

## OPERATE INDUSTRIAL PUMPS

**UNIT CODE:** ENG/OS/IPO/CR/O6/4/A

### UNIT DESCRIPTION

This unit describes competencies required to operate industrial pumps. It involves applying industrial pump safety procedures, identifying industrial pumps system components, running and monitoring industrial pumps, performing industrial pump basic maintenance and generating industrial pumps operation report.

### ELEMENTS AND PERFORMANCE CRITERIA

<b>Element</b> These describe the key outcomes which make up workplace function	<b>Performance Criteria</b> These are assessable statements which specify the required level of performance for each of the elements.  <i><b>Bold and italicized terms are elaborated in the Range</b></i>
1. Apply Industrial Pump Safety Procedures	1.1 Prescribed personal safety Equipment (PPE) is worn as per rules and regulations of the <i><b>Occupational Safety and Health Act (OSHA)</b></i> 1.2 Safety measures for the operation of the hydraulic systems are applied as per the rules and regulations of the <i><b>Occupational Safety and Health Act (OSHA)</b></i> 1.3 Work environment safety rules and regulations are observed as per the <b>Occupational Safety Act</b> 1.4 <i><b>Potential, workplace employee and equipment hazards,</b></i> and their <i><b>risk</b></i> control measures are identified as per OSHA to ensure the safety of personnel and equipment
2. Identify Industrial Pumps System Components	2.1 Operation manuals are obtained and interpreted as per manufacturer's specification and SOPs 2.2 The model of the industrial pump is identified as per manufacturer's specification 2.3 Different components of the pump are identified

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3. Run and Monitor Industrial Pumps	3.1 Pumps are operated in accordance with the manufactures <i><b>operating procedures</b></i> 3.2 Pump performance is monitored, and daily check chart updated 3.3 Take corrective action to rectify abnormalities in accordance to manufacturers and enterprise procedures 3.4 Operating hours for the pump is updated in the log book
4. Perform Industrial Pump Basic Maintenance	4.1 Basic Maintenance requirements are identified according to SOPs 4.2 Isolations associated with in-service maintenance are completed as per SOPs 4.3 Lubrication of parts are carried out according to SOPs 4.4 Loose foundation bolts and glands are tightened
5. Generate Industrial Pumps Operation Report.	5.1 Update daily check charts 5.2 Update the inventory

## **RANGE**

This section provides work environment and condition to which the performance criteria (PC) applies. It allows for different work environment and situations that will affect performance

<b>Variable</b>	<b>Range</b>
<ul style="list-style-type: none"> <li><i>Occupational Safety and Health Act 2007</i> may include but not limited to:</li> </ul>	<ul style="list-style-type: none"> <li>Personal safety equipment</li> <li>Responsibility of the employee</li> <li>Responsibility of the employer</li> <li>Work area safety</li> <li>Work area hazards</li> <li>Accident reporting procedure</li> </ul>
<ul style="list-style-type: none"> <li><i>Types of pump</i> may include but not limited to:</li> </ul>	<ul style="list-style-type: none"> <li>Centrifugal pump</li> <li>Reciprocating Pump</li> <li>Piston Pump</li> <li>Diaphragm Pump</li> <li>Rotary Pump</li> <li>Lobe Pump</li> </ul>

Variable	Range
	<ul style="list-style-type: none"> <li>• Screw Pump</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Types of Bearing</i> may include but not limited to:</li> </ul>	<ul style="list-style-type: none"> <li>• Plain/ Journal bearing</li> <li>• Ball Bearings</li> <li>• Roller bearings</li> <li>• Thrust bearings</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Types of Seals</i> may include but not limited to:</li> </ul>	<ul style="list-style-type: none"> <li>• Mechanical seals</li> <li>• Gaskets</li> <li>• O-rings</li> <li>• Gland packing</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Pump Auxiliaries</i> may include but not limited to:</li> </ul>	<ul style="list-style-type: none"> <li>• Pump lubrication oil systems</li> <li>• Valves</li> <li>• Pump prime movers including A.C and D.C motors, steam turbines, oil engines</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Hazards</i> may include but not limited to:</li> </ul>	<ul style="list-style-type: none"> <li>• Liquid spillage</li> <li>• Unguarded rotating parts</li> <li>• High temperature</li> <li>• Explosion</li> <li>• Pump vibrations</li> <li>• Electrical shock</li> <li>• Electromagnetic emissions</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Safety Standards</i> may include but not limited to:</li> </ul>	<ul style="list-style-type: none"> <li>• Relevant sections of Occupational Health and Safety legislation</li> <li>• Industry standards</li> <li>• Manufacturers' recommendations</li> <li>• National standards for plant and relevant state legislation.</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Procedures</i> may include but not limited to:</li> </ul>	<ul style="list-style-type: none"> <li>• Manufacturer guidelines (e.g. instructions, specifications or checklists)</li> <li>• Industry operating procedures</li> <li>• Workplace procedures (e.g. work instructions, operating procedures or checklists)</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Appropriate/Relevant personnel</i> may include but not limited to:</li> </ul>	<ul style="list-style-type: none"> <li>• Production personnel</li> <li>• Maintenance personnel</li> <li>• Supervisors/Team leaders and managers or equivalent</li> <li>• Technical and engineering officers or</li> </ul>

Variable	Range
	<ul style="list-style-type: none"> <li>equivalent</li> <li>Operating staff and contractor staff.</li> </ul>
<ul style="list-style-type: none"> <li><i>Personal Protective Equipment (PPE)</i> may include but not limited to:</li> </ul>	<ul style="list-style-type: none"> <li>Thermally insulated gloves</li> <li>Ear protection (muffs or plugs)</li> <li>Working protective gloves</li> <li>Safety boots</li> </ul>
<ul style="list-style-type: none"> <li><i>Faults/ abnormal operating conditions</i></li> </ul>	<ul style="list-style-type: none"> <li>Loss of pumping capacity</li> <li>Electrical power failure</li> <li>Tubing occlusion</li> <li>Cavitations</li> <li>Vibration</li> <li>Noise</li> <li>Misalignment</li> <li>Load faults</li> <li>Leakages</li> </ul>
<ul style="list-style-type: none"> <li><i>Appropriate emergency response</i> may include but not limited to:</li> </ul>	<ul style="list-style-type: none"> <li>Identification of emergency</li> <li>Isolation of power source</li> <li>Selection and application of appropriate fire-fighting equipment and PPE</li> <li>Notification of downstream users</li> <li>Notification of appropriate regulatory authorities</li> </ul>

## REQUIRED KNOWLEDGE AND SKILLS

### Required Knowledge

- Relevant environmental, occupational health and safety legislation and regulations
- Classification of pumps
- Pump construction and operating principles
- Pump Diagrams
- Recording procedures
- Pump speed control equipment
- Pump fittings
- Lubrication and bearings
- Fire protection control systems
- First aid

## Required Skills

### The trainee needs to demonstrate the following fundamental skills

- Communication skills
- Numeracy skills
- Digital literacy skills
- Occupational health safety and Practices
- Environmental Literacy
- Employability skills
- Entrepreneurship skills

## EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1. Critical Aspects of Competency	1.1 Observed safety at workplace and sound housekeeping 1.2 Identified different types of pump 1.3 Identified parts of pumps 1.4 Identified pump fittings 1.5 Operated and monitored pumps performance 1.6 Conducted basic First Aid and Emergency evacuation
2. Resource Implications	2.1 Various pumps 2.2 Pump simulations 2.3 Pump manuals 2.4 Relevant legislations, e.g. OSHA, Environmental Act; and regulations 2.5 Workshop tools
3. Methods of Assessment	Competency may be assessed through: 3.1 Observed behavior of the learners 3.2 Inspection of written operation procedures 3.3 Inspection of log books
4. Context of Assessment	Competency will be assessed individually in the actual workplace or through accredited institution
5. Guidance information for Assessment	Holistic assessment of other units relevant to the industry sector, workplace and job role is recommended