Overview cargo vent solutions

OSV Chemical Code

Challenges and possible cargo vent solutions according to Norwegian Maritime Authority's implementation of IMO Resolution A.1122(30). Code for the transport and handling of hazardous and noxious liquid substances in bulk on offshore

IMO Res A.1122(30)

Impact on tank ventilation practices for norwegian-flagged OSV vessels

The International Maritime Organization (IMO) adopted the new OSV Chemical code, **"CODE FOR THE TRANSPORT AND HANDLING OF HAZARDOUS AND NOXIOUS LIQUID SUBSTANCES IN BULK ON OFFSHORE SUPPORT VESSELS", by resolution A.1122(30)** on 6th of December 2017, and invited governments to take action to implement the code from 1st of July 2018. The code supersedes resolution A.673(16).

Implementing the new regulation has taken some time, as the subject is complex. However the governments of Norway & UK implemented the code from 1st of January 2021, with a transitional period of one year for the industry to get all modifications, with an exception for carriage of offshore contaminated bulk liquid on existing vessel, in place by 1st of January 2022.

The new OSV Chemical code has been developed in accordance with the requirements outlined in regulation 11.2 of Annex II to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL) and in recognition of the need for standards which provide an alternative to the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code).

The Norwegian Maritime Authority (NMA) has published a circular (RSV 9-2021) addressing the impact of the amendments, the challenges and solutions for norwegian-flagged OSVs.

The UK maritime and coast guard agency (MCA) have similarly published a Marine Guidance Note (MGN649(M)) addressing the same issues.

The impact on cargo tank ventilation for OSVs

Reclassification of liquid cargoes

A number of liquid cargoes has been reclassified in the IBC code and are now considered to pose a safety hazard as well as a pollution hazard. In A.673, there was a possibility of waiving some requirements for tanks carrying ”pollution-only” products. Some of these products are not “pollution-only” anymore, ie methanol (methyl alcohol) is now classified as toxic.
A.673 limits the products to be carried to IMO Ship Type 3 products, which are non-toxic. Exeptions are made for the carriage of methanol on exisiting vessel, certified in accordance with A.673.

Transport of backloaded contaminated bulk liquids, is currently performed according to local state rules. For this, there are now two entries in the revised IBC code. These are entered as Offshore contaminated bulk liquid P (o) and Offshore contaminated bulk liquid S (o), respectively. In a tre-partite agreement initiated by Norway, there is a 3rd entry for ”offshore contaminated bulk liquids Treated” that has been processed to remove or prevent the breakout of H2S.

The hazards relating to carrying contaminated liquid mud from rigs to shore have had special attention as reports of hydrogen sulphide (H2S) emissions on deck and inside cargo rails have been of great concern.

The modifications required on different vessels are dependent both upon the age of the vessel and the choice of whether to comply with the old resolution or the new code. Hence specific modifications required are particular for each vessel.

In short, the impact is as follows

- New carriage requirements for Noxious Liquid Substances (NLS)
- For toxic cargoes – Opening settings for the PV valves 0.6 bar. (A.1122 – 4.3.7)
- Methanol now classified as toxic (please note that for vessels that are carrying methanol today and chose to stay within the A.673 resolution there will be no changes - exceptions to the 0.6 bar, with a minimum setting of 0.2 bar).
- Placement of PV valves for toxic substances - 15 meters from air inlets and openings to accommodation. (A.1122 – 4.3.2)
- Alternative solution with regards to 0.6 bar demand on toxic cargoes accepted by NMA
- Controlled ventilation of tanks carrying offshore contaminated bulk liquids;
  - Offshore contaminated bulk liquid type Treated
  - Offshore contaminated bulk liquid type S (Opening pressure 0.6 bar)
  (A.1122 - chapter 16)

Solutions for carriage of toxic cargo

Ways to comply for carriage of toxic cargoes for norwegian-flagged OSVs (existing fleet)

Norwegian Maritime Authority (NMA) has acknowledged the challenges for existing vessels in complying with certain requirements in the new OSV Chemical Code.

The structural changes needed to comply with the requirements in 4.3.7 is challenging for the industry. The main rule in 4.3.7 still stands, but NMA has created an opening with regards to an arrangement that can ensure that all toxic vapour discharge can be safely diverted away from the ship.

Due to the demands for the existing fleet to comply with the increased tank pressure requirement in the new code, Norwegian Maritime Authority (NMA), has through RSV 09-2021 acknowledged the impact and will accept alternative solutions without pointing at any specific industry standard – except that all toxic vapor discharge must be diverted safely away from the ship.

An alternative solution has been described as a cargo vent arrangement, comprising submerged discharge of vapors from the cargo tanks which has been accepted by NMA.
Later investigation has concluded that such an alternative solution may well be suited for some of the existing vessels, but for the majority of the fleet, this is still not a feasible alternative. When submerging the cargo vent pipes, the varying pressure inside the vent pipes (due to the ships draft) will still result in an unacceptable high tank pressure, and again a lot of vessels will have challenges complying with the new code.

The focal point for changing the rules is to avoid the accumulation of toxic and flammable gases on the main deck of an OSV. In particular the focus is to protect the crew from inhaling toxic fumes emitted from the cargo tanks. By increasing the pressure setting to 0.6 bar, the intention was probably to reduce the volume of hazardous gases expelled from the relief vents. However, this is not the case as the rules do not set a requirement of any closing pressure for the relief valves. It could well be that the number of venting cycles are going down, but the amount of gas expelled, is comparatively the same.

3 ways to comply

Carriage of toxic cargoes according to A.1122(30) norwegian-flagged OSVs (existing fleet)

1. Cargo venting with directional dispersion discharge

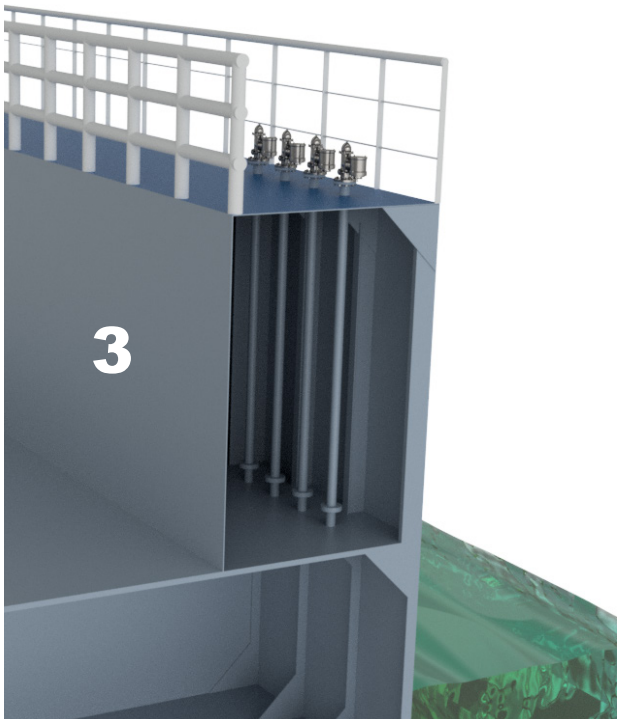
New additional alternative tank vent solution for toxic products. An alternative with higher velocity relief valves with discharge directed into a natural ventilation zone for improved gas dispersion.

2. Submerged termination of pipe-away cargo vents

Alternative tank vent solution for toxic products. Challenging due to high and varying cargo tank pressure dependent on ship draft and biofouling.
Emission restrictions due to local habour regulations.

3. Increased pressure settings on cargo tanks & PV valves:0.6 bar

Cargo tank vent solution for toxic products according to OSVCC 4.3.7. Solution according to the Code. Increased pressure to 0.6 Bar. Not suitable for most existing vessels.



Impact for compliance

For close to all vessels there will be changes required to the cargo ventilation system. The impact and complexity of the changes will be different. This will depend upon both the vessel and the system chosen. There are many considerations to be taken, while evaluating the different systems, both technical and from a cost perspective.

	Cargo pressure impact*	Complexity of conversion*
Directional dispersion discharge control of cargo vents	0,2 bar	Medium to low
Submerged termination of pipe-away cargo vents	0,35 - 0,5 bar	High to medium
Increase pressure settings on cargo tanks to 0,6 bar	0,6 bar	Very high

***anticipated average**

	Directional dispersion	Submerged termination	Increased pressure 0,6 bar
ADVANTAGES	- Complies with NMA alternative solutions - Harmful gases angeled away and ejected into natural ventilation zone - Increased velocity for discharge - Extended directional dispersion - Tank pressure from 20 kPa	- Harmful gases eliminated from deck area - Complies with NMA alternative solutions - Tank pressure below the required demand for 60 kPa - Increased cargo deck space available	- Complies with OSVCC 4.3.7 - Marginally fewer opening cycles
DISADVANTAGES	- Harmful gases not fully eliminated from deck area (compared to submerged solution) - Cargo deck space still restricted (compared to submerged solution)	- Uncertain pressure condition inside the cargo tank - Emitted Vapor completely dissolving in water, not verified - Submerged pipe subject to biofouling -Not accepted by all classification societies/maritime authorities. -Possible discharge to sea of unfortunate pollutants.	- Operating pressure to high for exisiting fleet - Uneconomical complexity of conversion - Harmful gases still not eliminated from deck area - Cargo space limitations

Backloading of contaminated bulk liquids (CBL) - from open to controlled tank ventilation

In order to control the vapors being emitted through the ventilation line from tanks containing contaminated bulk liquids, it is now a requirement that one must use controlled ventilation instead of open ventilation for safer handling of toxic and or flammable emissions.

With **open ventilation**, vapors from the tank will exit the valve and, if they are heavier than air, drop to the deck. If the vapors are lighter than air, they will rise and be accumulated inside the rails if they are enclosed. The crew can then be exposed to pockets of hazardous vapors.

With **controlled ventilation**, this hazard will be eliminated and vapors shall be emitted such that one ensures the emissions will be safely led away from the vessel.

Open ventilation no longer allowed for tanks carrying CBL type S and type "treated"

For norwegian-flagged vessels, a CBL definition has been created in order to smoothen the transition into the new code. (NMA - RSV 09-2021 – Annex II Controlled ventilation of tanks carrying offshore contaminated bulk liquids) This defines 3 different groups of CBL:

- Offshore contaminated bulk liquid type P (no danger of H2S formation in the liquid) (Continued open ventilation)

- Offshore contaminated bulk liquid "treated" (backload that has been treated with scavenger/ biocide to control formation of H2S) (Controlled ventilation)

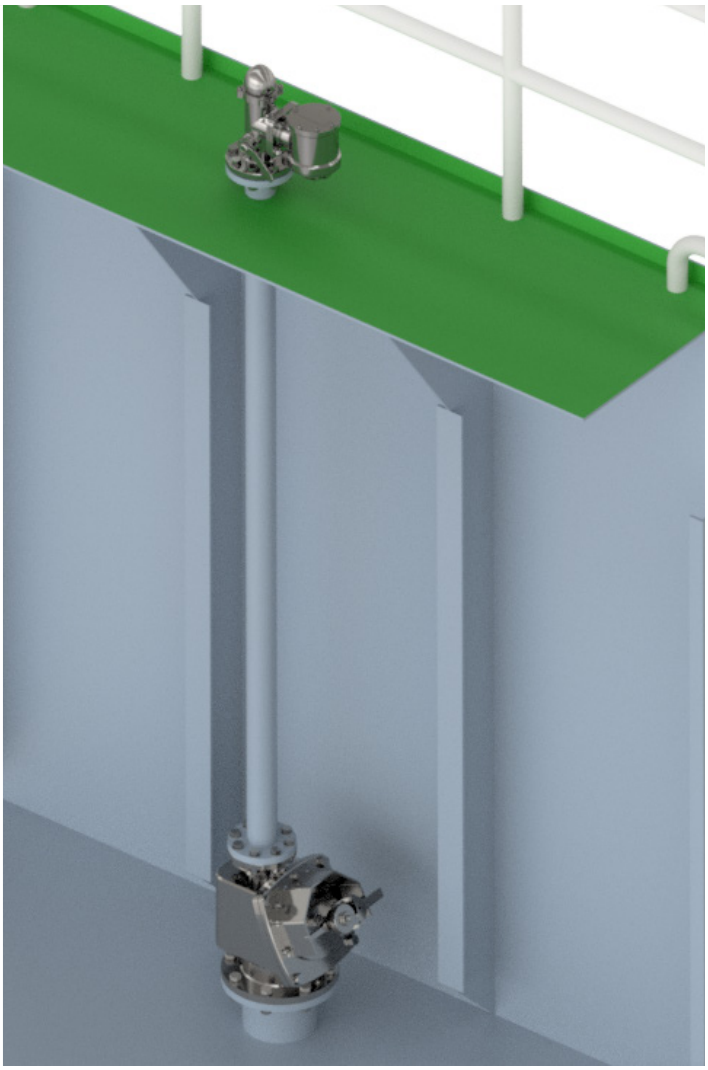
- Offshore contaminated bulk liquid type S (Controlled ventilation 0,6 Bar)

PV valve for controlled ventilation

New rules on contaminated bulk liquids - new solutions

When pumping contaminated bulk liquids (CBL) from the rig to the receiving tank onboard an OSV, consideration has to be given to the fact that there is a potential danger of CBL entering the ventilation line. If no protection device is in place to stop the uncontrolled flow of the mentioned liquid into the PV valve, this will flood the valve with a solid substance compromising the controlled ventilation leaving the valve clogged and inoperative. **This could lead to structural damage to the tank and the ship**. In any case, the PV valve needs to be dismantled and taken completely apart for cleaning and relubrication.

To avoid this situation, a liquid protection overflow device must be present, preventing the CBL from entering the termination point of the controlled ventilation.



Combined with the Ventiq line of safer and bluer high velocity cargo vent valves, the new solution offers a system keeping the ship and its crew safe from over pressurization of the mentioned tanks. The MOP automatic overflow protection system provides safe operation in controlled ventilation for tanks carrying treated CBL.

Essential tank vent control

Ventiq As is an engineering and manufacturing company specializing in equipment for ventilation of liquid cargoes on board tankers and OSV vessels.
The company has an experienced staff with notable maritime tank vent knowledge covering all parts of modern cargo tank vent operations.

Over the years the company has received recognition in a demanding international market, centering its focus on high quality and low maintenance equipment for worldwide maritime operations

Ventiq AS
6083 Gjerdsvika,
Norway
+47 70026540 (tel)
office@ventiq.com
www.ventiq.com

Represented in the US by:
W.A. Marine Sales LLC
+1-228-452-3004
info@wamarinesales.com
www.wamarinesales.com