

## CHEMICAL TANKERS KNOWLEDGEBASE

### CARGO SEGREGATION

#### What is segregation?

In its simplest form, a single valve provides segregation between differing products with the objective being to avoid contamination issues. However, the carriage of chemicals demands additional measures to ensure that contamination cannot occur between products.

#### How does segregation differ between oil tankers and chemical tankers?

Oil tanker charter parties often contain a 'segregation clause' where a 'minimum of two valves' is stated as the segregation requirement.

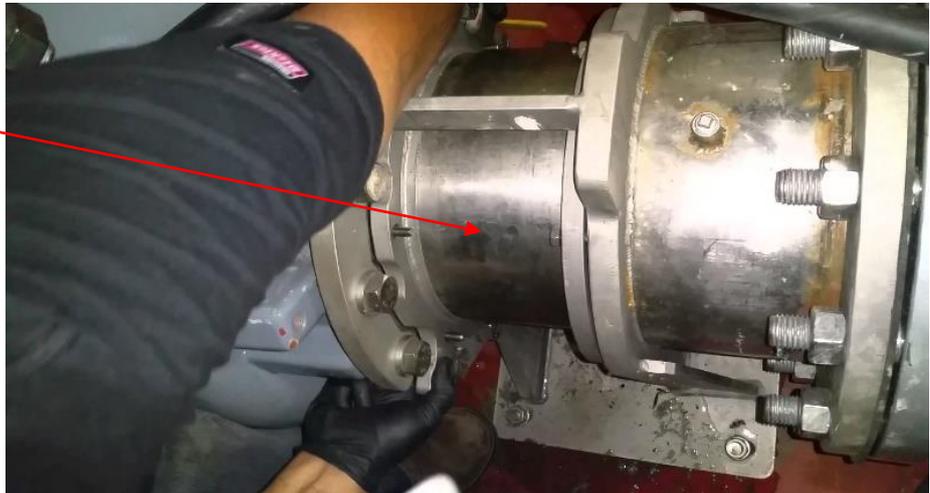
Chemical tankers on the other hand, due to the quality and value of products carried, cannot rely on segregation by valves alone, irrespective of the type and number used, and therefore a positive means of segregation is employed.

#### How is this achieved?

Positive segregation is the physical removal of a pipeline section such that an air gap is placed between two, or more, differing products.

This may be achieved by the use of spool pieces,

Spool Piece



or by the removal of valves or by proprietary methods, such as ‘Suet’ valves or ‘blind flange valves’.



Suet Valves.

The cover gasket being placed inside the valve; so as to be visible, indicates that the valve is isolated.

### What is required to be segregated by positive isolation?

All means of common communication between two, or more differing products, be they liquid or vapour, must be positively segregated. These common links would include all liquid and vapour lines plus tank cleaning lines, but not cargo heating systems, since they have no open communication between the differing products.

This includes any ‘small bore’ lines, including stripping lines, clearing lines, drain lines and cross-connection lines. Any and all lines, liquid or vapour, that connect between two dissimilar products must be positively segregated.

### All this takes time and effort, what is the legality behind this?

The IBC Code (3.1) states that for cargoes that are required to be *segregated* from each other due to the possibility of a hazardous reaction occurring between them, are required to be *separated* (3.1.4) by either of two means:

- 1/ By removing spool-pieces or valves and blanking the pipe ends; or:
- 2/ By arranging two spectacle flanges in series, with provisions for detecting leakage into the pipe between the two spectacle flanges.

*Separate* is also defined by the Code (1.3.32) as a cargo piping system or cargo vent system that is not connected to another cargo piping or cargo vent system.

Cargoes that are subject to this IBC Code requirement, can be identified by the code 15.12.3 (Toxic products) in Column ‘o’ of Chapter 17 ‘Summary of minimum requirements’.

The term ‘Positive segregation’ is commonly used to describe such ‘*separate segregation*’.

Apart from the few ‘Toxic Products’ identified in the IBC Code, there are no legal requirements for products to be ‘positively segregated’, therefore for most products, segregation is driven by commercial interests.

However, for any disputes arising from contamination, the first, and immediate, response is to study the isolation or segregation methods conducted between the *contaminated* cargo and all other spaces.

Should the means of segregation be found to be conducted by valves alone, than this will be considered the source of the contamination and be put under intense scrutiny.

### **Are means of ‘positive segregation commonly fitted to Chemical Tankers?’**

Only those Chemical Tankers carrying products with the nomination 15.12.3, and identified as such in the Vessels Certificate of Fitness, are required to be fitted with the methods described in the IBC Code Section 3.1.

However, methods of providing ‘positive segregation’ that do not fully comply with the Code are commonly fitted. These may include insertion of a spade in a pipeline or by a single spectacle piece.



A single Spectacle Piece.

The position of the piece is immediately apparent.

### **How thick should a spade or spacer be?**

As a rule of thumb, the following formula can be used to calculate the thickness of the required spacer:  
 $(P \times D) / 10 = T$  (mm)

P = System pressure (Barg) / D = Line Diameter (in) / T = Spacer thickness (mm)

## Errors in using Isolation Pieces

Shipboard modifications may result in contraventions of the IBC Code and others. The example below depicts a modification made in good faith, however several Codes are broken.

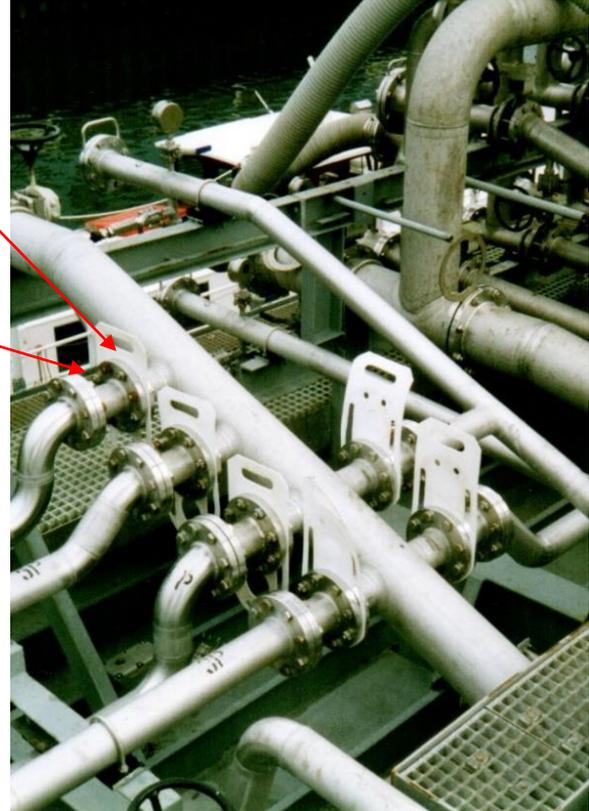
Spool and Spectacle Pieces used in conjunction.

Spool:

Spectacle:

The Spectacle appears to be made of Teflon, which does not comply with construction requirements.

The use of a Spectacle, instead of the Spool Piece contravenes IBC Code 3.1 and would not satisfy the Code definition of 'separate'.



## Identifying Pipeline Isolations?

Segregations conducted by means of spool pieces and spectacle flanges will be immediately apparent however, those made by blind or Suet flanges/valves will require a means of identification.

Blind flanges should be so constructed such that they can be readily identified for example, by means of a 'tail' that protrudes above the pipeline when the flange is in position.

Suet valves should, when in use, have the cover left in the open position. These valves may also have a 'tail' so that the valve cover cannot be closed when the isolation is in place.

## Recording?

All pipeline isolations should be the subject of a Work Order, and recorded as such. Cargo Plans should be prepared with Line Diagrams indicating the segregation points.

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