

23. June 2005

The EU Commission has granted its full support to the decision taken by the Danish government to ban the use of South Korean relief valves model NEW-ISO-HV on all Danish ships. The valves, manufactured by TANKTECH Co., are intended to prevent overpressure in tanks and stop the passage of flames into the cargo tanks on tankers, but the Korean valves fail to comply with international requirements.

**The European Union supports removing of dangerous Korean valves from all Danish ships**

Danish Maritime and our member Pres-Vac Engineering have, with the Danish authorities, assisted the Commission in bringing the matter to light. The hearing has regrettably taken too long considering the threat to the safety of ships.

On the basis of its investigations the Commission has now decided to uphold the Danish ban that the Commission finds "adequate and proportionate". The Commission recommends that the other member states take all the precautionary measures considered necessary in respect of the TANKTECH valves until the valves are proven to comply with the requirements. Besides the ban on installing the NEW-ISO-HV valves the Commission's decision implies that valves already installed should be removed and substituted by types that comply with the requirements.

**The Commission recommends that all member states follow the Danish example**

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For further technical information, read below.

## SUMMARY OF THE TANKTECH VALVE CERTIFICATION ISSUE

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Tanktech type NEW-ISO-HV is a high velocity pressure relief valve - "a device to prevent the passage of flame" as covered by SOLAS; IMO MSC/Circ. 677 and MSC/Circ. 1009, cf. ISO 15364. The valve makes use of a throttling member in the orifice to atmosphere to adjust the opening according to the available flow volume. The international rules require that such valves ensure that the velocity of escaping combustible gas is always above a minimum requirement of 30 m/s, to avoid flash-back. The design features of the valve include maintaining tank pressure within specific limitations.

The valve type is CE-approved by Bureau Veritas (BV) and is manufactured in a number of different sizes/models. The rules require re-testing if any modifications are made.

### Tank pressure

Regardless of valve make, tank pressure consists of **a)** pressure drop over the piping; **b)** the deadweight of the valve's moving parts and **c)** the pressure drop across the valve as flow increases and gradually lifts the moving parts upwards. However, to reduce the contribution of factor c) several mechanisms can be used, such as magnets and booster plates. The Tanktech valve incorporates a booster plate, which slides freely up a spindle until it reaches a shoulder. It will contact the shoulder when the flow volume is adequate. The upwards force of the flow is then transferred and the valve opens completely. The flow volume needed is defined as the "transition point" in CD ISO 15364. For the sake of good order it should be noted that the pressure needed to lift the plate to the shoulder registers as a further increase of the tank pressure.

The closing pressure is also determined by the plate. When the flow volume is no longer adequate to maintain the plate pressing against the shoulder, the plate drops down and the valve will shut. Effectively, varying the booster plate diameter has the following consequences:

Large diameter: Reduced pressure drop across the valve and reduced closing pressure (equals reduced efflux velocity).

Small diameter: Opposite effects.

The fire safety aspect aside (low efflux velocity may cause flash-back) it makes commercial sense to apply a larger diameter booster plate as the valve size needed for a given application is reduced.

### Background for the ban:

The documentation for the CE-approval shows no pressure drop across the valve from the valve is shut till full open. In reality, however, increased flow always generates increased pressure drop.

Swedish and Danish ships reported tank pressure twice the level expected according to the documentation from Tanktech. Furthermore notified body Force Technology

(FT) tested Tanktech valves and confirmed the discrepancy of more than 100% with regard to pressure conditions.

In spite of a request of the Danish Maritime Authority (DMA), Tanktech refused to produce drawings of the approved valves. Further, the DMA addressed a number of missing issues in the documentation that prevents the testing from being re-producible. The British Maritime and Coastguard Agency (MCA) provided flow charts (BV certified) to the DMA, which deviated more than 100% from the CE-documentation.

On this basis the DMA banned the type, i.e., all models/sizes.

#### **Testing in Germany, Holland and the UK:**

Later tests were made in the 3 mentioned countries, namely at the PTB in Germany, Delft University in Holland, and the Health & Safety Executive in the UK. These tests show results identical to the work performed by FT. Consequently, there are 4 identical results from European test institutions and two significantly deviating tests made in Korea, which even deviate between themselves.

#### **Warning issued by Lloyd's Register of Shipping:**

LRS issued a warning on over-pressure in August 2004 and referred to a revised manual issued by Tanktech according to which the valve type generally yields a pressure increase. This warning is contrary to what the CE documentation shows, but no revised flow charts were issued.

#### **Modified valves removed from Danish ships:**

Due to the Danish ban, Tanktech valves have been removed from Danish flag ships and subjected to testing. Amongst the DN 80 valves, two versions appeared: One with a booster plate size  $\varnothing 150$  and one size  $\varnothing 155$ . The latter solves most of the over-pressure problem but due to the efflux velocity being half the SOLAS minimum required level this version fails the flash-back test.

#### **Tanktech's admission of using wrong booster plates:**

Tanktech admitted to the Italian authority that during a specific period of time incorrect booster plates ( $\varnothing 150$ ) had been used in the DN 80 valve. However, Tanktech claimed that the larger plate ( $\varnothing 155$ ) is the approved version and therefore initiated a replacement program for the existing installations. Since the drawings remain unavailable, national authorities have no means to verify whether this is correct. Tanktech has not admitted mistakes with other sizes.

#### **Testing of the DN 80 valves with booster plates $\varnothing 150/155$ (LRS and FT):**

$\varnothing 155$ : The deviation (in terms of pressure drop) is half compared to the situation for the  $\varnothing 150$  plate. However, test reports issued by FT and LRS<sup>1</sup> confirm that the efflux velocity is only 15 m/s, whereas the SOLAS minimum requirement is 30 m/s. Both reports refer to flash-back in consequence of the sub-standard efflux velocity.

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<sup>1</sup> Testing by LRS was performed on a Tanktech valve fitted with a Pres-Vac name plate with LRS functioning as Notified Body.

Ø150: FT and LRS test reports confirm that the pressure does not conform to the level shown in the CE documentation. However, the efflux velocity is above 30 m/s and the valve passes the fire testing.

#### **Testing of sizes DN 65 and DN 100:**

##### **FT:**

DN 65: Tests confirm that the DN 65 valve yields the same pressure conditions as the DN 80 valve with the small booster plate.

DN 100: Tests confirm that the DN 100 valve yields the same pressure conditions as the DN 80 valve with the large booster plate, and it, too, has half the required efflux velocity and suffers flash-back.

##### **LRS:**

DN 100: Tests confirm exactly the same as mentioned above from FT. LRS do not accept the valve for their vessels.

#### **Method for efflux velocity testing:**

The test results by FT and LRS are based on the same method as applied in Tanktech's CE documentation. The minimum flow able to keep the valve open is established and compared to the orifice open to atmosphere. This is a simple approach, but it gives a higher efflux velocity than an actual measurement would give because the closing phase is not considered. So a sub-standard result achieved the "mathematical" way is a serious concern and cannot be discussed or subject to interpretation. There is only one possible error: The calibration of the flow meter. The test reports by FT and LRS confirm a 50% deviation from the SOLAS minimum requirement. They also confirm flash-back.

#### **Consequences for other products:**

Allowing continued use of Tanktech type NEW-ISO-HV would have the following consequences:

- Manufacturers can ignore requests for test documentation made by national authorities under the MED.
- Manufacturers can sell products that are disqualified by the most experienced test laboratories in the world if the approval by the first notified body is maintained.
- A notified body may choose to rely on the original tests in spite of any later evidence. Even the admission by the manufacturer that production has deviated from the tested versions does not prevent the notified body from continuing to rely on the same manufacturer's quality control system.