

**PROJECT NAME**

**ACTIVITY– INSTALLATION, TESTING & COMMISSIONING OF FIRE PUMPS SET**

Ref No:  
Rev.No:00  
Page 1 of 11

Serial No.	Sub-Activities	Hazards Identified (Generic & Task)	Risks Involved (People & Property)	Risk Rating			Control Measures	Residual Risk
				Severity	Probability	Initial Risk		
1.	Preparation of work	<ul style="list-style-type: none"> <li>Unauthorized, untrained workers</li> </ul>	<ul style="list-style-type: none"> <li>Cuts</li> <li>Abrasions</li> </ul>	2	A	L	<ul style="list-style-type: none"> <li>TBT/DSTI to be conducted by the foreman/ safety officer prior to work commencement</li> <li>Task specific safety training to be provided</li> <li>Authorized personnel to undertake the job</li> <li>Daily safety inspection should be carried and eliminate the hazard.</li> </ul>	Low (ALARP)
2.	Manual Handling	<ul style="list-style-type: none"> <li>Incorrect lifting of loads</li> <li>Sharp edges.</li> <li>Placing the object while fingers underneath.</li> <li>Slip/trip/fall ( same level )</li> <li>Unsafe posture</li> </ul>	<ul style="list-style-type: none"> <li>Back Injuries</li> <li>Cut to finger</li> <li>Strain</li> <li>Musculoskeletal Injuries</li> </ul>	3	C	M	<ul style="list-style-type: none"> <li>Any lifting tasks shall be carried out by persons physically capable to do so</li> <li>No employee should be asked to carry loads above his capacity and in any case no load shall exceed 30kg per man.</li> <li>Mass of the load is more then to be equally shared</li> <li>Deploy enough number of personnel for lifting shall be appointed to the task depending upon the type of load to be lifted.</li> <li>Use easy mode of transport like trolley etc.</li> <li>Load not to be lifted above your shoulder Height</li> <li>Keep your fingers away from pinch point While placing the load</li> <li>Area to be illuminated with adequate lighting.</li> <li>Proper personal protective equipments to be used while manual handling of materials and loads.</li> </ul>	Low (ALARP)

**PROJECT NAME**

**ACTIVITY– INSTALLATION, TESTING & COMMISSIONING OF FIRE PUMPS SET**

Ref No:  
Rev.No:00  
Page 2 of 11

Serial No.	Sub-Activities	Hazards Identified (Generic & Task)	Risks Involved (People & Property)	Risk Rating			Control Measures	Residual Risk
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3.	Traffic and road management	<ul style="list-style-type: none"> <li>• Collision with vehicles/ fixed installations.</li> <li>• Poor identification</li> <li>• Unauthorized/ untrained Operator/ driver, banks men</li> <li>• Poor access for vehicle</li> <li>• Public movement</li> </ul>	<ul style="list-style-type: none"> <li>• Fatality</li> <li>• Property damage</li> <li>• Fracture</li> <li>• Penalty/ compensation</li> </ul>	4	B	M	<ul style="list-style-type: none"> <li>• Prior to start obtain all relevant approval from traffic department in connection to the use of road.</li> <li>• PTW to be approved from Company/Contractor prior to start the activity.</li> <li>• Trained and experienced operator/ driver and banks men to be appointed for the activity.</li> <li>• Restricted to unauthorized and public to enter the area.</li> <li>• Public vehicles and transport to be restrict to enter the work area and proper alternative way to be provided.</li> <li>• Warning sign boards to be placed and area to be well barricaded.</li> <li>• High visibility vest to be provided to flagman to increase visibility.</li> <li>• Flagman to be positioned to the areas wherever required.</li> <li>• Close supervision to be done at all times.</li> </ul>	Low (ALARP)
4.	Unloading and shifting pumps with using crane or forklift	<ul style="list-style-type: none"> <li>• Unauthorized, Untrained Workers</li> <li>• Failure of lifting equipment</li> <li>• Failure of lifting tools &amp; tackles.</li> <li>• Unsafe lifting.</li> <li>• Swinging of material</li> </ul>	<ul style="list-style-type: none"> <li>• Fatality</li> <li>• Fractures</li> <li>• Property damage</li> <li>• Injury to personal</li> <li>• Sprain and strain</li> </ul>	4	C	H	<ul style="list-style-type: none"> <li>• Ensure the crane and forklift engaged is tested and having valid license and the operator has valid license and approved 3<sup>rd</sup> party certificate.</li> <li>• Engage trained and certified banks man.</li> <li>• Barrication and warning signs in to the area where lifting operation is carried out and restrict the entry.</li> <li>• Check list should be carried out to their vehicles by the operator prior to start any work</li> <li>• Use tagline for control of swing and alignment.</li> </ul>	M (ALARP)

**PROJECT NAME**

**ACTIVITY– INSTALLATION, TESTING & COMMISSIONING OF FIRE PUMPS SET**

Ref No:  
Rev.No:00  
Page 3 of 11

Serial No.	Sub-Activities	Hazards Identified (Generic & Task)	Risks Involved (People & Property)	Risk Rating			Control Measures	Residual Risk
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		<ul style="list-style-type: none"> <li>• Damaged sling/wire rope or a chain</li> <li>• Poor maintenance of vehicle</li> <li>• Speedy operation</li> <li>• Over turn</li> <li>• Over load</li> </ul>					<ul style="list-style-type: none"> <li>• The crane must be stopped when the wind speed exceeds 38km/hr.</li> <li>• SWL should be clearly marked on the crane and should be check that is functioning.</li> <li>• The crane and trucks shall be periodically maintained and a periodical check has been done by the maintenance team.</li> <li>• Vehicle not to be left unattended at site (ie,to be switch off mode if required and keys removed)</li> <li>• Safe working load should be carry by crane and trucks and Secure the load before it is travelling.</li> <li>• Operators and rigger must worn high level of reflecting vest and adequate PPE ( Shoe, helmet, leather gloves, goggles, over all )</li> </ul>	
5.	Stacking and Storing	<ul style="list-style-type: none"> <li>• Unauthorized, untrained workers</li> <li>• Material fall from height</li> <li>• Improper stacking</li> <li>• Collapse of materials</li> </ul>	<ul style="list-style-type: none"> <li>• Crush</li> <li>• Cut and abrasion</li> <li>• Damage to property</li> </ul>	3	B	M	<ul style="list-style-type: none"> <li>• All materials shall be stored below 2 meter height.</li> <li>• If the material is too heavy, use hydraulic trolley to shift the material.</li> <li>• No storage of materials to be done in the work place, only required quantity to be taken for the job.</li> <li>• Personnel protective equipment must wear at all time during the activity. (Helmet, shoe, vest, overall, gloves, goggles, mask.)</li> </ul>	Low (ALARP)

**PROJECT NAME**

**ACTIVITY– INSTALLATION, TESTING & COMMISSIONING OF FIRE PUMPS SET**

Ref No:  
Rev.No:00  
Page 4 of 11

Serial No.	Sub-Activities	Hazards Identified (Generic & Task)	Risks Involved (People & Property)	Risk Rating			Control Measures	Residual Risk
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6.	Installation of fire pumps by using chain blocks and lifting gears	<ul style="list-style-type: none"> <li>• Unauthorized, Untrained Workers</li> <li>• Uncontrolled movement of road</li> <li>• Damaged chain blocks lifting gears</li> <li>• Slip, trip and fall</li> <li>• Collision</li> </ul>	<ul style="list-style-type: none"> <li>• Fatality</li> <li>• Fractures</li> <li>• Eye damage</li> <li>• Skin damage</li> <li>• Property damage</li> </ul>	4	B	M	<ul style="list-style-type: none"> <li>• Authorized personnel to undertake the job</li> <li>• 3<sup>rd</sup> party certified chain blocks to be used And to follow the colour code.</li> <li>• Chain pulley block's hook shall have safety Latch.</li> <li>• Visual inspection shall be carried out prior to use of chain block &amp; lifting gears.</li> <li>• Ensure the sump pump are tightly secured before starting the hooking up activity.</li> <li>• Warning signs and barrication to be provided. around the area to restrict the other workers into the hazardous area.</li> <li>• Chain pulley block should be used to lift the object for vertical purpose only.</li> <li>• Provide padding for the materials at sharp corners.</li> <li>• Ensure that all accessories like chain, hooks, pins, latch &amp; break in good working condition.</li> <li>• Hoisting hook provided to install chain block, shall be tested and certified by third party inspector.</li> <li>• Maintain a good housekeeping policy to prevent slip, trip, fall hazards</li> <li>• Close supervision to be done at all times.</li> <li>• Proper communication to be maintained between the workers while doing the activity</li> <li>• Appropriate PPE to be worn while during the installation ( Helmet, shoe, vest, overall, Leather gloves, goggles.)</li> </ul>	Low (ALARP)

**PROJECT NAME**

**ACTIVITY– INSTALLATION, TESTING & COMMISSIONING OF FIRE PUMPS SET**

Ref No:  
Rev.No:00  
Page 5 of 11

Serial No.	Sub-Activities	Hazards Identified (Generic & Task)	Risks Involved (People & Property)	Risk Rating			Control Measures	Residual Risk
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7.	Working with ladder	<ul style="list-style-type: none"> <li>• Person/ material falling from height</li> <li>• Over reaching</li> <li>• Over loading</li> <li>• Obstructing the access way</li> <li>• Slippery or uneven surface</li> </ul>	<ul style="list-style-type: none"> <li>• Sprain and strain</li> <li>• Fracture</li> <li>• Injury to the person</li> </ul>	3	C	M	<ul style="list-style-type: none"> <li>• The ladder should extend minimum one meter from the top for safe movement</li> <li>• Heavy materials should not be carried</li> <li>• Do not erect in slippery, uneven surface</li> <li>• Should be set up with a 4 vertical to 1 horizontal slope ( 4:1 )</li> <li>• Inspection and maintenance to be registered and recorded by the store keeper</li> <li>• Step ladder must fully open and lock and the devices to be as per manufacturer</li> <li>• Defective ladder should not be used and report it immediately</li> <li>• Do not work from the top of two rungs</li> <li>• Remember the 3 point contact</li> <li>• Do not work in front of the door. If work is carried then locked the door or blocked off</li> <li>• Ladder to be used for short duration works only limited to 15 min.</li> <li>• Colour coded system to be implemented</li> </ul>	Low (ALARP)
8.	Working on mobile scaffold	<ul style="list-style-type: none"> <li>• Uneven surface</li> <li>• Overhead structure and cable</li> <li>• Materials and worker fall from height</li> <li>• Untrained, unauthorized Workers</li> <li>• Collapse of scaffold</li> </ul>	<ul style="list-style-type: none"> <li>• Sprain and strain</li> <li>• Fracture</li> <li>• Spinal cord damage</li> <li>• Musculoskeletal Injury</li> <li>• Fatality</li> </ul>	3	C	M	<ul style="list-style-type: none"> <li>• Do not stack materials on to the scaffold</li> <li>• Visual inspection should carry before use</li> <li>• Out rigger fitted and breaks are locked on</li> <li>• Only trained scaffolders shall be involved in erection &amp; dismantling activities.</li> <li>• No person to be on the scaffold while it is being moved</li> </ul>	Low (ALARP)

**PROJECT NAME**

**ACTIVITY– INSTALLATION, TESTING & COMMISSIONING OF FIRE PUMPS SET**

Ref No:  
Rev.No:00  
Page 6 of 11

Serial No.	Sub-Activities	Hazards Identified (Generic & Task)	Risks Involved (People & Property)	Risk Rating			Control Measures	Residual Risk
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							<ul style="list-style-type: none"> <li>• Scaffold only use in on level and surface area</li> <li>• Safety harness to be used above 2mtr height and anchored in above shoulder height at all time</li> <li>• Tagging system to be implemented ( i.e., all safe scaffolds shall be provided with green tags and unsafe scaffolds with red tag )</li> <li>• Keep walkways free of obstacles, tools and Equipment</li> <li>• Never stand and sit on the hand rails</li> </ul>	
9.	Working with power tools ( Drill machine )	<ul style="list-style-type: none"> <li>• Defective equipment</li> <li>• Electricity</li> <li>• Improper use of equipment</li> <li>• Poor maintenance</li> <li>• Untrained workers</li> <li>• Flying object</li> <li>• Noise and vibration</li> <li>• Fire</li> <li>• Dust</li> </ul>	<ul style="list-style-type: none"> <li>• Hearing losses</li> <li>• Eye injury</li> <li>• Crushing</li> <li>• Back injury</li> <li>• Burns</li> <li>• Electrocution</li> <li>• Ringing in the ear / Deafness</li> </ul>	3	C	M	<ul style="list-style-type: none"> <li>• PTW to be applied and obtained prior to start, If spark producing activity is performed</li> <li>• Defective tools should not be issued or used to perform a task.</li> <li>• Monthly inspection should be carried out by the electrician and record to be kept at the store</li> <li>• All portable power tools should be fitted with adequate fuse protection either in the tool body or in its electrical plug.</li> <li>• The weight, size and type of tool should be selected to suit the job being carried out.</li> <li>• Don't lay the cables around the access way, it should be proper routing</li> <li>• Industrial distribution board and socket only to be used at site</li> <li>• No joints shall be made in electrical cable.</li> <li>• Cable hangers shall be used to avoid the direct contact of power tools cable with the scaffolding members.</li> <li>• Electrical connection shall be routed through ELCB only.</li> </ul>	M (ALARP)

**PROJECT NAME**

**ACTIVITY– INSTALLATION, TESTING & COMMISSIONING OF FIRE PUMPS SET**

Ref No:  
Rev.No:00  
Page 7 of 11

Serial No.	Sub-Activities	Hazards Identified (Generic & Task)	Risks Involved (People & Property)	Risk Rating			Control Measures	Residual Risk
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							<ul style="list-style-type: none"> <li>• Correct rate of ELCB should be used ( Ex:- 30ma only acceptable)</li> <li>• Only those persons who have been adequately trained and experienced in the use of the tool should be allowed to use the same.</li> <li>Power tools shall have inspection sticker.</li> <li>• Tools should be stored and maintained in good working condition.</li> <li>• Appropriate PPE Should use ( Goggles, Mask, Ear plug, Gloves, Shoe, Helmet, Overall, Vest )</li> </ul>	
10.	Operating with Thread Machine	<ul style="list-style-type: none"> <li>• Defective Machine</li> <li>• Improper use of Machine</li> <li>• Poor maintenance</li> <li>• Untrained, Unauthorized Workers</li> <li>• Slip, trip and fall</li> <li>• Spillage</li> </ul>	<ul style="list-style-type: none"> <li>• Cuts</li> <li>• Crush</li> <li>• Skin Effect</li> <li>• Entanglement</li> <li>• Eye, finger injury</li> <li>• Fracture</li> </ul>	3	C	M	<ul style="list-style-type: none"> <li>• Polythene sheets to be laid and drip trays to be placed below the machine to prevent spillages.</li> <li>• Defective machine should not be used to perform a task.</li> <li>• Only those persons who have been adequately trained and experienced in the use of the machine should be allowed to use the same.</li> <li>• Machine should be maintained in good working Condition.</li> <li>• All spillages must be clean immediately</li> <li>• Waste oil should be disposed in an approved Manner.</li> <li>• Operator should check the machine condition prior to start the work.</li> <li>• Adequate lighting and ventilation to be Provided.</li> <li>• Don't lay the cables around the access way, it should be proper routing</li> <li>• Industrial distribution board and socket only to be used at site</li> <li>• No joints shall be made in electrical cable.</li> </ul>	M (ALARP)

**PROJECT NAME**

**ACTIVITY– INSTALLATION, TESTING & COMMISSIONING OF FIRE PUMPS SET**

Ref No:  
Rev.No:00  
Page 8 of 11

Serial No.	Sub-Activities	Hazards Identified (Generic & Task)	Risks Involved (People & Property)	Risk Rating			Control Measures	Residual Risk
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							<ul style="list-style-type: none"> <li>• Electrical connection shall be routed through ELCB only and should be used ( Ex:-30ma only acceptable)</li> <li>• Fire extinguisher to be provided</li> <li>• Area to be barricade and provide signage.</li> </ul>	
11.	Working with Hand tools ( Hack saw, wood saw, screw driver, spanner )	<ul style="list-style-type: none"> <li>• Slip, trip and fall</li> <li>• Damaged warn out hand tools</li> <li>• Flying objects</li> <li>• Mushroom Heads</li> <li>• Using incorrect type</li> </ul>	<ul style="list-style-type: none"> <li>• Fatigue</li> <li>• Trigger finger</li> <li>• Cuts and abrasions</li> </ul>	3	C	M	<ul style="list-style-type: none"> <li>• Defective tools should not be issued or used to perform the task, to be checked by store keeper</li> <li>• Don't extend the spanner by using a pipe as an extension bar</li> <li>• Hand tools shall be free from oil, grease &amp; etc.</li> <li>• Chisel's head shall have safety cap to avoid finger injury.</li> <li>• Never use a file as a lever</li> <li>• Never use a screw driver as a chisel</li> <li>• Use eye/ face protection when there is flying materials hazard, wear gloves while required to protect the hands</li> <li>• Use right tools for the job</li> </ul>	Low (ALARP)
12.	Flushing, pressure and leakage testing	<ul style="list-style-type: none"> <li>• Untrained, unauthorized Workers</li> <li>• Faulty pressure gauge</li> <li>• Poor lighting</li> <li>• Improper identification</li> <li>• Bursting of pipes</li> </ul>	<ul style="list-style-type: none"> <li>• Fatality</li> <li>• Property damage</li> <li>• Fractures</li> <li>• Full body injury</li> </ul>	4	B	M	<ul style="list-style-type: none"> <li>• PTW to be applied and obtained prior to start work</li> <li>• Calibrated pressure gauge only to be used for pressure testing</li> <li>• Never pressure test the system/ pipe above its designed pressure.</li> <li>• Never do hot work on a pressurized system ( always de-pressurize )</li> <li>• Close supervision to be done at all times</li> </ul>	Low (ALARP)



**PROJECT NAME**

**ACTIVITY– INSTALLATION, TESTING & COMMISSIONING OF FIRE PUMPS SET**

Ref No:  
Rev.No:00  
Page 9 of 11

Serial No.	Sub-Activities	Hazards Identified (Generic & Task)	Risks Involved (People & Property)	Risk Rating			Control Measures	Residual Risk
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							<ul style="list-style-type: none"> <li>• Proper lighting to be provided in around the working area.</li> <li>• Use always regulators and never pressurize the system directly without regulator.</li> <li>• Warning signs and boards should be provided And area to be well barricaded</li> </ul>	
13.	Electrical connection testing used with multi meter and ammeter	<ul style="list-style-type: none"> <li>• Unauthorized/ untrained Person</li> <li>• Faulty Instrument</li> <li>• Improper identification</li> <li>• Electricity</li> </ul>	<ul style="list-style-type: none"> <li>• Electric shock and Burns</li> <li>• Cut and abrasion</li> </ul>	3	B	M	<ul style="list-style-type: none"> <li>• Warning boards should be provided and Barricaded.</li> <li>• Appropriate fire extinguisher should be placed in to the work area ( Dry powder, CO2, Fire blanket )</li> <li>• Appropriate PPE Should use ( Electric insulated gloves, Electric resistivity Shoe, Helmet, Overall, Vest )</li> <li>• Calibrated/ certified multi meter only should be used.</li> </ul>	Low (ALARP)
14.	Working in hot weather	<ul style="list-style-type: none"> <li>• Heat Stress</li> </ul>	<ul style="list-style-type: none"> <li>• Dehydration</li> <li>• Sunburn</li> <li>• Skin Cancer</li> </ul>	2	B	M	<ul style="list-style-type: none"> <li>• Drink plenty of water</li> <li>• Employees shall be trained about heat stress symptoms &amp; first aid measures.</li> <li>• Avoid highly physical tasks during the hottest part of the day</li> <li>• Isotonic drinks to be provided</li> </ul>	Low (ALARP)

**PROJECT NAME**

**ACTIVITY– INSTALLATION, TESTING & COMMISSIONING OF FIRE PUMPS SET**

Ref No:  
Rev.No:00  
Page 10 of 11

Serial No.	Sub-Activities	Hazards Identified (Generic & Task)	Risks Involved (People & Property)	Risk Rating			Control Measures	Residual Risk
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15.	While working at night shift	<ul style="list-style-type: none"> <li>Poor illumination</li> <li>Slip/trip/fall</li> </ul>	<ul style="list-style-type: none"> <li>Fatality</li> <li>Cuts</li> </ul>	3	B	M	<ul style="list-style-type: none"> <li>Proper illumination to be provided</li> <li>light post to be secured from fall</li> <li>Proper cable management system to be Followed</li> <li>All materials to be staged in proper manner without obstacles</li> </ul>	Low (ALARP)
16.	Work Completion	<ul style="list-style-type: none"> <li>Poor housekeeping</li> <li>Slip/trip/fall</li> </ul>	<ul style="list-style-type: none"> <li>Fire</li> </ul>	2	A	L	<ul style="list-style-type: none"> <li>General housekeeping, Remove all surface, unwanted waste materials from the building</li> <li>All necessary precautions will be adopted to prevent fire</li> </ul>	Low (ALARP)

**PROJECT NAME**

**ACTIVITY– INSTALLATION, TESTING & COMMISSIONING OF FIRE PUMPS SET**

Ref No:  
Rev.No:00  
Page 11 of 11

**RISK MATRIX**

					Probability				
					A	B	C	D	E
Severity	People	Assets	Environment	Reputation	Improbable 1 in 100,000 Years	Remote 1 in 10,000 Years	Occasional 1 in 1000 years	Probable 1 in 100 years	Frequent 1 in 10 years
5-Catstrophic	Multiple fatalities or permanent total disabilities	Extensive damage	Massive effect	International impact	<p align="center"><b>High Risk</b></p> <p align="center"><b>Medium Risk (ALARP)</b></p> <p align="center"><b>Low Risk</b></p>				
4-Severe	Single fatalities or permanent total disabilities	Major damage	Major effect	National impact					
3-critical	Major injury or health effects	Local damage	Localised effect	Considerable impact					
2-Marginal	Minor injury or health effects	Minor damage	Minor effect	Minor impact					
1-Negligible	Slight injury or health effects	Slight Damage	Slight effect	Slight impact					

<b>HIGH</b>	<p><b>3-E</b></p> <p><b>4-C,D,E</b></p> <p><b>5-B,C,D,E</b></p>
<b>MEDIUM</b>	<p><b>1-D,E</b></p> <p><b>2-B,C,D,E</b></p> <p><b>3-A,B,C,D</b></p> <p><b>4-A,B</b></p> <p><b>5-A</b></p>
<b>LOW</b>	<p><b>1-A,B,C</b></p> <p><b>2A</b></p>