Cutting Fluids

What are cutting fluids?

Cutting fluids are the fluids which are generally applied while the machining (or cutting) operation is taking place. The machining operation can be any i.e. milling, turning, drilling etc. Sometimes a cutting fluid is also referred as coolant but it is wrong. A cutting fluid performs several functions and cooling the tool and workpiece is just one of them.

Functions or applications of cutting fluids

As mentioned above Cutting fluids performs several functions and some of them are

- Cool the tool and workpiece
- Reduce the friction
- Protect work against rusting
- Improve the surface finish
- Prevent the formation of Built-up edges (BUEs)
- Wash away the chips from the cutting zone

All the above functions are performed with the help of cooling and lubricating action of cutting fluids. It means a cutting fluid should have excellent cooling and lubricating properties.

Methods of applying cutting fluids

Cutting fluids can be applied to the tool and workpiece in the following three ways.

Flooding

In this method tool and workpiece are supplied with high volume of the cutting fluids which are generally in liquid condition.

Jet application

In this method the cutting fluids which may be either gas or liquid are applied with high pressure on the tool and workpiece.

Mist application

In this method the cutting fluids are mixed with a gas (generally air) and applied to tool and workpiece. Mist application combines the properties of above mentioned both methods i.e. flooding and jet application.

Types of cutting fluids

There are three basic types of cutting fluids

- Water based emulsions
- Straight mineral oils
- Mineral oils with additives (Neat oils)

Properties of cutting fluids

- It should have low viscosity
- It should be harmless to the operator
- It is have a good transparency
- It should have low surface tension
- It should have good lubricating properties
- It should not form foam
- It should be odorless
- It should be chemically inert
- It should have high thermal absorptivity
- It should be stable at high temperatures
- It should have high flash point
- It should have high thermal conductivity