



DRILLING AND COMPLETION COMMITTEE

# IRP 13: Wireline Operations

An Industry Recommended Practice (IRP)  
for the Canadian Oil and Gas Industry

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# 13.0 Preface

## 13.0.1 Purpose

The purpose of IRP 13 is to provide recommended practices for the selection, implementation and maintenance of surface pressure control equipment used in wireline operations.

## 13.0.2 Audience

The audience for this document includes wireline personnel (both planners and service personnel). The IRP is not a training document. A basic understanding of wireline operations is assumed.

## 13.0.3 Scope and Limitations

The scope of IRP 13 is to define recommended practices for the selection, implementation and maintenance of pressure control equipment for land-based wireline operations in Canada. This includes all types of wireline (i.e., slickline, braided line and coated line).

The scope does not include off-shore operations, downhole equipment or standards for transportation of equipment.

## 13.0.4 Revision Process

IRPs are developed by the Drilling and Completions Committee (DACC) with the involvement of both the upstream petroleum industry and relevant regulators. Energy Safety Canada acts as administrator and publisher.

Technical issues brought forward to the DACC, as well as scheduled review dates, can trigger a re-evaluation and review of this IRP in whole or in part. For details on the IRP creation and revisions process, visit the Energy Safety Canada website at [www.energysafetycanada.com](http://www.energysafetycanada.com).

A complete list of revisions can be found in Appendix A.

## 13.0.5 Sanction

The following organizations have sanctioned this document:

*Canadian Association of Oilwell Drilling Contractors (CAODC)*

*Canadian Association of Petroleum Producers (CAPP)*

*Petroleum Services Association of Canada (PSAC)*

*Explorers & Producers Association of Canada (EPAC)*

## 13.0.6 Acknowledgements

The following individuals helped develop this edition of IRP 13 through a subcommittee of DACC.

**Table 1. Development Committee**

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Bryan Miske (chair)	Tier 1 Energy Solutions Inc.	PSAC
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Clint Penney	Lee Specialties	OEM

### 13.0.7 Range of Obligations

Throughout this document the terms ‘must’, ‘shall’, ‘should’, ‘may’ and ‘can’ are used as indicated below:

**Table 2. Range of Obligation**

Term	Usage
<b>Must</b>	A specific or general regulatory and/or legal requirement that must be followed. Statements are bolded for emphasis.
<b>Shall</b>	An accepted industry practice or provision that the reader is obliged to satisfy to comply with this IRP. Statements are bolded for emphasis.
<b>Should</b>	A recommendation or action that is advised.
<b>May</b>	An option or action that is permissible within the limits of the IRP.
<b>Can</b>	Possibility or capability.

### 13.0.8 Background

IRP 13 was first sanctioned in December of 2007 in response to a fatality involving several third-party services, including slickline, and the fact that slickline service reference material was limited to API or company-specific documentation at the time. Its purpose was to ensure that guidelines for slickline operations were in place for all personnel involved in the development, planning and completion of a slickline program. At that time, slickline service was defined as a mobile oil and gas service that offers an array of downhole tools to aid in the manipulation of oil and gas wells. Oil and gas companies sub-contracted slickline service for a variety of services from routine oil well servicing to emergency well control. Slickline was defined as a single solid-stranded non-electric cable.

In 2009 some minor additions were made to the IRP to reference IRP15: Snubbing Operations in several sections.

In 2017 IRP 13 was opened for a full scope review. The review committee decided the IRP should cover all wireline, including electric line, slickline, braided line and coated line. The name of the IRP was changed to Wireline Operations and the relevant content was added.



# 13.1 Introduction

Wireline service is a mobile well service that offers an array of downhole tools to assist in the manipulation of oil and gas wells (e.g., servicing, emergency well control).

For purposes of this IRP, wireline is broken down into three categories:

1. Slickline
2. Braided Line
3. Coated Line

Slickline is a solid wire line, typically sized between 0.062” and 0.188” (outside diameter). It can be made of an improved plow steel or some form of stainless steel alloy. Slickline is typically used to manipulate bottomhole pressure control equipment, bottomhole pressure and temperature recorders and some memory logging services.

Braided lines are made of multiple strands of wire twisted together in a rope formation. They can be made of improved plow steel or some form of stainless steel alloy. Braided line comes in several forms. It has either a solid “non-conductor” center core (used for similar services to slickline) or it can be supplied with a conductor cable or armor as the central core. Conductor cables come with one to seven conductors in the core depending on the services that are required. Conductor cables are used in logging operations in both cased hole and open hole scenarios. Conductor cable is not typically used for the mechanical manipulation of tools. Pressure control for both conductor and non-conductor cables are similar and treated as the same within this document

Coated cable combines properties from both slickline and electric line. It is generally made up of a mono conductor cable as the base (used with logging and perforating tools) but combines that with a smooth outer jacket that is overlaid or infused into the cable to give it the sealing properties of slickline which reduces the need for grease injection systems in the pressure control string.

The various types of line can be passed through pressure control equipment mounted on the wellhead and used to run, set and control downhole equipment such as tools, recorders, plugs or flow-control equipment. Applications for wireline include the following:

- Logging
- Mechanical services

- Perforating

This IRP focuses on the pressure control equipment required for wireline operations and the practices and maintenance required to ensure safe operation of the well control equipment. The prime contractor and the wireline service provider have the responsibility to ensure there are procedures and practices in place for the preparation for and execution of a wireline operation (e.g., communication, information gathering, hazard assessments, crew requirements, roles and responsibilities, etc.). This IRP does not prescribe what those procedures or practices should be as they will be specific to each prime contractor and wireline service provider.

It is the responsibility of the service provider to ensure that the guidelines set out by this IRP, the Original Equipment Manufacturer, the applicable local jurisdictional regulator and the prime contractor are followed in a safe and secure manner.

## 13.2 Well Control

The well control section describes well pressure control on the surface and how to safely gain access to the wellbore.

### 13.2.1 Pressure Category

For purposes of this IRP, services are categorized by the pressure control equipment ratings as noted in Table 3.

**Table 3. Pressure Categories for Wireline Services**

Category	Pressure (MPa)	Pressure (psi)
1	< 20.7	< 3000
2	21.7 - 34.5	3000 – 4999
3	34.5 4 -69.0	5000 – 9999
4	>69.0	>10,000

### 13.2.2 Sour Operations

Pressure categories are the same for both sweet and sour operations with sour requiring verification of suitability for sour service based on metallurgical requirements.

**IRP All wireline equipment to be used in sour operations must meet the applicable local jurisdictional regulations for use in sour service (e.g., AER Directives, NACE, API, etc.).**

**IRP All wireline equipment to be used in sour or corrosive environments shall follow OEM specifications to ensure suitability.**

Refer to IRP 2: Completing and Servicing Critical Sour Wells for more information regarding critical sour operations.

### 13.2.3 Downhole Data and Conditions

The equipment and personnel required is dependent on downhole data and conditions. It is the responsibility of the wireline service provider and the prime contractor to ensure the necessary information is provided.

**IRP All downhole data and conditions should be recorded.**

Include the following:

- Scope of work
- Well type (sweet or sour)
- Wellhead connection
- Surface and bottomhole pressures and temperatures
- Downhole schematics

### 13.2.4 Barriers

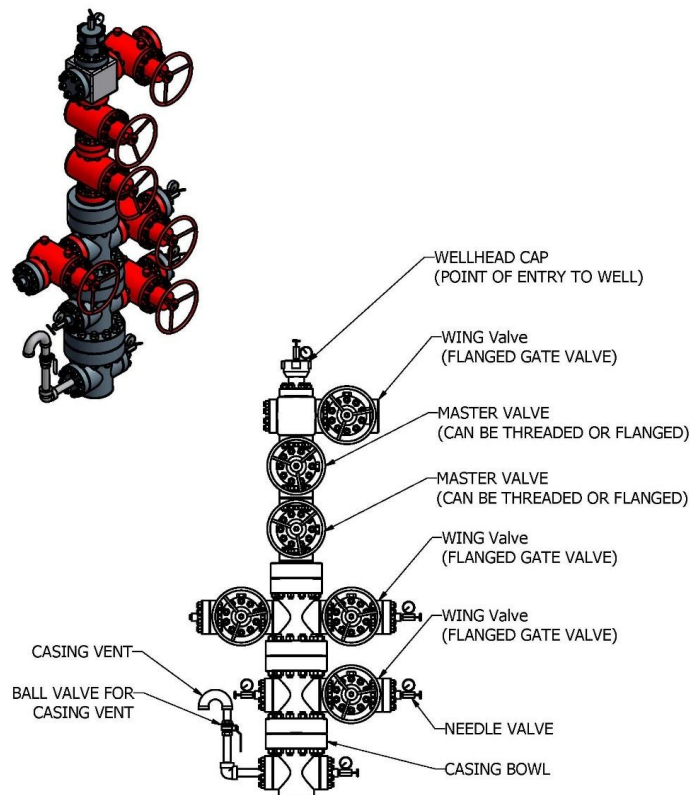
Ensure a proper assessment of the well and work being completed are considered when identifying well barriers.

**IRP Barriers must be in accordance with the local jurisdictional regulations for the wellbore being serviced.**

IRP The prime contractor and wireline service provider should review and agree on the barriers to be used.

### 13.2.5 Wellhead

**Figure 1. Sample Wellhead**





Wellheads are equipped with a master valve(s) to control wellbore pressure. Master valves are the access port for wireline operations (see Figure 1). There are a variety of valves that control flow of gas or fluids from the tubing and/or casing. Wellhead valve operations vary depending on the type of valve.

IRP Wellhead and valve operation should be discussed, determined, assigned and documented during the pre-job meeting.

A master valve with a defined number of opening turns (e.g., 13) should close with the same number of turns (e.g., 13). If, when closing the valve, it feels closed with fewer turns (e.g., 10) there may be an obstruction in the valve body. Obstructions may include wireline, wireline tools, ice plugs, hydrates, soap sticks, coil tubing, etc. Some master valves need to be turned back  $\frac{1}{2}$  - 1 full turn in order to get a proper seal. Neglecting this step can damage the valve or cause it to leak.

**IRP Valves shall be operated and maintained as per OEM procedures.**

**IRP Hand tools (e.g., snipes, pipe wrenches) shall not be used to assist closing the master valve.**

IRP Before attempting to open a valve, surface pressure control equipment above the valve should be equalized.

IRP When a stabbing valve is used, a secondary work valve should be used for wireline operations.

The following common master valve descriptions and diagrams are shown in Appendix B:

- $\frac{1}{4}$  Turn Ball Valves
- Gate Valves
- Needle Valves
- Orbit Valves
- Stabbing Valves

Refer to the Gate Valves section of IRP 5: Minimum Wellhead Requirements for more information about valve functions and recommendations.

## 13.2.6 Surface Pressure Control Equipment

Surface pressure is controlled through a series of specifically designed pressure-rated devices that contain, direct or control the flow of. Pressure control equipment (PCE) can vary in pressure ratings (see 13.2.1 Pressure Category). Metallurgy can vary to accommodate sweet or sweet/sour applications.

Major components of the wireline surface pressure control equipment are described below.

### 13.2.6.1 Identification of Pressure Control Equipment.

**IRP Pressure control equipment shall have identification, working pressure and suitability for H<sub>2</sub>S service engraved/identified on the Certification Band.**

Each company can adopt their own system of identification provided the PCE can be quickly and easily identified. This can be done with either a color coding system or textual identification (stenciled numbers) for the working pressure (or both). A system that uses both color coding and textual identification may reduce confusion.

**IRP Additional textual identification shall be visible from a distance of three metres (ten feet).**

**IRP The identification shall be used consistently throughout the entire company and be clear enough to avoid confusion.**

**IRP If a system of color coding is adopted by the Service Company, a guide shall be readily available for reference by any person who would be required to identify the PCE.**

**IRP If a system of color coding is adopted by the Service Company, the color coding should be visible from 10 metres away.**

### 13.2.6.2 Selection of Pressure Control Equipment

The lubricator length, diameter and working pressure rating need to be adequate for wireline service(s) to be provided. For pressure control equipment, working pressure is the maximum pressure allowed during field operations.

**IRP If working pressures are consistently greater than 80% of rated working pressure of the pressure control equipment then equipment with a higher pressure rating should be considered.**

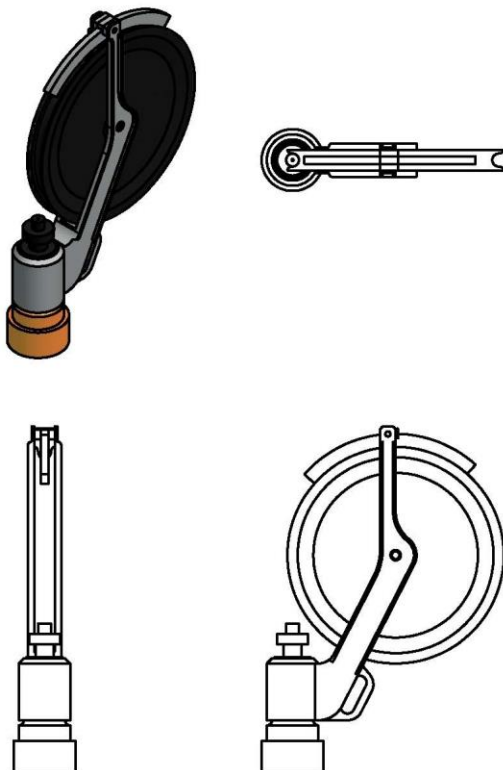
**IRP Working pressures shall not exceed the maximum working pressure rating of the pressure control equipment.**

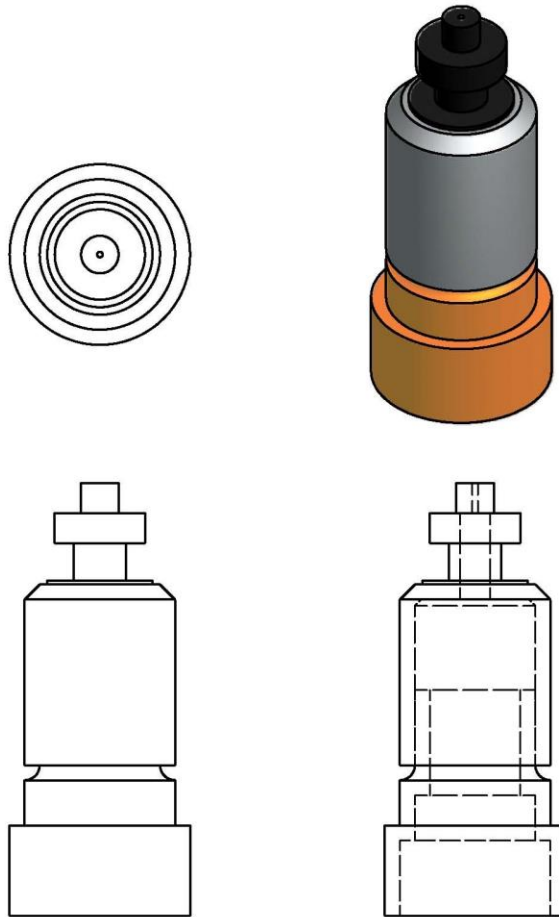
- IRP** On wells where the maximum potential wellhead pressure is not sufficiently established, pressure control equipment shall be rated to the maximum working pressure of the wellhead connection or the pressure rating of the pressure control equipment.
- IRP** The prime contractor must ensure the pressure control equipment is pressure tested on installation and as often as necessary to ensure continued safe operation as per local jurisdictional regulations.
- IRP** All equipment shall be fit for purpose, rated for the work and certified.

### 13.2.6.3 Stuffing Box

Stuffing boxes are only used for slickline operations. They are used on the top of the wellhead assembly to contain the pressure seal around the slickline as it is run in and out of the hole. An oil injection sub, or grease head, may be used in conjunction with a stuffing box to maintain the seal around the slickline.

**Figure 2. Stuffing Box with Sheave**



**Figure 3. Stuffing Box Without Sheave**

IRP Stuffing boxes should be inspected for packing wear before use and be appropriate for line size.

The two common types of stuffing boxes are the stuffing box with sheave and stuffing box without sheave.

The stuffing box with sheave (Figure 2) supports the top sheave which guides the line into the stuffing box.

IRP The sheave should be inspected for wear in the wire guide groove and the bearings should be in good working condition.

IRP The sheave should be sized to match the line.

The stuffing box without a sheave (Figure 3) is commonly used for larger gauge slickline. The sheave that guides the slickline into the stuffing box is suspended by a boom, derrick staff or rig blocks.

#### 13.2.6.4 Line Wiper/Packoff

The packoff (Figure 4) section of the Line Wiper/Packoff (Figure 5) acts as a type of well control by providing a rubber seal around a static wireline. This seal helps restrict wellbore fluids and gasses beneath it.

**Figure 4. Packoff**



**Figure 5. Line Wiper/Packoff**



The line wiper section uses a soft rubber seal to strip wellbore fluids from wireline traveling through it. These waste fluids are returned to an appropriate containment system by way of a waste drainage hose. The line wiper section is engaged when wireline is traveling out of the wellbore.

Continuous use of the packoff on a moving line could cause line damage.

IRP Packoffs are designed to be used in a static line environment and should not be used as a line wiper.

IRP The line wiper is not a pressure containment device and should only be used to wipe excess grease from a moving line.

#### 13.2.6.5 Coated Cable Packoff

The coated cable packoff (Figure 6) is designed to be the upper sealing point of the wireline pressure control string when using a coated cable. It contains two independent rubber seals that squeeze the coated cable. Most are designed with lubricating points to allow lubricating fluid to be injected between the rubber seals to help the cable move in and out of the wellbore.

**Figure 6. Dual Coated Cable Packoff**

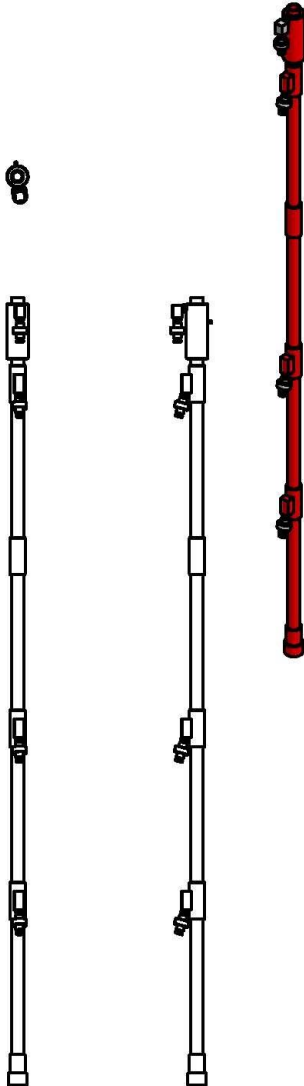


IRP Some form of lubricating medium shall be used between the rubber seals.

### 13.2.6.6 Grease Head

A grease injection system (Figure 7) is used to offer a frictionless seal to convey wireline while under pressure. A grease injection system consists of a grease head and a grease module (see also 13.2.6.19 Control Module).

**Figure 7. Grease Injection System**



The grease head (Figure 8) has a fitting at the bottom into which weather-appropriate grease is injected from a grease module through high pressure lines. The grease module injects grease at a slightly higher pressure than the pressure on the well. Grease is forced up through the flow tubes, filling any open spaces around and in the wireline creating a seal.

**Figure 8. Grease Head**

At the top of the grease head there is a return hose with a needle valve on the end.

The grease head allows for sealing at the top of the PCE string, while still allowing the wireline to enter and exit the wellbore under pressure. To achieve this the wireline is run through a series of tight tolerance flow tubes inside the grease head, then a viscous grease or oil is injected into the grease head at a higher pressure than the wellbore pressure. This fills the annular cavities between the inner walls of the flow tubes and the outside surface of the wireline.

The grease or oil is injected into at least one of the lower sections of the grease head through an injection coupling.

**IRP The injection line shall contain a check valve.**

At the upper most section of the grease injection head, a return port is connected to the return hose.

**IRP The grease return hose shall have a control valve at the bottom to control any undesired flow.**

The number and size of flow tubes is determined by line size and pressure of the wellbore.

IRP Personnel operating grease injection systems should be trained in the proper use of the system (e.g., flow tube sizing, running speeds, grease type, etc.).

**IRP Local jurisdictional regulations for line securement and anchoring of high-pressure lines must be followed.**

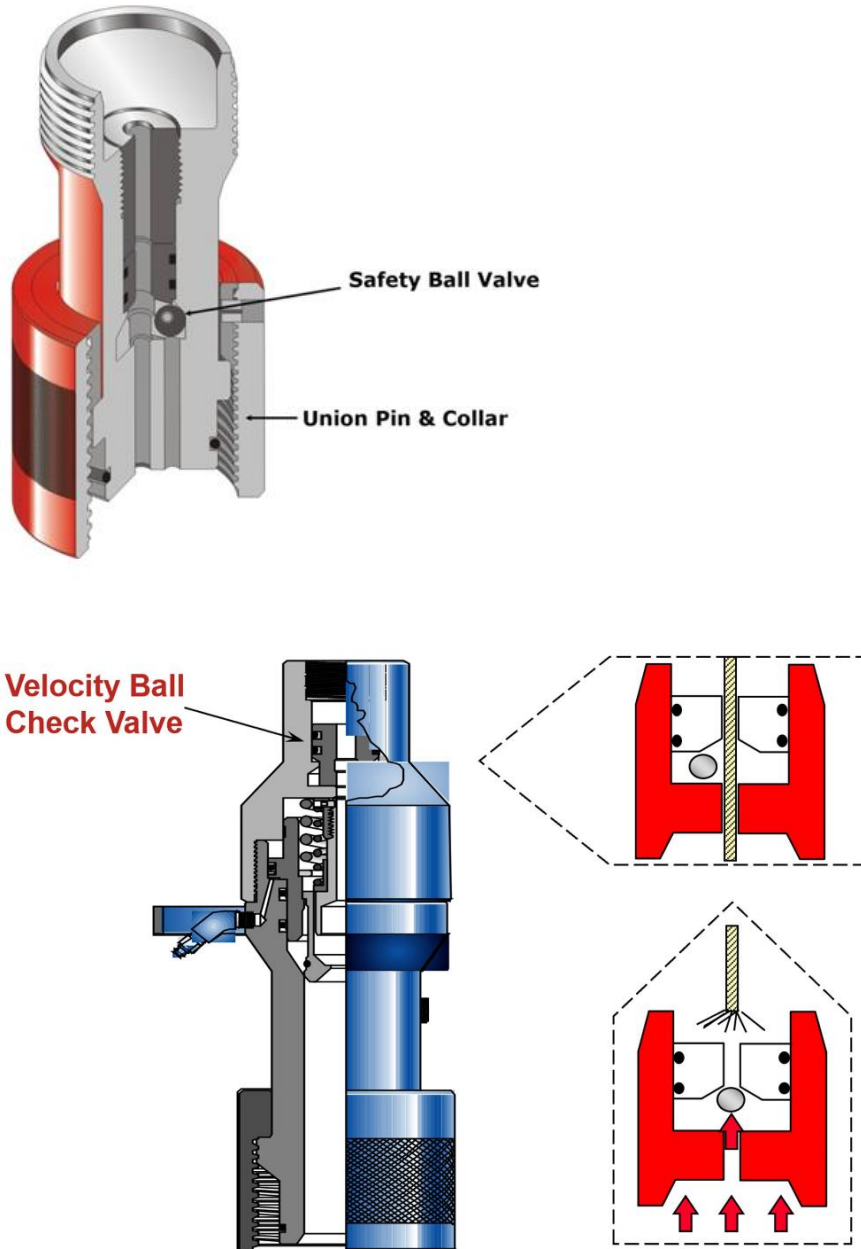
IRP A back up grease injection system should be in place for sour operations.



### 13.2.6.7 Velocity Check Valve

The velocity check valve (Figure 9) seals the bore/hole by the flowing pressure when there is an absence of cable.

**Figure 9. Velocity Check Valve**



**IRP A velocity check valve shall be utilized in the PCE assembly.**

### 13.2.6.8 Head Catcher

The head catcher (Figure 10) is placed at the top of the lubricator and catches the fish neck to prevent the uncontrolled fall of tools. This is typically related to crownouts.

**Figure 10. Head Catcher**



IRP There should be compatibility between the tool string outside diameter and the PCE inside diameter head catcher to allow the head catcher to catch the fish neck.

### 13.2.6.9 Chemical Injection Sub

Chemical injection subs (Figure 11) are usually located above the lubricator.

**Figure 11. Chemical Injection Sub**



Chemical injection subs are typically used in well servicing operations as follows:

- To apply a de-icing agent
- To apply a corrosion inhibitor
- To lubricate larger diameter line.
- To purge lubricators

A check valve on the side of the chemical injection sub has a hose connection.

IRP The chemical injection sub/hydraulic vent sub should be used to prevent adiabatic heating (which burns off the wire).

IRP A whip check or safety sling should be considered when connecting high pressure lines to the injection sub.

**13.2.6.10 Crossover**

A crossover (Figure 12) is utilized to adapt from one size of pressure control equipment to another. In most cases it is used at the top of a lubricator stack to adapt to the Grease Head, Packoff or Stuffing Box.

**Figure 12. Crossover**

**13.2.6.11 Sheave Hanger/Lifting Plate**

**Figure 13. Sheave Hanger/Lifting Plate**



### 13.2.6.12 Lubricator Lifting Clamp

The lubricator Lifting Clamp (Figure 14) is utilized by clamping it on to the top lubricator joint. The clamp has 2 lifting points to allow for safe lifting of the Pressure Control Stack. It is used in conjunction with a Sheave Hanger/Lifting Plate.

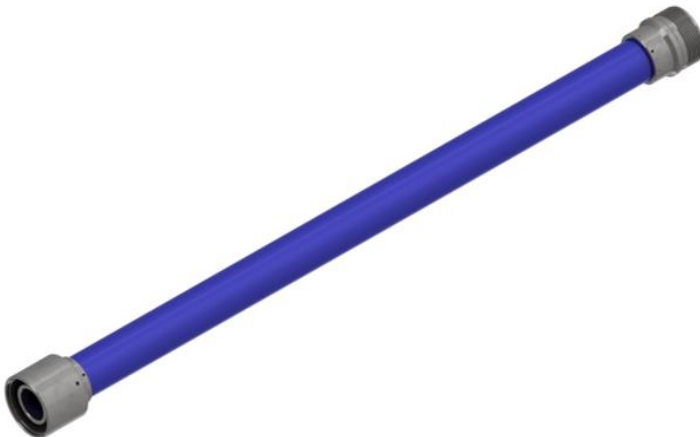
**Figure 14. Lubricator Lifting Clamp**



### 13.2.6.13 Lubricator

Lubricators (Figure 15) enable the tool string to be moved in or out of a wellbore under pressure. Length, size and amount of lubricant is dependent on the service to be completed.

**Figure 15. Lubricator**



Consider including a bleed sub (see Figure 16) above the wireline valve with port size based on lubricator size and length.

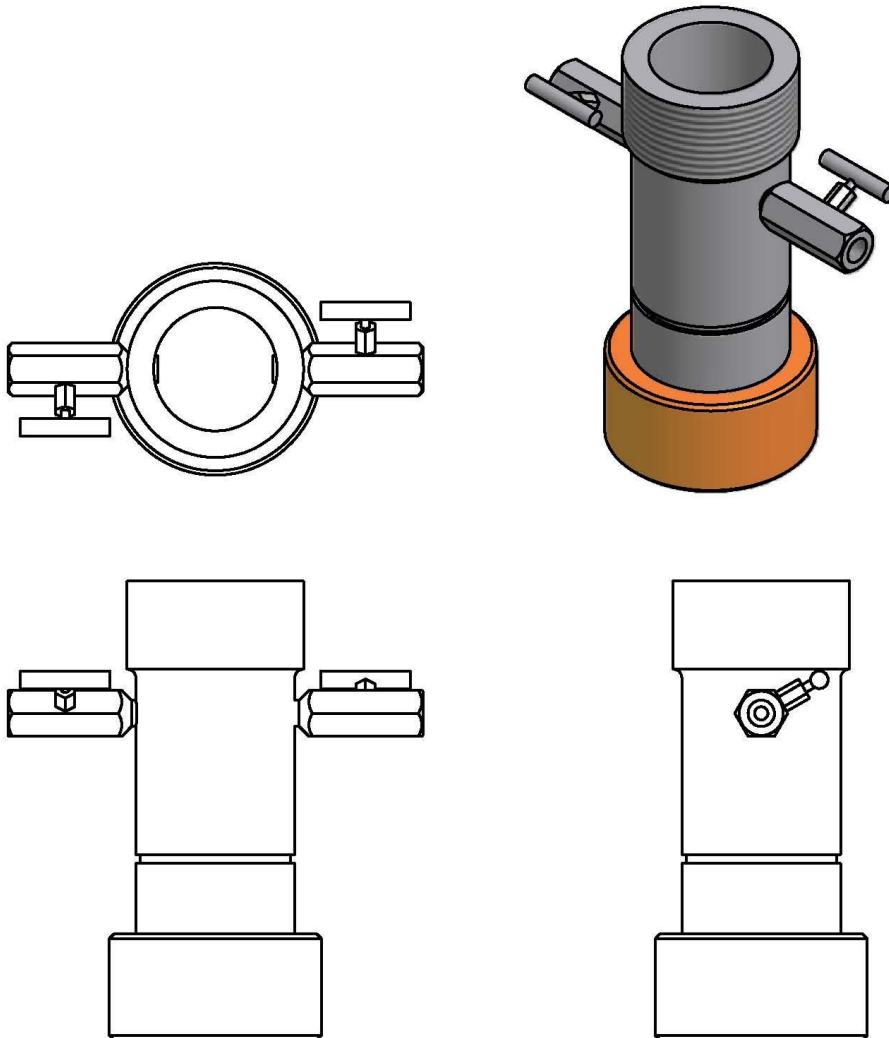
**IRP The length of the lubricator shall be sufficient to encompass the entire expected tool string length (including retrieved items).**

IRP The length of lubricator should exceed bottomhole assembly (BHA) or tool string length by a minimum of one metre when possible for contingency.

#### 13.2.6.14 Bleed Sub

The bleed sub (Figure 16) is designed to be inserted in the PCE string at the lowest possible location above the wireline valve. The bleed sub normally contains at least one, or possibly two, port(s) with valves.

**Figure 16. Bleed Sub**



### 13.2.6.15 Quick Test Sub

The quick test sub (Figure 17) is inserted either below or above the wireline valve at the position of the joint that is normally opened to insert or retrieve tools from the well.

**Figure 17. Quick Test Sub**



After performing the first pressure test to check the integrity of the entire string, subsequent pressure tests can be performed to verify the integrity of the joint disconnected using the quick test sub rather than retesting the entire string. This is achieved by connecting a hand pump to the quick test sub and testing the o-ring seal from the outside.

### 13.2.6.16 Tool Trap

The tool trap (Figure 18) is a safety device used to keep the tool string from falling into the wellbore in the event the wireline gets disconnected from the cable head. It also serves as an indicator of when the tool string is pulled up from the wellbore and is entering the lubricator. This device is normally installed below the lubricator and above the wireline valve. It is available in hydraulically actuated and manual models.

**Figure 18. Tool Trap**



Tool strings resting on or dropped on the tool trap can damage the flap or shaft.

- IRP The tool trap should be used only as a secondary device to stop tools from falling down the hole and not as part of rig-up.
- IRP Tool traps should be visually inspected and function tested before installation or after a dropped tool.



### 13.2.6.17 Wireline Valve

The wireline valve is a manual (Figure 19) or hydraulic (Figure 20) device containing a valve that closes around the wireline to isolate wellbore pressure in the event of pressure control failure above the wireline valve

**Figure 19. Manual Wireline Valve**



**Figure 20. Hydraulic Wireline Valve**



- IRP A wireline valve should be used in all wireline operations.
- IRP Prior to use, wireline valves should be cycled (opened and closed) to ensure all parts are functioning correctly.
- IRP A hydraulically actuated wireline valve should be used for sour wells.

### 13.2.6.18 Pump-in Sub

Pump-in subs (Figure 21) provide an access point to pump fluids into the wellbore, bleed pressure off or flow back well contents above or below a closed wireline valve. They usually include a large ID, low-torque valve appropriately rated for the well conditions.

**Figure 21. Pump-in Sub**



- IRP The PCE string should include a pump in point.
- IRP If there is no other access point, the pump-in sub should be positioned below the wireline valve and above the wellhead as a kill entry point.
- IRP The working pressure of the ball valves and plug valve should match the working pressure of the pump-in sub.

### 13.2.6.19 Quick Latch Systems

Quick latch systems (Figure 22) provide easy remote-controlled connections when connecting the PCE to the wellhead. They facilitate connecting the PCE without having personnel on the wellhead. They provide positive lock, visual indicators of that lock and a pressure seal.

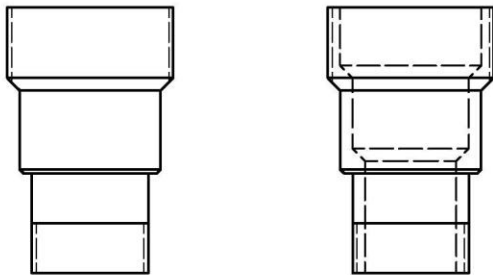
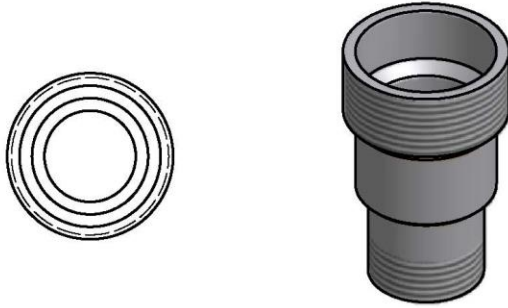
**Figure 22. Quick Latch Systems**



### 13.2.6.20 Wellhead Adapter

The two types of wellhead adapters are the swedge (Figure 23) and adapter flange (Figure 24).

**Figure 23. Swedge Wellhead Adapter**



**Figure 24. Adapter Flange**



IRP A wellhead adapter flange should be used for any pressure control equipment higher than Category 1 or for sour operations (see 13.2.1 Pressure Category).

### 13.2.6.21 Night/Lift/Test Cap

The Night/Lift/Test Cap (Figure 25) is primarily utilized as a barrier, in the event the pressure control equipment is to be left on the wellhead while unattended. It is also used as a lifting device for picking up and placing various components of the Pressure Control Stack. It can also be used as a test cap for pressure testing components of the Pressure Control Stack.

**Figure 25. Night/Lift/Test Cap**



### 13.2.6.22 Sheaves (Top and Bottom)

Sheaves (Figures 26 and 27) guide the wireline from the wireline unit to the wellbore. Sheaves are specific to the type and size of cable being used.

**Figure 26. Slickline Sheave**



**Figure 27. Braided Line Sheave**

A bottom sheave is usually connected to the wellhead or an anchor point. A top sheave can be suspended by a boom, sheave hanger (Figure 28) or rig blocks. For certain operations the top sheave may be attached to the stuffing box. The top sheave guides the line into the surface pressure control equipment.

**IRP Certification for sheaves and rigging must be available as per local jurisdictional regulations.**

IRP Rig anchor points should be sufficient for expected load.

### 13.2.6.23 Control Module

Control modules (Figure 28) are systems to remotely control one or more devices in a PCE string (e.g., Grease Injection, Wireline Valve, Smooth Cable Packoff, Quick Latch, N<sub>2</sub> Skids, etc.). Control modules are typically mounted on a self-contained skid unit.

**Figure 28. Control Module**

### 13.2.6.24 Load Cell

The load cell (Figure 29) measures the tension that is pulled on the wireline by measuring the force that is pulled on the bottom sheave.

**Figure 29. Load Cell**



IRP Weight indicators should, at minimum, be inspected and calibrated annually.

**IRP Load cells that are part of the sheave assembly shall, at minimum, be non-destructive tested (NDT), pull tested and calibrated annually.**





## 13.3 Equipment Maintenance

- IRP Wireline pressure control equipment shall be maintained in accordance with OEM specifications or this IRP, whichever is greater.**
- IRP Wireline pressure control equipment that may retain pressure (e.g., accumulator bottles) or is used for rigging (e.g., shackles, straps, line clamps) that is not mentioned in this document shall be visually inspected prior to use following the applicable OEM specifications.**
- IRP Any wireline pressure control equipment and/or rigging equipment involved in misuse/abuse or subjected to pressure or forces beyond its rating must undergo a Level IV Inspection (see 13.3.1.4 Level IV Inspection) as per OEM specification.**
- IRP Any damaged equipment shall be removed from service until the appropriate level of inspection is completed.**
- IRP All modifications to equipment shall be performed by qualified personnel following professional engineering standards.**
- IRP All modifications to equipment shall be documented and included with original equipment traceability records.**
- IRP OEM recommended replacement elastomers shall be used when the service rating of the equipment (e.g., sour, temperature) is to be maintained.**

For example, equipment may be sour rated when it leaves the manufacturer but is often used in non-sour environment. If replacement is required in the field, o-rings may get replaced with non-sour rated o-rings for expediency. This removes the sour rating from the equipment.

### 13.3.1 Inspections

This IRP references four levels of equipment inspection: Level I, Level II, Level III and Level IV. A summary table of inspections can be found at the end of this section.

See OEM procedures for sour maintenance guidelines.

**13.3.1.1 Level I Inspection**

**IRP A Level I inspection shall be performed by competent personnel pre-job or any time the equipment is assembled.**

Visually inspect each device for signs of damage or wear (e.g., corrosion, gouging or cracking).

**IRP Proof of equipment certification shall accompany the equipment and shall be accessible upon request.**

**IRP A function test at atmospheric pressure shall be performed after assembly.**

**13.3.1.2 Level II Inspection**

**IRP Competent personnel shall thoroughly inspect all wireline equipment as part of post-job maintenance.**

IRP Level II inspection should be performed in a controlled environment.

**IRP Level II Inspection shall include disassembly and inspection for damage or wear to the following:**

- Sheaves, slings and rigging equipment
- Pressure control equipment
- Hoses
- Areas that were under stress while in use (e.g., unions)
- Welds
- Pickup points
- Seals and sealing faces

**IRP OEM procedures to assess fit for duty shall be followed if a device fails inspection criteria.**

This may mean either a Level III or IV Inspection is required (depending on the component) or the device needs to be replaced/repaired.

**IRP If the device is disassembled, the following shall be performed consistent with OEM recommendations:**

- Pressure test to working pressure
- Function test at working pressure

**IRP If equipment is not to be used immediately or is being put into storage, internal surfaces shall be coated with anti-corrosion products.**

**IRP Inspections shall be documented and any completed repairs noted in the equipment certification records.**

### **13.3.1.3 Level III Inspection**

**IRP A shop pressure test and shop inspection shall be performed by competent personnel annually unless required more frequently by OEM specifications.**

**IRP Level III Inspections shall include the following:**

- Equipment disassembly
- Visual inspection of the threads and sealing areas
- Verification and updating of permanent equipment records including serial number, job or service order number, accurate description of the item, Maximum Allowable Working Pressure Rating (MAWP) and manufacturer.
- Re-banding of equipment in a manner that allows details of the inspection to be reviewed (e.g., job number that can be used to look up serial number, type of inspection performed, date performed, working pressure, test pressure, inspection facility, H<sub>2</sub>S rated, whether this is first or second Level III service, etc.).
- Documentation of repairs and pressure testing.
- Coating internal surfaces with anti-corrosion products.

**IRP Pressure testing shall include the following:**

- Pressure testing to 1400 kPa (200 psi), held for 10 minutes and recorded in the permanent records using a printed chart or electronic recorder.
- Pressure testing up to the MAWP, held for 10 minutes and recorded in the permanent records using either a printed chart or electronic recorder.
- Updates to the repair and pressure testing records (as required) for the equipment to maintain its MAWP.

**IRP For safety, pressure testing should only be performed by competent personnel in a facility/area suitable for pressure testing.**

**IRP Pressure-rated equipment repairs that involve machining or welding shall be completed by an OEM or qualified equivalent facility and shall have a Level IV Certified Pressure Test and Inspection performed.**

**IRP Elastomers and pressure sealing rings (e.g., o-rings, pressure rings) shall all be replaced with a Level III inspection.**

#### **13.3.1.4 Level IV Inspection**

**IRP Level IV inspections and repairs shall be completed by OEM designated representatives or a trained and competent third party working within Industry Standards and OEM practices/guidelines.**

**IRP The inspection shall include both non-destructive testing and pressure tests to test pressure of the equipment.**

**IRP Pressure control equipment shall be inspected and recertified three years after it was previously Level IV certified and/or placed in service, or immediately after one of the following events:**

- Pressure in excess of the manufacturer's rated working pressure.
- A sour fluid exposure (where the equipment materials are not NACE certified).
- Any circumstance that is outside the ordinary working scope of wireline pressure control (e.g., item is dropped or impacted, involved in a vehicular accident, etc.).

**IRP Level IV Certification Pressure Tests shall include the following:**

- Disassembly and cleaning of mechanical and hydraulic components including the following:
  - Remove paint (do not use shot blast).
  - Inspect all items for corrosion both internally and externally.
  - Check and document dimensional measurements of all sealing surfaces.
  - Check of all union threads with go/no go profile gauge.
  - Inspect all sealing surfaces
  - Perform a hardness test on all critical components.
  - Perform NDT inspection.
  - Discard and replace all elastomers and crush/seal rings.
  - Replace shear ram blades (if required).
- Verification and updating of the following documentation and records:
  - The condition of the received parts (identify all parts).
  - Required repairs (identify all parts).
  - The specifications for acceptable condition as described by the OEM.

- Measurements of wearing components with calibrated and traceable instruments.
  - Non-destructive testing at a minimum Level II CGSB Non-Destructive Testing Certification.
  - Completed repairs (include inspection criteria, sizes, tolerance and part numbers).
  - Repair methods including welding procedures, heat treatment and parts standards approved by an OEM or OEM equivalent, along with appropriate API, ASME and AWS standards.
- Repairs performed with traceable parts that are designed for equivalent or superior performance and approved by an OEM or OEM equivalent.
  - Repairs performed, or supervised, by competent repair personnel, as defined in 13.3.3: Personnel Qualification and Documentation.
  - Assembly, function testing and pressure testing of pressure rated equipment before shipment.

**IRP Pressure tests shall be performed, recorded in the permanent records using a printed chart or electronic recorder and include, at minimum, the following:**

- Low pressure test at 1,400 kPa (200 psi) for 15 minutes
- High pressure test at 1.5 times equipment working pressure or OEM specifications, whichever is greater, for 15 minutes
- Wireline valve body test at 1.5 times equipment working pressure or OEM specifications, whichever is greater
- Rams function test at MAWP
- Close function hydraulic pressure test to manufacturer's rating
- Open function hydraulic pressure test to manufacturer's rating
- Any additional testing as required by the OEM

**IRP Pressure test documentation shall include the following:**

- Certified Pressure Test document noting the full working pressure test results.
- An inspection report, repair report and testing documentation reviewed and signed by the certifying party.
- Certification documents including the following:
  - Name of the certifying facility
  - Facility certification job number

- Certification date
  - Manufacturer
  - Model or description
  - Pressure rating and bore size
  - Serial number
  - Date the certified equipment was tested
  - Signature of certifying party
- Re-banding of equipment in a manner that allows details of the inspection to be reviewed (e.g., job number that can be used to look up serial number, type of inspection performed, date performed, working pressure, test pressure, inspection facility, H<sub>2</sub>S rating, etc.).

**IRP Certification documents with unique identifying numbers as well as pressure test charts shall be maintained on file with the certification provider and wireline service provider for a minimum of four years.**

After a Level IV recertification is performed, the “in service date” is the date of the certification and no extension will be granted.

**IRP After a Level IV recertification is performed, the “in service date” is the date of the certification and no extension shall be granted.**

**IRP Hardness and materials tests must be performed on unknown materials as per NACE and records kept to prove NACE compliance. If materials cannot be certified they shall be taken out of service or downgraded to non-sour service only.**

#### **13.3.1.5 Control Module Inspections and Certification**

**IRP Annual inspection of all control module equipment shall include the following:**

- Equipment disassembly as per OEM specifications
- Pull tested at two times load rating
- NDT Inspection of the load bearing areas
- Permanent equipment records including the serial number, job number or service order number, accurate description of the item, description of any repairs performed and manufacturer)
- Tagging equipment in a manner that allows details of the inspection to be reviewed (e.g., job number that can be used to look up serial number, type of inspection performed, date performed, load rating, proof load, inspection facility, etc.).

**IRP A shop inspection shall be performed on the control module annually or as specified as OEM.**

Inspection could include the following:

- Visual inspection of the control panel for damaged gauges or controls
- Function test of all controls
- Pressure test of system and control hoses
- Check of charge pressure of accumulators

**IRP Recertification inspection of control modules shall be as per OEM specifications for a major certification, typically every 5 years.**

This may include the following:

- All items from the annual inspections
- Replacement of hoses
- Replacement of accumulator bags

#### **13.3.1.6 Lifting and Rigging Equipment Inspections**

Lifting and rigging equipment includes the following:

- Sheaves
- Slings
- Rigging Equipment
- Module lifting equipment
- Load cells attached to a sheave

**IRP All overhead equipment shall be engineered and tested as per OEM specifications.**

**IRP Annual inspection of all overhead lifting and rigging equipment shall include the following:**

- Equipment disassembly
- Pull tested at two times load rating
- NDT Inspection of the load bearing areas
- Review and update of permanent equipment records including the serial number, job number or service order number, accurate description of the item, description of any repairs performed and manufacturer.

- Tagging equipment in a manner that allows details of the inspection to be reviewed (e.g., job number that can be used to look up serial number, type of inspection performed, date performed, load rating, proof load, inspection facility, etc.).

### 13.3.1.7 Summary of Inspections and Certifications

Tables 4 and 5 summarize the inspections and IRP statements from the previous sections (13.3.1.1 through 13.3.1.6).

**Note:** This is a summary only. Not all devices and tests apply to all situations. Specific requirements and recommended practices are as per the above sections.

**Table 4. Inspections Summary**

Type	Inspection	Frequency	Devices and Tests
Level I	Visual inspection for damage and/or wear.	<ul style="list-style-type: none"> <li>• Pre-Job</li> <li>• Each time equipment is assembled</li> </ul>	<ul style="list-style-type: none"> <li>• All devices</li> <li>• Function test at atmospheric pressure after assembly.</li> </ul>
Level II	Service and Maintenance Inspection	Post- job	Inspect devices for damage and/or wear: <ul style="list-style-type: none"> <li>• Sheaves, slings and rigging equipment</li> <li>• Pressure control equipment</li> <li>• Hoses</li> <li>• Areas that were under stress while in use (e.g., unions)</li> <li>• Welds</li> <li>• Pickup points</li> <li>• Seals and sealing faces</li> </ul> Tests: <ul style="list-style-type: none"> <li>• Pressure test</li> <li>• Function test</li> </ul> Tasks: <ul style="list-style-type: none"> <li>• Coating all internal surfaces with anti-corrosion products (if equipment not being used immediately or being put into storage)</li> </ul>



Type	Inspection	Frequency	Devices and Tests
Level III	Inspection and Pressure Test	Annually OR more frequently if required by OEM	<p>Equipment:</p> <ul style="list-style-type: none"> <li>• Inspect devices for damage and/or wear including threads and sealing areas</li> </ul> <p>Tests:</p> <ul style="list-style-type: none"> <li>• Pressure testing (including updating repair and pressure test records)</li> </ul> <p>Includes:</p> <ul style="list-style-type: none"> <li>• Equipment disassembly</li> <li>• Re-banding equipment</li> <li>• Documentation of repairs and pressure testing.</li> <li>• Replacement of elastomers and pressure sealing rings</li> <li>• Coating internal surfaces with anti-corrosion products</li> </ul> <p><b>Note:</b> pressure-rated equipment repairs involving machining or welding require Level IV inspection.</p>

Type	Inspection	Frequency	Devices and Tests
Level IV	Certification Pressure Test and Inspection	<p>Every three years (i.e., three years after previous Level IV certification or in-service date)</p> <p>OR</p> <p>Immediately following any of these events:</p> <ul style="list-style-type: none"> <li>• Pressure in excess of manufacturer rated working pressure</li> <li>• Sour fluid exposure<sup>1</sup></li> <li>• Circumstances outside normal working scope of wireline pressure control<sup>2</sup></li> </ul>	<p>Testing:</p> <ul style="list-style-type: none"> <li>• NDT testing</li> <li>• Function testing</li> <li>• Pressure testing to maximum test pressure of the equipment</li> </ul> <p>Includes:</p> <ul style="list-style-type: none"> <li>• Disassembly and cleaning of mechanical and hydraulic components</li> <li>• Removing paint</li> <li>• Inspection for corrosion</li> <li>• Inspect/document dimensional measurements of sealing surfaces</li> <li>• Inspect all union threads</li> <li>• Inspect sealing surfaces</li> <li>• Hardness test of all critical components</li> <li>• Replace all elastomers and crush/seal rings</li> <li>• Replace shear ram blades (if required)</li> <li>• Verify/update documentation</li> <li>• Re-banding equipment</li> <li>• Hardness and materials tests of unknown materials</li> </ul>

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<sup>1</sup> Where equipment materials are not NACE certified.

<sup>2</sup> E.g., item is dropped or impacted, involved in a vehicular accident, etc.

**Table 5. Specific Equipment Inspection**

Equipment	Frequency	Notes
Control Module	<ul style="list-style-type: none"> <li>• Inspect annually</li> <li>• Shop test annually or as specified by OEM</li> <li>• Recertify as per OEM schedule (typically every 5 years)</li> </ul>	<p>Annual inspection Includes:</p> <ul style="list-style-type: none"> <li>• Equipment disassembly</li> <li>• Pull test at two times load rating</li> <li>• NDT Inspection of load bearing areas</li> <li>• Tagging equipment</li> <li>• Verifying and updating permanent equipment records</li> </ul> <p>Shop test could include:</p> <ul style="list-style-type: none"> <li>• Visual inspection of the control panel for damaged gauges or controls</li> <li>• Function test of all controls</li> <li>• Pressure test of system and control hoses</li> <li>• Check of charge pressure of accumulators</li> </ul> <p>Recertification could include:</p> <ul style="list-style-type: none"> <li>• All items from the annual inspections and shop tests</li> <li>• Replacement of hoses</li> <li>• Replacement of accumulator bags</li> </ul>
Lifting and Rigging Equipment	Annually	<p>Equipment:</p> <ul style="list-style-type: none"> <li>• Sheaves</li> <li>• Slings</li> <li>• Rigging Equipment</li> <li>• Module lifting equipment</li> <li>• Load cells attached to a sheave</li> </ul> <p>Includes:</p> <ul style="list-style-type: none"> <li>• Equipment disassembly</li> <li>• Pull test at two times load rating</li> <li>• NDT Inspection of load bearing areas</li> <li>• Tagging equipment</li> <li>• Recertification of any lifting equipment as per overhead lift certification standards</li> <li>• Verifying and updating permanent equipment records</li> </ul>



### 13.3.2 Job and Equipment Compatibility

NACE material guidelines apply to equipment and elastomer products in H<sub>2</sub>S or CO<sub>2</sub> environments.

**IRP All materials must be chemical resistant and suitable for the wellbore environment (as per NACE).**

### 13.3.3 Personnel Qualification and Documentation

Refer to IRP 07: Competencies for Critical Roles in Drilling and Completions for information about competent personnel.

#### 13.3.3.1 Certifying Party

**IRP A certifying party shall be an OEM designated representative and/or a trained and competent third-party company working within industry standards and OEM practices and guidelines.**

#### 13.3.3.2 Pressure Control Equipment Technicians

**IRP A qualified pressure control equipment technician shall be deemed competent by a certifying party and be able to produce evidence of the following:**

- Knowledge of equipment type and model.
- The ability to disassemble, repair and re-assemble equipment.
- Ongoing learning and development in certified environments.

#### 13.3.3.3 Welders

**IRP Qualified welders shall have a valid Journeyman Welding Ticket with a B pressure endorsement and be able to produce evidence of experience in pressure rated equipment repair or sign-off by certifying party.**

#### 13.3.3.4 Non-Destructive Testing Personnel

**IRP Qualified non-destructive testing personnel shall have CSGB Level II and be able to produce evidence of prior experience in the inspection of wireline pressure control equipment.**



## 13.4 Operations

**IRP All wireline service providers shall have standard operating procedures in place for any wireline operation that cover, at minimum, the following:**

- Pre-Job preparations (e.g., information gathering, setting job scope, reviewing regulatory requirements and industry recommended practice, defining crew requirements including certifications and/or training)
- Equipment securement and transportation
- Emergency Response Plans
- Wireline and pressure control equipment requirements and selection
- On-site communications
- Job Procedures and Job Safety Analysis (JSA)
- Site-specific hazard assessments
- Assessment of wellhead and surface conditions
- Winter/cold weather operations
- Rig up
- Wellsite pressure testing procedures that follow OEM guidelines for pressure testing
- Downhole procedures
- Rig out
- Assessment of relevant personnel competency

### 13.4.1 Pre-Job

**IRP Before the pre-job meeting the wireline service provider representative(s) and the prime contractor's representative shall review the conditions, tasks, risks, hazards and Safety Data Sheets (SDS) relevant to the wireline operation and discuss any changes to the job request.**

**IRP All identified hazards and control measures noted in the JSA shall be reviewed with all personnel on site.**

- IRP The pre-job meeting shall be held prior to the commencement of wireline operations or during a change in scope and shall include, at minimum, all personnel working on or near the wireline operation.**
- IRP The pre-job meeting should cover, at minimum, a review of wireline job tasks and the hazard assessment.
- IRP Wireline personnel should review all third-party and SimOps pre-job hazard assessments.
- IRP All workers shall be aware of the site-specific Emergency Response Plan (ERP).**

### 13.4.2 Rig up

- IRP All wireline equipment shall be rigged-up by wireline service provider personnel unless other services assisting with rig-up are informed of potential equipment and/or procedural hazards.**
- IRP All mobile equipment (e.g., cranes/pickers, mast units, rigs, trailers, accumulators, grease pumpers, wireline units, generators, etc.) shall be grounded to equal potential between the flow lines, wellhead and all equipment.**
- IRP The wireline truck/equipment should be spotted as far from the wellhead as reasonably practicable to reduce ignition hazards.**
- IRP Remote controls (e.g., accumulator, wireline valve, etc.) should be spotted as far from the wellhead as reasonably practicable for safe operation in an emergency.**
- IRP All diesel-powered equipment required for the wireline operation shall be equipped with positive air shut off valves.**
- IRP Rig-up shall be as per wireline service provider SOPs.**

### 13.4.3 Hazards

- IRP Wireline personnel shall assign control measures to identified hazards (engineering, administrative or PPE) and notify the wellsite supervisor if engineering controls are required for the prime contractor's equipment or lease.**



### 13.4.4 Onsite Pressure Testing

IRP PCE pressure tests should be completed for pressure category 1 wells, at minimum, as follows:

- On each rig up (i.e., prior to introducing well pressure to the lubricator)
- Each time the lubricator is laid down and picked back up
- Any time an o-ring sealed connection is opened
- Any time a PCE string component is added or removed

It is not always practical to pressure test in pressure category 1 wells. The onus is on the operator to perform due diligence for pressure testing requirements.

**IRP PCE pressure tests shall be completed for pressure category 2, 3 and 4 wells, at minimum, as follows:**

- On each rig up (i.e., prior to introducing well pressure to the lubricator)
- Each time the lubricator is laid down and picked back up
- Any time an o-ring sealed connection is opened
- Any time a PCE string component is added or removed

**IRP Pressure testing shall not exceed equipment maximum working pressure ratings.**

See API RP 67: Oilfield Explosives Safety for more information about pressure testing.



# Appendix A: Revision Log

Edition 1 of IRP 13 was sanctioned in November 2007.

Edition 1.1 added references to IRP15 in sections 13.1.2, 13.4.7, 13.4.8 and 13.5.11. Sanctioned February 2009.

Edition 2 incorporates a full industry review with scope change to include all wireline operations (not just slickline) and rename the IRP to Wireline Operations. Table 6 summarizes the changes in this edition. Edition 2 was sanctioned in February 2020.

**Table 6. Revisions Summary**

Edition	Section(s)	Remarks/Changes
1		Original IRP sanctioned November 2007.
1.1	13.1.2 13.4.7 3.4.8 13.5.11	Added references to IRP15 in sections noted Sanctioned February 2009.
2	General	<ul style="list-style-type: none"> <li>• Document converted to current DACC template.</li> <li>• Complete editorial review for conversion to template and current DACC Style guide. Specifically, IRP formatting (Must, Shall, Should) and active voice with clear, concise writing. Updates to references and hyperlinks. This required review of many "may" IRP statements from the original IRP and decision about whether they were actually an IRP statement or just general direction.</li> <li>• Complete industry review with scope change to include all wireline operations (not just slickline) and rename the IRP to Wireline Operations.</li> <li>• Align document with current industry practices and API standards.</li> <li>• Update definitions and acronyms.</li> <li>• Removed references to Demco valves (brand name)</li> <li>• Removed sections for service company, worker and owner responsibilities. These were all items that should be covered in SOPs for each party.</li> <li>• Focus on equipment and maintenance of surface pressure control equipment (as per scope) and removed information about downhole pressure control equipment.</li> <li>• Removed information in operational procedures sections that was not specific to wireline operations. Committee did not want to be prescriptive about this information as it is part of SOPs.</li> <li>• Removed the training section as crew requirements are part of SOPs and not to be dictated by IRP.</li> <li>• Removed Appendix with job order request for</li> </ul>

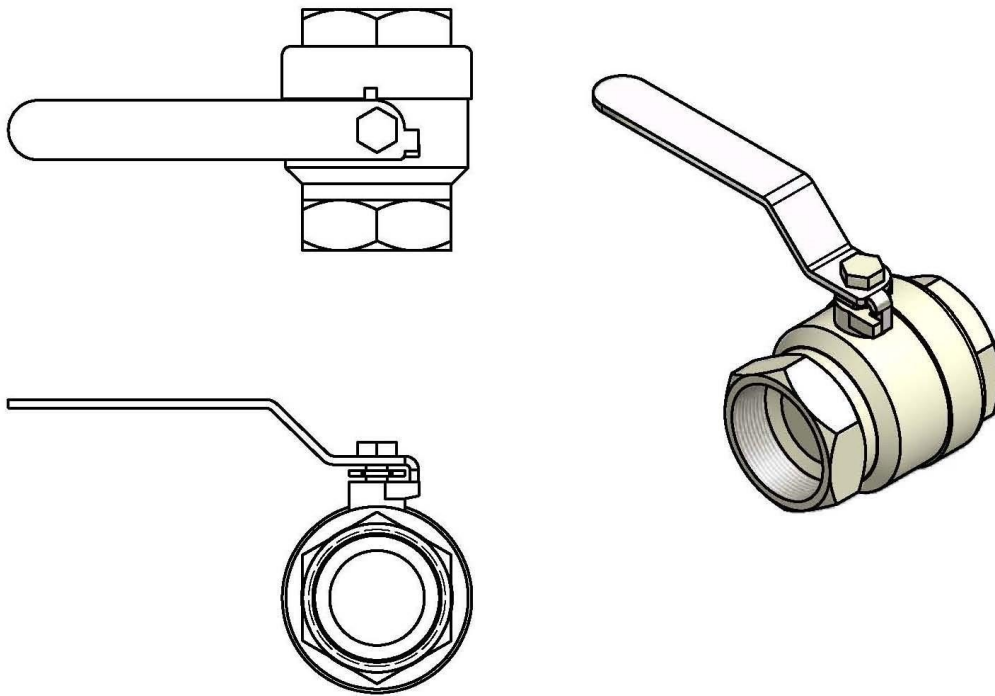
Edition	Section(s)	Remarks/Changes
		<ul style="list-style-type: none"> <li>• Removed Appendix of Slickline Control Equipment String with detail in 13.2.6 Surface Pressure Control Equipment and Appendix C.</li> <li>• Removed Appendix of pressure control equipment inspection form.</li> <li>• Removed appendix with overhead equipment service certification form.</li> <li>• Removed appendix of zeroing and adjustment calculations as is part of company SOPs.</li> <li>• Created Appendix for Master Valve information (Appendix B)</li> <li>• Remove Wing Valves from the document.</li> <li>• Added requirements for sour.</li> <li>• Changed pressure categories (13.2.1) to match PCE ranges.</li> </ul>
	13.2.6.20 Load Cells	<ul style="list-style-type: none"> <li>• Added IRP: Load cells that are part of the sheave assembly shall, at minimum, be non-destructive tested (NDT), pull tested and calibrated annually.</li> </ul>
	13.3.1.1 Level I Inspection	<ul style="list-style-type: none"> <li>• Changed from daily to pre-job or upon assembly.</li> </ul>
	13.3.1.2 Level II Inspection	<ul style="list-style-type: none"> <li>• Changed from quarterly to post-job.</li> </ul>
	13.3.1.3 Level III Inspection	<ul style="list-style-type: none"> <li>• New: Elastomers and pressure sealing rings (e.g., o-rings, pressure rings) shall all be replaced with a Level III inspection.</li> </ul>
	13.1.3.5 and 6	<ul style="list-style-type: none"> <li>• New sections to cover Control Module and Lifting/Rigging equipment that didn't fit into Level I/II/III/IV</li> </ul>
	13.1.3.7	<ul style="list-style-type: none"> <li>• Created summary maintenance/certifications to replace old table</li> </ul>

# Appendix B: Master Valves

## ¼ Turn Ball Valve

A ¼ turn ball valve is a flow control device with a handle to open or close the flow of gas or fluids through the wellhead. They are commonly seen in coiled tubing and small diameter tubing wellheads.

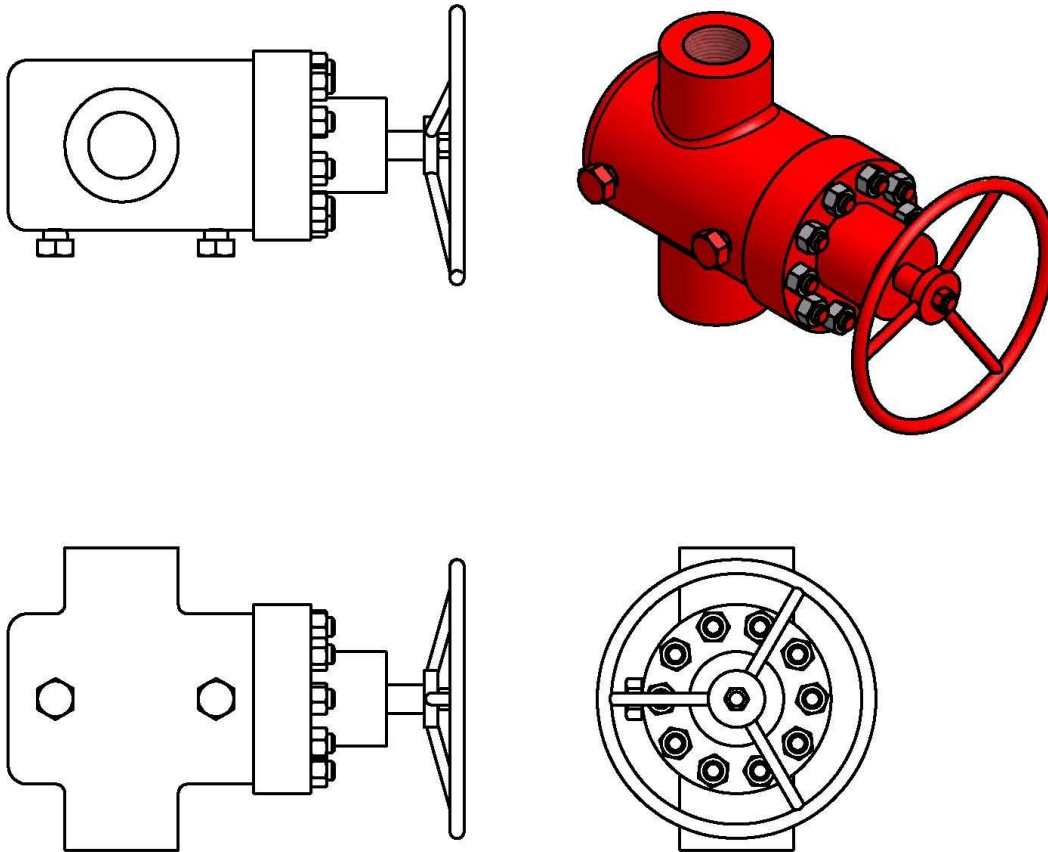
**Figure 30. ¼ Turn Ball Valve**



## Gate Valve

A gate valve is an opening and closing device (a valve) that employs a gate that is moved in or out of a sealing seat within the valve's body.

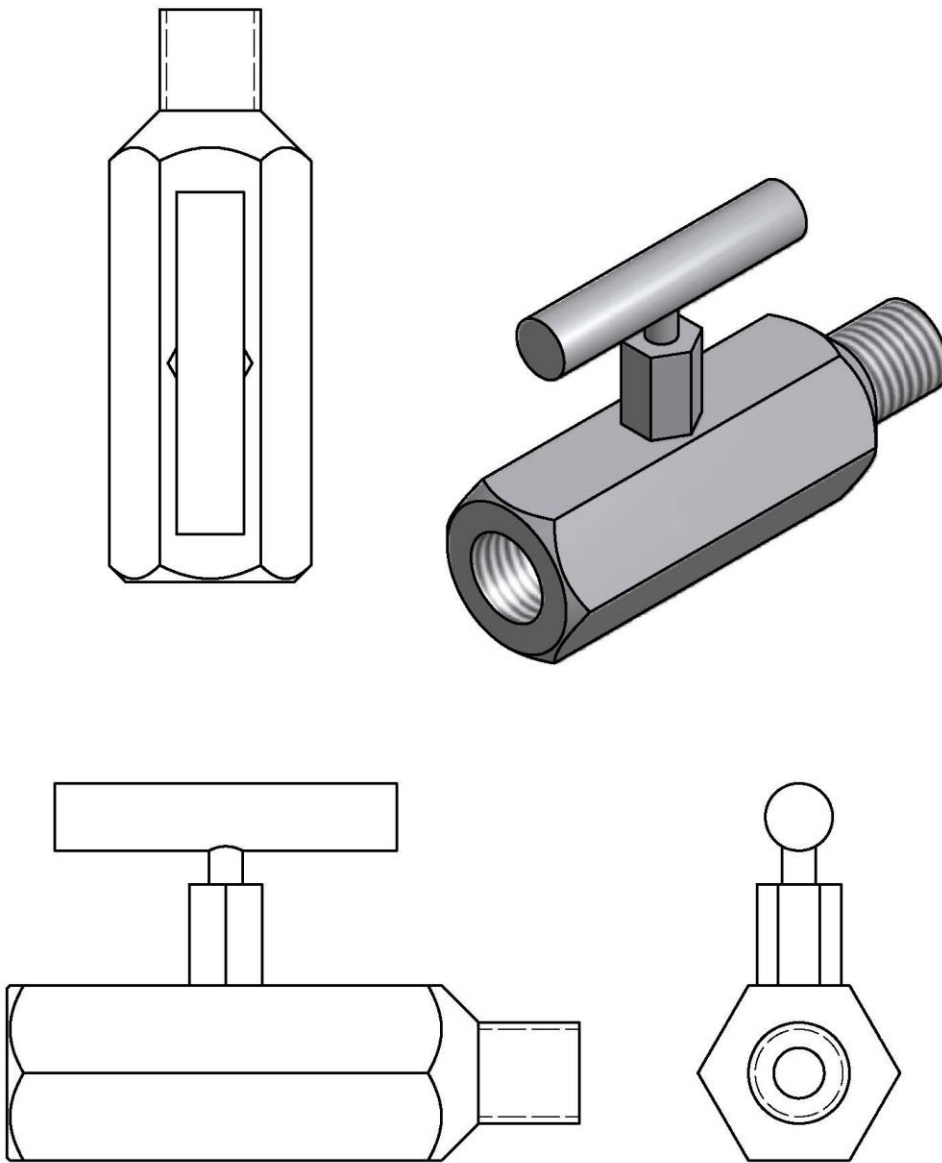
**Figure 31. Gate Valve**



## Needle Valve

Needle valves are functionally similar to gate valves but permit a finer flow adjustment. The end of the stem is pointed like a needle and fits accurately into the needle seat. Needle valves are used for very small, accurate adjustable flows. Needle valves are susceptible to becoming plugged or freezing-off at all temperatures due to the small flow path.

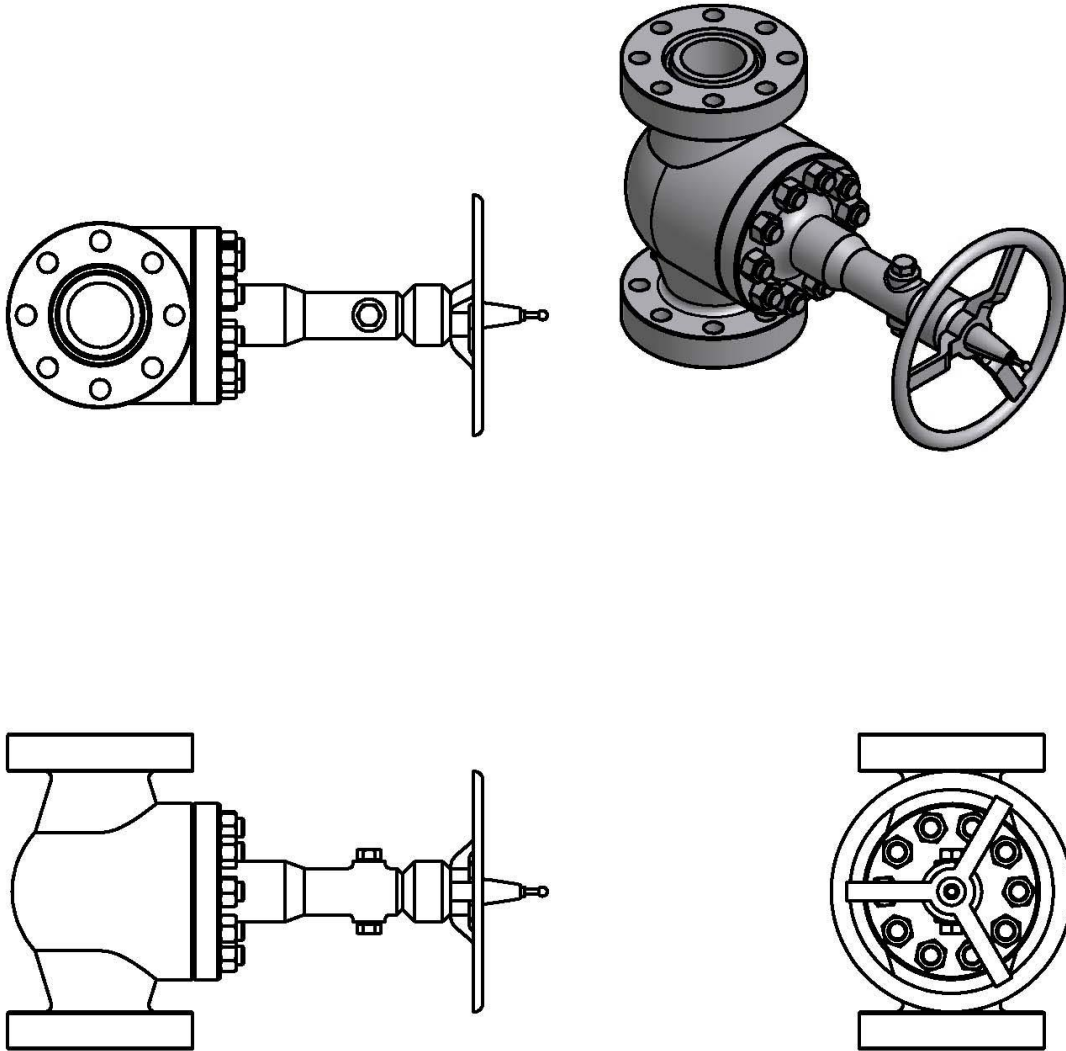
**Figure 32. Needle Valves**



## Orbit Valve

An orbit valve is a large diameter, multiple turn ball valve.

**Figure 33. Orbit Valve**

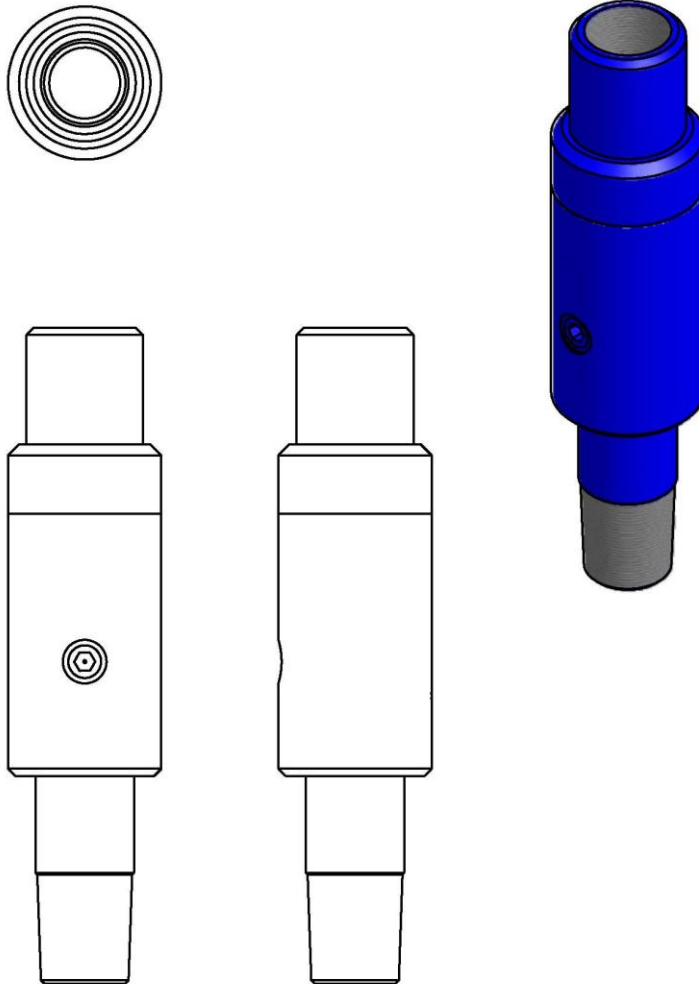




## Stabbing Valve

A stabbing valve is a  $\frac{1}{4}$  turn valve with a two-piece body containing a ball style gate that is typically used for emergency pressure control during service rig or snubbing operations.

**Figure 34. Stabbing Valve**





# Appendix C: Acronyms and Abbreviations

<b>AER</b>	Alberta Energy Regulator
<b>API</b>	American Petroleum Institute
<b>ASME</b>	American Society of Mechanical Engineers
<b>AWS</b>	American Welding Society
<b>BHA</b>	Bottomhole Assembly
<b>CAPP</b>	Canadian Association of Petroleum Producers
<b>CGSB</b>	Canadian General Standards Board
<b>CO<sub>2</sub></b>	Carbon Dioxide
<b>ERP</b>	Emergency Response Plan
<b>H<sub>2</sub>S</b>	Hydrogen Sulphide
<b>IRP</b>	Industry Recommended Practice
<b>JSA</b>	Job Safety Analysis
<b>MAWP</b>	Maximum Allowable Working Pressure
<b>NACE</b>	National Association of Corrosion Engineers
<b>NPT</b>	National Pipe Threads
<b>OEM</b>	Original Equipment Manufacturer
<b>PPE</b>	Personal Protective Equipment
<b>PSAC</b>	Petroleum Services Association of Canada
<b>SDS</b>	Material Safety Data Sheets



# Appendix D: Glossary

The following glossary terms have been defined from a Slickline context.

**Anti-corrosion products:** Chemicals introduced to the tubing to clean impurities off the walls of the tubing.

**Bottomhole assembly (BHA):** Completion assembly ran in the wellbore with tubulars.

**Casing Pressure:** The pressure in a well that exists between the casing and the tubing or the casing and the drill pipe.

**Casing:** Large diameter steel pipe cemented in place when the well is drilled.

**Critical sour well:** A well that generally includes all the elements of a sour well plus the added concerns of residents near the well site and environmental issues. The criteria for a critical sour well may vary according to specific jurisdiction's regulatory agency.

**Elastomer:** Rubber material used in molded flexible parts such as o-rings, seals and adhesives.

**Equalize:** The activity to balance the pressure above and below the valve, plug or similar pressure fluid isolation barrier.

**Flow Subs:** Equipment on the lubricator pressure control equipment to allow flow into, or from, the lubricator stack.

**Flow Tee:** A short joint of lubricator installed below the wireline valve with customer specified hand unions on the top and bottom, along with any combination of side ports required. Typical side ports requested are; ½" NPT, 2" LP, 2" ARP, or 1502 WECO thread half. Also referred to as 'the pump-in' or 'bleed-off sub'.

**Function Hydraulic Pressure Test:** A hydraulic method to function test rams.

**Function Test:** A test to ensure pressure control equipment parts are not seized, move freely and are able to work when under pressure (i.e. closing rams).

**Gate Valve:** An opening and closing device that employs a gate that is moved in or out of a sealing seat within the valve's body.

**Grease Injection Module:** A system used to pressurize grease and pump it into a grease injection head.

**Hydrates:** Compounds in natural gas molecules trapped within a crystal structure. Hydrates form in cold climates, such as permafrost zones and

deep water. They can form in pipelines and in gas-gathering, compression, and transmission facilities at reduced temperatures and under high pressures.

**Hydrogen sulphide:** A gaseous compound, commonly known by its chemical formula, H<sub>2</sub>S. It is frequently found in oil and gas reservoirs, and has a distinctive rotten egg odor at low parts per million. It is extremely poisonous and corrosive and quickly deadens the olfactory nerve so that its odor is no longer a warning signal.

**Job/Task Analysis:** A systematic analysis of the steps involved with doing a job/task, the loss exposures involved, and the controls necessary to prevent loss. An important step in the analysis is consideration of the elimination or reduction of hazards. A job/task analysis is a prerequisite to the development of work procedures and practices.

**Lubricating:** The action of running or pulling wireline tools from a wellbore while controlling associated well pressures.

**Night Caps:** A piece of a pressure control equipment with a female union including a port for a needle valve. It is commonly used as a cap for wireline valves or lubricator when pressure testing or to contain pressure overnight when workers are not present on site.

**Non-Destructive Testing:** A method of determining the integrity of pressurized equipment without incurring damage to the equipment.

**Pressure Control Equipment:** Equipment used to contain wellbore pressures at surface while wireline operations are being performed.

**Pressure Test:** A procedure to ensure proper operation at working pressure. Pressure bearing equipment is tested at defined timed intervals at a maximum pressure greater than, or equal to, working pressure.

**Purge:** The removal of substances within pipe, pipeline, vessel, container or PCE with inert gas or fluid in order to prevent creating an explosive atmosphere when pressure and/or hydrocarbons are introduced.

**Ram Function Test:** A procedure to open and close rams manually or hydraulically to ensure the equalizing ports work properly under pressure.

**Ram:** The closing and sealing component on a wireline valve. There are three types of nonmetallic rams: blind, line, and shear. Line rams, when closed, have configuration such that they seal around the line; shear rams cut through the line then form a seal; blind rams seal on each other with no line in the hole.

**Shackles:** Rigging components used for attaching lifting components.

**Sheave:** A pulley used to guide the line from the wireline unit into the surface pressure control equipment. A sheave can be suspended above equipment, attached to the stuffing box, and secured below the master valve.

**Surface pressure:** The pressure reading taken at surface from the wellhead or wireline surface pressure control equipment. Surface pressure can be read using an analog (needle style), or digital pressure gauge.

**Swabbing:** The operation conducted to reduce the hydrostatic pressure of the fluid in the wellbore to initiate flow from a formation.

**Test Pressure:** The recorded pressure surface pressure control equipment is subjected to during inspections.

**Well Control:** Well pressure control at the surface and access to the wellbore.

**Wellbore:** The hole drilled into the ground by a drilling rig to a specified depth. The wellbore may have casing in it, or it may be open (uncased), or part of it may be cased, and part of it may be open. When completed the wellbore has tubing in it that will convey the oil or gas from the formation to surface.

**Wellhead Connection:** The connection between well and wireline pressure control equipment.

**Wellhead:** All components and related equipment from the top of the outermost casing string (the casing bowl connection) up to but excluding the flowline valve. Within the IRP 13 context the wellhead includes both wellhead components and christmas tree equipment as defined by API Specification 6A (current edition).

**Working Pressure:** Maximum pressure on the pressure control equipment that must never be exceeded during field operations.





# Appendix E: References

## AER References

Available from [www.aer.ca](http://www.aer.ca)

Directive 033: Well Servicing and Completions Operations - Interim Requirement Regarding the Potential for Explosive Mixtures and Ignition in Wells

Directive 037: Service Rig Inspection Manual

## API References

American Petroleum Institute Exploration & Production Department. *Wireline Operations and Procedures*. (June, 2000). Third Edition. Washington, DC.

API RP 67: Oilfield Explosives Safety, Third edition. 2019.

API Spec 6A: Specification for Wellhead and Christmas Tree Equipment, Twenty-First Edition. 2018.

API Purchasing Guideline API Specification 6A 20<sup>th</sup> Edition, October 2010.

## DACC References

Available from [www.energysafetycanada.com](http://www.energysafetycanada.com)

IRP 02: Completing and Servicing Critical Sour Wells

IRP 05: Minimum Wellhead Requirements

IRP 07: Competencies for Critical Roles in Drilling and Completions

IRP 15: Snubbing Operations

## Other References

ASME Boiler and Pressure Vessel Code

NACE MR0175/ISO 15156: Petroleum and natural gas industries - Materials for use in H<sub>2</sub>S-containing environments in oil and gas production. 2015.

