



Treatment of Used Metal Working Fluids for Environment-Friendly Disposing

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Abstract

Metal Working Fluids (MWFs) are used for the machining processes because they can provide many advantages when they are in good operating condition. If the spent MWFs are disposed to the environment directly they can be very harmful to the environment. MWFs consist of approximately 80% water and 20% oil and other chemicals. MWFs are emulsions so separating and treating the water content is important. This treated water can be directly disposed to the environment. A low-cost setup is developed to separate the oil and water from each other. The setup consists of three main processes: filtration, oil-water separation, and adsorption. During filtration, a micro-filter is used for removing metal chips and other media of a certain size. In the second process, Dissolved Air Floatation (DAF) method is used for oil and water separation. The success of this method depends on the use of very fine air bubbles to increase the rate of rise of suspended particles so they can float to the surface for removal. In the third process, the absorption bed is used for reducing the BOD, and COD values of the separated water. Three types of charcoal beds are used for the adsorption process. Used MWF is tested through the developed setup. COD value, PH value, and the oil and grease content of three samples before the DAF process and after being subjected to a 3.5 hours DAF process with 0.5 hours and 24 hours settling times were tested. The initial sample had a PH, COD, and oil & grease content of 6.72, 3640.12 mg/l, and 687.5 mg/l respectively. After the DAF process with 0.5 hours settling time the above values were noted as 6.87, 2253.33 mg/l, and 105.1 mg/l respectively. After the DAF process with 24 hours settling time, the values were noted as 7.02, 667.57 mg/l, and 31.58 mg/l respectively. A significant improvement in the COD and the oil and grease content was observed especially after following the DAF process.

Keywords: *BOD, COD, Dissolved Air Floatation, Metal Working Fluids.*

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