



Longwall Integral Isolation Block

History

A near miss incident at Newstan Colliery has led to the investigation of a purpose built longwall isolation system. The incident at Newstan highlighted several key factors which led to the incident occurring:-

1. Faulty isolation equipment
2. Poor verification methods to prove isolation
3. Shock damage to components from hydraulic pressure spikes
4. Damage caused to ball valves by 'throttling' the pressure when restoring pressure to the system (see figure 1)



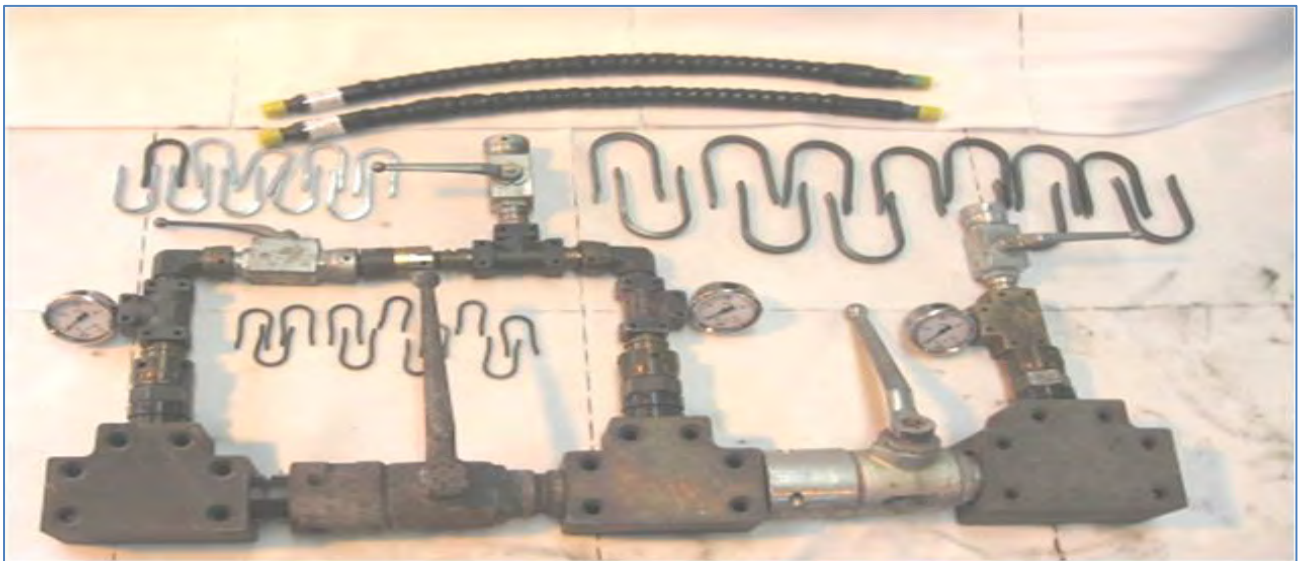
Figure 1 - Damaged Ball valve dismantled showing damage to seals

Since this incident, the Department of Primary Industries has released Mine Safety Report No: SA09-04

References:

1. AS 4024.1-2006, Safety of machinery
2. MDG 41 Guideline for Fluid Power System Safety at Mines
3. MDG 40 Guideline For Hazardous Energy Control (Isolation or Treatment)

To achieve what has been recommended by the Department of Primary Industries with individual components you would need the following



We would suggest that this would be an unacceptable installation which would further increase the hazards which workers are exposed to, extra hoses, staples, fittings etc. It would also increase the maintenance requirements to ensure the safe and reliable function of the system.

Integral Isolation Block – Double Block and Bleed

As a stand alone unit, the integral isolation block addresses all the issues identified above and in the Mine Safety Alert. It has double isolation, pressure dissipation, verification of both isolation points, and slow pressure rise for re-energising the system in a controlled manner. ‘Fortress’ locking actuators allow keyed sequenced operation to ensure that the isolation and restoration can only be done in the correct sequence. Normal Handle type actuators can still be locked for isolation.

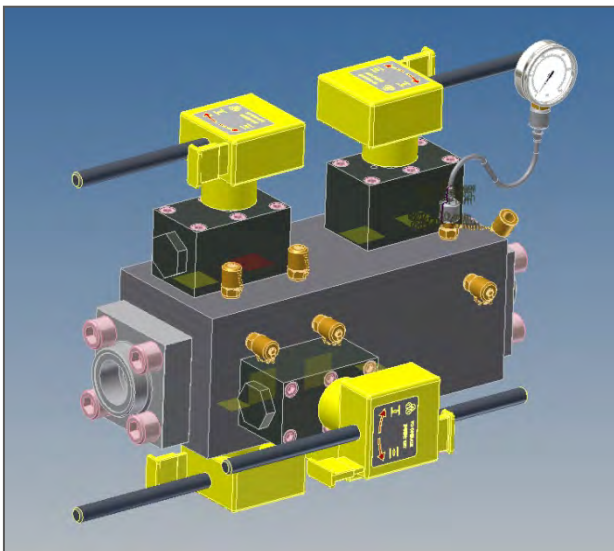


Figure 2 - Integral Isolation Block with locking actuators

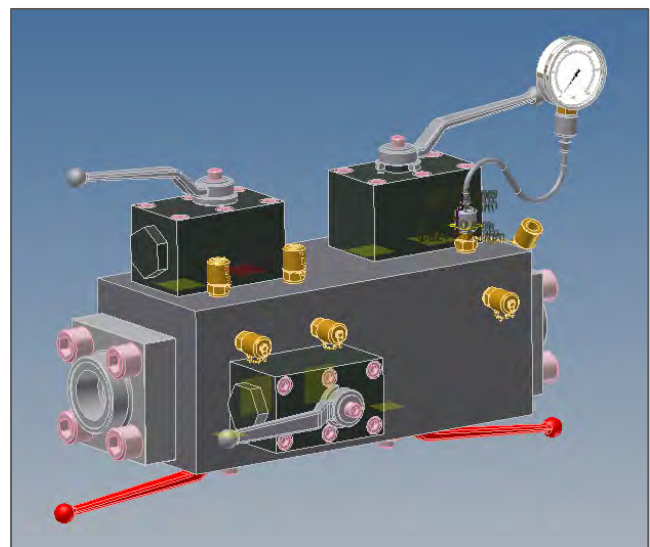


Figure 3 - Integral Isolation Block without locking actuators



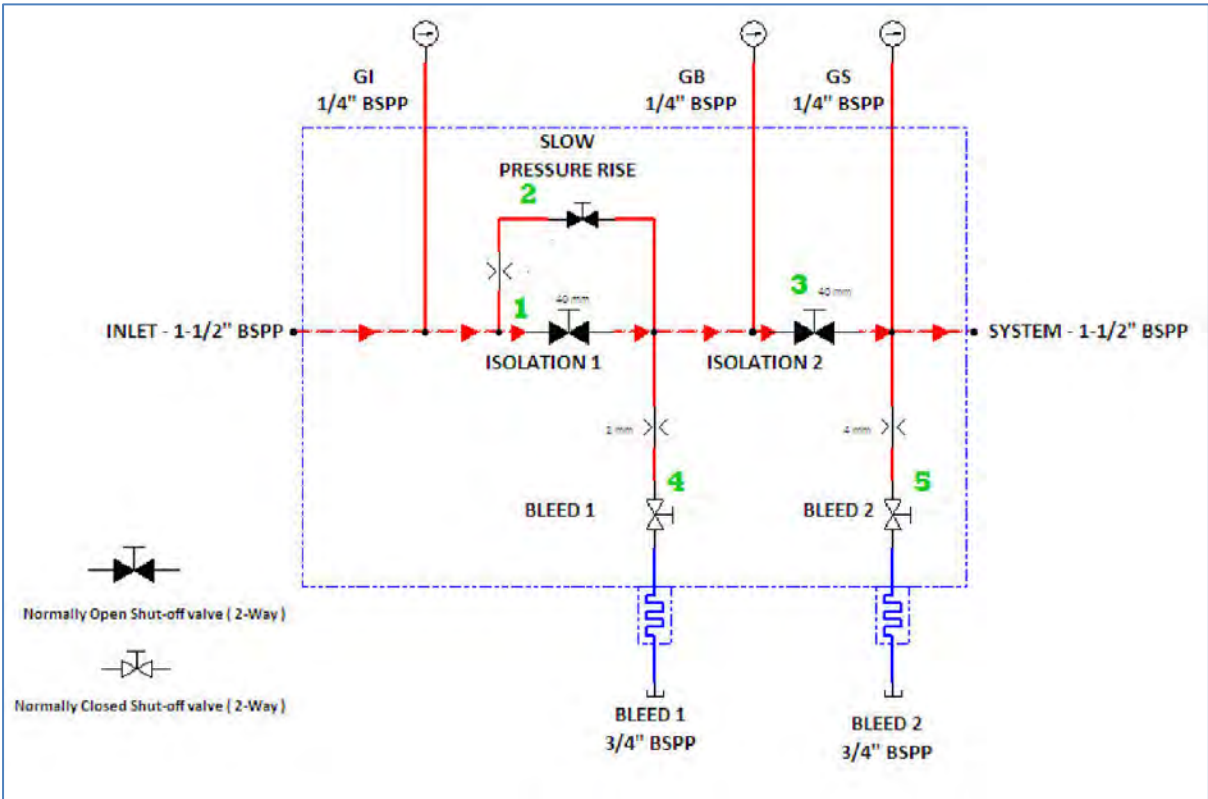


Figure 4 - Schematic View of Isolation Block

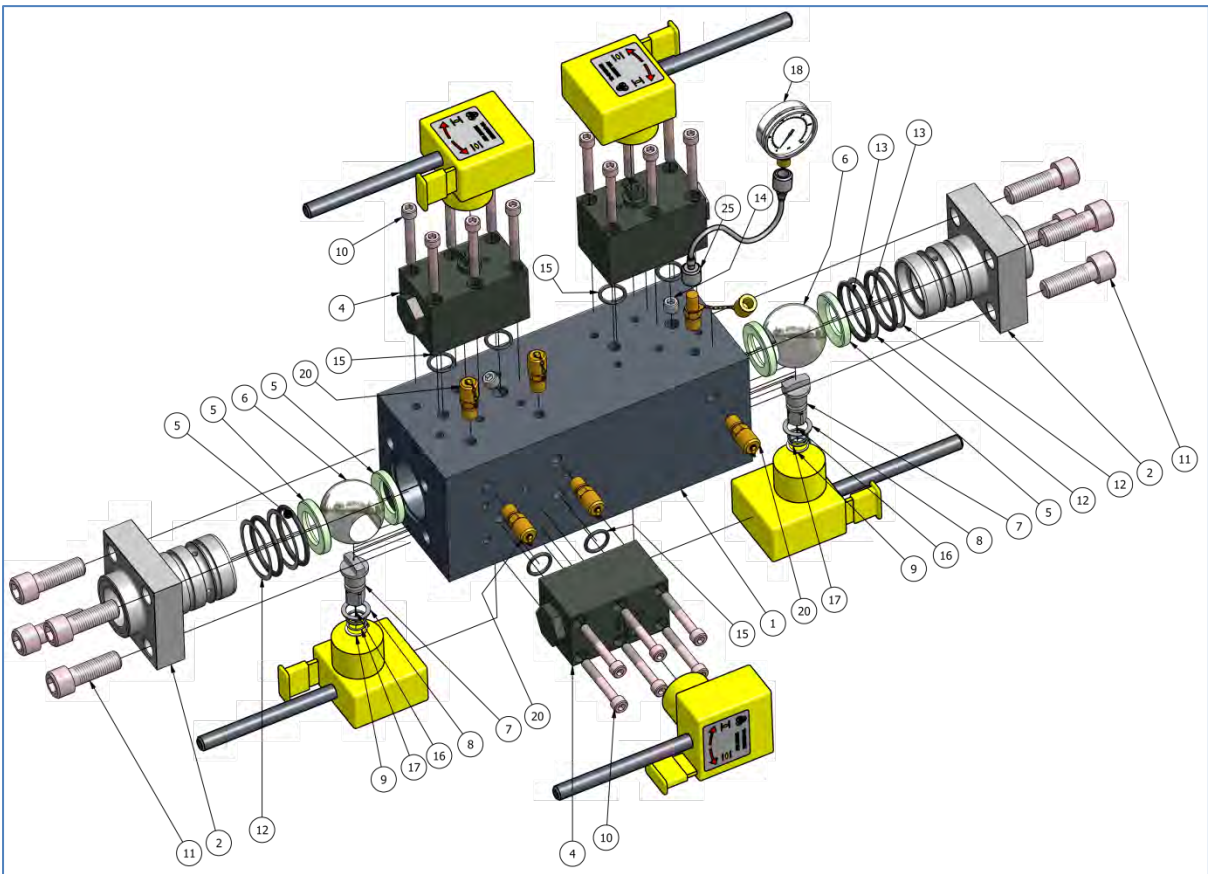


Figure 5 - Exploded view of Integral Isolation Block



The Integral Isolation Block has had a Finite Element Analysis completed to prove reliability and strength of the unit – this FEA has allowed a Factor or Safety greater than 4 to 1 at 450 BAR. Each unit is static tested to 700 BAR during the manufacture process.

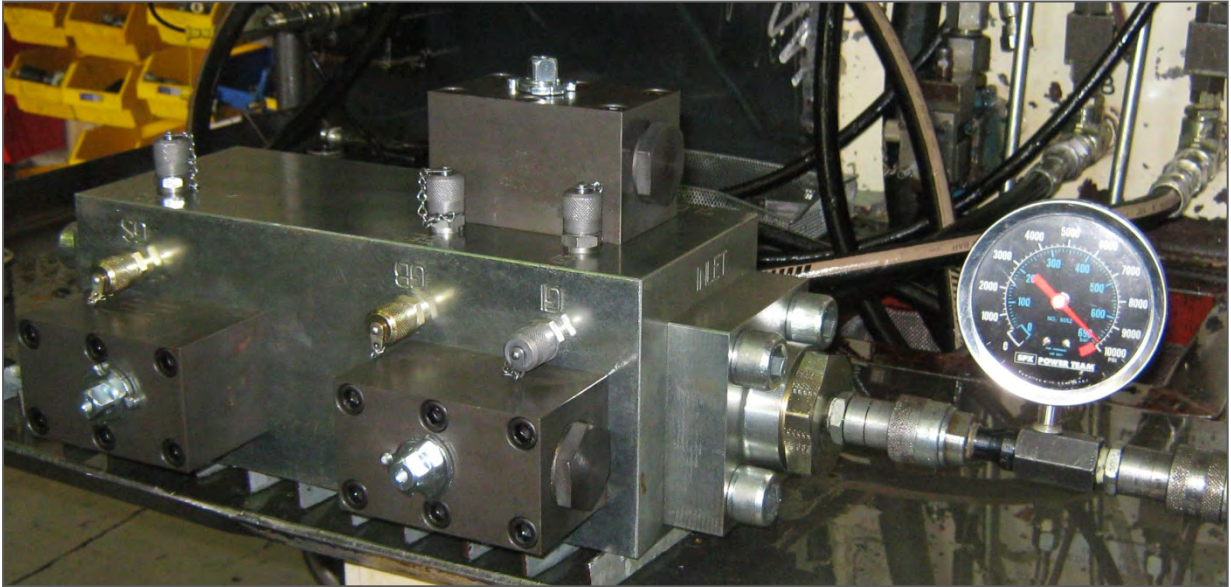
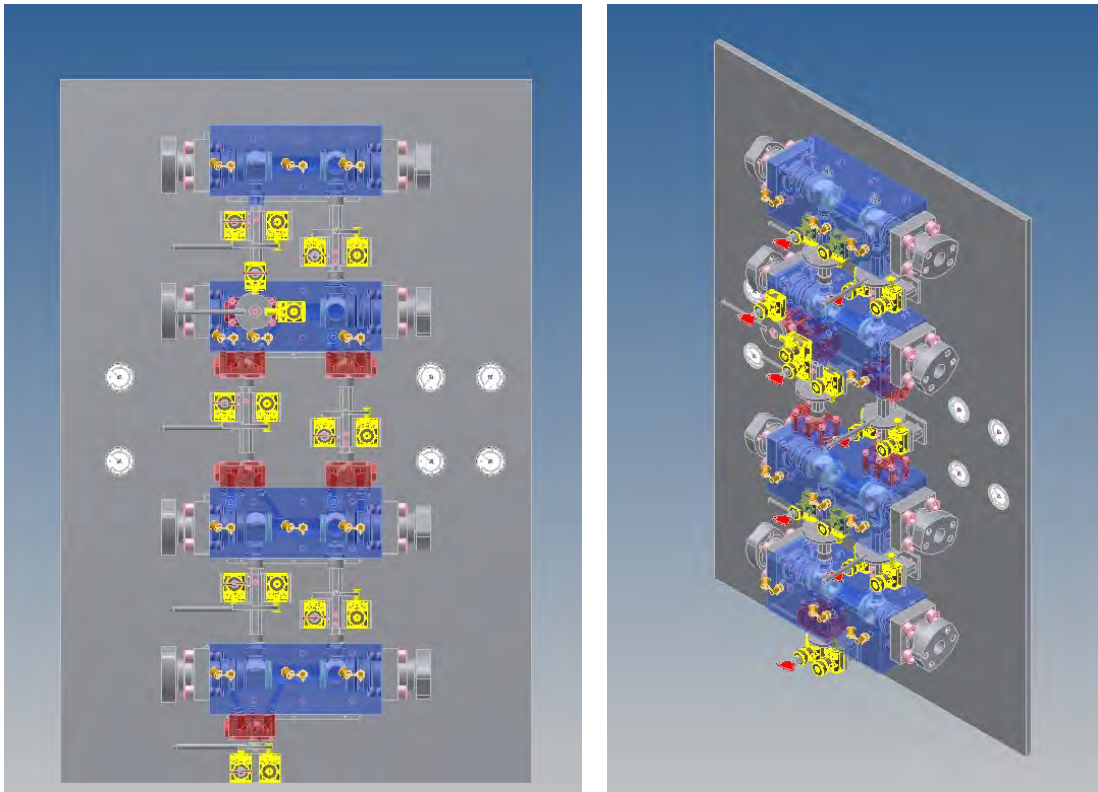


Figure 6 - Complete Block during testing at 10 000PSI

The Integral Isolation Block can be used in multiples to allow isolation of multiple incoming supply lines in one location, still using Fortress type locking actuators to ensure correct sequence of the total process.

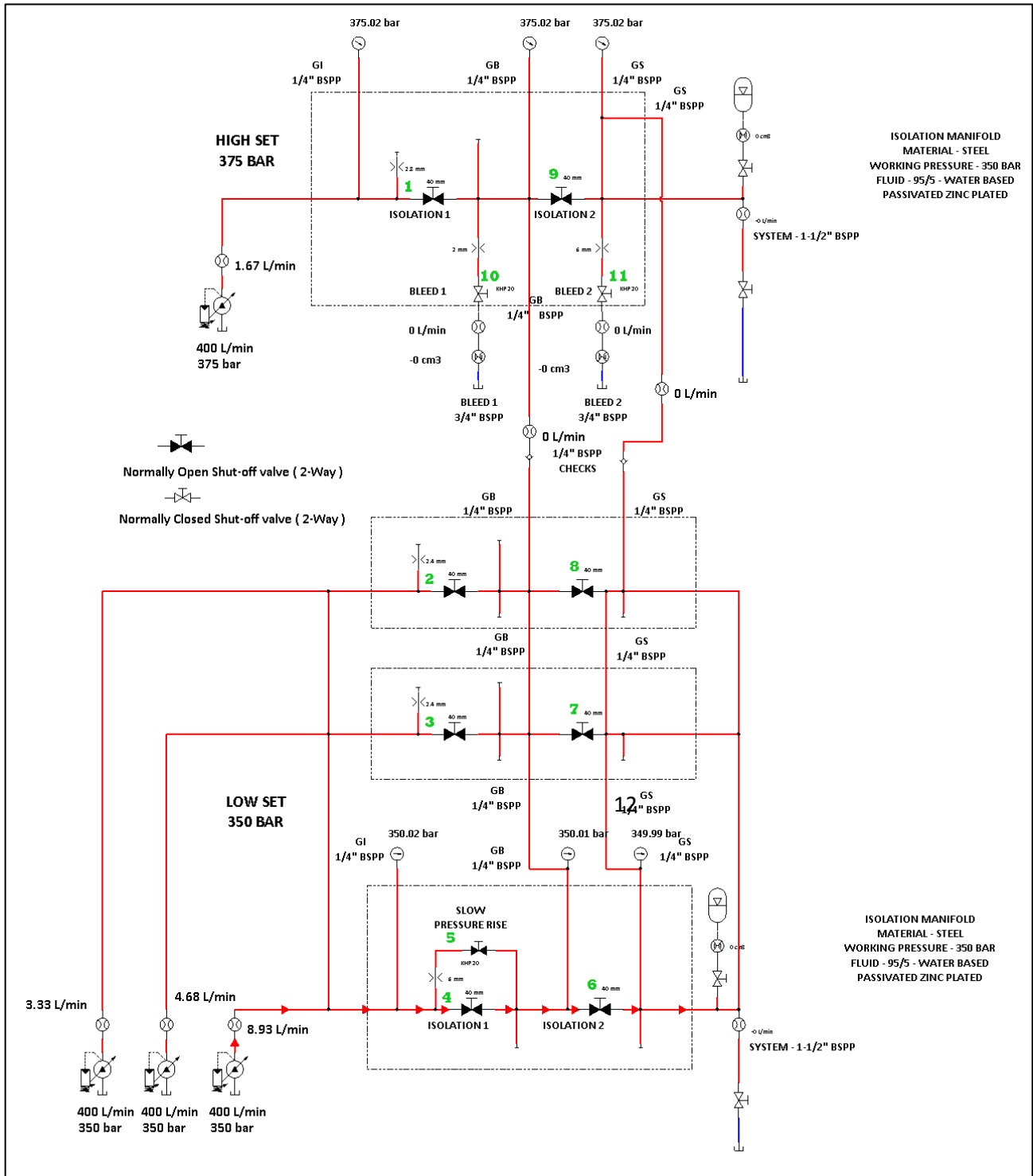
Figure 7 - Isolation Board concept for 4 incoming supply lines



This page shows a schematic representation of the above isolation board, this system uses 3 low pressure pumps for normal operation and 1 high pressure pump for High Set circuit used on this particular longwall system.

The combination of multiple blocks can be customised to suit any application.

Figure 8 – Schematic Representation of multiple blocks for isolation



Commissioning

- ✎ Each unit is manufactured and tested to 700 BAR before delivery. If a combination system is requested we will proof test the whole system.
- ✎ Installation is a simple plug and play – simply remove the single ball valve and install the Integral Isolation Block. The unit has BSPP threads in the end caps so that any fitting can be used.

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