

OPERATIONS SPECIFIC

CHEMICAL MIXING; LIQUID & DRY

Hazards

The mixing area provides an opportunity for exposure to chemicals and products at the point at which powdered products or liquid additives are introduced to the operation. Typically this occurs through a cone shaped venturi hopper. The narrow bottom section of the cone has a fluids circulating pipe passing through it and a choke provides a jetting action within the pipe which draws the materials added into the fluid being circulated. The products and the associated additives are usually handled manually at the hopper. This can give rise to dust or splashing. Both of these conditions may be hazardous. More modern facilities enable powdered products to be handled mechanically even to the point of removing and disposing of the packaging. Liquid additives can be pumped into the hopper instead of manually poured. The handling of powdered sacked products and liquid products from drums or cans, and the mixing of bulk powders such as barite, can cause exposure. Primarily this will be inhalation exposure as there may be dust associated with the movement of products in the storage area or with mixing products into the hopper. However, skin contact can also occur, particularly with powdered materials.

Alternatively, products and additives can be handled in bulk form from pre-loaded containers and added to the drilling fluid system from a remotely operated control zone, minimizing exposure at the rig site. Appendix 1 provides more detail about potential exposure to chemicals while mixing.

Access

- » Restrict access only to authorized staff that have been trained and equipped to work safely.

Equipment & Procedures

- » Select less hazardous additives if possible (e.g., low silica content bentonite and barite, low aromatic content base fluids for oil based mud systems).
- » Enclose the mixer as much as possible, and provide seals on the lid and other access points.
- » Consider automating and enclosing mixing system to eliminate need for direct worker contact with additives (GS Breaking Containment).
- » If enclosure is impracticable use local exhaust ventilation (LEV) hood that is positioned as close to the source of the dust or vapor source as possible.
- » Airflow across the whole mixer top should be towards the LEV and away from the workers adding materials.
- » Where possible, use lids on the mixer to contain dust and vapors.
- » Where possible, locate the working area away from other work areas to prevent exposure to other workers.
- » Discharge extracted air (from LEV) to a safe place away from workers.
- » If LEV or enclosure is not practicable, respiratory protective equipment is required unless occupational hygiene monitoring demonstrates visible dust, mist or vapor concentrations are less than 50% of occupational exposure limits.



Maintenance

- » Maintain the equipment as advised by the supplier/installer, in effective and efficient working order.
- » Get information on the design performance of the ventilation equipment from the supplier. Keep this information to compare with future test results.
- » Visually check the ventilation equipment at least once a week for signs of damage.
- » Have the ventilation equipment examined and tested against its performance standard - generally at least every year.
- » Keep records of all examinations and tests for at least five years.

Personal Protective Equipment

Respiratory Protective Equipment:

- » NIOSH approved P-95 (or P-99 or P-100) with combination organic vapor cartridge (if hydrocarbons also present) if no local exhaust ventilation or enclosed process unless occupational hygiene monitoring demonstrates dust, mist or vapor concentrations do not exceed 50% of occupational exposure limit.
- » Self-Contained Breathing Air: To be used when H₂S may exceed 10 ppm (GS H₂S & GS Respiratory Protective Equipment).

Other Personal Protective Equipment:

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

Cleaning & Housekeeping

- » Keep all work areas neat and free from debris.
- » Clean up chemical spills promptly (GS Spill Response).

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 assist in defining the procedures and control approaches you need to follow to protect worker health and safety.

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.

PRECAUTIONS YOU SHOULD TAKE

- Make sure the ventilation system is switched on and is working.
- Make sure the air movement is across or away from your face, and try not to lean into the mixer when adding materials.
- Look for signs of damage, wear or poor operation of any equipment used. If you find any problems, tell your supervisor.
- Do not carry on working if you think there is a problem.
- Make sure that paper bags and other waste material are not drawn into the ventilation duct.
- Wash your hands before and after eating, drinking or using the bathroom.
- Clear up spills immediately.
- Use vacuum cleaning or wet mopping/sweeping for solids. Contain or absorb spills with granules or mats. Dispose of spills safely.
- Use, maintain and store any PPE provided in accordance with instructions.