

## **METALWORKING FLUIDS**

### **TYPES OF COOLANTS**

When you hear someone mention the term cutting fluid these days, that person is most probably referring to one of the four major types:

#### **1. Straight Cutting Oils**

These products are oil based materials which generally contain what are called extreme pressure or anti-weld additives. These additives react under pressure and heat to give the oil better lubricating characteristics. These straight cutting oils are used undiluted. They will not mix with water and will not form an emulsion with water.

#### **2. Water Emulsifiable Oils**

More commonly referred to as soluble oils. This, however, is a misnomer because they are not really soluble in water but rather form an emulsion when added to water. These emulsifiable oils are oil based concentrates which contain emulsifiers that allow them to mix with water and form a milky white emulsion. Emulsifiable oils also contain additives similar to those found in straight cutting oils to improve their lubricating properties. They contain rust and corrosion inhibitors and a biocide to help control rancidity problems.

#### **3. Synthetic Fluids**

Sometimes referred to as chemical fluids, these synthetic cutting fluids are water based concentrates which form a clear or translucent solution when added to water. These fluids contain synthetic, water soluble lubricants which give them the necessary lubricating properties. In addition, these synthetic fluids contain rust and corrosion inhibitors, biocides, surfactants and defoamers. Synthetic cutting fluids do not contain any oil. Milanco makes a whole line of water soluble synthetic cutting fluids.

#### **4. Semi-Synthetic Fluids**

As the name would imply, the semi-synthetic fluids are a little bit like a synthetic and a little bit like an emulsifiable oil, kind of a combination of the two. These are really synthetic fluids which have a small amount of oil (up to 25%) added to the concentrate. When diluted with water they form a very fine emulsion that looks very much like a solution, but in fact, is an emulsion. The oil is added to improve lubricity. When synthetic fluids were in their early stages of development, lubricity was a big problem, so the semi-synthetics were introduced. However, with the technology in synthetic lubricants improving, lubricity is not the problem it once was for synthetic fluids and, therefore, the semi-synthetic is becoming less popular.

When talking about cutting fluids it is very important that you understand the differences in the four groups.