



**INDUSTRIALHUB BD**

RELIABILITY & ENGINEERING SERVICE PARTNER

# NAS ANALYZER OIL PARTICLE COUNTER

Measure oil cleanliness, read ISO and NAS codes and act on the result.



# How to use this guide

For reliability and maintenance engineers who check hydraulic and lube oil with a particle counter and report the result as an ISO or NAS code.

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## HOW TO USE IT

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Portable, mobile and bottle-sample particle counters, and an online monitor

## Data status

Values are typical catalogue data and general practice. Confirm range, pressure and fluid against the data sheet and manual of your own instrument before use. Not stated means the documents we reviewed do not list it. Photos come from those documents; confirm usage rights before external use.

**Read this first:** depressurize the system before you connect, and never block the instrument outlet.

# Why oil cleanliness matters

Hydraulic and lube oil carries dirt you cannot see. A particle counter turns that dirt into a number you can track.

## 70-80%

of hydraulic system failures link to contamination

## 45%

of bearing failures trace to dirt in the oil

## 40 $\mu\text{m}$

smallest particle the eye can see

### THE WEAR LOOP

#### DIRT ENTERS

breather, seals, oil

#### SURFACES WEAR

particles cut the film

#### NEW PARTICLES

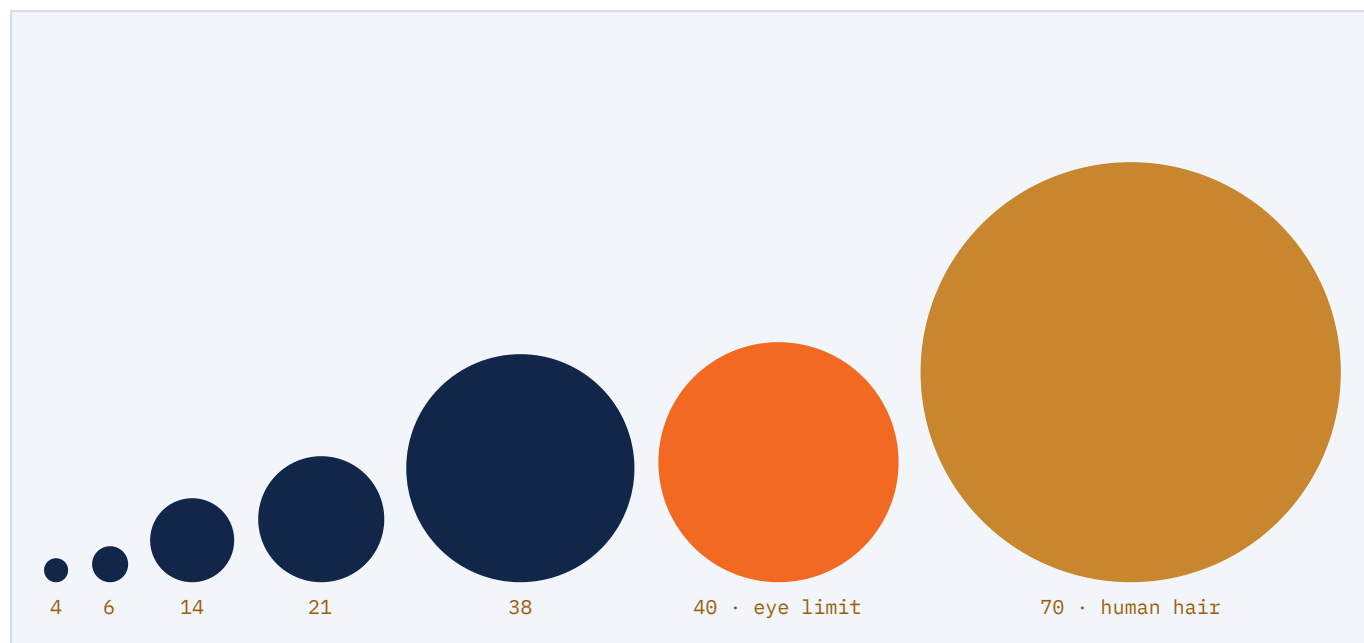
wear debris in oil

#### CLEARANCES OPEN

leak, heat, failure

THE LOOP FEEDS ITSELF UNTIL THE OIL IS CLEANED

### PARTICLES DRAWN TO SCALE ( $\mu\text{m(c)}$ )



ISO 4406 counts at 4, 6 and 14  $\mu\text{m(c)}$ . The human eye sees about 40  $\mu\text{m}$ ; a human hair is about 70  $\mu\text{m}$  wide.

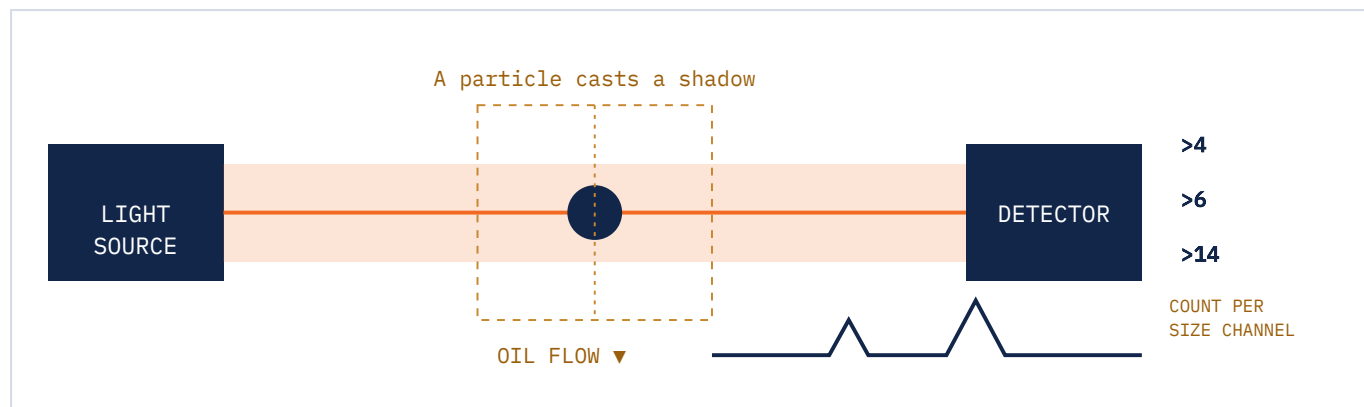
### KEY NOTE • HOW IT WORKS

Oil looks clean long before it is clean. Particles far below what the eye can see already cut into moving surfaces, and the wear debris they make is more particles. A counter measures that hidden dirt as a number per millilitre, so you can set a target, see it rise and act before a pump or bearing pays for it.

**Clean oil is cheap.** A reading every month finds a failing seal or filter before it costs a pump.

# How a particle counter works

Most portable counters use light blocking. A light beam crosses the oil, and each particle casts a shadow.



DEEPER DIP = BIGGER PARTICLE

**$\pm 1/2$**

ISO code accuracy

**100 ml**

reference volume for the count

**10-300 s**

set test time

**1 ml**

ISO 4406 report volume

## 1 • Light

A steady beam crosses the oil flow.

## 2 • Shadow

Each particle dims the beam for a moment. Bigger particle, deeper dip.

## 3 • Count

Dips are sorted into size channels and counted per 100 ml or per ml.

## STANDARD SIZE CHANNELS

| Standard                         | Channels                      |
|----------------------------------|-------------------------------|
| ISO 4406:1999 and AS 4059        | 4, 6, 14, 21 $\mu\text{m(c)}$ |
| Older ISO 4406:1987 and NAS 1638 | 2, 5, 15, 25 $\mu\text{m}$    |

## What fools it

Water droplets and air bubbles also bend light. They are counted as particles, so the reading reads high.

### KEY NOTE • HOW IT WORKS

The detector watches a steady beam. When a particle crosses it, the light drops for a moment, and the bigger the particle, the bigger the drop. The counter sorts every drop into a size channel and adds them up. Water drops and air bubbles bend light too, so a wet or foamy sample reads dirtier than it is. Degas or settle the sample, and compare readings only from the same method and the same point.

**Accuracy:** a calibrated counter reads within about  $\pm 1/2$  ISO code. Compare like with like: same method, same point.

# Types of particle analyzer

Pick the analyzer by where you measure: on the machine, on a line all the time, or on a bottle.



Portable analyzer

## Portable analyzer

- Spot checks and commissioning
- Hose to a test point
- ISO and NAS on a display



Portable laser counter

## Portable laser counter

- Two-minute test, memory and printer
- Reports ISO, NAS, AS 4059
- Battery for field work



Online sensor

## Online sensor

- Fixed on the line, signal 4–20 mA
- Alarm and trend all day
- No hose handling



Bottle sampler

## Bottle sampler

- Counts a captured bottle sample
- Good for remote sites
- Degasses the sample first

### KEY NOTE • HOW IT WORKS

Portable units go to the machine, so they are the tool for finding a problem and for checking after a filter change. An online sensor sits on the line and watches all day, so it is the tool for catching a change when nobody is there. A bottle sampler lets you measure oil collected at a remote site. Many plants use a portable unit to prove the online reading.

**Portable for finding, online for watching.** Many plants use a portable unit to prove the online reading.

# Reading the ISO 4406 code

ISO 4406 gives three numbers. Each counts particles per millilitre at one size or larger.

EXAMPLE: ISO 4406 CODE 18 / 16 / 13

## 18

> 4 µm(c)  
1,300 to 2,500 per ml

## 16

> 6 µm(c)  
320 to 640 per ml

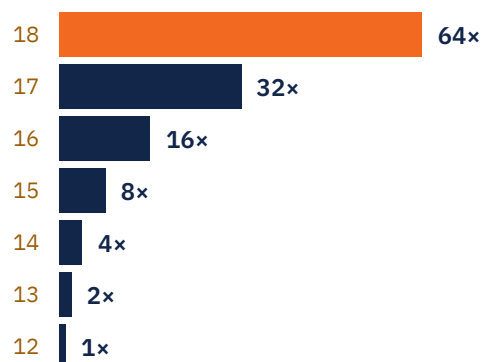
## 13

> 14 µm(c)  
40 to 80 per ml

### SCALE NUMBER TO PARTICLES PER ML

| Scale | More than – up to |
|-------|-------------------|
| 18    | 1,300 – 2,500     |
| 17    | 640 – 1,300       |
| 16    | 320 – 640         |
| 15    | 160 – 320         |
| 14    | 80 – 160          |
| 13    | 40 – 80           |
| 12    | 20 – 40           |
| 11    | 10 – 20           |

### THE SCALE DOUBLES



### Read it fast

First number = dirt count. A drop of two numbers is a four-fold cleaner oil.

### Worked example

A reading of 20/18/15 against a target of 18/16/13 is two numbers dirtier at every size. That is about four times the particles: find the source and clean the oil.

### KEY NOTE • HOW IT WORKS

Each step on the scale doubles the particle count, so the number is not a straight measure. Two steps is four times as many, and four steps is sixteen times. That is why a code that looks only a little higher can mean much dirtier oil. Read all three numbers against the target, and say which version of ISO 4406 you quote.

**Older code:** ISO 4406:1987 used two numbers at 2 and 15 µm (for example 20/15). Say which version you quote.

# NAS 1638 and AS 4059 classes

NAS 1638 and AS 4059 Table 1 give one class from 00 to 12. Counts are per 100 ml, in separate size bands.

| Class | 5–15 µm   | 15–25 µm | 25–50 µm | 50–100 µm | >100 µm |
|-------|-----------|----------|----------|-----------|---------|
| 3     | 2,000     | 356      | 63       | 11        | 2       |
| 4     | 4,000     | 712      | 126      | 22        | 4       |
| 5     | 8,000     | 1,425    | 253      | 45        | 8       |
| 6     | 16,000    | 2,850    | 506      | 90        | 16      |
| 7     | 32,000    | 5,700    | 1,012    | 180       | 32      |
| 8     | 64,000    | 11,400   | 2,025    | 360       | 64      |
| 9     | 128,000   | 22,800   | 4,050    | 720       | 128     |
| 10    | 256,000   | 45,600   | 8,100    | 1,440     | 256     |
| 11    | 512,000   | 91,200   | 16,200   | 2,880     | 512     |
| 12    | 1,024,000 | 182,400  | 32,400   | 5,760     | 1,024   |

AS 4059 uses the same limits at 6–14, 14–21, 21–38, 38–70 and >70 µm(c). Counts per 100 ml.

### How to give one class

Count each band, find the class of each, and quote the highest. Example: 42,000 / 2,200 / 150 / 18 / 3 particles is class 8.

### AS 4059 Table 2

Cumulative counts in channels A to F. Quoted as 6A/5B/5C style codes, one class per channel.

## Class 8

typical in-service oil

## Class 6

good lube system

## NAS 1638

inactive for new design

**KEY NOTE · HOW IT WORKS**

NAS gives one number for the whole oil, but it is built from five size bands. Find the class of each band in the table and report the worst one. The example in the table above gives bands of class 8, 6, 5, 4 and 4, so the oil is class 8. A single dirty band is enough to set the class, which is why one coarse-particle problem cannot hide behind clean fine bands.

**Note:** NAS 1638 is retired for new work. Many plants still use it. Use AS 4059 or ISO 4406 on new specs.

# Comparing codes and setting targets

Codes from different standards do not match exactly. This table gives the usual pairing.

| ISO 4406:1999 | NAS 1638 / AS 4059 T1 | AS 4059 Table 2 |
|---------------|-----------------------|-----------------|
| 23 / 21 / 18  | 12                    | 13A / 12B / 12C |
| 22 / 20 / 17  | 11                    | 12A / 11B / 11C |
| 21 / 19 / 16  | 10                    | 11A / 10B / 10C |
| 20 / 18 / 15  | 9                     | 10A / 9B / 9C   |
| 19 / 17 / 14  | 8                     | 9A / 8B / 8C    |
| 18 / 16 / 13  | 7                     | 8A / 7B / 7C    |
| 17 / 15 / 12  | 6                     | 7A / 6B / 6C    |
| 16 / 14 / 11  | 5                     | 6A / 5B / 5C    |
| 15 / 13 / 10  | 4                     | 5A / 4B / 4C    |
| 14 / 12 / 9   | 3                     | 4A / 3B / 3C    |

## TYPICAL TARGET CLEANLINESS: CLEANER AT THE TOP

|                   |                                             |
|-------------------|---------------------------------------------|
| 14/12/9 • NAS 3   | High-precision and laboratory servo systems |
| 17/15/11 • NAS 6  | Robotic and servo systems                   |
| 18/16/13 • NAS 7  | Very sensitive, high-reliability systems    |
| 20/18/14 • NAS 9  | Sensitive, reliable systems                 |
| 21/19/16 • NAS 10 | General equipment of limited reliability    |
| 23/21/18 • NAS 12 | Low-pressure, not in continuous service     |

### KEY NOTE • HOW IT WORKS

Different standards count different sizes in different ways, so the pairing is a guide and not an exact conversion. Always quote the standard and the code together, and set the target from the most sensitive component in the system. If a servo valve needs 17/15/11 and the pump can live with 20/18/14, the system target is 17/15/11.

**Set the target from the most sensitive part.** Servo and proportional valves need the cleanest oil. Check the component maker limit.

# Standards and terms

One oil, many codes. Know which standard a number comes from before you compare it with a target.

| Standard               | What it gives                                      | Size channels                        | Counts per |
|------------------------|----------------------------------------------------|--------------------------------------|------------|
| <b>ISO 4406:1999</b>   | Three numbers, for example 18/16/13                | >4, >6, >14 µm(c)                    | 1 ml       |
| <b>ISO 4406:1987</b>   | Two numbers, for example 20/15                     | >2, >15 µm                           | 1 ml       |
| <b>NAS 1638</b>        | One class, 00 to 12 (inactive for new design)      | 5–15, 15–25, 25–50, 50–100, >100 µm  | 100 ml     |
| <b>AS 4059 Table 1</b> | One class, same limits as NAS                      | 6–14, 14–21, 21–38, 38–70, >70 µm(c) | 100 ml     |
| <b>AS 4059 Table 2</b> | One class per channel A to F, for example 6A/5B/5C | Cumulative channels A to F           | 100 ml     |

## SAMPLING AND BOTTLE STANDARDS

### ISO 4021

How to take a representative oil sample from a system.

### ISO 3722

How to check that a sample bottle is clean enough.

## TERMS IN THIS GUIDE

| Term                      | Meaning                                                                                     |
|---------------------------|---------------------------------------------------------------------------------------------|
| <b>µm(c)</b>              | Particle size in micrometres, as measured by a counter calibrated for the current standard. |
| <b>Per ml, per 100 ml</b> | ISO 4406 reports counts per millilitre; NAS and AS 4059 Table 1 report per 100 ml.          |
| <b>Scale number</b>       | The ISO code number. Each step up doubles the particle count.                               |
| <b>Class</b>              | The NAS or AS 4059 number. The highest band class sets the class of the oil.                |
| <b>Target</b>             | The code you want the oil to stay at or below, set from the most sensitive part.            |

### KEY NOTE • HOW IT WORKS

A code means nothing without its standard. 18/16/13 under ISO 4406:1999 uses different sizes from a two-number code under the 1987 version, and NAS counts per 100 ml where ISO counts per ml. Before you compare a result with a target, check that both use the same standard, the same version and the same units.

**Compare like with like.** Same standard, same version, same sampling method and the same point.

# Taking a good oil sample

The best analyzer gives a bad answer from a bad sample. Take the sample from a live, turbulent line.



Oil sampling kit: vacuum pump, tubing, bottles



Bottle sampler unit for a captured sample

## FOUR METHODS: BEST FIRST

1

### Sampling valve, PTFE seal

Fit in a pressure or return line with steady flow. Run 30 minutes. Clean outside, flush at least 1 litre, keep the valve open and fill the bottle.

2

### Plain valve in return line

Flow steady, below 14 bar. Run 30 minutes. Flush about 45 litres back to the tank first, then fill.

3

### Reservoir with vacuum pump

Only if 1 and 2 are not possible. Run 1 hour. Insert hose midway in the tank. Flush three times, then fill to about 75%.

4

### Bottle dipping

Least preferred: dirt can enter. Run 1 hour. Clean a certified bottle, dip, cap and wipe.

## DO

- Use a certified clean bottle
- Label: oil type, hours, system, date
- Keep the cap face down in your hand

## DO NOT

- Sample from a cold, idle system
- Touch tank walls or baffles
- Pour oil from one container to another

## KEY NOTE • HOW IT WORKS

The sample must represent the oil that is flowing through the system, not the dirt that settled in a corner. That is why you sample from a live, turbulent line after the system has run, and why you flush the valve first. The best methods come first in the list because they let in the least outside dirt. Every extra step of handling adds particles of its own.

**Follow ISO 4021.** Check bottle cleanliness to ISO 3722, and dispose of oil under site safety rules.

# Connect: choose the method

Step 1 is to check the pressure at the test point. The pressure picks the connection.

## Open tank

0 bar  
pump suction

## Direct hose

1 to 45 bar  
pressure hose

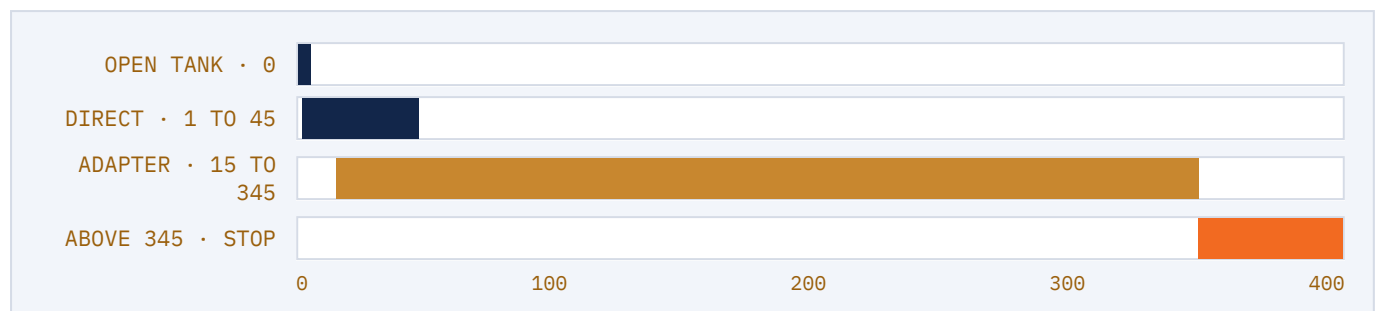
## Adapter

15 to 345 bar  
hose + adapter

## Do not use

> 345 bar  
pick another point

### TEST POINT PRESSURE (BAR)



### EVERY MEASUREMENT

- Use a turbulent point with good flow, such as a pipe bend
- Avoid dead legs and siphons in the INLET hose
- Power the unit: self-test counts WAIT 99 to 0
- Outlet hose goes to an unpressurized container (below 0.5 bar)
- Use mineral oil, flash point above 55 °C



### From an open tank (0 bar)

Use the clear suction hose. Prime the unit with about 120 ml. A first test without priming needs 300 ml.

### Above 345 bar

Do not connect. The unit withstands 345 bar. Pick a lower-pressure point.

### KEY NOTE • HOW IT WORKS

The analyzer takes oil from the system through the inlet hose, counts it and returns it through the outlet hose. The pressure at the test point decides whether you can connect directly or need the adapter, and above 345 bar you must not connect at all. A turbulent point, such as a pipe bend, gives a mixed, representative flow. A dead leg or a siphon holds old oil and air, and both spoil the count.

**Never seal the OUTLET.** Blocking it can destroy the unit. Depressurize before you work on the system.

# Before you measure: checklist

Run through this list at the test point. If any line fails, fix it or pick another point before you start the pump.

| Check                             | Limit                                                                  | If it fails                                         |
|-----------------------------------|------------------------------------------------------------------------|-----------------------------------------------------|
| <b>Pressure at the test point</b> | 1 to 45 bar direct; 15 to 345 bar with the adapter; open tank at 0 bar | Above 345 bar: pick another point                   |
| <b>Test point</b>                 | Turbulent, good flow, such as a pipe bend                              | Move to a better point; avoid dead legs and siphons |
| <b>Inlet hose</b>                 | No dead legs or siphons; finger-tight coupling                         | Re-fit and shorten the hose                         |
| <b>Outlet</b>                     | Hose to an unpressurized container, below 0.5 bar                      | Never seal the outlet                               |
| <b>Power</b>                      | 24 V DC; board network with load-dump protection                       | Use the mains adapter or a protected supply         |
| <b>Self-test</b>                  | Counts WAIT 99 to 0 after power on                                     | Wait for it to finish                               |
| <b>Fluid</b>                      | Mineral oil, flash point above 55 °C                                   | Use another method                                  |
| <b>Viscosity</b>                  | 10 to 350 mm <sup>2</sup> /s (up to ISO VG 68)                         | Do not measure outside the range                    |
| <b>Run time</b>                   | No longer than 30 minutes, then rest 10 minutes                        | Stop and let the unit rest                          |

## RUN CYCLE

**RUN** • no longer than 30 minutes

**REST** • 10 minutes

## OPEN-TANK PRIMING

### Prime the unit

About 120 ml of oil, with the clear suction hose.

### First test unprimed

Needs about 300 ml.

### Measuring time

Set between 10 and 300 seconds.

## KEY NOTE • HOW IT WORKS

Most bad readings come from the set-up, not the counter. Pressure outside the range can damage the unit, a blocked outlet can destroy it, and a dead leg or air in the hose gives a false reading. Spend two minutes on this list before you start the pump and you save a repeat measurement and a doubtful result.

**Stop signs:** pressure above 345 bar, a sealed outlet, or oil outside the viscosity range. Fix these before you connect.

# Run a measurement

Follow the order. For a pressure point, the pump is on before the hose meets the system.

## 1 Check the point

Pressure in range, system safe, point clean.

## 2 Power and outlet

Plug in 24 V DC. Fit the outlet hose to an unpressurized container.

## 3 Fit the INLET hose

Screw the coupling finger-tight onto the unit.

## 4 Pump on

Switch on the internal pump.

## 5 Connect to the point

Fit the free hose end to the test point. Oil starts to flow.

## 6 Wait for the reading

Let it run the set time. Read the stable value.

## 7 Record

Log the point, value and time. Store or download.

## 8 Shut down

Pump off, release hose, let hot oil cool, cap the ports.

### LIMITS TO RESPECT

- Run no longer than 30 minutes, then rest 10 minutes
- Viscosity 10 to 350 mm<sup>2</sup>/s (up to ISO VG 68)
- Supply 24 V DC, on a board network with load-dump protection
- Direct pressure to 45 bar; to 345 bar with the adapter



Analyzer in its case: display, pump switch, INLET and OUTLET ports

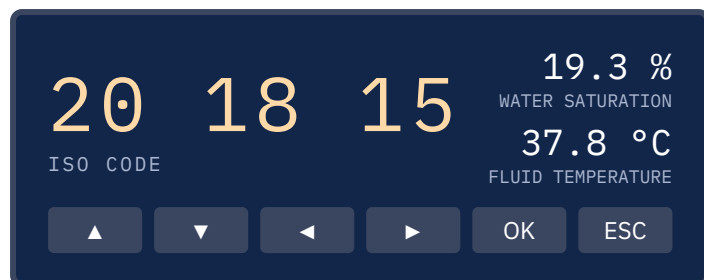
### KEY NOTE • HOW IT WORKS

Fit the outlet first so oil has somewhere safe to go, then the inlet, then start the pump, and only then connect to the system. Wait for the reading to settle. The first minute is the unit flushing itself, so it does not tell you the oil condition. Record the point, the value and the time so the next reading can be compared with this one.

**Fault on start?** Display CHECK means no oil flow. Switch the pump on and wait a few measurement cycles.

# Display, menus and data

Six keys move through the readings and the menus. The display shows the code, water saturation and temperature.



- Press OK to enter a menu, Esc to go back
- Use the arrows to scroll and change values
- The status LED shows ready, warning or fault
- Menu times out after 30 seconds

## WHAT THE DISPLAY SHOWS

### ISO code

The cleanliness code from the last measurement, for example 20 18 15.

### Water saturation

How much water the oil holds, as a percentage of what it can hold.

### Fluid temperature

The oil temperature at the sensor, in °C or °F.

## SCROLL THE ISO AND SAE DISPLAY



## SCROLL THE ISO AND NAS DISPLAY



### Power-up menu

Hold a key while you power on. Set date and time, measuring time (10 to 300 s), calibration type (ISO.SAE or ISO.NAS), delete memory, factory reset.

### Measuring menu

Press OK in use. Choose the record point (20 names of 6 characters), see free memory, set °C or °F.

## FIRST-TIME SET-UP



### KEY NOTE • HOW IT WORKS

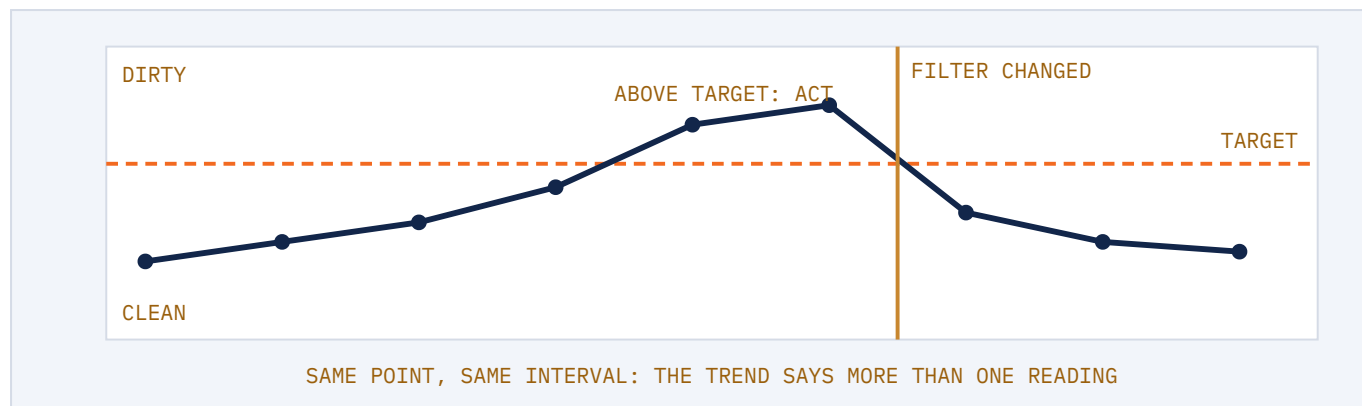
Do the first-time set-up once. The calibration type decides which scale the unit reports: ISO with SAE, or ISO with NAS. Name the points with short, clear names such as the machine tag, so every record can be found later. After a session, copy the records to a USB stick on a PC and clear the unit, so memory never fills up in the field.

**Save the data.** Copy records to a USB stick (FAT32) and open them on a PC. Then clear the unit memory.

# Results, trends and status messages

A single number is a snapshot. Plot each point over time and set a limit that triggers action.

## TREND AND TARGET (ILLUSTRATION)



## STATUS MESSAGES

| Display              | Meaning                    | Action                            |
|----------------------|----------------------------|-----------------------------------|
| CHECK                | No oil flow                | Switch pump on; wait a few cycles |
| < ISO 9/8/7          | Cleaner than range (CLEAN) | Valid: oil is very clean          |
| > ISO 25/24/23       | Dirtier than range (DIRTY) | Filter the oil, then repeat       |
| NO SENS / ERROR      | Sensor fault               | Switch off, on; call service      |
| Out of range (water) | Water sensor range         | Wait more cycles                  |

## READING THE TREND

### Rising

Dirt is entering faster than the filter removes it. Find the source.

### Falling

The fix is working. Keep measuring to confirm.

### Flat above target

A steady source or a poor filter. Check filters, breathers and seals.

#### DO

- Take 2 or 3 readings, use the stable one
- Measure the same point each time
- Note hours and last filter change

#### DO NOT

- Trust the first minute of data
- Measure with air in the hose
- Compare codes of different standards

#### KEY NOTE • HOW IT WORKS

One reading says where the oil is today. A line of readings from the same point says where it is heading. If the line rises toward the target, you can fix a filter or seal on your own schedule. If it jumps above the target, something has just changed. After a filter change the line should fall. If it does not, the filter is not the only source.

**When above target:** check filters, breathers and seals, flush or filter the oil, then measure again.

# From reading to action

A reading is only useful if it leads to a decision. This page turns a result into an action.

## FROM READING TO ACTION



### WORKED EXAMPLE: ISO

|                       | Reading                           | Target       |
|-----------------------|-----------------------------------|--------------|
| <b>Code</b>           | 20 / 18 / 15                      | 18 / 16 / 13 |
| <b>Difference</b>     | 2 steps higher at every size      | —            |
| <b>Particle count</b> | About 4 times the target          | —            |
| <b>Action</b>         | Find the source and clean the oil | —            |

### WORKED EXAMPLE: NAS 1638

| Band              | Count / 100 ml | Class |
|-------------------|----------------|-------|
| <b>5–15 µm</b>    | 42,000         | 8     |
| <b>15–25 µm</b>   | 2,200          | 6     |
| <b>25–50 µm</b>   | 150            | 5     |
| <b>50–100 µm</b>  | 18             | 4     |
| <b>&gt;100 µm</b> | 3              | 4     |

The oil is class 8: the highest band class sets the class.

## WHERE THE DIRT COMES FROM: WHAT TO CHECK

|                                                                    |                                                    |                                                                     |                                                                                   |
|--------------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>Breathers</b><br>Air entering the tank carries dirt in with it. | <b>Seals</b><br>Worn or damaged seals let dirt in. | <b>Filters</b><br>Blocked, bypassing or past their change interval. | <b>Wear in the system</b><br>Wear debris feeds the loop. Flush or filter the oil. |
|--------------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------|

## AFTER YOU ACT

- Measure again at the same point.
- Record the new value next to the old one.
- Note hours and the last filter change.
- If the oil stays above target, check the next source.

### KEY NOTE • HOW IT WORKS

The action follows the size of the gap. A reading that is one step above target is a warning to watch. A reading two steps above is about four times the particles and needs a cause found now. Always repeat the measurement after the fix: a clean reading proves the repair worked, and a dirty one tells you the source is still there.

**Close the loop.** Measure, act, measure again, and keep the record.

# Choose and look after an analyzer

Match the instrument to the job. Then keep it clean and calibrated.



Portable analyzer



Portable counter



Online sensor



Blockage monitor

| Type                          | Typical data                                                                                                |
|-------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Portable analyzer</b>      | ISO and NAS, $\pm\frac{1}{2}$ ISO code; 1–45 bar direct, 345 bar with adapter; also water % and temperature |
| <b>Portable laser counter</b> | 2-minute test, 4–70 $\mu\text{m(c)}$ ; about 300 tests in memory; printer; sensors to 420 bar               |
| <b>Online sensor</b>          | ISO 9/8/7 to 25/24/23; 350 bar; 30–500 ml/min; 4–20 mA; IP67                                                |
| <b>Mesh-blockage monitor</b>  | Not affected by water or air; ISO -/9/7 to -/21/17; to 315 bar; 500-test memory                             |

## Care

Keep the 400  $\mu\text{m}$  inlet strainer clean. Clean the adapter flow valve (0.55 to 0.7 l/min). Cap the ports and close the case after use.

## Calibration

Use the maker interval and keep the certificate. A field check with a reference sample catches drift.

### DO

- Cool down before removing hot hoses
- Store hoses and adapters in the case
- Format the USB stick as FAT32

### DO NOT

- Seal or block the outlet
- Run the pump over 30 minutes
- Use oils outside the viscosity range

### KEY NOTE • HOW IT WORKS

A counter is a measuring instrument, so its result is only as good as its calibration and cleanliness. The inlet strainer and the adapter flow valve protect the sensor from large dirt, and a blocked one gives wrong readings. A check against a reference sample now and then shows whether the unit has drifted before a wrong number leads to a wrong decision.

**Need help choosing?** Send the oil type, pressure and test points. We match the analyzer and adapters.

# Global brands and cross-reference

IndustrialHub BD helps maintenance and engineering teams choose oil particle counters by fluid, system pressure, test points, code standard and operating needs.



## Parker

### PORTABLE LASER COUNTER

Brand shown on the portable laser counter in this guide: 2-minute test, memory and printer. Model and data not stated.



## HYDAC

### ONLINE SENSOR

Brand shown on the online sensor in this guide: fixed on the line with a 4–20 mA signal. Model and data not stated.



## Pall

### MESH BLOCKAGE MONITOR

Brand shown on the blockage monitor in this guide: not affected by water or air. Model and data not stated.



## Stauff

### BOTTLE SAMPLER

Brand shown on the bottle sampler in this guide: counts a captured bottle sample. Model and data not stated.

## CROSS-REFERENCE RULE

Never mix sensors, adapters, hoses or software between brands. Match these points against the maker's own data first, then compare the offers.

|                          |                                 |                   |                    |                     |
|--------------------------|---------------------------------|-------------------|--------------------|---------------------|
| Standard and version     | Size channels, $\mu\text{m(c)}$ | Pressure range    | Flow and viscosity | Fluid compatibility |
| Accuracy and calibration | Water and temperature           | Memory and output | Power supply       | Rating and support  |

## Maintenance team

Start from the system: fluid, viscosity, pressure at the test points, the code standard you report and whether you need online or portable. Cross out the instruments that miss one of these, then shortlist on page 19.

We support solutions from recognized brands including Parker, HYDAC, Pall and Stauff, subject to technical suitability, product availability and specific customer requirements.

# Global brand comparison statement

Five documented instrument types on the points that decide most selections. Use it to shortlist by job, then ask each supplier for the full data sheet.

## MAJOR KEY POINTS

|                            | Portable analyzer                      | Portable laser counter                | Online sensor           | Mesh blockage monitor        | Bottle sampler            |
|----------------------------|----------------------------------------|---------------------------------------|-------------------------|------------------------------|---------------------------|
| Brand shown in guide photo | Not stated                             | Parker                                | HYDAC                   | Pall                         | Stauff                    |
| Reports                    | ISO and NAS; $\pm\frac{1}{2}$ ISO code | ISO, NAS, AS 4059                     | ISO 9/8/7 to 25/24/23   | ISO -/9/7 to -/21/17         | Counts a captured bottle  |
| Pressure                   | 1–45 bar; 345 bar with adapter         | Sensors to 420 bar                    | 350 bar                 | To 315 bar                   | Not stated                |
| Range, flow                | Viscosity 10 to 350 mm <sup>2</sup> /s | 4–70 $\mu\text{m(c)}$ ; 2-minute test | 30–500 ml/min           | Not stated                   | Degasses the sample first |
| Memory, output             | Memory; USB stick                      | About 300 tests; printer              | 4–20 mA; IP67           | 500-test memory              | Not stated                |
| Water and air              | Water % and temperature shown          | Not stated                            | Not stated              | Not affected by water or air | Not stated                |
| Best for                   | Spot checks and commissioning          | Field work with a printout            | Watching a line all day | Oil with water or air        | Remote sites              |

### How maintenance and procurement use this page

Maintenance picks the type by where it measures: machine, line or bottle. Procurement then asks every supplier for the model and revision, pressure and viscosity limits, code standards supported, calibration certificate, warranty, adapters and hoses in the kit, and delivery time. Brand names are those visible on the photos in the source guide; model data were not stated.

**Not stated** means the document we used does not list it. Ask for the current data sheet before you order. We support solutions from recognized brands including Parker, HYDAC, Pall and Stauff, subject to technical suitability, product availability and specific customer requirements.



# REQUEST A QUOTATION

Maintenance and plant teams: send the oil type, system pressure and the test points. We reply with the right particle counter, adapters, price and delivery time, and an engineer who stays with you after delivery.

PHONE / WHATSAPP +880 1746 881144

EMAIL [sales@industrialhubbd.com](mailto:sales@industrialhubbd.com), [industrialhubbd@gmail.com](mailto:industrialhubbd@gmail.com)

WEBSITE <https://industrialhubbd.com>

SOCIAL [linkedin.com/company/industrialhubbd](https://www.linkedin.com/company/industrialhubbd)  
[youtube.com/@IndustrialHubBD](https://www.youtube.com/@IndustrialHubBD)

ADDRESS House-70/A, Lane-2, Block-C, Road-1, South Khulshi,  
Chittagong-4225, Bangladesh

[Request a quotation →](#)

[WhatsApp +880 1746 881144](#)

★ WE STAY AFTER DELIVERY

## AFTER-SALES SERVICE

- Commission and start up equipment
- Find faults and analyse failures
- Plan shutdowns and advise on repairs

★ 20 YEARS ON THE PLANT FLOOR

## WHO LEADS US

- Erect, commission and revamp mills
- Operation, maintenance & shutdowns
- Troubleshoot and spares

## WHAT WE SUPPLY AND SUPPORT

### PARTS

- Portable particle counters
- Online contamination sensors
- Sampling kits and bottles
- Hoses, adapters, filters

### SUPPORT

- Pick the right analyzer
- Set-up and operating advice
- Target cleanliness advice
- Quotation and delivery follow-up