

## Magnetic filtration

# Quality surface finishing filtration

**S**urface finish quality is largely dependent on the cleanliness of the lubricating oil or coolant used, therefore identifying the best type of filtration is important. This article discusses the advantages and potential pitfalls of a range of filters and filtration methods.

Achieving a high quality surface finish is one of the main aims for many manufacturers carrying out processes such as grinding, lapping, honing, milling and drilling. The surface finish quality is

largely dependent on the cleanliness of the lubricating oil or coolant used, therefore identifying the best type of filtration for your application is important. Fortunately, there are many different types of

filtration systems available, each offering various degrees of success concerning the maintenance of clean coolants, lubricants and wash solutions.

The effective filtration of industrial fluids used in grinding, milling and washing applications is essential to achieving the highest levels of surface quality and finish. But of course, keeping oils free of ferrous particles doesn't just improve the surface finish of components, it also prevents damage to process equipment; ensuring machine longevity, optimum levels of performance, and reducing downtime.

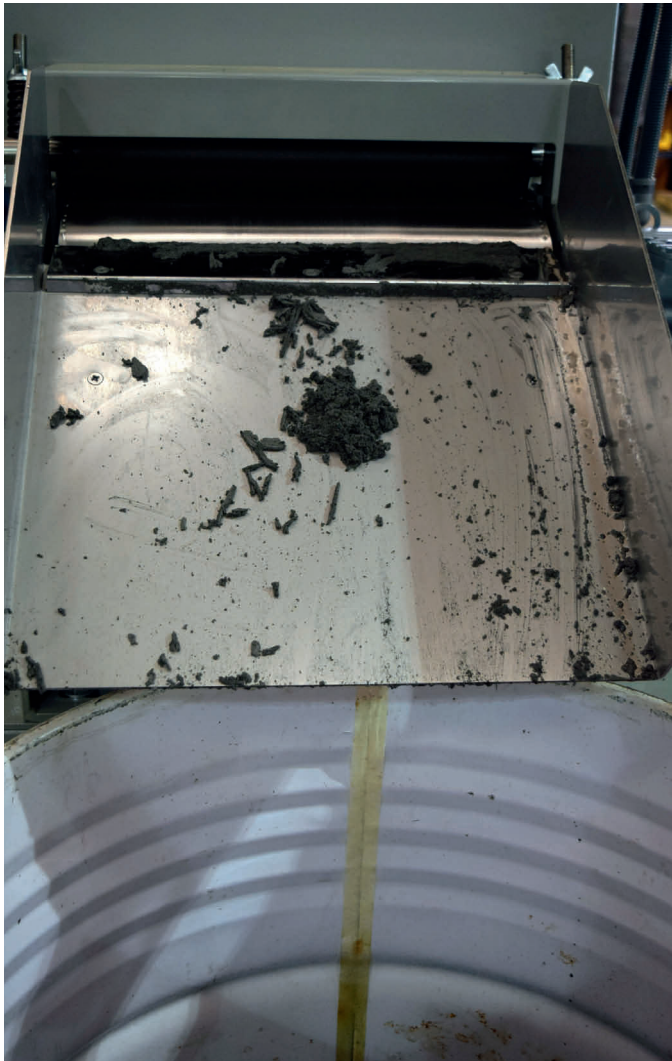
There are plenty of methods of filtration for industrial fluids, each with their own advantages and disadvantages. The final decision will clearly depend on the operating conditions of the individual application.

### Barrier filtration

Barrier filtration typically refers to cartridges, socks, bags and paper bands. The basic concept involves fluid passing through some form of barrier usually in the form of a bag, cartridge or sheet made from paper, polyester, or polypropylene. The barrier allows the fluid to pass through, but prevents contamination particles from circulating. When full, the barrier is either cleaned or replaced, depending on the filter media.



*Eclipse Magnetics' Auto-Mag 12 Skid installed at OSL Cutting Technologies, a Sheffield tool manufacturer. Shown here is the cutting and grinding processes using light honing oil.*



*Metal particulate removed by the AutoMag skid at OSL Cutting Technologies in Sheffield. The particulate is dry with substantially reduced oil content, and can, therefore, be sold as scrap.*



*Oil coolant. (Image courtesy of Shutterstock)*

Barrier filters are relatively easy to maintain due to the clear visual indication of when the filter is full. Although they do provide an adequate and effective means of filtration, barrier filters are really only suited to applications with low levels of contamination, and those that don't need an ultra-precise surface finish.

These filters are quite cheap to buy and install, in fact in some cases the fluid supplier may subsidise the costs. However, because of the on-going spend on consumable filters media, the overall costs are high with a very long return on investment period. Environmental costs must also be taken into consideration; using disposable filters results in disposal costs and environmental damage, as used media is sent to landfill or incinerated. With the advent of ISO14001 and increasing corporate focus on environmental responsibility, many companies are looking to reduce waste,

making disposable media an unattractive choice.

Despite the advantage of barrier filters having the ability to remove both magnetic and non-magnetic particles, this is limited to a certain size and is,

therefore, not 100% effective. The limited filtration capacity means that in order to maintain flow, barrier filters are often limited by the pore size of the media. This may be set at 10-20 microns to avoid restricting flow, meaning that any contamination particles below this size continue to be circulated, therefore damaging components, reducing surface

finish quality, reducing process accuracy, and reducing oil/coolant lifespan.

In medium to high contamination applications, barrier filters are also susceptible to blinding or blocking. This causes a drop in pressure which in turn triggers the machine

*“It is a common misconception that magnetic filtration only refers to traditional methods.”*

to stop, potentially resulting in hours of downtime and maintenance work.

### **Settlement tanks**

Another option is the use of settlement tanks, whereby processes rely on natural settlement to remove contamination particles. During the cycle, fluids such as

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