

What Went Wrong 3

ISOLATION FAILURE TO ISOLATE

A pump was being dismantled for repair. When the cover was removed, hot oil, above its auto-ignition temperature, came out and caught fire. Three men were killed, and the plant was destroyed. Examination of the wreckage after the fire showed that the pump suction valve was open and the drain valve shut. The pump had been awaiting repair for several days when a permit-to-work was issued at 8 a.m. on the day of the fire. The foreman who issued the permit should have checked ahead of time that the pump suction and delivery valves were shut and the drain valve open. He claimed that he did so. Either his recollection was incorrect or, after he inspected the valves and before work started, someone closed the drain valve and opened the suction valve. When the valves were closed, there was no indication on them of why they were closed. An operator might have opened the suction valve and shut the drain valve so that the pump could be put on line quickly if a complicating factor was that the maintenance team originally intended to work only on the pump bearings. When team members found that they had to open up the pump, they told the process team, but no further checks of the isolations were. It was not customary in the company concerned to isolate equipment under repair by slip-plates, only by closed valves. But after the fire, the company introduced the

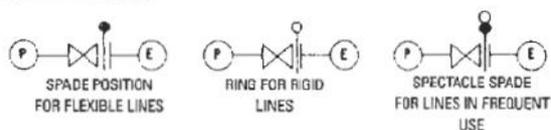
(a) Equipment under repair must be isolated by slip-plates (blinds or spades) or physical disconnection unless the job to be done will be so quick that fitting slip-plates (or disconnecting pipework) would take as long as the main job and be as hazardous. If hot work is to be carried out or a vessel is to be entered, then slip-plate or physical disconnection must always take place.

(b) Valves isolating equipment under maintenance, including valves that have to be closed while slip-plates are fitted (or pipework disconnected), must be locked shut with a padlock and chain or similar device. A notice fixed to the valve is not sufficient.

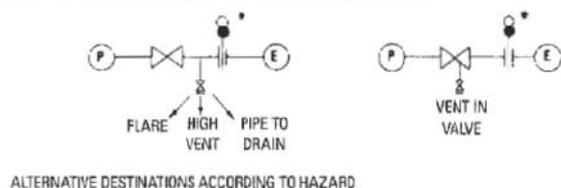
(c) For fluids at gauge pressures above 600 psi (40 bar) or at a temperature near or above the auto-ignition point, double block and bleed valves should be installed—not for use as main isolations but so that slip-plates can be inserted safely (Figure 1-1).

(d) If there is any change in the work to be done, the permit-to-work must be withdrawn and a new one issued.

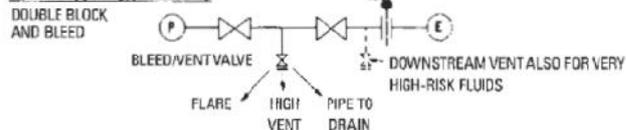
TYPE A. FOR LOW-RISK FLUIDS



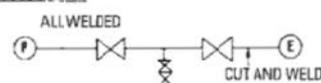
TYPE B. FOR HAZARDOUS FLUIDS WITH VENT TO CHECK ISOLATION



TYPE C. FOR HIGH PRESSURES (>600 PSI) AND/OR HIGH TEMPERATURES OR FOR FLUID KNOWN TO HAVE ISOLATION PROBLEMS



TYPE D. FOR STEAM ABOVE 600 PSI



E = EQUIPMENT UNDER MAINTENANCE
P = PLANT UP TO PRESSURE
* = OR SPADE OR RING AS REQUIRED

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An Initiative by:

JOGI SafeTech Private Limited

A-701/702, Shreeji Arcade, B/h. Bhulka Bhavan School, Anand Mahal Road, Adajan, Surat- 395009.

Ph.: 0261 - 2746499 Mo.: +91 7405480710