

OQ Task Name

Task XX.X – Install Electrical Insulating Device: Aboveground Piping Isolation

1.0 Task Description

This task consists of installing nonmetallic spacers or shields on aboveground pipeline segments.

The task begins when the required installation location of the isolation device is identified. This task ends when isolation device has been installed, tested, and documented according to Operator's procedure.

The performance of this covered task may require the performance of other covered tasks such as:

Inspect and Test Electrical Isolation (Reference Task 1.5).

2.0 Knowledge Component

The purpose of this task is to isolate aboveground pipeline segments and equipment from buried structures with nonmetallic spacers or shields to ensure proper functioning of cathodic protection (CP) systems.

An individual performing this task must have knowledge of the following.

- Cathodic protection (CP) systems.
- Electrical isolation.
- Electrical isolation devices, such as nonmetallic spacers or shields

Terms associated with this task:

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Abnormal operation conditions (AOC) associated with the performance of this task include:

AOC Recognition	AOC Reaction
Presence of corrosion, pitting, etc.	Document as required and notify appropriate personnel.
Unexpected hazardous liquid or carbon dioxide encountered.	Stop all activity related to this task and notify operator personnel, as required, and eliminate ignition sources.
Pipeline damage: dents, gouges, scrapes, etc.	Notify appropriate personnel.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Verify the location where the isolation device is required.	This step verifies that the installation will be appropriately mounted, enclosed, and compatible with the location of the installation.

2	Install the piping system so that it is not in physical contact with any foreign electrically conductive or metallic structure	<p>The CP design must include and account for such structures if electrical isolation is impractical to achieve. Cathodically protected pipelines installed aboveground and supported with steel supports should be electrically isolated from the supports.</p> <p>Conductive or metallic structures may include: casings, valve culverts, concrete caisson steel, cable trays, supporting pipe stanchions, bridge structures, pilings, or reinforcing steel in concrete.</p>
3	Align and install the electrical isolation device between pipe interfaces and metallic structures using nonmetallic spacers or shields.	<p>The proper installation of these materials ensures crevice corrosion does not result from ingress of dust and moisture between the insulation material/pipe interfaces.</p> <p>Follow Operator procedure to maintain appropriate pipe support during installation of isolation devices.</p> <p>The material should be properly sized, and has appropriate compression/abrasion resistance in conjunction with having effective dielectric properties.</p>
5	Verify isolation with the appropriate isolation tester.	NOTE The completion of this step may be completed by another individual qualified in Task 1.5 - <i>Inspect and Test Electrical Isolation</i>
6	Record all required documentation per the Operator's procedures.	Proper documentation is critical to future analysis and identification of problem areas.

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OQ Task Name

Task XX.X – Install Electrical Insulating Device: Casing Isolation

1.0 Task Description

This task consists of installing nonmetallic spacers or shields inside casings.

The task begins when the required installation location of the isolation device is identified. This task ends when the isolation device has been installed, tested, and documented according to Operator's procedure.

The performance of this covered task may require the performance of other covered tasks such as:

- Inspect and Test Electrical Isolation (Reference Task 1.5).
- Perform Coating Inspection (Reference Task 7.7).

2.0 Knowledge Component

The purpose of this task is to isolate pipeline segments and equipment from casings to ensure proper functioning of cathodic protection (CP) systems.

An individual performing this task must have knowledge of:

- Cathodic protection (CP) systems.
- Electrical isolation.
- Electrical isolation devices, such as casing isolators/spacers

Terms associated with this task:

This section intentionally left blank.

Abnormal operating conditions (AOC) associated with the performance of this task include:

AOC Recognition	AOC Reaction
Presence of corrosion, pitting, etc.	Document as required and notify appropriate personnel.
Unexpected hazardous liquid or carbon dioxide encountered	Stop all activity related to this task and notify operator personnel, as required, and eliminate ignition source.
Pipeline damage: dents, gouges, scrapes, etc.	Notify appropriate personnel.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
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1	Verify the location where the isolation device is required.	When metallic casings are used as part of the underground piping system (such as at roadways, railway crossings, watercourse crossings, etc.), the electrical isolation of the carrier pipeline from such casings is accomplished by the use of adequate and approved insulating spacing capable of high compressive strength and end-seal materials.
2	Verify the annular space is cleared of any debris and contaminants.	This step confirms the removal of all organic materials or electrolytes from the annular space between the casing and the carrier pipe and to it is completely free of contaminants prior to installation of the insulating spacers.
3	Install the nonmetallic spacers or shields and seal the ends.	Casing isolating spacers are specified to have the required mechanical strength for the installation. Follow Operator's procedure and the manufacturer's specification.
4	Verify that the annular space is cleared of any debris and contaminants and verify spacers are secured.	This step confirms that all foreign debris has been removed before sealing.
5	Install the end seals.	Water/debris penetration is effectively prevented when the end seals are correctly installed. NOTE: Install the casing end seals according to the manufacturer's instructions and in the quantity recommended by the manufacturer or design engineer.
6	Verify isolation with the appropriate isolation tester.	NOTE: The completion of this step may be completed by another individual qualified in Task 1.5 - <i>Inspect and Test Electrical Isolation</i>
7	Record all required documentation per the operator's procedures.	Proper documentation is critical to future analysis and identification of problem areas.

OQ Task Name

Task XX.X – Install Electrical Insulating Device: Isolation Joints

1.0 Task Description

This task consists of installing an isolation joint.

The task begins when the required installation location of the isolation device is identified. This task ends when isolation device has been installed, tested, and documented according to Operator's procedure.

The performance of this covered task may require the performance of other covered tasks such as:

Inspect and Test Electrical Isolation (Reference Task 1.5).

Perform Welding (Reference Task 42.7).

2.0 Knowledge Component

The purpose of this task is to isolate pipeline segments and equipment with an isolation joint to ensure proper functioning of cathodic protection (CP) systems.

An individual performing this task must have knowledge of:

- Cathodic protection (CP) systems.
- Electrical isolation.
- Electrical isolation devices, such as monolithic-style insulating joints

Terms associated with this task:

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Abnormal operating conditions (AOC) associated with the performance of this task include:

AOC Recognition	AOC Reaction
Presence of corrosion, pitting, etc.	Document as required and notify appropriate personnel.
Unexpected hazardous liquid or carbon dioxide encountered.	Stop all activity related to this task and notify operator personnel, as required, and eliminate ignition sources.
Pipeline damage: dents, gouges, scrapes, etc.	Notify appropriate personnel.

3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Verify the location where the isolation device is required.	This step verifies that the installation will be appropriately mounted, enclosed, and compatible with the location of the installation.

2	Verify the type of isolation device required, such as monolithic-style insulating joints that are typically welded in place.	<p>This step requires certain types of isolation devices where the isolation point location must be buried or the fluid inside the pipe is electrically conductive such as produced water.</p> <p>Isolating joints for pipelines should be adequate for the maximum pressure and temperature conditions encountered on the particular installation.</p> <p>NOTE: Assembling isolating joints and testing them both hydrostatically and electrically before installation in the pipeline is preferred.</p>
3	Install bond wires/cables on both sides of the section of pipe to be removed.	This step will enable electrical continuity to avoid arcing.
4	Install the isolation device.	NOTE: The completion of this step may be completed by another individual qualified in Task 42.7 – <i>Perform Welding</i>
5	Remove the bonding devices and verify isolation with the appropriate isolation tester.	<p>The use of a digital multimeter can give a false indication of isolation.</p> <p>NOTE: The completion of this step may be completed by another individual qualified in Task 1.5 - <i>Inspect and Test Electrical Isolation</i></p>
6	Record all required documentation per the operator's procedures.	Proper documentation is critical to future analysis and identification of problem areas.

OQ Task Name

Task XX.X – Install Electrical Insulating Device: Lightning Protection and Electrical Grounding

1.0 Task Description

This task consists of installing electrical insulating devices for lightning protection and electrical grounding.

The task begins when the required installation location of the isolation device is identified. This task ends when isolation device has been installed, tested, and documented according to Operator's procedure.

The performance of this covered task may require the performance of other covered tasks such as:

Measure Structure-to-Soil Potentials (Reference Task 1.1)

Test to Detect Interference (Reference Task 1.3)

Inspect and Test Electrical Isolation (Reference Task 1.5).

2.0 Knowledge Component

The purpose of this task is to isolate pipeline segments and equipment from lightning protection or electrical ground fault system to ensure proper functioning of cathodic protection (CP) systems.

An individual performing this task must have knowledge of:

- Cathodic protection (CP) systems.
- Electrical isolation.
- Grounding systems.
- Various electrical isolation devices, such as a polarization cell replacement (PCR) or a solid state decoupling (SSD) device.

Terms associated with this task:

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AOCs associated with the performance of this task include the following.

AOC Recognition	AOC Reaction
Presence of corrosion, pitting, etc.	Document as required and notify appropriate personnel.
Unexpected hazardous liquid or carbon dioxide encountered.	Stop all activity related to this task and notify operator personnel, as required, and eliminate ignition sources.
Pipeline damage: dents, gouges, scrapes, arc burns, etc.	Notify appropriate personnel.
Unintentional activation of a safety/control device (e.g. unauthorized removal of power) that results in a loss of control of the pipeline.	Take appropriate action to mitigate the situation and to return the pipeline to normal condition.

	Notify the control center or local operations.
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3.0 Skill Component

To demonstrate proficiency of this task, an individual must perform the following steps:

Step	Action	Explanation
1	Verify the location where the isolation device is needed.	This step verifies that the installation will be appropriately mounted, enclosed, and compatible with the location of the installation.
2	Install all insulating devices in accordance with the manufacturer's specifications.	For lightning and ground fault protection: The equipment typically will consist of either a polarization cell replacement (PCR) or a solid state decoupling (SSD) device that is bonded sufficiently and oppositely on both sides of the insulating flange. For electrical grounding: Provision for electrical isolation through an approved electrical device (PCR or SSD) that is rated for the service must be made at main line valves, densitometers, flow-meters, pressure transmitters, and other sites where such structures will be in bare metal contact to the soil.
3	Verify isolation with the appropriate isolation tester.	NOTE: The completion of this step may be completed by another individual qualified in Task 1.5 - <i>Inspect and Test Electrical Isolation</i> For electrical grounding: Conduct testing on all utility (electrical, telephone, etc.) supply or feeder cables to identify DC flow to the foreign structures. This may require the completion of Task 1.1 – <i>Measure Structure-to-Soil Potentials</i> , and Task 1.3 – <i>Test to Detect Interference</i> .
4	Record all required documentation per the operator's procedures.	Proper documentation is critical to future analysis and identification of problem areas.