

TYPE APPROVAL CERTIFICATE

This is to certify:**That the High Velocity Pressure Relief Valve**

with type designation(s)

PV-ECO, PV-VOC, PV-ECO-VAC, PV-VOC-VAC

Issued to

**Pres-Vac Engineering A/S
Allerød, Hovedstaden, Denmark**

is found to comply with

DNV GL rules for classification – Ships Pt.5 Ch.5 Oil tankers**DNV GL rules for classification – Ships Pt.5 Ch.6 Chemical tankers****Application :****Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV GL.**

Type:	Design:	Sizes:
PV-ECO	Min. Set Pressure: 10 kPa	PV-ECO-53, 66, 80 & 98
PV-VOC	Min. Set Pressure: 10 kPa	PV-VOC-106, 122, 150, 174, 204
PV-ECO-VAC	Vacuum set pressure: 3.5 kPa	PV-ECO-VAC-95, 116 & 150
PV-VOC-VAC	Vacuum set pressure: 3.5 to 7 kPa	PV-VOC-VAC-180, 215, 248 & 315

Issued at **Høvik** on **2018-08-24**This Certificate is valid until **2018-12-31**.for **DNV GL**DNV GL local station: **Copenhagen**Approval Engineer: **Adel Samiei**

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Marianne Spæren Marveng
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.



Product description

High Velocity Pressure Valves (PV-ECO & PV-VOC) consist of a cylindrical housing (optional: equipped with an integrated resilient seal and/or heating), a counterweight valve cone with valve spindle and a check lift to open the valve. Pressure valve house, upper valve house are made of E235 or SUS 316L. Top cone, pressure disc, seat, check lift, spindle, and weight are made of SUS 316L.
O-ring: FEP/Silicon / Gasket: PTFE

Deflagration vacuum valves (PV-ECO-VAC & PV-VOC-VAC) are used as end-of-line flame arresters equipped with a flame arrester element consisting of two wire mesh layers. Vacuum valve house, gas freeing cover, flame screen housing are made of E235 or SUS 316L. Vacuum disc, seat, check lift, rod, flame screen, mesh element are made of SUS 316L.
O-ring: FEP/Silicon / Gasket: PTFE

Products covered by this certificate are designed and tested according to:

- IMO MSC/Circ. 677 (as amended by MSC.1/Circ. 1324) Revised Standards for The Design, Testing and Locating of Devices to Prevent the Passage of Flame into Cargo Tanks in Tankers
- ISO 16852:2010 : Flame arresters - Performance requirements, test methods and limits for use
- ISO15364:2007: Standard for ships and marine technology – Pressure/vacuum valves for cargo tanks

Application/Limitation

Products covered by this certificate may be used as vents on tanks for cargo on board ships having class notation "Tanker for Oil", "Tanker for Oil Products" or "Tanker for Chemicals" carrying products having an MESG of 0.65 or greater (Apparatus group IIB).

PV-ECO & PV-VOC				PV-ECO-VAC & PV-VOC-VAC		
Designation	Maximum pipe length / Minimum pipe size	Outlet [mm]	Min. setting pressure	Designation	Nominal Setting	Inlet [mm]
PV-ECO-53	13 m / DN 50	53	10 kPa	PV-ECO-VAC-95	-3.5 kPa	95
	50 m / DN 80					
PV-ECO-66	16 m / DN 80	66	10 kPa	PV-ECO-VAC-116	-3.5 kPa	116
	50 m / DN 100					
PV-ECO-80	28 m / DN 100	80	10 kPa	-	-	-
	38 m / DN 125					
PV-ECO-98	17 m / DN 125	98	10 kPa	PV-ECO-VAC-150	-3.5 kPa	150
	32 m / DN 150					
PV-VOC-106	5 m / DN 125	106	10 kPa	PV-ECO-VAC-116	-3.5 kPa	116
PV-VOC-122	4 m / DN 150	122	10 kPa	PV-ECO-VAC-150	-3.5 kPa	150
PV-VOC-150	4 m / DN 200	150	10 kPa	PV-ECO-VAC-180	-3.5 kPa	180
PV-VOC-174	4 m / DN 250	174	10 kPa	PV-ECO-VAC-215	-3.5 to -7 kPa	215
PV-VOC-204	5 m / DN 300	204	10 kPa	PV-ECO-VAC-248	-3.5 to -7 kPa	248

The pressure valve and vacuum valve may be combined or used independently.

Installation on board is to comply with the DNV GL Ship Rules Pt.5 Ch.5 and Pt.5 Ch.6; whichever is applicable.

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

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

Each finished device to be pneumatically leakage tested according to ISO15364:2007 Pt. 8.3.

Each finished device shall be visually and dimensionally checked according to ISO15364:2007 Pt.8.2

The vacuum valve may be combined with inerted gas freeing covers

A copy of the instruction manual shall be kept on board, and is to include:

- Installation instructions
- Operating instructions
- Maintenance requirements including cleaning
- A copy of the laboratory report
- Flow test data, including flow rates under both positive and negative pressures, operating pressures, operating sensitivity, flow resistance and velocity

Vacuum Valves covered by this certificate (PV-ECO-VAC & PV-VOC-VAC) shall be installed on tankers fitted with inert gas systems.

Cargo tanks connected to the combined pressure-vacuum main vent line must carry the same type of cargo.

No product certificate is required.

Type Approval documentation

Tests carried out

Corrosion Test, Hydraulic Pressure Test, Setting and leakage test, flow measurement test, Undamped Oscillation test (For high Velocity Valves), Endurance Burning test, Ice test, Flashback test.

Marking of product

Each device shall be permanently marked indicating the following:

- manufacturer's name or trademark;
- manufacturer's designation;
- size of connections
- serial number,
- direction of flow through the device;
- set pressure; If the set-pressure is changed, the marking shall be updated accordingly.

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the approval are complied with. Reference is made to DNVGL-CP-0338.