

	<b>POSITIVE ISOLATION</b> ALL-HSE-PRC-181	<b>Retention Code:</b> CG01 - CA
		<b>Revised:</b> <i>March 2015</i>
<b>Owner:</b> <i>HSE Performance Assurance</i>	<b>Approved By:</b> <i>Manager, HSE Performance Assurance</i>	<b>Effective:</b> <i>June 2015</i>
		<b>Review Frequency:</b> <i>Five years or less</i>



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## 1.0 Purpose

The purpose of this Procedure is to establish minimum requirements for safely isolating piping and equipment.

The installation and use of ice plugs, mud plugs, etc. or hot tapping during pipeline construction or maintenance is not within the scope of this document.

## 2.0 Hazards to Mitigate

- Explosion
- Fire
- Hydrates/frozen valves
- Liquids
- Oxygen deficient or enriched atmosphere
- Oxygen introduction to flare systems
- Pyrophoric material
- Releases from pressurized systems
- Sparking
- Static electricity
- Toxic gas
- Trapped pressure – line of fire

## 3.0 Procedure-Specific Roles and Responsibilities

### 3.1. Supervisors

- Ensure only trained personnel, as validated by the company's competency assessment process, are permitted to undertake isolation procedures.
- Ensure adequate isolation devices are available.

### 3.2. Worksite Supervisors/Worker in Charge

- Determine, approve, and document the isolation method.
- Check all isolation points prior to commencing the work to ensure required isolations are in place and documented on the isolation certificate.
- Verify that the equipment/piping system is absent of stored energy and harmful substances prior to commencing the work.
- Notify affected workers in adjacent work areas, including panel operators where applicable, when equipment is removed from or returned to service.
- Ensuring the Lockout/Tagout and Bypassing Safety Shutdown Devices Procedures are followed in completing the isolation.

### 3.3. Workers

- Follow approved isolation procedures.
- Stop work and inform supervision if isolations cannot be completed according to this isolation process.

### 3.4. Engineering

- Review and approve alternative methods of isolation.

## 4.0 Procedure

**Note:** Eliminate pressure from a system prior to adjusting or maintaining attached equipment that has the potential to release pressure (e.g. adjusting fittings, piping, etc.). *This does not apply to equipment that is designed to be adjusted under pressure (e.g. greasing certain components such as valves, etc.). Always consult manufacturer maintenance instructions or approved engineering instructions prior to servicing equipment under pressure.*

- Isolation of process piping, vessels or equipment from energy and harmful substances (vapors, liquids, or solids) requires that all inlet and outlet lines be isolated as appropriate for the risk. One of the following methods of isolation shall be used:
  - Blanking/blinding and line disconnection or a combination thereof.
  - Double block and bleed.
  - An alternative method certified by a professional engineer as providing an equivalent level of safety (e.g. single valve isolation).
    - Certification of alternate isolation methods can be done on a case-by-case basis or through an appropriately approved BU Engineering Standard.
- Select the appropriate isolation method and document on the appropriate isolation or hazard assessment document.
  - Identify all isolation points on the isolation documentation and communicate to affected workers.
  - All personnel working on isolated equipment have the right to verify the isolation points.
  - All permits and isolation certificates must be available at the work site.
  - Evaluate cathodic systems and isolate as required during the permit or hazard assessment process.
- Work must not proceed until the absence of energy and/or harmful substances has been confirmed.
  - Workers must stay out of the line of fire when testing for the absence of energy.
- Changes in work conditions or approved work scope require a revalidation of the isolation method prior to continuing with the work.

### 4.1. Additional Equipment Required

#### 4.1.1. Additional Personal Protective Equipment (PPE)

- Refer to the permit or hazard assessment for appropriate task PPE.

#### 4.1.2. Additional Equipment

- Portable continuous gas detectors

- Grounding/bonding cables
- Containment devices

#### 4.2. Blanking and Blinding

**Note:** In British Columbia, pipes connecting a vessel to a flare system must be blanked off and hoses disconnected before work is performed within the vessel.

- Use a bonding cable to control static discharge when piping continuity is interrupted during blanking or blinding.
  - The bonding cable may be removed as soon as the isolation task has been completed. It need not remain in place for the entirety of the continuity break but must be used any time work is performed on the piping in the immediate area of the continuity break including the removal of devices used in the isolation method.
- Install blanks or blinds at the closest flange reasonably possible to the vessel being isolated. Install gaskets on the pressure side of the blank or blind if required to prevent leakage.
- Blanks/blinds and gaskets must have adequate pressure and service ratings.

**Note:** Non-code skillets and blinds may be used in non-pressure environments to contain vapors where pressure is isolated with approved pressure rated blinds.

**Note:** In British Columbia, a blind or blank must be stamped with or otherwise indicate its pressure rating.
- Tag piping that has been blanked or blinded with installed blinds or blanks visibly marked.
  - Maintain a list of where blinds/blanks are installed.
- Where a section of line is removed, the potential release of pressure or harmful substance must be evaluated.
- Where a section of line is capped or plugged, consideration should be given to pressure rise due to thermal expansion.
  - A method for pressure verification must be available.
- When leaving isolation devices as a permanent installation consider the metallurgy of the item. For assistance, contact the Asset and Operating Integrity department.

#### 4.3. Double Block and Bleed

**Note:** In British Columbia, double block and bleed is not permitted for confined space entries if the adjacent piping contains a harmful substance that is a liquid of sufficient volatility to produce a hazardous concentration of an air contaminant or is a gas or a vapor.

- There are two approved methods for achieving double block and bleed:
  1. Double block and bleed system.
  2. Use of a single double isolation and bleed valve.
- When used, double block and bleed must use valves immediately upstream of the work area.
- Close the identified isolation valve(s) and open the identified bleed-off valve(s), ensuring that the bleed valves are not plugged or frozen.

- Lock and tag the isolation and bleed valves in accordance with the Lockout Tagout Procedure (CPC-ALL-HSE-PRC-179).
- The devices used to secure the valves **must** be strong enough and designed to withstand inadvertent opening without the use of excessive force, unusual measures, or destructive techniques.
  - Note:** In British Columbia, during a confined space entry, the diameter of the bleed line must be no less than the diameter of the line being isolated, unless certified by a professional engineer.
  - Note:** In British Columbia, the bleed must be checked to ensure that it remains clear of obstructions while the confined space is occupied, either by continuous monitoring or by manually checking within 20 minutes before worker entry, or before worker re-entry after the space has been vacated for more than 20 minutes.
  - Note:** In Saskatchewan, a designated worker must monitor the valves to ensure they are not activated while a worker is in the confined space. The designated worker must record the date and time of each monitoring event on the tag and sign the tag each time.

#### 4.4. Alternative Isolation Methods

- Where it may not be reasonably practicable to provide blanking/blinding or double block and bleed isolations, alternative isolation methods may be utilized.
- Alternative methods of isolation must:
  - Adequately protect workers, and
  - Must be certified as appropriate and deemed safe by a professional engineer, and
  - Documented and retained on file.
- Workers must be informed of approved alternative isolation methods and be instructed in applicable work procedures required as part of the approval.
- Each business unit (BU) will maintain a listing of approved alternative methods of isolation not specifically referenced within this document.
  - The BU listing must contain:
    - Specific requirements or limitations related to the approval.
    - Timeframes associated with the approval.
    - Approver name and title.
  - The approved isolation must be specifically referenced on the applicable isolation certificates when used.
- Note:** In British Columbia, an alternative method of control or isolation used for confined space entry must be acceptable to and approved by WorkSafe BC.

##### 4.4.1. Single Valve Isolation

- Single valve isolations may only be used in the following circumstances unless an engineering assessment is completed as required in Section 4.0 above:
  - Opening equipment to establish positive isolation (i.e., install blinds).

- Pig sending and receiving during routine operations
- When a single valve isolation is used, the following conditions must be satisfied:
  - The isolation is not left unattended
  - The isolation is not for confined space
  - The isolation is not for hot work

## 5.0 Document Retention

Records must be retained in accordance with ConocoPhillips' Document Retention Schedule.

Record	Owner	Classification	Retention
Alternative methods of isolation approvals	Business Units	CG01 – CA	Obsolescence + 10 Years
Isolation Certificates	Business Units	HE11 – CA	2 Years

## Appendix A – Definitions

**Blind Flange:** A flange used to seal off and isolate the open end of a flanged pipe or flanged fitting. It is rated to the design pressure of the piping system or equipment being isolated.

**Blind Skillet/Blank:** Also referred to as a blind, steel line blank or paddle blank. This refers to a solid metal plate engineered and manufactured to form isolation between the faces of two flanges rated to the design pressure of the piping system or equipment being isolated. These fittings are pressure-containing devices and they must be engineered with respect to proper size, thickness, metallurgy and method of manufacture in order to ensure integrity.

**Double Block and Bleed (DBB) Ball Valve:** A ball valve with two seating surfaces and a cavity bleed port between the seats. In the closed position it provides a seal against pressure from both ends of the valve with a means of venting the cavity between the seats to prove seal integrity. It is intended to be used to separate process streams under pressure. For the purposes of isolation, a single DBB valve is considered to be single valve isolation as described above.

**Double Block and Bleed System:** Two valves in a series **Closed, Locked, and Tagged** with the pressure between the valves bled through a locked open and tagged vent directed to a safe location. The vent line is to be monitored when double block and bleed is used to isolate an area for confined space entry or hot work activities.

**Double Isolation and Bleed (DIB) Valve:** A single valve with dual positively energized seats (upstream and downstream) along with a cavity bleed port between the seats. If the upstream seat leaks, the downstream seat will hold the upstream pressure. The valve is Closed, Locked, and Tagged with any pressure between the seats vented to a safe location. The vent line is to be continuously monitored when a DIB valve is used to isolate an area for confined space entry or hot work activities. *Self-relieving valves do not meet these requirements.*

**Harmful Substances:** A substance that, because of its properties, application or presence, creates or could create a danger, including a chemical or biological hazard, to the health and safety of a worker exposed to it.

**Isolated:** To have separated, disconnected, de-energized or depressured.

**Lockout:** The use of a lock or locks to render machinery or equipment inoperable or to isolate an energy or product source. The purpose of a lockout is to prevent an energy or product isolating device (such as a switch, circuit breaker, or valve) from accidentally or inadvertently being operated while workers are performing maintenance or service on machinery or equipment.

**Positive Isolation:** Isolation of process piping, equipment or vessels from hazardous materials (vapors, liquids, or solids) such that it is impossible for hazardous materials to enter the work area.

**Single Valve Isolation:** Most common valves provide only one sealing surface to isolate upstream pressure and fluids. Common valves styles include floating ball valves, trunnion mounted ball valves and gate valves. Pressure relief and safety valves (PSV) are also included in this category when used as a single point of isolation.

**Spectacle Blind:** Also referred to as a figure 8 blank, this has the same pressure retaining characteristics as a blind skillet but has 2 ends, one solid (blind) and one open.

### Appendix B – Revision Record

Page#	March 16, 2015	Previous Information	Change Assessment
3	<p>Work must not start until the absence of energy and/or harmful substances has been confirmed.</p> <p>Changes in work scope require a revalidation of the isolation method prior to continuing with the work.</p>	None	Low – Life Saving Rules requirement.
3	<p>Pressure must be eliminated from a system prior to adjusting or maintaining attached equipment that has the potential to release pressure (e.g., adjusting fittings, piping, etc.). <i>This does not apply to equipment that has been engineered to be adjusted under pressure (e.g., greasing certain components such as valves, etc). Always verify with manufacturer maintenance instructions or engineering prior to servicing under pressure.</i></p>	None	Low – Clarification of expectations related to investigations and audits.
4	<p>Non-code skillets and blinds can only be used in non-pressure environments.</p>	None	Low – Clarification of engineering requirements.
5	<p>Workers must be informed of the alternative methods and instructed in any applicable work procedures.</p>	None	Low – Clarification of regulatory requirements.
5	<p>Each Business Unit will maintain a listing of approved alternative means of isolations.</p> <p>Single valve isolations may only be used in the following circumstances unless an engineering assessment is completed:</p> <ul style="list-style-type: none"> <li>• Opening equipment to establish positive isolation (i.e., install blinds).</li> <li>• Pig sending and receiving</li> </ul>	<p>Single valve isolation requires the use of sound judgment. If any doubt exists about the appropriateness of single valve isolation, use one of the other methods of isolation</p> <p>Examples of operations where the use of single valve isolation may be appropriate include: changing pressure gauges, cleaning sight glasses, replacing needle valves, pig launching, replacing fluid chokes, etc.</p>	Low – Clarification of regulatory requirements.
6	<p>Additional definitions added for clarity around isolation methods and valve types</p>	None	Low – Clarification