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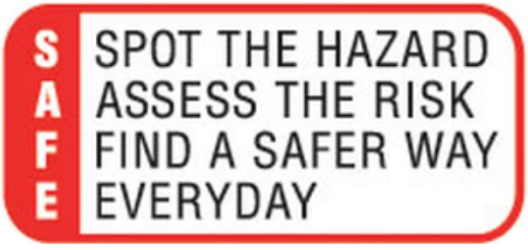

Risk Element

- Poisoning from the inhalation or ingestion of the substance;
- Irritation of skin or eyes from splashes of the substance;
- Leakage from system;
- Fire (certain coolants used are flammable and also give off toxic fumes).

Precautions to Eliminate/Reduce Risk

- Use appropriate personal protective equipment when handling the product;
- Refer to appropriate COSHH sheets before handling;
- Switch off plant or circulating pumps (if without personal risk);
- Contain any spillage with sand or earth;
- Remove injured person(s) to warm ventilated area;
- Wear suitable breathing apparatus if fighting a fire where refrigerants and coolants are involved.

NOTE: Before attempting to work on any secondary coolants system, operative(s) should refer to the relevant COSHH sheets and be aware of the hazards involved in handling the substances.

Safe Working Method

In many refrigeration applications heat is transferred to a secondary coolant (any liquid cooled by refrigerant and used to transmit heat without changing its state).

This procedure describes the use and maintenance of the more commonly employed ones.

Secondary Refrigerants

- Water;
- Calcium Chloride Brine;
- Sodium Chloride Brine;
- Potassium Carbonate;
- Aqueous Methyl Alcohol;
- Aqueous Ethyl Alcohol;
- Aqueous Ethylene Glycol;
- Aqueous Propylene Glycol;
- Methyl Alcohol (Methanol);
- Ethyl Alcohol (Ethanol);
- Methylene Chloride.

The decision of which secondary refrigerant to use in any application will be made initially upon the temperature at which it is required to operate, but other factors need to be considered chiefly from the health and safety point of view.

Health and Safety Hazards

- Methyl and ethyl alcohol fumes are flammable;
- Methylene chloride decomposes in the presence of a flame or ultra violet light, giving off highly toxic fumes as a result of this decomposition. At normal temperatures (10 to 25 °C) Methylene chloride is slightly toxic by inhalation of the vapour or swallowing. Methyl alcohol (known as methanol) and ethylene glycol are both toxic.

Corrosion

Water and all aqueous solutions are corrosive to some extent.

It is possible to give protection by the use of inhibitors but providing that the solution concentrations are maintained in slightly alkaline conditions (pH 8 to pH 9) and that air is eliminated from the solution, then the corrosive effects can be minimised even without inhibitors.

Weak Solutions at Low Temperature

If the solution mix is too weak for the working temperature, then water will freeze out on the evaporator surface, reducing the heat transfer effect, and thereby the efficiency of the plant. It may also absorb more air and become more corrosive.

Corrosion Inhibitors

To limit the corrosive tendency of brine solutions as much as possible the solution should be kept slightly alkaline (pH value between 8.0 and 9.0). This will not entirely eliminate corrosion and the addition of a suitable corrosion inhibitor may be necessary.

Frequent testing of the brine using cresol red test papers is required to maintain the required levels of alkalinity.

Storage and Handling

- Always follow the manufacturer's recommendations for the storage and use of each particular chemical;
- Inhibited glycol concentrates are stable; relatively non-corrosive, but such materials may decompose when heated above normal temperature and give off nitrogen oxide fumes;
- Before charging a system with a coolant, ensure residual contaminates are removed such as sludge, rust and oil and ensure complete removal of any cleaning agents used.

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