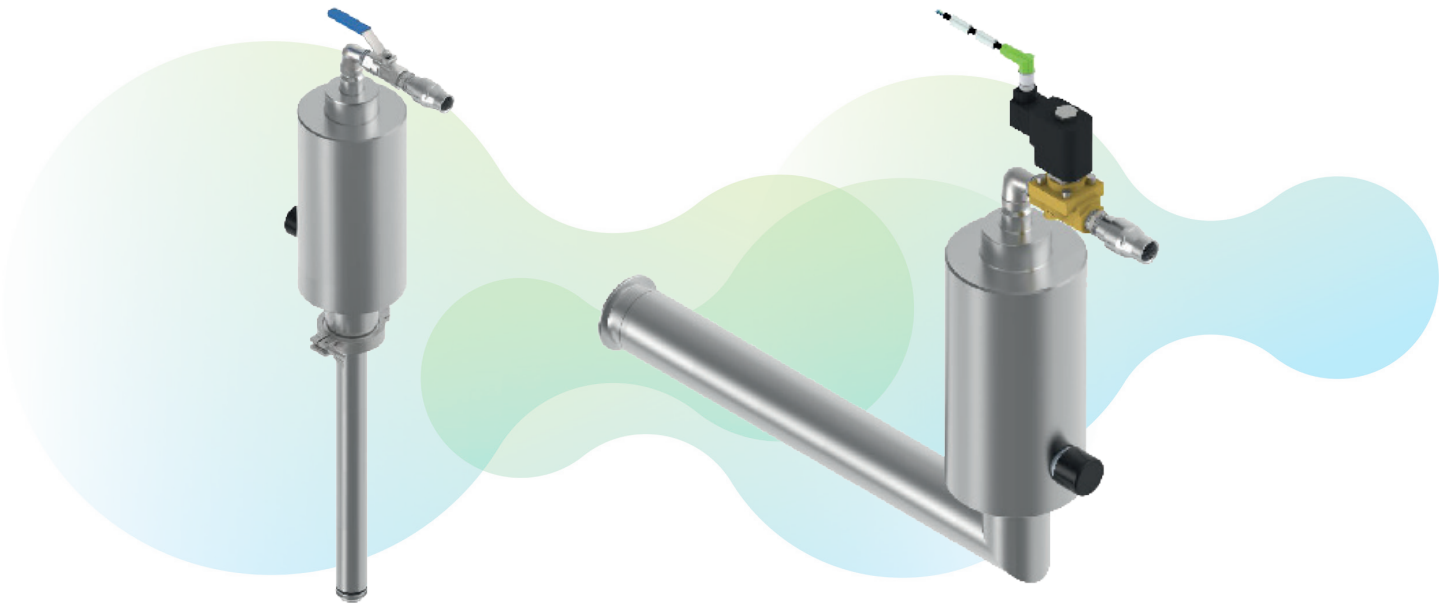


PRODUCT SHEETS



Transfer Lines	Conditioning Equipment ▼	Components	Filling Stations	Controlling
Automatic Has Vent	Degasser	Phase Separator	Subcooler	



Due to a constant heat inleak and pressure drop between the tank and consumer points, liquid nitrogen evaporates partly to boil-off gas. The Demaco Vacuum Insulated Gas Vent increases the liquid nitrogen quality on the consumer points, by mechanical separation of gas from liquid. This conditioning equipment is self-operating and works best in limited-flow situations. Placing this item in a vacuum-insulated pipe system provides the ability to keep lines continuously filled-up with liquid. It can also be used to automatically cool down the vacuum-insulated pipe after a stand still or at commissioning.

Our automatic gas vent is vacuum insulated and available in various configurations. The assembly is modular and available in a variety of sizes. The automatic gas vent functions entirely mechanical; electricity is only required for the optional solenoid valve. When in service with liquid nitrogen, the automatic gas vent is suitable for pressure rates up to PN16 and when in service with liquid CO2 for pressure rates of up to PN28. Both models can optionally be equipped with a vacuum insulated Johnston coupling for the GN2 blow-off and can then be implemented in a clean room or other industries where condensation or ice build-up is not allowed.

Benefits

- Due to outstanding insulation properties, thermal heat losses are kept to a minimum
- Standard DN10-25 Johnston coupling
- Easy to install
- Smart engineering allows multiple configurations for in- and outlet

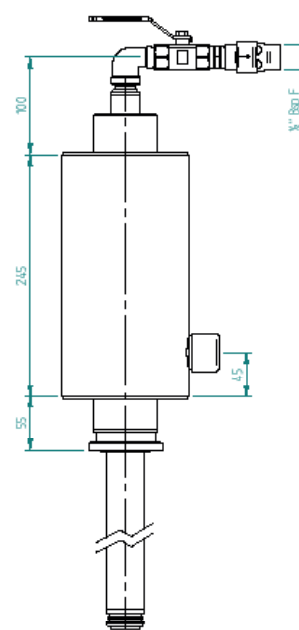
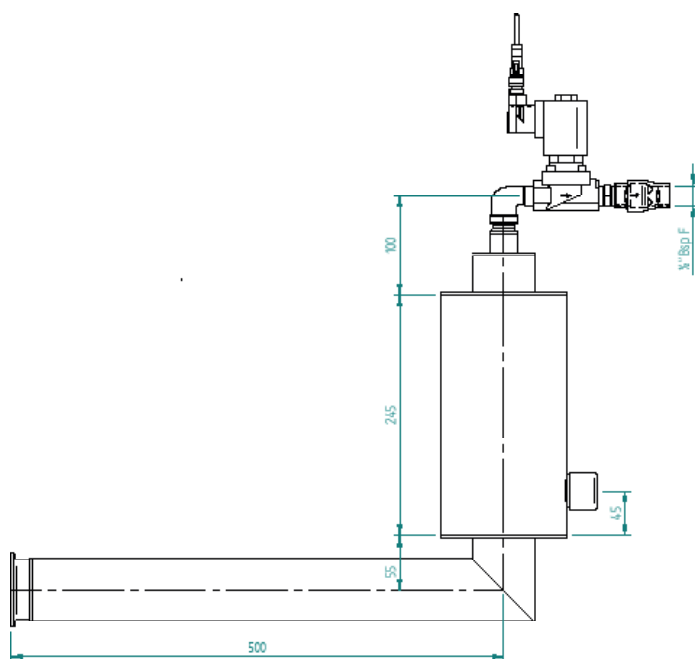
Application

- Increase in quality of the medium during limited flow situations
- When piping needs to be kept cold continuously
- When short cool-down reaction times are required
- Automatic cool-down of VIP lines

Features

- All stainless steel
- High vacuum insulation
- TIG welded according to the highest standards (ISO3834-2)
- Standard pressure rating PN16
- Male and female Johnston couplings possible for in- and outlet
- Outlet provided with:
 - ball valve and check valve
 - solenoid valve and check valve
 - vacuum insulated outlet possible (on request)
- Standard design according to Pressure Equipment Directive (PED)

Standard models



Interfaces

Johnston Coupling is standard, other couplings possible

Non-insulated blow-off connection for maximum connection flexibility

Available on request:

- Ice free vacuum-insulated blow-off connection by means of Johnston coupling
- Vacuum-insulated valves
- Custom interface connection

Materials

Process part gas vent
1.4301/1.4306/1.4307 ~304/304L

Vacuum Jacket
1.4301/1.4306/1.4307 ~304/304L
Optional: 1.4401/1.4404 ~ 316/316L

Ball valve and Ceck valve
Stainless steel

Solenoid valve
Messing housing and stainless steel inner parts

Spacers
Epoxy reinforced glass fibre

Multi-Layer Insulation
Glass paper and Aluminium foil

Johnston coupling seal
Fe36Ni and Buna-N

Design specifications

Standard according to Pressure Equipment Directive (PED)

Maximum allowable operating pressure PN16

Cleanliness level: oil and grease-free, inspected for pure oxygen usage

Static vacuum with Multi-Layer Insulation

Standard testing for each individual VIP spool:

- Dimensional check
- Helium leak test ($<1 \times 10^{-9}$ mbarL/sec)
- Vacuum retention test after 24h at ambient temp (acceptance level $<2 \times 10^{-4}$ mbar)

Documentation

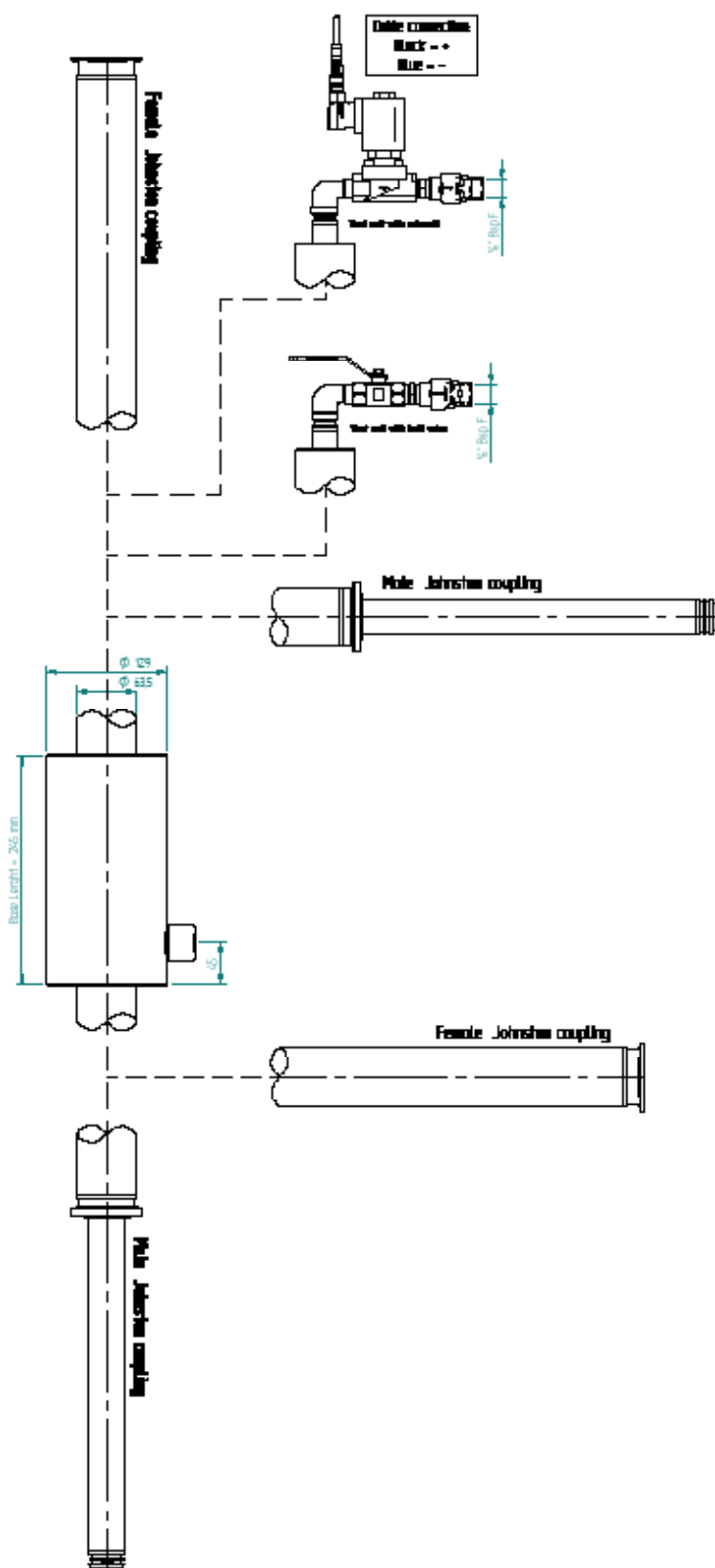
By default, a standard manufacturer data book record is part of each project and contains:

- As-built isometrics (if applicable)
- Safety guidelines
- User manuals
- Declaration of conformity (if applicable)

Extended data books are available on request

Related documents

Safety guidelines:	D0061116
Manual:	D0596412
Statement for food applications:	D0435171
1/2" Ball valve specifications:	D0256769
1/2" Solenoid valve specifications:	D0434059
Solenoid connector specifications:	D0650533
Electrical cable specifications:	D0650546



Vacuum-Insulated - Piping

Transfer Lines ▼	Conditioning Equipment	Components	Filling Stations	Controlling
VI Piping	VI Flex	VI CO2	VI Pipe Industry	VI Multi Transfer



The Vacuum Insulated Pipe, also known as VIP or SIVL, is used to transfer liquefied gases at extremely low temperatures, keeping thermal heat losses to a minimum. This rigid pipe in combination with a slim design results in an ideal and attractive alternative for non-insulated or conventional insulated piping.

Benefits

Due to outstanding insulation properties, thermal heat losses are kept to a minimum

All spools are pre-fab for a fast and efficient installation

Entire stainless steel structure keeps the VIP fit for purpose for many years and is perfectly suitable for food, laboratory and pharmaceutical industries

No ice

Features

All stainless steel

High vacuum insulation

Qualified welding to the highest standards

Integrated contraction bellows

Diameter process pipe: up to 8"

Pressure Rates: up to PN40

Suitable for: N₂, O₂, Ar, LNG, H₂, He, CO₂

Application

Connection of bulk storage with applications in food, medical, pharmaceutical, automotive, space and other applications

Transfer lines between cold boxes, storage tanks and truck/ship filling on air separation units

Transfer lines for small and mid-scale bulk break in LNG market

Combined into multiple transfer lines for research institutes and laboratory applications

Applicable for food. When stated upfront, Demaco can deliver a statement for tube and pipe systems according directive 1935/2004/EU

Vacuum-Insulated - Piping

Pipe size (mm)	Process Line (mm)	Vacuum jacket (mm)	Capacity indication (L/h) ⁽¹⁾	Heat loss indication (W/m) ⁽²⁾	Weight indication (kg/m)	ø Hole feedthrough (mm)
DN10 small	ø 12 x 1.0	ø 40.0 x 1.0	300	0.30	2.1	ø 70
DN10	ø 12 x 1.0	ø 63.5 x 1.5	300	0.40	3.4	ø 120
DN15	ø 18 x 1.0	ø 63.5 x 1.5	700	0.45	3.5	ø 120
DN25	ø 28 x 1.0	ø 63.5 x 1.5	2.000	0.65	4.0	ø 120
1"	ø 33.7 x 1.6	ø 76.1 x 2.0	3.000	0.75	6.0	ø 150
1½"	ø 48.3 x 1.6	ø 88.9 x 2.0	5.500	0.85	7.5	ø 170
2"	ø 60.3 x 1.6	ø 114.3 x 2.0	9.000	1.0	10.0	ø 200
2½"	ø 76.1 x 2.0	ø 139.7 x 2.0	14.500	1.3	14.0	ø 230
3"	ø 88.9 x 2.0	ø 154.0 x 2.0	20.000	1.9	16.0	ø 250
4"	ø 114 x 2.0	ø 168.3 x 3.0	34.500	2.0	22.0	ø 250
6"	ø 168.3 x 3.0	ø 219.1 x 3.0	74.000	3.3	32.0	ø 280
8"	ø 219.1 x 3.0	ø 273.0 x 3.0	128.000	4.4	41.0	ø 325

(1) Based on saturated boiling liquid at a flow speed of 1 metre/second

(2) For Nitrogen

Interfaces

Johnston plug-in coupling
(can be installed without welding)

Welded couplings with vacuum or Perlite insulation
(requires welding on-site)

Universal pipe end to allow welding to any fitting, flange or application

Materials

Process Pipe
1.4301/1.4306/1.4307 ~304/304L

Vacuum Jacket
1.4301/1.4306/1.4307 ~304/304L
Optional: 1.4401/1.4404 ~316/316L

Spacers
Epoxy-reinforced glass fibre

Multi-Layer Insulation
Glass paper and Aluminium foil

Supporting pipe clamps
Galvanised with rubber inlay
Stainless steel on request

Related documents

Safety guidelines: D0061116
Manual: D0275036
Statement for food applications: D0435171

Design specifications

Standard according to Pressure Equipment Directive (PED)

Design according to Demaco standard based on EN13480 or ASME B31.3, or AD2000 (others on request)

Suitable for ambient temperatures -25°C till +38°C

Cleanliness level:

- Oil and grease-free
- Oxygen clean on request

Static vacuum with Multi-Layer Insulation

Bellows: 1000 cycles from +38°C till -196°C, calculated according to EN14917 or EJMA

Standard testing for each individual VIP spool:

- Dimensional check
- Pressure testing (if applicable or on request)
- NDE by X-ray or PT (if applicable or on request)
- Helium leak test (<1x10⁻⁹ mbarL/sec)
- Vacuum retention test after 24h at ambient temp (acceptance level <2x10⁻⁴ mbar)

Documentation

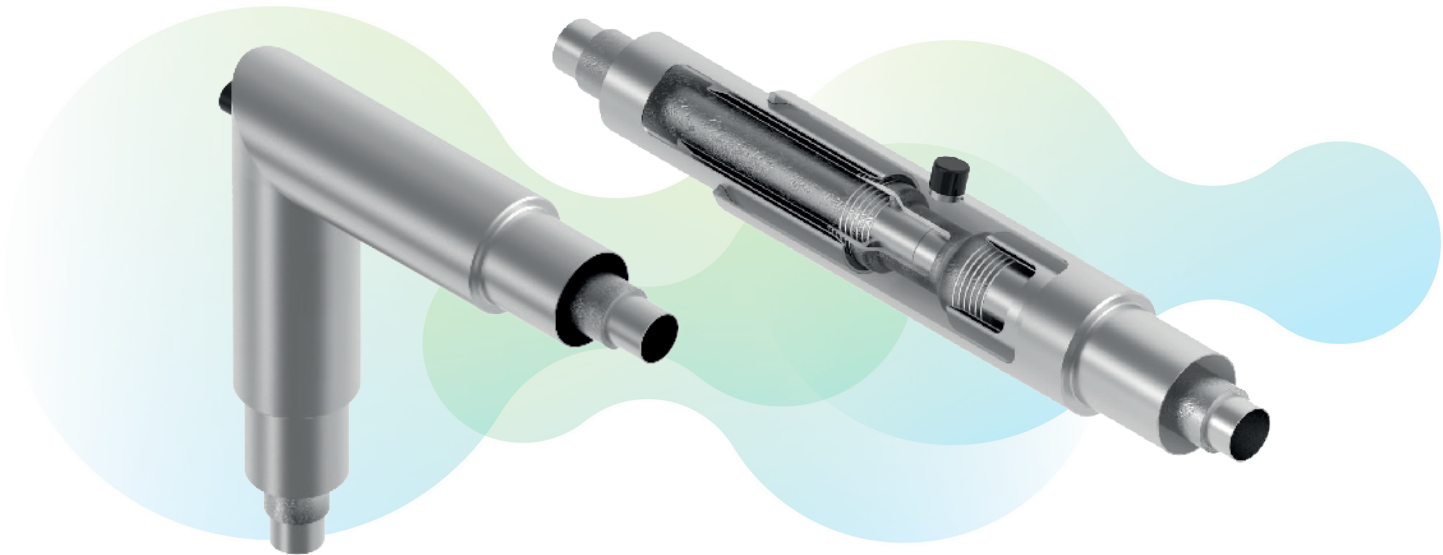
By default, a standard manufacturer data book record is part of each project and contains:

- As-built isometrics
- Safety guidelines
- User manuals
- Declaration of conformity (if applicable)

Extended data books are available on request

Welded Coupling - Vacuum/Perlite Insulated

Transfer Lines	Conditioning Equipment	Components ▼	Filling Stations	Controlling
Johnston Coupling	Welded Coupling	Blindcap / Endpiece	VI Demaco valve	Gas lock
			Highly flex	Pipe end heater



Welded couplings with vacuum or Perlite insulation are used to connect prefabricated vacuum-insulated pipe spools or vacuum-insulated flexible spools. This permanent connection between the spools assures maximum safety and allows testing by NDE on the process pipe. The version with vacuum insulation, which is established on-site after testing, provides the best possible reduction of heat loss. Both versions are easy to install and have a margin of flexibility in length. If there is a deviation between the initial engineering drawing and the actual circumstances on the construction site, the welded coupling can simply adjust the difference in length.

Benefits

- Lowest heat loss values due to vacuum insulation
- Permanent connection allows NDE testing
- No limits in diameter and/or pressure
- Allows limited adjustments in pipe routing while installed
- Re-vacuuming of coupling connections is possible

Application

- Ice free connection of 2 vacuum-insulated spools
- Ice-free connection with bulk tanks (if tank is prepared correctly)
- Where plug-in (Johnston) couplings are not available
- Low ambient temperature conditions (<-30°C)
- Suitable for all cryogenic medium and conditions
- Installations where high safety or quality aspects are required
- When zero leakage is allowed or regular inspection is hard to realise
- Tie-in connections with existing VI piping

Features

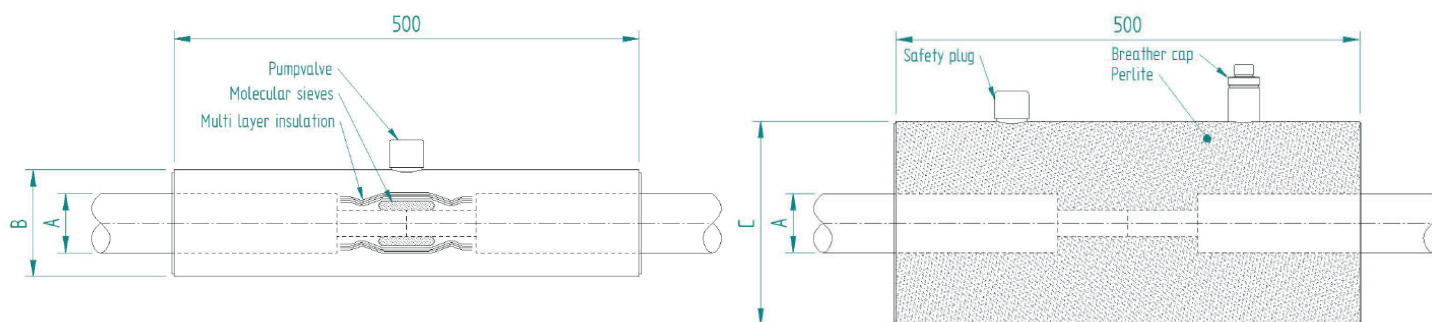
- All stainless steel
- Straight, Angled and/or Tee models available
- High vacuum level insulation
- Qualified welding to the highest standards
- Remarks:
 - Requires specialised tools
 - Requires longer installation time compared to other coupling types

PRODUCT SHEET

Welded Cuopling - Vacuum/Perlite Insulated

Pipe Size			Vacuum Insulated		Perlite Insulated	
A - (mm)			Vacuum Jacket B - (mm)	Heat Loss Indication Per Coupling (W)	Weld Coupling Sleeve C - (mm)	Heat Loss Indication Per Coupling (W)
DN10	Ø	63.5	Ø 114	2.1	Ø 219	14
DN15	Ø	63.5	Ø 114	2.2	Ø 219	15
DN25	Ø	63.5	Ø 114	2.8	Ø 219	16
1"	Ø	76.1	Ø 114	3.1	Ø 219	17
1½"	Ø	88.9	Ø 114	3.5	Ø 219	18
2"	Ø	114.3	Ø 154	4.6	Ø 219	21
2½"	Ø	139.7	Ø 168	5.5	Ø 219	23
3"	Ø	154	Ø 206	7	Ø 256	25
4"	Ø	168.3	Ø 206	9	Ø 273	29
6"	Ø	219.1	Ø 256	14	Ø 306	40
8"	Ø	273	Ø 306	19	Ø 406	44

(1) For Nitrogen



Design specifications

According to Pressure Equipment Directive (PED)

Design according to Demaco standard based on EN13480 or ASME B31.3, or AD2000 (others on request)

Suitable for: N₂, O₂, Ar, LNG, H₂, He, CO₂

Suitable for ambient temperatures to -35°C

Static vacuum with Multi-Layer Insulation (VI coupling)

Materials

Vacuum jacket sleeve

1.4301/1.4306/1.4307 ~304/304L

Optional: 1.4401/1.4404 ~316/316L

Multi-Layer insulation

Glass paper and aluminium foil

Related documents

Safety guidelines: D0061116

Manual: D0228071

Statement for food applications: D0435171

Vacuum insulated - Highly flex

Transfer Lines

Conditioning Equipment

Components ▼

Filling Stations

Controlling

Johnston Coupling

Welded Coupling

Blindcap / Endpiece

VI Demaco valve

Gas lock

Highly flex

Pipe end heater



Vacuum Insulated High Flexible Filling Hoses are used to transfer liquefied gases with extreme low heat losses. This high flexibility in combination with a ultra-slim design results in an ideal and attractive alternative for non-insulated or conventional insulated flexible hoses between filling stations, storage containers and applications.

Benefits

Due to outstanding insulation properties, thermal heat losses are kept to a minimum

Stainless steel basis, thus perfectly suitable for food, laboratory and pharmaceutical industries

Perfectly suitable where high-quality liquid is required for the proper function of the application or machine

After delivery, up to five years maintenance free

Application

Installations where frequent disconnection is required

Transfer lines from/to mobile storage and bulk tanks

Temporary connection between bulk storage and application

Flexible connection to vibrating equipment or moving applications

Hand-filling of small containers

Applicable for food. When stated upfront, Demaco can deliver a statement for tube and pipe systems according directive 1935/2004/EU

Features

All stainless steel

High vacuum level insulation

TIG welded in accordance with the highest standards (ISO3834-2)

Standard available diameter DN10

Standard pressure up to PN10

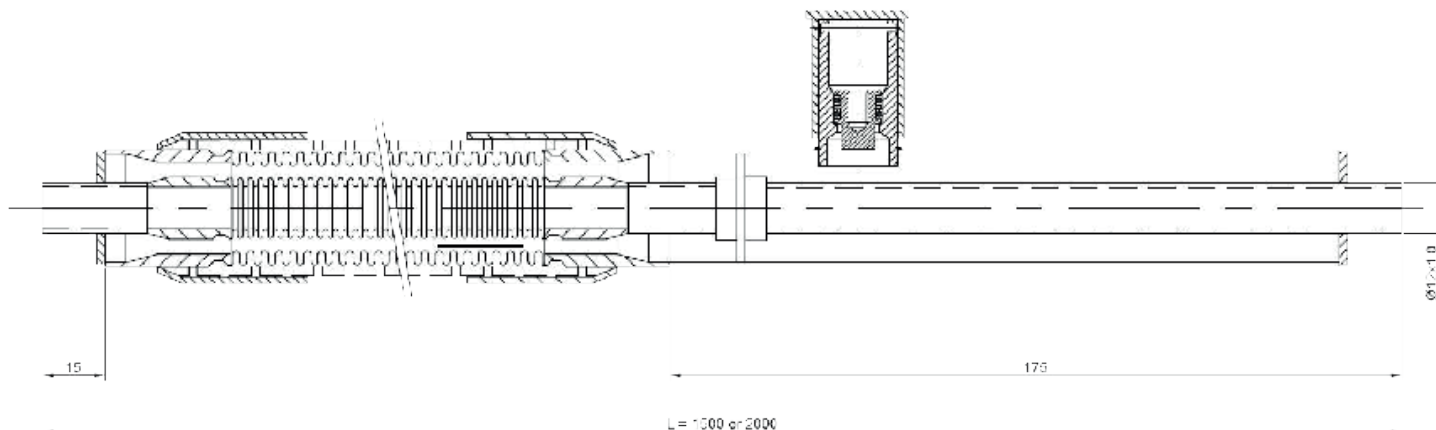
Delivery according to Pressure Equipment Directive (PED)

Vacuum insulated - Highly flex

Main dimensions

Pipe size	Process Line I.D. (mm)	Connection size (mm)	Vacuum Jacket (mm)	Max. O.D. (mm)	Max. capacity indication (L/h) ⁽¹⁾	Single Bend Radius (mm)	Frequent Bending Radius (barg)	Max. working pressure (barg)
DN10 HF	Ø10	Ø12x1	32	38	175	70	130	10
DN15 HF	Ø16	Ø18x1	50	60,3	300	130	300	49

(1)Based on saturated boiling liquid at a flow speed of 1 metre/second



Interfaces

Five standard types of connections are directly available:

- None (weld-on)
- 3/4-16UNF or 7/8-14UNF (Gland+Nut)
- Socket/Nipple 1/4", 3/8", 1/2"
- 3-piece union 1/4", 3/8", 1/2"
- Filling handle for open vessels

Standard stock lengths of DN10HF

Demaco Article No.	Length (mm)
517.160	1500
517.165	2000

Materials

Gas lock

1.4301/1.4306/1.4307 ~304(L)
(Other materials on request)

Spacers

Epoxy-reinforced glass fibre

Multi-Layer Insulation

Glass paper and Aluminium foil

Design specifications

Standard according to Pressure Equipment Directive (PED)

Design according to AD2000, EN13480 or ASME B31.3
(others on request)

Cleanliness level:

- Cleaned oil and fat free
- Inspected for pure oxygen usage

Static vacuum with Multi-Layer Insulation

Standard testing for each individual VIP spool:

- Dimensional check
- Pressure testing (2)
- NDE by X-ray or PT (2)
- Helium leak test (<1x10⁻⁹ mbarL/sec)
- Vacuum retention test after 24h at ambient temp (acceptance level <2x10⁻⁴ mbar)

Documentation

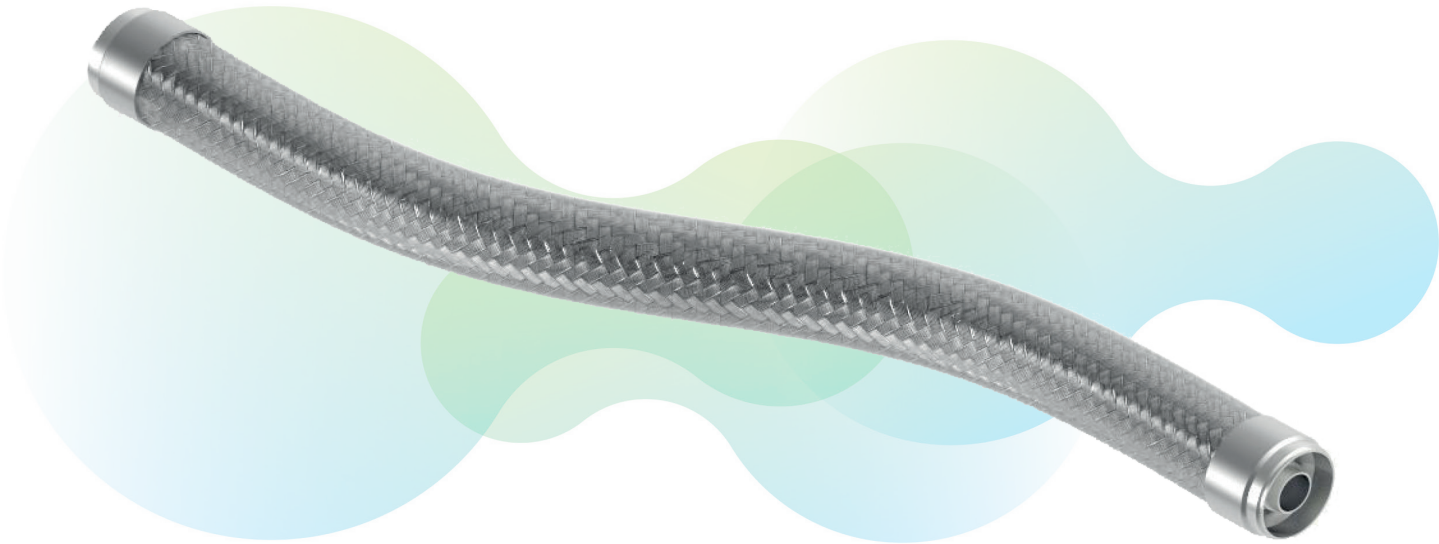
Standard manufacturer data book record is part of each project and contains:

- As-built isometrics
- Safety guidelines
- User manuals (if applicable)
- Declaration of conformity (if applicable)

PRODUCT SHEET

Vacuum-Insulated - Flexible

Transfer Lines ▾	Conditioning Equipment	Components	Filling Stations	Controlling
VI Piping	VI Flex	VI CO2	VI Pipe Industry	VI Multi Transfer



The Vacuum Insulated Flexible (VIF) is used to transfer liquefied gasses at extreme low temperatures, keeping thermal heat losses to a minimum. The VIF is applied when prefabricated rigid vacuum insulated pipe spools are difficult to install, not preferred or not feasible. This flexibility in combination with a slim design, results in an ideal and attractive alternative for non-insulated or conventional insulated flexible hoses.

Benefits

- Due to outstanding insulation properties, thermal heat losses are kept to a minimum
- Stainless steel basis therefor perfectly suitable for food, laboratory and pharmaceutical industries
- Perfectly suitable where high quality liquid is required for the proper function of the application or machine
- Maintenance free

Features

- All stainless steel
- High vacuum insulation
- Qualified welding to the highest standards
- Diameter process pipe; up to 4"
- Pressure Rates; up to PN40
- Suitable for: N₂, O₂, Ar, LNG, H₂, He, CO₂

Application

- Installations where frequent disconnection is required
- Transfer lines from/to mobile storage and bulk tanks
- Temporary connection between bulk storage and application
- Flexible connection to vibrating equipment or moving applications
- Degas lines for cryogenic conditioning equipment
- When an accurate measurement is difficult or even impossible or where complex and/or dense pipe routing is at hand
- Applicable for food. When stated upfront, Demaco can deliver a statement for tube and pipe systems according directive 1935/2004/EU

PRODUCT SHEET

Vacuum-Insulated - Flexible

Pipe size	Process Line I.D. (mm)	Vacuum Jacket (mm)	Capacity Indication (L/h) ⁽¹⁾	Frequent Bending Radius (mm)	Heat Loss Indication (W/m) ⁽²⁾	Weight Indication (kg/m)	Max. Working Pressure (barg)
DN10HF	∅ 10.1	∅ 32	250	130	1.1	1.09	10
DN15 HF	∅ 16.2	∅ 50	675	300	1.2	1.98	49
DN10 small	∅ 12.2	∅ 60.3	300	260	1.0	2.8	74
DN10	∅ 12.2	∅ 73	300	320	1.0	3.0	74
DN15	∅ 16.2	∅ 73	675	320	1.2	4.0	64
DN25	∅ 25.5	∅ 73	1.650	320	1.6	4.4	64
1"	∅ 34.2	∅ 88.9	3.000	460	1.7	5.3	24
1½"	∅ 40.1	∅ 104	4.000	660	1.9	6.1	39
2"	∅ 50.4	∅ 127	5.600	750	2.1	7.9	29
2½"	∅ 65.3	∅ 162	10.850	1.000	2.4	10	24
3"	∅ 80.2	∅ 156	16.350	1.000	2.7	11.4	15
4"	∅ 100	∅ 176	25.450	1.250	3.1	13.3	9

(1) Based on saturated boiling liquid at a flow speed of 1 metre/second

(2) For Nitrogen

Interfaces

Johnston coupling (can be installed without welding)

Welded couplings with vacuum or perlite insulation (requires welding on-site)

Universal pipe end to allow welding to any fitting, flange or application

Materials

Process line (inner flex)

1.4404/1.4541/1.4571 ~316/316Ti/321

Vacuum Jacket (outer flex)

1.4404/1.4541/1.4571 ~316/316Ti/321

Braiding

1.4301 ~304 (others on request)

Multi-Layer Insulation

Glass paper and Aluminum foil

Supporting pipe clamps

Galvanized with rubber inlay

Stainless steel on request

Related documents

Safety guidelines: D0061116

Statement for food applications: D0435171

Design specifications

Standard according Pressure Equipment Directive (PED)

Design according to Demaco standard based on EN13480 or ASME B31.3, or AD2000 (others on request)

Cleanliness level: oil and grease-free, inspected for pure Oxygen usage

Static vacuum with Multi-Layer Insulation

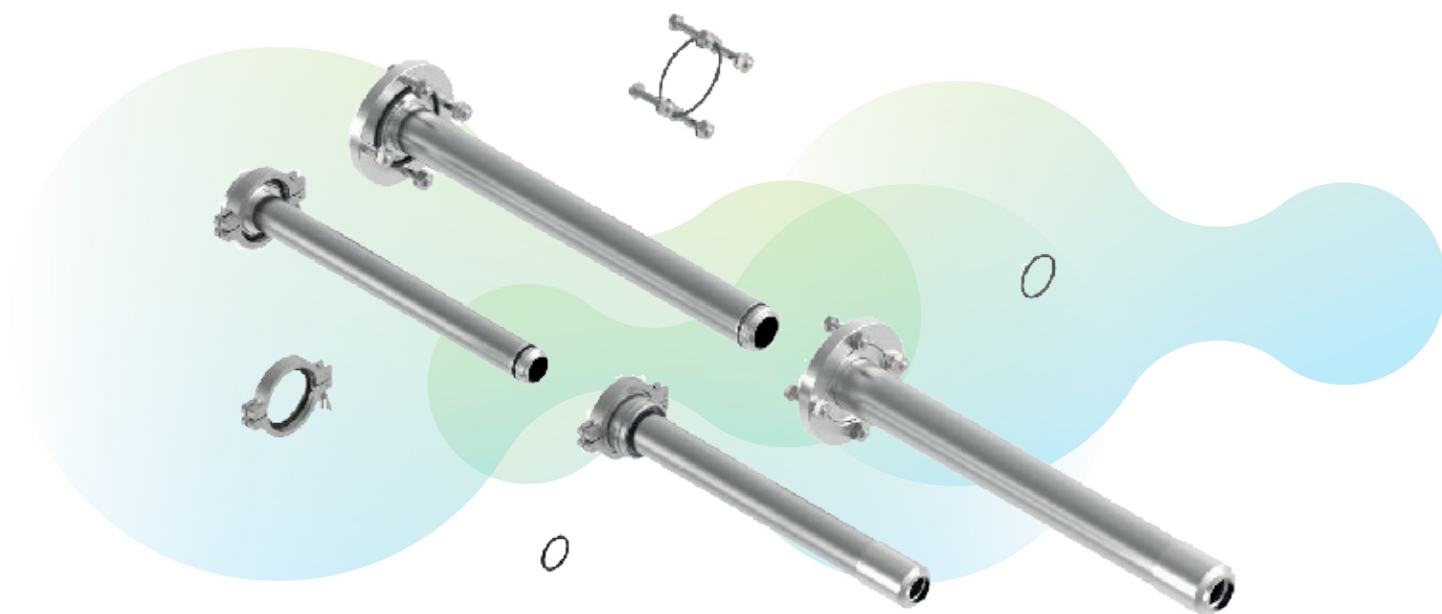
Standard testing for each individual VIP spool:

- Dimensional check
- Pressure testing (if applicable or on request)
- NDE by X-ray or PT (if applicable or on request)
- Helium leak test ($<1 \times 10^{-9}$ mbarL/sec)
- Vacuum retention test after 24h at ambient temp (acceptance level $<2 \times 10^{-4}$ mbar)

Documentation

Standard manufacturer data book record is part of each project and contains:

- As built isometrics
- Safety guidelines
- Declaration of conformity (if applicable)



Johnston couplings are used to connect prefabricated vacuum-insulated piping and vacuum-insulated flexible spools. The Johnston coupling consists of a male and female connector that can easily be installed without welding or special knowledge. In the picture below, two male and female couplings are shown, without process pipe and vacuum jacket.

Benefits

- Low heat-loss value due to vacuum insulation
- Easy installation
- No welding necessary on coupling
- No special vacuum tools needed for installation
- For DN10 up to DN25 universal model

Application

- Universal connection between prefabricated VI components like pipe spools, conditioning equipment and interface connections
- When fast and easy installation is required
- When pipe spools are frequently disconnected
- Installation at places where welding is not possible and/or allowed
- Suitable as preparation for future extensions or disassembling

Features

- All stainless steel
- Coupling securing by KF50 hinged clamp or flanges with bolts and nuts
- Sealing as combination of cold metal sealing and warm pressure containing O-ring (O-rings with BAM approval on request)
- High vacuum level insulation
- Pressure Rates; up to PN40
- Available sizes from DN10 to DN80 (3")
- Qualified welding to the highest standards
- Remarks:
 - Limited possibility for routing adjustments
 - NDE on coupling not possible
- Applicable for food. When stated upfront, Demaco can deliver a FDA certificate for the used O-rings in the couplings and a statement for tube and pipe systems according directive 1935/2004/EU

PRODUCT SHEET

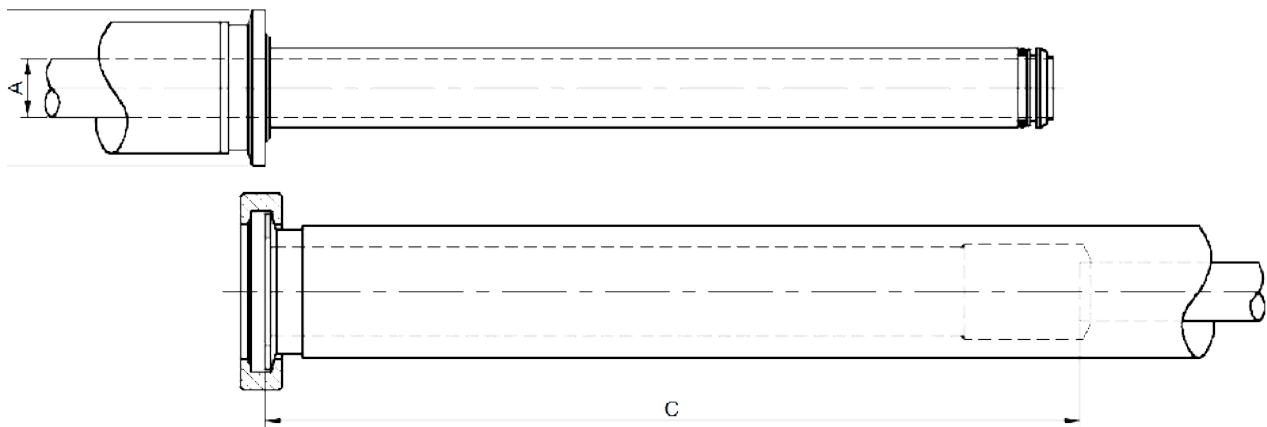
Johnston Coupling

Pipe size (mm)	Process Line I.D. (mm)	Vacuum jacket (mm)	Capacity indication (L/h) ⁽¹⁾	Heat loss indication (W/m) ⁽²⁾	Weight indication (kg/m)	Max. working pressure (barg)
DN10 Small	∅ 12x1	Threaded	50	225	6	2.0
DN10	∅ 12x1	KF50 Clamp	75	400	40	4.2
DN15	∅ 18x1	KF50 Clamp	75	400	40	4.2
DN25	∅ 28x1	KF50 Clamp	75	400	40	5.8
1"	∅ 33.7x1.6	Flanged	130	500	40	5.8
1½"	∅ 48.3x1.6	Flanged	140	500	40	5.8
2"	∅ 60.3x1.6	Flanged	177	700	40	7.6
2½"	∅ 76.1x2	Flanged	200	700	16	8.2
3"	∅ 88.9x2	Flanged	213	700	16	11.2

(1) For Nitrogen

* Standard length until -200°C. For much colder hydrogen and helium, longer lengths are used

* For helium and hydrogen design versions with reduced heat loss are available



Materials

Tubes and machined parts

1.4301/1.4306/1.4307 ~304/304L

Optional: 1.4401/1.4404 ~316/316L

KF50 clamp

Stainless steel

Bolts and nuts

Stainless steel A2

Warm pressure-containing seal

O-ring (Viton, Buna-N or EPDM)

Cold Seal

Metal seal

Related documents

Safety guidelines:

D0061116

Manual:

D0371384 / D0218671

Statement for food applications:

D0435171

Design specifications

According to Pressure Equipment Directive (PED)

Design according to Demaco standard based on EN13480 or ASME B31.3, or AD2000 (others on request)

Suitable for: N₂, O₂, Ar, LNG, H₂, He, CO₂

Suitable for ambient temperatures to -35°C

Static vacuum with Multi-Layer Insulation

O-ring seal leakage <1x10⁻⁸ mbarl/sec

Options

Other lengths and diameters on request

Reduced heat-losses for helium or hydrogen applications

PRODUCT SHEET

Degasser

Transfer Lines

Conditioning Equipment ▼

Components

Filling Stations

Controlling

Automatic Has Vent

Degasser

Phase Separator

Subcooler



The Demaco Vacuum Insulated Degasser is an upgrade of a Demaco Gas Vent. Due to a constant heat inleak and pressure drop between the tank and consumer points, liquid nitrogen partly evaporates to boil-off gas. A degasser helps you to increase the liquid nitrogen quality on the consumer points by mechanical separation of boil-off gas from liquid while in use. This degasser is part of the conditioning equipment group and, like the gas vent, is self-operating. Standard liquid nitrogen flow consumptions up to 250 L/h are no problem. Higher capacities are custom-made and available on request.

Our degasser is available in various configurations and is vacuum insulated; the functioning is entirely mechanical, and electricity is only required for the optional electric valve.

The degasser is a modular design and available in various sizes. With liquid nitrogen, the degasser is suitable for pressure rates up to PN16 and with liquid CO₂ pressure rates of up to PN28.

The degasser can optionally be equipped with a Johnston bayonet coupling for the GN₂ blow-off. This makes it possible to implement this device in a clean room or other industry, where condense or ice build-up is not allowed.

Benefits

Due to outstanding insulation properties, thermal heat losses are kept to a minimum

Standard DN10-25 Johnston coupling

Easy to install

Smart engineering allows multiple configurations for in- and outlet

Application

Maximisation of outlet quality for small consumers with high-quality demands like droppers.

As small phase separator in combination with a backpressure valve when no electric power or pneumatics are available

When piping needs to be kept cold continuously

When short cool-down reaction times are required

Automatic cool-down of VIP lines

Features

All stainless steel

High vacuum insulation

TIG welded according to the highest standards (ISO3834-2)

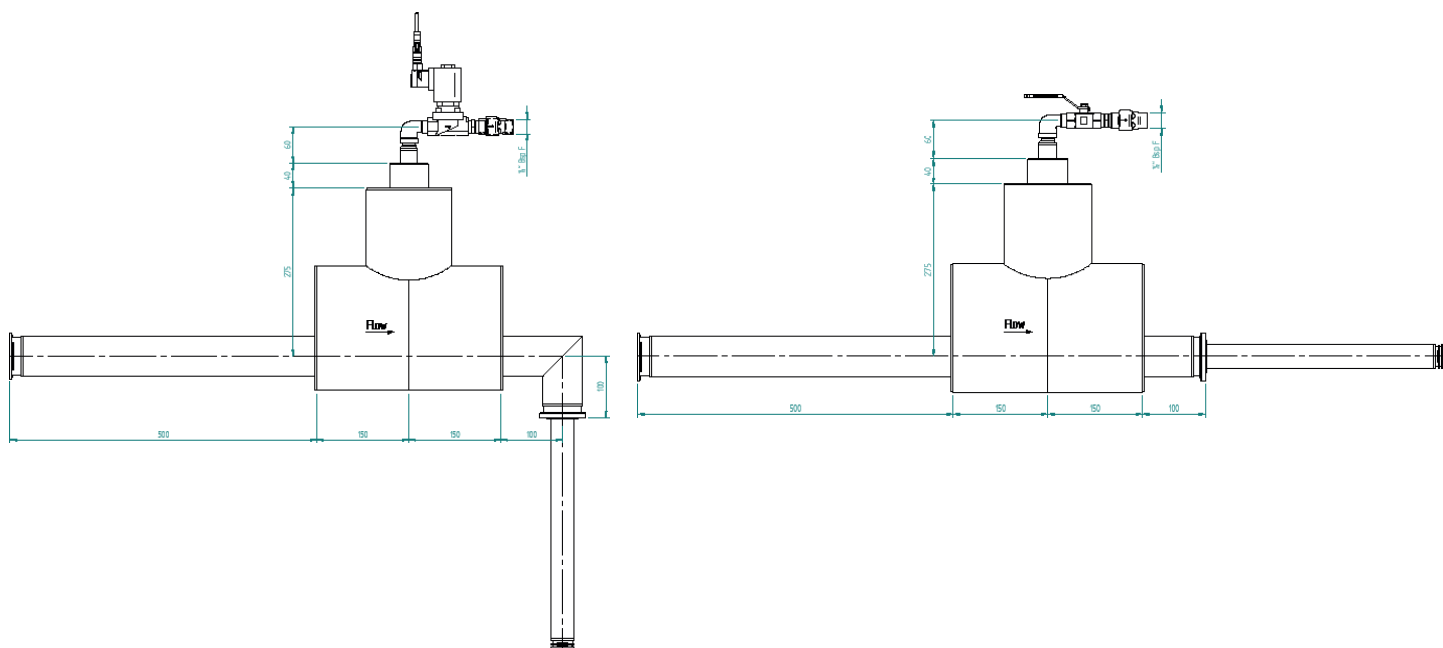
Standard pressure rating PN16

Male and female Johnston couplings possible for in- and outlet

Outlet provided with:

- ball valve and check valve
- solenoid valve and check valve
- vacuum insulated outlet possible (on request)

Standard design according to Pressure Equipment Directive (PED)



Interfaces

Johnston Coupling is standard, other couplings possible

Non-insulated blow-off connection for maximum connection flexibility

Available on request:

- Ice free vacuum-insulated blow-off connection by means of Johnston coupling
- Vacuum-insulated valves
- Custom interface connection

Materials

Process part gas vent
 1.4301/1.4306/1.4307 ~304/304L

Vacuum Jacket
 1.4301/1.4306/1.4307 ~304/304L
 Optional: 1.4401/1.4404 ~ 316/316L

Ball valve and Ceck valve
 Stainless steel

Solenoid valve
 Messing housing and stainless steel inner parts

Spacers
 Epoxy reinforced glass fibre

Multi-Layer Insulation
 Glass paper and Aluminium foil

Johnston coupling seal
 Fe36Ni and Buna-N

Design specifications

Standard according to Pressure Equipment Directive (PED)

Maximum allowable operating pressure PN16

Cleanliness level: oil and grease-free, inspected for pure oxygen usage

Static vacuum with Multi-Layer Insulation

Standard testing for each individual VIP spool:

- Dimensional check
- Helium leak test ($<1 \times 10^{-9}$ mbarL/sec)
- Vacuum retention test after 24h at ambient temp (acceptance level $<2 \times 10^{-4}$ mbar)

Documentation

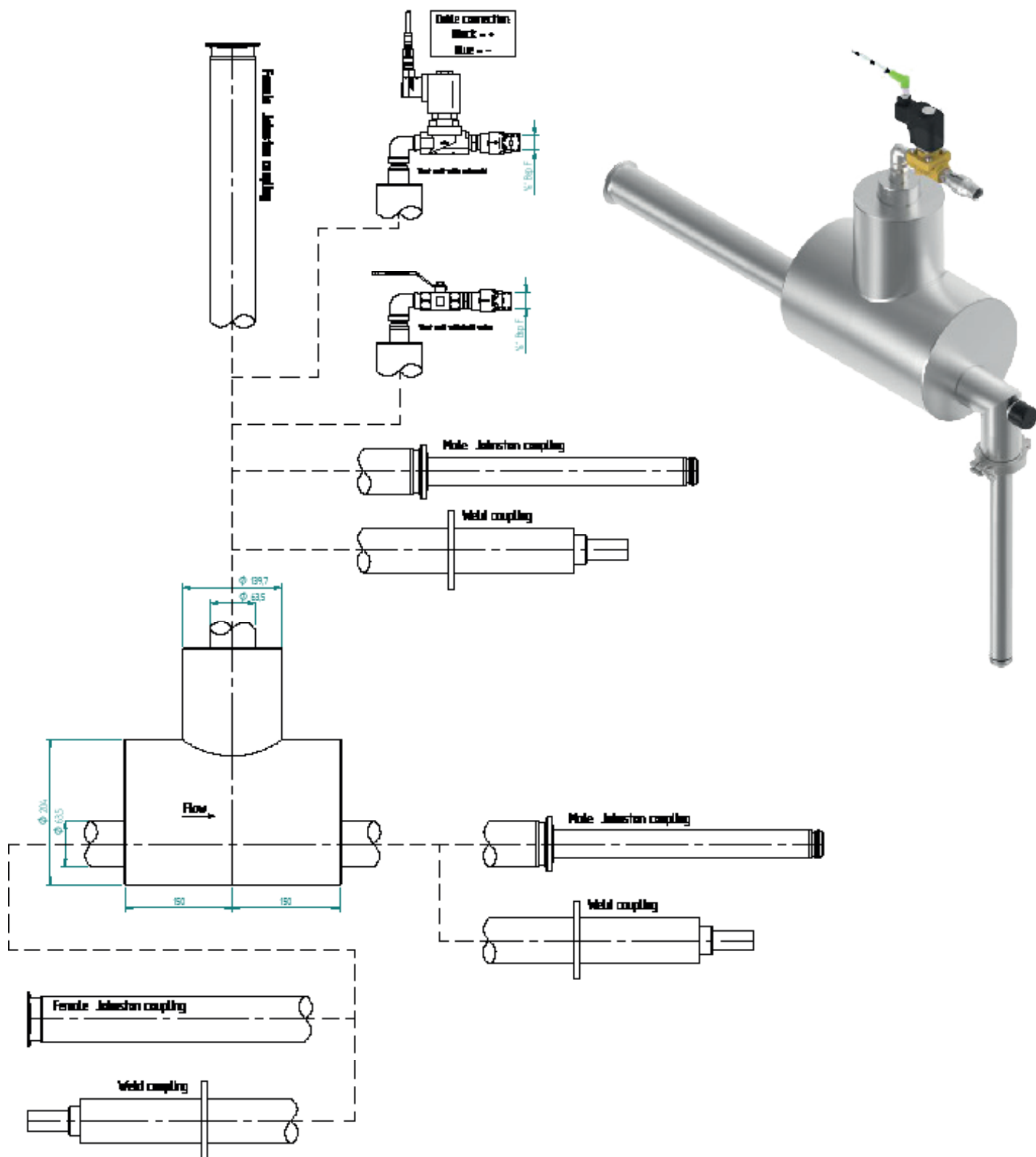
By default, a standard manufacturer data book record is part of each project and contains:

- As-built isometrics (if applicable)
- Safety guidelines
- User manuals
- Declaration of conformity (if applicable)

Extended data books are available on request

Related documents

Safety guidelines:	D0061116
Manual:	D0218649
Statement for food applications:	D0435171
1/2" Ball valve specifications:	D0256769
1/2" Solenoid valve specifications:	D0434059
Solenoid connector specifications:	D0650533
Electrical cable specifications:	D0650546





For the proper functioning of most cryogenic applications, it is necessary that the system's working pressure is adjustable and that the gas's quality is continuously enhanced. To meet these two conditions, it is recommended to use a phase separator.

The Demaco phase separator:

- Allows the working pressure to be set at the desired level
- Enhances the quality of liquid gases
- Guarantees a sufficient buffer of liquid gas

The construction and size of Demaco's phase separators are always perfectly matched to any project at hand. This is achieved by using standard modules that are configured in a product configurator based on specific customer requirements.

In recent years we mainly supplied phase separators with a capacity of 40 up to 200 liters. In most cases, these sizes perfectly meet the requirements of our customers. On request, Demaco can also increase the capacity size.

Benefits

An adjustable and controlled working pressure

Modular set-up

Automatic level controlling by means of electrical control cabinet

Application

Phase separators are used when:

- high-quality liquid on application is required
- pressure at application needs to be reduced
- fast reaction times for liquid consumption
- short interval periods of large consumption
- large amounts of boil-off are created in adherent piping

Features

Stainless steel inner and outer vessel

Vertical or horizontal orientation

Universal inlets and outlets with Demaco DN10-25 Johnston couplings

Up to 16 bar design pressure

Self-mechanical pressure control

Integrated DC-LS-050 capacitive level sensor

Open/Close or Regulating valve for filling

Standard cleanliness: Process clean

PED approved design with CE marking

PRODUCT SHEET

Phase Separator

Technical data

Positioning	Indoor/Outdoor
Ingress protection	IP65
Orientation	Vertical and horizontal versions
Design pressure	PN16
Inlet pressure	Max. 16 barg
Volmetric capacity	41 L
Effective buffer volume	15-30 L
Output volume O/C control system	Up to 1600 L/H
Output volume Regulated control system	Up to 2200 L/H
Level indication	4-20 mA capacitive sensor
Pressure indication	Pressure gauge
Safety precautions	Pressure relief valve
Dimension vessel	800x406 (LxD)
Minimum build-in dimensions	1900 mm
Power supply	240 VAC or (24 VDC, 24/110 VAC)
Pneumatic supply filling valve	4-6 barg

Options

- Custom-made mounting facilities
- Overflow protection by PT100 in gas vent blow-off line
- Integration in Building Management System (BMS)
- Integration with oxygen (O₂) detection system

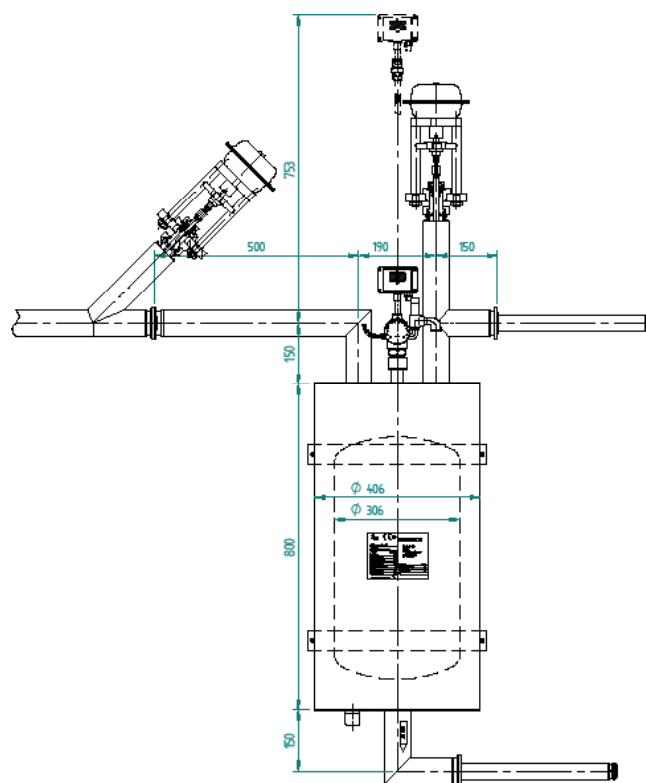
Materials

- Process part
1.4301/1.4306/1.4307 ~304/304L
- Vacuum Jacket
1.4301/1.4306/1.4307 ~304/304L
- Spacers
Epoxy-reinforced glass fibre
- Multi-Layer Insulation
Glass paper and Aluminium foil

Documentation

- By default, a standard manufacturer data book record is part of each project and contains:
- As-built isometrics (if applicable)
 - Safety guidelines
 - User manuals
 - Declaration of conformity

41 L Phase Separator



Design specifications

- Standard according to Pressure Equipment Directive (PED)
- Design according to EN13445

- Cleanliness level:
- Cleaned oil and grease-free
 - Oxygen clean on request

- Static vacuum with Multi-Layer Insulation (MLI)

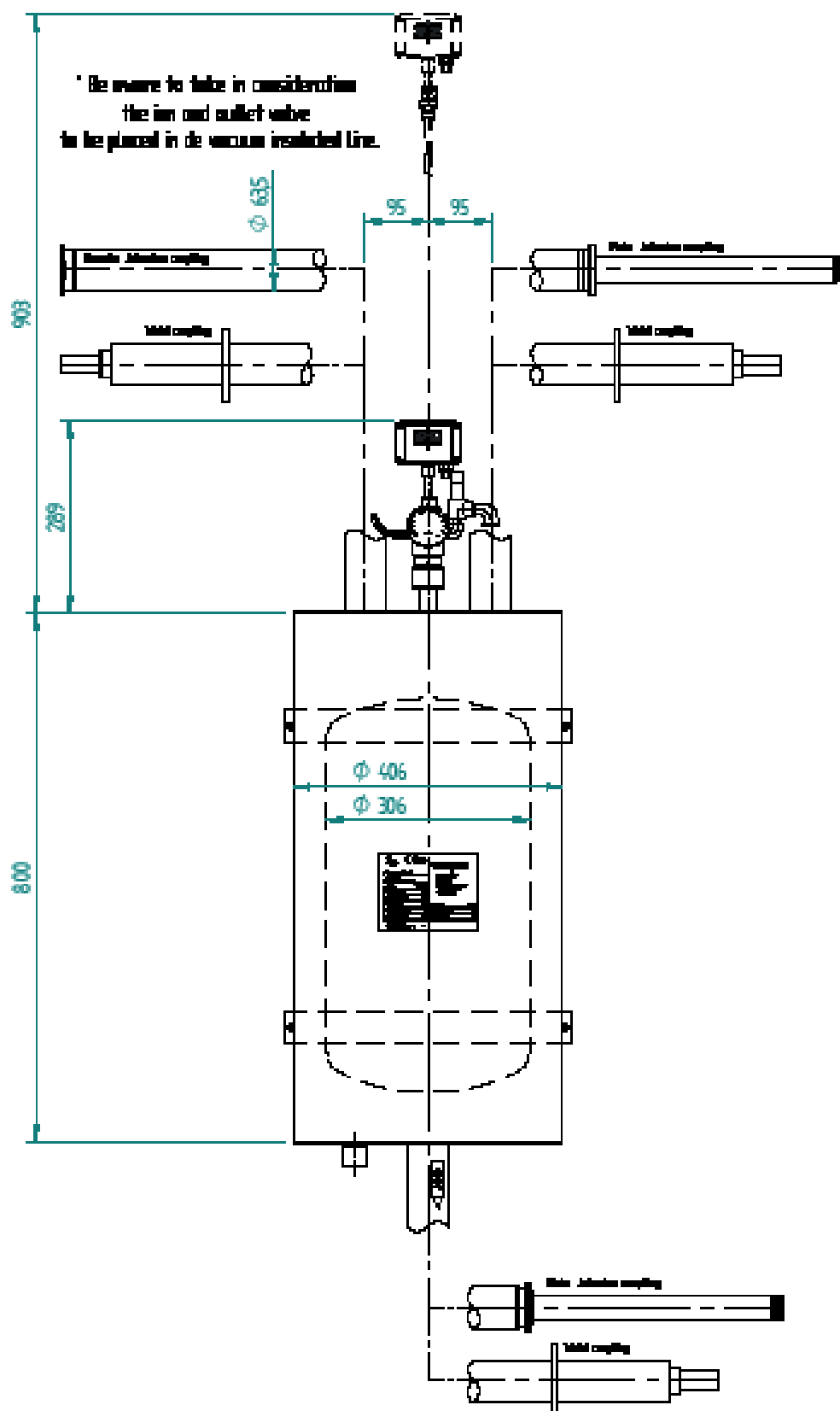
- Standard testing for each Phase Separator:
- Dimensional check
 - Pressure test
 - NDE by X-ray or PT
 - Helium leak test (<1x10⁻⁹ mbarL/sec)
 - Vacuum retention test after 24h at ambient temp (acceptance level <2x10⁻⁴ mbar)
 - Functional test at -196°C

Realted documents

- Safety guidelines: D0061116
- Manual: D0226172
- Statement for food applications: D0435171
- Level sensor specifications: D0434141
- Control cabinet specification: D0226201

Phase Separator

A selection of possible configurations



PRODUCT SHEET

Pipe-end-heater

Transfer Lines	Conditioning Equipment	Components ▼	Filling Stations	Controlling
Johnston Coupling	Welded Coupling	Blindcap / Endpiece	VI Demaco valve	Gas lock
			Highly flex	Pipe end heater



The Demaco pipe-end-heater keeps the end of a vacuum insulated gaseous line warm to prevent Ice build-up. When a pipe-end heater is not integrated in the system, Ice build-up could reach enormous proportions and even lead to dangerous situations when the ice breaks off. This can cause personal injury from falling ice or damage objects that lay underneath. In addition, ice build-up can also lead to congestion in transfer lines and systems. To avoid ice build-up, many of our customers use a pipe-end-heater. The pipe-end-heater is installed at the end of a gas line, where the cold gas leaves the system. An internal heating element keeps the end of the pipe warm, thus preventing ice build-up. A pipe-end-heater is not a necessarily part of a cryogenic infrastructure but used to complement quality improvement products such as our phase separator, automatic gas vent, degasser, and subcooler.

Benefits

- Self regulating - no electrical cabinet required
- Low energy consumption
- Easy to install
- Plug and play

Application

When pipe end needs to be free of ice

Features

- Weather proof
- TIG welded according to the highest standards (ISO3834-2)
- Pipe end for VIP pipe DN10 - DN25
- Self regulating

Materials

- Heating transfer block: Aluminium
- Protection Jacket: 1.4301/1.4306/1.4307

Materials

- Supply voltage: 230-240V 50/60Hz
- Power cable 5m
- Applicable for wall sockets - type E
- Power: 40W self regulating
- Max Temp. 110°C
- IP65 - weather proof
- Size Ø114,3 - L=130mm

Documentation

- By default, a standard manufacturer data book record is part of each project and contains:
- As-built isometrics (if applicable)
 - Safety guidelines
 - User manuals
 - Declaration of conformity

Related documents

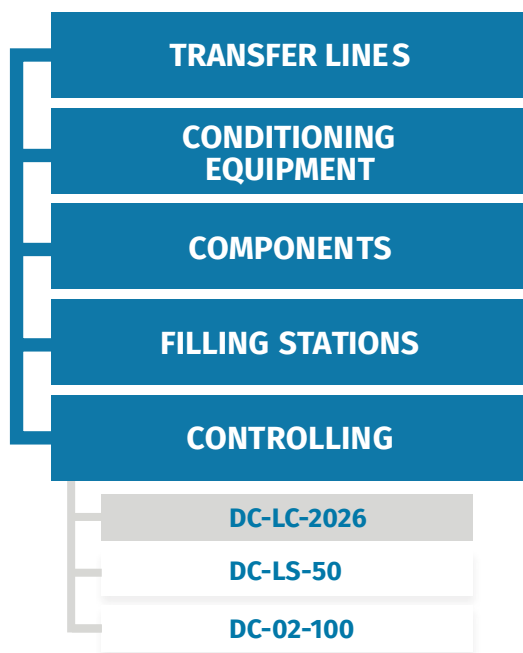
- | | |
|----------------------------|----------|
| Safety guidelines: | D0061116 |
| User manual: | D0546938 |
| Declaration of conformity: | D0590369 |

LEVEL CONTROLLER - DC-LC-2026

PRODUCT SHEET

INTRODUCTION

The DC-LC-2026 is an easy-to-mount, weatherproof level controller, developed especially for controlling levels of cold stored liquid gases in closed containers like storage tanks, dewars and phase separators. This DC-LC-2026 level controller is an ideal add-on to our DC-LS-50 level sensor with an easy-to-read LED display. Our DC-LC-2026 level controller compares any analogue input (4-20mA or 0-10VDC) with a free adjustable preset value. Depending on its preset control function (2-state or continuous), the level controller sets relays or generates an analogue output signal to activate components like valves or arms. With additional available option boards, extension of functionality or communication by means of PRO FI BUS or RS422/48S is possible.



PRODUCT PROPERTIES

The DC-LC-2026 is used to measure, display, validate and control actions on preset levels for:

- » Level
- » Pressure
- » Temperature
- » Other external signals



ORDER DETAILS

- » Easy to operate
- » Universal design set-up
- » Spare parts available worldwide

SCOPE OF DELIVERY

- » Weatherproof casing with transparent cover
- » Ingress protection IP6S
- » Main switch two-pole design
- » Double-fused
- » Integrated power supply for 110/230VAC to 24VDC
- » Full digital controller by Jumo
- » 2-state or continuous controlling
- » 1 Integrated output relay
- » 1 Integrated alarm output relay

LEVEL CONTROLLER - DC-LC-2026

PRODUCT SHEET

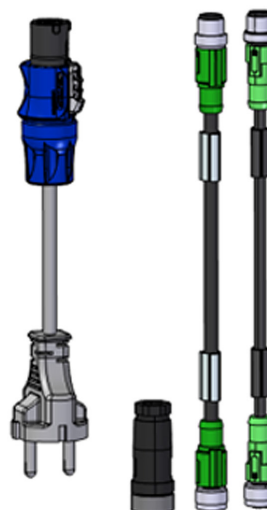
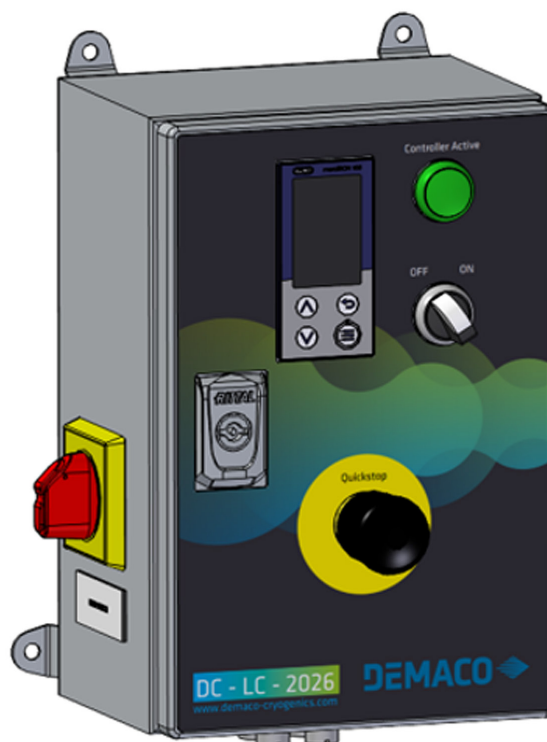
PRODUCT I/O	
Dimension casing	280x218x156mm (LxHxD)
Material casing	ABS
Material transp. cover	Polycarbonate
Power supply	110/240VAC 48-63Hz
Power output	24VDC
Ingress protection	IP65
Measuring input signal	0-20mA/4-20mA or 0-10VDC
Output alarm relay	Voltage free changeover relay NO, max. 3A at 230VAC
Output relay On/Off	Voltage free changeover relay NO, max. 3A at 230VAC
Output analog	0-20mA / 4-20mA $R_{load} < 500\Omega$
Power cable	L=5 meter with Type F plug

BRIEF DESCRIPTION

The DC-LC-2026 is a convenient level control solution for all Demaco supplied Phase Separators supplied by Demaco. This DC-LC-2026 does it all and is suitable for OPEN/CLOSE and PROPORTIONAL filling loops.

For applications in secured areas the DC-LC-2026 can be controlled by an oxygen safety system or for extra redundancy the build in fail-safe function can be used. Both safety functions are automatically recognized by the DC-LC-2026 when connected, no additional programming is required.

The DC-LC-2026 is suitable for all Demaco brand valves and sensors (Burkert/RTK/DC-LS-50/Pt00) and is equipped with potential-free contacts for Hi/Lo-level alarms, and if connected a potential free contact for the fail-save alarm. All contacts can be picked up by using the M12 output connectors located at the bottom side of the controller. All parameters that influence the control process can be easily adjusted on the integrated LCD display of the JUMO meroTRON. In short the DC-LC-2026 is a good choice when it comes to controlling liquid nitrogen levels.



LEVEL CONTROLLER - DC-LC-2026

PRODUCT SHEET

ORDER DETAILS

- » Level controller DC-LC-2026
- Part-number: A0109982

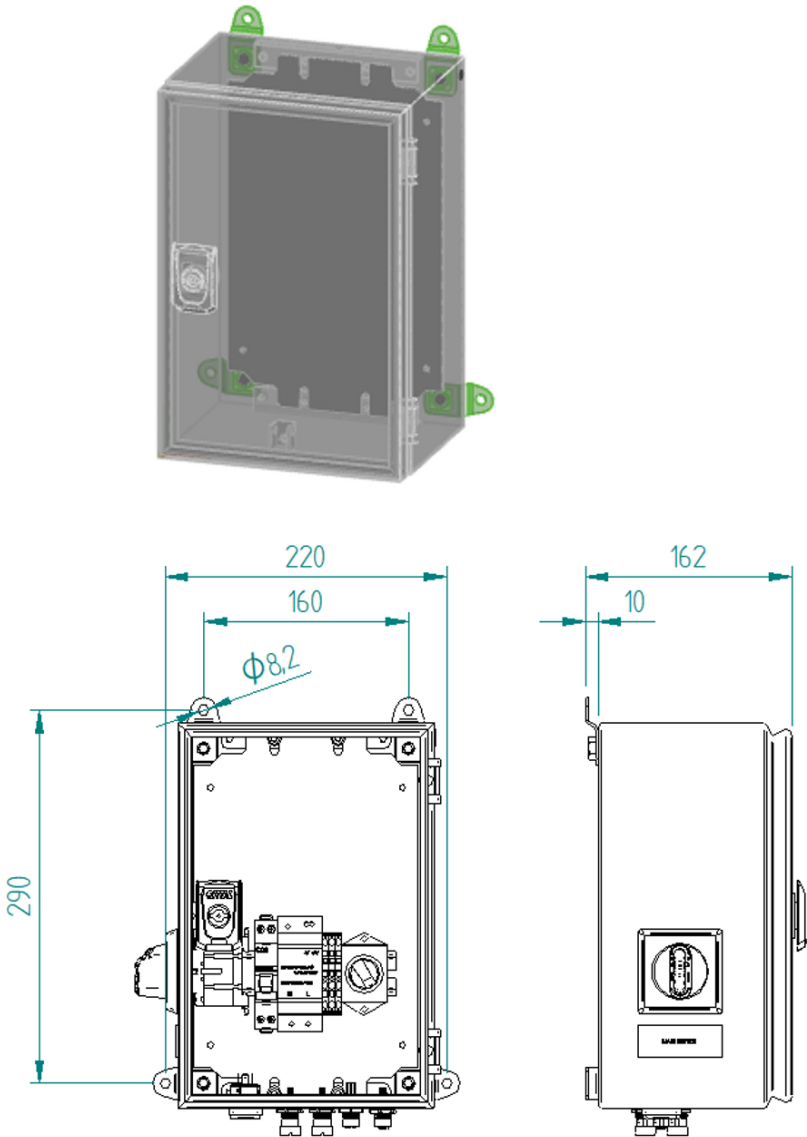
SCOPE OF DELIVERY

- » 1x DC-LC-2026 Level controller
- » 1x Operating Manual
- » Bootable USB-drive
- » 230V/50Hz Power cable
- » 5-P M12 Actuator cable
- » 8-P M12 Actuator cable
- » Adapter 8-P to 5-P (For RTK Conversion)

PRODUCT PROPERTIES	
Cabinet size	Rittal KX 1574.00, 300x200x155 (mm)
Degree of protection	IP65
Color	RAL 7035 / Demaco frond-theme
Power supply	230V/50Hz.
Output voltage	24VDC
Max current	3A
Main fuse	6A
Weight	2.5 Kg

PRODUCT I/O	
INPUT	Main Power, 230V/50Hz
INPUT	Level sensor type DC-LS-50, 4-20mA
OUTPUT	Filling valve, 24VDC
OUTPUT	Relays (NO) High Level Alarm, 3A
OUTPUT	Relays (NO) Low Level Alarm, 3A
INPUT	Digital Input (NO) "External OFF" signal (O2 Alarm)
INPUT	Pt100 sensor for Fail-Save detection
OUTPUT	Relays (NO) Pt100 Fail-Save Alarm, 3A

DC-LC-2026



PRODUCT SHEET

FILLING POINTS & FILLING STATIONS

Transfer Lines

Conditioning
Equipment

Components

Filling Stations

Filling Stations

Controlling

The Demaco Filling Points & Filling Station are a safe and easy to operate solution for filling open and closed dewars with LN2, coming from a cryogenic storage tank. The Demaco Filling Station has been designed for ease of use and comes in four (4) types, ranging from **Open Dewar – Manual Filling** to **Open & Closed Dewar – Manual and Automatic Filling**.

On top of that, Demaco offers a variety of configurations which allows the end-user to personalize it's filling station and therefore, optimize customer productivity.

The pictures below show the type 4 **Open & Closed Dewar – Manual and Automatic Filling**. It is equipped with a manual and automatic filling hose, a GN2 return hose and a user friendly control unit.

Additionally it is possible to personalize the design print of the filling station, making it a real eye catcher!



Front view filling station Type 4.



Back view filling station Type 4.



Filling an open dewar manually

APPLICATION

Fast reaction times for liquid consumption

Safe and clean filling

Short interval periods of large consumption

Close to point of use

FEATURES

All stainless steel

High vacuum insulation

Pressure controlled (when using Phase Separator)

For open and closed dewars

Multiple configurations possible

Handles for safe filling process

Customer specific control unit

PRODUCT SHEET

FILLING POINTS & FILLING STATIONS



Filling point: un-insulated



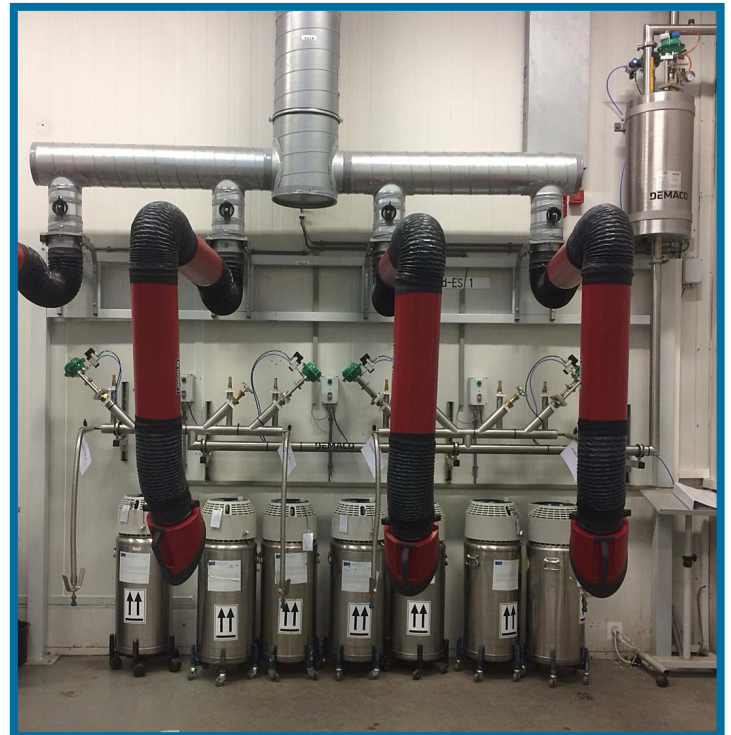
Filling point: vacuum insulated



Filling point: un-insulated valves & Phase Separator



Filling point: un-insulated valves & Phase Separator for open & closed dewars



Filling point: vacuum insulated & Phase Separator for LOX

PRODUCT SHEET

FILLING POINTS & FILLING STATIONS



Filling station with uninsulated valves



Filling station with vacuum insulated valves



Filling station with vacuum insulated valves and personalized sticker



Front view filling station Type 4.



Back view filling station Type 4.



Filling an open dewar manually

PRODUCT SHEET

FILLING POINTS & FILLING STATIONS

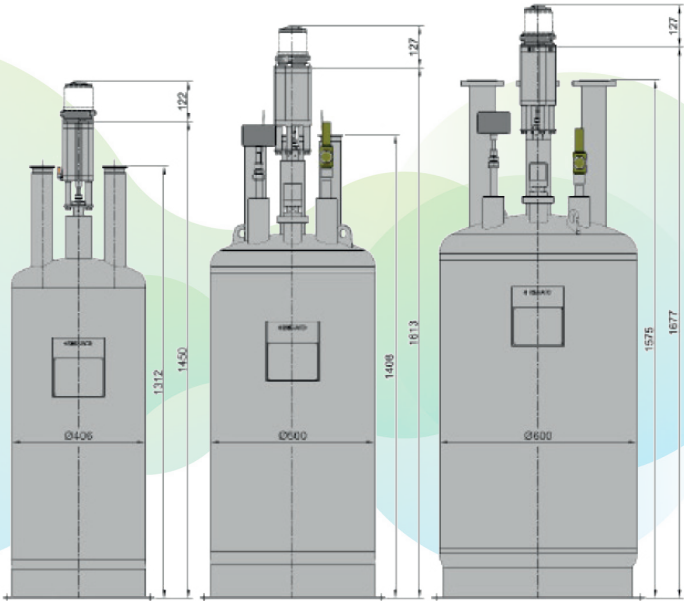


Type		1.	2.	3.	4.
Technical Specifications:		Open Dewar - Manual Filling	Open Dewar - Automatic Filling	Closed Dewar - Automatic Filling	Open & Closed Dewar - Manual and Automatic Filling
Application:		LN2 - Open dewars only	LN2 - Open dewars only	LN1 - Closed dewar only	LN2 - Open and Closed dewars
Inlet pressure:		1.5 bar(g) Optional: Phase Separator (max 10 bar (g))	1.5 bar(g) Optional: Phase Separator (max 10 bar (g))	2 bar(g) Optional: Phase Separator (max 10 bar (g))	1.5 bar(g) Optional: Phase Separator (max 10 bar (g))
Pressure control:		Not integrated (Optional: Phase Separator)	Not integrated (Optional: Phase Separator)	Not integrated (Optional: Phase Separator)	Not integrated (Optional: Phase Separator)
Operation open dewars:		Manual start and hold for flow	Manual start and automatic stop	✗	Manual start and hold for flow
Operations closed dewars:		✗	✗	Manual start and automatic stop	Manual start and automatic stop
LN2 inlet connection:		Demaco Johnston coupling DN25 Female	Demaco Johnston coupling DN25 Female	Demaco Johnston coupling DN25 Female	Demaco Johnston coupling DN25 Female
GN2 outlet connection:		Demaco Johnston coupling DN25 Male	Demaco Johnston coupling DN25 Male	Demaco Johnston coupling DN25 Male	Demaco Johnston coupling DN25 Male
Connection to Vessel:		✗	✗	3/4" x 16 UNF Female	3/4" x 16 UNF Female
Supply voltage:		230V AC	230V AC	230V AC	230V AC
Certification:		CE	CE	CE	CE
IP Code:		IP65	IP65	IP65	IP65
Main Material:		1.4301 (304L)	1.4301 (304L)	1.4301 (304L)	1.4301 (304L)
Finishing housing:		Personalised sticker	Personalised sticker	Personalised sticker	Personalised sticker
Quick stop:		Quick stop button	Quick stop button	Quick stop button	Quick stop button
Valves		Not vacuum insulated Optional: Vacuum insulated	Not vacuum insulated Optional: Vacuum insulated	Not vacuum insulated Optional: Vacuum insulated	Not vacuum insulated Optional: Vacuum insulated
Filling hose:		Not vacuum insulated Optional: Vacuum insulated	Not vacuum insulated Optional: Vacuum insulated	Not vacuum insulated Optional: Vacuum insulated	Not vacuum insulated Optional: Vacuum insulated
GN2 return hose:		Not vacuum insulated Optional: Vacuum insulated	Not vacuum insulated Optional: Vacuum insulated	Not vacuum insulated Optional: Vacuum insulated	Not vacuum insulated Optional: Vacuum insulated
Options					
Access control:	a. Keylock	✓	✓	✓	✓
	b. SEP card access and tank credits	✓	✓	✓	✓
	c. Scale and barcode reader	✓	✓	✓	✓
Filling Hoses Vacuum insulated:	a. Open dewar	✓	✓	✗	✓
	b. Closed dewar	✗	✗	✓	✓
	c. VI GN2 return hose	✓	✓	✓	✓
Filling Hoses Uninsulated:	a. Open dewar	✓	✓	✗	✓
	b. Closed dewar	✗	✗	✓	✓
	c. VI GN2 return hose	✓	✓	✓	✓
Noise damping:		In case of Phase Separator ✓	✓	✓	✓

PRODUCT SHEET

Subcooler

Transfer Lines	Conditioning Equipment ▼	Components	Filling Stations	Controlling
Automatic Has Vent	Degasser	Phase Separator	Subcooler	



The Demaco subcooler is used to cool liquefied gas in such a way that no gas bubbles are formed in the pipes during operation. This is achieved by cooling the inflow of the subcooler through a heat exchanger until the outgoing liquid has a lower temperature than the natural boiling point at the working pressure. In doing so, we make clever use of the natural temperature difference between liquid gases at different pressures.

In the subcooler, the pressurized liquid gas is passed through a heat exchanger into an atmospheric bath of liquid gas. Through this advanced heat exchange process, any evaporated gas bubbles in the liquid gas are re-liquefied, resulting in pure, high-quality liquid gas. A subcooler is constructed from modular building elements and assembled into a single vacuum insulated unit. If desired, the unit can be enhanced with a temperature sensor for distant monitoring.

The Demaco subcooler is made of stainless steel and comes in three standard models with a mass flow of 0-500, 0-1500 and 0-3500 kg/h. If required, we can also produce subcoolers with larger mass flows.

Benefits

- One-phase flow allows better and stable temperature control
- Liquid below boiling point results in no gas forming
- Possibility of spraying liquid on products
- Works ideally in situations when the nitrogen supply from a bulk tank becomes unstable
- Automatic level controlling by means of electrical control cabinet

Application

- Directly after bulk storage tank to maintain one-phase flow of large consumptions
- At the end of transfer lines directly before consuming machine(s)
- Freeze tunnels in food industries or aluminium extruders

Features

- All stainless steel design
- Vertical orientation
- Universal inlets and outlets with Demaco Johnston bayonet couplings
- Up to 16 bar working pressure
- Integrated DC-LS-050 capacitive level sensor
- Electro-pneumatic valve for filling atmospheric bath
- Standard cleanliness: Process clean
- PED approved design with CE certificate

Standard stock models

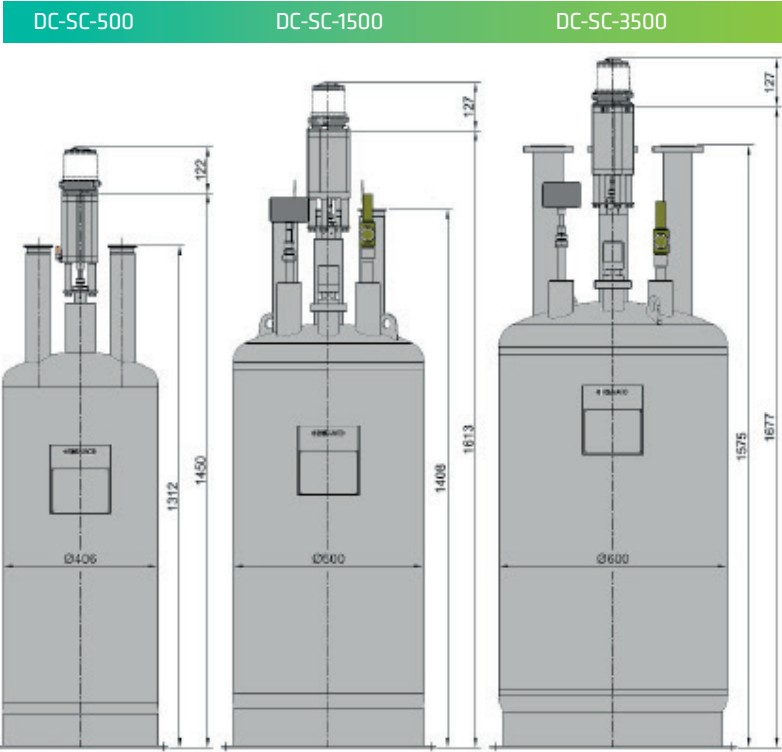
Type	Cooling Spirals	Max mass flow [kg/h] ⁽¹⁾
DC-SC-500	1	500
DC-SC-1500	3	1500
DC-SC-3500	7	3500

⁽¹⁾Large gas volumes in pre-supplied liquid results in less cooling capacity

PRODUCT SHEET

Subcooler

Technical data	
Positioning	Indoor / Outdoor
Ingress protection	IP65
Ingress protection	Vertical
Design pressure	
- Spiral	PN 18
- Bath	PN 0,5
Working pressure	
- Spiral	Max. 16 bang
- Bath	Atmospheric
Level indication	Capacitive
Safety precautions	Pressure relief valve
Power supply	24/110/240 VAC or 24 VDC
Pneumatic supply	Minimum 6 bang



Options

2x PT100 to measure inlet and outlet temperature
Regulating filling valve
Two media coolers
Oxygen clean on request
FDA certification on request

Materials

Inner vessel and cooling spiral
1.4301/1.4306/1.4307 ~304(L)
Vacuum Jacket
1.4301/1.4306/1.4307 ~304(L)
Spacers
Epoxy-reinforced glass-fibre
Multi-Layer Insulation
Glass paper and Aluminium foil
Johnston bayonet coupling
Fe36Ni and Buna N

(1) Large gas volumes in pre-supplied liquid results in less cooling capacity

Design specifications

Standard according to Pressure Equipment Directive (PED)
Design according to AD2000
Cleanliness level:
Cleaned oil and fat-free, inspected for process clean
Oxygen clean on request
Static vacuum with Multi-Layer Insulation
Standard testing for each subcooler:
Dimensional check
Pressure test
NDE by X-ray or PT
Helium leak test (<1x10-9 mbarL/sec)
Vacuum retention test after 24h at ambient temp. (acceptance level <2x10-4 mbar)
Functional test at -196°C

Documentation

A standard manufacturer data book record is part of each project and contains:
As-built isometrics (if applicable)
Safety guidelines
User manuals
Declaration of conformity



The Gaslock protects the system from unnecessary loss of cryogenic liquid and icing.

A Gaslock is placed inside the vacuum insulated pipe near the end of a vertical tapping point. The Gaslock creates a gas buffer between the liquid in the VIP and the uninsulated end of a tapping point. This is the same principal as a syphon for example in a kitchen basin.

A Gaslock is generally used at application that require an intermittent flow, for example a cryo-bank where the cryo-vessels are being filled up on a regular basis.

For the operating principle of the Gaslock, please visit the Demaco website and watch the animation of the Gaslock.

Benefits

No maintenance

Improves reaction time after a stand still

Reduces evaporation of liquid during a stand still

Possible to place up to 45° out of its vertical position

Application

In vertical descending VIP lines. E.g. cryo-banks

Features

TIG welded according to the highest standards (ISO3834-2)

Applicable for VIP pipe DN10 - DN40

Materials

Process part

1.4301/1.4306/1.4307 ~304/304L

Design specifications

DN10	Ø12
DN15	Ø18
DN25	Ø28
DN25 (1")	Ø33,7
DN40 (1 1/2")	Ø48,3

Demaco cryogenic valve - Control valve

Transfer Lines

Conditioning Equipment

Components ▼

Filling Stations

Controlling

Johnston Coupling

Welded Coupling

Blindcap / Endpiece

VI Demaco valve

Gas lock

Highly flex

Pipe end heater



The Demaco Cryogenic Control Valve offers a first-rate regulating valve for gaseous and liquid media for cryogenic systems with an extremely low heat loss value due to vacuum insulation. Through its streamlined valve body, an accurate control of the media as well as a high flow rate can be guaranteed.

The valve is applicable under EC 1935/2004 and FDA, which allows Demaco to integrate this valve in any market including the food, medical and pharmaceutical industry.

There are multiple flow value configurations possible as the valve comes with three standard Kv-values sets per line.

Through its Self-adjusting spindle packing with V-seals, intermediate relief and wiper, this valve assures a long service life.

With its compact industrial design, the Demaco Cryogenic Control Valve can be integrated in all our cryogenic infrastructures as well as our conditioning equipment.

Benefits

Low heat loss values due to vacuum insulation

No ice

Compact industrial design with a long service life for optimal use in cryogenic/food/hygienic environment

Accurate control of media flow

High flow value by the streamlined valve body

Maintenance-free under normal conditions

Application

Suitable flow media for liquid and gaseous like (Group 2): Nitrogen, Argon and Carbon dioxide

Actuator facing up and maximum 45° from vertical plane

Integrated in Demaco cryogenic infrastructure

Integrated in Demaco conditioning equipment

Features

All stainless steel

Many flow value configurations possible by optimum valve selection for the application through three standard Kv values sets per line

Straight flow path of the medium

Applicable under EC 1935/2004 and FDA

Excellent seat tightness due to PTFE soft sealing

Self-adjusting spindle packing with V-seals, intermediate relief and wiper

Spring return normally open or normally closed

TIG welded according highest standards (ISO3834-2)

PRODUCT SHEET

Demaco cryogenic valve - Control valve

Pipe size	Design pressure (barg)	Valve seat size (mm)	KV (m3/h)	Heat loss indication (W)	Control valve
DN15 (Ø18x1) ½" (Ø21.34X1.6)	16	Ø4	0.5	Max. 1.8	
		Ø6	1.2		
		Ø8	2.1		
		Ø10	3.1		
		Ø15	4.3		
DN25 (Ø28x1) 1" (Ø33.7X1.6)	16	Ø15	5.3	Max. 2.9	
		Ø20	7.2		
		Ø25	12.0		

Options

- Analogue output
- AS-interface communication
- DeviceNet communication

Design specifications

- Seat leakages IEC 534-4/EN 1349: Shut-off class VI
- Leakrate to vacuum jacket < 1x10-9 mbar.l/sec

Materials

Body:	Stainless steel
Spindle:	Stainless steel
Actuator:	PPS and Stainless steel
Spindle elements:	FKM and EPDM
Spindle sealing:	PTFE V-rings with spring compensation (with silicone grease)
Seat sealing swivel plate:	PTFE
Spindle guide:	PEEK

Interfaces

- Pilot air port push-in connector for external Ø6 mm or 1/4" tube
- Circular plug-in connector M12 x 1, 8-pole, 24 V DC, 0/4-20 mA
 - o Current consumption max. 150 mA
 - o Power consumption max. 3.5 W

PRODUCT SHEET

Demaco cryogenic valve - Manually on/off

Transfer Lines	Conditioning Equipment	Components ▼	Filling Stations	Controlling
Johnston Coupling	Welded Coupling	Blindcap / Endpiece	VI Demaco valve	Gas lock
			Highly flex	Pipe end heater



The Demaco Cryogenic Manual on/off Valve offers a premium valve for liquid and gaseous media for cryogenic systems with an extremely low heat loss value due to vacuum insulation. Through its streamlined valve body, a high flow rate can be guaranteed. The valve is applicable under EC 1935/2004 and FDA, which allows Demaco to integrate this valve in any market including the food, medical and pharmaceutical industry. Through its Self-adjusting spindle packing with V-seals, intermediate relief and wiper, this valve assures a long service life. With its compact industrial design, the Demaco Cryogenic Manual on/off Valve can be integrated in all our cryogenic infrastructures as well as our conditioning equipment.

Benefits

- Low heat loss values due to vacuum insulation
- No ice
- Compact industrial design with a long service life for optimal use in cryogenic/food/hygienic environment
- Remote operation of media flow
- Many configurations possible
- High flow value by the streamlined valve body
- Maintenance-free under normal conditions

Application

- Suitable flow media for liquid and gaseous like (Group 2): Nitrogen, Argon and Carbon dioxide
- Actuator facing up and maximum 45° from vertical plane
- Integrated in Demaco cryogenic infrastructure
- Integrated in Demaco conditioning equipment

Features

- All stainless steel
- Applicable under EC 1935/2004 and FDA
- Excellent seat tightness due to PTFE soft sealing
- Self-adjusting spindle packing with V-seals, intermediate relief and wiper
- Spring return normally open or normally closed
- TIG welded according highest standards (ISO3834-2)

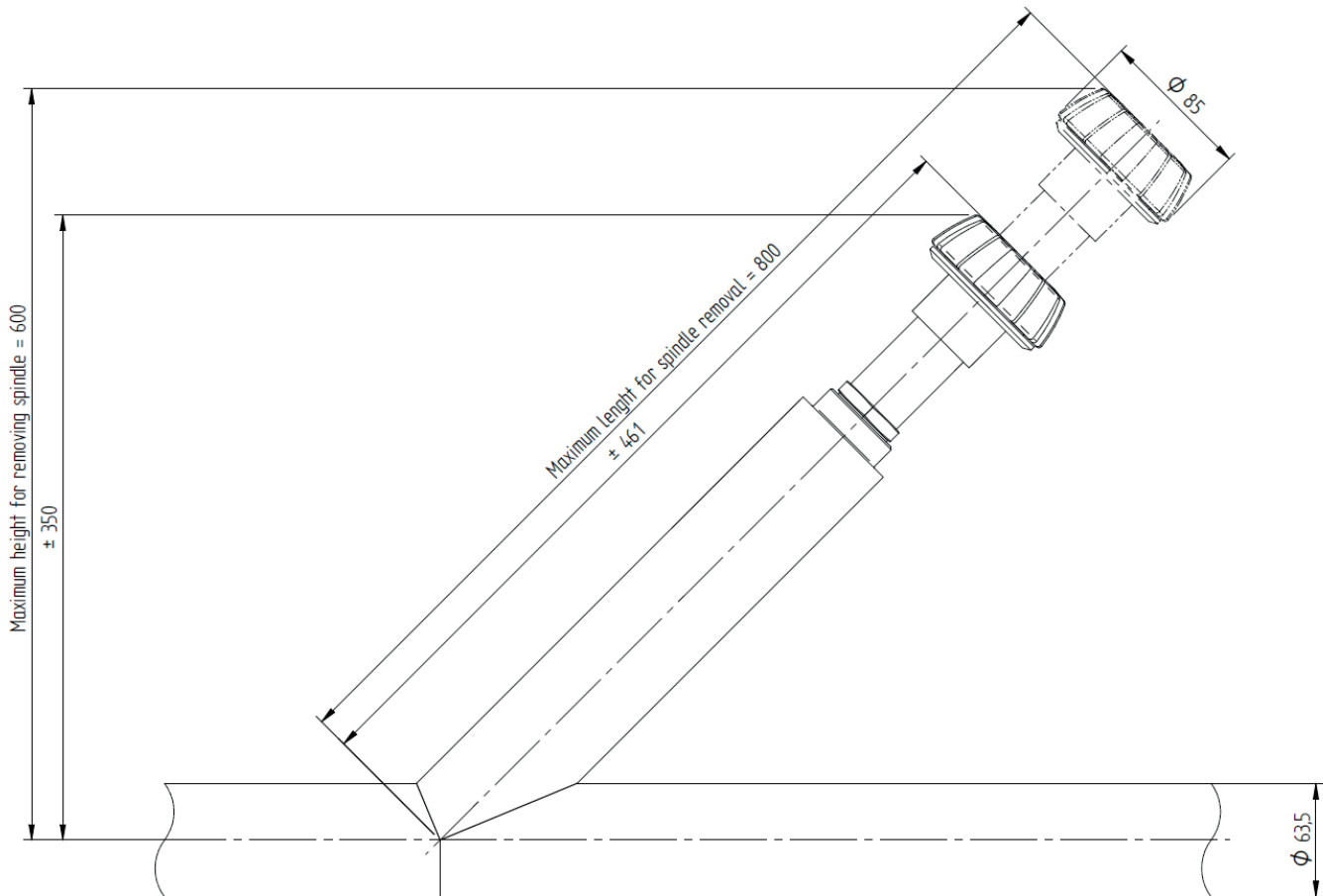


PRODUCT SHEET

Demaco cryogenic valve - Manually on/off

Pipe size	Design Pressure FTO-FTC (barg)	Kv (m3/h)	Heat loss indication (W)
DN15	16	4.5	1.7
DN25	16	20	2.7
1-INCH	16	20	2.7

*FTO: Flow To Open / FTC: Flow To Close



Materials

Body:	Stainless steel
Spindle:	Stainless steel
Actuator:	PPS and Stainless steel
Spindle elements:	FKM and EPDM
Spindle sealing:	PTFE V-rings with spring compensation (with silicone grease)
Seat sealing swivel plate:	PTFE
Spindle guide:	PEEK

Design specifications

Leakrate to vacuum jacket < 1x10-9 mbar.l/sec
Temperature: -40 °C to +60 °C

Option

Handwheel with locking against unauthorised or unintentional changing the valve position

PRODUCT SHEET

Demaco cryogenic valve - Pneumatic valve on/off

Transfer Lines	Conditioning Equipment	Components ▼	Filling Stations	Controlling
Johnston Coupling	Welded Coupling	Blindcap / Endpiece	VI Demaco valve	Gas lock
			Highly flex	Pipe end heater



The Demaco Cryogenic on/off Valve offers a premium regulating valve for liquid and gaseous media for cryogenic systems with an extremely low heat loss value due to vacuum insulation. Through its streamlined valve body, an accurate control of the media as well as a high flow rate can be guaranteed.

The valve is applicable under EC 1935/2004 and FDA, which allows Demaco to integrate this valve in any market including the food, medical and pharmaceutical industry.

Through its Self-adjusting spindle packing with V-seals, intermediate relief and wiper, this valve assures a long service life.

With its compact industrial design, the Demaco Cryogenic on/off Valve can be integrated in all our cryogenic infrastructures as well as our conditioning equipment.

Benefits

- Low heat loss values due to vacuum insulation
- No ice
- Compact industrial design with a long service life for optimal use in cryogenic/food/hygienic environment
- Remote operation of media flow
- Many configurations possible
- High flow value by the streamlined valve body
- Maintenance-free under normal conditions

Application

- Suitable flow media for liquid and gaseous like (Group 2): Nitrogen, Argon and Carbon dioxide
- Actuator facing up and maximum 45° from vertical plane
- Integrated in Demaco cryogenic infrastructure
- Integrated in Demaco conditioning equipment

Features

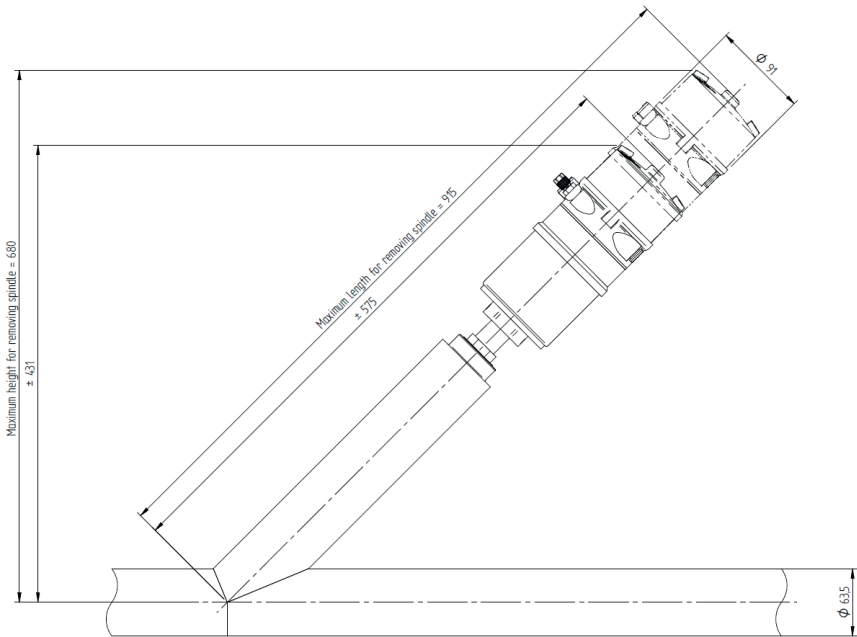
- All stainless steel
- Applicable under EC 1935/2004 and FDA
- Excellent seat tightness due to PTFE soft sealing
- Self-adjusting spindle packing with V-seals, intermediate relief and wiper
- Spring return normally open or normally closed
- TIG welded according highest standards (ISO3834-2)

PRODUCT SHEET

Demaco cryogenic valve - Pneumatic valve on/off

Pipe size	Design Pressure FTO-NC (barg)	Design Pressure FTO-NC / FTC-NC (barg)	Maximum pilot pressure (barg)	Kv (m3/h)	Heat loss indication (W)
DN15	25	16	10	4.5	1.7
DN25	16	16	10	20	2.6
1-INCH	16	16	10	20	2.6

*FTO: Flow To Open / FTC: Flow To Close / NC: Normally Closed / NO: Normally Open



Types	Interface connections	
	Pilot air port push-in connector for external Ø6 mm or ¼" tube	Circular plug-in connector M12 x 1, 8-pole
Model 2: Pneumatic activated valve with solenoid 24 VDC including limit switches	X	X

Materials

Body:	Stainless steel
Spindle:	Stainless steel
Actuator:	PPS and Stainless steel
Spindle elements:	FKM and EPDM
Spindle sealing:	PTFE V-rings with spring compensation (with silicone grease)
Seat sealing swivel plate:	PTFE
Spindle guide:	PEEK

Design specifications

Leakrate to vacuum jacket < 1x10-9 mbar.l/sec
Temperature: -40 °C to +60 °C
Electro pneumatic valve -20 °C to +60 °C

PRODUCT SHEET

VI Demaco valve - Manually on/off

Transfer Lines	Conditioning Equipment	Components ▼	Filling Stations	Controlling
Johnston Coupling	Welded Coupling	Blindcap / Endpiece	VI Demaco valve	Gas lock
			Highly flex	Pipe end heater



The Demaco Cryogenic Manual on/off Valve offers a premium valve for liquid and gaseous media for cryogenic systems with an extremely low heat loss value due to vacuum insulation. Through its streamlined valve body, a high flow rate can be guaranteed. With its spring energized seal, this valve assures a long service life. Due to its compact industrial design, the Demaco Cryogenic Manual on/off Valve can be integrated in all our cryogenic infrastructures as well as our conditioning equipment.

Benefits

- Low heat loss values due to vacuum insulation
- No ice
- Compact industrial design with a long service life for optimal use in cryogenic environment
- Many configurations possible
- Maintenance-free under normal conditions

Features

- All stainless steel
- High vacuum insulation
- Qualified welding to the highest standards
- Pressure rates up to PN25
- Diameter up to 1½"

Application

- Suitable flow media for liquid and gaseous like (Group 2): Nitrogen, Argon and Carbon dioxide
- Handwheel facing up and maximum 45° from vertical plane
- Integrated in Demaco cryogenic infrastructure
- Integrated in Demaco conditioning equipment
- Applicable for food. When stated upfront, Demaco can deliver a statement for tube and pipe systems according directive 1935/2004/EU

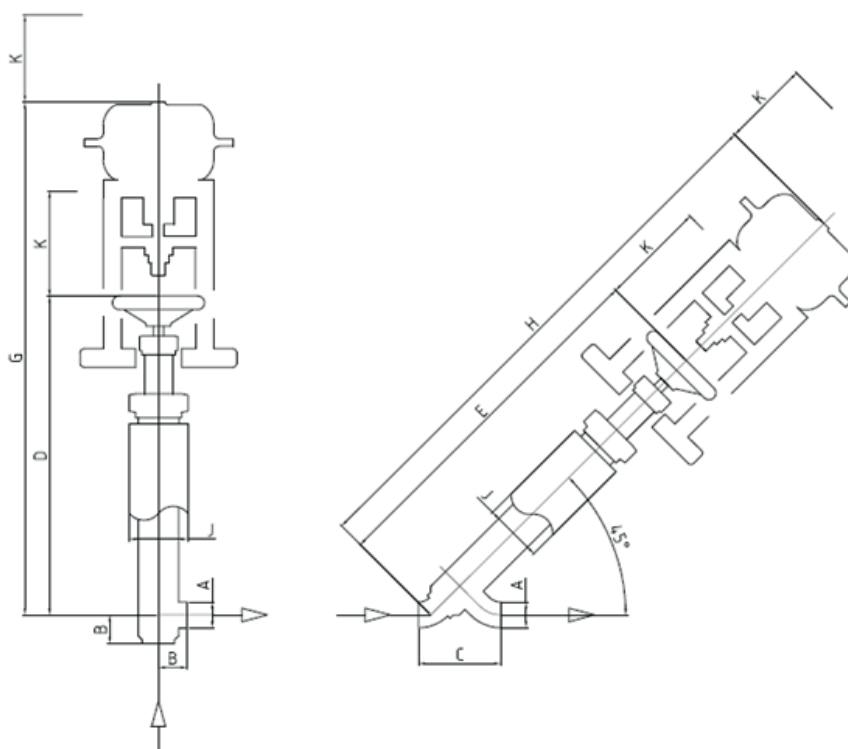


PRODUCT SHEET

VI Demaco valve - Manually on/off

	DN15	DN25
A	Ø18 x 1,5	Ø28 x 1,5
B	32	31
C	88	89
D	350	350
E	395	395
G	560	560
H	605	605
J	Ø63,5 x 1,5	Ø28 x 1,5
K*	260	260

*K = Clearance for maintenance:



Materials

Body:	Stainless steel (1.4301)
Spindle:	Stainless steel (1.4301)
Gland:	CW614N / PTFE
Seal	PTFE (PCTFE optional)
Seat	1.4301
Cone	1.4404
Hand wheel	Aluminium

Design specifications

Leakrate to vacuum jacket < 1x10⁻⁹ mbar.l/sec

Option

Handwheel with locking against unauthorised or unintentional changing the valve position

Transfer line	Coupling	Liquefier ▼	Loading Bay	Loading Arm
		GM-Cryocooler	Stirling	



A liquefier is a device that can be used to liquefy hydrogen gas. Hydrogen becomes liquid when it reaches the extremely low temperature of -252.9 °C at atmospheric pressure; the liquefier is a cooling system able to achieve this temperature under the right conditions. There are multiple technologies that allow hydrogen to be cooled to the point where it becomes liquid.

Benefits

- On-sight liquid hydrogen production
- High quality liquid hydrogen
- Easy to operate
- Potential closed-loop system that reliquefies hydrogen
- Small quantities of liquid hydrogen

Applications

- Small quantities of liquid hydrogen for testing applications
- Small quantities of liquid hydrogen for mobility applications (drones)
- Research centre (physical and chemical properties)
- Superconductivity

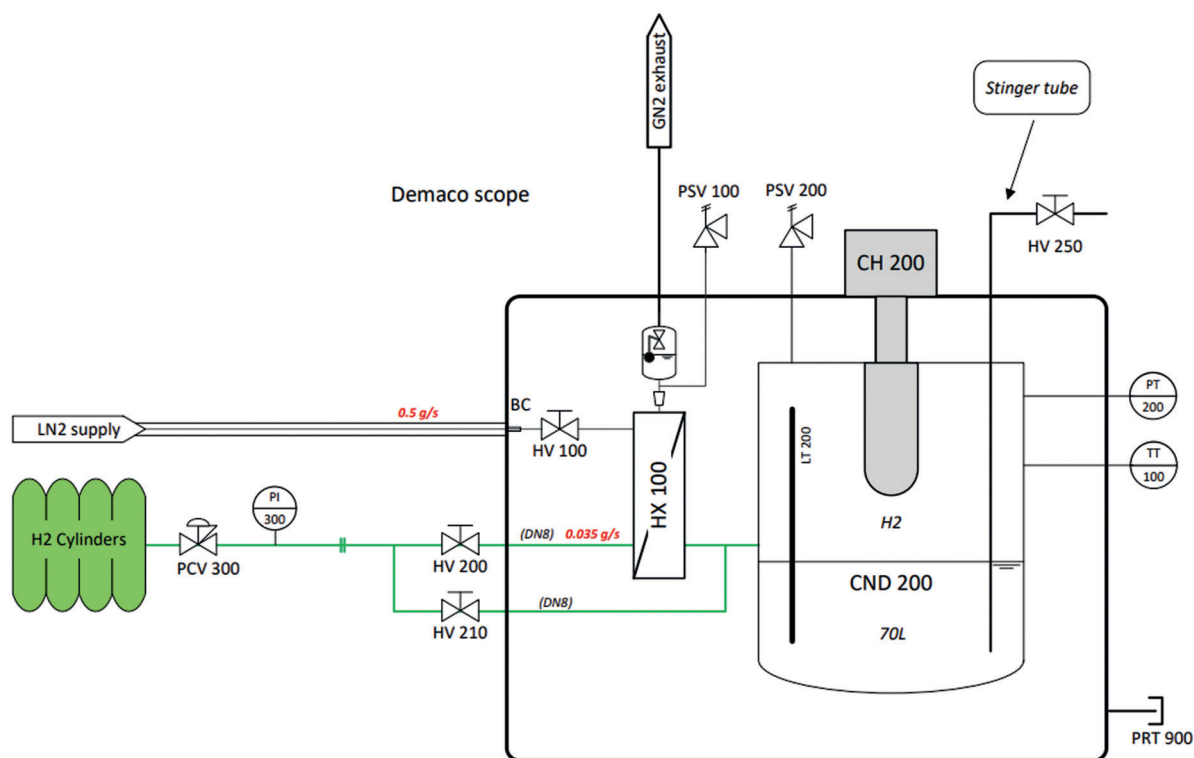
Features

- All stainless steel
- High vacuum insulation
- Qualified welding to the highest standards (ISO 3834-2)
- Output and size according to customer request
- Pre-cooling with LN₂ (optional)
- Minimum LH₂ production: 30 liter per day



Hydrogen Liquefier

Typical P&ID



Interfaces

Johnston coupling

Welded couplings with vacuum

Instrumentation panel

Materials

Process parts:

1.4401/1.4404~316/316L

Vacuum vessel:

1.4301/1.4306~304/304L

Optional:

1.4401/1.4404~316/316L

Multi-Layer Insulation:

Glass paper and aluminium foil

Related documents

Safety guidelines:

D0061116

Manual:

On request

Design specifications

Design according to Demaco standard based on EN13480

Other design codes on request

Suitable for ambient temperatures -25 till +38 °C

Cleanliness level:

- Oil and grease-free

Static vacuum with Multi-Layer Insulation

Standard testing for each individual liquefier:

- Dimensional check
- Pressure testing (if applicable on request)
- Helium leak test ($<1 \times 10^{-9}$ mbarL/sec)
- Vacuum retention test after 24h at ambient temp (acceptance level $<2 \times 10^{-4}$ mbar)
- Functional test (LH₂ production)

Documentation

By default, a standard manufacturer data book record is part of each project and contains:

- General drawing
- Safety guidelines
- User manuals
- Declaration of conformity (if applicable)

Extended data books are available on request

Transfer line	Coupling	Liquefier	Loading Bay	Loading Arm ▼
Automotive Industry		Marine Industry	Aerospace Industry	



A loading arm is required to refuel different kinds of applications, transferring liquid from one tank to another through a vacuum insulated pipe system. It is well known in the marine industry, the loading arm is placed onshore and follows the movement of a vessel. Apart from the marine industry, liquid hydrogen refuelling with a loading arm is required in the automotive and aerospace industry. For each application, the loading arm will slightly differ due to variable sizes and heights.

Benefits

- Due to outstanding insulation properties, thermal heat losses are kept to a minimum
- Emergency breakaway coupling for maximum safety
- Entire stainless steel structure keeps the VIP fit for purpose during its entire economical lifetime
- Increasing safety standard due to double containment (on request)
- No ice and oxygen condensation

Applications

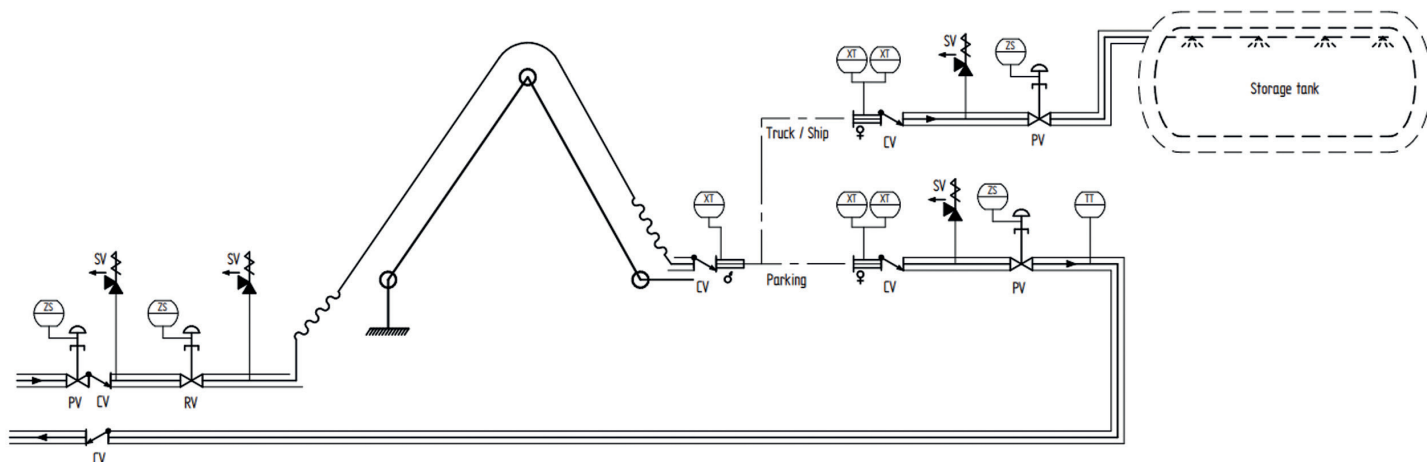
- Refuelling ships in the marine industry
- Refuelling aircraft in the aerospace industry
- Refuelling trucks in the automotive industry
- Transporting hydrogen from one tank to another

Features

- All stainless steel
- High vacuum insulation
- Qualified welding to the highest standards (ISO 3834-2)
- Vacuum insulated flexible hose up to 2"
- Integrated contraction bellows
- Integrated swivel joints (vacuum insulated optional)
- Diameters up to 8"
- Pressure rates: up to PN25
- Suitable for dual use (LH₂ and LNG)
- Balanced steel structure for movement compensation



Typical P&ID



Interfaces

- Johnston coupling
- Welded couplings with vacuum
- Breakaway coupling (vacuum insulated)

Materials

- Process Pipe:
1.4401/1.4404~316/316L
- Vacuum jacket:
1.4301/1.4306~304/304L
- Optional:
1.4401/1.4404~316/316L
- Spacers:
Epoxy-reinforced glass fibre
- Multi-Layer Insulation:
Glass paper and aluminium foil

Related documents

- Safety guidelines: D0061116
- Manual: On request

Design specifications

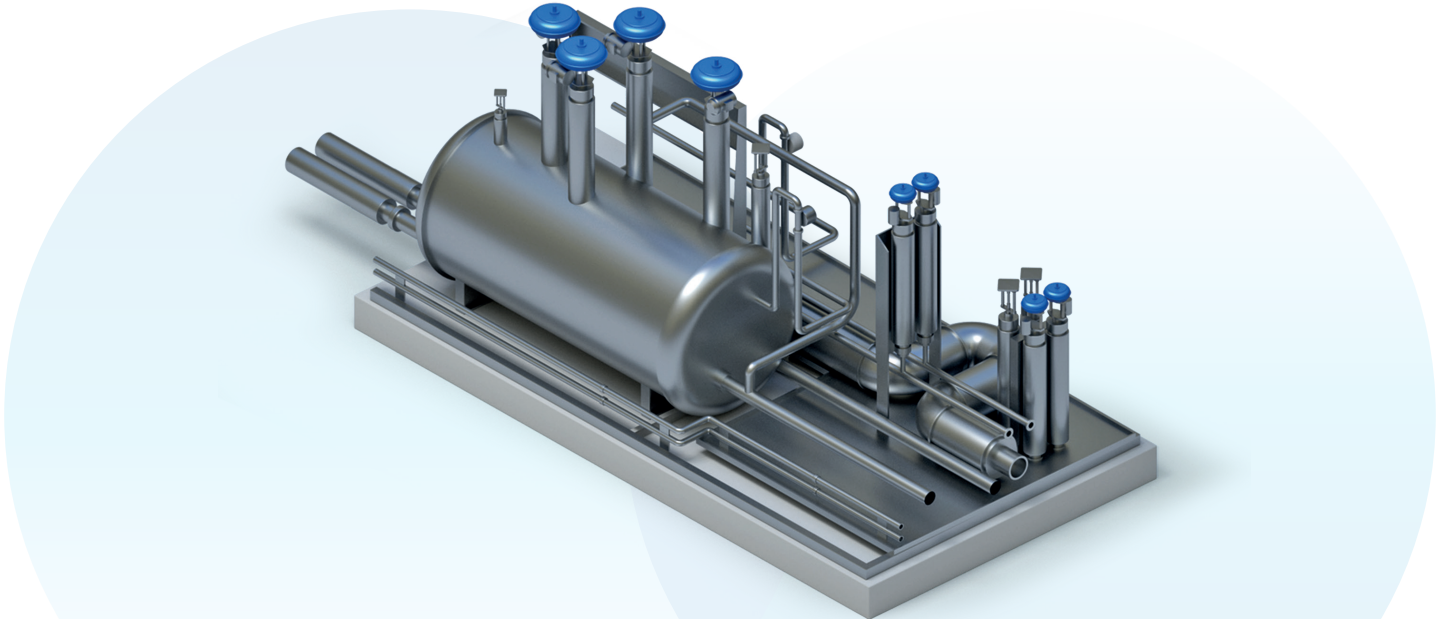
- Design according to Demaco standard based on EN13480
- DNV approved for marine applications
- Other design codes on request
- Suitable for ambient temperatures -25 till +38 °C
- Cleanliness level:
 - Oil and grease-free
- Static vacuum with Multi-Layer Insulation
- Bellows: 1.000-10.000 cycles from +38 till -253 °C, calculated according to EN14917 or EJMA
- Standard testing for each individual loading arm:
 - Dimensional check
 - Pressure testing (if applicable or on request)
 - NDE by X-ray or PT (if applicable or on request)
 - Helium leak test ($<1 \times 10^{-9}$ mbarL/sec)
 - Vacuum retention test after 24h at ambient temp (acceptance level $<2 \times 10^{-4}$ mbar)
 - Functional test
 - Cold shock test with LN₂ (if applicable or on request)

Documentation

- By default, a standard manufacturer data book record is part of each project and contains:
 - General drawing
 - Safety guidelines
 - User manuals
 - Declaration of conformity (if applicable)

Extended data books are available on request

Transfer line	Coupling	Liquefier	Loading Bay ▼	Loading Arm
	Stationary	Mobile	Hydrogen Refuelling Station (HRS)	



The loading bay is the place where LH₂ is transported from the storage tank to the filling place for a truck or a ship for long distance transportation. The LH₂ is transported via vacuum insulated pipelines to the filling location in order to fill the tanks of the truck/ship in an efficient and safe method via the loading bay. A loading bay includes a number of valves, pressure safety relief valves, and measuring equipment. These products can be installed in a small vacuum insulated valve box, decreasing the overall costs of the system and increasing the efficiency.

Benefits

- Due to outstanding insulation properties, thermal heat losses are kept to a minimum
- Stainless steel vacuum insulated pipelines
- High quality liquid hydrogen
- Increasing safety standard due to double containment (on request)
- No ice and oxygen condensation

Applications

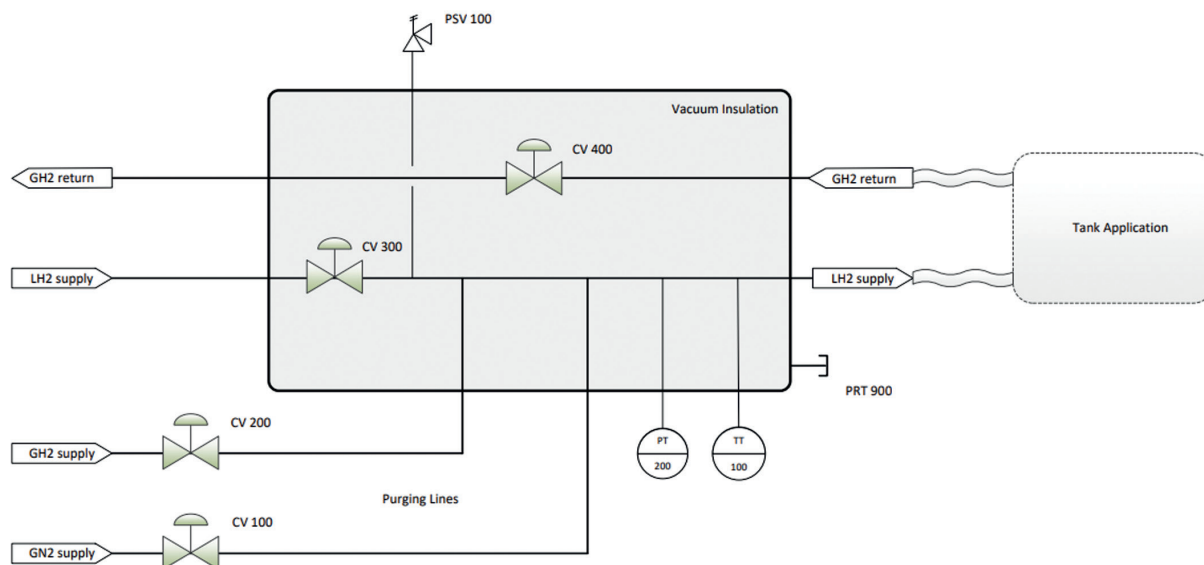
- Distributing liquid hydrogen
- Hydrogen liquefaction facility
- Transporting hydrogen from a storage tank to another location (break/bulk)
- Filling station
- Refuelling station

Features

- All stainless steel
- High vacuum insulation
- Qualified welding to the highest standards (ISO 3834-2)
- Integrated contraction bellows
- Hydrogen purification (on request)
- Output and size according to customer request
- Nitrogen flushing to remove oxygen (inertisation)
- Skid mounted, stationary or mobile



Typical P&ID



Interfaces

Johnston coupling
 Welded couplings with vacuum insulation
 Control system
 Vacuum insulated flexible filling hose
 Filling nozzle

Materials

Process Pipe:
 1.4401/1.4404~316/316L
 Vacuum jacket:
 1.4301/1.4306~304/304L
 Optional:
 1.4401/1.4404~316/316L
 Spacers:
 Epoxy-reinforced glass fibre
 Multi-Layer Insulation:
 Glass paper and aluminium foil

Related documents

Safety guidelines: D0061116
 Manual: On request

Design specifications

Design according to Demaco standard based on EN13480
 DNV approved for marine applications
 Other design codes on request
 Suitable for ambient temperatures -25 till +38 °C
 Cleanliness level:
 - Oil and grease-free
 Static vacuum with Multi-Layer Insulation
 Bellows: 1.000-10.000 cycles from +38 till -253 °C, calculated according to EN14917 or EJMA
 Standard testing for each loading bay:
 - Dimensional check
 - Pressure testing (if applicable or on request)
 - NDE by X-ray or PT (if applicable or on request)
 - Helium leak test ($<1 \times 10^{-9}$ mbarL/sec)
 - Vacuum retention test after 24h at ambient temp (acceptance level $<2 \times 10^{-4}$ mbar)
 - Functional test (if applicable or on request)
 - Cold shock test with LN₂ (if applicable or on request)

Documentation

By default, a standard manufacturer data book record is part of each project and contains:
 - General drawing
 - Safety guidelines
 - User manuals
 - Declaration of conformity (if applicable)

Extended data books are available on request