

*WHY YOU SHOULD ALWAYS*  
**FILTER NEW OIL**



# NEW OIL DOES NOT MEAN IT IS CLEAN OIL

Perhaps one of the most common misconceptions in maintenance and reliability is that the new oil we buy is clean enough for immediate use. New oil from drums or bulk deliveries usually contains anywhere from 2 to 20 times the amount of particles that is acceptable for most lubricated equipment.

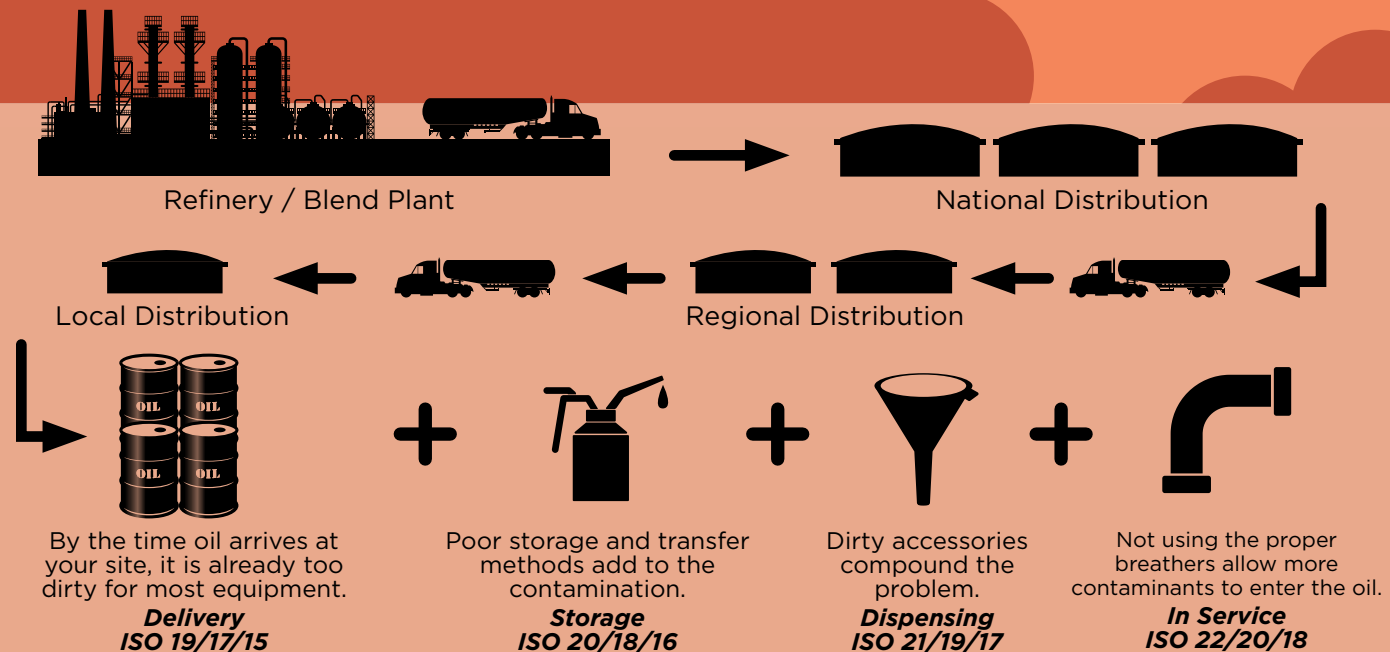
Cleanliness requirements for improved reliability and extending component life range from an ISO Particle Count of 15/13/10 to 18/16/13 depending on the component type. Very few new oil particle counts meet that criteria.



# HOW DOES NEW OIL GET DIRTY?

While the concept that new oil is not clean may be shocking to some, it stands to reason when you consider the number of times a lubricant is transferred before it's put into a machine. Each stop and transfer allows for the opportunity for new oil to become further contaminated before you receive it.

From the point of delivery to each subsequent lubricant transfer, the ISO code potentially increases by at least one grade — the equivalent to doubling, and in some cases tripling, the amount of contaminant in the oil.



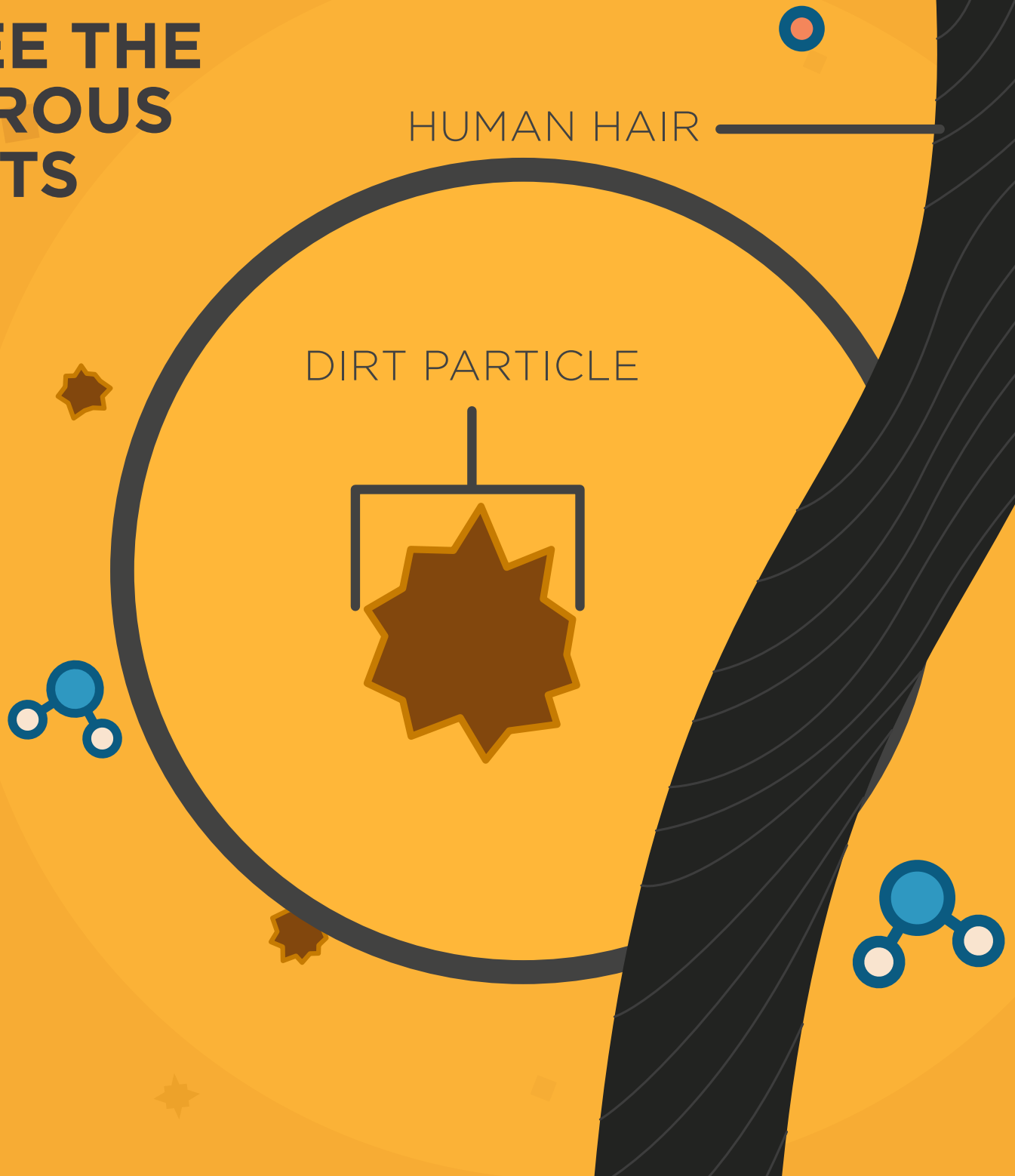
# YOU CAN'T SEE THE MOST DANGEROUS CONTAMINANTS

It's sometimes difficult to imagine, but the dirt and water we are most concerned with we cannot see. The particles that do the most damage are in the 2-5 micron range. This is the range of clearance in many sensitive components including servo valves, bearings and the pitch line of gear teeth.

To put that in perspective, a human hair averages 60 microns in diameter and the extent of human vision is approximately a 40 micron black dot on a white background.

HUMAN HAIR

DIRT PARTICLE



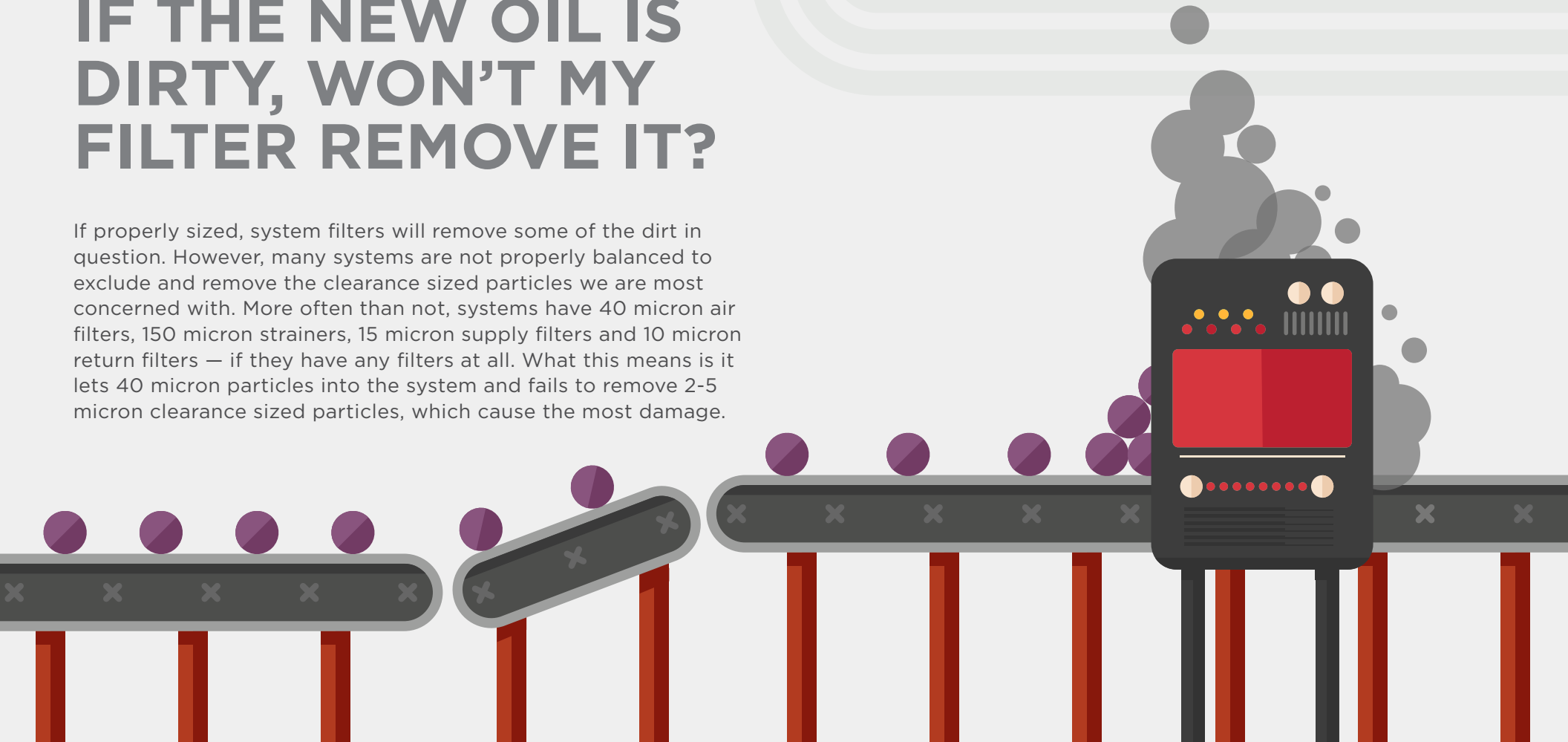
# HOW MUCH DOES IT TAKE TO CONTAMINATE?

It doesn't take much to contaminate clean oil. As little as a teaspoon of dirt in a 55 gallon drum of oil yields a particle count of 19/17/14, which means there are about a billion particles 4 microns and larger in the drum.



# IF THE NEW OIL IS DIRTY, WON'T MY FILTER REMOVE IT?

If properly sized, system filters will remove some of the dirt in question. However, many systems are not properly balanced to exclude and remove the clearance sized particles we are most concerned with. More often than not, systems have 40 micron air filters, 150 micron strainers, 15 micron supply filters and 10 micron return filters — if they have any filters at all. What this means is it lets 40 micron particles into the system and fails to remove 2-5 micron clearance sized particles, which cause the most damage.



# HOW CLEAN IS CLEAN?

The more sensitive a component is to contamination, the cleaner the system should be. Likewise, the more critical a system is from a production, safety or environmental standpoint, the cleaner it should be kept.

## TARGET PARTICLE (ISO CODE) LEVELS

Machine Type		Particle Level Target
Hydraulics 1500-2500psi	With servo valves	15/13/11
	With proportional valves	16/14/12
	Variable volume piston pump	17/15/12
	With cartridge valves or fixed piston pump	17/16/13
	With vane pump	18/16/14
Gearbox		19/16/13
Paper Machine		18/14/11
Steam Turbine		18/14/11
Pumps		17/14/12

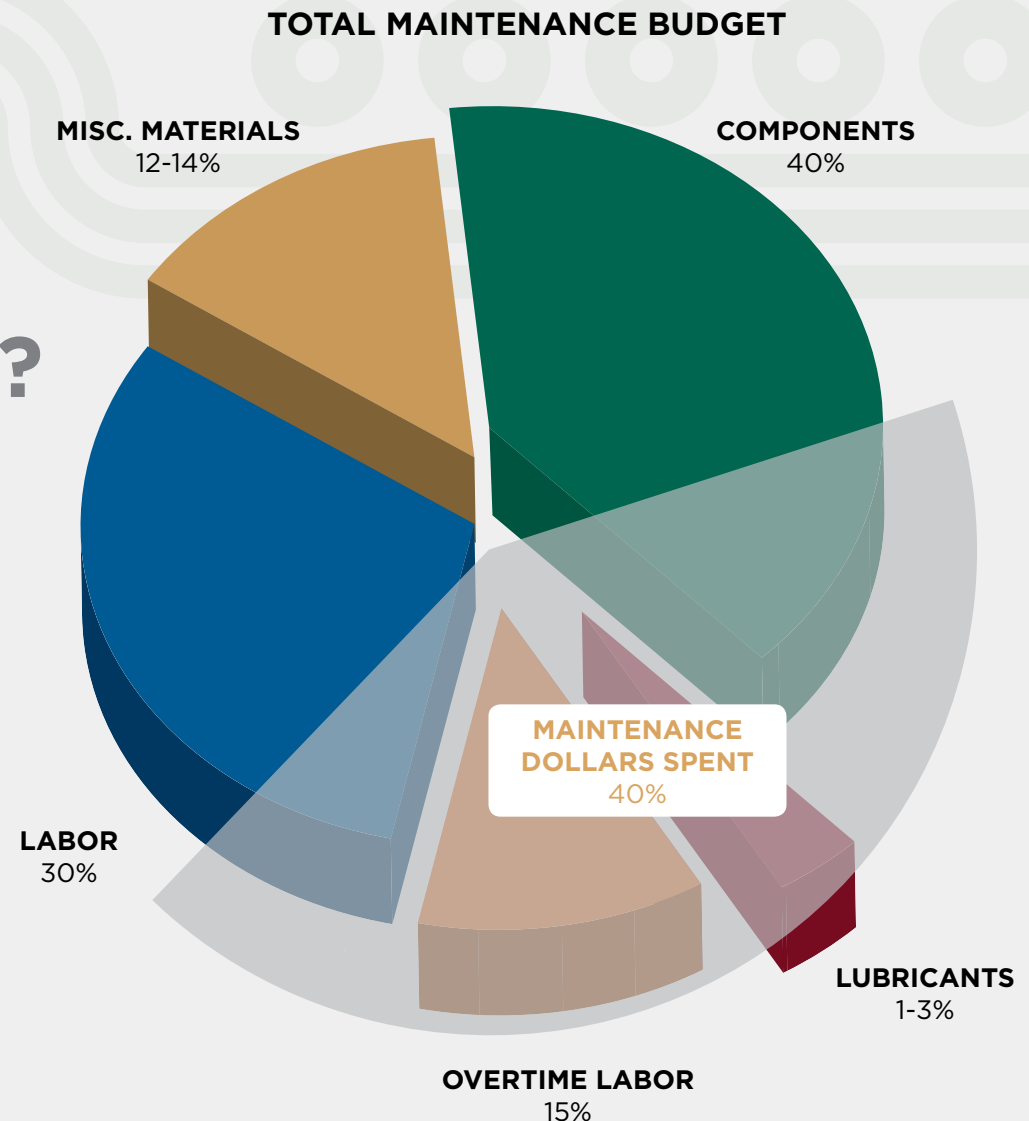
Targets should be adjusted up or down depending on criticality and appetite for risk. In essence, how much reliability do you want to buy? Just like exceeding the speed limit on a highway doesn't guarantee a crash, the further away from the limit you stray the higher your risk of a crash!

# WON'T IT BE EXPENSIVE TO PRE-FILTER NEW OIL?

Although the cost of lubricants typically represents 1-3% of a maintenance budget, it would be incorrect to make the assumption your lubrication program has little impact on your overall maintenance budget.

Studies show that approximately half of lost machine life is due to mechanical wear and approximately 80% of mechanical wear is caused by particle contamination in the oil. When particle contamination is reduced, wear rates go down and component service life goes up.

How does this impact your overall maintenance budget? Failed components and overtime due to machine downtime can total as much as 40% of maintenance dollars spent.

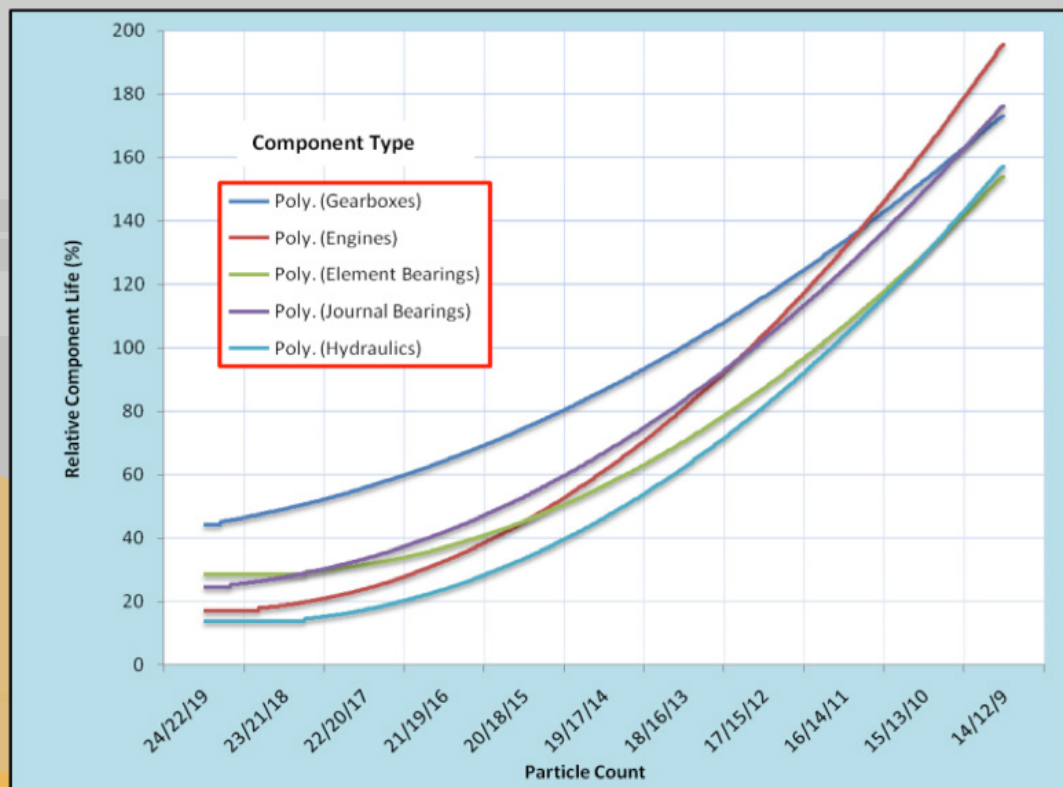




# ARE THERE ANY LONG-TERM BENEFITS FROM FILTERING NEW OIL?

Filtering new oil has multiple benefits to the component and the lubricant, but the number one benefit is increased component life.

This chart demonstrates the relative life of a component based on its cleanliness level. As an example, if we had a rolling element bearing operating at a cleanliness level of 23/21/18, it would only achieve 30% of its relative useful life. If that relative useful life is 10 years based on operational rated loads and speeds, the bearing would only last 3 years before a potential replacement is needed. Conversely, if the same bearing were operating at a cleanliness level of 16/14/11, 100% of its relative useful life could be achieved, representing a 3-4 fold life extension.





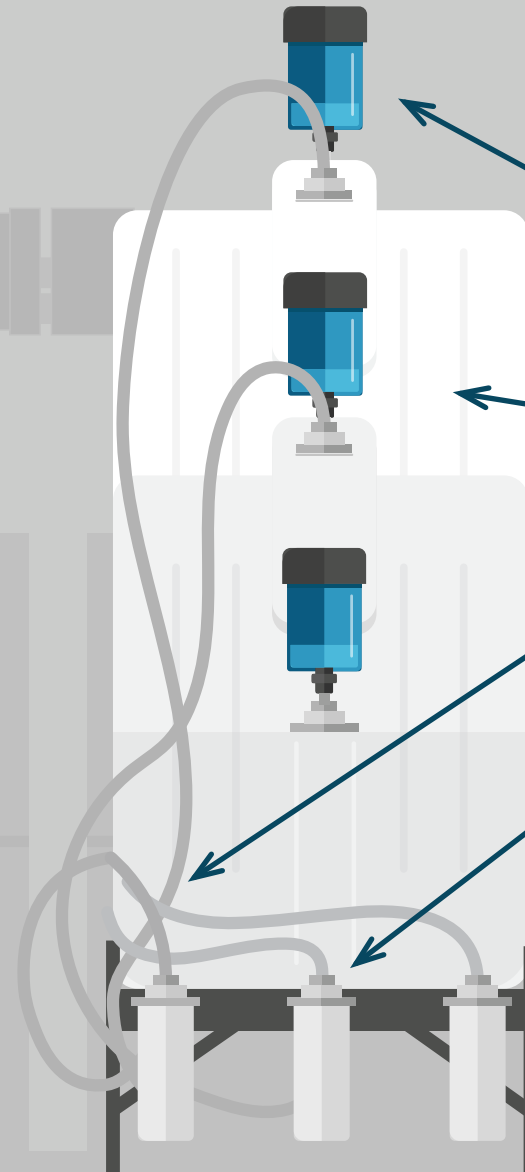
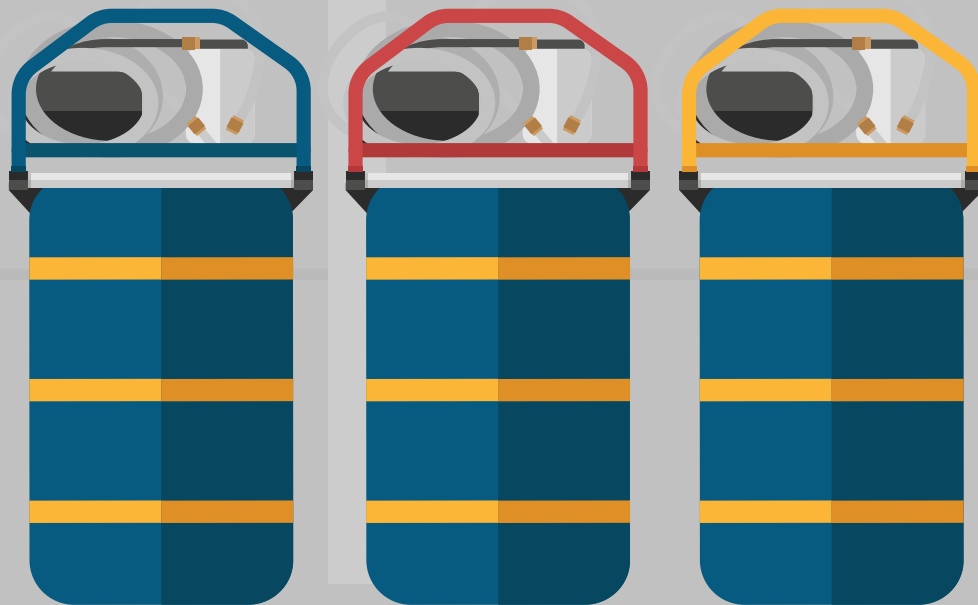
# NEW OIL CLEANLINESS CONSIDERATIONS

# ARRIVAL

**Cleanliness should first be addressed by how we handle the lubricant once we receive it in our facility.**

If it comes in drums, each drum can be filtered using portable compact filtration units like filter carts or drum toppers.

If drum storage is not desired, the oil can be transferred to a storage unit. The storage unit will allow for filtration at any point of its residency in the unit.



Individual desiccant breathers allow for moisture and particulate to be removed from make up while dispensing

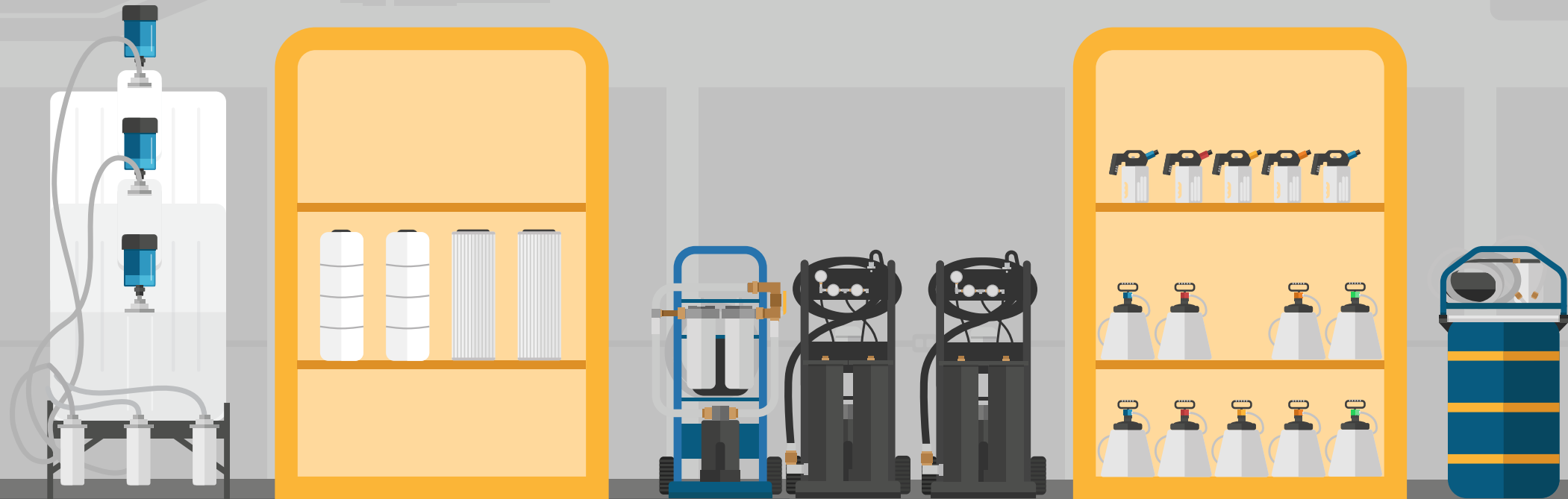
Individually sized stackable tanks to accommodate inventory requirements by lubricant

Hoses dedicated to each tank reduce risk of lubricant cross contamination

Dedicated filter can be sized for individual lubricant needs and configured for use during the fill, dispensing, and filtering processes

# STORAGE

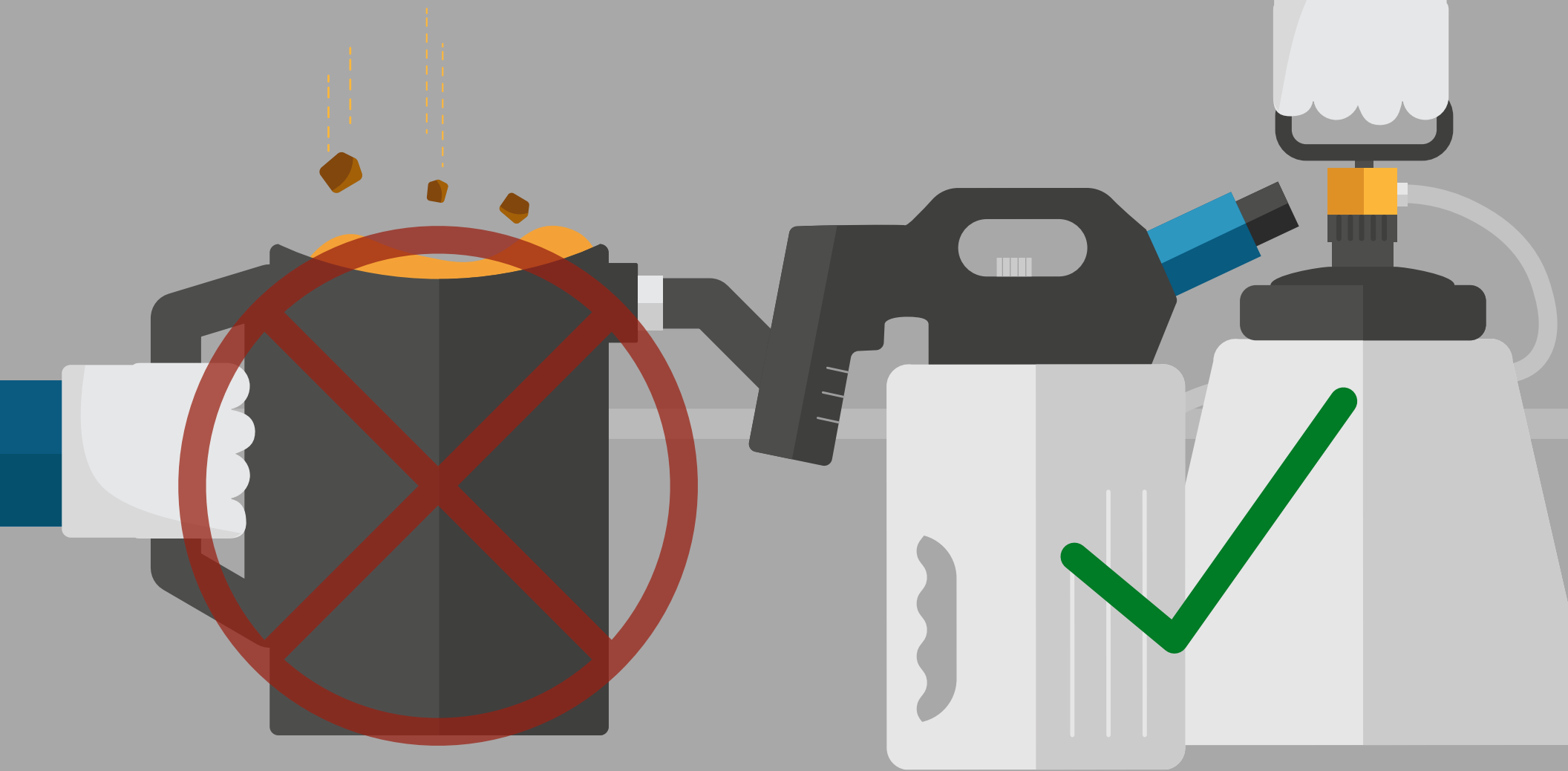
A custom designed Lubrication Storage & Handling Room is the lubricant's sanctuary from a harsh plant environment. The "Lube Room" provides a dedicated storage area where lubricants can be adequately prepared and maintained for service. This includes a place to pre-filter, store, and kit for routine preventive maintenance tasks. It also provides a method for usage control.



# HANDLING

**Don't undo the good work you've done filtering your new oil by contaminating it during transfer.**

It is critical to isolate your oil and equipment with a transfer container that is equipped with quick connects so they can be filled without exposing the container to the outside environment. The trigger should also be self closing so that the container is always sealed when not in use.

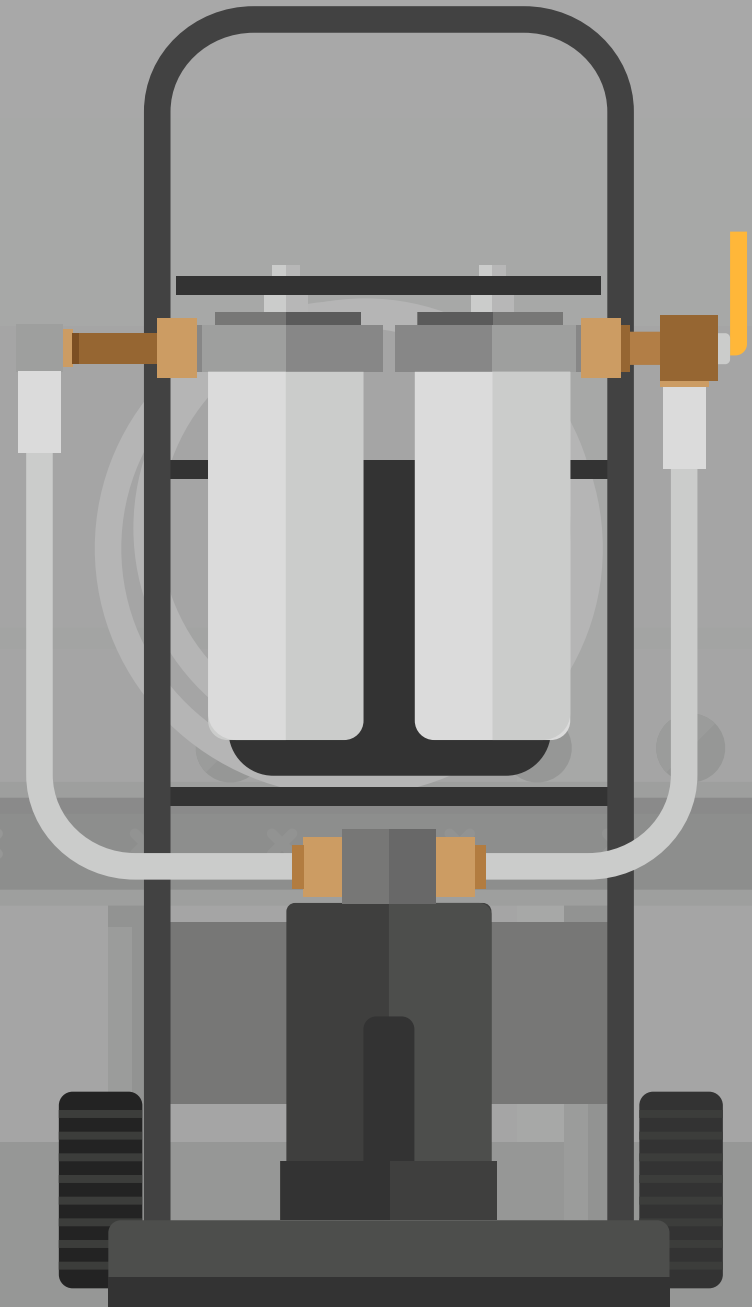


# IN USE

Oftentimes, plants will choose to immediately transfer the new oil into the machine's reservoir upon arrival at the facility. Filter carts are an excellent option that provides the necessary filtration to clean the oil before entering the reservoir.

When using a filter cart for offline filtration the oil will need to pass through the filter cart approximately seven times to achieve single-pass filtration.

To avoid cross-contamination of fluids, make sure there is a dedicated filter cart for each type of lubricant in use. They should also be fitted with quick connects to prevent contamination of the oil during transfer into the reservoir.



**Learn more about how Des-Case's fluid handling solutions can purify and protect your oil after it arrives at your facility.**

