

MOBILE FILTRATION UNITS

GRF SERIES



PASSION TO PERFORM



	Page
① GRF 015	8
② GRF 1	14
③ GRF 3	17
④ GRF 5	20
⑤ GRF 6	23
⑥ ACCESSORIES	25

Disclaimer

The details in this manual are for informational purpose only.
MP Filtri assumes no responsibility for use of the information provided.

① HYDRAULIC FLUIDS

The fluid is the vector that transmits power, energy within an oleodynamic circuit. In addition to transmitting energy through the circuit, it also performs additional functions such as lubrication, protection and cooling of the surfaces.

The classification of fluids used in hydraulic systems is coded in many regulatory references, different Standards.

The most popular classification criterion divides them into the following families:

- MINERAL OILS
Commonly used oil deriving fluids.
- FIRE RESISTANT FLUIDS
Fluids with intrinsic characteristics of incombustibility or high flash point.
- SYNTHETIC FLUIDS
Modified chemical products to obtain specific optimized features.
- ECOLOGICAL FLUIDS
Synthetic or vegetable origin fluids with high biodegradability characteristics.

The choice of fluid for an hydraulic system must take into account several parameters.

These parameters can adversely affect the performance of an hydraulic system, causing delay in the controls, pump cavitation, excessive absorption, excessive temperature rise, efficiency reduction, increased drainage, wear, jam/block or air intake in the plant.

The main properties that characterize hydraulic fluids and affect their choice are:

- DYNAMIC VISCOSITY
It identifies the fluid's resistance to sliding due to the impact of the particles forming it.
- CINEMATIC VISCOSITY
It is a widespread formal dimension in the hydraulic field.
It is calculated with the ratio between the dynamic viscosity and the fluid density.
Cinematic viscosity varies with temperature and pressure variations.
- VISCOSITY INDEX
This value expresses the ability of a fluid to maintain viscosity when the temperature changes.
A high viscosity index indicates the fluid's ability to limit viscosity variations by varying the temperature.
- FILTERABILITY INDEX
It is the value that indicates the ability of a fluid to cross the filter materials.
A low filterability index could cause premature clogging of the filter material.
- WORKING TEMPERATURE
Working temperature affects the fundamental characteristics of the fluid.
As already seen, some fluid characteristics, such as cinematic viscosity, vary with the temperature variation.
When choosing a hydraulic oil, must therefore be taken into account of the environmental conditions in which the machine will operate.
- COMPRESSIBILITY MODULE
Every fluid subjected to a pressure contracts, increasing its density.
The compressibility module identifies the increase in pressure required to cause a corresponding increase in density.
- HYDROLYTIC STABILITY
It is the characteristic that prevents galvanic pairs that can cause wear in the plant/system.

- ANTIOXIDANT STABILITY AND WEAR PROTECTION

These features translate into the capacity of a hydraulic oil to avoid corrosion of metal elements inside the system.

- HEAT TRANSFER CAPACITY

It is the characteristic that indicates the capacity of hydraulic oil to exchange heat with the surfaces and then cool them.

② FLUID CONTAMINATION

Whatever the nature and properties of fluids, they are inevitably subject to contamination. Fluid contamination can have two origins:

- INITIAL CONTAMINATION

Caused by the introduction of contaminated fluid into the circuit, or by incorrect storage, transport or transfer operations.

- PROGRESSIVE CONTAMINATION

Caused by factors related to the operation of the system, such as metal surface wear, sealing wear, oxidation or degradation of the fluid, the introduction of contaminants during maintenance, corrosion due to chemical or electrochemical action between fluid and components, cavitation. The contamination of hydraulic systems can be of different nature:

- SOLID CONTAMINATION

For example rust, slag, metal particles, fibers, rubber particles, paint particles or additives

- LIQUID CONTAMINATION

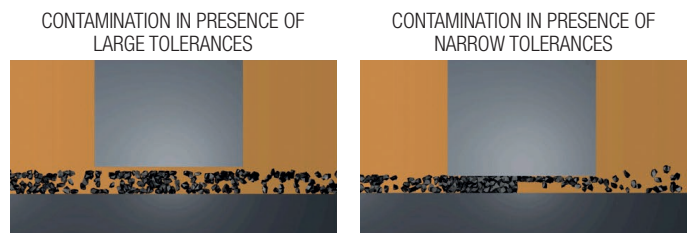
For example, the presence of water due to condensation or external infiltration or acids

- GASEOUS CONTAMINATION

For example, the presence of air due to inadequate oil level in the tank, drainage in suction ducts, incorrect sizing of tubes or tanks.

③ EFFECTS OF CONTAMINATION ON HYDRAULIC COMPONENTS

Solid contamination is recognized as the main cause of malfunction, failure and early degradation in hydraulic systems. It is impossible to delete it completely, but it can be effectively controlled by appropriate devices.



Solid contamination mainly causes surface damage and component wear.

- SURFACE EROSION

Cause of leakage through mechanical seals, reduction of system performance, variation in adjustment of control components, failures.

- ADHESION OF MOVING PARTS

Cause of failure due to lack of lubrication.

- DAMAGES DUE TO FATIGUE

Cause of breakdowns and components breakdown.

- MODIFICATION OF FLUID PROPERTIES

(COMPRESSIBILITY MODULE, DENSITY, VISCOSITY)

Cause of system's reduction of efficiency and of control.

It is easy to understand how a system without proper contamination management is subject to higher costs than a system that is provided.

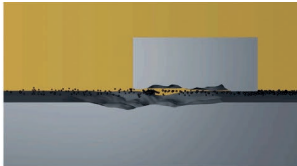
- MAINTENANCE

Maintenance activities, spare parts, machine stop costs

- ENERGY AND EFFICIENCY

Efficiency and performance reduction due to friction, drainage, cavitation.

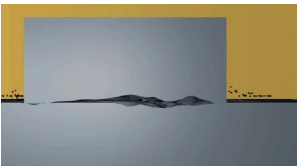
ABRASION



EROSION



ADHESION



FATIGUE



Liquid contamination mainly results in decay of lubrication performance and protection of fluid surfaces.

DISSOLVED WATER

- INCREASING FLUID ACIDITY

Cause of surface corrosion and premature fluid oxidation

- GALVANIC COUPLE AT HIGH TEMPERATURES

Cause of corrosion

FREE WATER - ADDITIONAL EFFECTS

- DECAY OF LUBRICANT PERFORMANCE

Cause of rust and sludge formation, metal corrosion and increased solid contamination

- BATTERY COLONY CREATION

Cause of worsening in the filterability feature

- ICE CREATION AT LOW TEMPERATURES

Cause damage to the surface

- ADDITIVE DEPLETION

Free water retains polar additives

Gaseous contamination mainly results in decay of system performance.

- CUSHION SUSPENSION

Cause of increased noise and cavitation.

- FLUID OXIDATION

Cause of corrosion acceleration of metal parts.

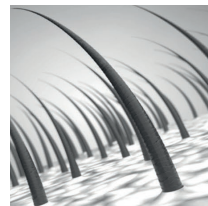
4 MEASURING THE SOLID CONTAMINATION LEVEL

The level of contamination of a system identifies the amount of contaminant contained in a fluid.

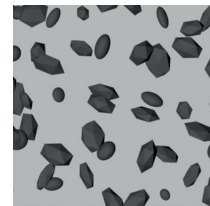
This parameter refers to a unit volume of fluid.

The level of contamination may be different at different points in the system. From the information in the previous paragraphs it is also apparent that the level of contamination is heavily influenced by the working conditions of the system, by its working years and by the environmental conditions.

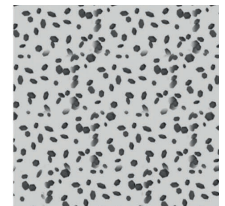
What is the size of the contaminating particles that we must handle in our hydraulic circuit?



HUMAN HAIR
(75 µm)



MINIMUM DIMENSION
VISIBLE HUMAN EYES
(40 µm)



TYPICAL CONTAMINANT
DIMENSION IN A
HYDRAULIC CIRCUIT
(4÷14 µm)

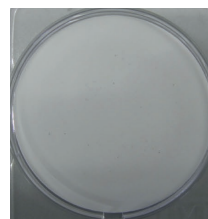
Contamination level analysis is significant only if performed with a uniform and repeatable method, conducted with standard test methods and suitably calibrated equipment.

To this end, ISO has issued a set of standards that allow tests to be conducted and express the measured values in the following ways.

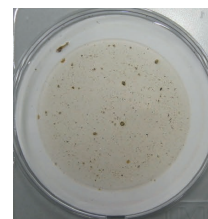
- GRAVIMETRIC LEVEL - ISO 4405

The level of contamination is defined by checking the weight of particles collected by a laboratory membrane. The membrane must be cleaned, dried and desiccated, with fluid and conditions defined by the Standard.

The volume of fluid is filtered through the membrane by using a suitable suction system. The weight of the contaminant is determined by checking the weight of the membrane before and after the fluid filtration.



CLEAN
MEMBRANE



CONTAMINATED
MEMBRANE

CONTAMINATION MANAGEMENT

- CUMULATIVE DISTRIBUTION OF THE PARTICLES SIZE - ISO 4406

The level of contamination is defined by counting the number of particles of certain dimensions per unit of volume of fluid. Measurement is performed by Automatic Particle Counters (APC).

Following the count, the contamination classes are determined, corresponding to the number of particles detected in the unit of fluid.

The most common classification methods follow ISO 4406 and SAE AS 4059 (Aerospace Sector) regulations.

NAS 1638 is still used although obsolete.

Classification example according to ISO 4406

The code refers to the number of particles of the same size or greater than 4, 6 or 14 μm in a 1 ml fluid.

Class	Number of particles per ml	
	Over	Up to
28	1 300 000	2 500 000
27	640 000	1 300 000
26	320 000	640 000
25	160 000	320 000
24	80 000	160 000
23	40 000	80 000
22	20 000	40 000
21	10 000	20 000
20	5 000	10 000
19	2 500	5 000
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
10	5	10
9	2.5	5
8	1.3	2.5
7	0.64	1.3
6	0.32	0.64
5	0.16	0.32
4	0.08	0.16
3	0.04	0.08
2	0.02	0.04
1	0.01	0.02
0	0	0.01

> 4 $\mu\text{m}_{(c)}$ = 350 particles

> 6 $\mu\text{m}_{(c)}$ = 100 particles

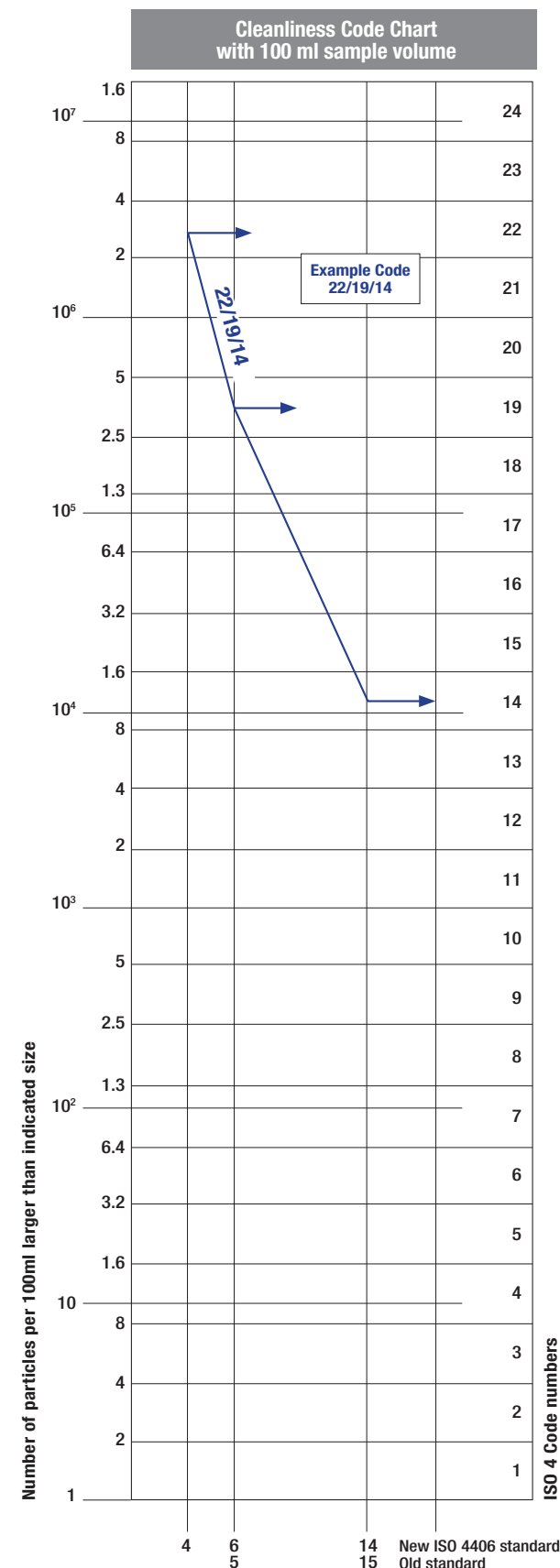
> 14 $\mu\text{m}_{(c)}$ = 25 particles

16 / 14 / 12

ISO 4406:2017 Cleanliness Code System

Microscope counting examines the particles differently to APCs and the code is given with two scale numbers only.

These are at 5 μm and 15 μm equivalent to the 6 $\mu\text{m}_{(c)}$ and 14 $\mu\text{m}_{(c)}$ of APCs.



- CUMULATIVE DISTRIBUTION OF THE PARTICLES SIZE - SAE AS 4059-1 and SAE AS 4059-2

Classification example according to SAE AS 4059-1 and SAE AS 4059-2

The code, prepared for the aerospace industry, is based on the size, quantity, and particle spacing in a 100 ml fluid sample. The contamination classes are defined by numeric codes, the size of the contaminant is identified by letters (A-F).

It can be made a differential measurement (Table 1) or a cumulative measurement (Table 2)

Table 1 - Class for differential measurement

Class	Dimension of contaminant				
	6÷14 µm _(c)	14÷21 µm _(c)	21÷38 µm _(c)	38÷70 µm _(c)	>70 µm _(c)
00	125	22	4	1	0
0	250	44	8	2	0
1	500	89	16	3	1
2	1 000	178	32	6	1
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

6÷14 µm _(c) = 15 000 particles
14÷21 µm _(c) = 2 200 particles
21÷38 µm _(c) = 200 particles
38÷70 µm _(c) = 35 particles
> 70 µm _(c) = 3 particles
Class 6

Table 2 - Class for cumulative measurement

Class	Dimension of contaminant					
	>4 µm _(c) A	>6 µm _(c) B	>14 µm _(c) C	>21 µm _(c) D	>38 µm _(c) E	>70 µm _(c) F
000	195	76	14	3	1	0
00	390	152	27	5	1	0
0	780	304	54	10	2	0
1	1 560	609	109	20	4	1
2	3 120	1 217	217	39	7	1
3	6 250	2 432	432	76	13	2
4	12 500	4 864	864	152	26	4
5	25 000	9 731	1 731	306	53	8
6	50 000	19 462	3 462	612	106	16
7	100 000	38 924	6 924	1 224	212	32
8	200 000	77 849	13 849	2 449	424	64
9	400 000	155 698	27 698	4 898	848	128
10	800 000	311 396	55 396	9 796	1 696	256
11	1 600 000	622 792	110 792	19 592	3 392	512
12	3 200 000	1 245 584	221 584	39 184	6 784	1 024

> 4 µm _(c) = 45 000 particles
> 6 µm _(c) = 15 000 particles
> 14 µm _(c) = 1 500 particles
> 21 µm _(c) = 250 particles
> 38 µm _(c) = 15 particles
> 70 µm _(c) = 3 particle
Class from 2F to 4E

- CLASSES OF CONTAMINATION ACCORDING TO NAS 1638 (January 1964)

The NAS system was originally developed in 1964 to define contamination classes for the contamination contained within aircraft components.

The application of this standard was extended to industrial hydraulic systems simply because nothing else existed at the time.

The coding system defines the maximum numbers permitted of 100ml volume at various size intervals (differential counts) rather than using cumulative counts as in ISO 4406:1999. Although there is no guidance given in the standard on how to quote the levels, most industrial users quote a single code which is the highest recorded in all sizes and this convention is used on MP Filtri APC's.

The contamination classes are defined by a number (from 00 to 12) which indicates the maximum number of particles per 100 ml, counted on a differential basis, in a given size bracket.

Size Range Classes (in microns)

Maximum Contamination Limits per 100 ml					
Class	5÷15	15÷25	25÷50	50÷100	>100
00	125	22	4	1	0
0	250	44	8	2	0
1	500	89	16	3	1
2	1 000	178	32	6	1
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

5÷15 µm _(c) = 42 000 particles
15÷25 µm _(c) = 2 200 particles
25÷50 µm _(c) = 150 particles
50÷100 µm _(c) = 18 particles
> 100 µm _(c) = 3 particles
Class NAS 8

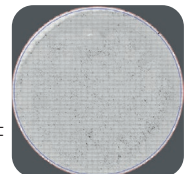
- CUMULATIVE DISTRIBUTION OF THE PARTICLES SIZE - ISO 4407

The level of contamination is defined by counting the number of particles collected by a laboratory membrane per unit of fluid volume. The measurement is done by a microscope.

The membrane must be cleaned, dried and desiccated, with fluid and conditions defined by the Standard. The fluid volume is filtered through the membrane, using a suitable suction system.

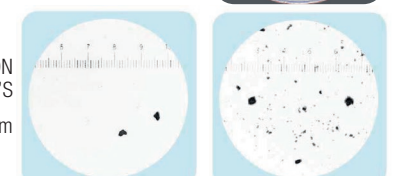
The level of contamination is identified by dividing the membrane into a predefined number of areas and by counting the contaminant particles using a suitable laboratory microscope.

MICROSCOPE CONTROL AND MEASUREMENT



COMPARISON PHOTOGRAPH'S

1 graduation = 10µm



ISO 4406:1999	Class 16/14/11	Class 22/20/17
SAE AS4059E Table 1	Class 5	Class 11
NAS 1638	Class 5	Class 11
SAE AS4059E Table 2	Class 6A/5B/5C	Class 12A/11B/11C

- CLEANLINESS CODE COMPARISON

Although ISO 4406:2017 standard is being used extensively within the hydraulics industry other standards are occasionally required and a comparison may be requested. The table below gives a very general comparison but often no direct comparison is possible due to the different classes and sizes involved.

ISO 4406:2017	SAE AS4059 Table 2	SAE AS4059 Table 1	NAS 1638
> 4 $\mu\text{m}_{(c)}$ 6 $\mu\text{m}_{(c)}$ 14 $\mu\text{m}_{(c)}$	> 4 $\mu\text{m}_{(c)}$ 6 $\mu\text{m}_{(c)}$ 14 $\mu\text{m}_{(c)}$	4-6 6-14 14-21 21-38 38-70 >70	5-15 15-25 25-50 50-100 >100
23 / 21 / 18	13A / 12B / 12C	12	12
22 / 20 / 17	12A / 11B / 11C	11	11
21 / 19 / 16	11A / 10B / 10C	10	10
20 / 18 / 15	10A / 9B / 9C	9	9
19 / 17 / 14	9A / 8B / 8C	8	8
18 / 16 / 13	8A / 7B / 7C	7	7
17 / 15 / 12	7A / 6B / 6C	6	6
16 / 14 / 11	6A / 5B / 5C	5	5
15 / 13 / 10	5A / 4B / 4C	4	4
14 / 12 / 09	4A / 3B / 3C	3	3

5 RECOMMENDED CONTAMINATION CLASSES

Any are the nature and the properties of fluids, they are inevitably subject to contamination. The level of contamination can be managed by using special components called filters.

Hydraulic components builders, knowing the problem of contamination, recommend the filtration level appropriate to the use of their products.

Example of recommended contamination levels for pressures below 140 bar.

Piston pumps with fixed flow rate	•					
Piston pumps with variable flow rate			•			
Vane pumps with fixed flow rate		•				
Vane pumps with variable flow			•			
Engines	•					
Hydraulic cylinders	•					
Actuators					•	
Test benches						•
Check valve	•					
Directional valves	•					
Flow regulating valves	•					
Proportional valves				•		
Servo-valves					•	
Flat bearings			•			
Ball bearings				•		
ISO 4406 CODE	20/18/15	19/17/14	18/16/13	17/15/12	16/14/11	15/13/10
Recommended filtration $\beta_{x(c)} \geq 1.000$	$\beta_{20(c)} > 1000$	$\beta_{15(c)} > 1000$	$\beta_{10(c)} > 1000$	$\beta_{7(c)} > 1000$	$\beta_{7(c)} > 1000$	$\beta_{5(c)} > 1000$

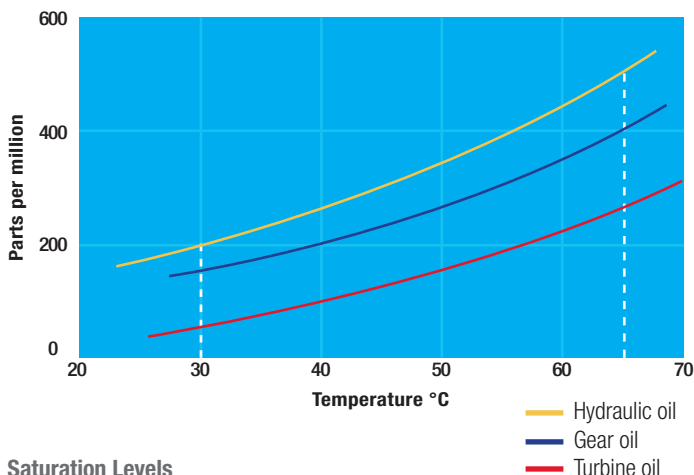
6 WATER IN HYDRAULIC AND LUBRICATING FLUIDS

Water Content

In mineral oils and non aqueous resistant fluids water is undesirable. Mineral oil usually has a water content of 50-300 ppm (@40°C) which it can support without adverse consequences.

Once the water content exceeds about 300ppm the oil starts to appear hazy. Above this level there is a danger of free water accumulating in the system in areas of low flow. This can lead to corrosion and accelerated wear.

Similarly, fire resistant fluids have a natural water which may be different to mineral oil.



Saturation Levels

Since the effects of free (also emulsified) water is more harmful than those of dissolved water, water levels should remain well below the saturation point.

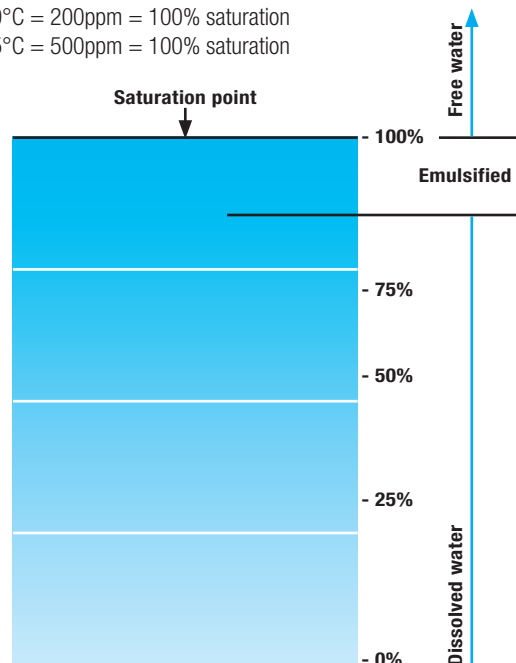
However, even water in solution can cause damage and therefore every reasonable effort should be made to keep saturation levels as low as possible. There is no such thing as too little water. As a guideline, we recommend maintaining saturation levels below 50% in all equipment.

TYPICAL WATER SATURATION LEVEL FOR NEW OILS

Examples:

Hydraulic oil @ 30°C = 200ppm = 100% saturation

Hydraulic oil @ 65°C = 500ppm = 100% saturation



W - Water and Temperature Sensing

"W" option, in MP Filtri Contamination Monitoring Products, indicates water content as a percentage of saturation and oil temperature in degrees centigrade. 100% RH corresponds to the point at which free water can exist in the fluid. i.e. the fluid is no longer able to hold the water in a dissolved solution.

The sensor can help provide early indication of costly failure due to free water, including but not exclusive to:

- Corrosion
- Metal surface fatigue e.g. bearing failure
- Reduced lubrication & load carrying characteristics

Different oils have different saturation levels and therefore RH (relative humidity) % is the best and most practical measurement.

Water absorber

Water is present everywhere, during storage, handling and servicing.

MP Filtri filter elements feature an absorbent media which protects hydraulic systems from both particulate and water contamination.

MP Filtri's filter element technology is available with inorganic microfiber media with a filtration rating $25\ \mu\text{m}$ (therefore identified with media designation WA025, providing absolute filtration of solid particles to $\beta_{x(c)} = 1000$).

Absorbent media is made by water absorbent fibres which increase in size during the absorption process.

Free water is thus bonded to the filter media and completely removed from the system (it cannot even be squeezed out).

By removing water from your fluid power system, you can prevent such key problems as:

- corrosion (metal etching)
- loss of lubricant power
- accelerated abrasive wear in hydraulic components
- valve-locking
- bearing fatigue
- viscosity variance (reduction in lubricating properties)
- additive precipitation and oil oxidation
- increase in acidity level
- increased electrical conductivity (loss of dielectric strength)
- slow/weak response of control systems

Product availability - GRF Series:

GRF 015

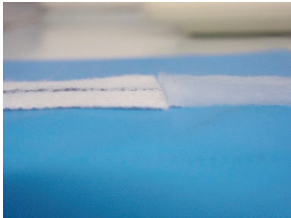
GRF 1

GRF 3

GRF 5

GRF 6

Filter Media

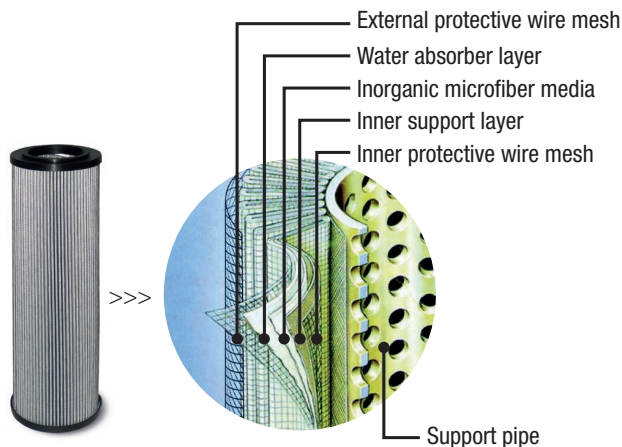


Fabric that absorbs water

Absorber media layer



The Filter Media has absorbed water



GRF 015

Mobile filtration unit 4 gpm flow rate



GRF 015 GENERAL INFORMATION

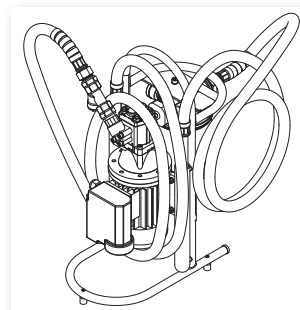
Description

Mobile filtration units

The GRF 015 is a portable oil transfer/filtration unit, specifically designed for both filling/transferring hydraulic oils from containers to the hydraulic tank as well as filtering and cleaning hydraulic systems.

The unit utilizes Spin-On element (supplied as option), available in two lengths, thus increasing the dirt holding capacity and lowering pressure drop of the unit.

The unit has the flexibility in being able to offer a wide range of medias and micron ratings to suit any application. The unit is very compact and lightweight.



> Features & Benefits

- Handle size
- Light
- Easy to use
- Easy maintenance
- Reliable
- Absolute filtration



Technical data

Pump

Gear pump

Protection Class

IP 55

Electric Motor

.25 hp 115 V single phase electric motor

Seal

NBR

Flow (l/min)

4 gpm at 1800 rpm

Fluid Compatibility

Mineral Oil - Other on request

Max. Operation Pressure

58 psi

Suction hose

DN18 length 100 in

lance

DN/OD20 length 16 in

Viscosity range

Min. operation 10 cSt

Max. operation 200 cSt

Max. only for cold start 400 cSt

Pressure hose

DN18 length 100 in

lance

DN/OD18 length 16 in

Weight

32.6 lb

Suction Filter

Type Y filtration 500 µm

Equipment

Visual clogging indicator (gauge)

Filtration Rating

1/3/6/10/25 µm $\beta > 1000$ flow through the element Out/In

 Standard

Bypass valve

Rating 58 psi

Fluid Temperature

From 41° to 140 °F

Ambient Temperature

From 41° to 104 °F

GRF 015 Series

Designation & Ordering code

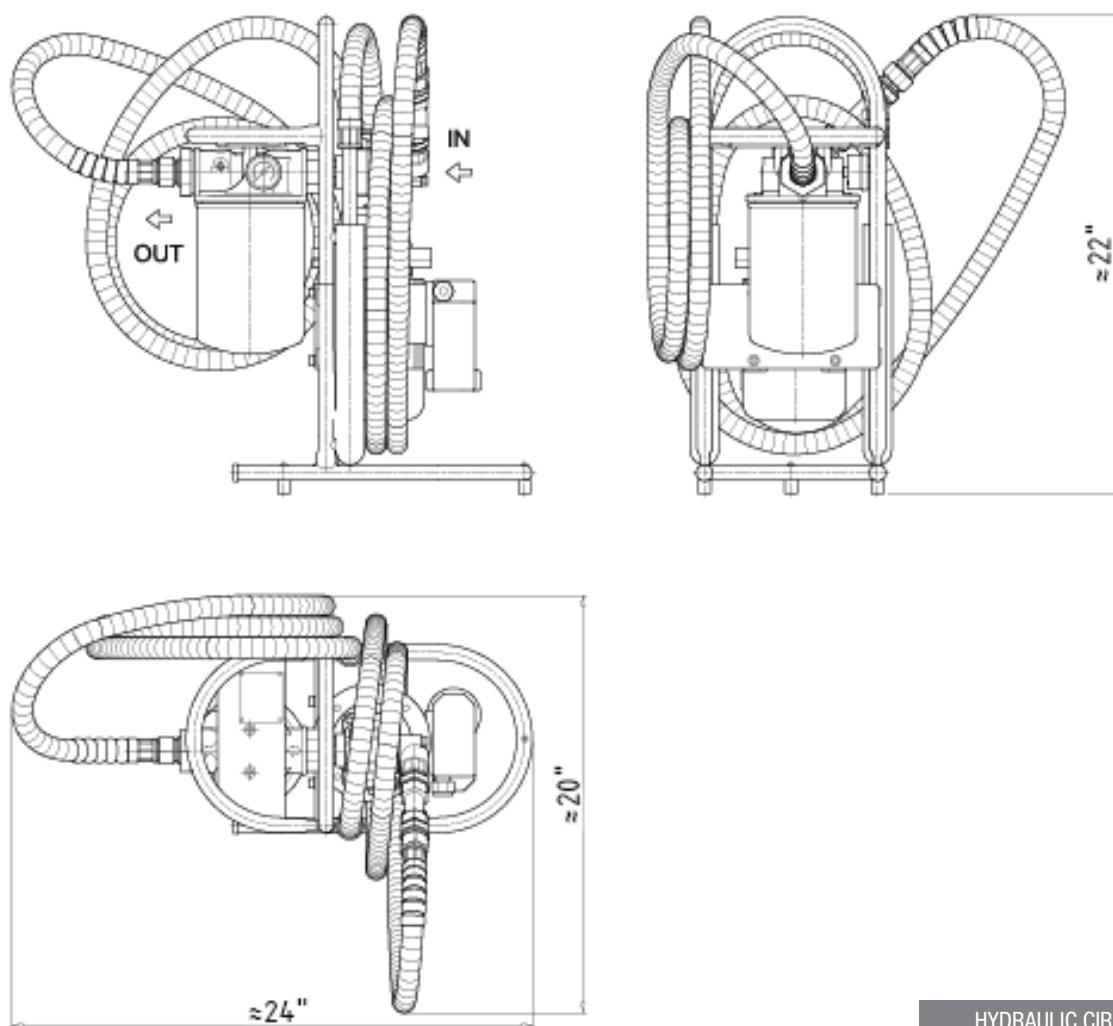
MOBILE FILTRATION UNIT GRF 015									
Series	Configuration example: GRF 015 M A 1 0 0 P01								
GRF									
Size									
015 4 gpm									
Electric motor									
M 115 single phase									
Seals									
A NBR									
Pressure gauges and Color coded gauge									
1									
Spin-on Element									
Note: Element ordered separately									
0 Without element									
Option									
0 No options									
Option									
P01 MP Filtri standard									
Pxx Customized									

Element Options

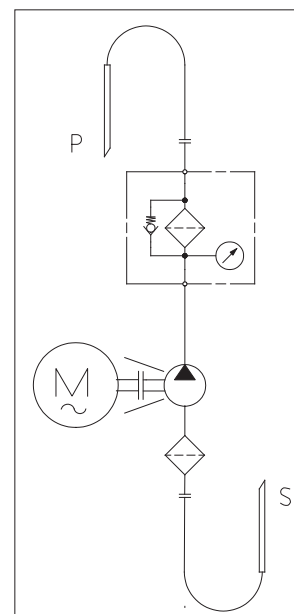
SPIN ON ELEMENT STANDARD LENGTH	
Inorganic microfibre	Wire mesh element
CSG100A01AP01	CSG100M25AP01
CSG100A03AP01	CSG100M60AP01
CSG100A06AP01	
CSG100A10AP01	
CSG100A25AP01	

SPIN ON ELEMENT EXTENDED LENGTH	
Inorganic microfibre	Wire mesh element
CSG150A01AP01	CSG150M25AP01
CSG150A03AP01	CSG150M60AP01
CSG150A06AP01	
CSG150A10AP01	
CSG150A25AP01	

WATER REMOVAL -ELEMENT EXTENDED LENGTH	
Multi-Layer water absorber	
CSGW100P10A	
CSGW150P10A	
CSGW150P25A	
CSGW150A03A	



HYDRAULIC CIRCUIT



GRF 1 General Information

Technical Data

Applications

- Filtering contaminated systems
- Collecting oil samples for analysis
- Dispensing new oil

Performance

For filtering mineral and synthetic based oils (hydraulic oils, gear oils, and turbine oils) with a maximum operating viscosity range of 3000ssu/648cSt at 100°F within ambient temperature ranges of -15°F to 150°F

> Features

- Carbon steel frame with drip tray
- 1 HP, 115 VAC, 60 Hz motor
- Low pressure aluminum heads
- Aluminum gear pump - available in 5 and 10 gpm
- Pop-up indicator triggers at 20 psid when elements need to be changed
- Pump relief opens at 150 psi
- Approximate weight 75-80 lbs
- Approximate dimensions 24"L x 12"W X 18"H

Replacement spin-on element options:

Part Number	Beta Rating	Desired Cleanliness Level (ISO Code)
CSG150A01A	B1(c)=1000	13/11/8 - 12/10/7
CSG150A03A	B3(c)=1000	14/12/19 - 13/11/18
CSG150A06A	B6(c)=1000	17/15/12 - 14/12/19
CSG150A10A	B10(c)=1000	18/16/13 - 17/15/12
CSG150A25A	B25(c)=1000	21/19/16 - 20/18/15
CSGW150A03A	Water Removal	

STATIONARY FILTRATION UNIT GRF 1

Series	Configuration Example 1:	GRF 105	A	1	1	-	A03	P01
GRF 105	5 GPM							
GRF 110	10 GPM							
Seal								
A	Buna							
Phase								
1	110 Volt							
3	230 Volt							
Auto-Shut Down Control Feature								
-	No auto-shut down control							
1	With auto-shut down control *							
*Note: Auto shutdown feature is only applicable with optional ICM								
Clogging Indicator								
-	No strobe light indicator							
1	With strobe light indicator							
Discharge Side Element								
A01	CSG150A01A							
A03	CSG150A03A							
A06	CSG150A06A							
A10	CSG150A10A							
A25	CSG150A25A							
WA03	CSGW150A03A							
WP10	CSGW150P10A							
WP25	CSGW150P25A							
Execution								
P01	MP Filtri Standard							
Pxx	Customize							

ICM contamination monitor is not include and should consult factory

ICM CONTAMINATION MONITOR

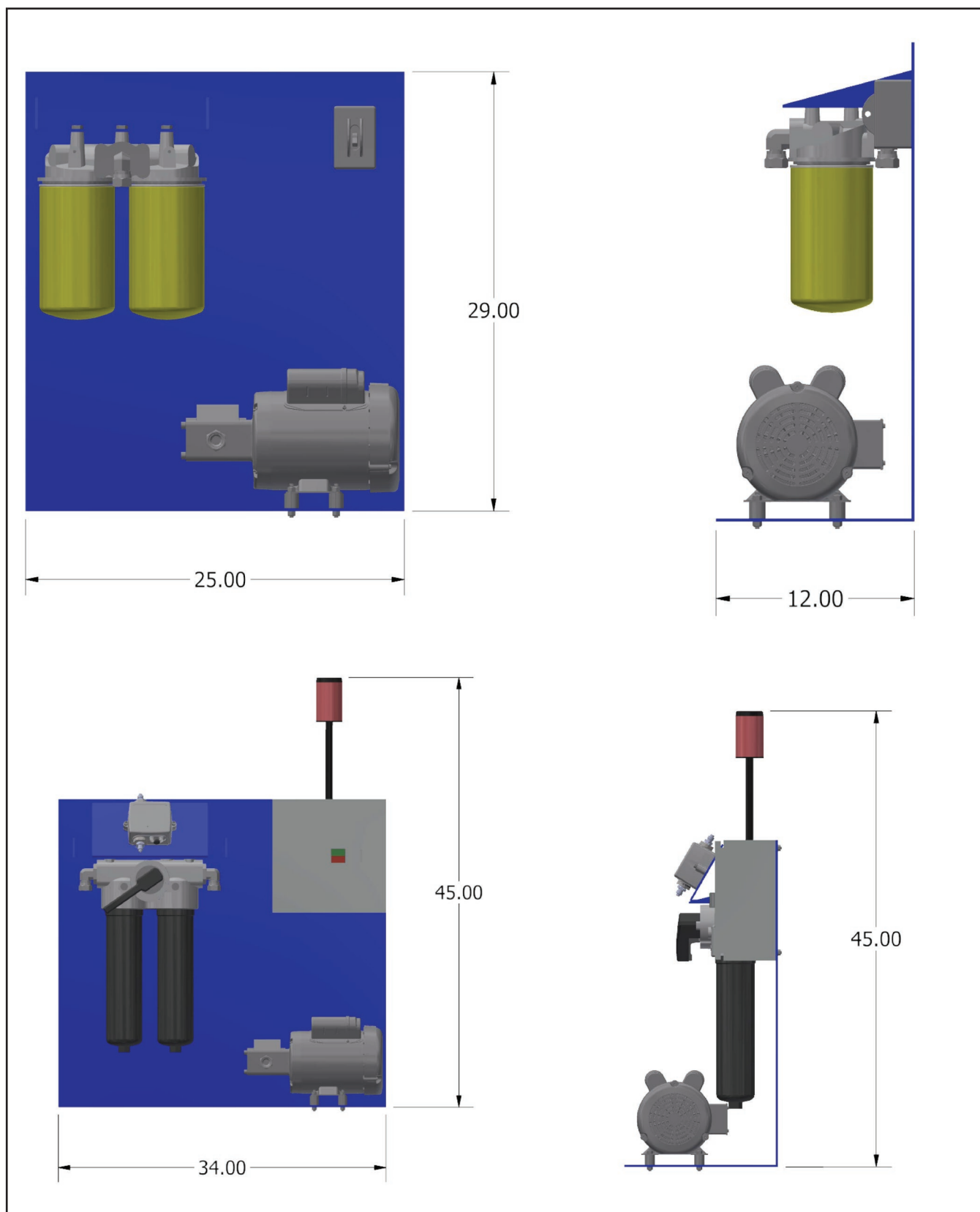
ICM Conamination Monitor	
ICM-O-M-K-R-G1	Without moisture and temperature sensor, with screen, with relays/external alarm outputs
ICM-W-M-K-R-G1	With moisture and temperature sensor with screen, with relays/external alarm outputs
ICM-O-M-K-U-G1	Without moisture and temperature sensor, with screen, with test record transfer plus relays/external alarm outputs
ICM-W-M-K-U-G1	With moisture and temperture, with screen, with test record transfer plus relays/external alarm outputs
Design Reference	
2.0	ICM 2.0
4.0	ICM 4.0 with integral WiFi

Note: Consult factory for options not listed

MP Filtri reserves the right to make improvements in design, product features and specifications at anytime without notice.

GRF1 Series

Dimensions



Applications

- Oil transfer from bulk drums to tank
- Reservoir clean-up

> Features

- 1 HP, 120 VAC, 1- Phase TEFC motor with cord and plug
- Rugged 5 gpm or 10 gpm gear pump with integral relief valve
- 10 ft. wire reinforced clear suction and discharge hoses with stainless steel wands
- Heavy Duty hand truck with pneumatic tires powder coated MP Filtri blue
- Large drip pan under filter element assemblies
- 2 pc 4ft. stainless steel wands
- Wand storage brackets with accommodations to contain excess in drip pan
- 25 ft. electrical cord with end plug, includes cord storage hook
- On-board sealed on/off switch

Suction Side

- 1 pc CSG100M90A - 90 micron wire mesh element

Discharge Side - 1

- 1 pc MPS350 Dual Spin-on with 25 psid bypass
- Choice of 1, 3, 6, 10, & 25 micron elements available
- With indicator

Discharge Side - 2

- 1 pc LMP 2102 housing with 50 psid bypass
- Choice of 1, 3, 6, 10, & 25 micron elements available
- With indicator

GRF 3 Series

Designation & Ordering Code

MOBILE FILTRATION GRF 3

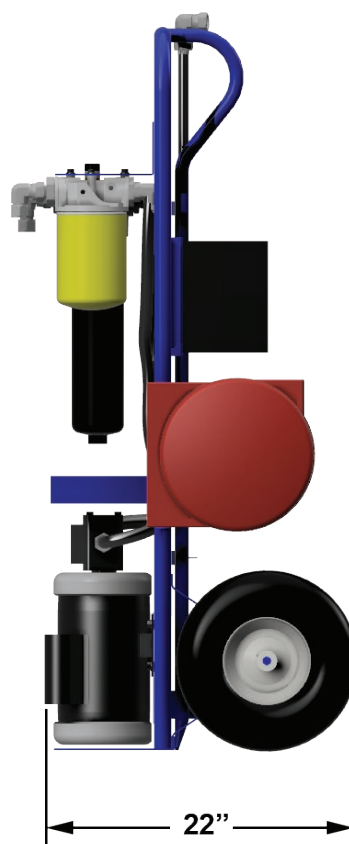
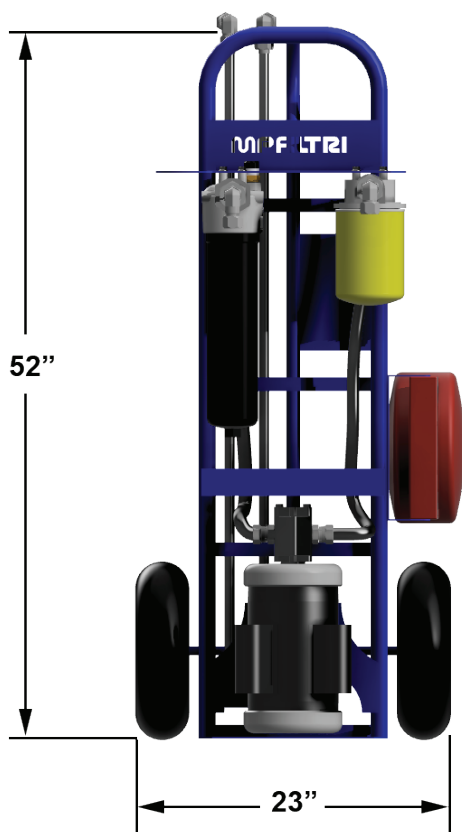
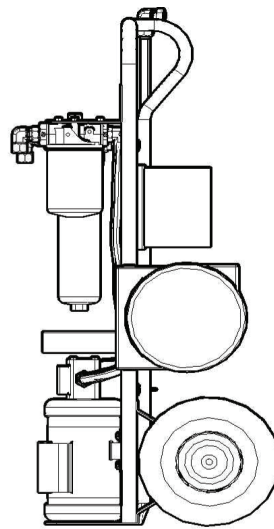
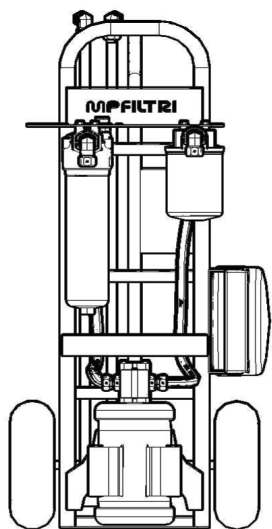
Series		Configuration Example 1:					
GRF 305	5 GPM	GRF 310	1	M90	A	A03	P01
GRF 310	10 GPM						
Type							
1	MPS300 assembly on discharge						
2	LMP2112 assembly on discharge						
Suction Side Spin-on Element							
M90	90 micron wire mesh						
Seal Material							
A	Buna						
Discharge Side Element (Spin-On Type 1 only)		MPS300	Discharge Side Element (Cartridge Type 2 only)		LMP211		
A01	CSG150A01AP01	•	A01	CU2102A01ANP01	•		
A03	CSG150A03AP01	•	A03	CU2102A03ANP01	•		
A06	CSG150A06AP01	•	A06	CU2102A06ANP01	•		
A10	CSG150A10AP01	•	A10	CU2102A10ANP01	•		
A25	CSG150A25AP01	•	A25	CU2102A25ANP01	•		
WA03	CSGW150A03AP01	•	WA25	CU2102WA25ANP01	•		
WP10	CSGW150P10AP01	•					
WP25	CSGW150P25AP01	•					
Execution							
P01	MP Filtri Standard						
Pxx	Customize						

Note: Consult factory for options not listed

MP Filtri reserves the right to make improvements in design, product features and specifications at anytime without notice.

GRF 3 Series

Dimensions



Applications

- Oil transfer from bulk drums to tank
- Reservoir clean-up

> Features

- 1 HP, 115 VAC, 1- Phase TEFC motor with motor start/stop, cord and plug
- Rugged 5 gpm or 10 gpm gear pump with integral relief valve
- 10 ft. wire reinforced clear suction and discharge hoses with stainless steel wands
- Mounted inline contamination monitoring (ICM) unit to measure fluid cleanliness
- Heavy duty hand truck with pneumatic tires, powder coated in MP Filtri Blue
- 2 pc 4ft. stainless steel wands
- Wand Storage brackets with accommodation to contain excess in drip pan
- 25 ft. electrical cord with end plug, includes cord storage hook
- On-board sealed on/off switch

Suction Side

- 1 pc CSG100M90A - 90 micron wire mesh element

Discharge Side

- 1 pc LMP2112 housing with 50 psid bypass
- Choice of 1, 3, 6, 10, & 25 micron elements available

ICM

- 8 channel contamination measurement
- International standard formats ISO 4406:1999, NAS 1638 AS 4059E and ISO 11218
- Data logging and 4000 test result memory
- Mineral oil fluid compatibility
- Optional water/temperature sensor
- Optional 6-key keypad and 128 x 64 back-lit display
- Optional relays
- LPA View software included

GRF 5 Series

Designation & Ordering Code

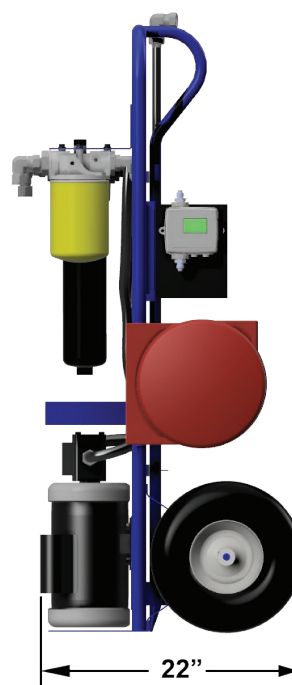
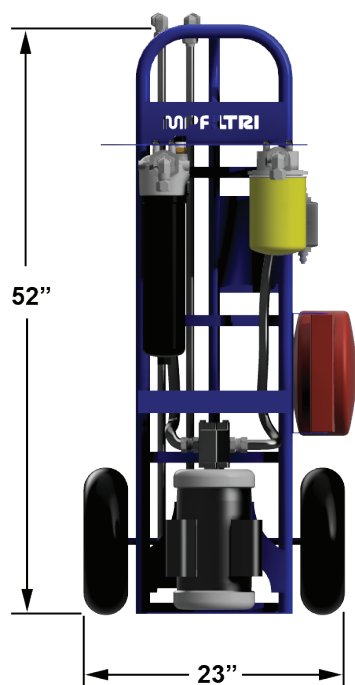
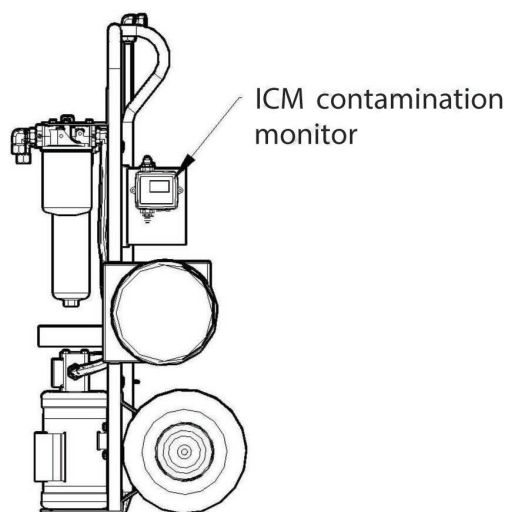
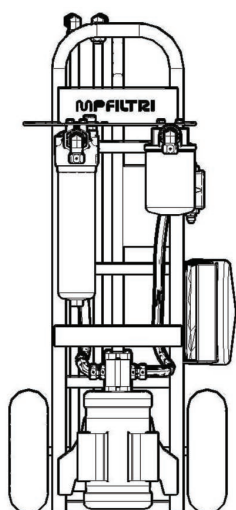
MOBILE FILTRATION GRF 5									
Series	Configuration Example 1: GRF 510 2 M90 A A03 ICMW M K U 2.0 P01								
GRF 505 5 GPM									
GRF 510 10 GPM									
Type									
2 LMP2112 assembly on discharge									
Suction Side Spin-on Element									
M90 90 micron wire mesh									
Seal									
A Buna									
Discharge Side Cartridge Element									
A01 CU2102A01ANP01									
A03 CU2102A03ANP01									
A06 CU2102A06ANP01									
A10 CU2102A10ANP01									
A25 CU2102A25ANP01									
WA25 CU2102WA25ANP01									
ICM Water/Temperature Sensor									
ICM0 Without water/temperature sensor									
ICMW With water/temperature sensor									
Fluid Compatibility									
M Mineral Oil									
Keypad									
K With 6-keypad with display									
Relays									
R With relays/external alarms									
Design Reference									
2.0 ICM 2.0									
4.0 ICM 4.0 with integral WiFi									
Execution									
P01 MP Filtri Standard									
Pxx Customize									

Note: Consult factory for options not listed

MP Filtri reserves the right to make improvements in design, product features and specifications at anytime without notice.

GRF 5 Series

Dimensions



Performance Data

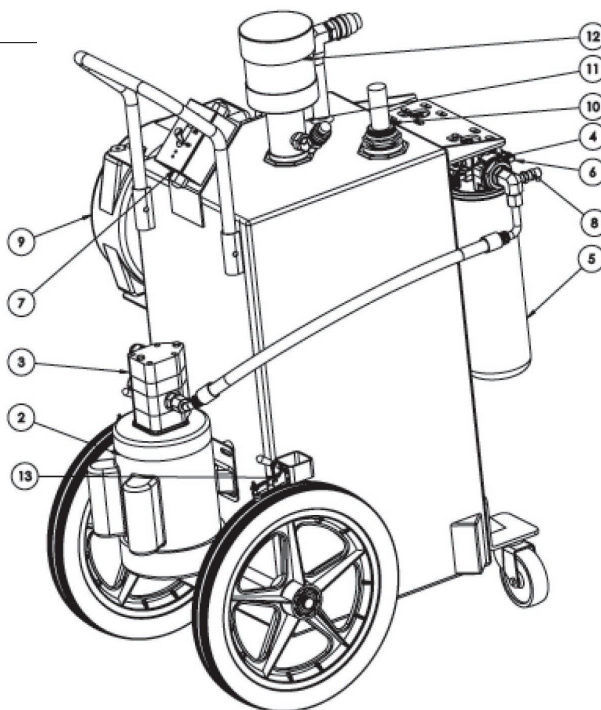
For filtering mineral and synthetic based oils (hydraulic oils, gear oils and turbine oils) with a maximum operating viscosity range of 300ssu / 648cSt at 100°F within ambient temperature ranges of -15°F to 150°F.

Standard Features

Frame	Carbon steel, 30 gallon tank with 4 wheels
Paint	Blue
Motor	1 HP or 120vac 60Hz
Filter Options	MPS 300 Dual Spin-on or LMP211 Cartridge Style
Pumps	Heavy Duty Cast Iron Gear Pump: Available in 5 and 10 GPM
Connections	3/4" JIC
Hoses	10 ft. Suction and Return
Power Switch	Sealed on/off power switch
Cord	40 ft. retractable cord reel
Breather	Desiccant breather
Filter Indicators	Pop up indicator triggers when elements need to be changed
Pump Relief	Opens at 150psi
Weight	Approx. 125 lbs (will vary depending on options)
Dimensions	Approx. 30"L x 19"W x 35"H

Components:

Item Number	Description	QTY
1	Tank	1
2	Motor	1
3	Pump	1
4	Filter Head	
5	Filter Element	
6	Filter Indicator	2
7	Switch On/Off	1
8	Sample Port	2
9	Retractable Reel	1
10	Sight Gauge	1
11	Breather Adapter	1
12	Breather	1
13	Brake	2



GRF 6 Series

Designation & Ordering Code

MOBILE FILTRATION GRF 6

Series		Configuration Example 1:						
GRF 605	5 GPM	GRF 605	1	A	SA03		1	P01
Type		Configuration Example 2:						
GRF 610	10 GPM	GRF 610	3	A	CA03	CA10	1	P01
1	MPS300 Dual Spin-On assembly on discharge (2) elements required							
2	LMP2112 Single Cartridge assembly on discharge (1) element required							
3	LMP2112 + LMP2112 (2) each Cartridge assemblies on discharge in series (2) elements required							
Seal Material								
A	Buna							
Discharge Side Element (Spin-On Type 1 only)		MPS300	Discharge Side Element (Cartridge Type 2 & 3 only)		LMP211			
SA01	CSG150A01A	•	CA01 CU2102A01ANP01		•			
SA03	CSG150A03A	•	CA03 CU2102A03ANP01		•			
SA06	CSG150A06A	•	CA06 CU2102A06ANP01		•			
SA10	CSG150A10A	•	CA10 CU2102A10ANP01		•			
SA25	CSG150A25A	•	CA25 CU2102A25ANP01		•			
SWA03	CSGW150A03AP01	•	CWA25 CU2102WA25ANP01		•			
SWP10	CSGW150P10AP01	•						
SWP25	CSGW150P25A Cellulos water removal	•	Note: Inorganic microfiber water removal		•			
			Note: If Type 3, must select applicable 2nd element for unit					
Contamination Monitor Options								
0	Without ICM unit							
1	ICM-W-M-K-U-G3-2.0 - mineral oil fluid moisture and temperature sensor with screen, and USB download capability							
2	ICM-W-M-K-R-G3-4.0 - mineral oil fluid moisture and temperature sensor with screen, and USB download capability							
Note: (1) each: ICM-USBi module required for programming ICM (Refer to ICM operator guide for selectable program options) Fluids other than mineral oil consult factory								
Execution								
P01	MP Filtri Standard							
Pxx	Customize							

Note: Consult factory for options not listed

MP Filtri reserves the right to make improvements in design, product features and specifications at anytime without notice.

The Drum Adapter Kit helps keep your lubricants free of moisture and particulate contamination while in storage or during the fluid transfer process. It also allows you to easily pre-filter your lubricant, ensuring you're only putting clean dry oil into your equipment.

Benefits:

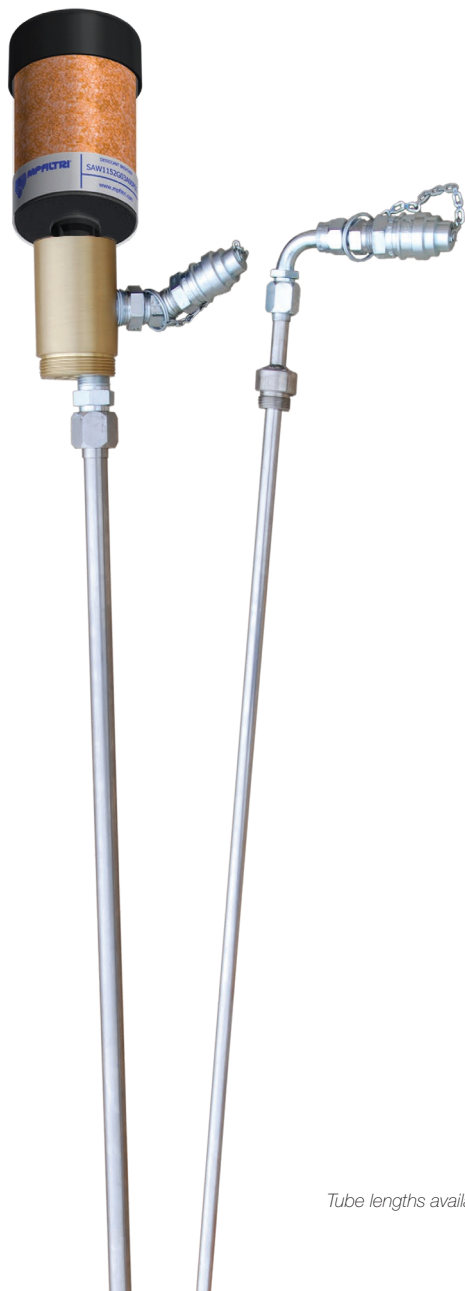
- Easily modify your equipment for seamless connection to various filtration systems
- Prevents the ingress of dirt and moisture by utilizing a desiccant breather
- Customizable to fit all your needs

Features:

- Various quick disconnects with steel dust plugs allow for various configurations
- 2" NPT connection easily replaces standard drum bungs
- Replaceable desiccant breather with 3/4" NPT adapter

Ordering Information:

- GRF-DAK



Tube lengths available in various size

Our heavy-duty stainless steel hose wand kit is great for those applications that require them. Hose wands aren't ideal, but some applications may require them. They can also be used for short term, while quick disconnects are being added to equipment.



Benefits:

- A quick connect tool that allows you to draw fluids from tanks, buckets, drums or open reservoirs when this is the only option
- Allows you to reach down into tanks for oil transport

Features:

- (2) Stainless steel 3/4" tube, 4 ft. long
- 90 degree female JIC swivel end

Ordering Information:

- GRF-HWKIT-SS

Pictured photo is cropped for visibility. Tubes are 4 ft. long.

Our Hydraulic Adapter Kit allows you to easily adapt your equipment with a desiccant breather and quick connects with the use of your system to remain completely sealed to atmospheric ingress, while allowing for easy access during offline filtration or topping reservoirs off.

**Benefits:**

- Easily modify your equipment for seamless connection to various filtration systems
- Prevents the ingress of dirt and moisture by utilizing a desiccant breather
- Customizable to fit all your needs

Features:

- Various quick disconnects with steel dust plugs allow for various configurations
- 6 bolt adapter fits most OEM connections
- Replaceable desiccant breather
- Customizable to fit your specific needs

Ordering Information:

- GRF - HAK

GRF Accessories

Tote Adapter Kit

Our Tote Adapter Kit allows you to easily adapt your equipment with a desiccant breather and quick connects with the use of a 2" NPT threaded adapter. This allows your system to remain completely sealed to atmospheric ingress, while allowing for easy access during offline filtration or topping reservoirs off.



Benefits:

- Easily modify your equipment for seamless connection to various filtration systems
- Prevents the ingress of dirt and moisture by utilizing a desiccant breather
- Customizable to fit all your needs

Features:

- Various quick disconnects with steel dust plugs
- 2" NPT connects to most poly totes
- Replaceable desiccant breather
- Customizable to fit your specific needs
- Spring loaded faucet for easy dispensing

Ordering Information:

- GRF-TAK



WORLDWIDE NETWORK

HEADQUARTERS

MP Filtri S.p.A.

Pessano con Bornago
Milano - Italy
+39 02 957031
sales@mpfiltri.it

BRANCH OFFICES

ITALFILTRI LLC

Moscow - Russia
+7 (495) 220 94 60
mpfiltrirussia@yahoo.com

MP Filtri Canada Inc.

Concord, Ontario - Canada
+1 905 303 1369
sales@mpfiltricanada.com

MP Filtri France SAS

Villeneuve la Garenne
Paris - France
+33 (0)1 40 86 47 00
sales@mpfiltrifrance.com

MP Filtri Germany GmbH

St. Ingbert - Germany
+49 (0) 6894 95652 2-0
sales@mpfiltri.de

MP Filtri India Pvt. Ltd.

Bangalore - India
+91 80 4147 7444 / +91 80 4146 1444
sales@mpfiltri.co.in

MP Filtri (Shanghai) Co., Ltd.

Shanghai Pudong - China
+86 21 58919916 116
sales@mpfiltrishanghai.com

MP Filtri U.K. Ltd.

Bourton on the Water
Gloucestershire - United Kingdom
+44 (0) 1451 822 522
sales@mpfiltri.co.uk

MP Filtri U.S.A. Inc.

Quakertown, PA - U.S.A.
+1 215 529 1300
sales@mpfiltriusa.com

PASSION TO PERFORM



mpfiltri.com