ENVIRONMENTAL, SAFETY, AND HEALTH

WORK PRACTICES

506: BREAKING LINES, ISOLATING, AND RELEASE OF EQUIPMENT

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ABSTRACT

Overview of ESH 506

Safe Work Practice 506ESH: **Breaking Lines, Isolating, and Release of Equipment** outlines the steps that shall be followed to reduce the risk of fire, spill, leak or injury when breaking lines and/or isolating equipment for release to maintenance. **It is used in coordination with ESH 509 Isolation Lockout Tagout.**

Contents

This Practice covers the following information:

- Definitions of relevant terms
- Roles and responsibilities
- General requirements (permits, locks and tags, blind list)
- Breaking lines
- Preferred methods of isolation
- Examples of isolation techniques
- Preparing the Equipment Isolation Checklist
- Six-part blind tag

Appendices

This Practice contains the following appendices:

- Appendix A: Equipment Isolation Checklist
- Appendix B: Blind Thickness For Various Pipe Sizes

SECTION 1 – PURPOSE

Purpose of Practice 506

The purpose of Safe Work Practice 506: **Breaking Lines, Isolating, and Release of Equipment** are to specify the minimum steps that must be followed to reduce the risk of fire, spill, or injury when isolating lines and equipment.

SECTION 2 – REFERENCES

References

For more information on breaking lines, isolating and releasing equipment, refer to the following documents:

Document Number	Title
ESH-505	Management of Change
ESH-507	General Work Permit
ESH-508	Hot Work
ESH-509	Isolation Lockout/Tagout
ESH-511	Personal Protective Equipment
ESH-512	Gas Detection
ESH-513	Confined Space Entry
ESH-515	Contractor Performance
ESH-518	Hearing Protection
ESH-524	Pre / Post Start-Up Reviews
ESH-533	Excavation
ESH-534	Tank Cleaning, Repairs, and Dismantling

SECTION 3 – DEFINITIONS OF RELEVANT TERMS

Blinds/Spade

A circular metal plate used to block the flow path in a pipeline that is bolted between two pipe flanges. The circular plate should have a portion attached that extends outside of the pipeline to show that a blind/spade is installed. Typically, either a “pancake blind” (sometimes called a "skillet blind”) or “spectacle blind’ is utilized. The blind/spade must be designed for the full maximum design pressure of the equipment into which it will be installed (see Appendix B: Blind Thickness for Various Pipe Sizes).

Pancake Blank

Spectacle Blank or Figure-Eight
(Used where piping is frequently blocked off and piping is not easily sprung apart.)

Blind/Blank flange

A blind/blank flange installed at the end of an open pipeline or after removing a valve from a piping system. A blind/blank flange is a flat flange, with no hole through the center, which bolts to the flanged end of a run of pipe or to a flanged equipment nozzle... See Appendix B - Blind Thickness For Various Pipe Sizes.

Legible stamp to ensure correct rating

Equipment Isolation Checklist

A list that is prepared and maintained by Operations which contains a step by step record of the isolation process. See Appendix A – Equipment Isolation Checklist

Blind tag

A six-part tag used to keep track of a blind from the time it is installed until it has been removed. Tags must be constructed and printed so that weather conditions or dampness will not cause the message on the tag to become illegible. The tag should be attached using a self-locking nylon cable tie with a breaking strength of at least 50 pounds.

Bonding

Electrically tying or connecting two conducting metal bodies to the same potential. Bonding prevents static accumulation by providing a low resistance path for the generated static charge. Bonding wires shall be sufficiently sized to provide adequate electrical continuity for example, 4 American Wire Gauge (AWG), larger copper wire, or braided metal grounding straps. If the terminal has an impressed current cathodic protection system, or if on a pipeline and the integrity of the insulating flanges is unknown, then a bond wire (or jumper) must be installed across all line separations before the line is opened, and on equipment before maintenance, operations begin. The jumper or bond wire must be a #4 AWG or larger copper wire. Braided metal grounding straps are an acceptable alternate to the copper wire. Clamps are to be designed for bonding such as clamps with a Tungsten Carbide tip. It is not necessary to use a jumper wire on metal drip pans that are in contact with the ground

Day-lighting

This refers to disconnecting, misaligning, and capping or plugging lines. Day-lighting is an approved method of isolation for all equipment when confined space entries are performed.

Double-block and bleed	Either a special valve or a combination of valves that close a line, duct or pipe by closing (blocking) the main line and opening a drain or vent valve in the line between the two closed valves**.**
Block valve	A twin seal valve, ball valve or gate valve. A butterfly valve is generally not to be used as a block valve (see "Butterfly Valve Rule, Section 15)**.**
Electrical isolation	The opening and locking of electrical switched or circuit breakers at the main power source, disconnecting leads, or removing fuses to make it physically impossible for electrical power to get to the equipment.
Maintenance	The person (contractor or Company) responsible for ensuring that all maintenance requirements of this procedure necessary to isolate the equipment, including permit requirements, are met in addition to performing the required maintenance or work activity on the equipment being isolated.
Out of Service	Lines or equipment that is removed from service for a temporary period.
Abandoned	Lines or equipment that is removed from service and will not be used again.
Operations	The Company person designated to see that conditions in the area are safe for the maintenance work to be performed. Operations may be any of the following: • Head Operator • Senior Operator • Operator • Terminal Manager • Designated Company Representative

SECTION 4 – EXCEPTIONS TO THIS SAFE WORK PRACTICE

Exceptions

Any exceptions to this Safe Work Practice may only proceed after completing all the requirements of Management Of Change, which are defined in ESH 505, and obtaining all the required signatures. The Area Manager shall review and approve the MOC and isolation plan. Additional resources available to review the MOC and isolation plan include the following: Safety Specialists, Manager – Regional Engineering, Engineering Supervisor, and Senior Reliability and Standards Engineer.

A MOC should not be submitted and approved to enable short-cutting of this Safe Work Practice. The MOC should include any alternative procedures to equivalently manage the risk of the work or task. This may require increased levels of protection. Examples of increased levels of protection can include but are not limited to: a fire watch to increase area monitoring and to initiate an ESD if needed, increased fire protection equipment immediately available at hand such as a fire extinguisher and/or water hose, and performing tasks at hours which coincide with low operation demand periods

SECTION 5 – GENERAL REQUIREMENTS

Pre-Planning

The scope of the job and the hazards that could be encountered dictate the amount of planning required. During the pre-construction meeting Operations, Maintenance and Contract personnel shall, where applicable, complete the "Pre-Job Conference and Contractor Safety Review Checklist" (see ESH-515).

Safety, Fire & Health Considerations

Protecting the Work Site: Barricades, plastic safety tape(s), traffic cones, and signs should be used to warn workers of possible danger. Nearby roads and walkways may need to be barricaded to keep vehicles and personnel from entering the area without authorization.

Working in High Noise Areas: Refer to ESH-518 Hearing Conservation.

Safety, Fire & Health Considerations

Personal Protection Requirements: When performing any work appropriate approved personal protective equipment (PPE) shall be worn by all personnel. Refer to ESH-511 Personal Protective Equipment, the Terminal specific Hazards Assessment for PPE and MSDS's for further information. Contractors must provide and wear their own PPE that provides at least equal protection.

Product Spills: Do not allow product to spill. Pump it to storage or catch it in a metal pan. A bond wire (or jumper) is not required if the metal pan is in direct contact with ground. It is required if the metal pan rests on a plastic sheet, plywood, etc, that does not allow direct contact with ground. Plastic containers are not allowed.

Post Job

When the work has been completed per the job scope, the facility may discuss how well the work progressed in accordance with the plan before closing out the permit. Refer to 4.0 Assess Performance in the Americas Products – Managing SWPs – Assessing Hazards and Managing High-Risk Work Procedure.

SECTION 6 – RESPONSIBILITIES

Terminal Manager

The Terminal Manger is ultimately responsible for all maintenance work occurring at their Terminal. They shall ensure that the systems and procedures contained in this Safe Work Practice are implemented throughout the Terminal. The Terminal Manager shall also inspect the work area periodically and isolation procedures for compliance to this ESH and provide feedback to Operations, Terminal Engineering and Maintenance.

Operations

Operations are responsible for preparing equipment for release to Maintenance, the complete preparation of all permit/forms and for the overall safety of the area where the work will be performed. This includes:

- Planning and arranging for the equipment to be prepared for release to Maintenance.
- Ensuring that all pre-job planning has been completed (including any JLAs); all personnel understand their responsibilities and the procedures and permit/forms that must be used. Where applicable, as a Best Practice consider walking the isolation plan with contractors to ensure they understand where and how isolation will be achieved.
- Operations shall install a **"Danger--Do Not Operate"** tag and lock at all locations where a maintenance or electricians **"Danger--Do Not Operate"** tag and lock will be installed.
- Isolating equipment by an appropriate method that ensures the maximum level of protection for workers.
- Rope off or barricade the job site to prevent unauthorized entry into the area.
- Completing the **"Equipment Isolation Checklist"** contained in Appendix A.
- Hanging a **"6-Part Blind Tag"** at each location where a blind must be installed to isolate equipment. The location of each blind shall be recorded on the **"Equipment Isolation Checklist"** by the Operations representative.

Operations (continued)

- Periodically each day observing the work site as work progresses to ensure that safe procedures are being followed.
- Alerting the maintenance personnel of any emergency or change in conditions that could affect their safety. If necessary:
  - Shut down the job
  - Immediately remove all permits until safe conditions can be confirmed and permits are reissued
  - Advise the Terminal Manager.
- Checking the work site at the end of each day to ensure the area is free of fire hazards and other hazards that may affect operation.
- Ensuring that the work is completed satisfactorily and the area is cleaned up before equipment is put back into service.
- Ensure the Equipment Isolation Checklist is complete and the "Return to Service Approval" is signed by the Terminal Manager (or designate).

Maintenance

Responsible for initiating the permitting process and safely performing the work, which includes:

Note: Maintenance cannot break lines, isolate equipment, blind lines, or do hot work without having Operations involved in the process, from start to finish.

- Each maintenance person working on lines or equipment shall install a **"Danger--Do Not Operate"** tag and lock at all locations where an Operations **"Danger--Do Not Operate"** tag and lock is installed.
- Electrical maintenance personnel shall install a "Danger—Do Not Operate" tag and lock at all locations where an Operations "Danger—Do Not Operate" tag and lock is installed.
- Participate on JLA Development Teams as requested.
- Installing blinds and barricading the area according to the instructions from Operations.
- Reviewing with Operations that the block valve, bleeder, and blind setup to be sure it is safe to open the line or equipment.
- Ensures the work site is left in a safe condition at the end of each day prior to leaving the terminal.
- Making sure the work site is adequately protected (barricaded) when the job is interrupted and workers leave the Terminal
- Removing maintenance material and cleaning up the site after work is complete.
- Returns equipment to required operating position(s) **when instructed to do so by operations** (removes blinds, connects lines, remove lock and tags).

Terminal Engineer	On construction projects or at the Power Team's request, is responsible for: • Design of line/equipment changes or alterations • Filling out the applicable parts of the MOC form (if required) • Providing Operations with enough Process Safety Information to understand the nature, scope, and specific hazards associated with a project or isolation procedures that should be considered. • Participate on JLA Development Teams as requested. • Inspect the work area periodically and isolation procedures for compliance to this Safe Work Practice and provide feedback to Terminal Operations and Maintenance.
Terminal ES&H Specialist	Shall be available at the Power Team's request and is responsible for: • Advising the Terminal Manger of safety and environmental requirements for the project, such as the need for gas testing, permitting, personal protective equipment, and standby or fire watch personnel etc. • Filling out the applicable parts of the MOC form (if required). • Participate on JLA Development Teams as requested. • Inspect the work area periodically and isolation procedures for compliance to this Safe Work Practice and provide feedback to Operations, Terminal Engineering and Maintenance.

SECTION 7 – PERMITS, LOCKS AND TAGS

7.1 – Permits

General Work Permit	See ESH-507 for details. Note: all isolation requires a permit.
Hot Work Form	See ESH-508 for details.
Excavation Work Form	See ESH-533 for details.
Hot Tap	Requires a work plan approved by the Area Manager and Manager – Regional Engineering. References include CVX Piping Manual Section 600 and API 2203. General Work Permit and applicable forms are also required.
Confined Space Entry Form	See ESH-513 for details.

7.2 – Locks and Tags

Lock and Tags See ESH-509 for details.

SECTION 8 – ISOLATION TECHNIQUES

General Requirements

Day-lighting, blinding, or double block and bleed are acceptable methods of isolation. However, there will be some situations where full day-lighting, full blinding, or full double block and bleed (including draining), will result in higher risk than alternate methods. Other considerations could include duration of exposure to employee (length of job), proximity to public exposures, volume of product required to be drained, size of valve to be removed, etc.

Single block valves shall not be relied upon as safe isolation for repair or maintenance work with the exception of short duration tasks such as the installation of a blind, cleaning a strainer, replacing a dry-break o-ring, or replacing filters These activities may be permitted against a single block valve. The valve(s) must be locked and tagged; the system must be verified to be depressurized downstream of or between the block valve(s), and the valve(s) verified to not be leaking.

Short duration tasks are tasks that can be completed by an Operator or Mechanic without them leaving the work area for the duration of the task. **If the work cannot be completed by an Operator or Mechanic without leaving the work site, blinding or double block and bleed must be used.**

8.1 – Lockout/Tagout

Lockout/ Tagout See ESH-509 for details.

8.2 – Double Block & Bleed

When to use

The double-block and bleed method is an acceptable level of isolation protection when performed correctly and can be used as an alternate to blinding for shorter duration work where blinding is determined to be more hazardous.

In addition, the double-block and bleed method shall only be considered for tasks where personnel will be working in the area the entire time the double block and bleed method is in use and the bleeder can be monitored. If personnel must leave the work area, the bleeder valve must be closed and locked/tagged. When work resumes, the double block and bleed isolation must be re-verified to be not leaking. . For determining if one side of the double-block is not forming a liquid tight seal, the bleed shall be monitored periodically for leaks during the entire time isolation is in effect.

How to use

Double-block and bleed isolation may be achieved in one of two ways:

1. Using a General Twin Seal valve or Orbit valve, this has an operable body bleed valve on the twin seal valve.
2. Using two block valves (gate valves, ball valves and butterfly valves are acceptable block valve types) and a low point bleed point between the two block valves on the line being isolated.

Prohibited use

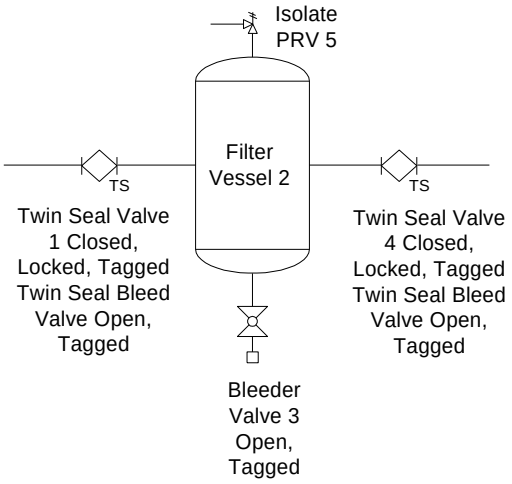
Do <u>not</u> use double-block and bleed to isolate a space for entry. Air gapping or blinding are acceptable for isolating for entry.

Documentation

The isolation technique shall be documented and signed by the Terminal Manager or designate on the Equipment Isolation Checklist (see Appendix A).

Procedure To use the General Twin Seal valve method to isolate equipment, follow these steps as an example:

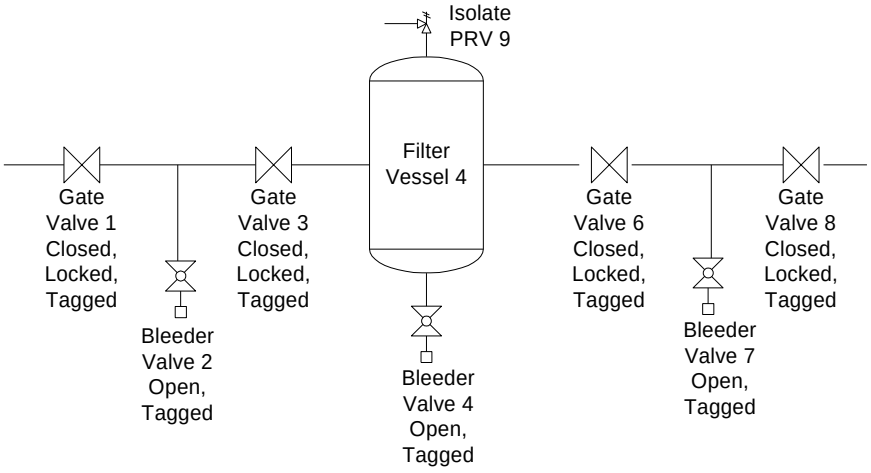
Step	Action
1	Operations chains and locks twin seal valve (1) and (4) in the closed position and tags them with **"Do Not Operate"** tags. • If maintenance work is required, Maintenance must also lock and tag the valves using **"Do Not Operate"** tags.
2	Operations slowly opens the bleeder valve on the twin seal valves (1) and (4) body and tags with **"Do Not Operate"** tags, making sure the bleeder is not plugged and the valve body is free of product. Place grounded drip pan under bleed point. • If maintenance work is required, Maintenance must also lock and tag valves (1) and (4) using **"Do Not Operate"** tags.
3	Operations depressors and fully drains the filter vessel (2) using bleed valve (3), making sure the bleed is not plugged and that the vessel drains completely.
4	Verify that valves (1) and (4) are not leaking by checking the valve body bleed. If leaking: a. An additional block valve upstream must be closed, chained, locked and tagged by operations and maintenance. b. This new section of line must be depressurized and drained. c. Monitor bleed valve periodically during isolation.
5	Isolate filter vessel PRV (5) (if required).
6	If the area is left unattended for a period of time (e.g. breaks and lunch) bleeder valves shall be closed and plugged. When work resumes; verify valves (1) and (4) are not leaking by slowly opening the valve body bleed.

Example of Double Block & Bleed Method Using Twin Seal Valves To Isolate A Filter Vessel	

Procedure To use the two block valves and bleeder valve method to isolate equipment, follow these steps as an example:

Step	Action
1	Operations chains and locks gate valves (1), (3), (6) and (8) in the closed position and tags them with **"Do Not Operate"** tags. • If maintenance work is required, Maintenance must also lock and tag the valves using "Do Not Operate" tags.
2	Open bleeder valves (2) and (7) on the product line between gate valves (1) and (3), (6) and (8).
3	Drain and depressurize the product line, making sure the bleed valves (2) and (7) are not plugged and the line drains completely.
4	Verify that gate valves (1) and (8) are not leaking. If they are: a. An additional block valve upstream must be closed, chained, locked and tagged by operations and maintenance. b. That new section of line must be depressurized and drained.
5	Isolate filter vessel PRV (9) (if required).
6	While work is in progress, ensure that the bleed valves (2) and (7) are: • Left in open position with a drip pan and frequent monitoring in place. • Tagged with **"Danger — Do Not Operate"** tags. • Tagged with "Danger **– Do not Operate**" tags. • Monitored periodically during isolation.
7	If the area is left unattended for a period of time (e.g. breaks and lunch) bleed valves (2) and (7) shall be closed and plugged and drip pans shall be verified as being empty. When work resumes; verify that the line is still depressurized by slowly opening the bleed valves (2) and (7).

Example Of Double-Block & Bleed Method Using Gate Valves (ball valves and butterfly valves are also acceptable) And Bleeder Valves To Isolate A Filter Vessel



8.3 – Blinding

Purpose of blinds

The purpose of blinds is to provide an increased level of isolation protection over the double-block and bleed method. This is achieved by physically isolating all other piping and equipment from the section of piping or equipment on which work will be performed.

Isolation for Entry

Blinding is an approved method to isolate all equipment for entry. Blinding shall be performed as close to the confined space as possible.

Locations for blinds

Blinds must be installed at locations designated by Operations. Blinds shall be installed on the closest flange to the vessel or line to be isolated and installed on the non-pressure side of the valve. Blind locations shall be documented on the Equipment Isolation Checklist (See Section 16).

Materials

Blinds must be of sufficient strength and thickness to withstand the maximum operating pressure of the line. Blinds shall be constructed of ASTM A517-70 or A516-70 carbon steel. See Appendix B.

Control of supply

1. Maintenance blinds shall not be used.
2. All blinds shall be stored in a dedicated location and they shall not be used for any other purpose than for isolation of tanks and piping.
3. All new blinds must be purchased from the Alliance Supplier, McJunkin, not fabricated.

Purchase from Alliance supplier

When the blind is purchased from the Alliance Supplier it shall be either a slip blind or a spectacle blind. These blinds are normally purchased for Class 150 service, but in some cases may be ordered for Class 300 service. The blinds shall be marked and stamped. This marking shall be checked prior to use.

Using blinds from existing stock

1. The material and dimension requirements shall be verified prior to use.
2. It shall be visually inspected with a light of at least 100 candlepower by illuminating the backside of the blind looking for pin holes or cracks.
3. Prior to each use, the gasket faces shall be inspected for any signs of damage or pitting that would interfere with its ability to contain the full service pressure.
4. Prior to each use each blind shall be inspected for corrosion. If corrosion or pitting is occurring, the thickness of each blind shall be checked with a caliper, or micrometer and Engineering consulted to ensure integrity of the blind. The closed side of spectacle blinds must be checked for minimum thickness too. Please refer to Appendix B for minimum thickness requirements.

Blind gaskets

Gaskets are to be installed on both sides of the blind to prevent leaks and protect the flange faces.
Use only the gasket specified for normal line service and pressure rating. It is acceptable to use a NEW composite gasket for blinding if it is for a short duration and is installed only on the non-pressure side of the blind. A metallic Spiral Wound gasket must be installed on the pressure side, no exceptions. Spiral Wound metallic gaskets have a metal outer ring that helps to center the gasket and prevents over-compression of the gasket. Composite gaskets are subject to blowout at low pressures and thus cannot be used on the high pressure side of the blind or for long durations.

Blinds at flanges

Install blinds at both of the following:

- The closest flange to the spot where the work will be done
- The closest flange on each adjoining line

Requirement for blind tags

A six-part blind tag (GO-1497) shall be attached by operations at each location a blind is required to be installed. A six-part blind tag (GO-1497) is used to track the installation and removal of each blind and is used in coordination with the Equipment Isolation Checklist. See Section 16 in this ESH for requirements.

Purpose of blind tags

Blind tags allow Maintenance and Operations to tell at a glance the status of the blind.

General Requirements

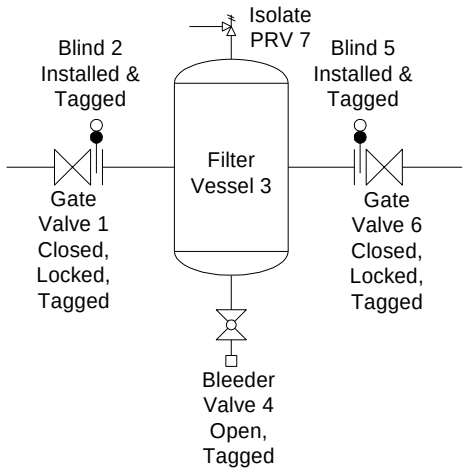
Installation

1. The non-pressure side of the valve shall be depressurized and drained before blinds are installed.
2. Installation of the blind is permitted against a single block valve, if the system can be proven to be depressurized downstream of the block valve.
3. When installing blinds, flanges shall be broken slowly. Bolts facing away from workers shall be broken first.
4. Verify that the valve is not leaking. If the valve leaks:
   - An additional block valve upstream must be closed, chained, locked and tagged by operations and maintenance.
   - That new section of line must be depressurized and drained.

Removal

1. A single valve is sufficient protection to remove blinds.
2. When removing blinds, flanges shall be broken slowly. Bolts facing away from workers shall be broken first.
3. Verify that the valve is not leaking. If the valve leaks:
   - An additional block valve upstream must be closed, chained, locked and tagged by operations and maintenance.
   - That new section of line must be depressurized and drained.

Example of Blinding Method To Isolate A Filter Vessel



8.4 – Day lighting

Day lighting (air gapping)

Day-lighting includes a blind flange on the pressure side of the air gap and is called air-gapping.

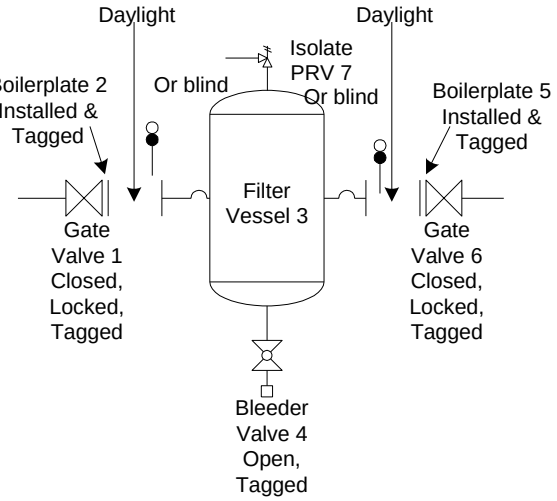
Isolation for Entry

Day-lighting is an approved method to isolate all equipment for entry. Air gapping shall be performed as close to the confined space as possible.

Emptying line

A check shall be made to ensure the section of line between the boiler plate/blank and the space or equipment being isolated is empty before installing the boilerplate/blank.

Example of Day-lighting or Blinding Method To Isolate A Filter Vessel



8.5 – Electrical Isolation

De-energize or disconnect power

Refer to ESH 509 – Lockout/Tagout

8.6 – Other Isolation Techniques

Disable rotating equipment

If the space to be entered contains rotating equipment, such as an agitator, fan, or mixer, this equipment must be disabled as follows:

- Perform required electrical disconnect activities, tag and lockout all controls including all local and remote stop/start stations (Refer to ESH 509).
- Equipment that has stored energy (springs, pneumatic or hydraulic) must be de-energized.
- The equipment must be blocked/strapped as necessary to prevent movement.

Atmospheric Lines

Atmospheric lines such as drain lines into an underground tank (UST) may require alternative isolation for entry into tanks and/or associated sumps. These lines typically cannot be blinded due to their configuration. Use of dollar plate type compression plugs is an acceptable type of isolation. Isolation of equipment with atmospheric lines must follow the MOC process in Section 4. An example of acceptable isolation of a UST sump is provided in Section 15.

Other

Other non-standard methods of isolation may be required periodically. See Section 4 of this ESH for instructions on how to proceed.

8.7 – Bolting-up Practice

Bolting up the blind

- Flange faces, and grooves on ring and tongue-and-groove flanges, should be thoroughly cleaned with a wire brush, being careful to not to damage the surface finish. After cleaning, inspect the flange faces for pits and defects.
- Bolts, studs and nuts must be of materials for the specified for the service. Bolts and studs should be long enough so that the nuts are fully engaged, with at least one full thread exposed at each end. Bolts, studs, and nuts should be cleaned and lubricated with an approved thread paste (Bostik, Inc. "Never-Seez Anti-seize and Lubricating Compound") Lubrication of the contact surface between the nut and flange prevents seizure when tightening the nut.
- Gaskets should be inserted dry. Metallic Spiral Wound Gaskets for tongue and groove joints should be placed with the seam in the bottom of the grove.
- When flanges are in close horizontal and vertical alignment and the faces are parallel, all bolts are installed except one or two and the nuts are tightened hand tight. Spud bar is inserted in one of the holes left open and is used as a lever to raise or lower either flange to achieve alignment. Ensure that the tongue enters the groove on tongue-and-groove flanges or that the ring seats into the groove on ring joints. Tighten one bolt sufficiently to keep the tongue and grove engaged (or the ring seated) and then tighten the opposite bolt a like amount. This will result in a parallel facement. Remove the spud bar and install the remaining bolts, tightening opposites and gradually working around the flange until all the bolts are tight, with equal tension on each bolt. With Spiral Wound gaskets, the flanges should be evenly seated on the gasket-centering ring.

Bolting up the blind (cont'd)

- Good practice for tightening bolted flanges is to draw up progressively on bolts in the 12 o'clock, 6 o'clock, 9 o'clock, and 3 o'clock positions, progressing in this manner around the flange until all the bolts are brought up snugly to ensure sufficient compression to seat the gasket. The larger the flange the more important this procedures is.

8.8 – Tank Isolation for Roof Seal Inspection and Lowering Floating Roof Legs

Isolating tank for roof seal inspection or lowering floating roof legs

1. Entry onto tank roofs which are in operation[1] is generally prohibited except for access onto steel roofs with annular pontoons or roofs with double deck construction for the following type reasons:
   - Roof seal inspections
   - Changing floating roof leg positions
   - Checking pontoons

2. Isolation shall be accomplished by locking and tagging all tank valves closed for the stilling and for the duration of the entry

3. All power to the tank shall be locked out and tagged out

4.. Tank must be stilled[2] before accessing roof by
   * waiting a minimum of 30 minutes after the end of a receipt to allow static dissipation

5. Follow ESH 513-Confined Space Entry.

[1] Entry onto steel pan roofs with no buoyancy compartments such as annular pontoons or double decks and all aluminum floating roofs in operation is never permitted.

[2] Stilled means that all valves closest to the tank shall be closed and that flow into or out of the tank is not possible because all incoming and outgoing valves are closed. It is not necessary to double block and bleed, blind or air gap these lines for these purposes. Stilling, also requires the lock out and tag out of all electric power supplies to the tank and the gauger's platform.

SECTION 9 – ISOLATING LINES

Isolating Lines

Lines to be worked on shall be completely isolated. **A single closed valve is not to be used for isolation except as noted in Section 8.0.**

- Ensure all valves and lines impacting the system to be isolated are closed or disconnected.
- Ensure PRV devices are isolated prior to work and reactivated after work is complete. **Caution** should be exercised against isolating a PRV which may be providing pressure relief for a line, section of line, vessel or piece of equipment other than the line or section of line on which work shall be performed. Alternative means of relief may need to be considered to allow for thermal expansion and/or pressure relief for other lines, sections of line, vessels or pieces of equipment.
- Always assume the line is pressurized. **Never rely on a pressure gauge to prove the line is depressurized.**
- After the line has been drained or flushed, open the nearest bleeder that is part of the same line and not separated from the point of work by an obstruction. Open valves of bleeders and/or flanges slowly until it can be verified the line has been depressurized.
- When de-pressuring a line make sure all low point bleed/drain points are clear of debris. Use a tool such as a hydraulic ram, bleeder reamer, or other approved method to ensure the full throat of the bleed/drain is clear. Wire or welding rod is not an approved method for checking and clearing bleeder/drain valves. Note: A high point vent or other means of introducing air into the system may be needed to allow product flow.
- All bleeders/drains left open must be tagged with a **"Danger--Do Not Operate"** tag by operations and a **"Danger--Do Not Operate"** tag by maintenance.
- Operations shall verify the line is depressurized, while Maintenance observes and then stands by while the line is opened.
- Spillage shall be prevented when opening a line by placing a suitable metal container of sufficient capacity under the line, flange or bleeder being opened. Bond between the container and the line if the container is not sitting directly on the ground.
- To de-pressurize or drain a line if a bleeder valve is unavailable, place an appropriate bonded (the ground is considered an appropriate bond) conductive container underneath the flange and loosen the bottom or away bolts and crack open the flange closest to where the work is to take place.

Isolating Lines (continued)

- When a valve or spool is dropped out of a line, a blind flange must be installed on the pressure side. If the spool was removed between line sections, both open ends must be blinded if the line is being left unattended.
- When removing a spool, mark the spool and flange with a grease pencil or Sharpie to ensure proper alignment during reinstallation.
- When installing new spools, verify proper alignment and mark spool and flange with a grease pencil or sharpie to ensure proper initial installation and future alignment.
- Blind flanges should have a bleeder/vent valve installed if there is not a bleeder on the section of line or equipment being isolated.
- If a flange is not available and the line is to be cold cut, a JLA shall be developed.
- When cutting bolts to remove a spool or valve, the old bolts shall be replaced with new bolts and tightened to rated capacity as each old bolt is removed. Use the cross hatch (opposite sides of flange) method of replacing the bolts. Issue a Hot Work Form if tools are a potential source of ignition. .
- When opening a line that is in flammable or in combustible liquid service all ignition sources within 50 feet should be removed. This may involve shutting down equipment.
- If the line has cathodic protection, shut off the electric current 24 hours in advance, open the breaker, and attach tags and locks. If this is not possible, a low resistance bond or jumper must be installed around the point of separation before the line is opened.
- An Equipment Isolation Checklist shall be filled out if the criteria described in Section 16.0 of this ESH are applicable.

SECTION 10 – BREAKING LINES

Breaking Lines

The precautions that need to be taken when breaking a line depend upon the service the line is in and the nature of the work that will be done.

- Before breaking lines, it is required to wait for 30 minutes after any flow in the line has stopped to allow any accumulated static electricity to bleed off.
- Bonding is required when breaking all flammable, combustible and cathodically protected lines. Stray currents may originate from cathodic protection systems on the line to be isolated or adjacent lines and can be verified by using an ohmmeter to test for resistance. If stray currents are present a low resistance bond or jumper must be installed around the point of separation.
- Use appropriate hand tools or pneumatic power tools to cut lines (if required). A stream of water or oil must be sprayed on the cutting tool to keep it cool. Place a suitable container of sufficient capacity under the line to prevent spills.
- If required, the procedure for installing a low resistance bond is as follows:
  - Install a bond wire or jumper (No. 4 A.W.G. or larger copper wire) across the point of separation before the line is opened.
  - Use standard bonding clamps
  - There must be positive metal-to-metal contact and the connection must be secure
  - The bond wire must remain in place until the line is closed.
- **Caution** should be exercised against isolating a PRV, which may be providing thermal relief and/or pressure relief for a line, section of line, vessel or piece of equipment other than the line, section of line, vessel or equipment on which work shall be performed. Alternative means of relief shall be considered to allow for thermal expansion and/or pressure relief for other lines, sections of line, vessels or pieces of equipment.
- Whenever a line that has contained product is opened, workers must wear appropriate personal protective equipment. Refer to the product MSDS and/or ESH -511 for guidance on PPE equipment needs.
- All sources of ignition must be eliminated within 50 feet of where the line will be opened.
- Open ended, out of service or abandoned lines must be sealed, plugged off, or removed. Refer to Section 14.0

SECTION 11 – PREPARING LINES FOR HOT WORK

When preparing lines for hot work the following are required in addition to the items specified in Section 10.0 – Breaking Lines. In addition refer to ESH 508 – Hot Work.

Flushing and cleaning

Before opening a line perform the following:

- Eliminate all ignition sources within 50 feet of the exposed material and its drainage path **and**
- Steam clean the line (if steam available) **or**
- Flush line with water (water needs to be disposed of/treated correctly) **or**
- A Nitrogen purge may be used if the Power Team determines the risks associated with the task to be performed dictate its use. Nitrogen purging shall be accompanied by a JLA. If nitrogen purging is used, the area shall be continuously checked for oxygen content until the nitrogen used for purging has dissipated.

Cutting Lines

- All product lines are to be cold cut using an air powered saw, commonly known as a "German Hacksaw." Prior to cutting the line, verify that the line is gas freed by opening the low point drain; or if there is no low point drain, drill a pilot hole at the low point (use a drip pan). Use an air drill and use oil to cool the drill bit. Gas test the line by inserting the gas tester hose into the opening of the line. If product is still in the line or LFL reading exceeds 10%, close the valve or plug the hole using a screw, and continue to clean the line until the atmosphere is below 10% LFL. Proceed with cutting the line with the air-powered saw using plenty of oil to cool the blade. If a hole had to be drilled, while the line is still gas freed, install a low point drain valve.
- Prepare a JLA for this procedure
- If it is absolutely necessary to hot cut the line using a welding torch or other "Hot Cut" device, LFL readings must be 0% and the MOC process must be followed prior to work being done. Particular caution must be exercised with Jet and Diesel lines to ensure they are completely flushed clean before cutting.

Hydrostatic/ Hydrodynamic Isolation Tool

This tool provides complete hydrostatic/hydrodynamic isolation on lines. It isolates downstream areas where hot work is in progress from potentially hazardous materials upstream of the work area. The use of this tool must be by trained technicians from Car-Ber Testing Services, 1-800-592-8378. Use of this tool does not require a variance.

Alternate Methodologies

Alternate methodologies such as dry ice, balloons, plumber's plugs and mud packs that negate cleaning of the line, may only be used after following the Variance process detailed in Section 4.

Returning lines to service

Before a line is put back into service ensure all the air has been removed by bleeding from a high point vent or bleeder valve during the initial re-filling process.

SECTION 12 – REPAIRING LINES IN SERVICE

Repairing Lines In Service

Welding and patching lines in service is hazardous and is to be avoided whenever possible. Options to isolate the equipment properly or to delay the work until the equipment can be shut down should be carefully reviewed beforehand.

- If the repair of lines in service is required, the work plan approved by the Area Manager and Manager – Regional Engineering is required. .
- The terminal must work with Engineering to develop a detailed procedure for the work to be conducted.

SECTION 13 – TRANSFERS WITH A PORTABLE PUMP FOR THE PURPOSE OF BREAKING LINES OR ISOLATING EQUIPMENT FOR RELEASE TO MAINTENANCE

Transfers With A Portable Pump

Care must be taken when transferring product with a portable pump. Transfers with a portable pump may be required, but not limited to:

- Tank to tank transfers e.g. removing the residual product below the suction line in a tank before tank cleaning begins
- Removing product from other equipment such as sumps, oil/water separators, filter vessels or catch containers that have been used to collect product from lines that have been opened and drained.
- Refer to ESH 561 Static for Bonding/Grounding during Pump off.

The following shall be addressed during pre-planning of all transfers:

- An air operated diaphragm pump is required for this type of operation.
- The pump shall be compatible with the product being transferred.
- Pressure rated hoses shall be used with the pump. The pressure rating of the hose shall exceed the maximum working pressure of the pump.
- The hose quick coupler connections shall be secured with steel wire or other suitable device to prevent hose separation during pumping.
- Place spill pads or drip pans around the connections prior to start of product flow.
- Hoses shall be placed away from sharp edges or abrasive surfaces to prevent wear damage during pumping.
- Hose gaskets shall be inspected for wear, rips/tears, correct size and fit prior to pumping.
- A bleeder valve shall be installed on the discharge of pump to provide a means to relieve pressure and drain hoses when transfer is complete.
- A check valve shall be used at the entry point of a tank (Discharge Hose End) when product is being pumped into a storage tank.
- The transfer operation, hoses and pumps shall be monitored continuously during the transfer.
- Ensure bleeder valves are located so that the transfer lines can be safely relieved of pressure after the transfer is complete.
- Ensure pressure gauges are located so that the pressure can be monitored during the transfer.
- Workers performing the transfer shall be adequately trained to perform the operation.
- Appropriate drip pans and absorbent pads shall be available in the area.

SECTION 14 – ABANDONING & REMOVING LINES AND EQUIPMENT FORM SERVICE

General Requirements

A MOC shall be completed prior to abandoning or removing any lines or equipment from service as this action may have implications on other systems within the Terminal. Lines/equipment that are being abandoned or removed from service should be prepared in the following manner:

- The line/equipment shall be thoroughly cleaned and gas freed.
- Gas testing over a representative area of the entire line/equipment shall be performed to confirm the line is gas free.
- Ensure low points, underground sections of lines, dead legs and elbows are gas freed.

Regulatory requirements

Local or State regulatory laws may govern the abandonment and removal of lines from service and supersede this ESH if more stringent.

Abandoning

- Removal of all abandoned lines and equipment should always be considered as a first option.
- If removal is not feasible and a line or underground piece of equipment is to be abandoned in place, a cement or slurry mix shall be used to fill the entire interior space of the line/equipment.
- Immediately after the abandonment has taken place the Terminal's process safety information shall be updated. This means updating the current P&ID's. Place a copy of the old P&ID, a description of the process used to abandon the line/equipment, and the line/equipment's records in a file at the Terminal. This file shall be retained for the life of the Terminal.
- All lines and equipment shall be labeled with the date abandoned and the abandonment method.

Removing From Service

- All lines and equipment shall be isolated by draining, gas-freeing, day-lighting and capping at both ends.
- All lines and equipment shall be stenciled "Out Of Service" and the "Date Removed From Service"
- Open manways on equipment shall be stenciled or tagged "Confined Space - Danger Do Not Enter" and a grill installed or the manway cover off-bolted in such a way to restrict access.

SECTION 15 – ISOLATING EQUIPMENT

Goal

The purpose of this section is to provide examples of isolation techniques so that the intent of this Safe Work Practice can be understood and applied at each Terminal.

A Best Practice for each Terminal is to develop site specific isolation procedures for each piece of equipment. Isolation techniques should be documented in three ways:

- On site specific Equipment Isolation Checklists
- On Terminal P&IDs
- Incorporated into SOPs

Documentation should be retained at the Terminal for future use and refinement.

The Butterfly Valve Rule

Butterfly valves require special consideration because they typically do not provide the same level of sealing as do gate or ball valves. Gate and ball valves are commonly referred to as "block valves".

Every isolation plan must consider what type valves are installed and where these valves are installed in the system to prevent potential exposure to energy in the form of pressure. In a system that has only butterfly valves upstream of the work being performed, energy sources must be de-energized to safely perform the work and the following rules apply:

1. The line upstream of the butterfly valve must be depressurized. This may mean that the pumps must be removed from service then locked and tagged.
2. There must be a low point drain downstream of the butterfly valve. If there is not a low-point drain downstream of the butterfly valve, ***a flange can be cracked and used as the low point drain and then used as a tattle-tale***. Remember to follow the 30 minute requirement to dissipate static charge described in Section 10.
3. The next valve downstream of the low point drain can be another butterfly or a control valve. The tattle-tale upstream of this valve will indicate if the upstream butterfly valve is leaking.
4. The job must be a short duration task as defined in Section 8 and a MOC and JLA must be approved per Section 4.
5. If the first valve in 1 above is a block valve then the upstream side of the valve does not have to be depressurized if verified to be liquid-tight by observing the tattle-tale.

NOTE 1: When a butterfly valve is in place the system upstream of that valve must be depressurized. This means that you must drain off enough liquid to compensate for thermal gain. Connect a hose to the high point bleed and drain that hose to an adequately sized container while you are performing the work.

NOTE2: High performance butterfly valves and metal seated triple offset butterfly valves can be used as normal block valves. A onetime MOC documenting the use of these type butterfly valves as a block valve must be completed and approved per Section 4. See CVX Piping Manual Section 270 for more details on these type valves.

15.1 – Pumps

Pump Packing Or Seal Change Using The Gate Valve Double Block & Bleed Method of Isolation

Step 1: Tag the ON-AUTO-OFF local pump switch in the OFF position.
Step 2: Electrically isolate the pump per Section 8.5.

Pump Packing Or Seal Change Using The Double Block And Bleed Method Of Isolation

Step 3: Close lock and tag the suction and discharge valves.

Step 4: Close lock and tag the next valve upstream and downstream of the pump suction and discharge valves. Where tank safety valves (TSV's) are present on the pump suction, isolate the TSV by performing electrical isolation as described in section 8.5.

Step 5: Isolate PRV's around tank safety valve. See Section 15.5

Caution: Ensure adequate thermal relief is available to systems that are isolated.

Step 6: Slowly open the following bleeder valve(s):

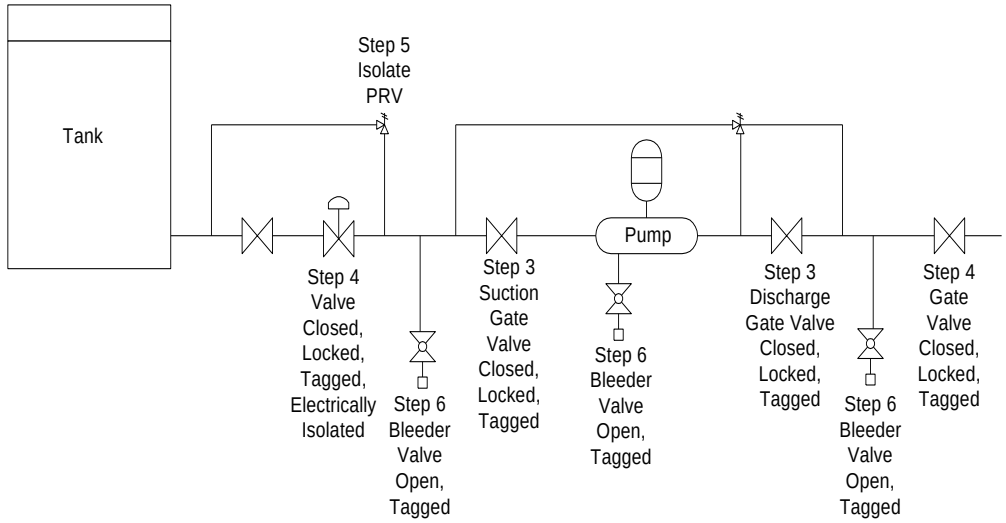
- Between the two block valves on the suction side of the pump
- Between the two block valves on the discharge side of the pump
- On the pump case

Step 7: Depressure and drain pump and lines, making sure bleeders are not plugged and lines are drained. If product is found blinds shall be installed.

Tag the bleeder valves in the open position with a **"Danger – Do Not Operate"** tag, while work is in progress.

Step 8: Maintenance (if working on the system) shall install a **"Danger – Do Not Operate"** tag and lock (where required) whenever **Operator locks and tags** are present.

Pump Packing Or Seal Change Using The Double Block And Bleed Method Of Isolation

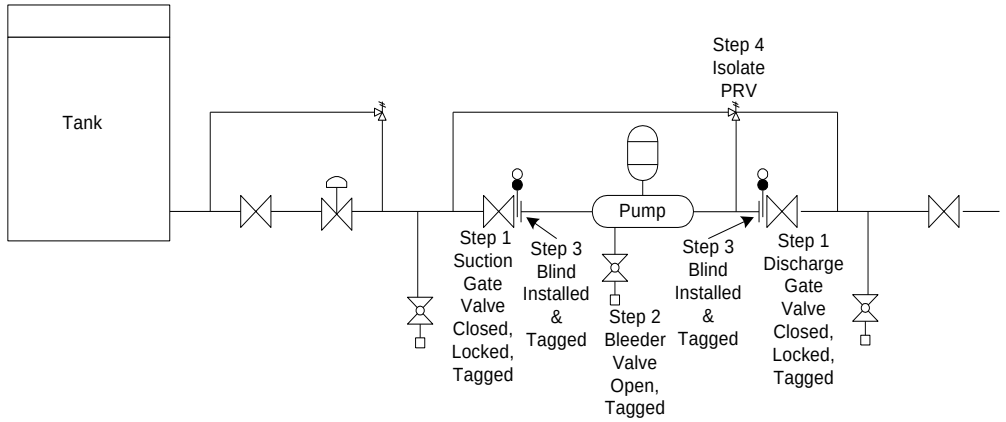


If removing pump and housing

If the pump and housing are being removed, install blind flanges on the following:

- Suction line and discharge line
- Any other line connected to the pump, such as a warm-up line, bypass, PRV, etc

Removing Pump And Housing Using The Blinding Method Of Isolation



If removing pump only

If the pump is removed and the housing remains, install a pump case "blank" with a properly fitted gasket in the cavity left by the pump.

- All bleeders must be closed for this installation.
- When work resumes, open bleeders to verify that the lines and pump case are still depressurized.

15.2 – Tanks

Isolating Tank for entry following the *Day-lighting* procedure

Step 1: Refer to ESH-534 Tank Cleaning, Repairing And Dismantling
Step 2: Remove product from tank
Step 3: Close, lock and tag all inlet and outlet tank valves
Step 4: Drain all inlet and outlet lines to tank leaving the low point drain open and tagged.
Step 5: Daylight **all** lines and appurtences connected to tank.
Step 6: Blind all inlet lines and outlet lines. Close low point drain.
Step 6: Close, lock and tag breakers and remove fuse for all electrical equipment related to tank (including lighting).
Step 7: Ensure adequate sun-relief on product system. See Section 15.4
Step 8: Open manway to tank and begin to ventilate per ESH 534.

Isolating Tank for entry following the *Blinding* procedure *(this is an alternate method)*

Step 1: Refer to ESH-534 Tank Cleaning, Repairing And Dismantling
Step 2: Remove product from tank and piping
Step 3: Close, lock and tag all inlet and outlet tank valves
Step 4: Blind all lines and appurtences connected to tank. Install blinds on the tank side of any valves.
Step 5: Close, lock and tag breakers or remove fuses for all electrical equipment related to tank (including lighting).
Step 6: Ensure adequate sun-relief on product system. See Section 15.4
Step 7: Open manway to tank and begin to ventilate per ESH 534.

Isolating Tank for entry following Isolation Procedure for Small Lines

Small lines, sampling devices, or other equipment which may be seal welded or difficult to blind or air gap and which are dead ended to the atmosphere but plugged, capped or blinded may be flushed with water and atmospheric testing done in lieu of blinding and air gapping. To qualify for this procedure there shall be no more than 1 cubic foot of volume in the dead section of line and the line size shall be less than 3 inches in diameter.

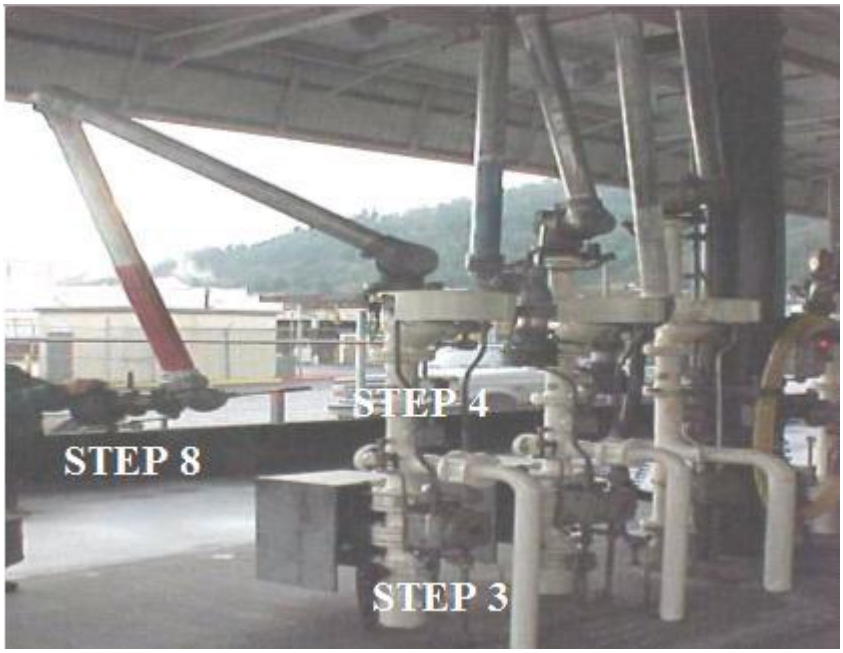
Step 1: Ensure that the line valve is closed and that and the downstream portion of the line is opened to atmosphere
Step 2: Flush the dead-leg with water to remove all residual liquid.
Step 3: Test the atmosphere inside the dead-leg with the tester probe at least 1 inch inside the opening.
Step 4: A reading of 0% LEL indicates that this line may be considered isolated.

Isolating Tank for Roof Seal Inspection

Step 1: Bring tank level to safe fill height if possible.
Step 2: Tank must remain static for at least 30 minutes after filling before entry.
Step 3: Close, lock and tag **all** valves into and out of the tank including VRU Lines if applicable.
Step 4: Follow Confined Space requirements specified in ESH 513. The space must be considered to have a potential hazardous atmosphere.
Step 5: Lockout/Tagout all mixers/rotating equipment
Step 6: Lockout/Tagout all power to the tank

15.3 – TTLR

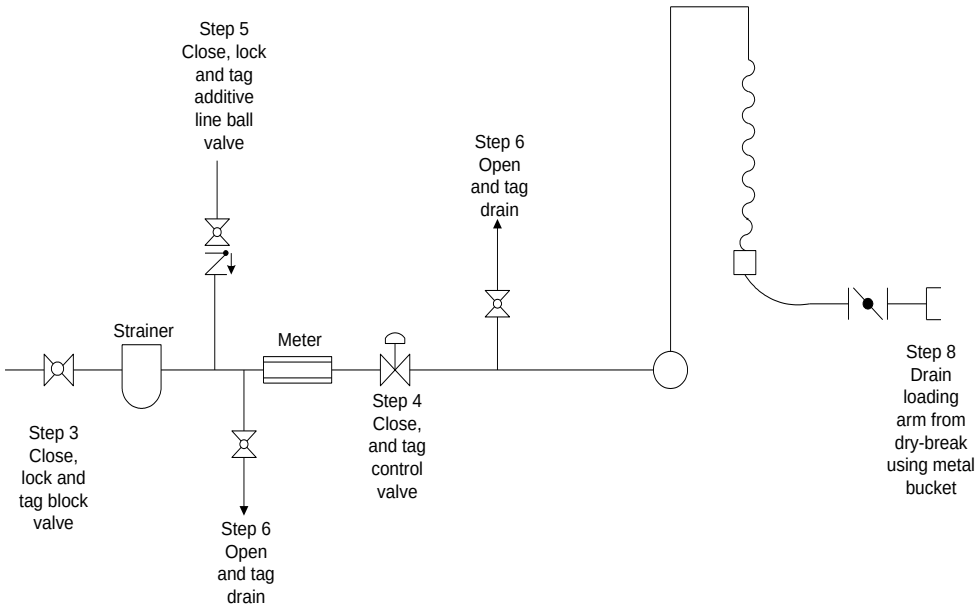
Changing Loading Arm, Flex-Hose or Swivel Joint



Changing Loading Arm, Flex-Hose or Swivel Joint

Step 1: Cone off lane
Step 2: Lockout lane using terminal control system in control room
Step 3: Close, lock and tag ball valve or butterfly valve
Step 4: Close and tag control valve
Step 5: Close, lock and tag additive line ball valve
Step 6: Open and tag drain(s) to determine if control valve and ball valve are forming a product tight seal with no product leaking by either valve.
Step 7: If product is leaking by and a product tight seal is not formed the entire product system shall be shutdown and the leaking valves replaced as necessary.
Step 8: Drain loading arm from dry-break into a metal bucket. The use of a male dry-break will prevent the possibility of finger pinch-points and splashing product.

Changing Loading Arm, Flex-Hose or Swivel Joint

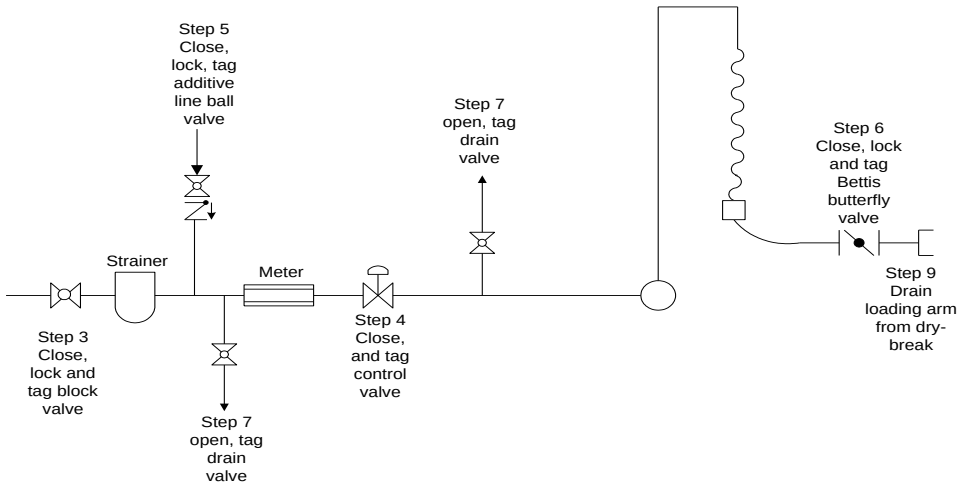


Changing Dry-Break / Dry-Break Gasket

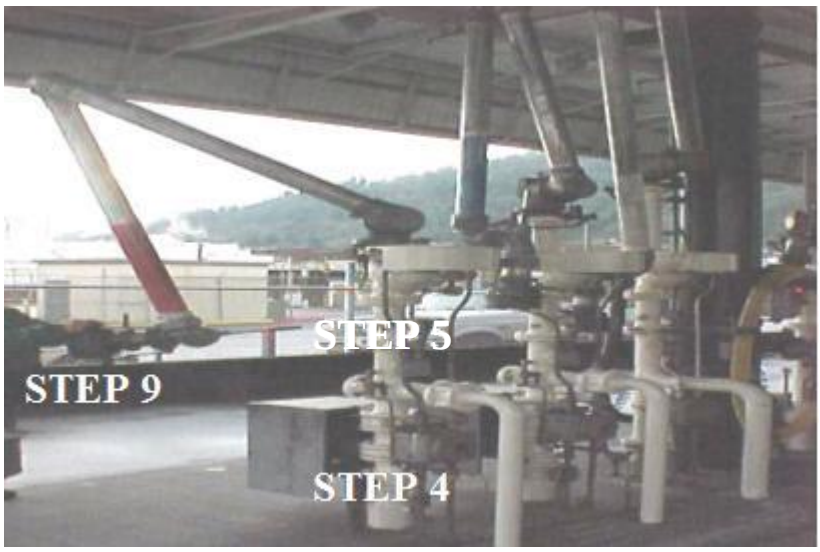
Changing Dry-Break / Dry-Break Gasket

Step 1: Cone off lane
Step 2: Lockout lane using terminal control system in control room
Step 3: Close, lock and tag ball valve
Step 4: Close and tag control valve
Step 5: Close, lock and tag additive line ball valve
Step 6: Close, lock and tag Bettis butterfly valve
Step 7: Open and tag drain(s) to determine if control valve and ball valve are forming a product tight seal with no product leaking by either valve.
Step 8: If product is leaking by and a product tight seal is not formed the entire product system shall be shutdown and the leaking valves replaced as necessary.
Step 9: Depressure loading arm through dry-break using metal bucket by draining 3-4 gallons. The use of a male dry-break will prevent the possibility of finger pinch-points and splashing product.

Changing Dry-Break / Dry - Break Gasket



Maintain/ Replace Meter

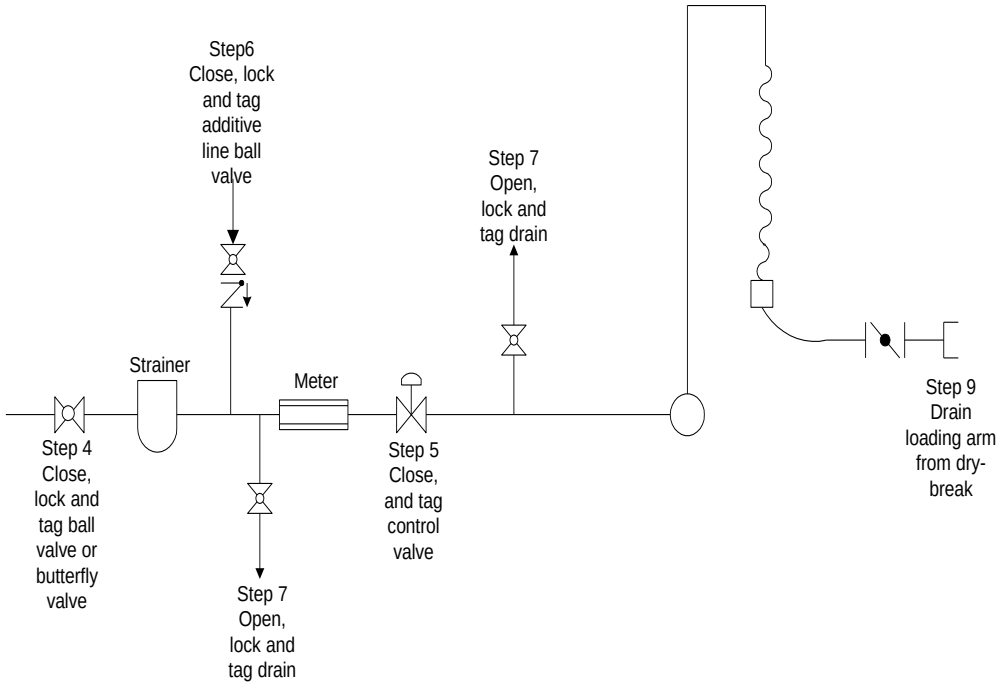


Step 1: Cone off lane
Step 2: Lockout lane in Terminal Control System
Step 3: Lockout product pump in Terminal Control System
Step 4: If a butterfly is present as the main lane isolation valve; close, lock and tag the butterfly valve. The system upstream of the valve shall then be depressurized and remain depressurized throughout the change-out of the meter. An alternate to depressurizing the system for the life of the job is to insert a blind on the upstream/pressure side of the butterfly valve.

If a ball valve is present; close, lock and tag the ball valve. Verify that the ball valve is forming a liquid tight seal. Since the actual drop out and replacement of the meter is a short duration task no further isolation is required. If the meter is not immediately replaced by another meter, install a blind flange on the non-pressure side of the ball valve.

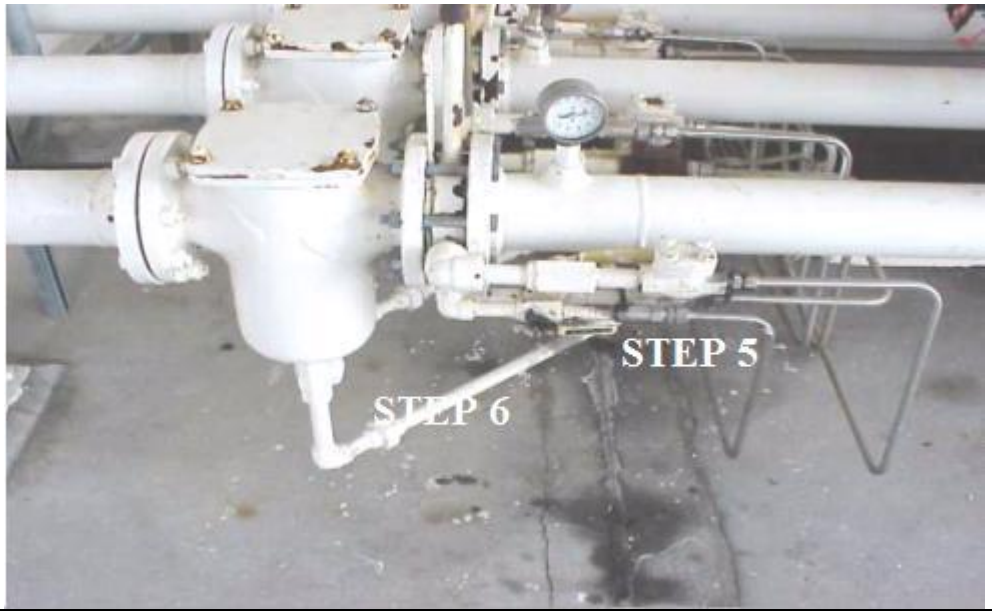
Step 5: Close and tag control valve
Step 6: Close, lock and tag additive line ball valve
Step 7: Open and tag drain(s) to determine if control valve and ball valve are forming a product tight seal with no product leaking by either valve.
Step 8: If product is leaking by and a product tight seal is not formed the entire product system shall be shutdown and the leaking valves replaced as necessary.
Step 9: Depressure loading arm through dry-break using metal bucket by draining 3-4 gallons. The use of a male dry-break will prevent the

Maintain/ Replace Meter

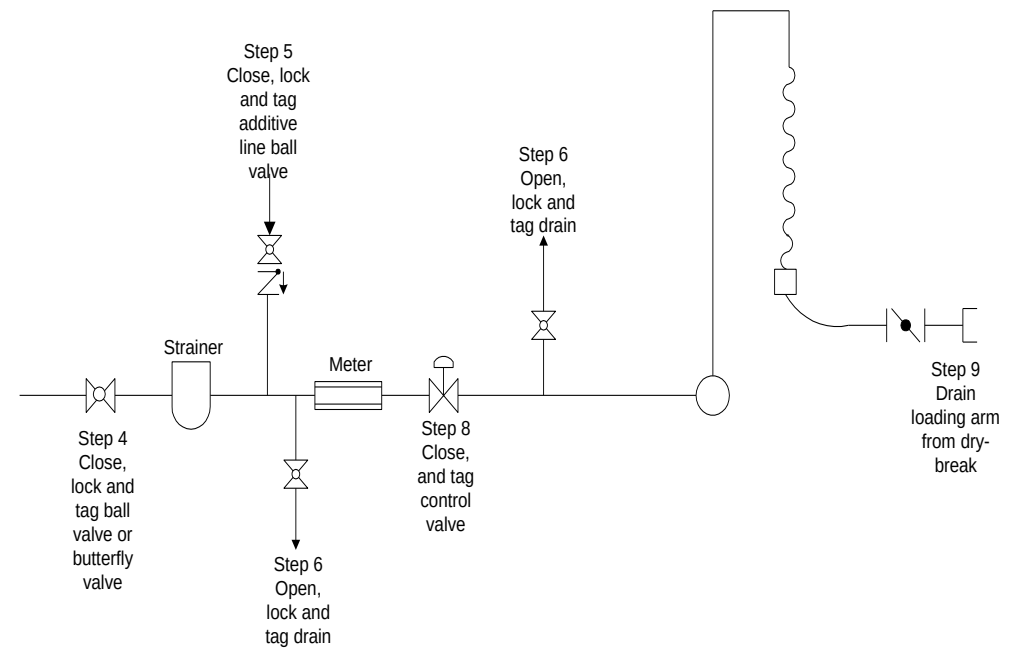


Clean Strainer

Clean Strainer

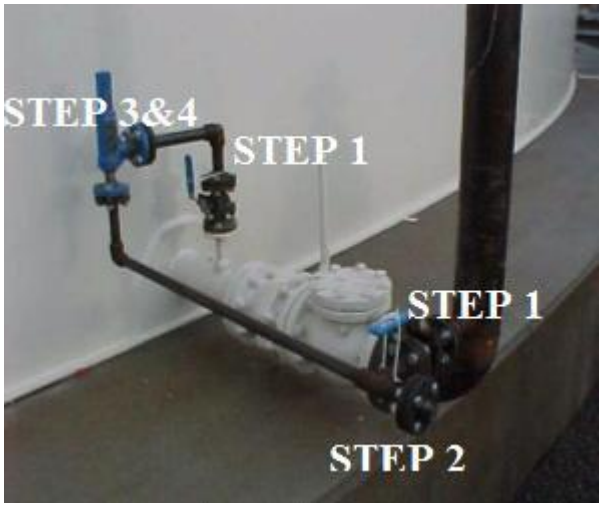


Clean Strainer	**Step 1:** Cone off lane. **Step 2:** Lockout lane in Terminal Control System. **Step 3:** Lockout product pump for strainer to be cleaned in Terminal Control System. **Step 4:** If a butterfly is present as the main lane isolation valve; close, lock and tag the butterfly valve. The system upstream of the valve shall then be depressurized and remain depressurized throughout the change-out of the meter. An alternate to depressurizing the system for the life of the job is to insert a blind on the upstream/pressure side of the butterfly valve. If a ball valve is present; close, lock and tag the ball valve. Verify that the ball valve is forming a liquid tight seal. Since the actual cleaning and replacement of the strainer is a short duration task no further isolation is required. If the strainer is not immediately replaced after, install a blind flange on the non-pressure side of the ball valve. **Step 5:** Close, lock and tag final additive line ball valve. **Step 6:** Open and tag drain(s) line at Control valve and strainer to determine if control valve and ball valve are forming a product tight seal with no product leaking by either valve. **Step 7:** If product is leaking by and a product tight seal is not formed the entire product system shall be shutdown and the leaking valves replaced as necessary. **Step 8:** Close and tag control valve. **Step 9:** Depressurize loading arm through dry-break using metal bucket by draining 3-4 gallons. The use of a male dry break will prevent the possibility of finger pinch-points and splashing product.

Clean Strainer	

15.4 – Pressure Relief & Safety Valves

PRV Maintenance



Step 1: Remove carseals, close, lock & tag inlet & outlet valves.
Step 2: Open drain, depressure system & tag drain valve.
Step 3: Crack PRV bolts drain residual product. Remove PRV
Step 4: Install boilerplate on flanges.

Caution should be exercised against isolating a PRV, which may be providing thermal relief and/or pressure relief for a line, section of line, vessel or piece of equipment other than the line, section of line, vessel or equipment on which work shall be performed. Alternative means of relief shall be considered to allow for thermal expansion and/or pressure relief for other lines, sections of line, vessels or pieces of equipment.

15.5 – Vessels

Filter Vessel With Twin Seal Valves - Changing Filters Using Double Block And Bleed Method Of Isolation

CAUTION: Never open vessel lid without first draining the vessel of its contents

Step 1: Operations chains and locks twin seal valves in the closed position and tags them with **"Do Not Operate"** tags. If maintenance work is required, Maintenance must also lock and tag the valves using **"Do Not Operate"** tags.

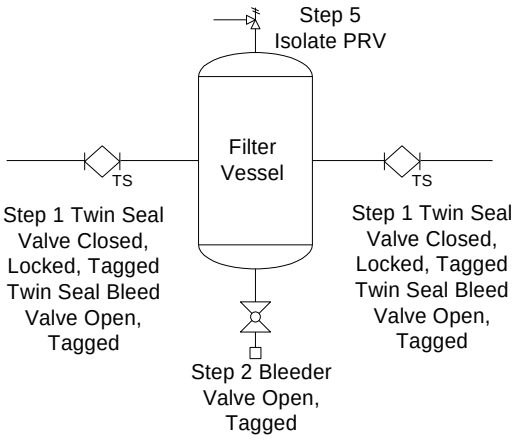
Step 2: Operations slowly opens the bleeder valve on the twin seal valve body, and tags with **"Do Not Operate"** tags, making sure the bleeders are not plugged and the valve body is free of product. If maintenance work is required, Maintenance must also lock and tag valves using **"Do Not Operate"** tags. Monitor bleed valve periodically during isolation.

Step 3: Crack PRV (high-point bleed if present). Operations depressures and fully drains the filter vessel using the bleed valve, making sure the bleed is not plugged and that the vessel drains completely.

Step 4: Verify that valves are not leaking by checking the valve body bleed. If they are an additional block valve upstream must be closed, chained, locked and tagged by operations and maintenance and that new section of line must be depressured and drained.

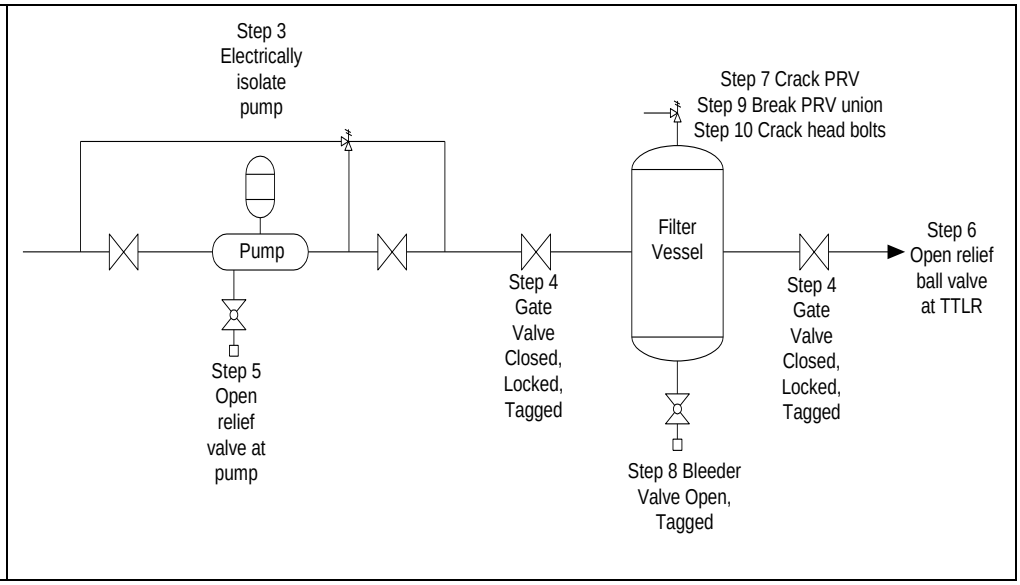
Step 5: Isolate filter vessel PRV (if required).

Step 6: If the area is left unattended for a period (e.g. breaks and lunch) bleeder valves shall be closed and plugged. When work resumes, verify twin seal valves are not leaking by slowly opening the valve body bleed.

Example of Double Block & Bleed Method Using Twin Seal Valves To Isolate A Filter Vessel	

Filter Vessel With Gate Valves – Changing Filters

Step 1: Lockout pumps in terminal control system
Step 2: Tag the ON-AUTO-OFF local pump switch in the OFF position.
Step 3: Electrically isolate the pump per Section 8.5.
Step 4: Close, lock & tag inlet & outlet filter vessel valves.
Step 5: Open relief valve at pump to relieve pressure on suction line
Step 6: Open relief valve at ball valve on TTLR to relieve pressure on discharge line
Step 7: Crack PRV (high point bleed if present).
Step 8: Open low point bleeder. Drain vessel completely & tag bleeder.
Step 9: Break PRV union & crack head bolts.
Step 10: Remove head bolts and change filters

Example Of How To Isolate A Filter Vessel Using The Lockout/Tagout Method Of Isolation	

15.6 – VRU

Clean VRU Strainer

Step 1: Shut down, lockout and tagout VRU
Step 2: Close, lock and tag supply tank valve
Step 3: Close lock and tag gate valves. Verify that the gate valve is forming a liquid tight seal. Since the actual removal and cleaning of the meter is a short duration task no further isolation is required. If the strainer will not immediately be cleaned and replaced or the work area is left unattended for any reason, install blind flanges on the non-pressure side of each gate valve.
Step 4: Drain bottom of strainer using a drip pan of suitable size
Step 5: Remove bolts/nuts from strainer

Change VRU Return Pump

Change VRU Return Pump

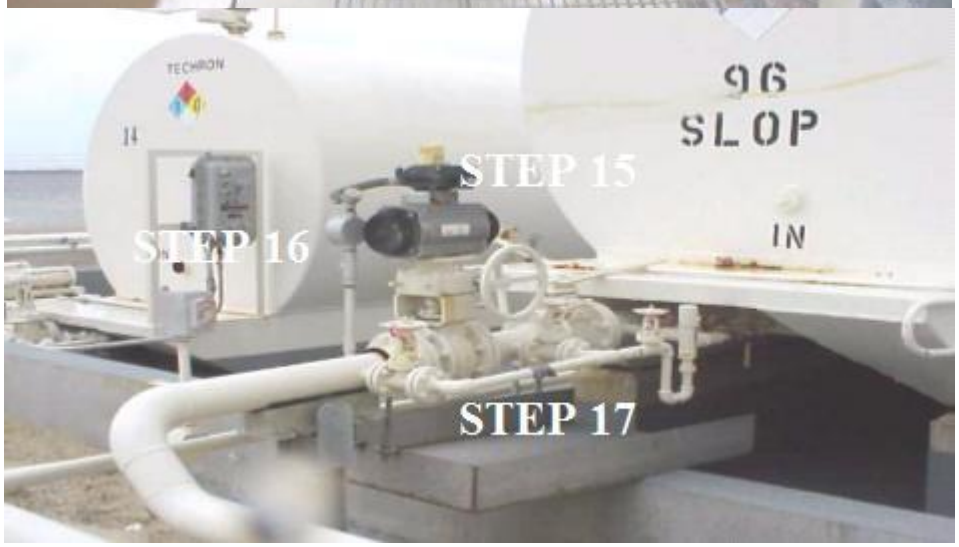
Step 1: Close, lock and tag vapor valve and flip spectacle blind to isolate from TTLR
Step 2: Pump down absorber tower until pump runs dry
Step 3: Shut down, lockout and Tagout VRU
Step 4: Open and tag bleeder drain valves on pump and absorber tower
Step 5: Unbolt absorber connection
Step 6: Remove pump shaft guard and coupling
Step 7: Remove pump base bolts and remove pump
Step 8: If the pump will not immediately be replaced install blind flanges on suction line and discharge line.

15.7 – Oil Water Separator

Cleaning OWS – Underground Process Tank

Cleaning OWS – OWS Sump

Cleaning OWS – Slop Tank



Cleaning OWS

Gauge & Empty
Step 1: Hand gauge UST, product and water side of separator
Step 2: Print ENRAF or gauge slop tank
Step 3: Turn on product pump to hand, pump UST empty.
Step 4: Turn on OWS product pumps to hand, until empty.
Step 5: Turn on OWS water pump until empty
Lock and Tag out UST
Step 6: Close, lock and tag controller for UST
Step 7: Close, lock and tag UST pump discharge valve and electrically isolate the pump per Section 8.5.
Step 8: Close, lock and tag UST Thermal Relief Inlet & Outlet valve for UST
Sump inlets to separator
Step 9: Close, lock and tag air supply to sump pump.
Step 10: Close, lock and tag pump discharge valves.
Separator
Step 11: Close, lock and tag controller and product pumps and electrically isolate the pump per Section 8.5.
Step 12: Close, lock and tag controller to water pump.
Step 13: Close, lock and tag both product pump discharges
Step 14: Close, lock and tag water pump discharge
Slop Tank
Step 15: Turn automatic valve to off position, lock and tag
Step 16: Take automatic valve out of service in ITS and electrically isolate the pump per Section 8.5.
Step 17: Close, lock and tag thermal relief
Water Evaporation Tank
Step 18: Close, lock and tag inlet valve
Drain and Vent
Step 19: UST pump discharge
Step 20: Product side of separator pump discharge
Step 21: Water side of separator pump discharge

15.8 – Underground Storage Tank

Configuration of underground storage tanks in Marketing Terminals are varied based on installation and function. Specific isolation plans developed for working in and around these systems should take into consideration the activity being permitted. For example, isolation requirements for entry into a sump to perform inspection may differ from entry into a sump in order to perform work that exposes workers to process streams (by breaking lines or opening up the UST).

A MOC and isolation plan must be written per Section 4 for entry into USTs and for entry into UST sumps when *process lines, tanks, and vents* are opened or are leaking to the sump or where the sump is otherwise subjected to the environmental conditions & hazards of the UST. Certain elements of the system are typically not capable of being blinded and day lighted so alternative isolation is needed. An example of this is atmospheric drain lines. An example of isolation is a follows:

Step 1: Electrically isolate tank sump pump
Step 2: Isolate/shut down Veeder Root system
Step 3: Close ball valves in sump prior to entry.
Step 4: Install dollar plate plugs in all atmospheric lines draining to UST
Step 5: Lock and tag ball valves upon initial entry into sump.
Step 6: Blind and daylight lines capable of being blinded.

When entering the sump for inspection, survey the sump for openings from the sump into the tank and ensure these are positively isolated. Examples can include (but are not limited to) gauge hatches and sample ports. Positive isolation in this case is locking the fitting closed and tagging with the appropriate tags.

For USTs/sumps that may need to be isolated periodically, a permanent MOC should be developed. One time or infrequent isolation should use a temporary MOC.

SECTION 16 – PREPARING THE ISOLATION LIST

Purpose

A written record of all steps in the isolation procedure from pre-planning until after the equipment is placed back into service. The **"Equipment Isolation Checklist"** is displayed in Appendix A.

Responsibilities

- The Equipment Isolation Checklist is prepared by Operations in conjunction with Maintenance.
- Updates are the responsibility of Operations.
- Changes shall be thoroughly communicated to Maintenance.
- A copy of the checklist is to be kept with the General Work Permit at the worksite.

Requirements

In conjunction with the Job Loss Analysis, prepare an Equipment Isolation Checklist for all projects.

The following steps shall be recorded when preparing the Equipment Isolation Checklist:

1. Operations must determine the methodology for gas freeing and/or cleaning the line or equipment, the locations of valves to be closed or opened and the locations where tags, locks, blind are to be installed. (Use the appropriate P&ID's as an aid). The sequence of installation shall be documented on the Equipment Isolation Checklist in the left-hand column (See Appendix A).
2. Operations shall record the number and location of each blind tag as it is installed, date and initial the list as blinds are installed and as they are removed.
3. The isolation procedure shall be approved by the Terminal Manger (or designate), before work is allowed to begin.
4. Before returning lines and equipment back to service, operations shall consider the steps involved and record the sequence of each step on the Equipment Isolation Checklist in the right hand column.
5. The Equipment Isolation Checklist shall be retained at the Terminal for one year after the lines or equipment have been returned to service and approved by the Terminal Manager (or designate).

Best Practice

Equipment Isolation Checklists and JLAs for individual lines, equipment and maintenance activities should be archived at the Terminal for future refinement and use. This time saving step enables operations to build on previous job experience when preparing new Equipment Isolation Checklists. When re-using an existing EIC, review the system to identify any changes to the system and update the EIC as needed.

SECTION 17 – USE OF THE SIX PART BLIND TAG

Blind Tag Procedure

Each location to be blinded must be identified using the six part blind tag. As sections of the tag are removed, operations keeps the stubs in the Terminal office and updates the Equipment Isolation Checklist. Blind tagging works according to the following steps:

Step 6
After the blind has been removed, Operations removes the yellow and white section of the tag and completes checking the equipment prior to putting it back into service. For each blind installed and removed all six tag parts shall be accounted for. Operations shall stand by whenever lines that were repaired or altered are put back in service for a time sufficient to ensure the installation was made correctly and the line is not leaking.

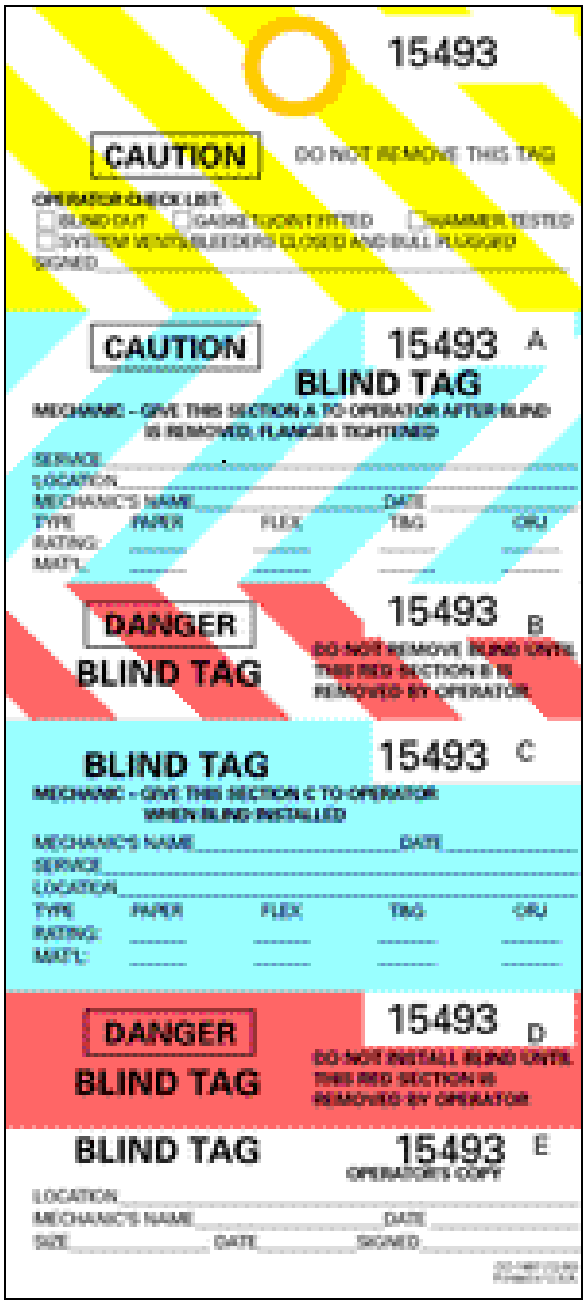
Step 5 – Section A
After the blind has been removed, a new gasket installed, and the line closed the mechanic performing the task removes the blue and white Section A, fills in the information, dates, initials, and gives it to Operations. Operations shall date and initial the Isolation List.

Step 4 – Section B
After verifying with the mechanic it is safe to remove the blind, Operations will remove the red and white Section B in the presence of the mechanic. The blind may then be removed. Operations shall date and initial the Isolation List.

Step 3 – Section C
The mechanic removes the blue Section C, fills in the information, dates and initials it, and gives it to Operations after work is complete. Operations shall date and initial the Isolation List.

Step 2 – Section D
When the mechanic is ready to install the blind, Operations must prove to the mechanic that the line is safe for blinding. Operations will remove the red section D in the presence of the mechanic then date and initial the isolation list

Step 1 – Section E
After Operations has installed the blind tag on the flange to be blinded, they detach the white Section E, fill in the information and date and initial this stub. Operations records the tag number on the Isolation List, dates and initials.



SECTION 18 – RETURN OF LINES & EQUIPMENT BACK TO SERVICE

Return of Equipment Back to Service

- Upon completion of work the operations representative and maintenance representative shall inspect the work performed. Both parties shall then jointly approve the preparations and schedule for returning the equipment back to service.
- Before returning lines and equipment back to service, operations shall consider the steps involved and record the sequence of each step on the Equipment Isolation Checklist (if used) in the right hand column.
- The Equipment Isolation Checklist shall be retained at the Terminal for one year after the lines or equipment have been returned to service and approved by the Terminal Manager (or designate).
- Once the line or equipment has been cleared for return to service a documented informal or formal Pre Start-up Safety Review (PSSR) is required on all projects. Refer to ESH 524 Pre / Post Start-up Safety Reviews. All nuts must be hammer tested for tightness on all flanges from which they were removed.
- The affects or changes in operations from any project, such as leaving a blind turned in place, shall be communicated to all terminal personnel and documented in the MOC, Operations Turnover Log, and any other pertinent communication document.

APPENDIX A: EQUIPMENT ISOLATION CHECKLIST

Chevron **EQUIPMENT ISOLATION CHECKLIST (EIC)**

Facility: Affected Area: EIC Number:

Equipment Number: Description Of Work Required:

Equipment Name and location:

Associated Permitry Required: ☐ Cold Work Permit # ☐ Hot Work Form # ☐ Confine Space Entry Form #

EIC Prepared By: EIC Field Checked By:

Isolation Point	Equipment Isolation Point	✓ if Tag Installed	✓ if Lock Installed	Lock Number	Blind Installed	Blind Number	Normal Operating position	Date installed	Initials	Date Removed	Initials
1 (Primary)											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
23											
COMMENTS											

Sample DS Equipment Isolation C

APPENDIX B - BLIND THICKNESS FOR VARIOUS PIPE SIZES

PIPE SIZE	BLIND THICKNESS	BLIND DIAMETER
1"	0.125"	2.5"
2"	0.25"	4.0"
3"	0.25"	5.25"
4"	0.375"	6.75"
6"	0.5"	8.625"
8"	0.5"	10.875"
10"	0.625"	13.25"
12"	0.75"	16.0"
14"	0.75"	17.625"
16"	0.875"	20.125"
18"	1.0"	21.5"
20"	1.125"	23.75"
24"	1.25"	28.125"

NOTES:

Blind thickness calculations are based on Chevron Standard Drawing GC-L31452-21 "Standard Spectacle Blinds, Blinds and Spacers for RF and FF Flanges".

2. These are 150# steel flange blinds, which are designed for 425 PSI maximum cold test pressure in either 3166 or CR-MO or 304L materials.

3. Carbon steel blinds shall be machined from forging conforming to ASTM A105 or A181, grades 102Z or from plate conforming to ASTM A285 grade C or A515 or A516 grades 55, 60, 65 or 70.

Revision Log

Revision	Date	By	Approved	Issued for	Remarks
A	08/21/2002	tjhi	nwth	Review	Updated blinding for tank isolation
B	09/27/2002	gpke	nwth	Review	Section 3, Definitions – added Block Valve Section 7, Operations Role - added "electrician" before "Danger--Do Not Operate" tag and lock will be installed Section 7, under maintenance responsibilities- clarified that maintenance cannot break lines, isolate equipment, blind lines or conduct hot work without the involvement of operations from start to finish Section 9, General Requirements - added information defining 15 minute short duration task. Section 16 - added Butterfly valve rule. Section 16.3 - updated line diagrams for changing loading arm flex hose and dry-break gasket to remove reference to butterfly valve. Added Section 21- Accountability
C	12/31/2002	tjhi	nwth	final	Clarified the definition of a Blank and a Blind in Section 3 Added to Bonding in Section 3 that a jumper wire is not required when breaking lines if there is no impressed current cathodic protection system or if on a pipeline the integrity of the insulating flanges is known, and added braided steel wire grounding straps are an acceptable alternative to copper wire Added to Section 9.3 that composite gaskets can be used only on the low pressure side of the blind and only for a short duration Added Section 9.7 Bolting-up Practices

Revision	Date	By	Approved	Issued for	Remarks
D	06/07/2003	tjhi	nwth	final	Clarified in Section 3 Definitions that blinds must always be installed on the tank side of the valve during confined space entry. Added sentence to Section 16.2 Tanks that blinds must always be installed on the tank side of the valve during confined space entry.
E	12/02/2003	Gpke & tjhi	nwth	Final	Section 10 Isolating Lines the following text was added: When removing a spool, mark the spool and flange with a grease pencil or Sharpie to ensure proper alignment during reinstallation. When installing new spools, verify proper alignment and mark spool and flange with a grease pencil or sharpie to ensure proper initial installation and future alignment. Section 9.3 Blinding: Added subsection on Isolation for Entry and that Blinds are an approved method. Section 9.4 Day-lighting: Removed reference to blinding. Section 16.5 Filter Vessels with Twin Seal Valves, Step 3 and Filter Vessel with Gate Valve, Step 8: Where filter vessel isolation and maintenance are mentioned: Indicated that fully draining filter vessel is required.
F	01/27/2004	tjhi and PEMY	NWTH	Final	Section 9.4. Modified the definition of Day lighting or Air gapping. Section 9.8 Added section for Entry onto Tank Roofs for Roof Seal Inspection and Lowering roof legs. Included definition of "stilled". Required lock out and tag out of power for purpose of stilling. Section 10, tenth bullet down. Removed the requirement for closing the next closest valve if blinding or boiler plating a line Section 16.2 Modified the first

Revision	Date	By	Approved	Issued for	Remarks
					paragraph concerning day lighting. Section 16.2. Added example for Isolating for Entry following Isolation Procedure for Small Lines. Section 16.2. Added example for Isolating Tank for Roof Seal Inspection. Section 16.5 Added: Caution: Never open vessel lid without first draining vessel contents Added to Section 19. The affects or changes in operations from any project, such as leaving a blind turned in place, shall be communicated to all terminal personnel and documented in the MOC, Operations Turnover Log, Critical Equipment and any other pertinent communication document.
G	9/30/11	LSGO	TMLT	Section 3	Updated definitions to be consistent with ESH 509 Isolation.
				Section 4	Updated Exceptions to ESH to be consistent with philosophy used for Permit Approval Level standard recently deployed.
				Section 5	Training section – deleted as process developed since ESH 506 was originally written supersede it.
				Section 5	Refer to Post Job process when closing out form.
				Section 6 Responsibilities	Pared this section down where other ESHs already cover information and deleted references to Daily JSA. Deleted references to colored tags.
				Section 7.1 Hot Tap	Updated guidance to require MOC with Area Manager and Regional Manger Engineering approval. Added references to CVX standard and API standard covering Hot Taps.

Revision	Date	By	Approved	Issued for	Remarks
				Section 8.0	Deleted the "15 minute" rule and clarified use of a single block valve for short duration work. Valve must be verified to not be leaking and work must be able to be completed by an Operator or Mechanic without leaving the work site for the duration of the task. Also, requires MOC and isolation plan approved by Area Manager. Deleted references to colored tags.
				Section 8.2 Double Block and Bleed	Modified use of double block and bleed to tasks what will have personnel working in the area the entire time double block and bleed is being used with no specific duration.
				Section 8.6 Other Isolation	Added guidance for isolating atmospheric lines such as drain lines. Requires MOC and isolation approved by Area Manager plan per Section 4.
				Section 8.8 Isolating Floating Roofs	Updated to be consistent with ESH 513 Confined Spaces.
				Section 15 Isolating Equipment	Modified the "Butterfly Valve rule" to allow high performance and metal seated triple offset butterfly valves be used as isolation valves to be consistent with CVX Piping Manual Section 270. Modified short duration job to be consistent with updated Section 9. Deleted references to colored tags.
				Section 15.8 Underground Storage Tanks	Added example of isolation for a UST/UST sump.
				Sections on Stewardship and Accountability	Deleted - out of date and other processes put in place to manage these since ESH originally developed.
				Appendix A	Update EIC form

Revision	Date	By	Approved	Issued for	Remarks
				Appendix C	Deleted Daily JSA