

OPERATIONS SPECIFIC

PUMP MAINTENANCE

Hazards

The hazards that are present when working on pumps depend on the types of fluids being transferred by the pump. If proper procedures are not followed spills or leaks pose may a serious risk to workers. Serious injuries have resulted from fires, explosions and release of flammable toxic vapours and gases (e.g. hydrogen sulphide) when production fluids or additives are released. Most frequently this has occurred when breaking lines that have not been properly flushed and drained. Process fluids are complex mixtures in the liquid state (crude oil, condensate) and will contain BTEX (benzene, toluene, ethyl benzene and xylenes), natural gas (predominantly methane), and liquefied petroleum gases (butane and propane). Health risks include toxicity by inhalation or skin contact (GS Production Fluids).

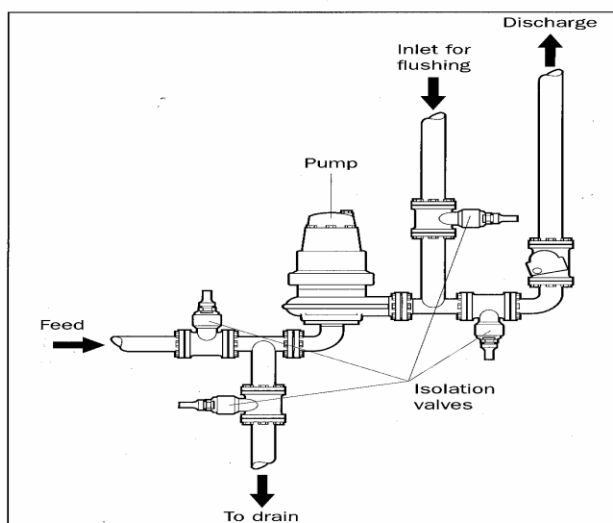
In addition to the chemical hazards, the risk fire and explosion will increase with the flammability of the fluids used or produced and the risk of slips and falls increase when surfaces get covered with liquids (GS Flammable Materials).

Access

Keep unnecessary people away from the work area. Ensure that no one is working close by downwind.

Design & Equipment

- » Design the closed system to allow easy maintenance.
- » Ensure that seals, gaskets and valve packings are compatible with the materials being handled and suitable for the conditions of use. (e.g., will not creep or crack at high temperature)
- » Ensure all pumps, pipes and couplings are to a suitable standard
- » Protect the pump against overheating and overpressure, (e.g., by the use of pressure relief valves).
- » Provide arrangements for draining and flushing the pump and for safe disposal of residues.
- » Make provision for the maintenance and replacement of the pump, (e.g., by slip plates or isolation valves).



Procedures

- » Prior to performing any work on pump systems lock-out and tag-out the pump and motor to be worked on (GS Lock-out/Tag-out System).
- » Before breaking any lines ensure that the system involved has been depressurized, drained and isolated.
- » Prove isolation. Carry out pressure build-up checks. Test for leaks with LEL/H2S meters.
- » Provide for gas venting to a safe place, e.g. a flare stack or cold vent.
- » Connect via valves and lock the pipe work to the appropriate drain. Purge and drain the fluids.
- » Workers should break joints gently. In the event of an unexpected release, workers should evacuate the area immediately and raise the alarm.
- » Tag or label any broken joints.
- » Provide a spillage clean-up kit. Adopt a “permit-to-work” system for all maintenance work.
- » Document and follow any special procedures that are needed before the system is opened or entered, e.g., purging or washing.

Personal Protective Equipment

Respiratory Protective Equipment:

- » Self-Contained Breathing Air: To be used when H2S may exceed 10 ppm (GS H2S and GS Respiratory Protective Equipment).
- » NIOSH approved P-95 (or P-99 or P-100) with combination organic vapor cartridge required for work around pumps if contamination with productions fluids or hydrocarbons is suspected.

Other Personal Protective Equipment:

- » Personal H2S Monitor: To be worn at all times if hydrogen sulfide is possible contaminant (GS H2S Gas Monitors).
- » Fire Retardant Coveralls: To be worn at all times (GS Flame Resistant Clothing).
- » Chemical resistant gloves, clothing, boots and eye protection (goggles) are required if direct contact with fluids (GS Skin Contact and GS Gloves).

Cleaning & Housekeeping

- » Clean the work equipment and work area daily.
- » Spills are the major cause of dust or vapour in the workplace. Clean up all spills immediately.

Information Training and Supervision

Employer responsibilities:

- » Gather and provide safety data sheets on the chemicals that will be present at the workplace.
- » Use the Controlling Chemical Hazards Guideline to define the required chemical management process for the work you wish completed.

Supervisor responsibilities:

- » Ensure the availability of the required Guidance Sheets for chemical management.
- » Ensure the availability and use of appropriate protective equipment.
- » Complete and review with workers the chemical management process and the applicable Safety Data Sheets.
- » Review safe work procedures with workers before they start work.

Worker responsibilities:

- » Wear appropriate personal protective equipment.
- » Follow safe work procedures.
- » Ensure spills and leaks are quickly cleaned up.
- » Wash contaminated clothing before reuse.

EMPLOYEE CHECKLIST

- Are you sure about safe work procedures?
- Is the equipment in good condition and working properly?
- Is your portable/personal alarm fully charged and working properly?
- Is your respirator working properly? Check it every time.
- Look for signs of leaks, wear and damage before every job.
- Do you have a spill cleanup kit handy? See GS Spill response.
- If you find any problem, get it fixed. Don't just carry on working.
- Discard single-use gloves every time you take them off. Discard other gloves at the end of the shift.
- Wash hands before eating, drinking or using the bathroom.