



Transport and Storage of Propellants: Procedure 7

DISCHARGE OF ZEPHEX® PROPELLANT FROM 'DOT 51' UPRIGHT CONTAINERS

Introduction

A procedure for the discharge of ZEPHEX® propellants from the DOT 51 Upright Containers ('Van Hool' containers) will always need to be fine tuned for a particular installation to which it applies. Particular details, such as valve numbers, will typically need to be included to ensure the maximum clarity for those responsible for operating the procedure. The outline procedure given below describes the main activities and the precautions to be taken. In the event of any doubt, further advice should be sought from Mexichem Fluor Transport Engineers.

1 General

The connections on the containers are to the following designs:

Liquid discharge valve: 2 inch ASA 300 flange
Vapour balance valve: 1.5 inch ASA 300 flange

Connections are made between the upright container and the customer installation by means of flexible hoses. The liquid discharge hose is connected to the container liquid outlet flange (by a suitable adapter) and the pump suction on the customer installation. The vapour connection should remain blanked off.

The services of a fitter, or other skilled person, are required to make tight connections with the flanged joints.

In addition to the visible liquid discharge and the vapour balance valves, the upright containers are also equipped with internal valves, which must be opened to enable the delivered load to be discharged. These internal plug valves have excess flow devices fitted to both the liquid outlet and vapour balance valves; these can cause problems on discharge if the discharge procedure is not followed.

2 Safety Precautions

Whilst ZEPHEX® propellants have a very low order of toxicity and are non-flammable on leakage to atmosphere, there are still safety and handling issues that need to be understood. These are outlined below, but details of these and advice regarding personal protection are contained in the Chemical Safety Data Sheet which should be consulted before handling either ZEPHEX®134a or ZEPHEX® 227ea.

Avoiding skin contact: The pressure in containers storing ZEPHEX® propellants will be greater than atmospheric pressure and in the event of a leak, liquid or gas can escape with some force. Contact with the liquid can cause local freezing of the skin and eyes. Therefore whenever there is a possibility of escape of vapour or liquid, suitable thermal insulating gloves and eye/face protection should be worn. Particular care should be taken when removing blank flanges or caps, when valves are opened for the first time, when uncoupling hoses, and when disconnecting items of equipment.

Exposure to vapour: In common with other compounds of this class, inhalation of very high concentrations of the vapour even for short periods of time should be avoided since this may cause anaesthetic effects and asphyxiation. The vapour is heavier than air and in static, poorly ventilated situations, or enclosed spaces may be slow to disperse. Anyone suffering from the effects of inhalation of the vapour should be moved to a well ventilated position and given relevant First Aid treatment as described in the Chemical Safety Data Sheet.

Avoiding static: Liquid transfers between containers, and to and from systems, can result in static generation. Bulk liquid transfers should use metal braided hoses and an earth lead.

3 Discharge Procedure for DOT 51 Upright Containers of ZEPHEX® Propellants

3.1 Preliminary checks

The delivery documentation should be carefully checked by the customer to ensure that the correct grade/weight of product has been delivered. The customer should also check that the tamper proof seals are in place on the liquid and vapour outlet valves ('B' and 'E' on Figure 1) and that the tag numbers correspond to those on the Certificate of Analysis.

3.2 Connecting the upright container to the customer installation

Refer to Figure 1, showing the typical upright container and delivery installation.

- 3.2.1 The upright container should be berthed adjacent to the discharge point and an earth lead connected between the upright container and the customer installation.
- 3.2.2 Check that valves 'C' and 'D' in the inlet lines to the customer installation are closed.
- 3.2.3 Wearing appropriate eye protection and gloves remove the blank flanges from the inlet hose connected to the customer installation.
- 3.2.4 Check that both the liquid outlet valve 'B' and the vapour valve 'E' on the upright container are closed and the cable linkage to the internal valves 'A' is in the closed position. Remove the tamper proof tag seal from valve 'B' only.
- 3.2.5 Carefully remove the blank flange from the liquid outlet line on the upright container. Using a PTFE envelope gasket fit a flanged adapter to the liquid outlet valve on the upright container.
- 3.2.6 Connect the pump suction hose to the liquid discharge connection on the upright container.
- 3.2.7 Slowly pull out the internal valve-operating handle 'A', and twist to lock in the open position. This action opens both the internal valve and the excess flow valve on the liquid outlet and vapour balance lines on the upright container.

Allow the pressure to equalise on both sides of the excess flow valves before proceeding further (at least 60 seconds).

See Figure 2 for operating sequence for internal valves.

- (1) shows valve in the closed position
- (2) pulling handle 'A' moves the lever via a cable link through 70°. This opens the pilot valve allowing the pressure to equalise.
- (3) pressure has equalised across the valve and the valve fully opens

The valve will remain closed at a differential pressure greater than 3 mbar.

3.3 Discharge

- 3.3.1 Wearing appropriate eye protection and gloves crack open momentarily the liquid outlet valve 'B' on the upright container and check all the joints which have been made on the flexible hoses for leaks. Cure any leaks that are found and confirm by further testing as necessary.

3.3.2 Open the valves 'C' and 'D'

3.3.3 SLOWLY open to halfway the liquid outlet valve 'B' on the upright container. Wait at least 1 minute for the pressure to equalise then fully open valve 'B'.

PLEASE NOTE IT IS ESSENTIAL THAT EQUALISATION OF PRESSURE BETWEEN THE UPRIGHT CONTAINER AND THE OFF-LOADING PUMP DELIVERY SIDE PIPEWORK IS ACHIEVED BEFORE STARTING THE PUMP OTHERWISE THE EXCESS FLOW VALVE IN THE INTERNAL VALVE MAY CLOSE.

3.3.4 Start the discharge pump.

If flow ceases, stop pump and close internal valves 'A'. Wait for 1 minute and re-open internal valves 'A' and allow pressure to equalise. Then recommence discharge procedure as above. If problems still persist carry out checks 3.3.5 and 3.3.6 below.

3.3.5 Check lever on internal valves has moved through 70° (see Figure 2).

The cable link could have stretched or broken.

There is a remote possibility that the pin securing the lever to the valve may have sheared and in this situation the lever would travel through 70° but not operate the valve.

3.3.6 If difficulty is still experienced then half open valve 'B' and half close valve 'D'. Restart pump. Gradually fully open valve 'B' followed by valve 'D' taking care that flow is not interrupted.

3.4 Completion of discharge

3.4.1 In the absence of a weigh scale system an inventory of the use of the product should be kept to ensure that product is available when required.

3.4.2 When the upright container is considered empty STOP THE DISCHARGE PUMP and close valves 'C' and 'D' on the customer installation.

3.4.3. Close the valves 'B' and the internal valves 'A' on the upright container.

3.5 Disconnection of the upright container

3.5.1 When all the valves have been closed, and wearing appropriate eye protection and gloves, cautiously slacken the joints connecting the liquid and vapour balance hoses to the upright container. Allow only gas to escape, slowly.

- 3.5.2 When the gas escape ceases, disconnect the liquid discharge hose from the upright container. Remove the adapter and refit the blank flanges on the hose and on the outlet of the upright container.
- 3.5.3 Check that all valves on the upright container are closed and fit a new security tag to the liquid valve 'B' on the upright container before it leaves site.

The security tag for the vapour valve should still be in place from the containers arrival on the customer site.

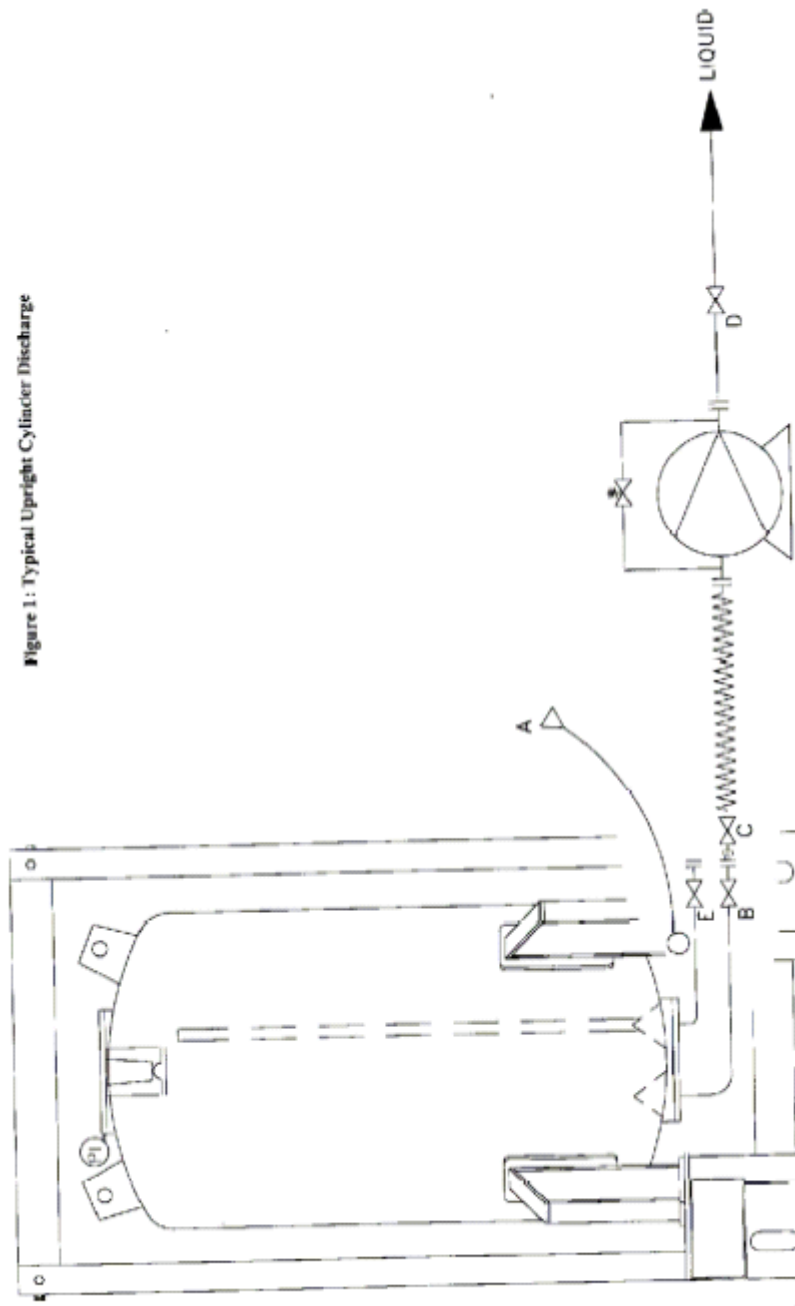
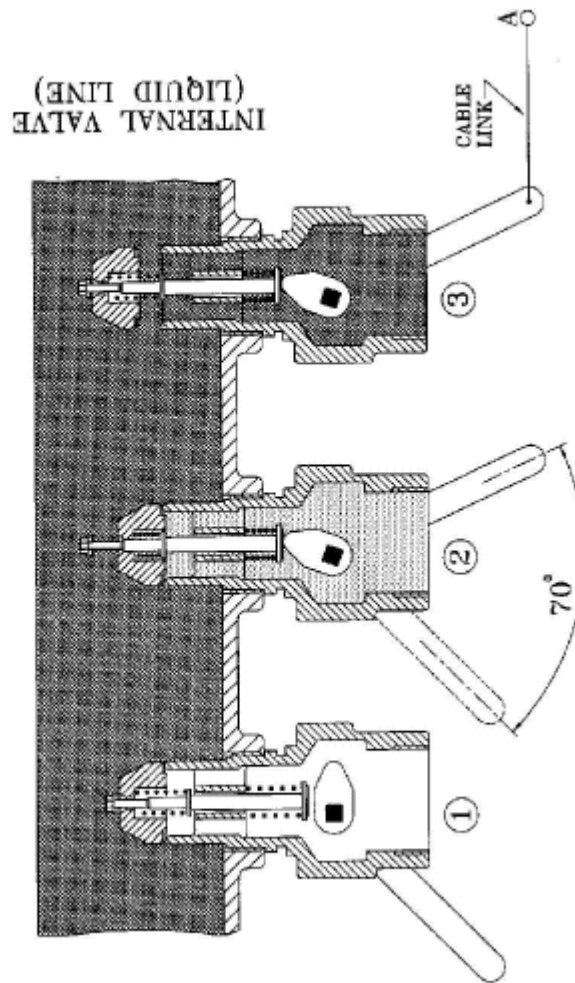


Figure 2: Internal Valve (Liquid Line)



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**Mexichem UK Limited, The Heath Business and Technical Park,
Runcorn, Cheshire, WA7 4QX
Tel: +44 (0) 1928 514840
e-mail: zephexsales@mexichem.com
www.mexichemfluor.com**

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