

# PRODUCT INFORMATION PACK

*An upgraded portable and self contained sampler for jet fuel field tests*

## SSAFCON

### SAMPLER



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SAMPLER

## **PRODUCT INFORMATION PACK**

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# **SSAFCON** SAMPLER

## **1. Product Description**

The 16160-2 SSAFCOON Sampler is a portable instrument developed in collaboration with a major oil company for the determination of particulate contaminant and colour ratings of aviation turbine fuel by line sampling.

... line sampling of aviation fuels

### **Methods:**

ASTM D2276 - IP 216; FTMS 791b 3008

### **Scope:**

These methods describe two procedures. The basic method is to evaluate the level of contamination gravimetrically. The second method utilises a colour rating technique for rapid qualitative assessment of changes in contamination level without the time delay required for gravimetric determinations.

... contamination levels by weight or colour

### **Gravimetric method:**

A known volume of fuel, typically 5 litres, is filtered through a preweighed membrane filter in a field monitor and the increase in filter mass determined after washing and drying. The change in mass of a control membrane filter located immediately below the test membrane filter is also determined. The particulate contaminant is determined from the increase in mass of the test membrane filter relative to the control membrane filter.

... change in mass of filter determines particulate contaminant

### **Colour Ratings:**

A similar procedure is followed, except the colour of a single filter membrane is compared with an ASTM colour standard and assigned a rating letter or number.

... comparison with an ASTM colour standard to indicate possible contamination

2) **Application:**

Modern aircraft fuel systems demand a fuel free from water, dirt, and foreign contaminants. To deliver contaminant free fuel a number of multistage filtration systems are employed at terminals, airports and as part of fuel service vehicles. Jet fuel is widely distributed from refineries to airports through pipelines that also handle other products. As a consequence, contamination of the fuel by water, solids or additive traces is inevitable and must be removed by ground filtration systems. It is therefore essential to routinely monitor filter performance.

Tests for contaminants occur at many points in the distribution system. ASTM D2276 provides a field quality control of dirt content. It can also be supplemented by a visual assessment of membrane appearance after comparison against ASTM colour standards. However, no direct relationship exists between the weight of particulate content and membrane colour. The colour rating is primarily used to provide a rapid and simple means of detecting change in the fuel, or changes in the mechanical condition of the fuelling system upstream of the sampling point. Changes in membrane colour over a period of time in a fuel handling system may be indicative of changes in fuel contaminant level, contaminant type, or the systems mechanical condition.

SSAFCON is principally used at airports by,

- Airlines**
- Major Oil Companies**
- Airport Re-Fuelling Companies**

These units are primarily installed on Static Test Sites of Fuelling Vehicles downstream of an Airport Storage Filtration System.

A key point is that in line filters are expensive to replace. Routinely checking filter performance can extend their useful life.

... Filtration systems are used to remove contamination from jet fuel

... Checks performance of in-line filter systems

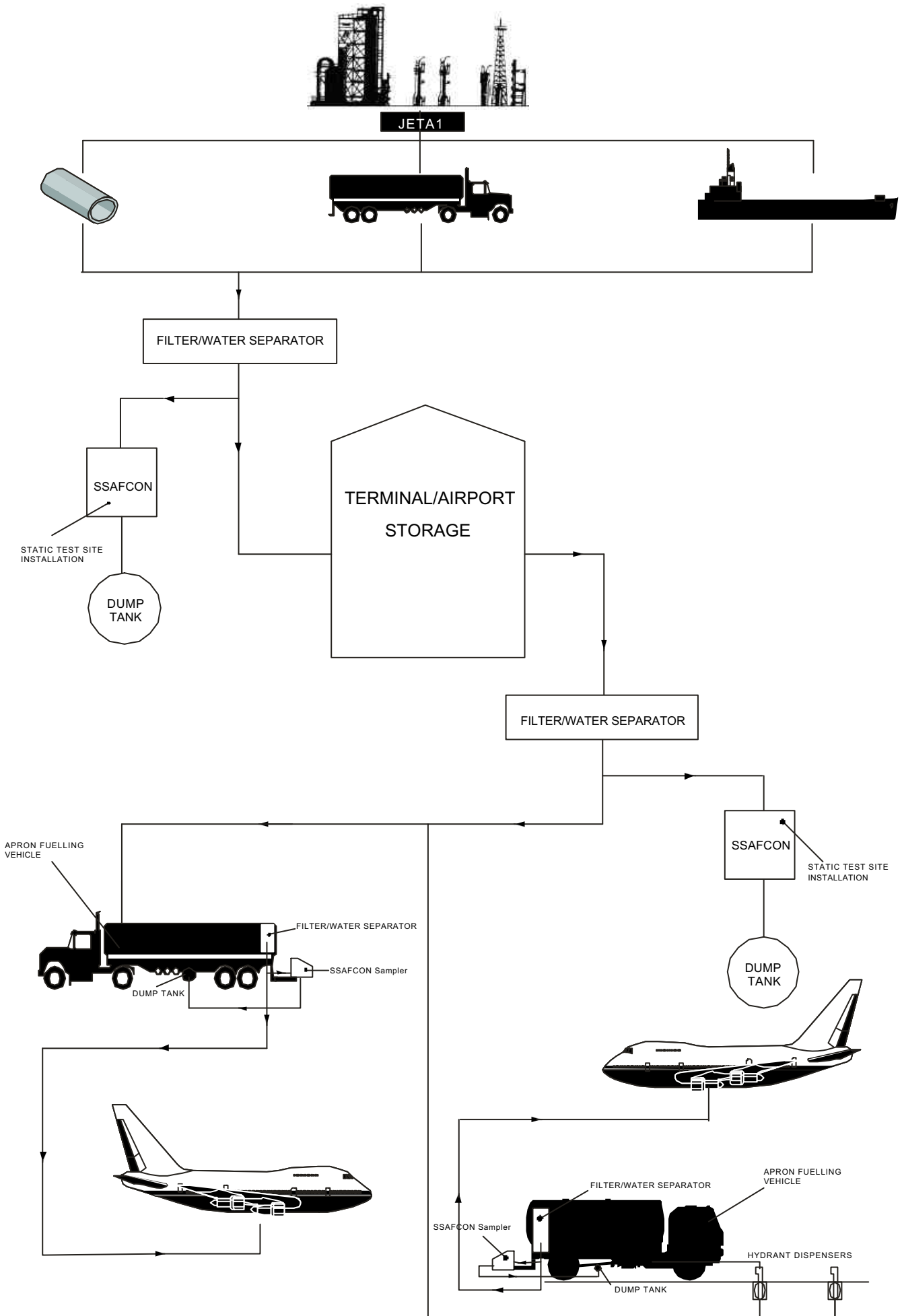
... Cost saving – can extend the useful life of filters

... Two tests: Gravimetric and qualitative (colour)

... Airports, terminals and storage facilities

... Tests carried out on the output of fixed filters

# FUEL DISTRIBUTION - REFINERY TO AIRPORT



### 3) Installation

A permanently installed sampling point - the mounting tray - is usually plumbed "in line downstream of the filtration system using 1/4" o/d pipes. These pipes are connected to compression fittings on the rear of the 16165-2 Mounting Tray. The "Fuel Out" side is normally connected to a dump tank.

To take a sample the 16160-2 SSAFCOON Sampler is plugged into the mounting tray by squeezing the two handles on the front of the unit. Self sealing female "Hansen" connectors engage with their counterparts on the mounting tray to provide a leak-free flow of sample. The Sampler is quickly and easily removed after the test by disengaging the connectors.

Trays and Samplers are not usually sold on a one to one basis. It would be normal for an installation to incorporate a number of trays and utilize one or two SSAFCOON Samplers.



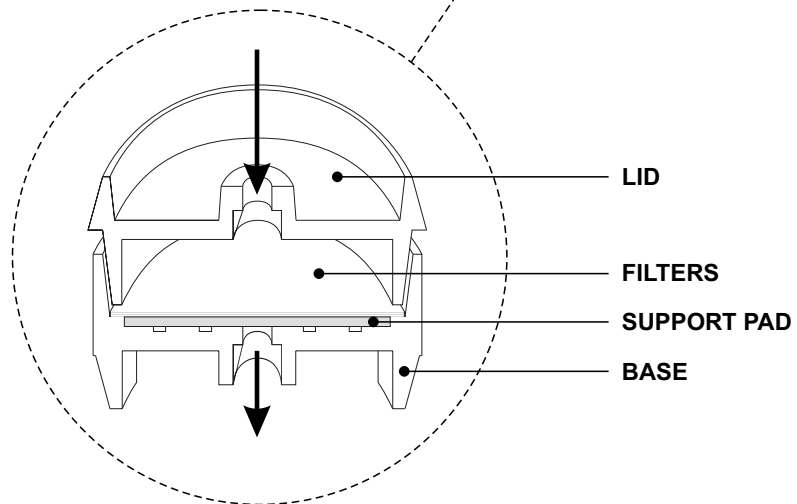
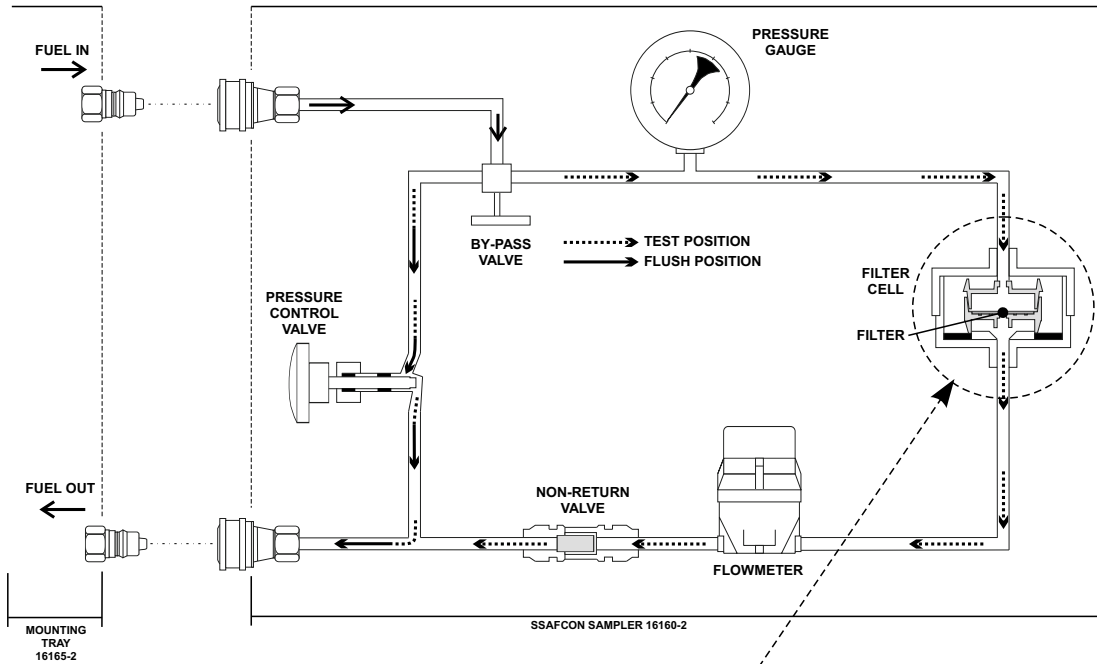
Static Test Site Installation



Permanently installed mounting tray and removeable Sampler

#### 4) Operation

The following diagram illustrates the basic flow schematic of the SSAFCON Sampler:



SSAFCON Filter and Support Pad assembly

***A test would comprise the following procedure:***

- Prepare filter assembly (the filter cell is not suitable for castellated monitors)
- Place monitor in the filter cell, on top of the unit
- Turn Bypass Valve to “Flush” and fully open Control Valve to remove previous sample
- Connect Sampler to Mounting Tray and attach earth bonding clip
- Turn Bypass Valve to “Test ” and gradually close Control Valve

As the Pressure Control Valve is slowly closed a flow is established in the test loop via the Pressure Gauge, Filter Cell, Flowmeter and Non-return Valve. Closing the pressure Control Valve increases the pressure as indicated by the pressure Gauge and also increases the flow rate through the filter cell.

The pressure indicated should be sufficient to give a flow of between 1 and 2 litres/minute through the filter cell. The pressure required to produce this flow rate should be established for any monitor/filter combination, utilising the sampler’s own flowmeter. Once established, the pressure requirement will remain the same for that monitor/filter combination.

- When flowmeter indicates 5 litres, turn Bypass Valve to “Flush”
- Remove monitor case and proceed with gravimetric or colorimetric analysis.
- Remove Sampler from Mounting Tray

***Note: It is possible to flush the filter cell and pressure gauge pipework by fitting an empty monitor case.***

**5) Calibration**

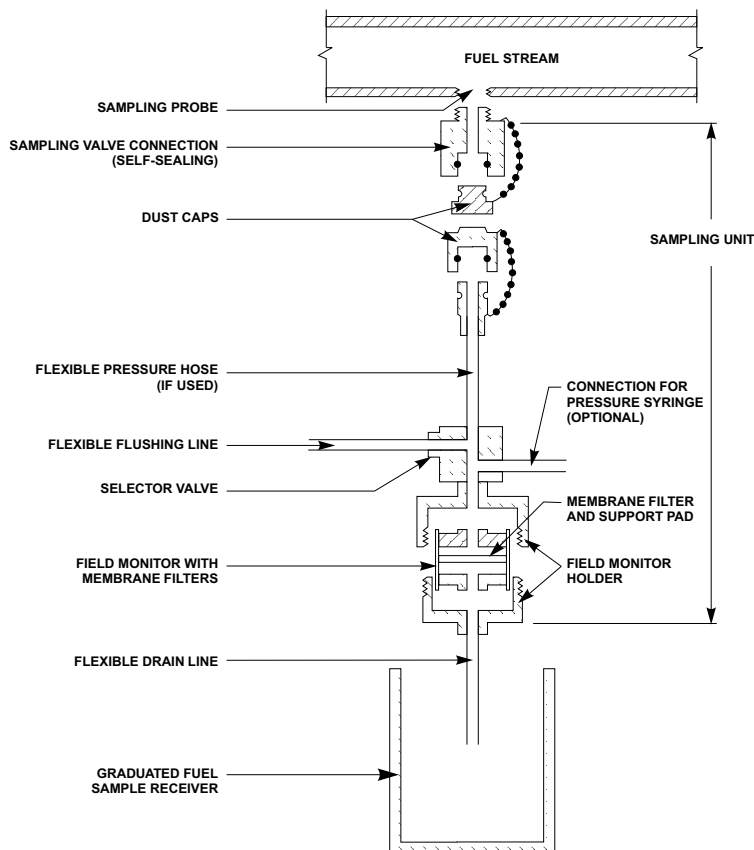
The Pressure Gauge, Flowmeter and other components are of robust construction and should not require repair or recalibration unless subject to abuse. However these devices can be calibrated in situ if necessary.



## 6) Traditional Sampling

The following figure is an example of field sampling apparatus currently in use by many international and regional airports world-wide, and generally referred to as “Hose End” sampling.

SSAFCON was designed as a self contained, cleaner and SAFER alternative.



### Conventional Hose End Sampling requires:

- 1) Piping and associated valves
- 2) Pressure gauge
- 3) Flowmeter or graduated bucket
- 4) Something to collect the used sample
- 5) A platform to put the “bag of bits” on
- 6) Cloth/wipes to mop up spillage
- 7) Tools for assembly
- 8) Carrying case
- 9) 3 hands!
- 10) Earth bonding
- 11) Time

In most industries more and more emphasis is placed on health & safety - aviation and fuel handling are no exception, and lead the way in many respects. Airlines, Oil Companies, and Re-fuelling organisations continue to look for new ways of reducing operator contact with fuel, and any procedures which can be implemented to this effect are generally preferred. Spilt fuel, trailing tubes, open buckets, and leaks from the monitor case are all potential hazards associated with traditional sampling kits.

The concept of the SSAFCON Sampler is to minimise exposure to fuel in the airport service area, thus IMPROVING SAFETY and REDUCING THE HEALTH RISK.

## 7) Main Features

- Developed for the determination of Particulate Contaminant of Aviation Turbine fuels, using either a gravimetric or colorimetric procedure.
- Suitable for static test sites, hydrant dispensers, and airport fuelling vehicles.
- Portable. Designed to plug into permanently installed sampling point - the mounting tray. A typical installation at a major airport might comprise 30 or more mounting trays at various points in the distribution system, and 5 or more SSAFCON Samplers.
- Completely self contained. No trailing tubes samples buckets, and spilt fuel. All connections are drip free.
- Utilises dry-break self sealing Hansen couplings to provide a leak-free flow of sample through the sampler.
- A safer alternative to “hose end” sampling. Eliminates operator exposure to jet fuel and the associated hazards.
- Integral volume meter and pressure control. Volume meter and pressure gauge are slanted towards the operator for easy observation.
- Reverse flow protection prevents sample from flowing back into the supply line.
- Robust design, with stainless steel case, ideally suited for harsh operating environments.
- Carrying handles.
- Well proven, and adopted at most major airports throughout Europe.
- Supplied with an earth bonding clip to avoid static discharges.
- Integral flushing system

## 8) Technical Specification

### 16160-2 SSAFCON Sampler:

Measuring principle	Millipore Method
Size (hwxwd):	100 x 200 x 400mm
Weight:	6kg
Couplings:	Hansen, female, 2 off
Pressure Gauge:	7 bar Bourdon tube
Flowmeter:	L/min
Calibration:	Not applicable



### Accessories

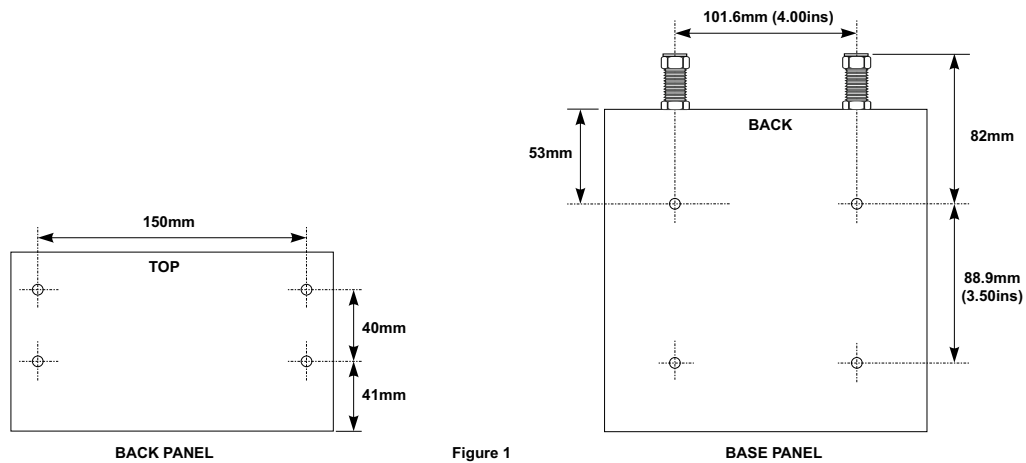
#### 16165-2 Mounting Tray:

Couplings	Hansen, male, 2 off Compression fittings for 1/4" o/d piping, 2 off
Required piping from fuel line	1/4" o/d



The Mounting Tray is installed using suitable fixings in any of its eight available 6.35mm (1/4ins) dia. holes. Refer to Figure 1 below, for hole positions. Countersunk fixings must be used for the base plate holes.

A 210mm clearance should be allowed in front of the unit, and 300mm clearance above the tray base, for the addition of the SSAFCON Sampler.



16170-0 Monitor Case, pack of 48	Millipore Ref. M000.037 PO
16180-0 Filter (37mm dia, 0.8µm), and support pad, (disposable), pk of 100	Millipore Ref. AAWG 037 00
or	
16190-0 Matched Filter and Support Pad	Millipore Ref. AAWP 037 PM



**Note: The use of matched filters removes the requirement to weigh the filters before the test**

## Spares

The following spares are also available:

<b>Seta No.</b>	<b>Description</b>
16160-002	Flowmeter
16160-203	Pressure Gauge
16160-204	By-Pass Control Valve
16160-005	Pressure Control Valve
16160-207	High Pressure Hose
16160-208	Seal Replacement Kit
16160-009	Quick-Connect Female
16160-210	Washer, pack of 10

**Suggested spares for up to 2 years based on 200 tests per annum:**

<b>Seta No.</b>	<b>Description</b>	<b>Quantity</b>
16160-208	Seal replacement kit	2
16170-0	Monitor case (reuseable) pack of 48	5
16180-0	Filter and support, pack of 100	8
16190-0	Matched filter and support, pack of 50	16
16165-206	Dust cap set, for 16165-2 Mounting Tray	1

**Items not supplied by Stanhope-Seta but required by the test method:**

ASTM Colour Standard

Hoses

Solvents

9)

**Current End Users include:**

BP  
KLM  
Qatar Jet Fuel Company  
Shell  
Aircraft Fuel Supply  
Combined Refuelling Services  
Groupement Petrolier Aviation  
Kuwait Aviation Fuelling Company  
Ministry of Defence  
Heathrow Hydrant Operating Co.  
CLH S.A.  
Naftec  
FSH  
Pakistan State Oil Company  
Mobil  
Airport Refuelling Service  
Service Aviation  
YPF

**Major airports include:**

London Heathrow  
Gatwick  
Paris Charles de Gaulle  
Paris Le Bourget  
Frankfurt  
Kuwait City  
Luton  
Schipol  
Madrid  
Hong Kong - Chep Lap Koh  
Geneva  
Casablanca  
Sydney  
Singapore

# SSAFCON™ SAMPLER

## *Determination of Particulate Contaminant and Colour Ratings of Aviation Turbine Fuels*

**Determination of Particulate Contaminant of Aviation Turbine Fuels**

**ASTM D2276 - IP216; FTMS 791b 3008**

**Filter Membrane Colour Ratings of Aviation Turbine Fuels**

**Formerly ASTM D3830**



- Suitable for static test sites, hydrant dispensers, and airport fuelling vehicles
- Portable and completely self contained
- Safer alternative to “hose end” sampling
- Integral volume meter and pressure control
- Measures solids contamination by the Millipore Method
- Reverse flow protection

## Applications

With the rapid expansion of the aviation industry almost every country on the globe is becoming part of the international aviation community. This poses a number of problems and the IATA Aviation Fuel Subcommittee is increasingly focusing attention on fuel distribution and handling issues.

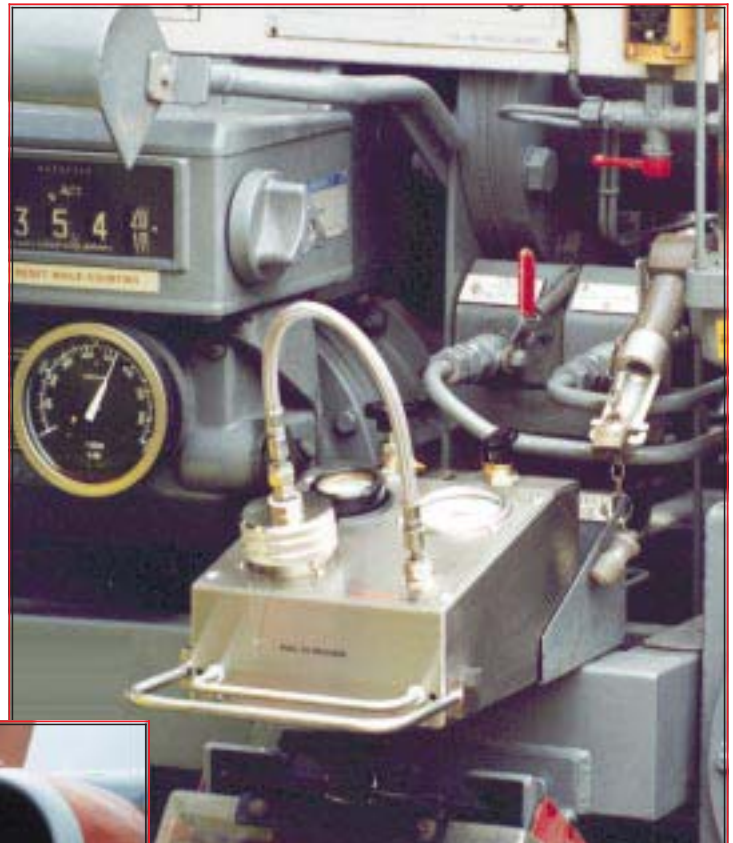
As Jet A1 fuel is widely distributed from refineries to airports by pipeline, contamination by water, solids, and additive traces is inevitable. Modern aircraft fuel systems demand a fuel free from water, dirt, and foreign contaminants. To achieve this, multi-stage filtration systems are employed at terminals, airports, and fuelling vehicles, and it is essential to periodically check filtration performance.



Field tests such as ASTM D2276 or D3830 (obs) are regularly performed at various stages in the distribution system. Traditionally a sample is taken via a trailing tube and drained through a monitor case containing a filter. The filter is then analysed for contaminant either by weight or colour change. This type of "hose end" sampling exposes the operator to the hazards of contact with jet fuel particularly during a fuelling operation. Typically an operator located on a platform during the pressurised re-fuelling of an Airbus or Boeing 747 will be exposed to possible leaks from the monitor case, which is often at eye level, or fuel spraying on to a hot part of the aeroplane. The SSAFCON Sampler was designed to avoid exposing fuel in the airport service area thus improving safety and reducing the health risk.

The SSAFCON Sampler was developed in collaboration with a major oil company to provide a portable, self contained unit which can easily be plugged into static test sites, fuelling vehicles, or hydrant dispensers on the airport apron, without trailing tubes and spilt fuel, all connections being drip free. The unit has been widely adopted at major airports throughout Europe, and our new upgraded version has refined and enhanced the same basic concept while retaining simplicity of use.

It is plugged into a permanently installed sampling point - the mounting tray - which, in the case of fuelling vehicles, is connected into the vehicle pipework downstream of the filter via 1/4" BSP connectors. The outflow from the mounting tray can either be connected directly to the vehicle dump tank, or returned to the vehicle pipework. The new stainless steel mounting tray has been improved to allow easier connection to the Sampler. However the Sampler and tray are interchangeable with existing installations.



▲ SSAFCON Sampler installed on a fuelling vehicle



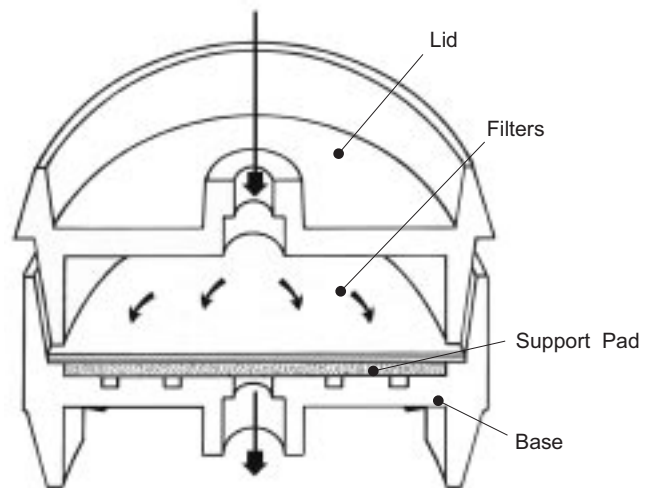
▲ A typical under wing re-fuelling operation

To make a determination, a monitor case with two filters and a support pad are placed in the filter cell on top of the unit and the sampler pushed into the mounting tray whilst squeezing together the two handles on the front. The self-sealing female connectors on the sampler engage with their counterparts on the mounting tray to provide a leak-free flow of sample.

Operation of the bypass valve in conjunction with the pressure control valve causes fuel to flow through the filter cell. At the end of the test, after the requisite quantity has passed, (the sampler has its own in-built volume meter), the monitor is removed for colorimetric or gravimetric analysis.

Dust caps for both male and female connectors are supplied for the prevention of dirt ingress when the sampler is disengaged from the mounting tray.

NOTE: *Only one filter is required for colorimetric analysis*



SSAFCON Filter and Support Pad assembly

Airport Storage and Filtration System ➤



Permanently installed mounting tray and removeable Sampler ➤

◀ Static Test Site Installation





**16160-2 SSAFCON SAMPLER**

Size (hxwxd): 100 x 200 x 400mm  
 Weight: 6kg

**ACCESSORIES**

- 16170-0 MONITOR CASE** (reuseable), pack of 48
- 16180-0 FILTER (37mm dia, 0.8µm) AND SUPPORT PAD** (disposable), pack of 100
- 16190-0 MONITOR REFILL**, alternative to 16180-0 avoids need to initially weigh the filter, pack of 50
- 16165-2 MOUNTING TRAY**
- 99200-0 DRYING OVEN**

**Suggested spares for 2 years/ 400 tests**

16160-208	Seal replacement kit	2
16170-0	Monitor case (reuseable), pack of 48	5
16180-0	Filter and support, pack of 100	8
16190-0	Monitor refill, pack of 50	16
16165-206	Dust cap set, for 16165-2 Mounting Tray	1

**Additional items required for particular test methods**

ASTM Colour Standards      Hoses      Solvents

Balance

**ORDERING INFORMATION**  
 Please quote SETA No. and TITLE

In addition to the SSAFCON Sampler, Stanhope-Seta is able to supply a range of test equipment for the quality control of aviation fuel including:



Setaflash Series 7 Flash Point Tester



Setapoint Detector



Universal Sampler



P556/230409

STANHOPE-SETA produces over 200 major instruments, 500 minor products and accessories, and meets the requirements of more than 500 national and international test methods.



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