



FLOATING SUCTION LINES AND SKIMMER UNITS

When withdrawing product from storage tanks the quality of the product withdrawn is extremely important. Quite often the bottom part of the product stored in the tank will be contain contaminants, such as water (rainwater) or sludge (tank corrosion and other pollutants). To avoid withdrawing contaminated product from storage tanks floating suction lines are the ideal approach. For instance the JIG (Joint Inspection Group) requires a floating suction draw off line in Jet Fuel tanks. Installations with special suction arrangements for storage tanks are also known from slops tanks, where oil skimmers are used to withdraw the top part of the liquid column, usually being the lighter hydrocarbon parts. Floating suction lines and skimmer arrangements can be fitted in conventional fixed roof storage tanks, external floating roof tanks and light weight internal floating roof tanks.

Special design options

Over the years we have realized multiple special applications and designs such as the following:

- Suspended suction lines connected to both internal and external floating roofs
- Skimmer lines with adjustable skimming sump

Our extensive experience and profound knowledge of all relevant design codes will ensure a sound approach on the basis of an important and extensive tank inspection and survey.

Features

- Designed for each specific tank, reviewing:
 - a) General arrangement of the floating suction line, depending on the height to diameter ratio of the tank
 - b) The stored product
 - c) Required maximum withdrawal rate from the tank
 - d) Other tank hardware present inside the tank
 - e) Orientation of the floating suction line
- Available in different materials and configurations
- Diameters from 2" to 30"
- Different swivel joints possible, like U-type and central-type balanced design to eliminate the unbalanced lading of a conventional swing joint
- Can also be supplied with one or multiple Drainmaster hose swivels
- Maintenance free
- Compatible with all products stored, including 100% aromatics
- Can be fitted on tanks with minimum modifications required
- Expected service life in excess of 20 years
- Easy installation, full installation manuals and project support available
- Assembly is either pressure tested before shipment or prior to commissioning
- Successfully used globally by many major oil and tank storage companies

FLOATING SUCTION LINES AND SKIMMER UNITS

Construction

We are able to supply floating suction lines in all suitable materials where the most commonly used floating suction line materials are aluminium, carbon steel and stainless steel grades.

Accessories

A floating suction line can be equipped with different optional accessories.

Some examples of these accessories are:

- A position indicator for the floating suction line or skimmer unit
- Sampling tubes along the floating suction or skimmer unit, allowing product sampling at different liquid levels
- Integrated strainer, to prevent heavy contaminants from entering the suction line
- Manual lifting arrangement, allowing the floating suction line or the skimmer unit to be manually raised in case this would be required

Tank inspection

The CTS staff responsible has an extensive record in conducting tank inspections prior to recommending or engineering these products. We will either be conducting tank inspections ourselves or we will facilitate a third party inspection with our detailed inspection sheets. At an inspection we will be concentrating on analysing all tank data influencing product design. Our inspection focuses on aspects like the stored product, existing systems, site access, local requirements, dimensional reports and every other relevant aspect.



Suspended floating suction line in external floating roof tank.



Floating suction lines packed and ready to ship.



Floating suction line under internal floating roof.



Floating suction line under internal floating roof.

All our product information and specifications are drafted with extreme care but can be subject to change. We reserve the right to change product specifications.

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INTEGRAL FOAM DAM (IFD) FOR FLOATING ROOF TANKS

Foam dams are installed on both external and internal floating roofs to concentrate firefighting foam in the seal area in the case of a fire, which typically can only occur at the seal area. The common design for a foam dam is a steel plate dam welded on top of the external floating roof. However an integral foam dam is bolted directly on top of the rim of the floating roof. Being modular of design and extensively tested it can be installed in little time without any hot work being required. An integral foam dam can be engineered to suit any secondary seal design and may be executed in carbon steel and different grades of stainless steel.

Design and engineering

Any Integral foam dam will normally be engineered to match the tank and tank seal involved. As mentioned materials would either be galvanized steel or stainless steel, where the latter is obviously the longer lasting alternative. Delivery will include an as-built drawing for the integral foam dam as well.

Features

- Can be installed on tanks in service without requiring hot work
- Reducing foam consumption considerably (in many cases less than 50% foam would be required to fill up the foam dam when compared to traditional foam dams)
- Faster accumulation of foam
- Available for both horizontal and vertical rim angles
- Typically manufactured in stainless steel, resulting in a maintenance free foam dam
- Service life expectation in excess of 30 years
- Designed for each specific tank and seal arrangement
- Easy installation
- Compliant with all international standards such as API, NFPA 11 and EN, etc.
- Successfully used by many reputed major oil and independent tank storage companies
- Extensively live tested under surveillance from local fire departments and other government bodies
- Reducing corrosion of floating roof rim areas (typically as a result of water being trapped between the seal and the steel foam dam)

INTEGRAL FOAM DAM (IFD)

Installation

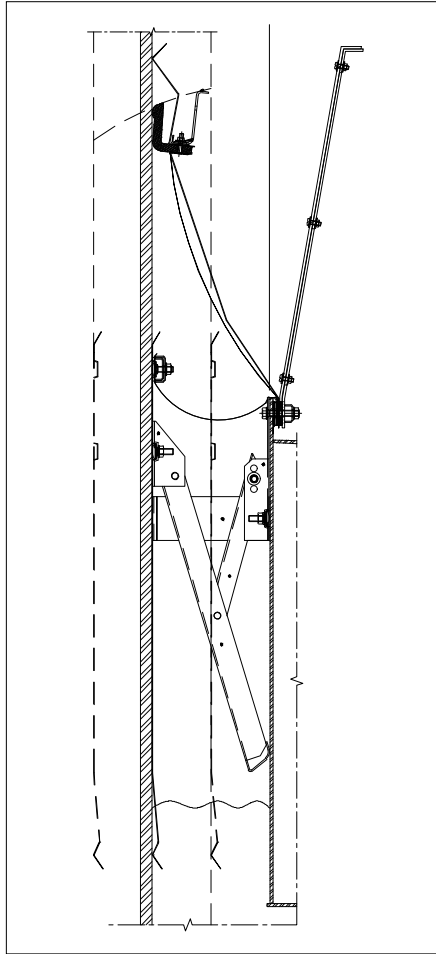
CTS is capable to install an Integral foam dam on any tank, but our provided detailed drawings and installation manual will give you the choice to have either your own staff or contractor staff installing the Integral foam dam. The economic advantages of having your own (contractor) staff installing the system could be significant, reducing travelling and lodging costs. Experienced CTS supervision is available upon request.

Conventional welded foam dam

Traditional foam dams are usually welded steel structures, welded to the top of the pontoon area and equipped with drain holes. A major concern is the fact that this foam dam design traps rain, corrosion from the tank shell and any product residue. These can be scraped from the tank shell by the secondary seal or flow down as a result of the tank shell being warmed up by exposure to bright sun light. Ultimately the drain holes will get blocked with this debris.

The water will accumulate behind the foam dam and expose the rim angle to aggressive corrosion (see picture). Both foam dam modifications and replacements of foam dam and rim angle will result in significant refurbishing costs for external floating roof tanks.

Also the distance between the foam dam and tank shell is much larger than for a bolted integral foam dam. This delays the built up of foam on top of the seal arrangement in the case of a rim fire.



Integral foam dam (IFD), cross section.



Typical corrosion between tank seal and welded foam dam.



Foam dam test.



Live foam test on external floating roof tank with an integral foam dam.



Integral foam dam immediately after live foam test.

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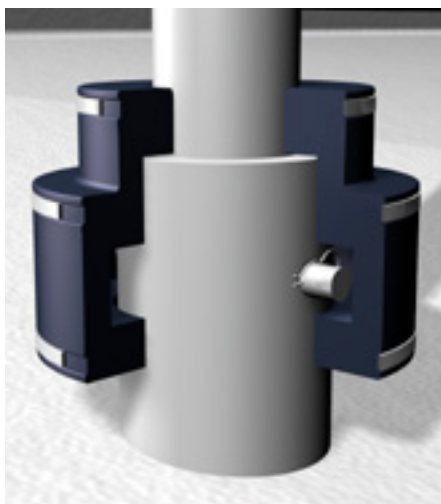
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LEG SEAL

FOR FLOATING ROOF TANKS

The CTS leg seal has been developed in 1991 and is extensively used on open-top storage tanks to eliminate roof leg emissions and prevent rainwater ingress. They will also prevent product splashing on top of the external floating roof, for instance as a result of product fractions boiling off or mixer operations. Nowadays the CTS leg seals are developing a standard for tanks storing volatile hydrocarbons. The first ones supplied and installed in 1991 are now more than 25 years in service and are still in excellent condition.



Leg seal detail artist impression.

Emissions are prevented installing a vapour and water tight seal consisting of two semi-circular parts, manufactured from flexible material, each surrounding on both sides a part of the support leg and a part of the leg sleeve. The contact surfaces of both parts fit together with tongue and groove connections, and the cylindrical surfaces have a sealing profile on the inside. Stainless steel hose clamps connect both individual parts against one another and clamp the seal around the support leg and the leg sleeve. For a full gastight roof leg pin hole seals can be included if no tube was welded in on the high pin location of the hollow roof leg.

Features

- Excellent vapour and liquid tight seal, pressure tested
- Long service life
- Maintenance free
- Fast and simple installation and removal
- Prevents seizing of the support legs to the sleeves
- Ensures leg pin to remain in position
- Reusable
- Successfully used by many reputed major oil and independent tank storage companies

LEG SEAL FOR FLOATING ROOF TANKS

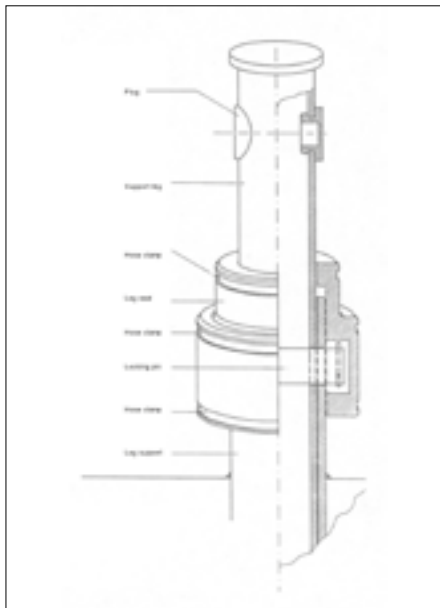
Construction

Leg seal	Superior EPDM rubber (hydrocarbon, chemical and ozone resistant and weather-proof)
Hose clamps	SS 304 (1.4301)
Pin hole plug (optional)	EPDM 60 Shore A rubber (hydrocarbon, chemical and ozone resistant and weather-proof)

PRODUCT DATA

Leg seal				
Leg size	Sleeve size	Upper inside diameter	Lower inside diameter	Height
inches	inches	mm	mm	mm
2.5	3	75	90	200
	3.5	75	102	200
3	3.5	89	102	200
	4	90	115	165
	4	90	115	200
	4	90	115	225
4	5	115	145	165
	5	115	145	225
	5	115	145	242

Pin hole plug		
Hole size	Diameter	Height
mm	mm	mm
30	70	29
35	70	29
38	70	29
42	70	29
45	70	29
50	70	29



Leg seal technical drawing.



Leg seals will prevent product splashing out from leg sleeves.



CTS Leg seals on tank in service.

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CTS LEG SOCKS FOR FLOATING ROOF TANKS

CTS Leg socks are designed to reduce emissions and product loss caused by vapours escaping from floating roof support legs. The leg socks are as a standard designed in PTFE material to form a covering sock to be positioned over the upper part of the external floating roof support legs. The interior of the leg sock provides excellent chemical resistance against products in the tank while the exterior resists the harshest environmental conditions.

The sock is a one side closed tube and covers the hole leg assembly so emission from the leg pin holes and the leg sleeve itself are prevented in high pin and low pin position. The sock is fully closed for emission and rain water by tightening the hose clamp.

Features

- Interior resists 100% aromatics, neat M.T.B.E. and gasohol vapours
- Exterior resists UV, water and ozone exposure
- Easily installed and removed while tank is in-service
- Significantly reduces vapour emissions from floating roof support legs
- Factory welded R/F seams provide durability
- Standard sizes, configurations and custom designs available
- Most economical and efficient vapour reduction solution
- Successfully used by many reputed major oil and independent tank storage companies

CTS LEG SOCKS

Construction

Fabric Plain weaved glass coated with PTFE
 Hose clamp SS 304 (1.4301)

PRODUCT DATA

Leg sock

Width	Length
mm	mm
106	1,650
110	1,425
121	1,000
135	405
136	400
140	1,650
160	1,050
166	625
203	1,220
203	305
210	1,350
220	1,650
260	1,350
260	1,550
360	1,000

Other dimensions are available upon request (where a tailor made leg sock design can be made available based on handle type, pin length, leg sleeve and length).



Leg sock on tank in service, PU (Polyurethane) fabric.



Leg sock on tank in service, PTFE (Teflon) fabric.

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GAUGE POLE SLEEVE FOR FLOATING ROOF TANKS

International regulations are now often requiring that slotted gauge (guide) poles are to be equipped with an emission control system such as a gauge pole sleeve (GPS). CTS Gauge pole sleeves are designed to significantly reduce Volatile Organic Compound (VOC) emissions from slotted gauge/guide poles and their wells utilized on external floating roof storage tanks. The CTS stainless steel sleeve is attached to the existing gauge well slide plate. The sleeve reduces emissions from inside the gauge pole significantly.



Gauge pole sleeve during installation.

Features

- Resistant to all commonly stored products because of its stainless steel construction and abrasion resistant PTFE (Teflon®) liner
- Designed for each specific tank
- Can be installed on tanks in service just requiring cold work
- Easy installation
- Long service life
- Lightweight construction
- Maintenance free operation
- Compliant to Chapter 4 – IPPC, BREF Storage tanks, 2006
- Also available for multiple poles like thermos wells
- Available for IFR gauge pole or pole penetrations as well
- Installing a CTS Transition box allows installation of a CTS gauge pole cover in combination with a gauge pole sleeve as well

GAUGE POLE SLEEVE

BACT classified product

Installing a CTS Gauge pole sleeve will result in significant emission reductions.

On that basis a gauge pole sleeve has been classified as BACT (Best Available Control Technique) under various environmental codes and regulations. Installing a gauge pole sleeve will typically bring your emission reduction above 99% when comparing external floating roof emissions to fixed roof reference tank emissions.

Below is an example of emission reductions reported for a refinery tank located in North West Europe as per API Chapter 19 (as also used in various other environmental codes and legislative documents such as EPA, IPPC BREF Storage tanks and many others):

Tank diameter: 36 m. (120')
 Seals: Shoe plate seal + rim mounted secondary seal
 Product: Gasoline (RVP 10)
 Annual turn overs: 152.3

Storage tank description	Annual emission	Emission reduction
	kg	%
Fixed roof tank, no emission reduction measures	845,088	0
External floating roof tank (EFRT) with slotted guide pole and gasketed sliding cover	13,990	98.34
EFRT with slotted guide pole, gasketed sliding cover and sleeve	4,287	99.49

Installation

CTS is capable to install a CTS supplied gauge pole sleeve on any of your tanks, but our detailed product drawings and installation manual will give you the choice to have either your own staff or contractor staff installing the gauge pole sleeve as well. The economic advantages of

having your own (contractor) staff installing our products could be significant, reducing travelling and lodging costs. Experienced CTS supervision will be available upon request from our global network of CTS offices.



Gauge pole sleeve.



Gauge pole sleeve, bottom view.



Gauge pole sleeve, top view.

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GAUGE POLE COVER FOR FLOATING ROOF TANKS

CTS Gauge pole covers greatly reduce Volatile Organic Compound (VOC) emissions through slotted gauge poles installed at external floating roofs. Tank owners benefit by reducing product emissions while meeting environmental regulations.

CTS Gauge Pole Covers are manufactured using a fabric to form a casing around the exterior of the slotted gauge pole. The cover includes a zipper for installation while the tank remains in service. The optional CTS Transition box provides a seal at the deck opening.

They also eliminate the need for gauge pole floats, which are prone to premature failure from gasket wear and other service related problems. Tanks using radar gauging equipment also benefit by using CTS Gauge pole covers, which holds vapours and allows the radar gauge to perform at all times.

Features

- Significantly reduces gauge pole emissions up to 90%
- Meets or exceeds environmental regulations
- Suitable for both internal and external floating roof tanks
- Can be installed while the tank remains in-service
- Excellent chemical and UV resistance
- Easy installation
- Collapsible design provides flexibility
- Custom engineered to ensure effective operation
- Provides an efficient and economical solution
- Also available for multiple poles like gauge poles with thermo wells bi-poles or piggy back pole designs

Cover material

- The gauge pole cover consists of a high level aromatics and tear resistant fabric
- The CTS gauge pole cover can be used with all products stored, including 100% aromatics
- The cover does not absorb any liquids/products and does not become brittle when in use. The CTS Gauge pole cover is resilient against wind, rain, sand, UV exposure and is suitable for temperatures of -40°C up to 80°C
- The CTS Gauge pole cover will be designed as per API Chapter 19, section 2 and IPPC BREF storage tanks (2006)
- The cover is equipped with a full length zipper that allows easy installation, also on tanks in service

Transition box material

- The CTS Transition box is typically made out of stainless steel
- The CTS Transition box split parts will overlap each other with a minimum of 2". This will ensure that the transition box in combination with the sealant applied creates an optimal seal

GAUGE POLE COVER

BACT classified product

Installing a gauge pole cover will result in significant emission reductions. On that basis a gauge pole cover has been classified as BACT (Best Available Control Technique) under various environmental codes and regulations. Installing a gauge pole cover will typically bring your emission reduction above 99% when comparing external floating roof emissions to fixed roof reference tank emissions.

Below is an example of emission reductions reported for a refinery tank located in North West Europe as per API Chapter 19 (as also used in various other environmental codes and legislative documents such as EPA, IPPC BREF Storage tanks and many others):

Tank diameter: 36 m. (120')
 Seals: Shoe plate seal + rim mounted secondary seal
 Product: Gasoline (RVP 10)
 Annual turn overs: 152.3

Storage tank description	Annual emission kg	Emission reduction %
Fixed roof tank, no emission reduction measures (reference tank)	845,088	0
External floating roof tank (EFRT) with slotted guide pole and gasketed sliding cover	13,990	98.34
EFRT with unslotted guide pole, gasketed sliding cover (gauge pole cover)	5,038	99.40

Installation

CTS is capable to install a CTS supplied gauge pole cover on any of your tanks, but our detailed product drawings and installation manual will give you the choice to have either your own staff or contractor staff installing the gauge pole cover as well. The economic advantages of

having your own (contractor) staff installing our products could be significant, reducing travelling and lodging costs. Experienced CTS supervision will be available upon request from our global network of CTS offices.



Gauge pole cover on transition boxes.



Gauge pole cover, view from floating roof.



Gauge pole cover, view from rolling ladder.

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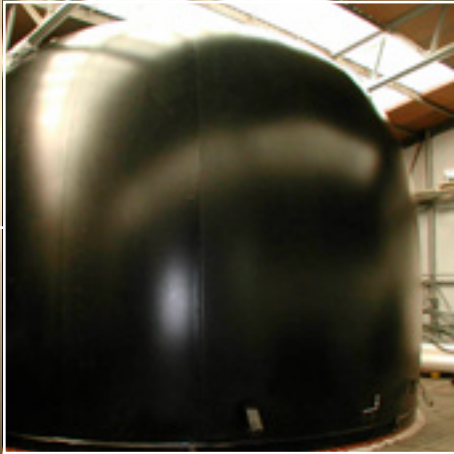
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VAPOUR BLADDER FOR VAPOUR RECOVERY SYSTEMS

In storage terminals reducing the emission of volatile organic carbons is both economically as well as for preserving our environment of tremendous importance. Reasons for this are the increase of awareness and the changed products due to additives and higher vapour pressures which both results in changed and higher emissions.

Fitting a vapour bladder in your vapour recovery system will enable you to install smaller vapour recovery systems since the bladder eliminates peak loads from the most busy operational hours of your loading stations. It will ensure an uniform vapour pressure within your vapour recovery unit (VRU) 24 hours a day. Any VRU in your tank farm will benefit from the CTS designed and manufactured bladders, as they are detailed to last and virtually eliminate any future maintenance.

Safety

The use of reinforced ester coated polyurethane makes the bladder oil and abrasion resistant. The membrane is vapour tight and therefore fully safe for all vapour storage applications for refineries, independent tank storage terminals and fuel distribution terminals or depots.

Features

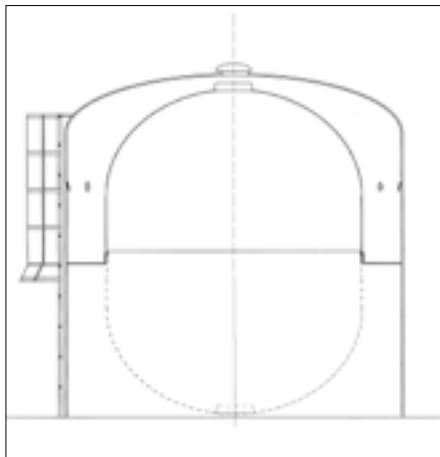
- Maintenance free
- Excellent vapour tightness
- Dynamically stable within the holding tank
- Designed and manufactured for each specific project as hemispherical configuration or in a ring type truncated cone
- Pressure tested prior to shipment or after installation if required
- Materials are extensively tested for its service
- Fabrics available compatible with all stored products, including high aromatic fuel vapours and MTBE vapours
- Light weight structure, excellently detailed
- Easy installation, full installation manuals and project support available
- Successfully used globally by many reputed major oil and tank storage companies

VAPOUR BLADDER

Installation

CTS is capable to install a CTS supplied vapour bladder (or gas holder) in any of your tanks, but our detailed product drawings and installation manual will give you the choice to have either your own staff or contractor staff installing our products and systems as well.

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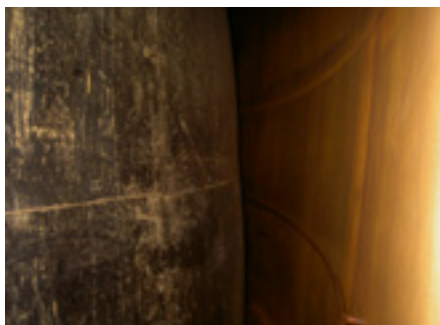
Vapour bladder technical drawing.



Vapour bladder during factory test.



Vapour bladder lifting point.



Vapour bladder in-service inspection.

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SUSPENDED ALUMINIUM LNG DECKS

LIGHTWEIGHT ALTERNATIVE TO WELDED NICKEL DECKS

Suspended Aluminium LNG Decks can be customized to fit nearly all types of cryogenic storage needs with a variety of options and specifications. Its unique design ensures an insulation deck and method of construction that provides a lightweight alternative to welded nickel steel. This makes our decks the most efficient, reliable, and cost effective choice for liquefied natural gas.

The Economic Advantage

The design, utilizing unique lock-groove connections and lightweight aluminium components, eliminates the need for field welding and facilitates a safe, reliable installation in a fraction of the time. Our high-strength aluminium alloys easily supports various insulation materials and job-specific design loads.

Design

As with all our solutions, we utilize an extruded beam interconnected to gusset plates, attached with mechanical fasteners which eliminates the need to torque nuts and bolts. Each panel is independently fastened with an interlocking batten bar system.

Features

- All aluminium components
- Unique pneumatic fastening systems eliminates need for on-site welding
- Lightweight for ease of assembly
- Reduces need for heavy equipment
- Safe, efficient on-site construction
- Excellent strength-to-weight ratio
- Material remains ductile as required in cryogenic temperatures

SUSPENDED ALUMINIUM LNG DECKS

The Quality Advantages

CTS has an unparalleled reputation for quality products and services:

- Extensive experience designing, fabricating and installing aluminium cover systems
- In service since 2005
- Installed for several reputable international customers
- CTS is ISO 9001:2008 and SHE (VCA**) certified

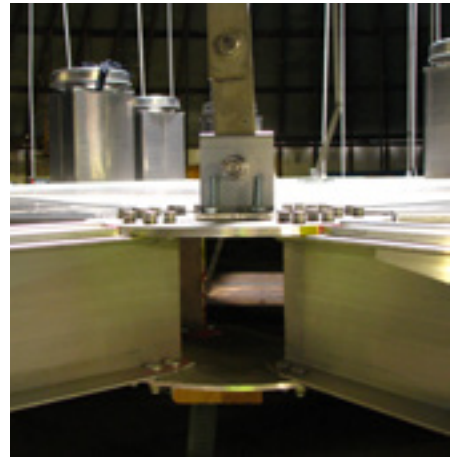
LNG Deck Installation Photos



Typical Vent.



Nozzle Penetrations.



Typical Hanger Assembly.



Completed Deck Prior to Dome Airlift.



Topside Completed View.



Bottom Side Completed View.

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C300 RIM VENTS

FOR FLOATING ROOF TANKS

Excessive pressure accumulations in the rim vapour space can result in floating roof bulkhead or seal damage. Also pressure could develop under the central membrane overstressing the central membrane. For these reasons discharging the pressurised volume (pressure relief) from atmospheric storage tanks might be required. Therefore storage tanks that could develop such pressure spikes are to be equipped with properly designed rim vents. The C300 rim vent ensures that tanks and vessels are kept within the design pressure range when pressure within the tank design limits being the result of tank manipulations, light fractions boiling off or other influences.

Safety and standards

Construction: API 650, API 653, API 2000, EN14015, EEMUA 159 and most end-user standards
 Safety: ATEX, PGS 29
 Emissions: API Chapter 19

Rim vents are factory tested and fully certified and based on full compliance with strict ISO 9001 quality assurance system. All products are from European origin and available with an ATEX, PED or CE certification (where the PED approval has been covered by Lloyds).

Features

- Open vent
- Pressure range 2.15 mbarg (20 mm WC – water column) to 100 mbarg (1,020 mm WC – water column)
- Size range 2" (50 mm) – 12" (300 mm)
- Available as flanged or threaded version
- Lightweight design provides easy handling whilst interchangeable components ensure that standard parts and seats can be easily replaced
- Seating design ensures minimum leakage < 0.03 m³/hour at 90% of set pressure
- Seats designed to ensure that condensate drains away from all seating areas (self-draining)

C300 RIM VENTS

Construction

Body material	Aluminium, CS or SS 316 (1.4401)
Trim material	SS 316 (1.4401)
Diaphragm	PTFE (Teflon®) or FEP (Fluorinated Ethylene Propylene)

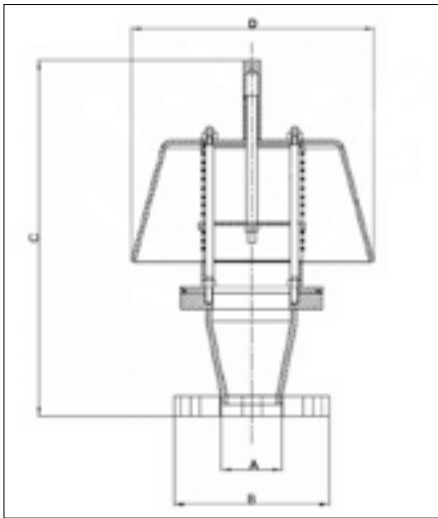
There are numerous options available for special applications. Exotic materials such as Hastelloy, Monel and various plastics can be offered to suit the most hazardous of environments. Special coatings can also be applied for extreme service. For low temperature duties, internal parts can be PTFE coated to prevent seizure.

Please contact us for non-standard applications to allow us to be able to support.

PRODUCT DATA

C300 Rim Vent, main dimensions

Nominal size	A	B	C	D
inches (mm)	mm	mm	mm	mm
2 (50)	54	152	453	208
3 (80)	84	191	498	305
4 (100)	108	229	503	380
6 (150)	161	280	548	438
8 (200)	211	343	555	600
10 (250)	255	406	575	650
12 (300)	305	483	802	700



C300 rim vent technical drawing.



C300 rim vents ready for shipment.



C300 rim vent flanged.

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C100 P/V VENTS FOR STORAGE TANKS AND VESSELS

Excessive pressure and/or vacuum conditions for the vapour space of atmospheric storage tanks and vessels can result in tank damage. Discharging the volume of product pumped in (displacement) of generated vapours above boiling point (pressure relief) or inbreathing the volume of required air to compensate for emptying activities (vacuum relief) is very important. Therefore often storage tanks must be equipped with properly designed P/V vents. The C100 pressure/vacuum vents ensure that tanks and vessels are kept safe by keeping pressure and vacuum within the tank design limits being the result of tank manipulations or other influences.

Safety and standards

Construction: API 650, API 653, API 2000, EN14015, EEMUA 159 and most end-user standards
 Safety: ATEX, PGS 29
 Emissions: API Chapter 19

C100 P/V vents are factory tested and fully certified and based on full compliance with strict ISO 9001 quality assurance system. All products are from European origin and available with an ATEX, PED or CE certification (where the PED approval has been covered by Lloyds).

Features

- Open vent or closed vent (pipe-away)
- Pressure range 2.15 mbarg (20 mm WC – water column) to 100 mbarg (1,020 mm WC – water column)
- Vacuum range -2.15 mbarg (-20 mm WC – water column) to -60 mbarg (-610 mm WC – water column)
- Size range 2" (50mm) – 12" (300mm)
- Flanged as per ANSI or DIN
- Lightweight design provides easy handling whilst interchangeable components ensure that standard parts and seats can be easily replaced
- Seating design ensures minimum leakage < 0.03 m³/hour at 90% of set pressure
- Seats designed to ensure that condensate drains away from all seating areas (self-draining)

C100 P/V VENTS

Construction

Body material	Aluminium, CS or SS 316 (1.4401)
Trim material	SS 316 (1.4401)
Diaphragm	PTFE (Teflon®) or FEP (Fluorinated Ethylene Propylene)

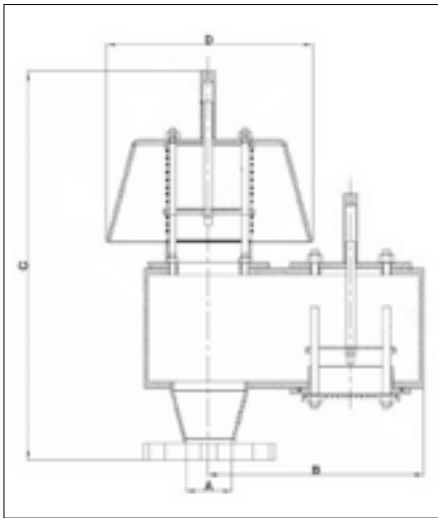
There are numerous options available for special applications. Exotic materials such as Hastelloy, Monel and various plastics can be offered to suit the most hazardous of environments. Special coatings can also be applied for extreme service. For low temperature duties, internal parts can be PTFE coated to prevent seizure.

Please contact us for non-standard applications to allow us to be able to support.

PRODUCT DATA

C100 Pressure/Vacuum Vent, main dimensions

Nominal size	A	B	C	D
inches (mm)	mm	mm	mm	mm
2 (50)	54	252	440	208
3 (80)	84	308	515	305
4 (100)	108	355	623	380
6 (150)	161	516	721	535
8 (200)	211	576	677	600
10 (250)	255	701	750	650
12 (300)	305	741	835	700



C100 P/V vent technical drawing.



C100 P/V vents on a fixed roof tank.

All our product information and specifications are drafted with extreme care but can be subject to change. We reserve the right to change product specifications.

Your Distributor:



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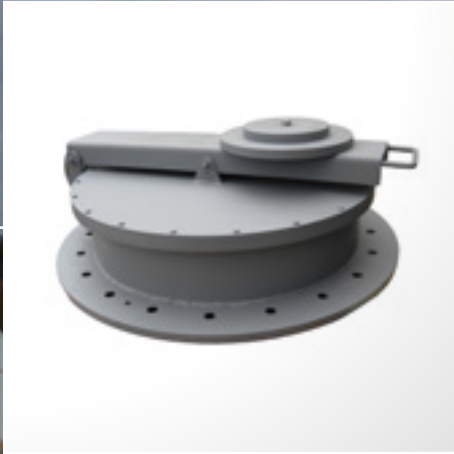
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C400 EMERGENCY RELIEF VENTS FOR STORAGE TANKS AND VESSELS

Exposure of an atmospheric storage tank or other vessel to an external fire source or other mishaps could result in larger volumes of vapours requiring an instant release. During a fire nearby a significant amount of heat may be transferred through the tank shell and the volume of vapours generated as a result of this heat input can be substantial. Providing emergency means of discharging this large volume of vapours and preventing an unacceptable increase of pressure within the tank is defined as emergency venting.

The C400 Emergency Relief Vent (ERV) ensures that tanks and vessels are kept safe when an excessive pressure develops due to or external fire sources, and also allows access to the tank for inspection and cleaning purposes.

Safety and standards

Construction: API 650, API 653, API 2000, EN14015, EEMUA 159 and most end-user standards
 Safety: ATEX, PGS 29
 Emissions: API Chapter 19

C400 ERV's are factory tested and fully certified and based on full compliance with strict ISO 9001 quality assurance system. All products are from European origin and available with an ATEX, PED or CE certification (where the PED approval has been covered by Lloyds).

Features

- Pressure range 4 mbarg (40 mm WC – water column) to 140 mbarg (1,430 mm WC – water column)
- Size range 10" (250 mm) – 36" (900 mm)
- Flanged as per ANSI or DIN
- Counter balance or screw down
- Lightweight design provides easy handling whilst interchangeable components ensure that standard parts and seats can be easily replaced
- Seating design ensures minimum leakage < 0.03 m³/hour at 90% of set pressure
- Seats designed to ensure that condensate drains away from all seating areas (self-draining)
- Two types of manway which are either a long arm or counter balance for very light settings

C400 EMERGENCY RELIEF VENTS

Construction

Body material	Aluminium, CS or SS 316 (1.4401)
Trim material	SS 316 (1.4401)
Diaphragm	PTFE (Teflon®) or FEP (Fluorinated Ethylene Propylene)

There are numerous options available for special applications. Exotic materials such as Hastelloy, Monel and various plastics can be offered to suit the most hazardous of environments. Special coatings can also be applied for extreme service. For low temperature duties, internal parts can be PTFE coated to prevent seizure.

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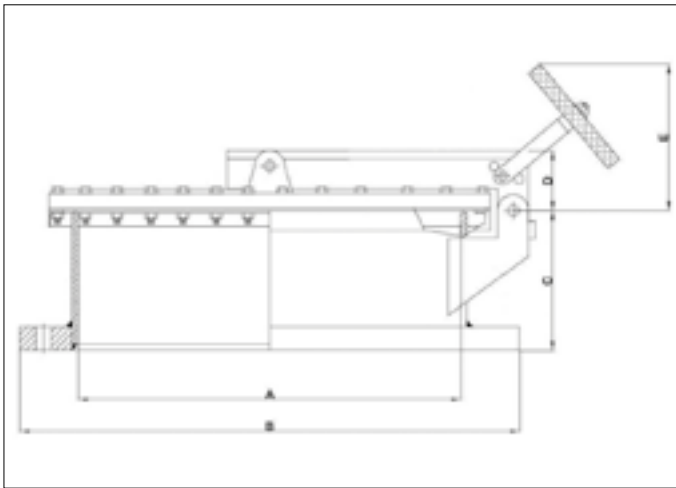
PRODUCT DATA

C400 CB (Counter Balanced) Emergency relief vent, main dimensions

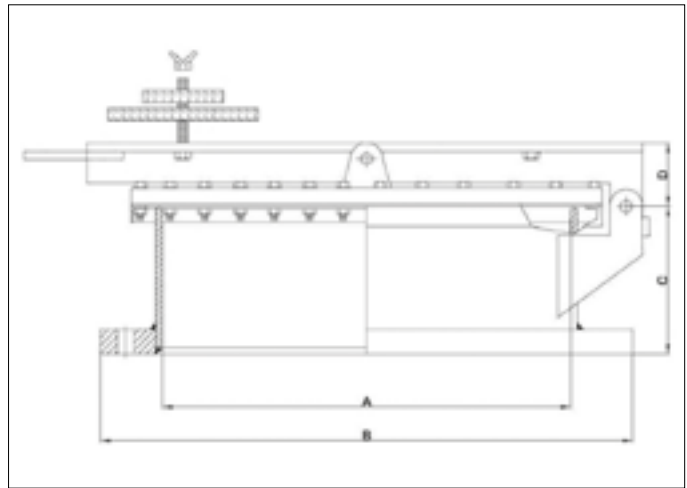
Nominal size	A	B	C	D
inches (mm)	mm	mm	mm	mm
10 (250)	254	406	205	40
12 (300)	305	483	205	40
16 (400)	406	597	205	40
18 (450)	457	635	205	40
20 (500)	508	699	205	40
24 (600)	610	813	205	40
30 (750)	762	984	205	40
36 (900)	910	1125	205	40

C400 SD (Screw Down) Emergency relief vent, main dimensions

Nominal size	A	B	C	D
inches (mm)	mm	mm	mm	mm
10 (250)	254	406	205	40
12 (300)	305	483	205	40
16 (400)	406	597	205	40
18 (450)	457	635	205	40
20 (500)	508	699	205	40
24 (600)	610	813	205	40



C400 CB Emergency relief vent technical drawing.



C400 SD Emergency relief vent technical drawing.

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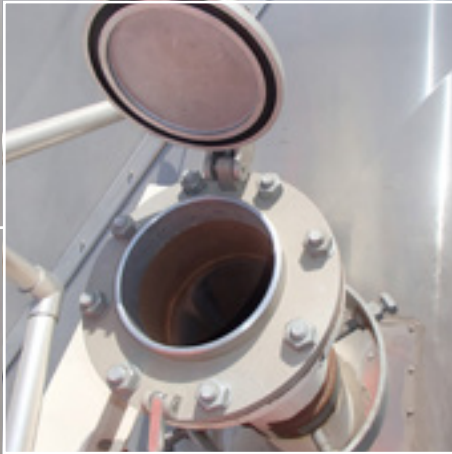
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C500 GAUGE HATCHES

FOR STORAGE TANKS AND VESSELS

The C500 gauge hatches are designed to provide access to tanks or vessels for sampling, measurement and inspection.

Safety and standards

Construction: API 650, API 653, API 2000, EN14015, EEMUA 159 and most end-user standards
Safety: ATEX, PGS 29
Emissions: API Chapter 19

All products are factory tested and fully certified and based on full compliance with strict ISO 9001 quality assurance system. All products are from European origin and available with an ATEX, PED or CE certification (where the PED approval has been covered by Lloyds).

Features

- Size range 3" (100mm) – 8" (200mm)
- Flanges as per ANSI or DIN
- Free lift or screw down
- Lightweight design provides easy handling whilst interchangeable components ensure that standard parts and seats can be easily replaced
- Seating design ensures minimum leakage < 1 SCFH at 90% of set pressure and designed to ensure that condensate drains away from all seating areas (self-draining)

C500 GAUGE HATCHES

Construction

Body material	Aluminium, CS or SS 316 (1.4401)
Trim material	SS316 (1.4401)
Diaphragm	PTFE (Teflon®) or FEP (Fluorinated Ethylene Propylene)

There are numerous options available for special applications. Exotic materials such as Hastelloy, Monel and various plastics can be offered to suit the most hazardous of environments. Special coatings can also be applied for extreme service. For low temperature duties, internal parts can be PTFE coated to prevent seizure.

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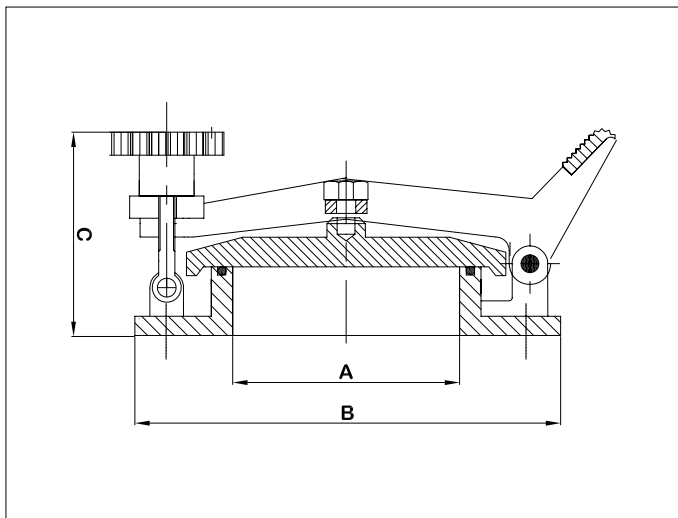
PRODUCT DATA

Gauge Hatch C500FL (Free lift)

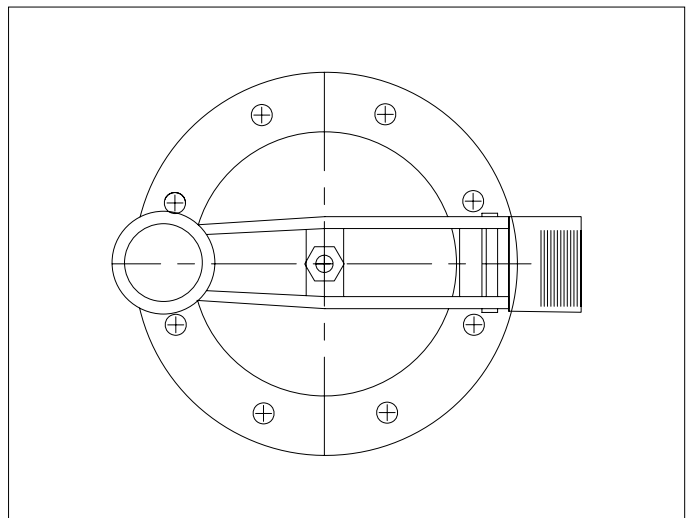
Nominal size	A	B	C
inches (mm)	mm	mm	mm
3 (80)	76	190	105
4 (100)	102	229	111
6 (150)	152	279	124
8 (200)	203	343	137

Gauge Hatch C500SD (Screw Down)

Nominal size	A	B	C
inches (mm)	mm	mm	mm
3 (80)	76	190	110
4 (100)	102	229	116
6 (150)	152	279	129
8 (200)	203	343	142



C500 Gauge Hatch technical drawing (Side elevation).



C500 Gauge Hatch technical drawing (Plan view).

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EXPANSION JOINTS

FOR FLEXIBLE AND VAPOUR TIGHT JOINTS

Movements and expansion of individual pipe linings has to be captured in a way that the pole is also completely closed for fluids and vapours. The CTS Expansion joints are fully resistant against the fluids and vapours and are absorbing movements which occur due to changes in temperature, cancelling alignment differences and absorbing noises and vibrations in pipeline systems. The expansion joints absorb axial and lateral movements as well as angular movements.

The CTS expansion joints can be used in all applications where movements between pipe lines has to be compensated. Common applications amongst others are gauge pole penetrations on fixed roof tanks, cooling and heating pipe lines, product pipe lines and exhausts.

Safety

CTS Expansion joints are selected for the individual application based on medium, connection and pressure. All expansion joints are tested. On demand special electrical continuity connections can be supplied. Stainless steel expansion joints are designed, produced and tested in accordance with Stoomwezen D 0901BS 5750 Part 1 & EN 29001, TÜV Südwest, DNV,

PED 97/23/EC, Lloyds Register of Shipping, ASME and NACE.

Identification

Depending on the material rubber expansion joints have a special colour or coloured band to identify the applied material (and application). Customer specific identification is possible on demand.

Features

- Different materials (rubber, stainless steel and fabric) for different applications
- All possible installation methods like clamps, flanged and thread
- Round shape as standard (most sizes), special shapes and sizes on demand even up to 5,500mm
- Single and multiple arch with rubber expansion joints
- Excellent reliability, each individual expansion joint is pressure tested
- Temperature range -100°C up to 1,000°C (depending on type and material)
- Customer specific identification available

EXPANSION JOINTS

Materials

Rubber

Lining and cover

CR (Neoprene), EPDM, IIR (Butyl), CSM (Hypalon®), NBR (Nitrile), FPM (Viton®), Silicone or PTFE (Teflon®), others on demand

Reinforcement

Nylon, polyester, Kevlar®, glass fibre or steel mesh

Clamps

1.4301 (SS304)

Stainless steel

Assembly (bellow and connection)

1.4307 (SS 304L), 1.4404 (SS 316L), Monel 400, Inconel 600, others on demand

Fabric

Assembly

built up from various layers of fabrics and foils

PRODUCT DATA

Expansion joints and allowable deviation (single arch)

DN	Axial (-/-) mm	Axial (+) mm	Lateral mm	Angle °
50	31	10	20	21.8
65	31	10	20	17.1
80	31	10	20	14.0
100	31	10	19	11.3
125	31	10	19	9.1
150	31	10	18	7.6
175	31	10	18	6.5
200	31	10	18	5.7
250	31	10	18	4.6
300	31	10	17	3.8
350	31	10	17	3.3
400	31	10	17	2.9
450	31	10	17	2.5
500	31	10	17	2.3
550	31	10	16	2.1
600	31	10	16	1.9
650	31	10	16	1.8
700	31	10	16	1.6
750	31	10	16	1.5
800	31	10	16	1.4
850	31	10	16	1.3
900	31	10	16	1.3
1,000	31	10	16	1.1
1,100	31	10	15	1.0
1,200	31	10	15	1.0
1,300	31	10	15	0.9
1,400	31	10	15	0.8
1,500	31	10	15	0.8

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