Top Reliability, Smart Design, Valuable Product and Better Life

HIGH VELOCITY PRESSURE / VACUUM RELIEF VALVE
(with Gas Free Cover)

APPROVED
1. IMO MSC.1 / Circ, 1324 & MESG 0.65mm
2. ISO 15364:2016
3. ISO 16852:2010

SMART-HV Series
International patented

Approved for crude oil, products and IMO type I or II chemical tankers carrying dangerous flammable cargoes of a Maximum Experimental Safe Gap (MESG) with 0.65mm and 0.9mm

PROSAVE
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.

Meet
EC Directive 2009 / 26 / EC
(5th Amendment)
IMO MSC/Circ.677 & 1009
MSC,1/Circ.1324
ISO 15364: 2016
Vapor control system of USCG
ISO 16852 : 2010

**Applied International Rule Requirements**

**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 cases 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.

**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**
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; 2016**
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

**ISO 16852 : 2010**
Flame arresters-Performance requirements, test methods and limits for use
NEW IMO Regulation for Product & Chemical carriers, MSC.1/Circ,1324

1. The Maritime Safety Committee approved the following amendments to MSC/Circ.677:

1. Paragraph 1.2.3 is replaced with the following:

1.2.3 These Standards are intended for devices protecting cargo tanks containing crude oil, petroleum products and flammable chemicals. In the case of the carriage of chemicals, the test media referred to in section 3 can be used for products having an MESG of 0.9 mm and greater. However, devices for chemical tankers certified for the carriage of products with an MESG* less than 0.9 mm should be tested with the following media based on the apparatus group assigned as per column “i” of the IBC Code, chapter 17:

1. Apparatus Group II B - ethylene (MESG = 0.65 mm); and
2. Apparatus Group II C - hydrogen (MESG = 0.28 mm).

Where no apparatus group is assigned in column “i”, the device should be tested in accordance with the requirements for Apparatus Group II B.

2. Subparagraph .4 of paragraph 4.1 is replaced with the following:

“4 approved location for installation, including maximum or minimum length of pipe, if any, between the device and the atmosphere and the apparatus group assigned to the tested device.”.

NEW MED(CE) Regulations for Crude, Product & Chemical carriers


<table>
<thead>
<tr>
<th>No</th>
<th>Item designation</th>
<th>Regulation SOLAS 74 where “type approval” is required</th>
<th>Regulations of SOLAS 74 and the relevant resolutions and circulars of the IMO, as applicable</th>
<th>Testing standards</th>
<th>Modules for conformity assessment</th>
</tr>
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Important performance requirement: The disc of high velocity vent shall not be contacted to seat or stopper, with frequency more than 0.5 Hz. as based on undamped oscillation rule.
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FEATURES and BENEFITS

1. Reliable operations reduces vapor losses
2. Suitable and compact design ensures long-term maintenance free life cycle
3. Meet new IMO & MED requirements for cargo vapor flammability
   - MESG 0.9 & 0.65 mm
4. Non-oscillating performance
5. Full lifting and high flow capacity
6. Variable application for usable installation vent pipe length and flow capacity range
7. No peak pressure over opening pressure
8. No need inside maintenance
9. Available outside inspection, cleaning and maintenance without disassembling
10. Adjustable outside opening and closing pressure without exhausting vapor gas

BASIC DRAWING

PROSAVE SMART-HV series full opening valves

1. Shipyard Name
2. Hull No.
3. Type of Valve
   - S-Type
   - L-Type
4. Connecting Flange
   - JIS 5K F.F
   - ANSI 150# R.F
5. Pressure/Vacuum Setting
   - PRESSURE :
     - 1400 mmW.G
     - 1750mmW.G
     - 2100mmW.G
   - VACUUM :
     - -350 mmW.G
     - -700mmW.G
6. Paint Specification
   - No Paint
   - Tar Epoxy 200 mic.
   - Shipyard requirement
7. Supply Q’ty / Ship
   - SEE SPEC. for CARGO TANK
   - SEE SPEC. for SLOP TANK
   - SEE SPEC. for RESIDUAL TANK
SAFETY IS THE FIRST & MOST IMPORTANT

BILL OF MATERIAL SELECTION

<table>
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<tr>
<th>NO</th>
<th>DESCRIPTION</th>
<th>SPEC.1</th>
<th>SPEC.2</th>
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<tr>
<td>1</td>
<td>DISC CAP</td>
<td>Stainless steel 316</td>
<td>Stainless steel 316</td>
<td>Stainless steel 316L</td>
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<tr>
<td>2</td>
<td>SET PRESSURE ADJUSTER</td>
<td>Capsulated Magnet</td>
<td>Capsulated Magnet</td>
<td>Capsulated Magnet</td>
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<td>3</td>
<td>PRESSURE DISC</td>
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<td>PRESSURE SEAT</td>
<td>Cast Steel</td>
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<td>5</td>
<td>GAS FREE SCREEN</td>
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<tr>
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<td>VACUUM SCREEN</td>
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<td>BODY</td>
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<td>8</td>
<td>VACUUM DISC</td>
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<td>FLAME SCREEN COVER</td>
<td>Carbon Steel</td>
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<td>FLAME SCREEN</td>
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<td>12</td>
<td>VACUUM CHECK LIFT</td>
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<td>PREESURE CHECK LIFT</td>
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**OPTIONAL FEATURES**

- Proximity switches and junction box to indicate position of pressure and vacuum disc
- Desiccator to prevent ingress of moist air during vacuum operation
- Anti-slushing devices for preventing cargo vapours pollution onto deck
- Integral gas-freeing cover
- Floats on vacuum side preventing water ingress for installation of inerted ballast tanks
- Test bench of opening pressure / vacuum and seat leak test of P/V valves
- Test tank
- Heating arrangement for ice class vessels
Company Overview
The company is a manufacturer of safety valve for tank, we strive to comply and maintain the quality manual to increase development of new technology, enhance product quality and productively while reducing costs.

Scope of Application
This manual was established based on the regulations of ISO 9001 : 2000 / ISO 14001:2004 and applies to design, development, sales, procurement, manufacturing, inspection, service department and overall organizations.

Definition of Terminology

Approved Classification
- QUALITY MANAGEMENT SYSTEM
  ISO 9001;2000 / ISO 14001:2004
- MAN Diesel & Turbo
- AMERICAN BUREAU OF SHIPPING (ABS)
- Bureau Veritas (BV)
- LLOYD’S REGISTER OF SHIPPING (LR)
- DET NORSKE VERITAS (DNV)
- GERMANISCHER LLOYD (GL)
- NIPPON KAIJI KYOKAI (NK)
- KOREA REGISTER (KR)
- CHINA CLASSIFICATION SOCIETY (CCS)
- REGISTRO ITALIANO NAVALE (RINA)
TOP RELIABILITY OF SAFETY & ENVIRONMENT IS THE FIRST & MOST IMPORTANT

Products
- Air Release Valves
- Combination Air Release and Air/Vacuum Valve
- Vacuum Breaker Valves
- Pilot Operating Pressure/Vacuum Valves
- Surge Relief Valves
- Crankcase Explosion Relief Valve
- Explosion Venting Devices
- High Velocity Pressure/Vacuum Valve
- Flame Arrester
- Flame Screen
- Gas Free Cover
- Pressure/Vacuum Relief Valve
- Hybrid Solar Distiller

Application Fields
- Offshore & Ocean Gas Plants
- Desalination Plants
- Ballast System for Ships & Offshore Plants
- Sea & Fresh Water Plants
- Marine Tank Ships
- Cryogenic gas Facilities
- Petrochemical Plants
- Tank Terminals
- Marine Engines
- Generators
- Duct

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