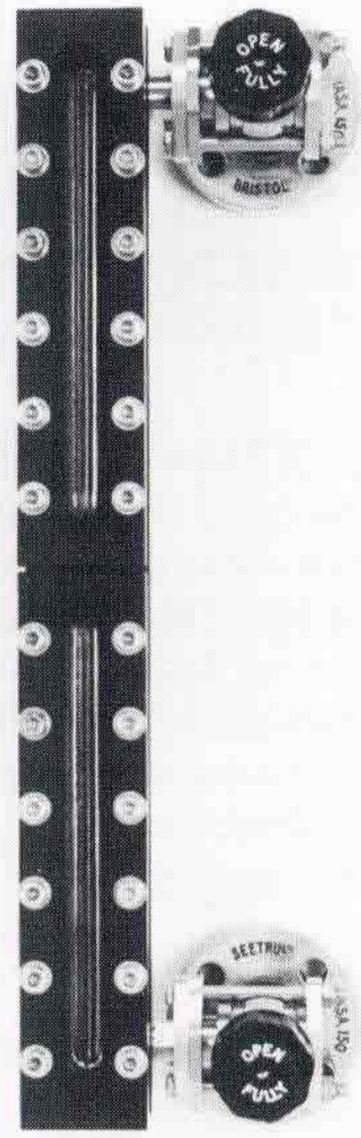
The CPI range ►

for the chemical and process industries

Ideally suited to high duty chemical and process applications, the CPI model is constructed from stainless steel with PTFE sealing and a choice of tubular or reflex borosilicate sight glass. This robust and safe liquid level gauge has a number of safety features built into its design.



Tubular sight glass



Reflex sight glass

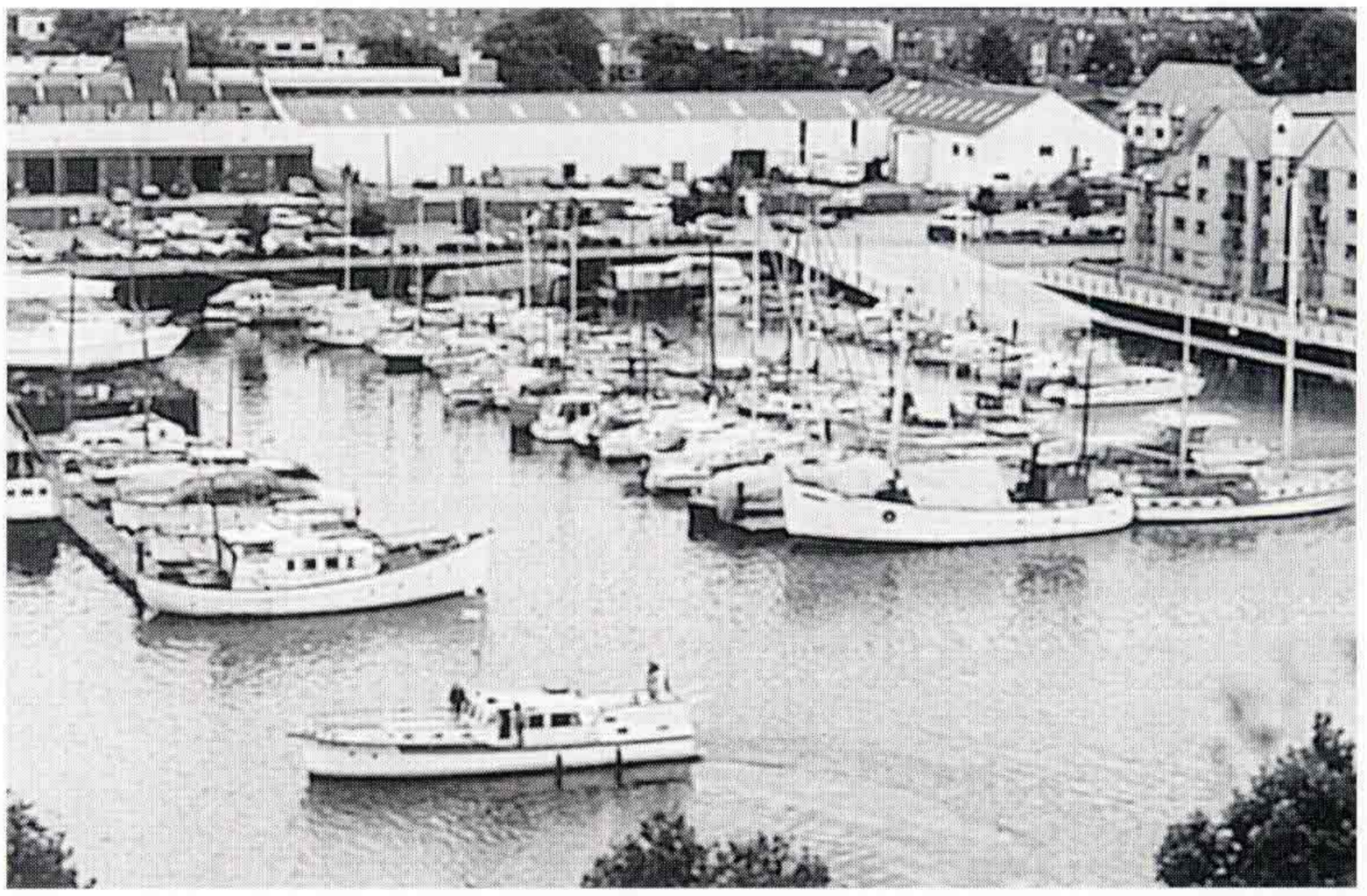
SEETRU – The British company that gives inside information

Seetru products are manufactured in a purpose built factory located in the pleasant surroundings of the Bristol Marina.

Established in 1949, we are proud of our quality products and reputation for customer service.

Our engineers have considerable experience in the design and development of a comprehensive range of liquid level instrumentation and pressure protection devices for applications in all sectors of industry.

In addition to the standard product ranges, Seetru will undertake individual project developments.



SEETRU

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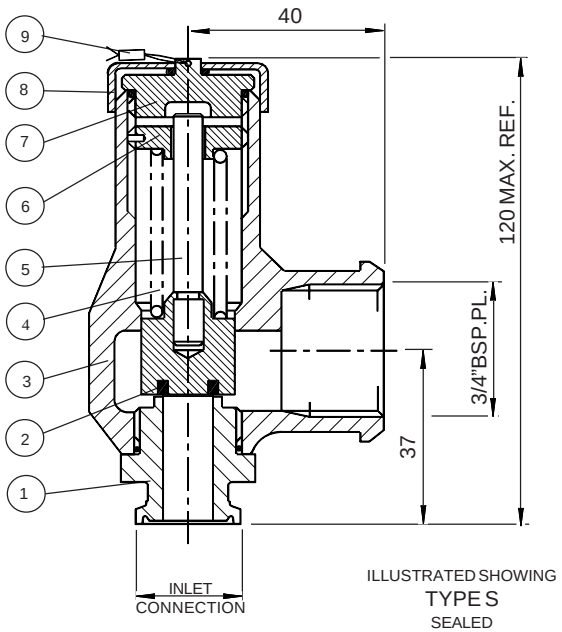
Web www.seetru.co.uk

Agents worldwide

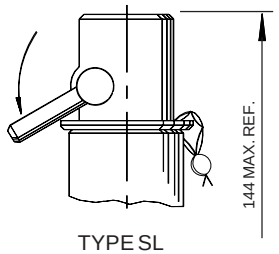
ed in England

Ref 1602



ILLUSTRATED SHOWING
TYPE S
SEALED
NO EASING GEAR

ALTERNATIVE TOP FITTING



TYPE SL
SEALED LEVER
EASING GEAR

PARTS LIST AND MATERIAL SPECIFICATION

		64610, 64710, 64110
1	INLET SEAT	ST.STL. BS EN 10088-3 1.4404 (316L)
2	PLUNGER/SEAL	ST.STL. BS EN 10088-3 1.4404 (316L) / TO SUIT APPLICATION
3	BODY	ST.STL. BS EN 10283 1.4408 (316) SA-351 CF8M
4	SPRING	ST.STL. BS EN 10270-3 1.4310 (302)
5	SPINDLE	ST.STL. BS EN 10088-3 1.4057 (431)
6	ADJUSTER	ST.STL. BS EN 10088-3 1.4401 (316)
7	CAP	ST.STL. BS EN 10088-3 1.4401 (316)
8	COVER	ST.STL.
9	WIRE & SEAL	ST.STL & LEAD

APPROVALS

Ad-Merkblatt A2: (TÜV Germany), Ref- TÜV.SV.03-728.9,5.D/G.0,78.p.
P.E.D. 97/23/EC.
Type examination module B, Cert. No. 01 202 11-B-00016
Quality management system, module D, Cert. No. EDS 0002011/01
Designed in accordance with BS6759 & BS EN ISO 4126-1
Meeting the requirements of the A.S.M.E. Boiler & Pressure Vessel Code section VIII for air/gas.
UV Cert. of Authorisation: 35757
Capacities certified by the National Board of Boiler & Pressure Vessel Inspectors.

TECHNICAL DATA

Relieving pressure	= Set pressure +10%	(0.3 Bar.g. below 1.55 Bar.g)
Reseating pressure	= Set pressure -10%	(0.3 Bar.g minimum)
Maximum set pressure	= 55.2 Bar.g	(12 Bar.g Steam)
	SUBJECT TO CLAMP PRESSURE RATING	
Minimum set pressure	= 0.48 Bar.g	(TÜV & A.S.M.E. 1.55 Bar.g)
Flow area	= 70.9 mm²	
Inlet bore diameter	= 9.5 mm	
BS Derated coefficient of discharge K_{dr}	= 0.78	
TÜV Derated coefficient of discharge α_d	= 0.78	
NB Certified rated slope	= 1.71 scfm/psia	
BS Minimum lift at 10% overpressure	= 3.5 mm	
Temperature Range	= Subject to seal material.	

Maximum permissible built up back pressure = 10% of set pressure at or below which flow is not reduced.
Stable operation on flows down to 50% of valve rated capacity.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

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CLEAN SERVICE 10mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE
FOR COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
10mm NOMINAL BORE SERIES M/2

TYPE 64610, 64710, 64110 ST.STL.

FLOW CHART (P.E.D.) AIR

TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION

FOR GREATER FLOWS REFER TO 13mm BORE TYPE 64613 DATA SHEET, FOR LOWER FLOWS REFER TO SEETRU.

	NOT TÜV APPROVED		PRESSURE RANGE												
SET PRESSURE Bar.g	0.48	1	1.55	2	3	4.5	5	10	15	20	30	33	40	50	55.2
RATED DISCHARGE * CAPACITY INACCORDANCE WITH BS EN 4126, AIR AT 15°C AND 1013 mbar Std. Litres/s	16	22	29	34	46	63	69	128	187	245	363	398	480	598	659
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013 mbar Normal m³/h	55	79.5	102	121	162.4	224.5	245.3	452.4	659.5	866.7	1280.9	1405.2	1695.2	2109.5	2325

FLOW CHART (A.S.M.E.) AIR

SET PRESSURE Psig	23	30	40	50	75	100	150	200	300	400	500	600	700	800
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH A.S.M.E. AIR AT 60°F AND 14.7 psia/scfm	70	82	100	119	166	213	307	401	589	777	966	1154	1342	1530

* DISCHARGING TO ATMOSPHERE

FLOW CHART (P.E.D.) SATURATED STEAM

SET PRESSURE Bar.g	0.48	1	1.55	2	3	4	5	6	7	8	9	10	11	12
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS EN 4126 STEAM Kg/hr	45	61	76	95	126	158	189	220	251	282	313	344	374	405
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TUV STEAM Kg/hr	-	-	79	93	125	157	189	220	253	285	316	348	380	412

VALVE SELECTION CHART

Standard seat sizes shown, other sizes may be available

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE	
			S	SL
1/2" CLAMP	G 3/4 (3/4" BSP PARALLEL)	64610A 64710A 64110A	5748	5838
3/4" CLAMP			5758	5848
1" CLAMP			5768	5858

Example: Ordering code 64610A 5748 is St.Stl construction. Sealed, no easing gear, type S, with 1/2" Clamp inlet connection, 3/4" BSP parallel outlet connection with Perfluorelastomer (Isolast®) seals & wirelocked.

Seal material: Last digit of ordering code calls up Perfluorelastomer (Isolast®) seal.

When other material is required last digit changes to:

6. ETHYLENE PROPYLENE Temperature range (-40°C to 150°C)
8. PERFLUOROELASTOMER (ISOLAST®) Temperature range (-15°C to 190°C)

For advice on seal material selection refer to Technical Information Section A.

APPLICATION

1. Safety valve for food industry & other hygienic applications including clean steam & gas applications.
2. For protection of installations in which clean service is required only on the inlet.
   e.g. normal operation wetted parts.
3. Generally in accordance with 'ASME BPE 2005 Bioprocessing Equipment'.
4. Economic design giving small compact size, with high discharge capacities.
5. Elastomer soft sealing for high level sealing tightness at operating pressure, with minimum leakage for cost effective operation.

SURFACE FINISH

Process Contact Surface

In accordance with ASME BPE-2005 Table SF-5.

Surface designation R_a Max 15 µinches, 0.4 µm, Electropolished.

Other Surfaces

Not greater than 60 µinches, 1.5 µm.

SEAL MATERIAL

Elastomer soft sealing specifically developed for food & pharmaceutical industries.

Complaint to

1. FDA 21 CFR 177.2600
2. United States Pharmacopoeia (USP) Class VI
3. SP3A Sanitary Standards for Multiple Use Rubber Dairy Equipment No 18-03.

CONNECTIONS

Inlet

Tri-Clamp® compatable generally in accordance with ASME BPE 2005 & BS 4825-3.

Outlet

Pipe threads (G) where pressure tight joints are not made on the thread in accordance with BS EN ISO 228. For other threads & clamp connections consult Seetru.

VALVE TYPE OPTIONS:

64610 = TUV, B.S. (P.E.D.)
64710 = A.S.M.E. & N.B.
64110 = A.S.M.E. & N.B., TUV, B.S. (P.E.D.)

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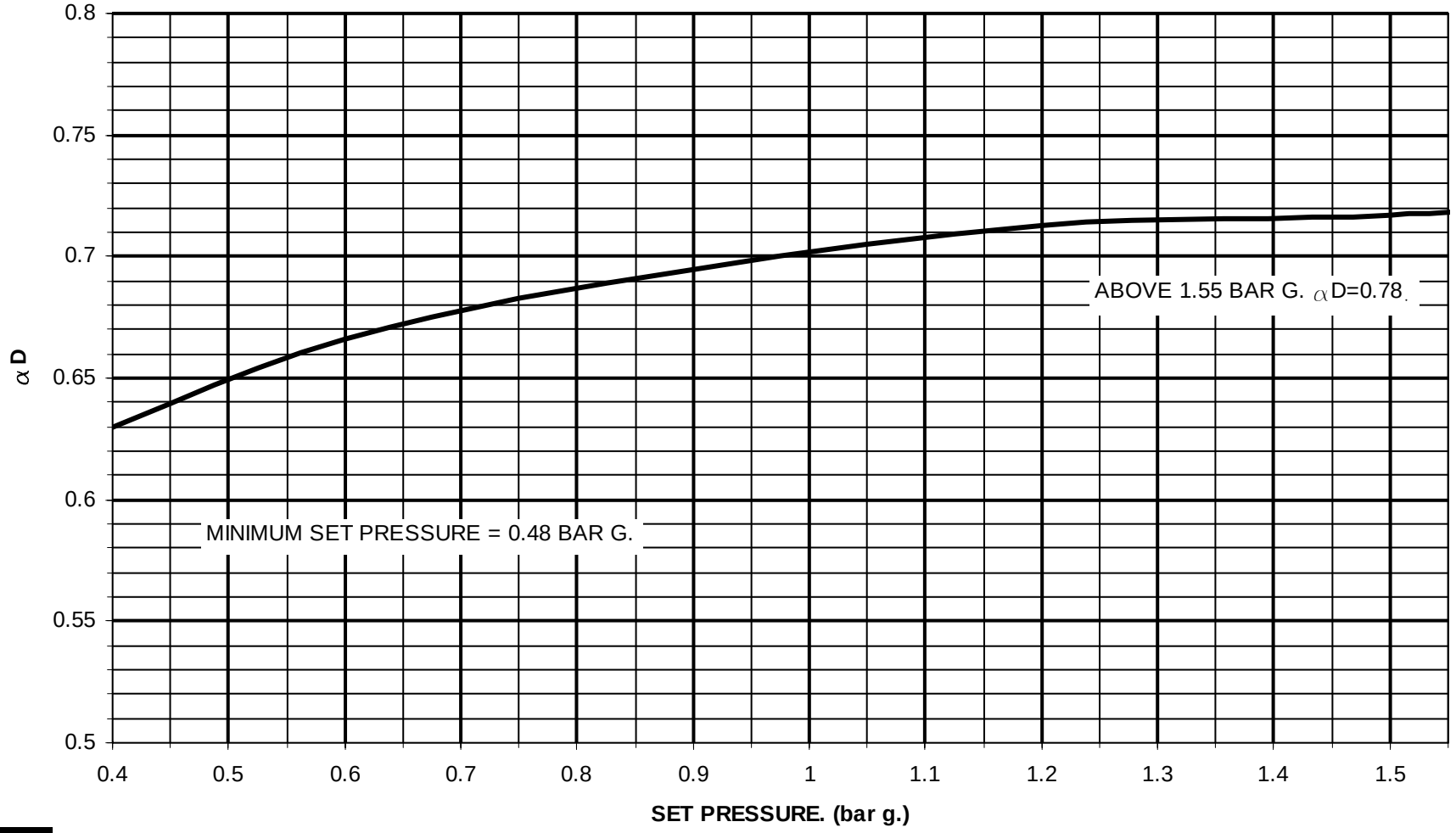
CLEAN SERVICE 10mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE
FOR COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
10mm NOMINAL BORE SERIES M/2

TYPE 64610, 64710, 64110 ST.STL.

DERRATED DISCHARGE COEFFICIENT FOR SET PRESSURES BELOW 1.55 BAR G.



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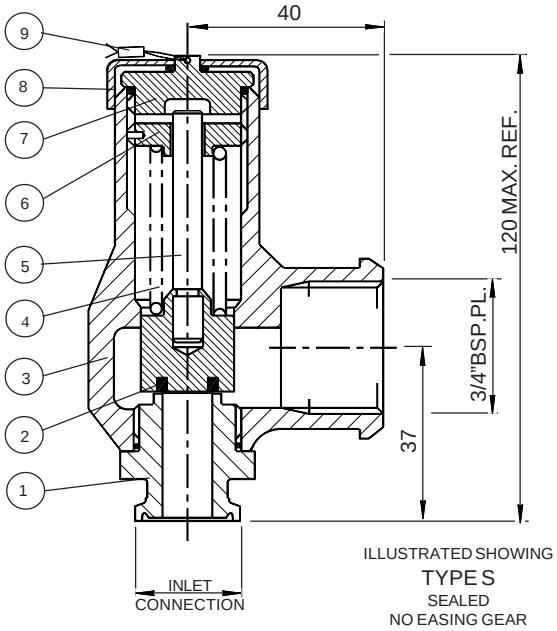
10mm NOMINAL BORE SERIES M/2

TYPE 64610, 64710, 64110 ST.STL.



PARTS LIST & MATERIAL SPECIFICATION

		68010
1	INLET SEAT	ST.STL. BS EN 10088-3 1.4404 (316L)
2	PLUNGER/SEAL	ST.STL. BS EN 10088-3 1.4404 (316L) / TO SUIT APPLICATION
3	BODY	ST.STL. BS EN 10283 1.4408 (316) SA-351 CF8M
4	SPRING	ST.STL. BS EN 10270-3 1.4310 (302)
5	SPINDLE	ST.STL. BS EN 10088-3 1.4057 (431)
6	ADJUSTER	ST.STL. BS EN 10088-3 1.4401 (316)
7	CAP	ST.STL. BS EN 10088-3 1.4401 (316)
8	COVER	ST.STL.
9	WIRELOCKING	ST.STL. & LEAD

APPROVALS

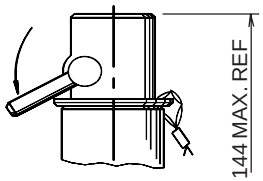
P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/048/8923
Quality management system module D, Cert. No. EDS 0002011/01.
Designed in accordance with BS 6759 & BS EN ISO 4126-1

TECHNICAL DATA

Relieving pressure	= Set pressure +25%
Reseating pressure	= Set pressure max -20% down to 3 Bar.g. = Below 3 Bar.g. = 0.6 Bar.g.
Maximum set pressure	= 30 Bar.g. SUBJECT TO CLAMP PRESSURE RATING
Minimum set pressure	= 0.76 Bar.g.
Flow area	= 70.9 mm²
Inlet bore diameter	= 9.5 mm
Derated coefficient of discharge K_{dr}	= 0.59
Temperature Range	= Subject to seal material.

FOR FURTHER INFORMATION, CONVERSION FACTORS, INSTALLATION AND OPERATION INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

ALTERNATIVE TOP FITTING



TYPE SL
SEALED LEVER
EASING GEAR

SHT 1 OF 2 SHTS

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CLEAN SERVICE 10mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR LIQUIDS

ENCLOSED DISCHARGE
10mm NOM. BORE SERIES M/2
TYPE 68010 ST.STL.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION C
- FOR GREATER FLOWS REFER TO 13mm BORE TYPE 68013 DATA SHEET, FOR LOWER FLOWS REFER TO SEETRU

SET PRESSURE Bar.g	0.76	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
RATED DISCHARGE *CAPACITY IN ACCORDANCE WITH BS6759 WATER AT 15°C (kg/hr)	2075	3367	4761	5831	6733	7528	8246	8907	9522	10100	10650	11170	11660	12140	12600	13040

* DISCHARGING TO ATMOSPHERE

VALVE SELECTION CHART

Standard seat sizes shown, other sizes may be available

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE	
			S	SL
1/2" CLAMP	G 3/4 (3/4" BSP PARALLEL)	68010A	5748	5838
3/4" CLAMP			5758	5848
1" CLAMP			5768	5858

Example: Ordering code 68010A 5748 is St.Stl. construction Sealed, no easing gear, type S, with 1/2" Clamp inlet connection, 3/4" BSP parallel outlet connection with Perfluoroelastomer (Isolast®) seals & wirelocked.
Seal material: Last digit of ordering code calls up Perfluoroelastomer (Isolast®) seal.
When other material is required last digit changes to:

6. ETHYLENE PROPYLENE Temperature (-40°C to 150°C)
7. PERFLUOROELASTOMER (ISOLAST®) Temperature (-15°C to 190°C)

For advice on seal material selection refer to Technical Information Section A.

APPLICATION

1. Safety valve for food industry & other hygienic applications including clean steam & gas applications.
2. For protection of installations in which clean service is required only on the inlet.
   e.g. normal operation wetted parts.
3. Generally in accordance with 'ASME BPE 2005 Bioprocessing Equipment'.
4. Economic design giving small compact size, with high discharge capacities.
5. Elastomer soft sealing for high level sealing tightness at operating pressure, with minimum leakage for cost effective operation.

SURFACE FINISH

Process Contact Surface
In accordance with ASME BPE-2005 Table SF-5.
Surface designation R_a Max 15 µinches, 0.4 µm, Electropolished.
Other Surfaces
Not greater than 60 µinches, 1.5 µm.

SEAL MATERIAL

Elastomer soft sealing specifically developed for food & pharmaceutical industries.
Complaint to

1. FDA 21 CFR 177.2600
2. United States Pharmacopoeia (USP) Class VI
3. SP3A Sanitary Standards for Multiple Use Rubber Dairy Equipment No 18-03.

CONNECTIONS

Inlet
Tri-Clamp® compatible generally in accordance with ASME BPE 2005 & BS 4825-3.
Outlet
Pipe threads (G) where pressure tight joints are not made on the thread in accordance with BS EN ISO 228. For other threads & Clamp connections consult Seetru.

SEETRU LIMITED

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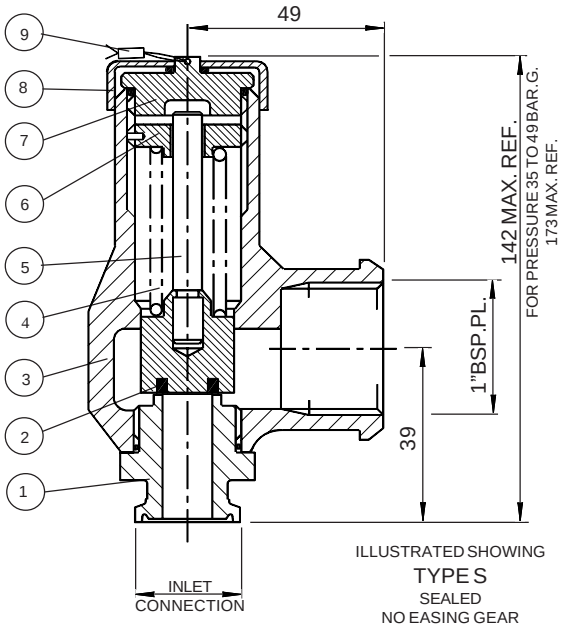
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR LIQUIDS

ENCLOSED DISCHARGE
10mm NOM. BORE SERIES M/2
TYPE 68010 ST.STL.

EDITION A. 04.05.07



PARTS LIST & MATERIAL SPECIFICATION

		64613, 64713, 64113
1	INLET SEAT	ST.STL. BS EN 10088-3 1.4404 (316L)
2	PLUNGER/SEAL	ST.STL. BS EN 10088-3 1.4404 (316L) / TO SUIT APPLICATION
3	BODY	ST.STL. BS EN 10283 1.4408 (316) SA-351 CF8M
4	SPRING	ST.STL. BS EN 10270-3 1.4310 (302)
5	SPINDLE	ST.STL. BS EN 10088-3 1.4057 (431)
6	ADJUSTER	ST.STL. BS EN 10088-3 1.4401 (316)
7	CAP	ST.STL. BS EN 10088-3 1.4401 (316)
8	COVER	ST.STL.
9	WIRE & SEAL	ST.STL & LEAD

APPROVALS

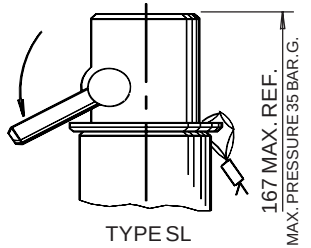
Ad-Merkblatt A2: (TÜV Germany) Ref - TÜV.SV.04-761.13,7.D/G.0,71.p.
P.E.D. 97/23/EC
Type examination module B, Cert. No. 01 202 111-B-00016
Quality management system module D, Cert. No. EDS 0002011/01
Designed in accordance with BS6759 & BS EN ISO 4126-1
Meeting the requirements of the A.S.M.E. Boiler & Pressure Vessel code section VIII for air/gas.
UV Cert. of Authorisation: 35757
Capacities certified by the National Board of Boiler & Pressure Vessel Inspectors.

TECHNICAL DATA

Relieving pressure	= Set pressure + 10%	(0.3 Bar.g. below 1.4 Bar.g)
Reseating pressure	= Set pressure - 10%	(0.3 Bar.g. minimum)
Maximum set pressure	= 49 Bar.g	(12 Bar.g. Steam)
	SUBJECT TO CLAMP PRESSURE RATING	
Minimum set pressure	= 0.32 Bar.g	(TÜV & A.S.M.E. 1.4 Bar.g)
Flow area	= 147.4 mm²	
Inlet bore diameter	= 13.7 mm	
BS Derated coefficient of discharge K_{dr}	= 0.78	
TÜV Derated coefficient of discharge α_w	= 0.71	
BS Minimum lift at 10% overpressure	= 5.7 mm	
NB Certified rated slope	= 3.47 scfm/psia	
Temperature Range	= Subject to seal material.	
Maximum permissible built up back pressure	= 10% of set pressure at or below which flow is not reduced.	

Stable operation on flows down to 50% of valve rated capacity.
FOR FURTHER INFORMATION, INSTALLATION AND OPERATION INSTRUCTIONS, CONVERSION FACTORS ETC. SEE TECHNICAL INFORMATION SECTION.

ALTERNATIVE TOP FITTING



TYPE SL
SEALED LEVER
EASING GEAR

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FOR COMPRESSED AIR, GASES & STEAM

ENCLOSED DISCHARGE
13mm NOMINAL BORE SERIES M/2

TYPE 64613, 64713, 64113 ST.STL.

FLOW CHART (P.E.D.)

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION.
- FOR GREATER FLOWS REFER TO SEETRU, FOR LOWER FLOWS REFER TO 64610 DATA SHEET

	NOT APPROVED		APPROVED PRESSURE RANGE													
SET PRESSURE Bar.g	0.32	1	1.4	2	3	4	5	6	7	8	9	10	20	30	40	49
RATED DISCHARGE * CAPACITY INACCORDANCE WITH BS EN 4126 AIR AT 15°C AND 1013 mbar Std. Litres/s	27	47	56	71	95	120	144	169	193	217	242	266	508	752	995	1214
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TÜV, AIR AT 0°C AND 1013 mbar Normal m³/h	86	150.6	182	229	307.5	385.9	464.3	542.7	621.2	699.6	778	856.5	1641	2425	3209	3915

FLOW CHART (A.S.M.E.)

SET PRESSURE Psig	20	30	40	50	60	70	80	90	100	150	200	250	300	400	500	600	700	710
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH ASME AIR AT 60°F AND 14.7 psia/scfm	131	166	204	242	280	318	356	395	433	624	814	1005	1196	1578	1960	2341	2723	2761

* DISCHARGING TO ATMOSPHERE

FLOW CHART (P.E.D.) SATURATED STEAM

SET PRESSURE Bar.g	0.32	1	1.4	2	3	4	5	6	7	8	9	10	11	12
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH BS EN 4126 STEAM Kg/hr	71	116	140	179	239	298	358	417	475	534	592	651	709	767
RATED DISCHARGE * CAPACITY IN ACCORDANCE WITH TUV STEAM Kg/hr	-	116	140	176	237	297	358	418	478	539	599	660	720	780

VALVE SELECTION CHART

Standard seat sizes shown, other sizes may be available.

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE	
			S	SL
3/4" CLAMP	G 1 (1" BSP PARALLEL)	64613A 64713A 64113A	5758	5848
1" CLAMP			5768	5858

Example: Ordering code 64613A 5758 is St.Stl. construction Sealed, no easing gear, type S, with 3/4" Clamp inlet connection, 1" BSP parallel outlet connection with Perfluoroelastomer (Isolast®) seals & wirelocked.
Seal material: Last digit of ordering code calls up Perfluoroelastomer (Isolast®) seal.
When other material is required last digit changes to:

6. ETHYLENE PROPYLENE Temperature range (-40°C to 150°C)
8. PERFLUOROELASTOMER (ISOLAST®) Temperature range (-15°C to 190°C)

For advice on seal material selection refer to Technical Information Section A.

APPLICATION

1. Safety valve for food industry & other hygienic applications including clean steam & gas applications.
2. For protection of installations in which clean service is required only on the inlet.
   e.g. normal operation wetted parts.
3. Generally in accordance with 'ASME BPE 2005 Bioprocessing Equipment'.
4. Economic design giving small compact size, with high discharge capacities.
5. Elastomer soft sealing for high level sealing tightness at operating pressure, with minimum leakage for cost effective operation.

SURFACE FINISH

Process Contact Surface

In accordance with ASME BPE-2005 Table SF-5.
Surface designation R_a Max 15 µinches, 0.4 µm, Electropolished.

Other Surfaces

Not greater than 60 µinches, 1.5 µm.

SEAL MATERIAL

Elastomer soft sealing specifically developed for food & pharmaceutical industries.
Complaint to

1. FDA 21 CFR 177.2600
2. United States Pharmacopoeia (USP) Class VI
3. SP3A Sanitary Standards for Multiple Use Rubber Dairy Equipment No 18-03.

CONNECTIONS

Inlet

Tri-Clamp® compatible generally in accordance with ASME BPE 2005 & BS 4825-3.

Outlet

Pipe threads (G) where pressure tight joints are not made on the thread in accordance with BS EN ISO 228. For other threads & clamp connections consult Seetru.

VALVE TYPE OPTIONS:

64613 = TUV, B.S. (P.E.D.)
64713 = A.S.M.E. & N.B.
64113 = A.S.M.E. & N.B., TUV, B.S. (P.E.D.)

SHEET 2 OF 2 SHEETS.

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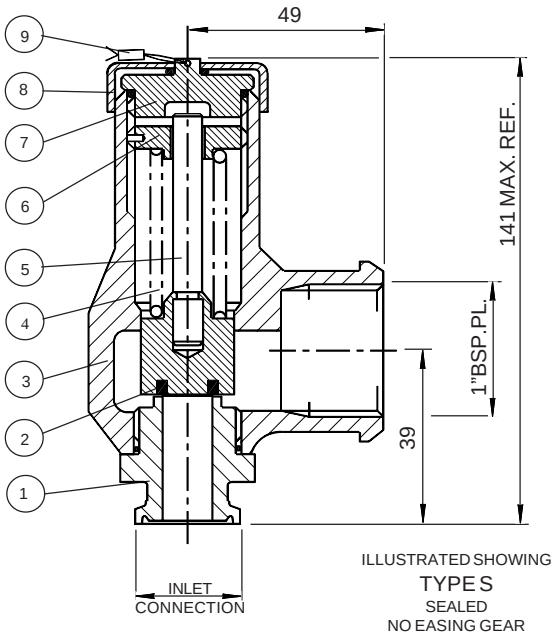
ENCLOSED DISCHARGE
13mm NOMINAL BORE SERIES M/2

TYPE 64613, 64713, 64113 ST.STL.



ILLUSTRATED SHOWING
TYPE S
SEALED
NO EASING GEAR

PARTS LIST & MATERIAL SPECIFICATION

		68013
1	INLET SEAT	ST.STL. BS EN 10088-3 1.4404 (316L)
2	PLUNGER/SEAL	ST.STL. BS EN 10088-3 1.4404 (316L) / TO SUIT APPLICATION
3	BODY	ST.STL. BS EN 10288-3 1.4408 (316) SA-351 CF8M
4	SPRING	ST.STL. BS EN 10270-3 1.4310 (302)
5	SPINDLE	ST.STL. BS EN 10088-3 1.4057 (431)
6	ADJUSTER	ST.STL. BS EN 10088-3 1.4401 (316)
7	CAP	ST.STL. BS EN 10088-3 1.4401 (316)
8	COVER	ST.STL.
9	WIRELOCKING	ST.STL. & LEAD

TECHNICAL DATA

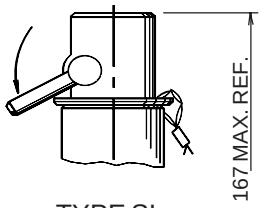
P.E.D. 97/23/EC
Type examination module B, Cert. No. 2002/043/8923.
Quality management system module D, Cert. No. EDS 0002011/01.
Designed in accordance with BS 6759 & BS EN ISO 4126-1

TECHNICAL DATA

Relieving pressure	= Set pressure +25%
Reseating pressure	= Set pressure - max 20% down to 3 Bar.g.
	= Below 3 Bar.g. = 0.6 Bar.g.
Maximum set pressure	= 27 Bar.g. SUBJECT TO CLAMP PRESSURE RATING
Minimum set pressure	= 0.7 Bar.g.
Flow area	= 147.4 mm²
Inlet bore diameter	= 13.7 mm
Derated coefficient of discharge K_{dr}	= 0.57
Temperature Range	= Subject to seal material.

FOR FURTHER INFORMATION, CONVERSION FACTORS INSTALLATION AND OPERATION INSTRUCTIONS ETC. SEE TECHNICAL INFORMATION SECTION.

ALTERNATIVE TOP FITTING



TYPE SL
SEALED LEVER
EASING GEAR

SHT 1 OF 2 SHTS

SEETRU LIMITED
ALBION DOCKSIDE WORKS, BRISTOL. BS1 6UT
TELEPHONE +44 (0) 117 927 9204, FAX +44 (0) 117 929 8193
www.seetru.com enquiries@seetru.com

CLEAN SERVICE 13mm Nominal Bore
DIRECT SPRING LOADED ENCLOSED
DISCHARGE SAFETY VALVE FOR LIQUIDS

ENCLOSED DISCHARGE
13mm NOM. BORE SERIES M/2
TYPE 68013 ST.STL.

FLOW CHART

- TO CALCULATE INTERMEDIATE FLOWS SEE TECHNICAL INFORMATION SECTION C.
- FOR GREATER FLOWS REFER TO SEETRU, FOR LOWER FLOWS REFER TO 10mm BORE TYPE 67010 DATA SHEET

SET PRESSURE Bar.g	0.7	2	4	6	8	10	12	14	16	18	20	22	24	26	27
RATED DISCHARGE * CAPACITY INACCORDANCE WITH BS 6759, WATER AT 15°C (kg/hr)	3764	6759	9560	11708	13519	15116	16558	17885	19119	20279	21376	22419	23416	24372	24837

* DISCHARGING TO ATMOSPHERE

VALVE SELECTION CHART

Standard seat sizes shown, other sizes may be available.

INLET CONNECTION	OUTLET CONNECTION	ORDERING CODE	TOP FITTING CODE	
			S	SL
3/4" CLAMP	G 1 (1" BSP PARALLEL)	68013A	5758	5848
1" CLAMP			5768	5858

Example: Ordering code 68013A 5758 is St.Stl. construction Sealed, no easing gear, type S, with 3/4" Clamp inlet connection, 1"BSP parallel outlet connection with Perfluoroelastomer (Isolast®) seals & wirelocked.
Seal material: Last digit of ordering code calls up Perfluoroelastomer (Isolast®) seal.
When other material is required last digit changes to:

6. ETHYLENE PROPYLENE Temperature (-40°C to 150°C)
7. PERFLUOROELASTOMER (ISOLAST®) Temperature (-15°C to 190°C)

For advice on seal material selection refer to Technical Information Section A.

APPLICATION

1. Safety valve for food industry & other hygienic applications including clean steam & gas applications.
2. For protection of installations in which clean service is required only on the inlet.
   e.g. normal operation wetted parts.
3. Generally in accordance with 'ASME BPE 2005 Bioprocessing Equipment'.
4. Economic design giving small compact size, with high discharge capacities.
5. Elastomer soft sealing for high level sealing tightness at operating pressure, with minimum leakage for cost effective operation.

SURFACE FINISH

Process Contact Surface
In accordance with ASME BPE-2005 Table SF-5.
Surface designation R_a Max 15 µinches, 0.4 µm, Electropolished.
Other Surfaces
Not greater than 60 µinches, 1.5 µm.

SEAL MATERIAL

Elastomer soft sealing specifically developed for food & pharmaceutical industries.
Complaint to

1. FDA 21 CFR 177.2600
2. United States Pharmacopoeia (USP) Class VI
3. SP3A Sanitary Standards for Multiple Use Rubber Dairy Equipment No 18-03.

CONNECTIONS

Inlet
Tri-Clamp® compatible generally in accordance with ASME BPE 2005 & BS 4825-3.
Outlet
Pipe threads (G) where pressure tight joints are not made on the thread in accordance with BS EN ISO 228. For other threads & clamp connections consult Seetru.

SEETRU LIMITED

SHT 2 OF 2 SHTS

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EDITION A. 04.05.07