

Saving Danger, More Safe and Better Life

HIGH VELOCITY VENT & VACUUM RELIEF VALVE

SAFETY IS THE FIRST & MOST IMPORTANT

for Marine Cargo Venting Devices



SUPER-ISO series

Meet

New EU(MED) & IMO Regulation
IMO MSC/Circ.677 & 1009
MSC,1/Circ,1324(NEW)
ISO 15364: 2007(NEW)
Vapor control system of USCG
EN 12874: 2001(NEW)



International patented

Approved for crude oil, products and IMO type II or III chemical tankers carrying dangerous cargoes of a Maximum Experimental Safe Gap(MESG) with 0.65mm

TOPSAFE

HIGH VELOCITY VENT & VACUUM RELIEF VALVE

for Marine Cargo Venting Devices

Authorized Requirements

High velocity vent and vacuum relief valve is designed to protect marine vessel systems, including cargo tanks, that may be subject to gas/vapour pressure or vacuum outside the design parameters of the system / tank.

This valve is also designed for devices to prevent the passage of flame into cargo tanks in tankers and to relieve excessive over pressure or under vacuum of cargo tanks during cargo loading, discharging, ballasting and thermal variations.

Applied Basic Rule

Solas Regulation 59.1.2

The venting arrangements shall be so designed and operated as to ensure that neither pressure nor vacuum in cargo tanks shall exceed design parameters and be such as to provide for :

.1 the flow of the small volumes of vapour, air or inert gas mixtures caused by thermal variations in a cargo tank in all case through pressure/vacuum valves ; and

.2 the passage of large volumes of vapour, air or inert gas mixtures during cargo loading and ballasting, or during discharging.

.3 a secondary means of allowing full flow relief of vapour, air or inert gas mixtures to prevent over-pressure or under-pressure in the event of failure of the arrangements in 1.2.2. Alternatively, pressure sensors may be fitted in each tank protected by the arrangement required in 1.2.2, with a monitoring system in the ship's cargo control room or the position from which cargo operations are normally carried out. such monitoring equipment shall also provide and alarm facility which is activated by detection of over-pressure or under-pressure conditions within a tank.

1.3.3 If cargo loading and ballasting or discharging of a cargo tank or cargo tank group is intended, which is isolated from a common venting system, that cargo tank or cargo group shall be fitted with a means for over-pressure or under-pressure protection as required in paragraph 1.2.3.

Relative Rules and Requirements

IMO MSC/Circ.677

Revised standards for the design, testing and locating of devices to prevent the passage of flame into cargo tankers

IMO MSC/Circ.1009

Amendments to the revised standards for the design, testing and locating of devices to prevent the passage of flame into cargo tanks in tankers(MSC/Circ.677)

IMO MSC,1/Circ.1324 (NEW)

Amendments to the revised standards for the design, testing and location of devices to prevent the passage of flame into cargo tanks in tankers (MSC/CIRC.677 , AS AMENDED BY MSC/CIRC.1009)

International Standard 15364; 2007 (NEW)

Ships and marine technology-pressure/vacuum valves for cargo tanks

IMO MSC/Circ.450 Rev.1

Revised factors to be taken into consideration when designing cargo tank venting and gas-freeing arrangement

IMO MSC/Circ.585

Standard for Vapor Emission Control System

IMO MSC/Circ.731

Revised factors to be taken into consideration when designing cargo tank venting and Gas-freeing arrangement

API 2000 - Flow test procedure

EN 12874 : 2001 (NEW)

Flame arresters-Performance requirements, test methods and limits for use.



Features & Benefits



Safe-Guard Case from corrosion

Provide good protection for disc and seat from pitting, solid salt content and seawater corrosion



Full stroke check lifting of all moving parts

Full stroke lifting disc, outside visible checking and no need greasing system for maintenance free



Perfect air cushion damper

Initially full lifting, non-chattering, non-hammering, non-oscillation performance result in no risk to valves and tankers. Providing very low over pressure and high closing pressure to reduce VOC loss



Effective outside setting adjustable system

Available replacement and adjustment of disc and weight without any change of flow characteristic, gas leakage and escaping



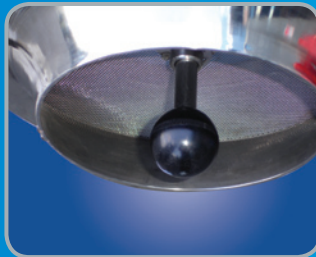
Available outside inspection

Available outside inspection of all moving parts without relieving of toxic chemical gas



Optional Gas Free Cover

Capable of inerting, purging and gas freeing in accordance with SOLAS regulation 59.2



Risk free flame screen

Protectable screen for chemical tankers with MESG 0.65 mm for IEC II B gas group and MESG 0.90mm for II A gas group



Clearly Visible Vacuum disc operation

Fully realizable operating condition of vacuum disc at the side and down of valve and long distance from valve



Benefits

- Protectable MESG 0.65mm chemical gases
- Optional gas free cover
- Safe-guard case from corrosion
- Perfect air cushion damper
- Effective outside setting adjustable system
- Full stroke check lifting
- Clearly visible vacuum disc operation
- Complete self-drain & non-accumulation structure inside
- Less than 0.5Hz of undamped oscillation

HIGH VELOCITY VENT & VACUUM RELIEF VALVE

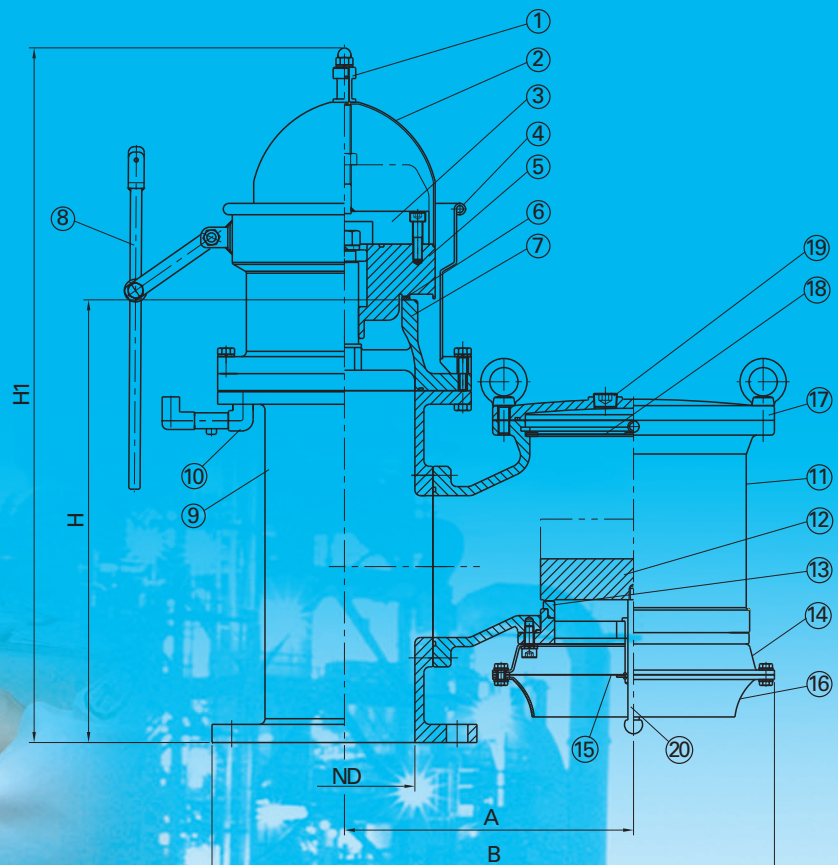
for Marine Cargo Venting Devices

Ordering Information

To eliminate dangerous condition against ship safety, the following information shall be provide to manufacturer by buyer, as applicable minimum requirements, in accordance with ISO 15364 Section 4 and MSC/Circ,731

- Nominal pipe size, Configuration and pipe length
- Vapor-air Weight density at 115°F and the pressure setting of P/V valve.
- Required Maximum Explosive Safe Gap(MESG) value, or IEC gas group for intended cargo list
- Inspection and test requirements.
- Anticipated ambient air temperature range.
- Material of construction.
- Maximum required standard air flow rate and the design pressure drop for the piping system at that maximum flow rate.
- Maximum allowable tank design pressure / vacuum.
- Maximum design loading / discharging rate.

Outline Drawing



High Velocity Vent and Vacuum Relief Valve shall be located at a height not less than 2m above the cargo tank deck and not less than 10m measured horizontally from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery and equipment which may constitute an ignition hazard. These outlets shall be provided with high velocity devices of an approved type. (Solas regulation 59.1.9.4)

Materials of Construction

No.	Description	Material		
		Spec. 1	Spec. 2	Spec. 3
1	LIFTING BUSH	Stainless steel 316	Stainless steel 316	Stainless steel 316L
2	WEIGHT CASING	Stainless steel 316	Stainless steel 316	Stainless steel 316L
3	WEIGHT	Stainless steel 316	Stainless steel 316	Stainless steel 316L
4	SAFE-GUARD CASE	Stainless steel 316	Stainless steel 316	Stainless steel 316L
5	PRESSURE DISC	Stainless steel 316	Stainless steel 316	Stainless steel 316
6	PRESSURE SEAT	Stainless steel 316	Stainless steel 316	Stainless steel 316L
7	PRESSURE BODY	Cast steel	Stainless steel 316	Stainless steel 316L
8	CHECK-LIFT HANDLE	Stainless steel 316	Stainless steel 316	Stainless steel 316L
9	CONNECTION TEE	Ductile cast iron	Stainless steel 316	Stainless steel 316L
10	DRAIN UNIT	Stainless steel 316	Stainless steel 316	Stainless steel 316
11	VACUUM BODY	Ductile cast iron	Stainless steel 316	Stainless steel 316L
12	VACUUM DISC	Stainless steel 316	Stainless steel 316	Stainless steel 316L
13	VACUUM SEAT	Stainless steel 316	Stainless steel 316	Stainless steel 316L
14	SCREEN PROTECTOR	Galvanized Steel with Coating	Stainless steel 316	Stainless steel 316L
15	FLAME SCREEN	Stainless steel 316	Stainless steel 316	Stainless steel 316L
16	VACUUM COVER	Galvanized Steel with Coating	Stainless steel 316	Stainless steel 316L
17	GAS FREE COVER	Ductile cast iron	Stainless steel 316	Stainless steel 316L
18	GAS FREE SCREEN	Stainless steel 316	Stainless steel 316	Stainless steel 316L
19	PLUSHING PLUG	Stainless steel 316	Stainless steel 316	Stainless steel 316L
20	VACUUM CHECK LIFT	Stainless steel 316	Stainless steel 316	Stainless steel 316L

Dimension Table & Field Information

unit:mm

Size	N.D	A	B	H	H1	W'T(kg)
65A	65	190	364	258	406	27
80A	80	206	394	273	435	36
100A	100	226	437	311	487	48
125A	125	256	500	353	567	66
150A	150	321	614	433	736	104
200A	200	385	740	483	782	150
250A	250	449	872	543	904	224
300A	300	501	974	593	987	290

- Hull No. _____
- Connection Flange JIS 5K F.F

- Pressure Setting 1,400 mmW.G 2,100 mmW.G _____
- Vacuum setting -350 mmW.G _____
- MESG Requirements Above 0.90mm Less than 0.90mm and Above 0.65mm
- Paint Specification No paint Tar Epoxy 250μ _____
- Supply Quantities _____ sets per one ship

HIGH VELOCITY VENT & VACUUM RELIEF VALVE

for Marine Cargo Venting Devices

Valve Sizing Equations

Determining venting capacity

– For pressure relieving capacity

$$Q_a = (Q_l)(VGR) \sqrt{\frac{\rho_{v-a,115}}{\rho_{a,115}}}$$

Q_a : required air equivalent volumetric flow rate

Q_l : liquid transfer rate

VGR : growth rate of vapor–air mixture

$\rho_{v-a,115}$: vapor–air weight density at 115° F and the pressure setting of the cargo tank P/V valves

$\rho_{a,115}$: air weight density at 115° F and the pressure setting of the cargo tank of the cargo tank P/V valves

– For vacuum relieving capacity

$$Q_v = Q_L \text{ or } Q_P$$

Q_v : required air vacuum capacity

Q_L : maximum liquid discharge rate

Q_P : maximum pump rate

Determining the vapor growth rate

$$VGR = 1 + 0.25 \frac{P_{v,115}}{12.5}$$

VGR : growth rate of vapor–air mixture

$P_{v,115}$: saturated vapor pressure at 115° F

Determining the vapor–air mixture weight density

$$\rho_{v-a,115} = [(S.G_v)(V_{v,115}) + V_{a,115}] 0.0047(P_{P/V})$$

$\rho_{v-a,115}$: vapor–air weight density at 115° F and the pressure setting of the cargo tank P/V valves

$S.G_v$: specific gravity of cargo vapor

$V_{v,115}$: partial volume of vapor at 115° F

$V_{a,115}$: partial volume of air at 115° F

$\rho_{a,115}$: air weight density at 115° F and the pressure setting of the cargo tank of the cargo tank P/V valves

$P_{v,115}$: saturated vapor pressure at 115° F

$P_{P/V}$: cargo tank P/V valve pressure setting

Determining the pressure drop of the vapor–air mixture through the venting pipe.

$$\Delta P = \frac{\rho f L v^2}{144 D^2 g_C}$$

ΔP : pressure drop

ρ : weight density of fluid

f : Darcy friction factor

L : equivalent length of pipe

v : mean velocity of flow

D : internal diameter of pipe

g_C : acceleration constant

Quality Control Activities & World-Wide Service

**Normative quality, satisfying the customers and trustworthy, is maintained !
Awakened to new significance by all of our employees is better quality !**

Approved by:

- Certified for Quality Management System ISO9001
- EUROPEAN COUNCIL DIRECTIVE 96/98 EC on MARINE EQUIPMENT(M.E.D)
- DET NORSKE VERITAS
- LLOYD'S REGISTER OF SHIPPING
- AMERICAN BUREAU OF SHIPPING
- NIPPON KAIJI KYOKAI
- GERMANISCHER LLOYD
- BUREAU VERITAS.
- KOREAN REGISTER OF SHIPPING
- UNITED STATES COAST GUARD
- MINISTRY OF MARITIME AFFAIRS AND FISHERIES REPUBLIC OF KOREA
- FACTORY MUTUAL APPROVED



Safety is the First



Safety Protection Devices

- High Velocity Vent & Vacuum Relief Valve
- Flame Arrester
- Breather Valves
- Air Release Valves
- Vacuum Breaker
- Pilot Operating Pressure/ Vacuum Valves
- Emergency Vent Cover
- Gauge Hatches
- Sampling Dipping Devices
- Flame Trap Assembly
- Floating Suction
- Roof Drain System
- Oil Skimmer
- Crankcase Explosion Relief Valve

Application Fields

- Offshore & Ocean Gas Plants
- Marine Tank Ships
- Cryogenic Gas Facilities
- Sea & Fresh Water Plant
- Tank Terminals
- Refinery Tank Farm
- Gas Plants
- Oil & Chemical Storage Tanks
- Marine Engines
- Generators
- Duct
- Marine Engine

ISO 9001 Registered

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