

# ESSENTIAL SAFETY INFORMATION, WARNINGS AND CAUTIONS FOR HIGH-PRESSURE PUMPS



## IMPORTANT SAFETY INSTRUCTIONS

It is the responsibility of the user to read and understand all instructions, regulations and safety precautions before installing, operating, maintaining or servicing any machinery. Personnel must be in possession of all relevant Instructions, Technical Data, Standards and Regulations before commencing work. If in doubt, contact your supplier. All personnel must be suitably skilled and trained. Failure to observe these and all the following instructions may result in property damage, personal injury to yourself or others, or death.

### General Safety Information and Symbols

Pay special attention to the following signal words, safety alert symbols and statements:



**DANGER**

indicates a hazardous situation which, if not avoided, will result in death or serious injury.



**WARNING**

indicates a hazardous situation which, if not avoided, could result in death or serious injury.



**CAUTION**

indicates a hazardous situation which, if not avoided, could result in minor or moderate injury or property damage.



**DANGER**

### A. FLAMMABLE OR EXPLOSIVE LIQUID OR VAPOUR HAZARD

Do not operate pump with or in the presence of flammable or explosive liquids or vapours unless necessary safety precautions are observed. Explosive atmospheres and leaks of flammable or explosive liquids exposed to static electricity, sparks or other sources of ignition will result in flame or possible explosion, causing serious personal injury, death or property damage.

1. Do not install or operate a pump or any other equipment in an explosive atmosphere without ensuring it is suitably specified, constructed, labeled, installed, maintained and serviced.
2. Follow ATEX laws, regulations and instructions for potentially explosive atmospheres.



**WARNING**

### A. ELECTRICAL SHOCK HAZARD

Do not service pump or electrical equipment while energized. Electricity can cause personal injury, death or property damage.

1. Adhere to "Lock Out" and "Tag Out" procedures for electrical equipment.
2. Before commencing pump service, turn power supply off.
3. Keep water away from electrical outlets and electrical devices.
4. Electrical components must be installed by a qualified electrician to avoid risk of electrocution.

### B. ROTATING PARTS HAZARD

Do not operate without correct guards in place. Do not service pump while energized. Moving, rotating or reciprocating parts can crush and cut, causing personal injury, death or property damage.

1. Ensure pump is installed with all necessary guards fitted, in accordance with laws and regulations, to prevent contact with belt drives, couplings, shafts and other moving parts.
2. Do not operate equipment with guards, covers or parts removed.
3. Before commencing equipment servicing, turn power supply off isolate from electricity supply and lock out, following all relevant site and official laws and regulations.
4. For mobile equipment, ensure engines and hydraulics are turned off and secured to avoid accidental start.

### C. HOT SURFACE HAZARD

Do not touch hot surface areas of pump, accessories or drive system, risk of burns or personal injury.

1. Fit guards where necessary to prevent personnel from touching very hot surfaces.
2. Allow equipment to cool before maintaining or servicing equipment.
3. Do not operate equipment beyond the maximum temperatures, speed and pressure specified in the Instructions and Technical Data.
4. Do not operate equipment in full by-pass for long periods due to excessive heat build-up. Refer to Instructions for correct installation of by-pass lines and protection devices.

### D. SKIN PUNCTURE HAZARD

Do not allow high pressure jet or spray to contact any part of the body, or animals. Liquids under high pressure can pierce skin and underlying tissue, can damage eyes and ears or propel debris leading to serious personal injury or death.

1. Wear adequate Personal Protective Equipment including suitable gloves, footwear and eye protection when operating high pressure spray equipment.
2. When high pressure gun is not in use, set safety trigger lock (safety latch) to avoid accidental high pressure operation.
3. Do not check for leaks with bare hands.

### E. PUMPING HAZARDOUS LIQUIDS

Do not operate pump with hot water, chemicals, or other hazardous liquids unless extraordinary safety precautions are observed. Risk of serious skin damage, eye injury, poisoning, disease and other harm to personnel by ingestion, inhalation or contact.

1. Ensure equipment is suitable for use with the liquid to be pumped.
2. Only pump liquids that are compatible with materials in contact.
3. Obtain a material safety data sheet (MSDS) and take appropriate safety measures for the liquid being handled. Refer to equipment Instructions.
4. Take all necessary precautions before using equipment for any application other than that for which it was originally specified, supplied and installed.
5. Pump seals always leak a small quantity of liquid during normal use even when pump is new. Leakage will increase as seals wear during normal use. Ensure any leakage will not cause harm or danger e.g. by ventilation, provision of drip tray.
6. If even a very small amount of harmful liquid leakage is unacceptable, install a Flushed Seal pump with suitable barrier fluid containment system.
7. Wear adequate Personal Protective Equipment including suitable gloves, footwear and eye protection when operating equipment.
8. Ensure leakage or discharge from pressure protection devices e.g. Relief Valve is contained and disposed of safely.
9. Before commencing pump service:
  - Isolate from electricity supply and lock out motor, engine or other power source.
  - Close valves to isolate pump from liquid supply.
  - Vent trapped pressure in a safe manner.
  - Drain and dispose of hazardous liquids safely.

### F. OVER PRESSURIZATION HAZARD

Do not operate high pressure pumping system unless necessary safety precautions are observed. A positive-displacement pump can over-pressurise causing serious personal injury and property damage.

1. Do not operate the pump at pressures higher than the maximum rated pressure. Refer to Instructions and Technical Data.
2. Take all necessary precautions before using equipment for any application other than that for which it was originally specified, supplied and installed.
3. All high pressure systems must include a suitable primary pressure regulating device, i.e. a pressure regulator valve or unloader, and a secondary pressure relief device e.g. relief valve or rupture disc, to limit working pressure and to provide overpressure protection. Refer to Instructions for correct selection, installation and setting.
4. All high pressure systems must include a pressure gauge or other device to indicate operating pressure.
5. Pressure regulators, unloaders and relief valves must only be adjusted by suitably-trained personnel.
6. Do not operate equipment with inlet or outlet isolation valves closed or with blocked nozzles, filters or pipes & hoses.

## G. EXPLOSION HAZARD

Do not charge Pulsation Dampeners with oxygen or compressed air. Risk of explosion causing personal injury, death or property damage.

1. Use nitrogen only when charging pulsation dampeners; do not use compressed air or oxygen, which can ignite.
2. Use proper charging tools to charge pulsation dampeners.
3. Do not charge above maximum rated pressure. Refer to Technical data.

## ⚠ CAUTION

### A. FAILURE OF CONNECTED PIPES AND FITTINGS HAZARD

Do not operate the pump with improperly connected, sized, worn or loose fittings, pipes or hoses. Risk of personal injury and property damage.

1. Ensure all fittings, pipes and hoses are properly rated for the maximum pressure and flow of the pump.
2. Check all fittings and pipes for cracks or damaged threads frequently.
3. Check all hoses for cuts, wear, leaks, kinks or collapse frequently.
4. Ensure all connections are tight and secure and use suitable sealing liquid or tape to prevent leaks.

### B. FROZEN LIQUID HAZARD

Do not operate the pump with frozen liquid. Risk of over-pressurisation and ejection of parts, causing personal injury and property damage.

1. Protect equipment from freezing temperatures during storage or carry out suitable frost protection procedures e.g. drain liquid, fill with suitable antifreeze.
2. Do not operate equipment if you suspect it may be frozen.

### C. CLEANING CHEMICALS HAZARD

Observe necessary precautions if using flammable or harmful chemicals to clean or degrease equipment. Risk of personal injury and property damage.

1. Follow safety instructions in MSDS or on packaging of chemicals.
2. Wear adequate Personal Protective Equipment including suitable gloves, mask and eye protection.
3. Ventilate area during cleaning.
4. Dispose of waste in accordance with all site and official laws and regulations.

### D. LIFTING HAZARD

Do not lift pump by unsuitable method; risk of injury to personnel from lifting incorrectly. Equipment may fall; risk of personal injury, damage to property.

1. Refer to labels, instructions and technical data to ascertain weight of equipment before lifting unpacking or moving.
2. Use correct manual handling techniques and follow site and official regulations when lifting manually.
3. Use suitable lifting eyes, slings or chains when lifting heavy equipment. These must be safely and securely attached according to the centre of gravity and weight of the equipment.
4. Lifting eyes installed on the pump, motor or transmission may not be strong enough to lift a larger assembly or complete machine.

### E. MECHANICAL FAILURE HAZARD

Observe instructions for safe installation, operation, maintenance and service. Failure to follow instructions may lead to failure of components and system. Risk of ejection of parts causing personal injury and property damage.

1. Do not operate equipment beyond the maximum temperatures, speed and pressure specified in the Instructions and Technical Data.
2. Take all necessary additional precautions before using equipment for any application other than that for which it was originally specified, supplied and installed.
3. Do not remove, disable, tamper with or adjust safety and protection devices, guards and controls.
4. Maintain correct quantity of genuine Cat Pumps lubricants or approved equivalents in pump crankcase, lubricated drives and transmissions. Risk of excessive temperatures, short equipment life and sudden dangerous failure.
5. Observe recommended Direction of Rotation, risk of inadequate lubrication.

## H. FALL HAZARD

Do not operate pressure washing gun and lance whilst standing on a wet or unstable surface unless suitable safety precautions are observed. Risk of slippery surface, personnel may fall causing personal injury or death.

1. Wear suitable footwear to maintain a good grip on wet surfaces.
2. Do not over-reach or stand on unstable supports.
3. Keep good footing and balance and hold gun with both hands to control kick back.
4. Take special care when working at heights; follow relevant laws and regulations.

6. Do not operate equipment with crankcase breather cap vent hole blocked by debris, ice or deliberate closure. Risk of pressure rise leading to explosion of crankcase.
7. Frequently inspect equipment for liquid leaks; stop equipment and repair all leaks. Risk of dilution, contamination and loss of lubricant leading to excessive temperatures, short equipment life and sudden dangerous failure.
8. Do not operate equipment under conditions of liquid supply starvation or cavitation; risk of mechanical damage leading to short equipment life and sudden dangerous failure.
9. Repair all worn or damaged equipment as soon as possible using genuine Cat Pumps original parts. It can be dangerous to fit sub-standard parts or to run worn equipment until sudden failure occurs.
10. Frequently check belt-drive transmissions for correct belt tension. Replace worn belts before sudden failure.
11. Periodically check security of all mountings and fasteners; risk of projectiles and exposed moving parts.

### F. LIQUID LEAK HAZARD

Do not operate the pump when liquid is leaking from seals\*, joints and components. Risk of spillage on surfaces leading to falls and personal injury.

1. Ensure equipment is suitable for use with the liquid to be pumped. Only pump liquids that are compatible with materials in contact.
2. Do not operate equipment under conditions of liquid supply starvation, dry running or cavitation. Risk of shortened equipment life and/or sudden failure can occur. Frequently inspect equipment for liquid leaks; stop equipment and repair all leaks.
3. Ensure leakage or discharge from pressure protection devices e.g. Relief Valve is managed safely.
4. Before servicing pump, relieve trapped pressure in system. Take care to catch and drain away all liquids when disconnection pipes, fittings and components.
5. Clean up all spills and dispose of waste safely.

\* Pump seals may seep a small quantity of liquid during normal use, even when pump is new. This can slightly increase as seals wear during normal use. Manage any possible drips e.g. by provision of drip tray or bund.

### G. NOISE HAZARD

Machinery may generate high noise levels during operation. Risk of damage to hearing.

1. On first commissioning, measure noise levels in area surrounding equipment.
2. Post notices indicating high noise output, if necessary.
3. Wear appropriate hearing protection in areas of high noise levels.

If you require any additional information or advice, please contact your supplier or your local Cat Pumps office.



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