icountACM20 Lab Unit

Aviation Fuel Contamination Monitoring

Note: For information on icountPD for aviation fuels see page 436

A unique product with pedigree

DEFSTAN 91-91 Issue 6 Jet A-1Fuel Specification, adopts particle counting.

Development work carried out by the CMC engineers, in conjunction with Exxon Mobil Aviation, highlighted the need for an alternative test method to determine the levels of dispersed contamination in Jet fuel. 5 years of field testing and development of the already established and successful icountLCM20 Hydraulic Laser Particle Counter saw the introduction of the Parker icountACM20 with enhanced software providing the user with a better understanding of the contamination present in a sample.
As the benchmark particle counter for use in measuring the levels of contamination in fuels, the icountACM20, as per the UK's Energy Institute Test Method IP564, has now been included in the DEFSTAN 91-91 Issue 6 Jet Fuel Specification as a report only test alongside the current Gravimetric test method (IP423 or ASTM D5452) and Clear & Bright Visual test method (IP216 or ASTM D2276)

Contact Information:

Parker Hannifin
Hydraulic Filter Division Europe

European Product Information Centre
Freephone: 00800 27 27 5374
(from AT, BE, CH, CZ, DE, EE, ES, FI, FR, IE, IT, PT, SE, SK, UK)
filtrationinfo@parker.com

www.parker.com/hfde

Product Features:

- icountACM20 monitors aviation fuel contamination to DEFSTAN 91-91 Issue 6 Jet A-1 fuel specification.
- Energy Institute Test Method IP 564.
- 2-minute test procedure.
- Fully manufactured by Parker with 20 years experience in the Particle Counter Measuring market.
- Laser optical scanning analysis.
- Multi-standard ISO cleanliness reporting.
- On-board, rear-mounted pump enables monitoring possibilities.
  For example: Fuel storage/ vehicle tanks and fuel storage drums.
- Latest averaging software as standard.
- Downloader software.

icountACM20 Lab Unit

Aviation Fuel Contamination Monitoring

Features & Benefits

Test Time:
2 minutes

Repeat Test Time:
Every 2 minutes (Manual testing), every 6 minutes (automatic)

Principle of Operation:
Optical scanning analysis and measurement of actual particles and inference to water presence

Primary Output:
≥4µ(c), ≥6µ(c), ≥14µ(c), ≥21µ(c), ≥25µ(c), ≥30µ(c) counts per ml

Secondary Diagnostic Output:
% Volume Distribution, via graphical display on handset and printout

International codes:
ISO 7-22 in accordance with ISO 4406-1999

Data entry:
32 character two line dot matrix LCD. Full alpha numeric entry facility on keypad

Data retrieval:
Memory access gives test search facility for up to 300 saved tests

Calibration:
In accordance with Parker Calibration Procedure CM20-N, which complies to ISO11171:1999, Clause 6 (Omitting Annex F)

Re-calibration:
Every 12 months by a dedicated Parker Service Centre (Consult Parker) as required under strict EI methods

Max. working pressure:
420 bar

Operating Temperature:
+5°C to +80°C

Memory store:
300 test capacity

Computer compatibility:
Interface via RS 232 connection @ 9600 baud rate (USB serial cable to RS232 option available)

Laboratory sampling:
Utilizes on-board rear mounted pump

Portability:
Only 8 kg. icount ACM20 has its own battery pack and carry case with wheels 13kg total weight

Power requirement:
12vDC input, 6 x 'D' Cell batteries or rechargeable battery pack

Printer facility:
Integral 16 column printer for hard copy data

Certification:
Complies with all relevant EC declarations of conformity

icount ACM20 Case Mounted Pump

- Integrated Pump assembly incorporated onto the ACM20 unit.
- Powered directly from ACM20 unit, LED power indication with no additional power supplies required.
- Direct sampling from fuel sample bottles or tank via 3 metre inlet suction tube.
- Incoporated double speed flush and test sequence.
- Managed flow rate/correct volume sample as per IP 564 test method.

FACT: icountACM20 is fully compliant with the EI (Energy Institute) test method

Applications

The Parker icountACM20 Portable Particle Counter has been developed from existing technology for monitoring contamination in AvTur and other hydrocarbon fuels, in accordance with the Energy Institute (EI) Method IP 564.

In addition, the ACM can also be used to monitor various fuels from existing sampling points in locations from refineries, pipelines, distribution terminals, airport fuel supply systems all the way through to the point of uplift into aircraft*.

* Hot works permit required for online sampling (ATEX Zone 2 unit available). Page 478.

- **Fuel Testing Laboratories – DEFSTAN 91-91 Issue 6**
  In order to better understand dispersed contamination in jet fuel, particle counting is now included alongside existing laboratory techniques

- **Bottle Sampling - Energy Institute (EI) - IP 564**
  Laboratory determination of the level of dispersed contamination in aviation kerosine using an Automatic Particle Counter (APC)

- **Replace Clear & Bright and Gravimetric**
  With the introduction of the icount ACM20, all subjectivity surrounding Clear & Bright and Gravimetric methods can be removed

- **Also for use on petroleum based hydraulic applications (Skydrol compatible available)**
  Suitable for use with mineral oil and petroleum based fluid as per standard hydraulic particle counter, reporting fluid cleanliness to ISO 4406:1999

Parker Hannifin
Hydraulic Filter Division Europe
FDHB500UK/icountACM20

Specification

Construction:
ABS structural foam and injection moulded case
Hand-held display - ABS
Keypad flurosilicone rubber

Mechanical Components:
Brass, plated steel, stainless steel and aluminium

Seals:
Fluorocarbon

Hoses:
Nylon (Kevlar braided microbore). St. steel armoured ends

Flow Rate:
25 - 28ml/min (dictated by CMP) 100ml/min with additional flush button

Fluid Compatability:
Hydrocarbon Fuel, Mineral Oil. For other fluids consult Parker

Fuse:
1.25 amp fast blow fuse included for overload protection (spare supplied)

icountACM20 Technology:
Flow cell, light obscuration

Repeatability/Accuracy:
As per or better than ISO 11171

Coincidence:
40,000 particles per ml

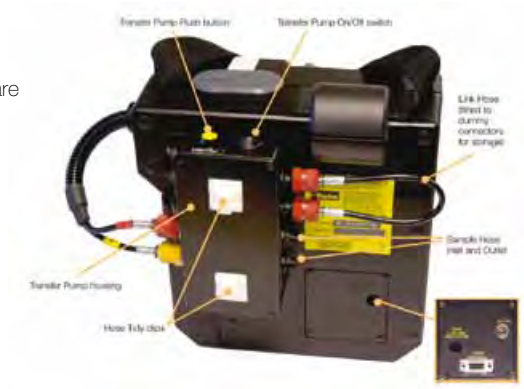
Viscosity Range:
1 -100 centistokes

icountACM20 Weight:
8 kg

Monitor Carrying Case:
Astra Board case

Carrying Case Weight:
5 kg

icountACM20 - rear view



Input Power Socket (note that you will have to remove the plastic dust cap to access the 12Vdc power socket).
A fast blow 1.25A fuse and the RS232 connection are located behind the removable cover plate. The RS232 interface is provided to download all test data stored in the instrument. See the **ParSmart Downloader** software for more information.

Ordering Information

Standard products table - icount ACM20

Product number	Supersedes	Description
ACM202022UK	N/A	icountACM20 (UK)
ACM202022US	N/A	icountACM20 (US)
ACM202022EUR	N/A	icountACM20 (EURO)
ACM202024UK	N/A	icountACM20 with lab kit - UK (DEFSTAN 9191)
ACM202024US	N/A	icountACM20 with lab kit - US (DEFSTAN 9191)
ACM202024EUR	N/A	icountACM20 with lab kit - EURO (DEFSTAN 9191)
ACC6ND000	B84794	1 meter process cable
ACC6NE006	B84816	Parsmart downloader software
ACC6NE019	P843855	icountACM20 transit Case
ACC6NW003	B84746	Vapour/waste bottle assembly
ACC6NE029	B84745	Throttle kit
ACC6NE001	B84645	Millipore adaptor kit
ACC6NE013	B84609	Re-chargeable battery pack
ACC6NE008	B84817	UK power supply
ACC6NE010	B84830	US power supply
ACC6NE009	B84831	Euro power supply
ACC6NE020	B84832	UK Offline kit
ACC6NE021		Euro Offline kit
ACC6NE022		US Offline kit
SERMISC067	N/A	500ml verification fluid
ACC6NE015	B84702	Printer reel (x5)
ACC6NE014	P843702	Printer ribbon (x1)

Note 1: Part numbers featured with bold highlighted codes will ensure a 'standard' product selection.
Note 2: Alternate displayed part number selection will require you to contact Parker Filtration for availability.
Note 3: Selected spare parts - for a full list contact Parker.
* Hot works permit required for online sampling.

Field Monitoring - icountACM202022

For use in non-hazardous areas, the icountACM202022 is designed for online sampling of hydrocarbon fuels and hydraulic systems, utilising existing "quick connect" sampling points such as the Millpore Adaptor.

icountACM20 Lab Unit

Aviation Fuel Contamination Monitoring

DEFSTAN 91-91 Issue 6

Defence Standard 91-91 is the specification for aviation turbine fuel, which the United Kingdom Civil Aviation Authority (CAA) has agreed is under the technical authority of the Director of the Defence Fuels Group.

IP 564

Laboratory determination of the level of dispersed contamination in aviation kerosene using an Automatic Particle Counter (APC). This standard describes a method for determining the level of dispersed contamination in aviation kerosene fuels, specifically dirt particles and water droplets in the range from ≥4µ(c) to ≥30µ(c).
This method relates specifically to Aviation fuels but the equipment can be used on all fuels, petroleum and mineral based fluids.

Note:
The mandatory implementation date for IP 564 test method "Determination of the level of cleanliness of aviation turbine fuel - laboratory automatic particle counter" was July 1st 2009. It is the specification authorities intention to replace current test methods with particle counting at the earliest opportunity.

IP 564 Procedure

Step 1
The apparatus shall be set up in accordance with Parker's operating instructions.

Step 2
Test Portion Preparation:
Decant a minimum of 450ml of the field sample into a clean test portion container.

Step 3
Prior to starting a test, tumble the test portion end over end for 60 seconds to ensure any settled particles are redistributed.

Step 4
Turn on the Case Mounted Pump and flush for 60 seconds.
Do not press the fast flush button.
While flushing, enter the test identifier (see manual).

Step 5
Following the flush, start a test by turning the blue valve in the direction indicated
Perform a further 3 tests. (4 in total).

Parker Hannifin
Hydraulic Filter Division Europe
FDHB500UK/icountACM20

icountPD Z2

ATEX Approved Online Particle Detector

For use in explosive and hazardous areas

The icountPD Particle Detector from Parker represents the most up to date technology in solid particle contamination analysis. This compact, permanently mounted laser-based ATEX approved particle detector module is designed for use in Zone 2 areas and is housed in a robust Stainless Steel IP69K approved enclosure that provides a cost effective solution to fluid management and contamination control.

Contact Information:

Parker Hannifin
Hydraulic Filter Division Europe

European Product Information Centre
Freephone: 00800 27 27 5374
(from AT, BE, CH, CZ, DE, EE, ES, FI, FR, IE, IT, PT, SE, SK, UK)
filtrationinfo@parker.com

www.parker.com/hfde

Product Features:

- Independent monitoring of system contamination trends.
- Assembled in an approved and certified Stainless Steel enclosure to comply with ATEX Directive 94/9/EC.
- Can be used in explosive and hazardous areas.
- ATEX Zone 2.
- Certified to CE Ex II 3GD,Ex nA IIC T4 Gc,Ex tc IIIC Dc SIRA 09ATEX4340X and IECEx SIR 09.0137X (-30°C<Ta<+60°C).
- Moisture & %RH indicator (optional).
- Warning limit relay outputs for low, medium and high contamination levels.
- Continuous performance for prolonged analysis.
- Self diagnostic software.
- Full PC/PLC integration technology such as:- RS232 and 0-5Volt, 4-20mA, CAN(J1939) (Contact Parker for other options.
- Set up and Data logging support software included.

icountPD Z2

ATEX Approved Online Particle Detector

Features & Benefits

Diagnostic Self Check Start-up Time:
Customer selectable 5-900 seconds
Measurement Period:
5 to 180 seconds
Reporting interval through RS232:
0 to 3600 seconds
Limit Relay Output:
Changes occur +/- 1 ISO code at set limit (Hysteresis ON) or customer set (Hysteresis OFF)
Particle / % RH Output Signal:
Continuous
Principle of operation:
Laser diode optical detection of actual particulates.
Reporting Codes:
ISO 7 – 21, NAS 0 – 12, (AS 00 – 12 Contact Parker)
Icount will also report less than ISO 7, subject to the statistical uncertainty defined in ISO4406:1999, which is shown in the RS232, reporting results as appropriate e.g ">6"
Calibration:
By recognised on-line methods, confirmed by the relevant International Standard Organisation procedures.
Calibration Recommendation:
24 months
Performance:
+/- 1 ISO Code (Dependant on stability of flow)
Reproducibility / Repeatability:
Better than 1 ISO Code
Power Requirement:
Regulated 9 to 40Vdc
Maximum Current Draw:
150mA
Hydraulic Connection:
Size: 066
Connection: EO 24 cone end

Required Flow Range through the icountPD:
40 to 140 ml/min (Optimum Flow = 60ml/min)
Online Flow Range via System 20 Inline Sensors (Hydraulic systems only):
Size 0 = 6 to 25 l/min - (Optimum Flow = 15 l/min)
Size 1 = 24 to 100 l/min - (Optimum Flow = 70 l/min)
Size 2 = 170 to 380 l/min - (Optimum Flow = 250 l/min)
Required Differential Pressure across Inline Sensors:
0.4 bar (Minimum)
Viscosity Range:
1-500 cSt
Temperature:
Operating Environment -30°C to +60°C (-22°F to +140°F)
Storage -40°C to +80°C (-40°F to +176°F)
Operating Fluid +5°C to +80°C (+41°F to +176°F)
Working pressure:
2 to 420 bar (30-6000 PSI)
Moisture sensor calibration (Not offered with the fuel version):
±5% RH (over compensated temperature range of +10°C to +80°C) (+50°F to +176°F)
Operating humidity range:
5% RH to 100% RH
Moisture sensor stability:
±0.2% RH typical at 50% RH in one year
Certification:
IP69K rating
EMC/RFI – EN61000-6-3:2007
EN61000-6-2:2005
Materials:
Stainless Steel case construction.
Stainless Steel hydraulic block.
Dimensions:
260mm x 114mm x 110mm
Weight:
2.6kg
Seals:
Fluorocarbon seals.

Ordering Information

Product Configurator

Key	Fluid type		Calibration		Display		Limit relay		Communication		Moisture		Cable connector kit	
IPDZ	1	Mineral	2	MTD	1	None	2	Yes	2	RS232 / 4 - 20mA	1	No	30	M12, 8 pin plug connector
	3	Aviation Fuel (4 channel)							5	RS232 / CANBUS (J1939)	2	Yes		

Standard Products Table

Part Number	Fluid type	Calibration	Display	Limit relay	Communication	Moisture	Cable connector kit
IPDZ12122230	Mineral	MTD	None	YES	RS232 / 4 - 20mA	YES	M12, 8 pin plug connector
IPDZ32122130	Aviation Fuel (4 channel)	MTD	None	YES	RS232 / 4 - 20mA	NO	M12, 8 pin plug connector

Accessory Part Numbers

Description	Part Number
Single Point Sampler	SPS2021
External flow device	S840074
Power supply	ACC6NN013
2 x 10 metre M12, 8-pin plug and socket Ultrat cable kit	ACC6NN021
RS232 to USB converter	ACC6NN017

Note: For System 20 Sensor part numbers see page 428.

Parker Hannifin
Hydraulic Filter Division Europe
FDHB500UK/icountPD Z2

icountACM20 Z2

ATEX Approved Portable Particle Counter

For use in explosive and hazardous areas

icountACM20 Z2 is designed to be used to monitor various fuels from existing sampling points in hazardous locations such as refineries, pipelines, distribution terminals, airport fuel supply systems all the way through to the point of uplift into aircraft. With Zone 2 classification, the icount ACM20 Z2 is the worlds **only** ATEX approved particle counter.

Contact Information:

Parker Hannifin
Hydraulic Filter Division Europe

European Product Information Centre
Freephone: 00800 27 27 5374
(from AT, BE, CH, CZ, DE, EE, ES, FI, FR, IE, IT, PT, SE, SK, UK)
filtrationinfo@parker.com

www.parker.com/hfde

Product Features:

- Assembled in an approved and certified stainless steel enclosure to comply with ATEX Directive 94/9/EC.
- Can be used in explosive and hazardous areas, including offshore and mining applications.
- ATEX Zone II
- Certified to CE Ex II 3 G Ex nR/ nL IIC T6
- “A” Class product defined for the Aviation market.
- ATEX approved Handset and keypad.
- Suitable for use with mineral oil and petroleum based fluid as per ACM20/LCM20 particle counters.

icountACM20 Z2

ATEX Approved Portable Particle Counter

Features & Benefits

Test Time:
2 minutes.

Repeat Test Time:
Every 2 minutes (Manual testing) Every 6 minutes (Automatic).

Principle of Operation:
Optical scanning analysis and measurement of actual particles and inference to water presence.

Primary Output:
≥4µ(c), ≥6µ(c), ≥14µ(c), ≥21µ(c), ≥25µ(c), ≥30µ(c) counts per ml.

Secondary Diagnostic Output:
% Volume Distribution, via graphical display on handset.

International codes:
ISO 7-22 in accordance with ISO 4406-1999

Data entry:
32 character two line dot matrix LCD. Full alpha numeric entry facility on keypad.

Data retrieval:
Memory access gives test search facility for up to 300 saved tests.

Calibration:
In accordance with Parker Calibration Procedure CM20-N, which complies to ISO11171:1999, Clause 6 (Omitting Annex F).

Re-calibration:
Every 12 months by a dedicated Parker Service Centre (Consult Parker).

Max. working pressure:
420 bar.

Operating Temperature:
+5°C to +80°C

Memory store:
300 test (scrolling memory) capacity.

Computer compatibility:
Interface via RS 232 connection @ 9600 baud rate.

Portability:
15 kg. ACM20 has its own battery pack and carry case with wheels.

Power requirement:
Rechargeable battery powered or via the 12vDC input.

System connection:
Via Millipore adaptor with flow restriction through supplied needle valve.

Certification:
Complies with all relevant EC declarations of conformity.

Printer facility:
No printer. Data download only.

Online Commission Kit

a – icountACM20 Zone II Particle Counter
b – Battery Charger
c – Process Cable
d – User Manual
e – Downloader Software
f – Throttle Kit
g – Millipore Adaptor Assembly
h – Aluminium Case
i – Bottle Assembly

Specification

Construction:
Unit: Stainless Steel
Carrying case: ABS
Hand-held display: ABS
Keypad: polyester membrane

Mechanical components:
Brass, plated steel, stainless steel and aluminium

Seals: Fluorocarbon

Hoses: Nylon (Kevlar braided microbore)

Fluid compatibility:
All fuels. For other fluids consult Parker

Internal rechargeable battery:
Note: ONLY to be charged outside of the hazardous area, with the unit switched off

Fuse:
1.25A fast blow fuse included for overload protection
Return to Parker Hannifin if fuse is blown

icountACM20 2032 technology:
Unique optical scanning system

Using icountACM20 Z2

icountACM20 Z2 is designed to be used to monitor various fuels from existing sampling points in hazardous locations from refineries, pipelines, distribution terminals, airport fuel supply systems all the way through to the point of uplift into aircraft. With Zone II classification, the icountACM20 Z2 is the worlds **only** ATEX approved particle counter.

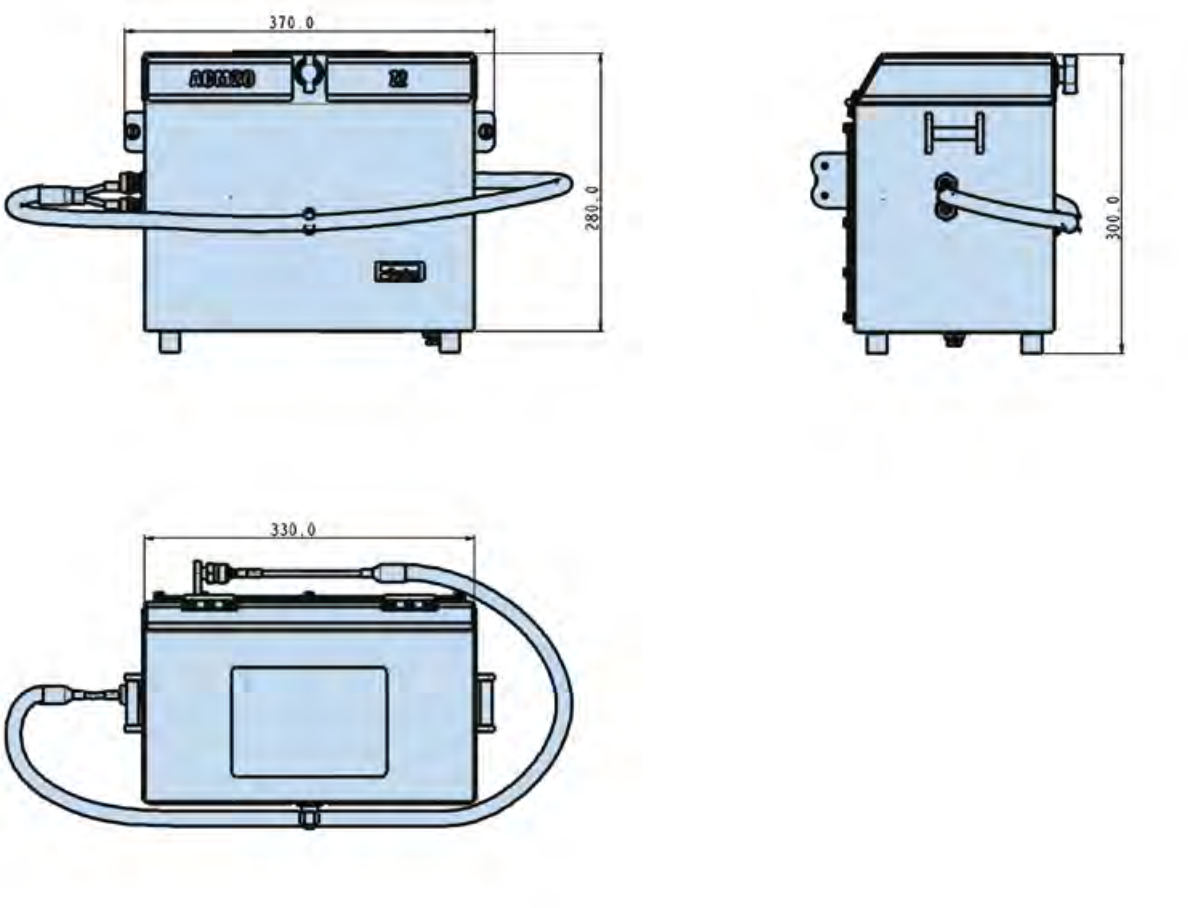
Applications in Fuels

- **Oil Refinery**
  - To count and verify the levels of dispersed contamination in accordance with specification limits. (Consult Parker CMC).
- **Distribution Terminals/Hubs**
  - For use on receipt and outbound supply. Also to provide filtration performance, tank cleanliness and product quality checks.
- **Storage**
  - Settling times can be reduced by monitoring with the ACM by ensuring that levels of dispersed contamination are below acceptable levels.
- **Airport Fuel Farm**
  - Monitoring of fuels into storage, through the fuel farm, hydrant system and during uplift into wing.
- **Pipeline Commissioning**
  - Fast real time monitoring of pipelines following pigging and cleaning processes.
- **Oil and Gas Platforms**
  - Used to monitor the filtration performance, system cleanliness and quality of delivered product.

icountACM20 Z2

ATEX Approved Portable Particle Counter

Installation Details



Ordering Information

Standard products table - icountACM20 Z2

Product number	Supersedes	Description
ACM202032UK	N/A	icountACM20 Z2 + online kit & UK battery charger
ACM202032US	N/A	icountACM20 Z2 + online kit & US battery charger
ACM202032EUR	N/A	icountACM20 Z2 + online kit & Euro battery charger
ACC6NE023	B84647	UK battery charger
ACC6NE025	B84652	US battery charger
ACC6NE024	B84653	Euro battery charger
ACC6NE027	B84650	2m process cable assembly
ACC6NE006	B84816	Parsmart downloader software
ACC6NE028	P843066	Carry case
ACC6NW003	B84746	Bottle assembly
ACC6NE029	B84745	Throttle kit
ACC6NE001	B84645	Millipore adaptor assy

Applications in hydraulics

OFFSHORE

Solutions in the offshore industry.
In addition, the icountACM20 Z2 can be used in many hydraulic system applications as detailed below.

In many industries, worker awareness needs to be maintained at a high level to ensure the safety of their operation. This is particularly relevant to offshore oil-drilling and gas-drilling crews, given the interactive and hazardous nature of their work. The Zone II ACM portable particle analyser is a tried and tested technology designed, proven and approved as a fluid contamination monitor that crews are using and trusting in such hazardous and demanding environments.

- Certified to CE Ex II 3 G Ex nR/nL IIC T6
- Can be used in explosive and hazardous areas, including Offshore and Mining.
- Primary Output. Six cumulative particle size channels ranging from ≥4µm(c) to ≥30µm(c) and numbers per ml in accordance with ISO4406-1999.

REFINERIES

icountACM20 Z2 – operational in oil refineries and fuel fields.
Already operational in oil refineries and designed to be used inside commercial airfield fuel locations and at the point of upload of fuel into the aircraft, icountACM20 Z2 has an impressive success record in this approval sensitive area of operation.

With a number of safety features designed in as operational standards, the icountACM20Z2 can be taken to the point of use, connected in moments and reporting in little more than 2 minutes to ISO approved standards.

- Assembled in an approved and certified stainless steel enclosure to comply with ATEX Directive 94/9/EC and EN50 021 requirements.
- 'A' Class product defined for the aviation market.
- Designed for on-line operation, connecting to the process line via existing Millipore™ fittings, already in use for other industry equipment.

QUARRYING

Applications in other hazardous environments.

- Railroad equipment manufacturer - Warranty protection.
- Power generation stations - Preventative maintenance.
- Mobile equipment - Roll-off cleanliness testing.
- Mining operations - Service tool.
- Steel mills - Preventative maintenance.

icountACM20 Z2

ATEX Approved Portable Particle Counter

Average Particle Counts in AV System

The table below gives estimated counts found in a typical aviation fuel distribution system, and is given as guidance, in which API/EI filtration equipment is installed.

Receipt into Microfilter
Expect 2,500 counts per ml
or cleaner @ 4µ(c)

MF

Receipt into FWS (After MF)
Expect 500 counts per ml
or cleaner @ 4µ(c)

FWS

Receipt into Storage (After FWS/MF)
Expect 100 counts per ml
or cleaner @ 4µ(c)

Airport storage

FWS out of storage
Expect 500 counts per ml
or cleaner @ 4µ(c)

FWS

After FWS into Hydrant
Expect 100 counts per ml
or cleaner @ 4µ(c)

To Hydrant/Refueller

After Monitor Into Aircraft
Expect 100 counts per ml
or cleaner @ 4µ(c)

Note: Figures will vary from location to location.
Key: MF=Microfilter (API/EI 1590)
FWS=Filter Water Separator (API/EI 1581)

Receipt into Microfilter		ISO Code - 4406 1999
	High Count	High Count Code
≥4µ(c)	2,500	18
≥6µ(c)	350	15
≥14µ(c)	10	10

Receipt into FWS (After MF)		ISO Code - 4406 1999
	High Count	High Count Code
≥4µ(c)	500	16
≥6µ(c)	50	13
≥14µ(c)	5	9

Receipt into Storage (After FWS/MF)		ISO Code - 4406 1999
	High Count	High Count Code
≥4µ(c)	100	14
≥6µ(c)	10	10
≥14µ(c)	1	7

FWS Out of Storage		ISO Code - 4406 1999
	High Count	High Count Code
≥4µ(c)	500	16
≥6µ(c)	50	13
≥14µ(c)	5	9

After FWS Into Hydrant		ISO Code - 4406 1999
	High Count	High Count Code
≥4µ(c)	100	14
≥6µ(c)	10	10
≥14µ(c)	1	7

After Monitor Into Plane		ISO Code - 4406 1999
	High Count	High Count Code
≥4µ(c)	100	14
≥6µ(c)	10	10
≥14µ(c)	1	7