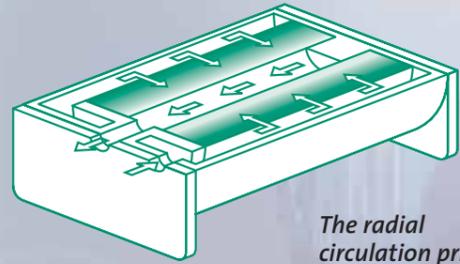


The NTF® filter is a Radial Micro Filter with an official, ISO-certified beta (efficiency) value for its cleanliness. The filter operates continuously, always purifying the oil in the system. The NTF® Radial Micro Filter is totally safe



The radial circulation principle.

and reliable. Even if your system is blocked for any reason, the standard oil circuit remains intact and fully functional. This system has proven itself over many years, both in hydraulic applications and in internal combustion engines and transmissions.

### Guaranteed Guarantee

NTF® provides you with a unique guarantee, covering any damage to a system or engine caused directly by the use of NTF® filters.

### The benefits of cleaner oil from Radial Micro Filtration

- Fewer breakdowns
- Less wear
- Longer intervals between services
- Structural cost savings
- Longer system life
- Better performance
- Longer oil life
- Less environmental impact (less waste oil)

### Versatile Applications

- Lubrication oil
- Transformer oil
- Thermic oil
- Fuel
- Transmission oil
- Hydraulic oil



NTF® filter systems have been the mark of improved efficiency in a wide range of applications for the past 30 years. You will find them in earth-moving equipment, cranes, diggers, marine engines, military tanks, street sweepers, hydraulic units, vehicle engines and transmissions, container transfer equipment, gearboxes and so on.



# Durability

Superior filtration to improve your performance



www.ntf-filter.com

**NTF FILTER B.V.**  
Kiotoweg 47  
3047 BG Rotterdam  
The Netherlands  
Phone: +31(0)10-3138300  
Email: info@ntf-filter.com

**NTF Micro Filtration, Inc.**  
28221 Beck Road, Bldg A-1  
Wixom, Michigan 48393  
USA  
Phone: +1(248)449-8700  
Fax: +1(248)449-8706  
Email: info@ntf-filter.com

Dealer



www.ntf-filter.com



## Why extra filtration?

The chemical stability of oil today is determined in part by the market's demand for longer service intervals for machinery and equipment. Improved chemical stability can double or even triple the mileage covered by a vehicle or the time a system operates between services. But this improvement does require that filtration be optimized. The answer: micro filtration.

## Oil: more than just lubrication

Oil is vital to the effective operation of engines, machines and systems. As well as lubrication, oil has a number of other functions:

- Cooling
- Sealing
- Power transmission
- Insulation
- Cleaning

## Cut costs and downtime

The level of purity in new oil is often not high enough to meet the technical specifications of many component suppliers. And the assembly or mechanical working of a new system often means that it is far from clean. In use the oil is contaminated even further: by wear, by ground dirt particles, by moisture and by other factors.



This causes more wear and breakdowns, resulting in higher maintenance costs, downtime and loss of productivity. So it is very important to keep the amount of dirt in the oil to a minimum. The NTF®, Radial Micro Filter does exactly that - and extends the useful life of all your production equipment.

## A closer look at oil contamination

The stability of oil's chemical properties depends on several factors, including the amount of impurities in the system and the size of any dirt particles present. Metal particles oxidize in the presence of air, moisture and heat. For example, a nail dropped into a tank will have little effect on the oil and is very unlikely to damage pumps or other vital components. But grind that nail into very small particles and every one of them will oxidize, accelerating the degradation of the additives in the oil. And those particles will find their way into the system, where they can cause untold damage.



Looking at oil contamination under the microscope, we see that the individual particles have different dimensions. The contamination level is measured using an ISO or NAS standard.

ISO standard 4406 covers the number of contaminating particles measuring 2,5 and 15 microns (in ISO 4406-1999, those dimensions are 4,6 and 14 microns). The table below shows two ISO standards: ISO 17/15/11 for such things as proportional valves, and so reasonably clean oil;



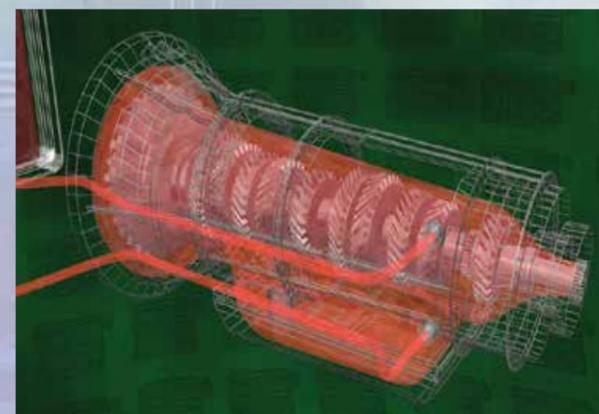
and ISO 21/18/12, a value that is often measured in systems without bypass filtration.

### Maximum number of contaminant particles in 100 ml of oil

	ISO 17/15/11	ISO 21/18/12
2 microns	130,000 (range 17)	2,000,000 (range 21)
5 microns	32,000 (range 15)	250,000 (range 18)
15 microns	2,000 (range 11)	4,000 (range 12)

These are quantities per 100 milliliters of oil, which in the case of ISO 17/15/11 equate with the transfer of approximately 22 kilograms of contamination per annum at a pump capacity of 200 liters per minute, 8 hours a day over 230 working days - a standard workload for a hydraulic system.

It appears, then, that the majority of oil contamination consists of particles measuring less than 10 microns.



## Radial Micro Filtration From NTF® - Reliable And Resilient

NTF® has been producing the Radial Micro Filtration system for more than 30 years. This tried and tested technology increases oil yields and so improves the efficiency of your machinery and equipment, as well as extending the life of your costly investments by reducing wear considerably.

## Inline Filter/Return Filter

An inline or return filter usually has a screen measuring between 10 and 25 microns. This is to allow large amounts of oil to flow through. But it also means that the filters fail to capture the majority of the contaminants (see Figure 1), even though it is those very tiny particles that are responsible for damaging cylinder walls, piston rods and the like.

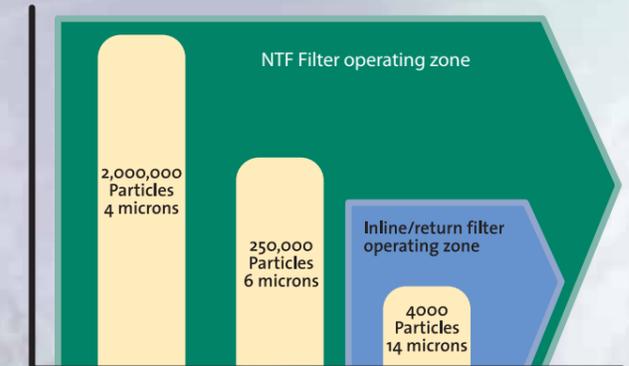


Figure 1.

Moreover, a bypass filter is more than 10 times more efficient than an inline filter. This is due to the materials used and the structure of the filter. The oil's rate of flow through an inline filter varies and compression pulses can occur, neither of which enhances the performance of the filter.

## Bypass Filtration

As the name indicates, bypass filtration occurs outside the main flow of the oil system, under constant pressure. It can use either axial or radial circulation through the filter element. NTF® has been producing bypass filters using the radial circulation principle since 1970. Unlike axial circulation, this approach precludes canalization between the media layers in the filter element.