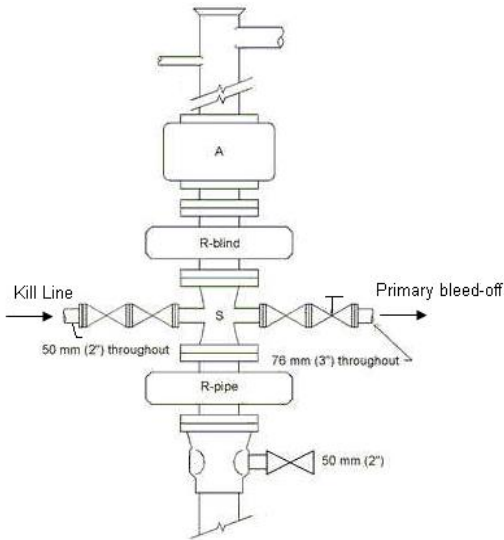


Appendix A: Drilling Blowout Prevention Systems

Blow-Out Prevention Stack

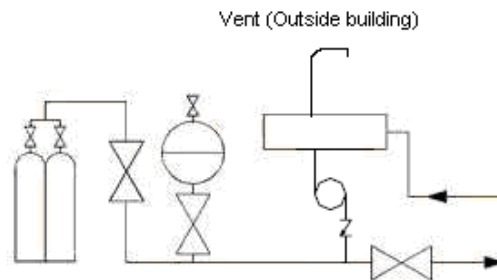


CLASS A

Surface Casing Depth - 1,800 metres (14,000-21,000 kPa).

Drilling Blowout Prevention System for Wells not exceeding a True Vertical Depth of 1,800 metres.

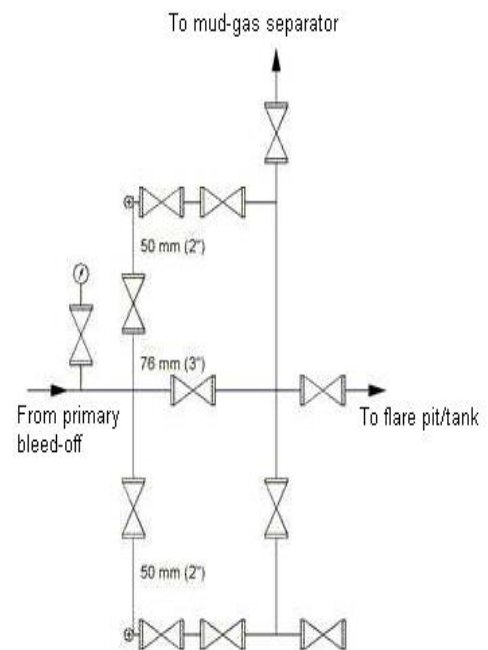
Minimum pressure rating: 14,000 kPa (2,000 psi).



Accumulator System

Notes:

- Bleed-off line, centreline through choke manifold, and flare line must be a minimum nominal diameter of 76.2mm throughout.
- Lines through chokes must be a minimum nominal diameter of 50.8mm throughout.
- Kill line must be a minimum nominal diameter of 50.8mm throughout.
- Flanged pipe connections must be used from the drilling spool down to and including the connection to the choke manifold. The remainder of the choke manifold may contain threaded fittings.
- Minimum pressure rating for flares and degasser inlet lines is 14MPa.
- Hydraulic and manual valve positions in the bleed-off line may be interchangeable
- Ram type BOPs manufactured with integral outlets may be used in place of drilling spool, but must be inspected and re-certified if significant flow occurs through the body.



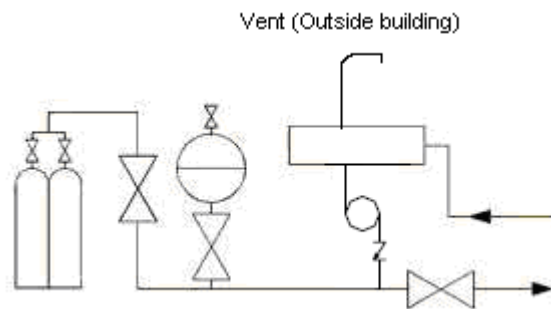
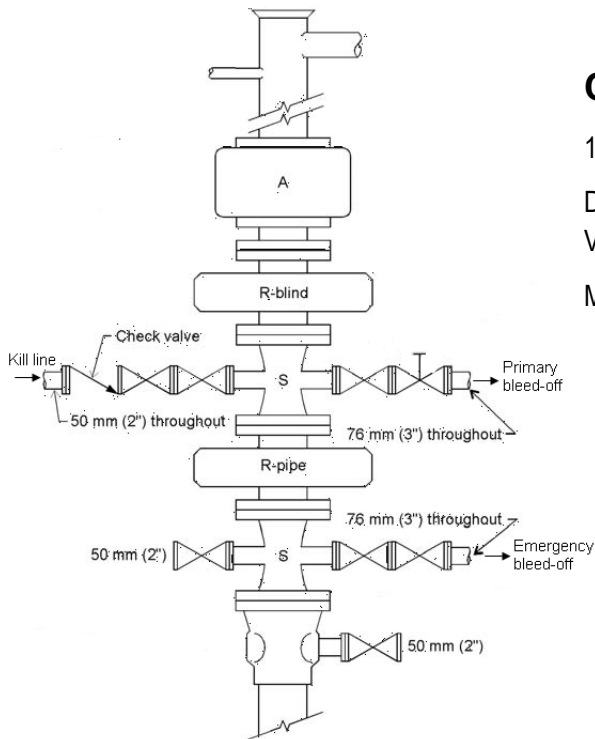
Choke Manifold

CLASS B

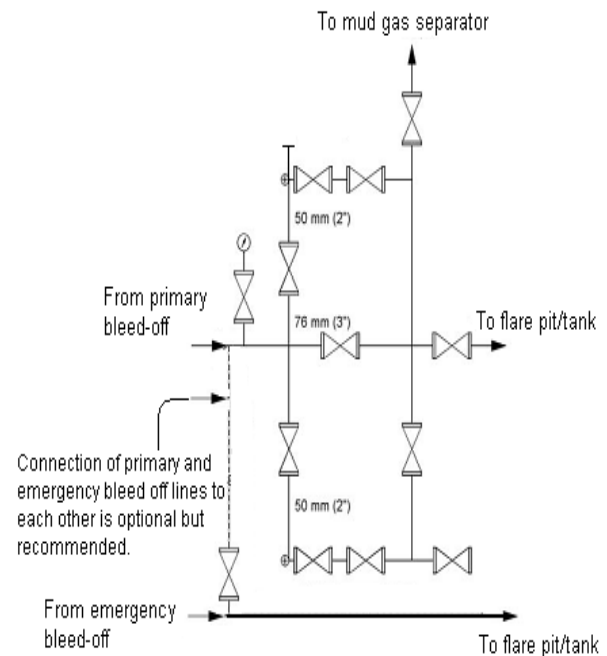
1,800-3,000 metres.

Drilling Blowout Prevention System for Wells not exceeding a True Vertical Depth of 3,000 metres.

Minimum pressure rating 21,000 kPa (3,000 psi).

**Accumulator System****Blow-out Prevention****Notes:**

- Bleed-off line, centreline through choke manifold, and flare line must be a minimum nominal diameter of 76.2mm throughout.
- Lines through chokes must be minimum nominal diameter of 50.8mm throughout.
- Kill line must be a minimum nominal diameter of 50.8mm throughout.
- Flanged pipe connections must be used from the drilling spool to the last valve on the choke manifold, inclusive
- Welded flanges required to connect primary and emergency bleed-off lines.
- Minimum pressure rating for flare and degasser lines is 14MPa.
- Hydraulic and manual valve positions in the bleed-off line may be interchangeable
- Ram type BOPs manufactured with integral outlets may be used in place of the drilling spools, but must be re-certified if significant flow has occurred through the body.

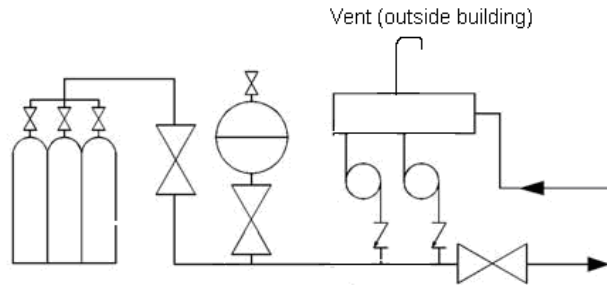
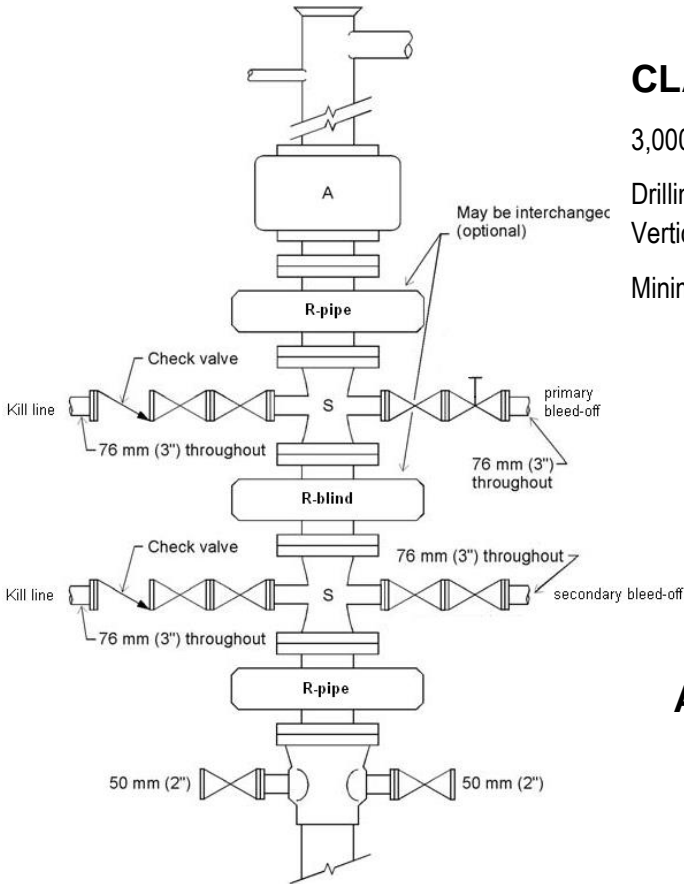
**Manifold System**

CLASS C

3,000-5,500 metres.

Drilling Blowout Prevention System for Wells not exceeding a True Vertical Depth of 5,500 metres.

Minimum pressure rating 34,000 kPa (5,000 psi).

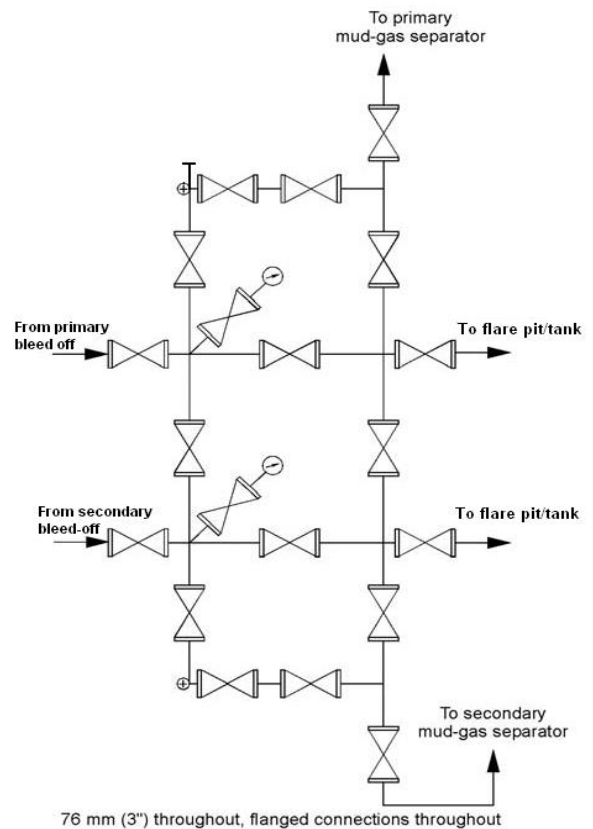


Accumulator System

Blow-out Prevention

Notes:

- Kill lines, bleed-off lines, choke manifold, and flare lines must be a minimum nominal diameter of 76.2mm throughout.
- Flanged pipe connections must be used from the drilling spool to the last valve on the choke manifold, inclusive.
- Minimum pressure rating for flare and degasser lines is 14MPa.
- Hydraulic and manual valve positions in the bleed-off line may be interchangeable.
- Ram type BOPs manufactured with integral outlets may be used in place of the drilling spools, but must be re-certified if significant flow has occurred through the body.



Manifold System

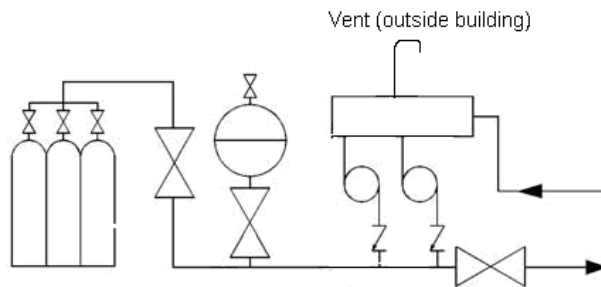
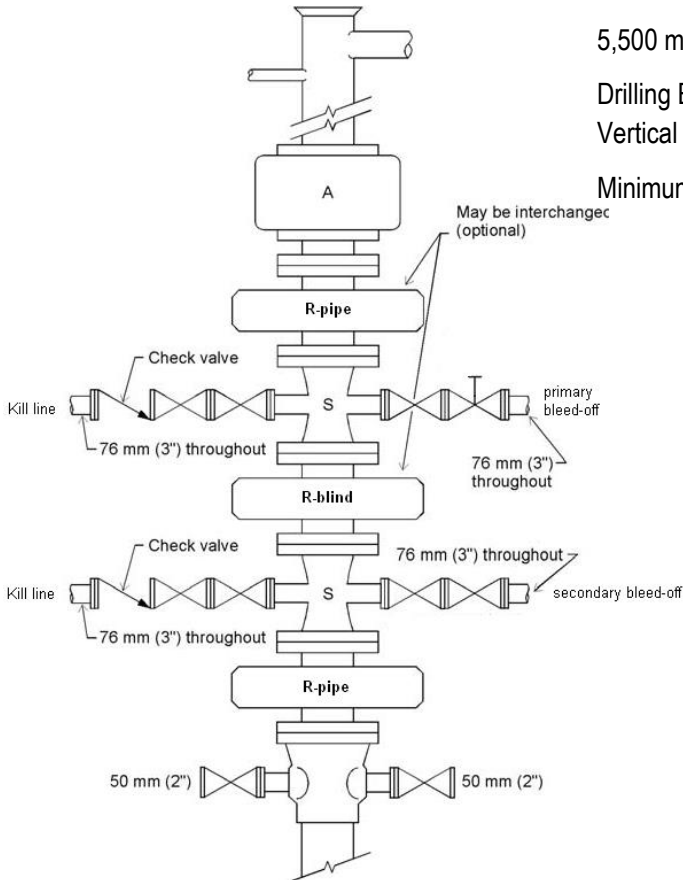
Blow-out Prevention

CLASS D

5,500 metres and deeper.

Drilling Blowout Prevention System for Wells exceeding a True Vertical Depth of 5,500 metres.

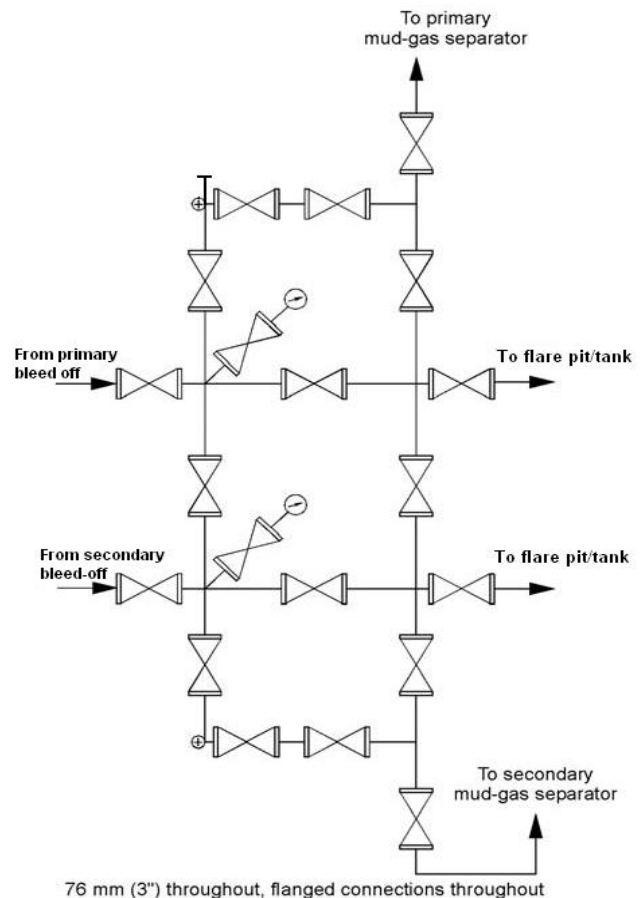
Minimum pressure rating 70,000 kPa (10,000 psi).



Accumulator System

Notes:

- Kill lines, bleed-off lines, choke manifold, and flare lines must be a minimum nominal diameter of 76.2mm throughout.
- Flanged pipe connections must be used from the drilling spool to the last valve on the choke manifold, inclusive.
- Minimum pressure rating for flare and degasser lines is 14MPa.
- Hydraulic and manual valve positions in the bleed-off line may be interchangeable
- Ram type BOPs manufactured with integral outlets may be used in place of the drilling spools, but must be re-certified if significant flow has occurred through the body.
- Other BOP stack configurations are acceptable, including the use of double gate rams. Stack must contain a minimum of 2 pipe rams and one blind ram.

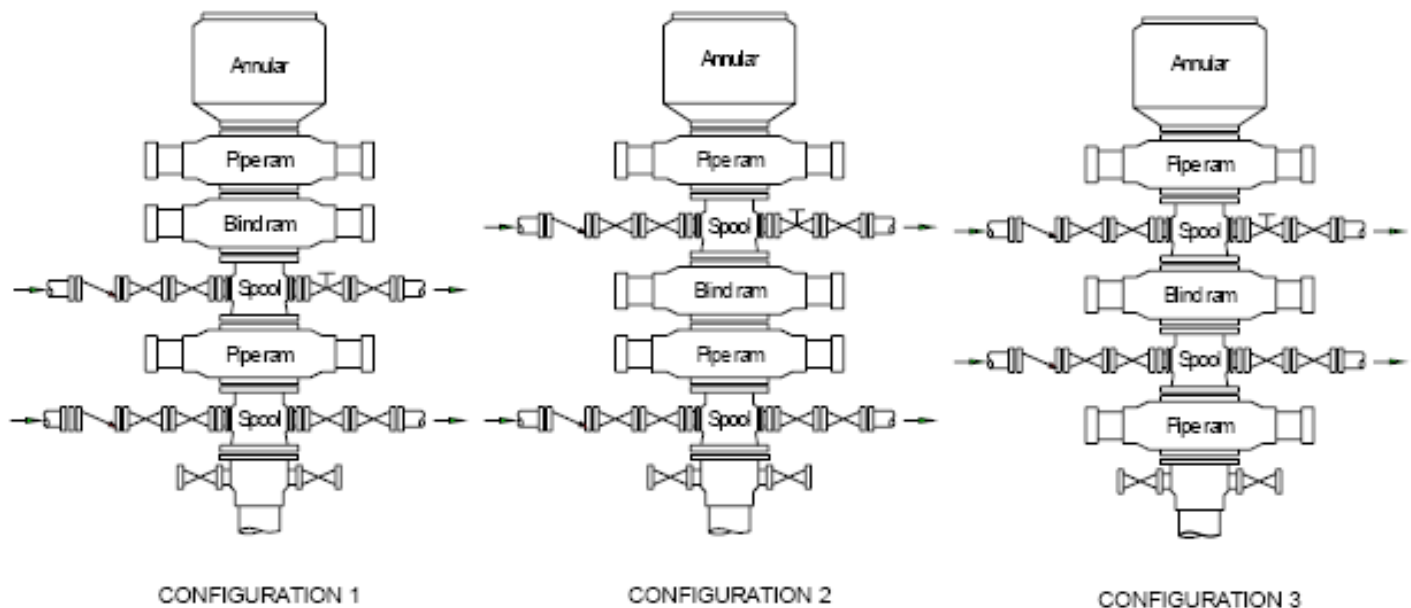


Manifold System

Special Sour: All Depths

Drilling Prevention Systems for Special Sour Wells.

Minimum pressure rating 14,000 kPa (2,000 psi).

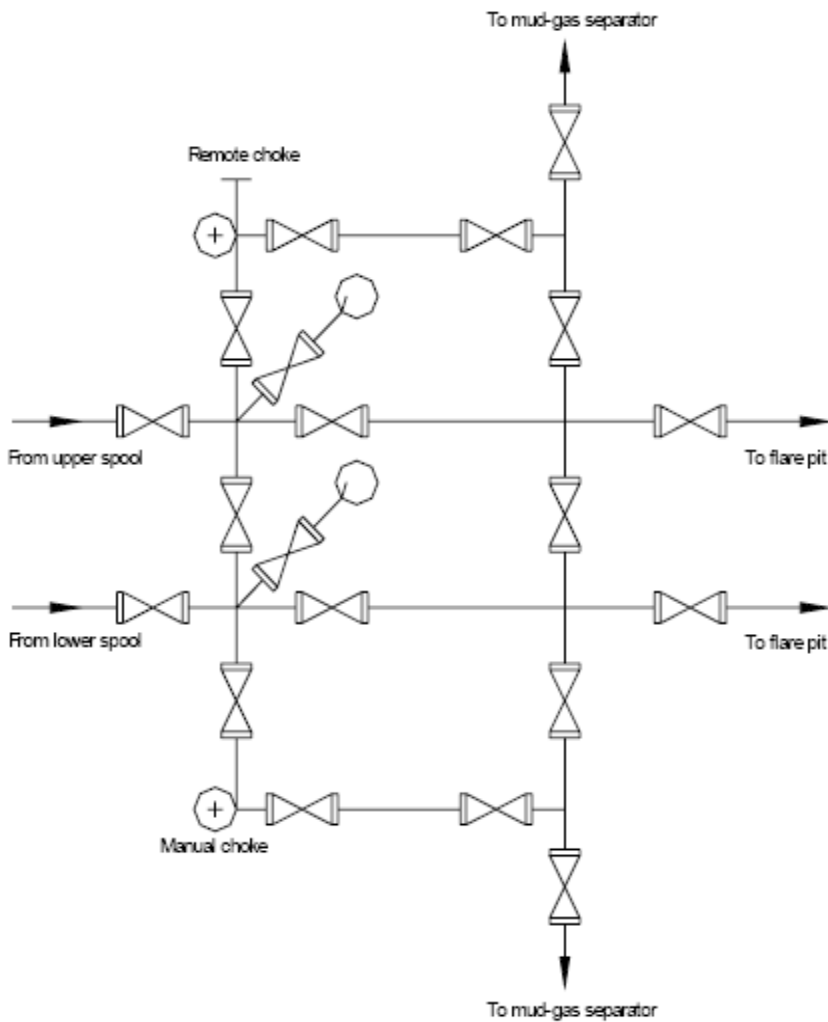


Note:

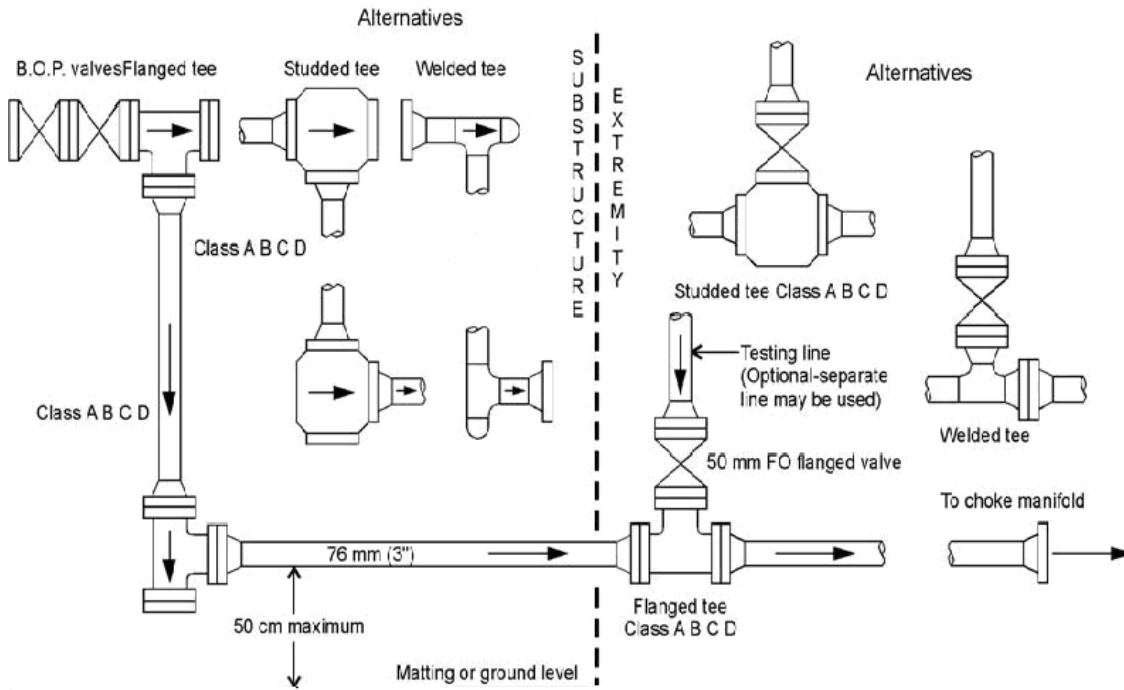
- Hydraulic and manual valve positions in bleed-off line are interchangeable
- If BOP Configuration 2 or BOP Configuration 3 is used, an appropriately sized ram blanking tool fitting into the top pipe ram must be on location and readily available.
- If BOP Configuration 3 is used, there must be sufficient surface or intermediate casing to contain the maximum anticipated reservoir pressure.
- Shear blind rams may be required in place of the blind rams.
- Rams type BOPs manufactured with integral outlet may be used in place of the drilling spools, but must be re-certified if significant flow has occurred through the bodies.

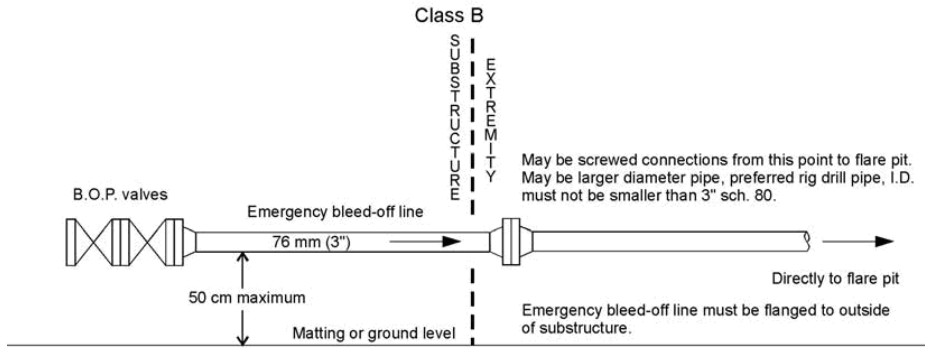
Special Sour Manifold

Minimum pressure rating 14,000 kPa (2,000 psi).

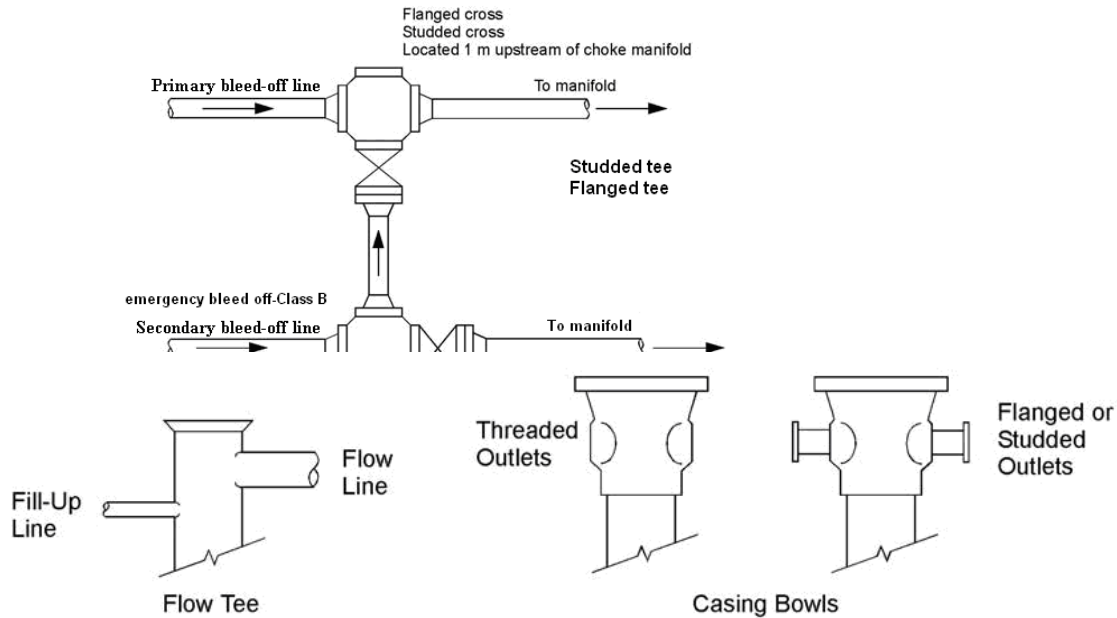


Bleed off lines – All Classes





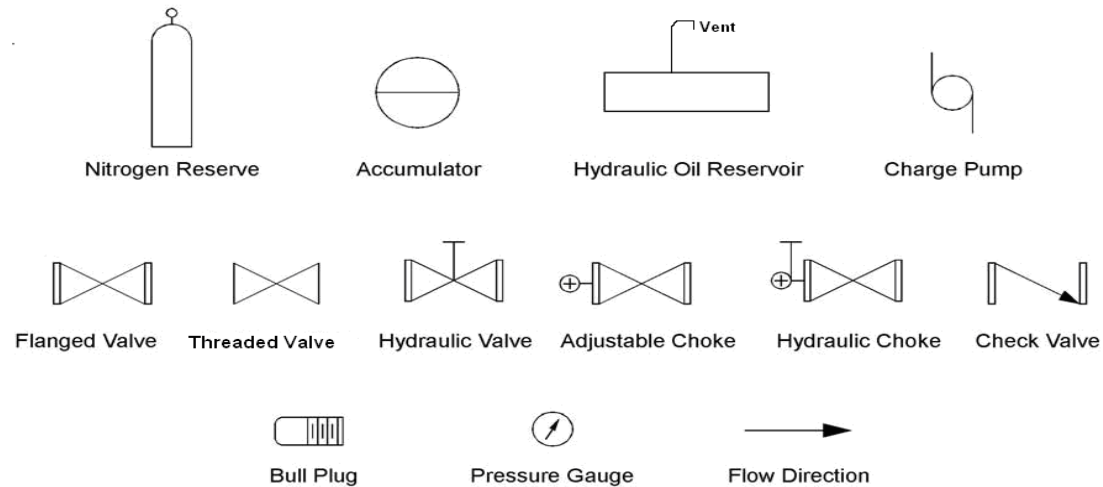
Bleed Off Lines- Class C & D
Connection of primary and emergency bleed off lines- Class B



For all classes:

Class A, B, C and D diagrams indicate single ram preventer. The single blind ram preventer may be replaced with a double gate preventer.

Equipment Symbols



Note:

- R – Single ram type preventer with one set of blind or pipe ram.
- A – annular-type blowout preventer.
- S – drilling spool with flanged side outlet connections for bleed-off and kill lines.
- Flanged means weld necked flanges.
- A double gate blowout preventer may replace a single gate preventer but the lowest ram in any stack shall be a pipe ram.