INDUSTRIAL MATRIX

DESCRIPTION

MATRIX is a superior general purpose, water-miscible metal processing fluid that forms a stable milky white emulsion when mixed with water due to high content of emulsifiers for superior performance. It demonstrates excellent resistance to bacterial growth. It readily emulsifies and forms very stable emulsions, even with relatively hard water (350 ppm $CaCO_3$) and high dilution ratios. It does not contain any phenolic, chlorine or cresylic components. It is also free of secondary amine, boron and formaldehyde.

The product must be kept in a cool place and be used within six months of its production date. Caution: The concentrate is added to water, under agitation, and not vice versa. Best results are obtained using a mixing device.

APPLICATIONS

MATRIX is intended for general-purpose metal treatment applications (grinding, drilling, threading, facing etc.) for various ferrous and non ferrous (alloys of copper and of aluminium except manganese). Suggested dilution ratios vary according to the application and severity of the operation. The usual mixing ratio of 5% ensures adequate anticorrosion protection.

CHARACTERISTICS-BENEFITS

CHARACTERISTICS	BENEFITS
Suitable for a wide range of applications.	Reduced rationalization costs.
Good corrosion protection.	Very good machining performance.
Effective resistance to bacterial degradation.	Good dilution stability even in «hard» waters.
Resistance to foam formation.	Improved operation efficiency.
Nitrite-, chlorine-, phenol-, cresol-free; low odor.	Safe and easy to work with.

PHYSICAL-CHEMICAL CHARACTERISTICS

MATRIX	METHOD	
Density at 15°C, g/cm^3	ASTM D1298	0,8830
Viscosity, Kinematic (cSt) 100^{0}C	ASTM D445	4,8
Viscosity, Kinematic (cSt) 40^{0}C	ASTM D445	33,5
Viscosity index	ASTM D2270	98
Emulsion stability, 5% v.v.	Visual	
200ppm/24 hours		Stable; no oil seperation
1000ppm/24 hours		Stable; no oil seperation
Color (emulsion)	Visual	White-ish
p.H. solution (5% in DI-water) @ 20°C		9,2

The abovementioned characteristics represent mean values.

SPECIFICATIONS

ISO 6743-7 (ISO-L-MAA)

GUIDELINES FOR PREPARATION OF EMULSIFIABLE CUTTING OILS

The points listed below should be respected when mixing the cutting lubricant with water to form a stable emulsion.

- The emulsion is prepared in different tank from the machine tool container.
- The container should be clean, free from previous emulsion residues.
- The specified amount of mineral oil should be slowly poured into the specified total water volume **(never upside down**) while mixing the mixture until a homogeneous mixture is achieved. **Reverse this of the process can lead to an emulsion in the form of agglomerates and gels!!!**

- The preparation of emulsions with mechanical stirrers or measuring pumps guarantees stable formation emulsion.

In situations where mixing is manual the best is to mix as follows:
The tank is partially filled with water and then vigorously stirred a vortex is generated at the center while the concentrate is added to the vortex.

- In cases where there is difficulty in mixing, it is best to leave the mixture for a few minutes to stand in order to allow the material to disperse and ensure complete mixing before being transferred to the machine tool container.

- The water used for its preparation must be clean and neutral with a pH of about 7.
- Mixing water (preferably drinking water) should have a hardness of 175-350 ppm CaCO3.
- Very hard water or too soft water is inappropriate.
- Water quality should be known to avoid problems such as bacteria or extreme value of pH.
- Do not store cutting liquids below 0 ° C or more than 45 ° C. If the product is exposed to low temperatures, should be stored indoors.
- If the concentrated product is not homogeneous it is not suitable for use.
- Remove lubricant from the surface of the emulsion.

Mixing

Coolant should always be mixed by following the suppliers' directions and by measuring. Mixing coolant "by eye" doesn't work well enough. Mixtures should be prepared according to the manufacturer's directions Mixing should always be done outside the sump. Mixing in the sump is quick and easy method but the coolant doesn't get fully mixed and it is almost impossible to measure fluid concentration accurately.

Fluid Concentration

If the concentration is too high it means there is too much coolant and not enough water. This means wasted concentrate, poorer heat transfer, foaming, reduced lubrication, residue formation and more built-up edges for shorter tool life. Over-concentrated fluid can stain the work and / or the machine and it increase the toxicity of the fluid, which means increased skin irritation. Low concentration means poor lubricity, shorter tool life, more bacterial growth activity and an increased risk of rust. Evaporation means a loss 3% to 10% of water daily. Water and concentrate are both lost as a result of splashing, misting and dragout. The daily loss of coolant mixture maybe as much as 5% to 20% form all these. This means the coolant concentration will change every day. The coolant needs to be checked daily at the start. As the system gets more stable weekly checks maybe appropriate. It depends on how well your system is functioning and how much it changes from day to day. Cooling units or chillers on machine sumps or central reservoirs reduce evaporation losses, help extend tool life by inhibiting microbial activity and increase the fluid's ability to remove heat.

System Inspections

Inspections of the fluid and over all system for cleanliness are important to monitor fluid quality and avoid premature fluid failure. Operators and maintenance personnel should both do this.

Routine Maintenance Practices

Maintaining clean machines, coolant lines and sumps is an essential part of coolant management. Clean machines use metalworking fluids more economically and extend fluid life. Any dirt and oil allowed to remain in the system simply recirculates, resulting in plugged coolant lines, unsightly machine build-up and bacterial growth.

Signs, which indicate a need for fluid maintenance or recycling

Excessive tramp oil accumulation
Build-up of metal cuttings within the sump
Foaming problems
Leaky machinery
Dirt and bacterial slime accumulations

When to change coolants and clean the sump

pH is less than 8.0 (normal pH range is 8.5 to 9.4)
Fluid concentration is less than 2.0% (normal is 3.0% to 12.0%)
Appearance is dark gray to black when normal is milky white, clear green or other