

Detect and Alert Equipment Operators of the Presence of Metal Particles

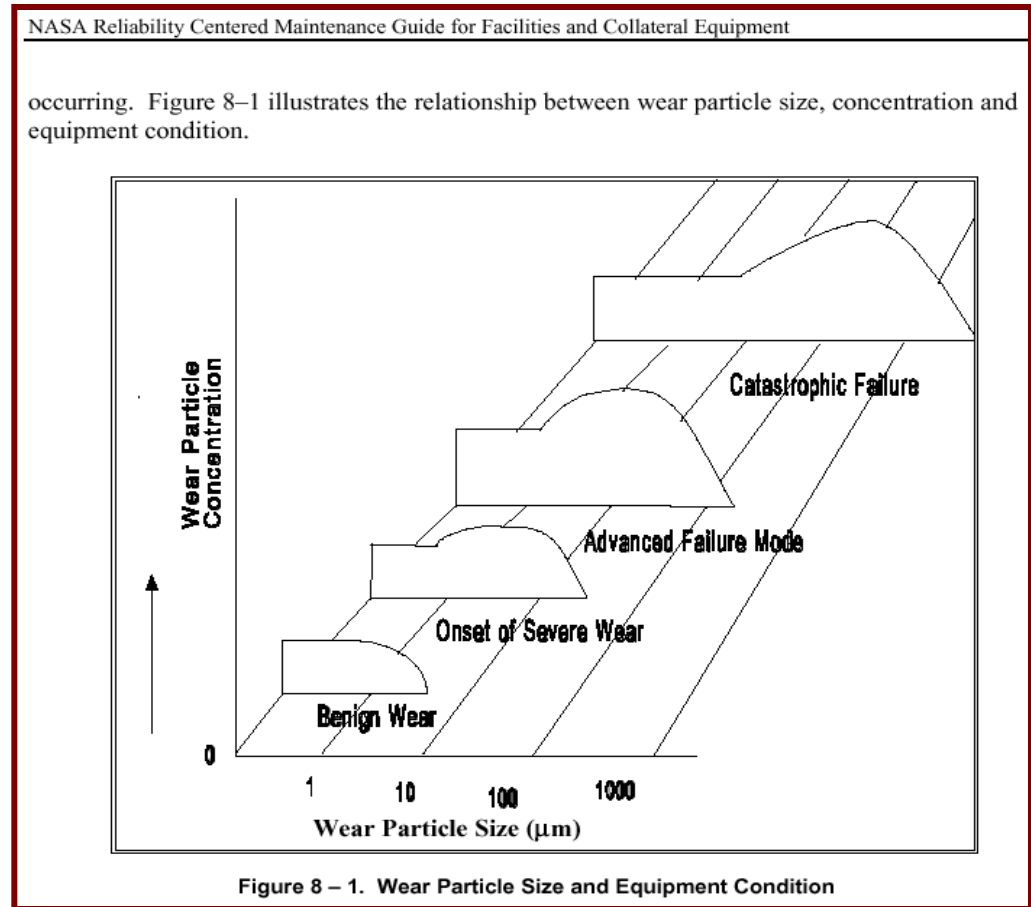


amot

What is a Metal Particle Detector (MPD)?

2

- MPD uses AMOT patented technology to detect and alert equipment operators of the presence of metal particles in non-conductive fluid lubrication systems (lube oil, transmission fluids, etc).
- A sizable wear particle can cause some serious damage to engine



Why should you use MPD?

3

- **How the oil is affected-** Particles, especially catalytic metal ones like copper, iron and lead increase the rate at which oxidation occurs. Numerous minute particles in stable suspension can cause the oil's viscosity to increase. Oil gets stripped of its:
 - polar additives
 - anti-wear additives
 - extreme pressure additives
 - rust inhibitors
 - dispersants
- **How the machine is affected-** Abrasive particles are responsible for much of the wear leading to premature failure of mechanical components. Under sliding conditions, clearance-sized particles enter the oil film between surfaces and cut away material much like a lathe cuts metal; resulting in surface fatigue, pitting, and spalling. Particle-contaminated oil traveling at high velocity can also cause erosive wear.

Eliminate costly repairs

4

- Insures against costly parts and repairs
 - Replace a bearing instead of a crankshaft!
- Proactive Maintenance Tool
 - Minimize down time!
- Verifies filter performance and failures
- Permits “on-condition” lab oil analysis
- Confirms systems flushing
- Identifies botched machine repairs
- Detects high corrosion and abrasion wear conditions
- Confirms corrective maintenance

Features & Benefits

5

- Unique, Grid Sensing Technology
 - Detects all conductive particles
 - Metal particles and chips
 - Non magnetic particles
 - Plated grid resists lacquering
- Oil and electrical compartments positively sealed from each other
- Improve electrical isolation
- UL Version
 - Approved for Class 1, Div. 1, Groups B,C, & D
 - Meets National Electric Code
 - 316 S.S. Body
 - Meets API 614

What industry uses MPD?

6

If you have metal particles in non-conductive fluid lubrication systems, you need MPD.

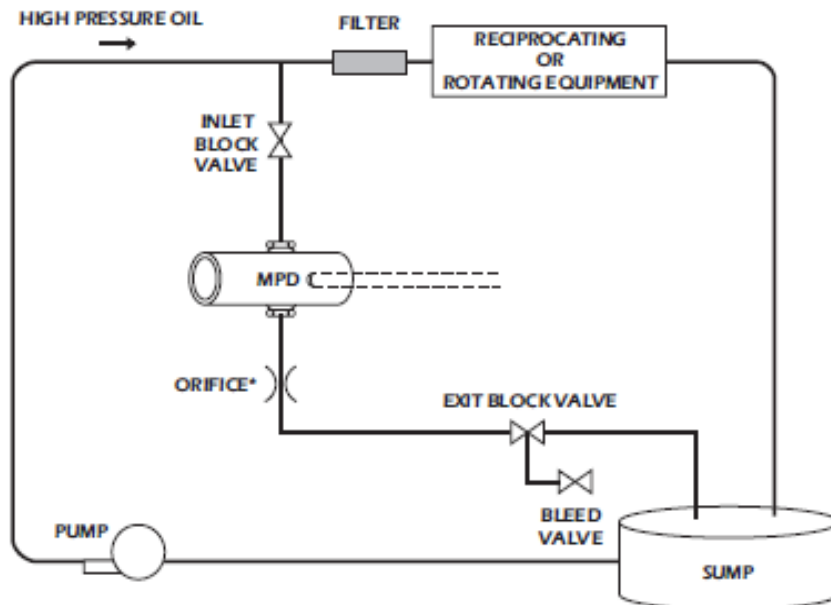
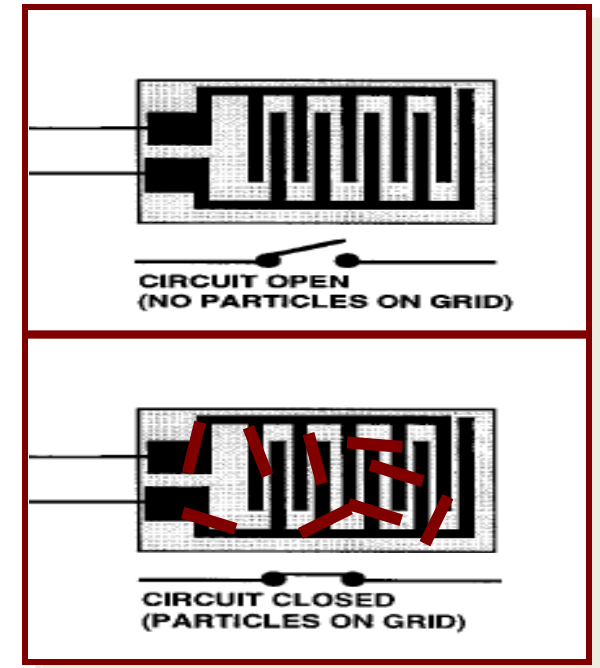
- Gas compression/pipeline/gas plants
- Power plants/utilities
- Marine Industry
- Food Industry
- Refrigeration
- Mining Industry
- Oil and Gas platforms
- Wind farms



How does it work?

7

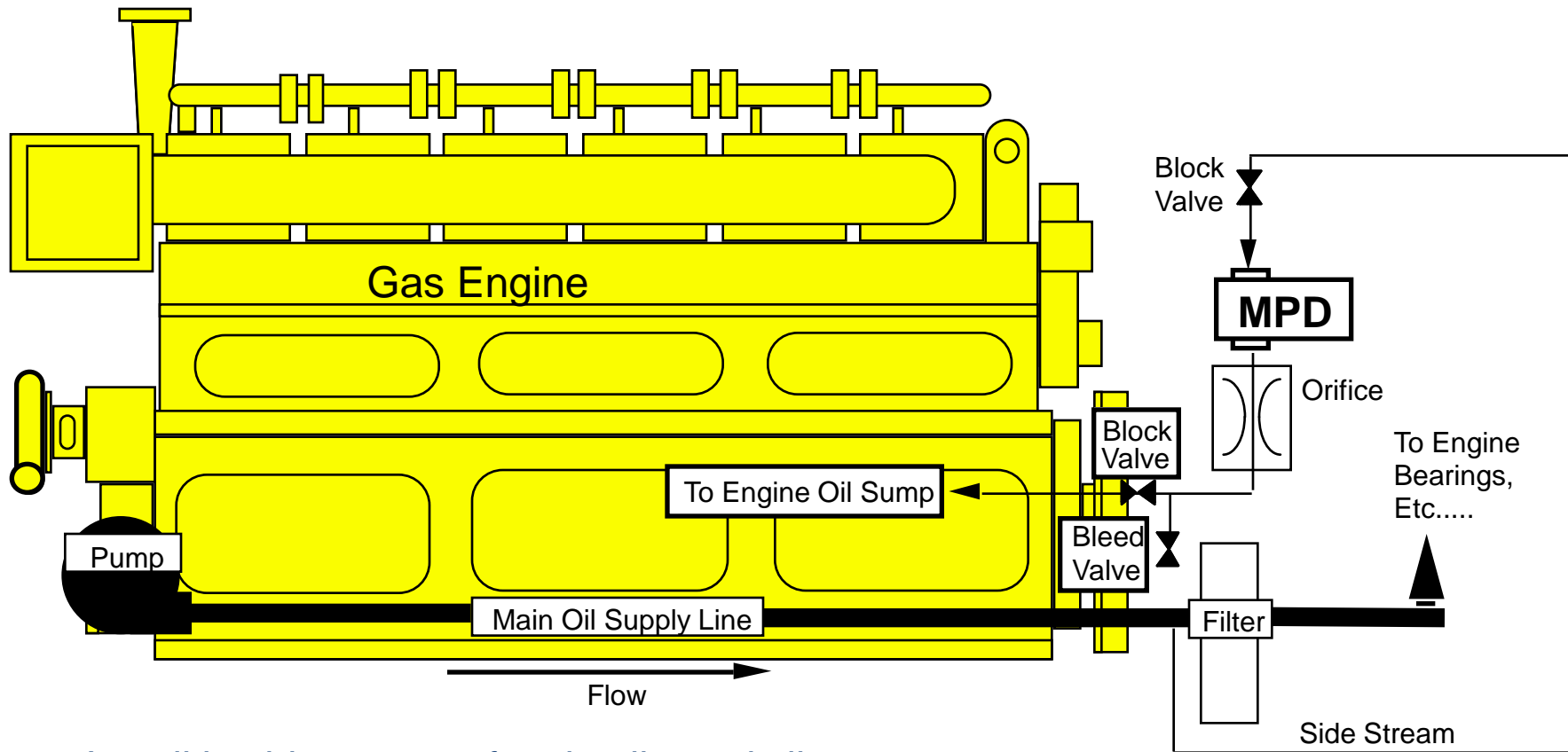
- Oil enters at the top of the MPD's body
- Oil then travels through a perforated board containing a plated electrical grid across the board
- Metal particles bridges the gap on MPD's electrical grid
- The normally open electric circuit is completed and alarm sounds



- Oil flow is controlled by orifice (supplied by customer), allowing for a holding flow over the plates, but not starving the lubricated equipment
- Recommended redundant sensors for alarm integrity

Easy to Install

8



- Install in side stream of main oil supply line
- After pump, before filter, in bottom of oil line
- Install above crank case, if possible
- Install block valves before and after the MPD- use a bleed valve with the outlet block valve
- Use an adequate size orifice on the outlet of the MPD to prevent starving the equipment of oil
- Oil exits MPD into sump

- Q: What size particles will the MPD detect?
- A: Any accumulation of metal shavings, flakes or chips which can bridge the gap between the MPD's grid.

- Q: Are grids available with different size spaces between the grid?
- A: AMOT will customize special grid boards with smaller or larger spaces than the 1/6" standard space
 - AMOT's experience indicates 1/16" spacing is optimum for 95%+ applications
 - Set up charges for custom grid board

- Q: What types of metals will the MPD detect? Does the metal have to be magnetic (ferrous)?
- A: The MPD will detect all metal particles which are conductive; the particles do not have to be magnetic.
 - Steel
 - Aluminum
 - Babbit
 - Stainless Steel
 - Bronze
 - Tin
- Q: Does the MPD detect water in oil?
- A: MPD does not detect water in oil. However, AMOT can provide water in oil detection monitor.

- Q: What is the flow rating for the MPD?
- A: Cv (flow coefficient) for the MPD is 4.34. Generally speaking, the MPD's outlet flow should be controlled to limit the oil flow to 10% of the oil pumps capacity.
 - For reference, the maximum flow thru MPD at 60 psi is 27 GPM of 180 SSU oil, specific gravity .90, with no restriction on its outlet port.

Specifications

12

Body & end caps	316 Stainless Steel	
Seals	Viton (Buna N optional)	
Electrical connections	Plated tin	
Oil port connections	½" NPT, ½" SAE, ½" BSP (PL)	
Electrical connections	¾" NPT	
Grid electrical ratings	3.5 va. 24V (AC or DC)	
Temperature rating (Viton)	-23 to 177°C (Viton)	-10 to 350°F (Viton)
	-48 to 121°C (Buna N)	-54 to 250°F (Buna N)
Max. flow rate	6.1 m ³ /hour	27 GPM
Max. working pressure	13.8 bar	200 psi
Recommended wire gauge	1.5 mm ²	16 gauge
Lead wire gauge	1.5 mm ²	16 gauge
Flow coefficient	$K_v = 3.78$	$C_v = 4.39$
Grid specification	Hole size	0.8 mm (1/32")
	Grid space distance	1.6 mm (1/16")
Approvals	UL Class, Division 1	Groups A, B, C, D