



中国船级社  
CHINA CLASSIFICATION SOCIETY

证书格式号/Form: T01.01-11B000076

型式认可证书  
CERTIFICATE OF TYPE APPROVAL

证书编号/Certificate No. FS12T00041

兹证明本证书所述制造厂生产的下列产品能够满足下面列明认可标准的要求。

This is to certify that the following products produced by the manufacturer stated in the certificate can meet the requirements of the approval standards listed below.

认可产品/ Product Approved

高速阀和真空阀

High velocity vent and Vacuum relief valve

高速透气阀

HIGH VELOCITY VENT VALVE

制造厂/ Manufacturer

PROSAVE CO., LTD.

PROSAVE CO.,LTD.

#1407, Daman-ri, Jillye-myeon, Gimhae-si, Gyeongsangnam-do, Korea  
#1407, Daman-ri, Jillye-myeon, Gimhae-si, Gyeongsangnam-do, Korea

认可标准/ Approval Standard

1. IMO MSC/Circ.677/Circ.1009 and ISO 15364  
IMO MSC/Circ.677/Circ.1009 and ISO 15364
2. CCS 《散装运输危险化学品船舶构造与设备规范》2009  
CCS Rules for the Construction and Equipment of Ships Carrying Dangerous Chemicals in bulk (2009)
3. ISO 15364:2007(E) 《货油舱压力/真空阀》  
ISO 15364:2007(E) ~"Pressure / Vacuum Valves for Cargo Tanks~"
4. EN 12874:2001
5. Chapter II-2, Regulation 4.5 of SOLAS Consolidated Edition 2009
6. Chapter 5, Part 3 of CCS's Rules for the Classification of Sea-going Steel Ships(2012)
7. MSC.1/Circ.1324

证书有效期至/ This Certificate is valid until

2017年6月3日 / Jun. 3, 2017

发证机构 中国船级社釜山分社  
Issued by CCS Busan Office



2013年6月4日  
Jun. 4, 2013

本证书按照中国船级社《钢质海船入级规范》及有关程序规定签发。关于证书的有关规定见本证书背面所附说明。当本证书包括多个附件时，所有附件构成一个整体，必须同时使用。每一页证书均须由本社盖章方为有效。证书复印件无效。任何单位和个人均不应向本社索取证书的复制品。有关各方对所持证书的真实性有疑问时，可以向本社检验机构咨询。  
This Certificate is issued pursuant to the Rules for Classification of Sea-going Steel Ships and related procedures of the Society. Refer to the back of the certificate for detailed requirements of the certificate. When the certificate consists of more than one page, all pages of the certificate are taken as a whole and are used simultaneously. No certificate page is valid without bearing the stamp of the Society and no copied form of the certificate is regarded as valid. Any part of the certificate is not to be extracted or abridged by any unit or individual in any form. This approval certificate does not constitute the inspection of the Society about the quality of the unit/batch product. Related parties who are doubted about the authenticity of the certificate may inquire of the Society or its offices.



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本地检验机构/CCS Local Office: 中国船级社釜山分社 CCS Busan Office 电话/Tel: 0082-51-1632034 传真/Fax: 0082-51-1632037

FS09691790  
No. 13034618

**产品明细/ Product Description**

高速透气阀/HIGH VELOCITY VENT VALVE 型号/Model	: SMART-HV-3S/3L/4S/4L/5S/5L/6S/6L SMART-HV-8S/8L/10S/10L/12S/12L
公称尺寸/Nominal size	: DN80/100/125/150 DN200/250/300 mm
压力设定值/Pressure setting point	: 0.014 TO 0.021; 0.014 TO 0.0175 (PRESSURE V/V SETTING PRESSURE) -0.0035 TO -0.007; -0.0035 (VACUUM V/V SETTING PRESSURE) MPa
本体材料/Body material	: SEE OTHERS
最大试验安全间隙的最低值/ Lowest MESH 排气速度/Efflux velocity	: 0.65/11B; 0.90/11A mm : 30 m/s

**批准的图纸和设计计算书/ Approved Drawings and Design Calculations**

图纸批准号/ Drawings Approval No. : NP12A02248

**产品认可试验报告/ Approval Test Report**

试验报告编号/Test Report No.	: P13-0527-01
试验报告日期/Test Report Date	: 2013-05-27
试验单位/ Laboratory	: PROSAFE CO., LTD
试验单位地址/ Test Address	: 1407 DAMAN-RI, JILLY-MYEON, GIMHAR-SI, KOREA
试验报告编号/Test Report No.	: 2011444323-01 TO -06
试验报告日期/Test Report Date	: 2012-04-20
试验单位/ Laboratory	: -
试验单位地址/ Test Address	: KOREA INSTITUTE OF MACHINERY AND MATERIALS 104, SINSEONG-RO, YUSEONG-GU, DAEJEON, 305-343, KOREA

**产品适用范围/ Application of the Product**

1. LIQUID CARGO SHIPS CARGO SPACE BREATH
2. THE CHOSEN MATERIAL (ASSEMBLY PARTS) OF HIGH VELOCITY VENT AND VACUUM RELIEF VALVE SHOULD BE COMPATIBLE WITH LIQUID CARGO TO BE CARRIED ON BOARD A SHIP.

**认可保持条件/ Maintenance Requirements of Approval**

1. 型式认可后, 如果产品及其重要零部件的设计、所用材料或制造方法有所改变, 且影响到产品的主要特性、特征; 或产品的性能指标有所更改, 且超过认可的范围, 则有关图纸和文件应经检验机构审批。并在检验机构认为必要时, 经本社检验人员见证有关试验和进行检查, 其结果应能证实仍符合认可条件。  
After type approval, if there are changes to the design, materials used or manufacturing method of the product and important components and such changes affect major characteristics and properties of the product, or property indexes of the product are changed and exceed the scope of approval, related drawings and documents are to be examined and approved by the concerned survey office. Where deemed necessary by the survey office, the surveyor to the Society will go to witness relevant tests and conduct inspection and the results should be able to demonstrate compliance with the approval conditions.
2. 工厂的专业质量管理体系应保持有效运行, 并且与认可时一致。如果质量管理体系发生改变, 应经原体系认证机构审核并报本社批准。  
The professional quality management system of the factory shall be ensure effective operation, and shall be the same as the situation of approval. If there are any changes to the quality management system, auditing of the original certification organization for quality management system and the society's approval shall be obtained.
3. 认可证书有效期内, 如果出现可能导致本社取消认可的情况, 工厂应及时采取有效的纠正措施。  
Within the validity of the approval certificate, if cases occur that may cause the Society to withdraw the approval, the manufacturer should take corrective actions in a prompt and effective manner.
4. 在认可证书有效期内, 本社检验人员可在未经事先通知的情况下对工厂的产品制造过程进行审核, 以验证产品的生产是否符合业经本社批准的图纸和文件。工厂应予以配合。  
Within the validity of the approval certificate, the surveyor to the Society may pay unannounced audit to the manufacturing process of the product in order to confirm whether it is in compliance with the drawings and documents approved by the Society. The factory should provide an active cooperation and necessary for the surveyor.

**认可后的产品检验方式/ Method of Product Inspection after Approval**

Nº 13972312



按照规范每批抽样检验的产品/The product inspected by sampling in term of the rules:

认可后的产品检验应由本社验船师根据本社规范规定每批抽样按批准的产品检验计划进行检验, 经检验合格后由本社颁发产品证书。

After approval, product inspection should be carried out by sampling by the Surveyor of the Society in accordance with the approved product inspection scheme, and the Product Certificate will be issued by the Society upon satisfactory inspection.

**对于原材料和零部件的检验要求/ Inspection Requirements for Materials and Components**

产品如下原材料和零部件应由本社认可的制造厂生产/The following materials and components of the product should be manufactured by the factory approved by the Society:Nil

产品如下原材料和零部件应经本社检验, 持有本社产品证书/The following materials and components of the product should be inspected and certificated by the Society:Nil

产品如下原材料和零部件的制造厂清单, 经本社批准方可变更/The list of manufacturer for the following materials and components of the product should not be changed without the Society's approval:

BODY, DISC CAP/COVER, VACUUM COVER, PRESSURE/VACUUM DISC, PRESSURE/VACUUMSEAT SEAT, PRESSURE ADJUSTTER, VACUUM WEIGHT FLAME SCREENS, O-RINGS.

**责任声明/Statement of Responsibility**

本社的认可不影响、替代与本社授权或检验无关的各方对上述工厂的认可和发证, 并且不对与本社授权或检验无关的各方负责, 不承担其未经应允而承认、接受本社认可所导致的法律和经济责任。

The approval of the Society does not affect and replace any approval and certification of the manufacturer by any parties that bear no relation with this Society's authorization or survey and therefore takes no responsibility for these parties. The Society does not undertake any legal and economic liabilities arising from accepting this Society's certificate without prior permission from this Society.

**其他/Others**

HIGH VELOCITY VENT AND VACUUM RELIEF VALVE CAN'T BE FIXED ON BOARD A SHIP UNLESS THE MANUFACTURER AND CONSUMER HAVE CONFIRMED THE MATERIALS OF THESE PRODUCTS ARE COMPATIBLE WITH THE LIQUID MEDIUM TO BE CARRIED.



\*\*\*\*\*本证书正文完/ End of Text\*\*\*\*\*

注: 本证书含有附页, 共1页

Note:The certificate is attached with 1 additional page(s)

## 1. Ratings

Type	Pressure Setting (kpa)	Vacuum Setting (kpa)	Pipe Length Max. (m)	Pipe Size Min. (mm)	MESG min./ Apparatus Group
SMART-HV-3S	14-21	3,5-7	30	DN 80	0,65 / IIB
SMART-HV-3L	14-21	3,5-7	24	DN 80	0,65 / IIB
SMART-HV-4S	14-21	3,5-7	30	DN 100	0,65 / IIB
SMART-HV-4L	14-21	3,5-7	24	DN 100	0,65 / IIB
SMART-HV-5S	14-21	3,5-7	30	DN 125	0,65 / IIB
SMART-HV-5L	14-21	3,5-7	24	DN 125	0,65 / IIB
SMART-HV-6S	14-21	3,5-7	15	DN 150	0,65 / IIB
SMART-HV-6L	14-21	3,5-7	3,5	DN 150	0,65 / IIB
SMART-HV-8S	14-17,5	3,5	15	DN 200	0,90 / IIA
SMART-HV-8L	14-17,5	3,5	3,5	DN 200	0,90 / IIA
SMART-HV-10S	14-17,5	3,5	3,5	DN 250	0,90 / IIA
SMART-HV-10L	14-17,5	3,5	3,5	DN 250	0,90 / IIA
SMART-HV-12S	14-17,5	3,5	3,5	DN 300	0,90 / IIA
SMART-HV-12L	14-17,5	3,5	3,5	DN 300	0,90 / IIA

## 2. Material specification

Parts	Spec. 1	Spec. 2	Spec. 3
Body	SC480/FCD450	SCS14A	SCS16A
Disc cap/cover	SUS316	SUS316	SUS316L
Vacuum cover	SS400/FCD450	SUS316	SUS316L
Pressure/Vacuum disc	SUS316	SUS316	SUS316L
Pressure seat	SC480/SUS316	SCS14A/SUS316	SCS16A/SUS316L
Vacuum seat	SC480/SCS14A	SCS14A	SCS16A
Set pressure adjuster	SUS316/magent	SUS316/magent	SUS316L/magent
Vacuum weight	SS400	SUS316	SUS316L
Flame screens	SUS316	SUS316	SUS316L
O-rings	Viton	Viton	Viton

## 3. APPLICATION/LIMITATION

3.1 Approved as high-velocity pressure/vacuum valve with gas free cover on vent outlets to prevent the passage of flame into the cargo tanks of oil tankers, product tankers or combination carriers and in case of chemical tankers carrying flammable products with MESG of mixture of 0,65mm and greater (apparatus Group IIB) or 0,90mm and greater (apparatus Group IIA) as applicable and subject to suitability of materials with both seawater and the cargoes carried. Ice-layer cap max.5mm. Maintenance acc. to Instruction manual.

3.2 Size and installation to be in accordance with manufacturer' s instructions, especially with respect to vent pipe length and diameter, direction of valve flanges and accessibility to valve for its maintenance. The valves are to be installed in a upright mounting position. They have to be so constructed as to direct the efflux vertically upwards.

The in-service requirements described in the MSC/Circ.731 and 2.5.1 of MSC/Circ.677 are to be taken into consideration by the users in charge of vent system. The flow capacity curves are to be available to the users.

3.3 Valve setting, valve fitting and pressure loss calculations shall be submitted to the relevant authority for the concerned ship.

3.4 The manufacturer' s instruction manual shall be kept on board ships at all times.

## 4. MARKING OF PRODUCT

Each device is to be permanently marked indicating at least:

- Manufacturer' s name or logo
- Style, type, model or other manufacturer' s designation for the device
- Valve setting
- Serial number
- Additional markings acc. to IMO MSC/Circ.672 & 1324
- Society' s brand as relevant





## *Confirmation of Product Type Approval 24/JUL/2012*

Please refer to the "Service Restrictions" shown below to determine if Unit Certification is required for this product.

This is to certify that, pursuant to the Rules of the American Bureau of Shipping (ABS), the manufacturer of the below listed product held a valid Manufacturing Assessment (MA) with expiration date of 23/AUG/2016. The continued validity of the Manufacturing Assessment is dependent on completion of satisfactory audits as required by the ABS Rules.

And; a Product Design Assessment (PDA) valid until 26/JUN/2017 subject to continued compliance with the Rules or standards used in the evaluation of the product.

The above entitle the product to be called Product Type Approved.

The Product Design Assessment is valid for products intended for use on ABS classed vessels, MODUs or facilities which are in existence or under contract for construction on the date of the ABS Rules used to evaluate the Product.

ABS makes no representations regarding Type Approval of the Product for use on vessels, MODUs or facilities built after the date of the ABS Rules used for this evaluation.

Due to wide variety of specifications used in the products ABS has evaluated for Type Approval, it is part of our contract that; whether the standard is an ABS Rule or a non-ABS Rule, the Client has full responsibility for continued compliance with the standard.

### PROSAVE CO., LTD.

**Model Name(s): SMART-HV-3S, SMART-HV -3L, SMART-HV -4S, SMART-HV -4L, SMART-HV -5S, SMART-HV -5L, SMART-HV -6S, SMART-HV -6L, SMART-HV -8S, SMART-HV -8L, SMART-HV -10S, SMART-HV -10L, SMART-HV -12S, SMART-HV -12L**

**Presented to:**

PROSAVE CO., LTD.  
1407, DAMAN-RI  
JILLYE-MYEON  
GIMHAE  
Korea, Republic of

**Intended Service:**

Device to relieve over-pressure in cargo tanks of oil tanker, product tanker, combination carrier and chemical tanker and to prevent the passage of flame into the cargo tank. This product may be combined with gas free cover.

**Description:**

1. Disc cap / Disc cover / Cap nut, S/W / Pressure stem / Bolt / Bolt S/W / Lift bush / Bolt, Nut / Gas free screen / Stop ring / Eye bolt, S/W / Pressure disc / Wrench bolt / Bush / Check lift / Lift handle / Vacuum stem / Vacuum disc / Guide / Post / Flame screen : SUS316 2. Open adjuster / Vacuum weight / Vacuum cover / Close adjuster / Screen plate : SS400 3. O-Ring : Viton 4. Set pressure adjuster : SUS316/magent 5. Pressure seat : SC480/SUS316 6. Vacuum seat : SC480/SCS14A

**Ratings:**

High Velocity Pressure/Vacuum Valves; Type(Pressure setting, Max. pipe length, Min. pipe size, Pressure Min. MESH Value / Vacuum setting, Vacuum Min. MESH Value): SMART-HV-3S(1400~2100mmAq, 30m, DN80, 0.65mm / -350~-700mmAq, 0.65mm); 80A SMART-HV-3L(1400~2100mmAq, 24m, DN80, 0.65mm / -350~-700mmAq, 0.65mm); 80A SMART-HV-4S(1400~2100mmAq, 30m, DN100, 0.65mm / -350~-700mmAq, 0.65mm); 100A SMART-HV-4L(1400~2100mmAq, 24m, DN100, 0.65mm / -350~-700mmAq, 0.65mm); 100A SMART-HV-5S(1400~2100mmAq, 30m, DN125, 0.65mm / -350~-700mmAq,

0.65mm); 125A SMART-HV-5L(1400~2100mmAq, 24m, DN125, 0.65mm / -350~-700mmAq, 0.65mm); 125A SMART-HV-6S(1400~2100mmAq, 15m, DN150, 0.65mm / -350~-700mmAq, 0.65mm); 150A SMART-HV-6L(1400~2100mmAq, 3.5m, DN150, 0.65mm / -350~-700mmAq, 0.65mm); 150A SMART-HV-8S(1400~1750mmAq, 15m, DN200, 0.9mm / -350mmAq, 0.9mm); 200A SMART-HV-8L(1400~1750mmAq, 3.5m, DN200, 0.9mm / -350mmAq, 0.9mm); 200A SMART-HV-10S(1400~1750mmAq, 3.5m, DN250, 0.9mm / -350mmAq, 0.9mm); 250A SMART-HV-10L(1400~1750mmAq, 3.5m, DN250, 0.9mm / -350mmAq, 0.9mm); 250A SMART-HV-12S(1400~1750mmAq, 3.5m, DN300, 0.9mm / -350mmAq, 0.9mm); 300A SMART-HV-12L(1400~1750mmAq, 3.5m, DN300, 0.9mm / -350mmAq, 0.9mm); 300A

**Service Restrictions:** Unit Certification is not required for this product. If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, inspection standards and tolerances, must be clearly defined.

**Comments:** Compliance with IMO MSC/Circ. 677 & 1009, ISO 15364(2007) and EN 12874:2001 has been verified by the test in the competent laboratory.

**Notes / Documentation:** 1. Type test done by KIMM (Korea Institute of Machinery and Materials) : Test Report No. 2011444323~2011444323-6 2. Certificate of Type Approval (Busan Regional Maritime Affairs and Port Office) Certificate No.: 2012-041/042/043/044/045/046/047/048/049/050/051/052/053/054

**Term of Validity:** This Product Design Assessment (PDA) Certificate 12-BK891573-PDA, dated 27/Jun/2012 remains valid until 26/Jun/2017 or until the Rules or specifications used in the assessment are revised (whichever occurs first). This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product. Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA. Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

**ABS Rules:** 2012 Steel Vessels Rules 1-1-4/7.7, 5C-1-7/11.9

**National Standards:** API Standard 2000

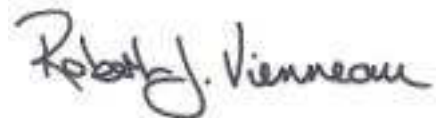
**International Standards:** IMO MSC Circ. 677 & 1009, ISO 15364(2007), EN12874;2001, SOLAS Regulation II-2/11.6

**Government Authority:**

**EUMED:**

**Others:**

Model Certificate	Model Certificate No	Issue Date	Expiry Date
PDA	12-BK891573-PDA	27/JUN/2012	26/JUN/2017



ABS Programs

ABS has used due diligence in the preparation of this certificate and it represents the information on the product in the ABS Records as of the date and time the certificate was printed. Type Approval requires Drawing Assessment, Prototype Testing and assessment of the manufacturer's quality assurance and quality control arrangements. Limited circumstances may allow only Prototype Testing to satisfy Type Approval. The approvals of Drawings and Products remain valid as long as the ABS Rule, to which they were assessed, remains valid. ABS cautions manufacturers to review and maintain compliance with all other specifications to which the product may have been assessed. Further, unless it is specifically indicated in the description of the product; Type Approval does not necessarily waive witnessed inspection or survey procedures (where otherwise required) for products to be used in a vessel, MODU or facility intended to be ABS classed or that is presently in class with ABS. Questions regarding the validity of ABS Rules or the need for supplemental testing or inspection of such products should, in all cases, be addressed to ABS.



MARINE DIVISION

Certificate number: 31468/A0 BV

File number: ACM 145/2563/01

Product code: 2238I

*This certificate is not valid when presented without the full attached schedule composed of 7 sections*

www.veristar.com

## TYPE APPROVAL CERTIFICATE

*This certificate is issued to*

**PROSAVE CO., LTD**  
Gimhae (Kyungnam) - KOREA (REPUBLIC OF)

*for the type of product*

### PRESSURE / VACUUM RELIEF VALVES

SMART-HV-Series with Gas Free Cover

**Requirements:**

- BUREAU VERITAS Rules for the Classification of Steel Ships
- BUREAU VERITAS Rules for the Classification of Offshore Units
- IMO MSC/Circ.677 and MSC/Circ.1009 as amended by MSC.1/Circ.1324
- ISO 15364:2007
- EN 12874:2001

*This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.*

**This certificate will expire on: 15 Jan 2018**

For BUREAU VERITAS,

At BV PUSAN, on 15 Jan 2013,

Keum-Ho Lee



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with BUREAU VERITAS. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of BUREAU VERITAS Marine Division available on the internet site [www.veristar.com](http://www.veristar.com). Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

## THE SCHEDULE OF APPROVAL

### 1. PRODUCT DESCRIPTION

#### SMART-HV-Series High Velocity Pressure/Vacuum Relief Valve with Gas Free Cover

##### 1.1 Description

- Design: magnet type, with check lift and lift handle
- Type: SMART-HV-xS/L (where x is size 3, 4, 5, 6, 8, 10 and 12)
- Model: HV-S (small flow capacity) and HV-L (large flow capacity)
- Nominal sizes (mm): DN 80 to DN 300
- Setting Pressure (kPa): 14-17,5-21 (pressure side) and 3,5-7 (vacuum side)
- Installation: vertically connected on the top of the pipe
- Flange connection: JIS 5K-FF and ANSI 150#RF or other standard

##### 1.2 Ratings

Type	Pressure Setting (kPa)	Vacuum Setting (kPa)	Pipe Length max. (m)	Pipe Size min. (mm)	MESG min. / Apparatus Group
HV-3S	14-21	3,5-7	30	DN 80	0,65 / IIB
HV-3L	14-21	3,5-7	24	DN 80	0,65 / IIB
HV-4S	14-21	3,5-7	30	DN 100	0,65 / IIB
HV-4L	14-21	3,5-7	24	DN 100	0,65 / IIB
HV-5S	14-21	3,5-7	30	DN 125	0,65 / IIB
HV-5L	14-21	3,5-7	24	DN 125	0,65 / IIB
HV-6S	14-21	3,5-7	15	DN 150	0,65 / IIB
HV-6L	14-21	3,5-7	3,5	DN 150	0,65 / IIB
HV-8S	14-17,5	3,5	15	DN 200	0,90 / IIA
HV-8L	14-17,5	3,5	3,5	DN 200	0,90 / IIA
HV-10S	14-17,5	3,5	3,5	DN 250	0,90 / IIA
HV-10L	14-17,5	3,5	3,5	DN 250	0,90 / IIA
HV-12S	14-17,5	3,5	3,5	DN 300	0,90 / IIA
HV-12L	14-17,5	3,5	3,5	DN 300	0,90 / IIA

##### 1.3 Material specification

Parts	Spec. 1	Spec. 2	Spec. 3
Body	SC480 / FCD450	SCS14A	SCS16A
Disc cap/cover	SUS316	SUS316	SUS316L
Vacuum cover	SS400 / FCD450	SUS316	SUS316L
Pressure/vacuum disc	SUS316	SUS316	SUS316L
Pressure seat	SC480 / SUS316	SCS14A / SUS316	SCS16A / SUS316L
Vacuum seat	SC480 / SCS14A	SCS14A	SCS16A
Set pressure adjuster	SUS316 / magent	SUS316 / magent	SUS316L / magent
Vacuum weight	SS400	SUS316	SUS316L
Flame screens	SUS316	SUS316	SUS316L
O-rings	Viton	Viton	Viton



### 2. DOCUMENTS AND DRAWINGS

#### 2.1 Assembly Drawings rev. 0 dated 04/08/2011

- N° SMART-HV-03-00 - High Velocity Vent P/V Valve - Model SMART-HV-3S/L



- N° SMART-HV-04-00 - High Velocity Vent P/V Valve - Model SMART-HV-4S/L
- N° SMART-HV-05-00 - High Velocity Vent P/V Valve - Model SMART-HV-5S/L
- N° SMART-HV-06-00 - High Velocity Vent P/V Valve - Model SMART-HV-6S/L
- N° SMART-HV-08-00 - High Velocity Vent P/V Valve - Model SMART-HV-8S/L
- N° SMART-HV-10-00 - High Velocity Vent P/V Valve - Model SMART-HV-10S/L
- N° SMART-HV-12-00 - High Velocity Vent P/V Valve - Model SMART-HV-12S/L

#### 2.2 Detailed Drawings

- N° SMART-HV-0x-zz rev. 0 dated 04/08/2011 (*where x is valve size and zz is part number*)
- Instruction Manual PRO-IOM-01 rev. 0

*No departure from the above documents shall be made without the prior consent of the Society. The manufacturer must inform the Society of any modification or changes to these documents and drawings.*

### **3. TEST REPORTS**

- 3.1 Prototype tests carried out in compliance with IMO MSC/Circ. 677 and ISO 15364:2007 at works witnessed by KIMM Laboratory, Republic of Korea. Test specimen all sizes.
- 3.2 Tests carried out: corrosion test, hydraulic pressure test, flow test, ice test, ISO undamped oscillation test, flashback test (including gas free and flame screen) and endurance burning test and leakage test.
- 3.3 Test reports dated 20/04/2012 N° 2011444323 (SMART-HV-3S & 3L), N° 2011444323-1 (SMART-HV-4S & 4L), N° 2011444323-2 (SMART-HV-5S & 5L), N° 2011444323-3 (SMART-HV-6S & 6L), N° 2011444323-4 (SMART-HV-8S & 8L), N° 2011444323-5 (SMART-HV-10S & 10L) and N° 2011444323-6 (SMART-HV-12S & 12L).

### **4. APPLICATION / LIMITATION**

- 4.1 Approved as high-velocity pressure/vacuum valve with gas free cover on vent outlets to prevent the passage of flame into the cargo tanks of oil tankers, product tankers or combination carriers and in case of chemical tankers carrying flammable products with MESH of mixture of 0,65 mm and greater (apparatus Group II B) or 0,90 mm and greater (apparatus Group II A) as applicable and subject to suitability of materials with both seawater and the cargoes carried. Ice-layer cap max. 5 mm. Maintenance acc. to Instruction manual.
- 4.2 Size and installation to be in accordance with manufacturer's instructions and Bureau Veritas Rules, especially with respect to vent pipe length and diameter, direction of valve flanges and accessibility to valve for its maintenance. The valves are to be installed in a upright mounting position. They have to be so constructed as to direct the efflux vertically upwards.  
The in-service requirements described in the MSC/Circ. 450 and MSC/Circ. 731 and 2.5.1 of MSC/Circ. 677 are to be taken into consideration by the users in charge of vent system. The flow capacity curves are to be available to the users.
- 4.3 Valve setting, valve fitting and pressure loss calculations shall be submitted to the relevant authority for the concerned ship.
- 4.4 The manufacturer's instruction manual shall be kept on board ships at all times.

### **5. PRODUCTION SURVEY REQUIREMENTS**

- 5.1 The devices are to be supplied by PROSAVE CO., LTD. in compliance with the type described in this certificate and in compliance with the requirements stated on the front page of this certificate.  
This type of product is within the category IBV of Bureau Veritas Rule Note NR320.
- 5.2 Production site: #1407, Daman-ri, Jillye-myeon, Gimhae (Gyeongnam) Republic of KOREA.
- 5.3 Each finished device is to be pneumatically tested at 70 kPa (10 psi) according to 7.3 of ISO 15364.
- 5.4 The setting of the valve is to be confirmed during the Society's Surveyor attendance at works.
- 5.5 Bureau Veritas product certificate is required.

### **6. MARKING OF PRODUCT**

Each device is to be permanently marked indicating at least:

- Manufacturer's name or logo
- Style, type, model or other manufacturer's designation for the device
- Valve setting
- Serial number
- Additional markings acc. to IMO MSC/Circ.677 & 1324
- Society's brand as relevant



**7. OTHERS**

This approval is given with the understanding that the manufacturer will accept full responsibility for informing shipbuilders, shipowners and/or their sub-contractors of the proper methods of fitting and general maintenance of the devices and of the conditions of this approval.

**\*\*\* END OF CERTIFICATE \*\*\***





# DET NORSKE VERITAS

## EC TYPE-EXAMINATION CERTIFICATE

Application of: Council Directive 96/98/EC of 20 December 1996 on Marine Equipment as amended by directive 2010/68/EU, issued as "Forskrift om Skipsutstyr" by the Norwegian Maritime Directorate. This Certificate is issued by Det Norske Veritas under the authority of the Government of the Kingdom of Norway.

CERTIFICATE NO. **MED-B-7942**

This is to certify that the  
**Devices to prevent the passage of flame into the cargo tanks in oil tankers**

with type designation(s)  
**SMART-HV 3S, 3L, 4S, 4L, 5S, 5L, 6S, 6L, 8S, 8L, 10S, 10L, 12S, 12L**

Manufacturer  
**Prosave Co.,Ltd.**  
**Kyungnam, Republic of Korea**

is found to comply with the requirements in the following Regulations/Standards:  
Annex A.1, item No. A.1/3.12 and Annex B, Module B in the Directive. SOLAS 74 as amended, Regulation II-2/4 & II-2/16

Further details of the equipment and conditions for certification are given overleaf.

Høvik, 2012-08-17  
for Det Norske Veritas AS



This Certificate is valid until  
**2017-08-17**

  
Marianne Strand Valderhaug  
Head of Department

Notified Body No.: 0575

DNV local office:  
Changwon



  
Tom Berg-Nielsen  
Surveyor



The Certificate is subject to terms and conditions overleaf. Any significant changes in design or construction of the product, or amendments to the Directive or Standards referenced above may render this Certificate invalid. The product liability rests with the manufacturer or his representative in accordance with Council Directive 96/98/EC, as amended. The Mark of Conformity may only be affixed to the product and a Declaration of Conformity may only be issued when the production/product assessment module referred to in the council directive, is fully complied with.



Certificate No.: MED-B-7942  
Item No.: A.1/3.12  
Job Id.: 344.1-003539-1

## Product description

Integrated, weight loaded high velocity- and vacuum relief valves with integrated gas freeing cover delivered as a unit.

Part	Materials
Valve body/house	SCS14A or SCS16A
Check lift handle	SUS316 or SUS316L
Pressure disc	SUS316 or SUS316L
Vacuum disc	SUS316 or SUS316L
Vacuum seat	SCS14A or SCS16A
Flame screen cover	SUS316 or SUS316L

## Application/Limitation

May be fitted on tanks containing products with Maximum Experimental Safe Gap:

Vacuum side: 0.65 mm or above, max 0.9 mm

Pressure side: 0.65 mm or above, max. 0.9 mm

Maximum standpipe length and set pressure:

Type	Max eqv. Pipe length	Min pipe diameter	Set Pressure	
			Pressure side	Vacuum side
HV-3S	30 meter	DN80	14kPa – 21kPa	3.5kPa – 7.0kPa
HV-3L	24 meter	DN80	14kPa – 21kPa	3.5kPa – 7.0kPa
HV-4S	30 meter	DN100	14kPa – 21kPa	3.5kPa – 7.0kPa
HV-4L	24 meter	DN100	14kPa – 21kPa	3.5kPa – 7.0kPa
HV-5S	30 meter	DN125	14kPa – 21kPa	3.5kPa – 7.0kPa
HV-5L	24 meter	DN125	14kPa – 21kPa	3.5kPa – 7.0kPa
HV-6S	15 meter	DN150	14kPa – 21kPa	3.5kPa – 7.0kPa
HV-6L	3.5 meter	DN150	14kPa – 21kPa	3.5kPa – 7.0kPa
HV-8S	15 meter	DN200	14kPa – 17.5kPa	3.5kPa
HV-8L	3.5 meter	DN200	14kPa – 17.5kPa	3.5kPa
HV-10S	3.5 meter	DN250	14kPa – 17.5kPa	3.5kPa
HV-10L	3.5 meter	DN250	14kPa – 17.5kPa	3.5kPa
HV-12S	3.5 meter	DN300	14kPa – 17.5kPa	3.5kPa
HV-12L	3.5 meter	DN300	14kPa – 17.5kPa	3.5kPa

### Notes:

The length of the standpipe between cargo tank and valve is restricted with regard to hammering. The maximum allowable dynamic pressure drop in the standpipe between the cargo tank and the valve is not to exceed the equivalent (steel) pipe length as indicated. This is applicable to the high velocity valve only.

Maximum loading rate to be established according to the latest revision of IMO MSC/Circ. 731

Sizing and location to be in accordance with the latest revision of IMO MSC/Circ. 731

Installation on board is to comply with the Ship Rules Pt. 5, Ch. 3, Sec. 5B

Each finished device is to be pneumatically leakage tested to 700 hPa, ref. ISO15364 Pt. 7.3.

A copy of the instruction manual shall be kept on board. It is to include:

- Copy of the laboratory report
- Flow test data incl. flow rates under both positive and negative pressures, operating pressures, operating sensitivity, flow resistance and velocity.

*TOB*



Certificate No.: MED-B-7942  
Item No.: A.1/3.12  
Job Id.: 344.1-003539-1

### Type Examination documentation

The approval is based on the following documentation:

- A 403 pages pdf file filed under journal no 2 in the NPS job

### Tests carried out

Corrosion test, Hydraulic test, Freezing test, Flow condition test, Hammering and undamped oscillation test, Flashback and endurance burning test and Leakage test

### Marking of product

For traceability to this type examination certificate each device is to be marked with:

- Manufacturers name or trade mark
- Type designation
- Valve setting
- Additional marking according to IMO MSC/Circ. 677 Section 4.1
- MED mark of conformity

### Mark of Conformity

The manufacturer is allowed to affix the Mark of Conformity according to Article 11 in the Council Directive 96/98/EC on Marine Equipment and shall issue a Declaration of Conformity, only when the module F of Annex B in the same directive is fully complied with.

Module F: Compliance of the products to type as described in this EC Type-Examination Certificate must be verified by the Notified Body who also shall issue a Certificate of Conformity.

END OF CERTIFICATE

JABU



## TYPE APPROVAL CERTIFICATE

**Certificate No.** : CWN27524-VS001 **Initial Approval** : 29th June, 2012.  
**Product** : High Velocity Pressure/Vacuum Relief Valves with Gas Free Cover  
**Manufacturer** : PROSAVE Co.,Ltd.  
1407 Daman-ri, Jillye-myeon, Gimhae-si, Geongnam, Korea

**Product Description** : Type : SMART-HV-3S, SMART-HV-3L, SMART-HV-4S, SMART-HV-4L,  
SMART-HV-5S, SMART-HV-5L, SMART-HV-6S, SMART-HV-6L,  
SMART-HV-8S, SMART-HV-8L, SMART-HV-10S, SMART-HV-10L,  
SMART-HV-12S, SMART-HV-12L

" See Appendix 1 "

**Approval Condition** : " See Appendix 1 "

**THIS IS TO CERTIFY** that the above-mentioned product has been approved in accordance with the relevant requirement of this Society's Rules and / or of the recognized standards as follows and entered in the "List of Approved Manufacturers and Type Approved Equipment".

Pt. 7, Ch. 6, Sec. 8 of the Rules for Classification, Steel Ships and IMO MSC/Circ. 677/1009, MSC.1/Circ. 1324/1325 & ISO 15364(2007), EN12874(2001), API2000.

This Certificate is valid until 28th June, 2017.

Reissued at Busan, Korea on 24th December, 2012.



*General Manager of  
Materials and Equipment Team*

**Note** : 1. The approval will be automatically suspended and the Certificate become invalid from the expiry date of the Certificate in the event that the extension has not been granted or the renewal of the Certificate is not underway.  
2. The manufacturer should notify this Society of any modification or changes that may affect the validity of this Certificate.

## Appendix 1

# Product Description and/or Approval Condition

Certificate No : CWN27524-VS001

Date of Issue : 24th December, 2012.

### 1. Product Descriptions :

Model	Nominal Dia.	Max. Pipe Length	Pressure Setting [kPa]	Vacuum Setting [kPa]	Apparatus Group (MESG [mm])
SMART-HV-3S/L	ND 80	30/24	14 to 21	-3.5 to -7	IIB (0.65)
SMART-HV-4S/L	ND 100	30/24	14 to 21	-3.5 to -7	IIB (0.65)
SMART-HV-5S/L	ND 125	30/24	14 to 21	-3.5 to -7	IIB (0.65)
SMART-HV-6S/L	ND 150	15/3.5	14 to 21	-3.5 to -7	IIB (0.65)
SMART-HV-8S/L	ND 200	15/3.5	14 to 21	-3.5 to -7	IIA (0.90)
SMART-HV-10S/L	ND 250	3.5	14 to 17.5	-3.5 to -7	IIA (0.90)
SMART-HV-12S/L	ND 300	3.5	14 to 17.5	-3.5 to -7	IIA (0.90)

### 2. Approval Drawings :

Model	Approval Drawing No.
SMART-HV-3S/L	SMART-HV-03-00, 01, 02, 04, 06, 09, 13, 14, 15, 16, 18, 19, 20, SMART-HV-03-22, 25, 26, 27, 28, 31, 32, 33, 35, 37, 38, 39
SMART-HV-4S/L	SMART-HV-04-00, 01, 02, 04, 06, 09, 13, 14, 15, 16, 18, 19, 20, SMART-HV-04-22, 25, 26, 27, 28, 31, 32, 33, 35, 37, 38, 39
SMART-HV-5S/L	SMART-HV-05-00, 01, 02, 04, 06, 09, 13, 14, 15, 16, 18, 19, 20, SMART-HV-05-22, 25, 26, 27, 28, 31, 32, 33, 35, 37, 38, 39
SMART-HV-6S/L	SMART-HV-06-00, 01, 02, 04, 06, 09, 13, 14, 15, 16, 18, 19, 20, 21, SMART-HV-06-22, 25, 26, 27, 28, 31, 32, 33, 35, 37, 38, 39
SMART-HV-8S/L	SMART-HV-08-00, 01, 02, 06, 08, 09, 13, 14, 15, 16, 18, 19, 20, 21, SMART-HV-08-22, 23, 26, 27, 28, 29, 31, 32, 33, 35, 37, 38, 40
SMART-HV-10S/L	SMART-HV-10-00, 01, 02, 06, 08, 09, 13, 14, 15, 16, 18, 19, 20, 21, SMART-HV-10-22, 23, 26, 27, 28, 29, 31, 32, 33, 35, 37, 38, 40
SMART-HV-12S/L	SMART-HV-12-00, 01, 02, 06, 08, 09, 13, 14, 15, 16, 18, 19, 20, 21, SMART-HV-12-22, 23, 26, 27, 28, 29, 31, 32, 33, 35, 37, 38, 40, 41

### 3. Approval Conditions :

- 1) This approval is granted on the basis of the test report No. 2011444323~2011444323-6 issued on 23th April 2011 by Korea Institute of Machinery and Materials (KIMM).
- 2) Followings are to be considered prior to installation on the intended ships.
  - Design loading and unloading rate.
  - Gas evolution during loading (multiply the max. loading rate by at least 1.25).
  - Density of the cargo vapour mixture.
  - Pressure loss in vent piping, across valves and fittings.
  - Pressure/vacuum settings of relief devices.
- 3) To be used on cargo tanks of chemical tanker, subjected to suitability of materials with the cargos transported, in compliance with IBC Code.
- 4) The product is to be marked with manufacturer's name and type designation on a suitable position.
- 5) Each device is to be permanently marked, or have a permanently fixed tag made of stainless steel or other corrosion-resistant material to indicate the assigned apparatus group, in addition to the existing marking requirements.
- 6) Individual Product Certification is required.

< The End >

## Type Approval Certificate

*This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the LR Type Approval System.*

This certificate is issued to:

PRODUCER	PROSAVE Co., Ltd.
PLACE OF PRODUCTION	#1407, Daman-ri, Jillye-myeon, Gimhae-si, Gyeongnam, 621-881, Korea
DESCRIPTION	High Velocity Pressure/Vacuum Relief Valve with Gas Free Cover
TYPE	SMART-HV-3S/3L/4S/4L/5S/5L/6S/6L/8S/8L/10S/10L/12S/12L
APPLICATION	SMART-HV-3S/3L/4S/4L/5S/5L/6S/6L/8S/8L Device to prevent the passage of flame into cargo tanks and to relieve over-pressure or vacuum exceeding the maximum allowable working pressure of the cargo tanks carrying crude oil, products and chemicals with a minimum MESH of 0.65 mm SMART-HV-8S/8L/10S/10L/12S/12L Device to prevent the passage of flame into cargo tanks and to relieve over-pressure or vacuum exceeding the maximum allowable working pressure of the cargo tanks carrying crude oil, products and chemicals with a minimum MESH of 0.9 mm
DESIGN CODE	IMO/MSC/Circular 677, 30 December 1994
STANDARD	IMO/MSC/Circular 1009, 8 June 2001 IMO/MSC/Circular 1324, 10 June 2009 ISO 15364:2007 'Ships and marine technology - Pressure/vacuum valves for cargo tanks' EN 12874:2001 'Flame arresters - Performance requirements, test methods and limits for use' Chapter II-2, Regulation 4.5.3.3 of SOLAS Consolidated Edition 2009
Certificate No.	12/10056
Issue Date	11 September 2012
Expiry Date	10 September 2017
Sheet	1 of 2



Y. Sawada  
Yokohama Design Support Office  
Lloyd's Register Group Limited

*Lloyd's Register Group Limited, registered office:  
71 Fenchurch Street, London EC3M 4BS*



Lloyd's Register Rules and Regulations for the Classification of Ships,  
Part 5, Chapter 15, July 2012

**RATINGS**

**SMART-HV-3S/3L/4S/4L/5S/5L/6S/6L/8S/8L**

Nominal diameters (mm)	: 80/100/125/150
Opening setting (mmAq)	: 1,400 ~ 2,100 (pressure) -350 ~ -700 (vacuum)
MESG (mm)	: 0.65

**SMART-HV-8S/8L/10S/10L/12S/12L**

Nominal diameters (mm)	: 200/250/300
Opening setting (mmAq)	: 1,400 ~ 1,750 (pressure) -350 (vacuum)
MESG (mm)	: 0.9

**OTHER CONDITIONS**

- 1) Where the valve is intended to be installed on a ship classed or intended to be classed with Lloyd's Register (LR), its position is to be indicated on the cargo tank venting system arrangement plan which is submitted for approval.
- 2) Sizing of the valves is to be in accordance with IMO/MSC/Circular 731 and Section 2.5.1 of IMO/MSC/Circular 677.
- 3) The location of the device is to be in accordance with Chapter II-2, Regulation 4.5 of SOLAS Consolidated Edition 2009.
- 4) The installation and maintenance are to be in accordance with the manufacturer's instructions.
- 5) A copy of the instruction manual, as per IMO/MSC/Circular 677 is to be kept onboard the vessel.

*"This Certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register Group Limited of any modification or changes to the equipment in order to obtain a valid certificate."*

*The Design Appraisal Document No. 12/10056 and its supplementary Type Approval Terms and Conditions form part of this Certificate.*

<b>Certificate No.</b>	12/10056
<b>Issue Date</b>	11 September 2012
<b>Expiry Date</b>	10 September 2017
<b>Sheet</b>	2 of 2

  
 Y. Sawada  
 Yokohama Design Support Office  
 Lloyd's Register Group Limited

*Lloyd's Register Group Limited, registered office:  
71 Fenchurch Street, London EC3M 4BS*

\*Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as 'Lloyd's Register'. Lloyd's Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.\*



# NIPPON KAIJI KYOKAI

## Certificate

Certificate No.  
12EQ1037CD(N)

OF


APPROVAL

Item	: High velocity vent/vacuum relief valve with gas free cover
Product name	: SMART-HV-3S, -3L, -4S, -4L, -5S, -5L, -6S, -6L, -8S, -8L, -10S, -10L, -12S, -12L
Manufacturer	: PROSAVE CO., LTD. #1407, Daman-ri, Jillye-myeon, Gimhae-si, Gyeongsangnam-do, Korea
Testing standard	: IMO MSC/Circ. 677, 1009, IMO MSC.1/Circ. 1324, ISO 15364(2007) and EN 12874 : 2001
Documentation	: See Annex.
Descriptions	: See Annex.
Apparatus Group	: See Annex.
Condition of approval	: See Annex.

THIS IS TO CERTIFY that the above type of products has been approved by Nippon Kaiji Kyokai with type approval No. 12CD13T as complying with the relevant requirements of the Society's *Rules for the Survey and Construction of Steel Ships* and those of the *International Convention for the Safety of Life at Sea, 1974*, as amended.

This certificate is valid until 9 September 2017.  
Issued at Tokyo on 10 September 2012.

NIPPON KAIJI KYOKAI

  
Y. Usuki  
General Manager  
Material and Equipment Department



Initial approval date : 10 September 2012

1. Documentation

Drawing/Document No.	Drawing/Document Name
SMART-HV-03-00	HIGH VELOCITY P/V VALVE ( SMART-HV-3S/L SIZE ND80)
SMART-HV-04-00	HIGH VELOCITY P/V VALVE ( SMART-HV-4S/L SIZE ND100)
SMART-HV-05-00	HIGH VELOCITY P/V VALVE ( SMART-HV-5S/L SIZE ND125)
SMART-HV-06-00	HIGH VELOCITY P/V VALVE ( SMART-HV-6S/L SIZE ND150)
SMART-HV-08-00	HIGH VELOCITY P/V VALVE ( SMART-HV-8S/L SIZE ND200)
SMART-HV-10-00	HIGH VELOCITY P/V VALVE ( SMART-HV-10S/L SIZE ND250)
SMART-HV-12-00	HIGH VELOCITY P/V VALVE ( SMART-HV-12S/L SIZE ND300)
PRO-IOM-01	Insulation Manual for HIGH VELOCITY PRESSURE & VACUUM VALVE
2011444323	TEST REPORT on High Velocity Pressure/Vacuum Valve With Gas Free Cover (TYPE : SMART-HV-3S, SMART-HV-3L) for PROSAVE CO., LTD.
2011444323-1	TEST REPORT on High Velocity Pressure/Vacuum Valve With Gas Free Cover (TYPE : SMART-HV-4S, SMART-HV-4L) for PROSAVE CO., LTD.
2011444323-2	TEST REPORT on High Velocity Pressure/Vacuum Valve With Gas Free Cover (TYPE : SMART-HV-5S, SMART-HV-5L) for PROSAVE CO., LTD.
2011444323-3	TEST REPORT on High Velocity Pressure/Vacuum Valve With Gas Free Cover (TYPE : SMART-HV-6S, SMART-HV-6L) for PROSAVE CO., LTD.
2011444323-4	TEST REPORT on High Velocity Pressure/Vacuum Valve With Gas Free Cover (TYPE : SMART-HV-8S, SMART-HV-8L) for PROSAVE CO., LTD.
2011444323-5	TEST REPORT on High Velocity Pressure/Vacuum Valve With Gas Free Cover (TYPE : SMART-HV-10S, SMART-HV-10L) for PROSAVE CO., LTD.
2011444323-6	TEST REPORT on High Velocity Pressure/Vacuum Valve With Gas Free Cover (TYPE : SMART-HV-12S, SMART-HV-12L) for PROSAVE CO., LTD.

2. Descriptions and Apparatus Group

Product name*1	Nominal Diameter	Max. Pipe length (m)	Pressure valves Setting Pressure (MPa)	Vacuum valves Setting Pressure (MPa)	Apparatus Group (MESG [mm])		
SMART-HV-3S	DN80	30	0.014 to 0.021	-0.0035 to -0.007	IIB (0.65)		
SMART-HV-3L		24					
SMART-HV-4S	DN100	30					
SMART-HV-4L		24					
SMART-HV-5S*2	DN125	30					
SMART-HV-5L*2		24					
SMART-HV-6S*2	DN150	15					
SMART-HV-6L*2		3.5					
SMART-HV-8S*2	DN200	15			0.014 to 0.0175	-0.0035	IIA (0.90)
SMART-HV-8L*2		3.5					
SMART-HV-10S*2	DN250	3.5					
SMART-HV-10L*2		3.5					
SMART-HV-12S*2	DN300	3.5					
SMART-HV-12L*2		3.5					

\*1. The product indicates pressure valve, vacuum valve and gas free cover.

\*2. The devices to be fitted for the vessels with an inert gas systems only.



3. Condition of approval

The following production tests should be carried out for each product in the presence of the surveyor of the Society at manufacturing plant prior to shipment. [ Part 6, Chap. 7, 7.6.1 of NK *Guidance for The Approval and Type Approval of Materials and Equipment for Marine Use* ]

- (1) PV valves (Vacuum valves)
  - (a) Confirmation of the pressures at which the valve opens and closes
  - (b) Hydraulic test (to be carried out before carrying out the test of (a))
  - (c) Finished inspection
- (2) Flame screens (Flame screen for vacuum valves, Gas free cover)
  - (a) Finished inspection
- (3) High velocity devices (Pressure valves)
  - (a) Confirmation of the pressures at which the valve opens and closes
  - (b) Hydraulic test (to be carried out before carrying out the test of (a))
  - (c) Finished inspection

- End of Certificate -



**TYPE APPROVAL CERTIFICATE**  
No. MAC184312PU

**This is to certify** that the product identified below is in compliance with the regulations herewith specified.

<i>Description</i>	<b>DEVICES TO PREVENT THE PASSAGE OF FLAME INTO CARGO TANKS OF TANKERS</b>
<i>Type</i>	<b>SMART-HV Series</b>
<i>Applicant</i>	<b>3S-3L-4S-4L-5S-5L-6S-6L-8S-8L-10S-10L-12S-12L PROSAVE CO., LTD. 1407 DAMAN-RI, JILLYE-MYEON 621-881 GIMHAE-SI, GYEONGNAM REPUBLIC OF KOREA</b>
<i>Manufacturer</i>	<b>PROSAVE CO., LTD.</b>
<i>Place of manufacture</i>	<b>1407 DAMAN-RI, JILLYE-MYEON 621-881 GIMHAE-SI, GYEONGNAM REPUBLIC OF KOREA</b>
<i>Reference standards</i>	<b>IMO MSC / CIRC. 677/1009/1324/1325 AND ISO 15364; 2007 AND EN12874 (2001) AND API2000 (AS APPLICABLE)</b>
<i>Reference documents</i>	<b>RINA TYPE APPROVAL SYSTEM</b>

*Issued in* **PUSAN** on **January 18, 2013**. *This Certificate is valid until* **January 17, 2018**



**RINA**  
**Dominic Suk**

This certificate consists of this page and 1 enclosure

**TYPE APPROVAL CERTIFICATE**

No. MAC184312PU

Enclosure - Page 1 of 2

SMART-HV Series

**- Reference documents**

1. Instruction Manual No. PRO-IOM-01

2. Drawing No. :

SMART-HV-03-00 (ND80), SMART-HV-04-00 (ND100), SMART-HV-05-00 (ND125),  
SMART-HV-06-00 (ND150), SMART-HV-08-00 (ND200), SMART-HV-10-00 (ND250),  
SMART-HV-12-00 (ND300)

3. Test report no. :

SMART-HV-3 : 2011444323, SMART-HV-4 : 2011444323-1,  
SMART-HV-5 : 2011444323-2, SMART-HV-6 : 2011444323-3,  
SMART-HV-8 : 2011444323-4, SMART-HV-10 : 2011444323-5  
SMART-HV-12 : 2011444323-6

- Tests carried out by KIMM on 01/11/2011 ~ 08/02/2012.

4. The above drawings and test reports : RINA App. No. PUMC-5533 on 17/01/2012.

**- Application / Limitation**

Type designation	Min. pipe size	Max. pipe length (m)	Min. MESH value (mm)	Setting pressure (kPa)	
				Pressure	Vacuum
SMART-HV-3S	ND 80	30	0.65	14 ~ 21	-3.5 ~ -7.0
SMART-HV-3L	ND 80	24	0.65	14 ~ 21	-3.5 ~ -7.0
SMART-HV-4S	ND 100	30	0.65	14 ~ 21	-3.5 ~ -7.0
SMART-HV-4L	ND 100	24	0.65	14 ~ 21	-3.5 ~ -7.0
SMART-HV-5S	ND 125	30	0.65	14 ~ 21	-3.5 ~ -7.0
SMART-HV-5L	ND 125	24	0.65	14 ~ 21	-3.5 ~ -7.0
SMART-HV-6S	ND 150	15	0.65	14 ~ 21	-3.5 ~ -7.0
SMART-HV-6L	ND 150	3.5	0.65	14 ~ 21	-3.5 ~ -7.0
SMART-HV-8S	ND 200	15	0.9	14 ~ 17.5	-3.5
SMART-HV-8L	ND 200	3.5	0.9	14 ~ 17.5	-3.5
SMART-HV-10S	ND 250	3.5	0.9	14 ~ 17.5	-3.5
SMART-HV-10L	ND 250	3.5	0.9	14 ~ 17.5	-3.5
SMART-HV-12S	ND 300	3.5	0.9	14 ~ 17.5	-3.5
SMART-HV-12L	ND 300	3.5	0.9	14 ~ 17.5	-3.5

RINA  
Via Corsica, 12 - 16128 Genova  
Tel +39 010 53851  
Fax +39 010 5351000

**TYPE APPROVAL CERTIFICATE**  
No. **MAC184312PU**  
Enclosure - Page 2 of 2  
SMART-HV Series

**- Acceptance conditions**

1. Maximum loading rate are to be established according to the latest revision of IMO MSC / Circ. 731.
2. Sizing and location are to be in accordance with the latest revision of IMO MSC / Circ. 731.
3. Installation is to comply with Ch 7 and 8, Pt E of RINA Rules.
4. Cargo tanks connected to a combined pressure-vacuum main vent line must carry the same type of cargo.
5. A copy of the instruction Manual, including data as per IMO MSC / Circ. 677 Sec. 4.3, is to be kept on board.
6. The diameter, length and configuration of the venting system are to comply with the limitations verified during the acceptance tests.

**- Product description**

Materials as per a.m. reference drawings.

**- Marking of products**

Each device is to be permanently marked according to IMO MSC / Circ. 677 sec. 4.1.



PUSAN January 18, 2013



СВИДЕТЕЛЬСТВО О ТИПОВОМ ОДОБРЕНИИ  
TYPE APPROVAL CERTIFICATE

Изготовитель **PROSAVE CO., LTD.**  
Manufacturer

Адрес **1407, Daman-ri, Jillye-myeon, Gimhae-si, Gyeongnam, 621-881, Korea**  
Address

Изделие\*  
Product\*

**Высокоскоростные дыхательные клапаны (модель SMART-HV)**  
**High velocity pressure/vacuum relief valves (SMART-HV model)**

Код номенклатуры **08030500МК**  
Code of nomenclature

На основании освидетельствования и проведенных испытаний удостоверяется, что выше-упомянутое(ые) изделие(я) удовлетворяет(ют) требованиям Российского морского регистра судоходства.  
This is to certify that on the basis of the survey and tests carried out the above mentioned item(s) complies(ly) with the requirements of Russian Maritime Register of Shipping.

*Главы 4, 9, 21, части VIII Правил классификации и постройки морских судов, изд. 2012; главы 8, части IV Правил технического наблюдения за постройкой судов и изготовлением материалов и изделий для судов, изд. 2012 и IMO MSC/Circ.677, IMO MSC/Circ.1009, IMO MSC/Circ.1324, ISO 15364:2007 (Суда и морские технологии. Нагнетательные/вакуумные клапаны для нефтеналивных судов), EN 12874:2001 (Гасители пламени. Требования к рабочим характеристикам, методы испытания и ограничения применения).*

*Chapters 4, 9, 21, Part VIII of Rules for the classification and construction of sea-going ships, ver. 2012 and Chapter 8, Part IV of Rules for technical supervision during construction of ships and manufacture of materials and products for ships, ver. 2012 and IMO MSC/Circ.677, IMO MSC/Circ.1009, IMO MSC/Circ.1324, ISO 15364:2007 (Ships and marine technology. Pressure/vacuum valves for cargo tanks), EN 12874:2001 (Flame arresters - Performance requirements, test methods and limits for use).*

Настоящее Свидетельство о типовом одобрении действительно до **20.04.2017**  
This Type Approval Certificate is valid until

Настоящее Свидетельство о типовом одобрении теряет силу в случаях, установленных в Правилах технического наблюдения за постройкой судов и изготовлением материалов и изделий для судов.

This Type Approval Certificate becomes invalid in cases stipulated in Rules for the Technical Supervision during Construction of Ships and Manufacture of Shipboard Materials and Products.

Дата выдачи **28.01.2013**  
Date of issue

№ **13.00006.294**

Российский морской регистр судоходства  
Russian Maritime Register of Shipping

М.П.  
E.S.

(подпись)  
signature

**Пилупец В.П. / V. Pilipets**

( фамилия, инициалы )  
name

\*Дополнительную информацию смотри на обороте.  
Additional information see overleaf.



Технические данные  
Technical data

Высокоскоростные дыхательные клапаны (модель SMART-HV):  
High velocity pressure/vacuum relief valves (SMART-HV model):

Тип Type	Ном. диаметр Nom. Diameter (мм / mm)	Макс. длина трубы Max. Pipe Length (м / m)	Установочное давление Setting Pressure (МПа / MPa)	Установочный вакуум Setting Vacuum (МПа / MPa)	БЭМЗ * MTSG (мм / mm)
SMART-HV-3S	80	30	0.014 ~ 0.021	-0.0035 ~ -0.007	0.65
SMART-HV-3L	80	24	0.014 ~ 0.021	-0.0035 ~ -0.007	0.65
SMART-HV-4S	100	30	0.014 ~ 0.021	-0.0035 ~ -0.007	0.65
SMART-HV-4L	100	24	0.014 ~ 0.021	-0.0035 ~ -0.007	0.65
SMART-HV-5S	125	30	0.014 ~ 0.021	-0.0035 ~ -0.007	0.65
SMART-HV-5L	125	24	0.014 ~ 0.021	-0.0035 ~ -0.007	0.65
SMART-HV-6S	150	15	0.014 ~ 0.021	-0.0035 ~ -0.007	0.65
SMART-HV-6L	150	3.5	0.014 ~ 0.021	-0.0035 ~ -0.007	0.65
SMART-HV-8S	200	15	0.014 ~ 0.0175	-0.0035	0.90
SMART-HV-8L	200	3.5	0.014 ~ 0.0175	-0.0035	0.90
SMART-HV-10S	250	3.5	0.014 ~ 0.0175	-0.0035	0.90
SMART-HV-10L	250	3.5	0.014 ~ 0.0175	-0.0035	0.90
SMART-HV-12S	300	3.5	0.014 ~ 0.0175	-0.0035	0.90
SMART-HV-12L	300	3.5	0.014 ~ 0.0175	-0.0035	0.90

\* БЭМЗ (Безопасный экспериментальный максимальный зазор)  
MESG (Maximum experimental safe gap)

Техническая документация и дата ее одобрения Российским морским регистром судоходства  
Technical documentation and the date of its approval by Russian Maritime Register of Shipping

Техническая документация одобрена письмом РС No. 294-351-3.3-002095 от 27.11.2012.  
Technical documentation was approved by the RS letter No. 294-351-3.3-002095 dated 27.11.2012.

Образец изделия испытан под техническим наблюдением Российского морского регистра судоходства.  
Product's specimen has been tested under the technical supervision of Russian Maritime Register of Shipping.

Акт № 13.01006.294 от 28.01.2013  
Report No. \_\_\_\_\_ of \_\_\_\_\_

Область применения и ограничения  
Application and limitations

Газоотводные системы нефтеналивных и комбинированных судов и химовозов.  
Venting systems for oil tankers combination carriers and chemical tankers.

Вид документа, выдаваемого на изделие  
Type of document issued for product

Изделие должно поставляться со Свидетельством Российского морского регистра судоходства по форме 6.5.30 или 6.5.31.  
The product shall be delivered with Russian Maritime Register of Shipping Certificate in accordance with form 6.5.30 or 6.5.31.