

## Oil Flushing System

- Lube Oil Flushing System
- Chemical Flushing System
- Hydraulic Flushing System

## When to Flush a System

A newly fabricated system or one that is in-service requires different approaches for when and how to perform flushing. This is because of different procedural methods deployed, but more so because of practical limitations and overall requirements of individual machines. It is important to consider that flushing can become time-consuming, and it may be difficult to predict the time needed to do so. Often, due to system design constraints, as little as one-third of the total time is spent on the flushing activity itself. Two-thirds of the time is used to mobilize flushing equipment and workers, disassemble sensitive components, assemble by-pass lines, connect flushing hoses, pre-clean the flushing fluid, fill up the system and heat the flushing fluid and piping. Well-planned and well-performed flushing practices give considerable return on investment.



Lube Oil Flushing System



Chemical Flushing System



Hydraulic Flushing System

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## Chemical Cleaning and Hot Oil Flushing

Each circuit should be connected to achieve the specified fluid velocity and Reynolds number, as well as the fluid pressure in all components, lines and fittings. Avoid flushing configurations that can lead to settling of particles in quiescent zones, dead legs, etc. The pressure and flow capacity of the cleaning/flushing rig must also be considered.

## Hot Oil Flushing

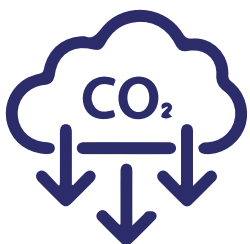
Generally speaking, the required cleanliness level to target during flushing is half the level during normal operation. For example, if the normal operation level is ISO 15/13/11, flush to an ISO 14/12/10. Requirements for cleanliness levels of both solid particles and moisture should be achieved.

## Turbulent Flushing Flow

With a Reynolds number equal to or greater than 4,000, the fluid is certain to have turbulent flow. This is required to remove particles from the surface inside tubes. To also prevent remaining contaminants from becoming suspended during operation, it is required that: Re- flushing number is equal or greater than 1.2 x Re-in service, but always a minimum of 4,000

## Application

- Power Generation
- Pipeline and pumps of the lube oil
- Water / diesel / acid solution of 10% - citric acid and alkaline solution of 10% ammonia
- Lube Oil Flushing, Hot Oil Flushing – ISO VG 32/46/68



# REDUCE YOUR CARBON FOOTPRINT

## Specifications

Minimac Model	FS- 500	FS - 2000	FS - 4000	FS - 5500
Skid Dimensions (mm)	2800 x 2200 x2200	3500 x 2200 x2200	5800 x 2200 x2200	5800 x 2200 x2200
Skid Tare Weight (Kg)	3000 Kg	4000 Kg	7500 Kg	8000 Kg
Pump Flow Rate	30 m <sup>3</sup> /hr	120 m <sup>3</sup> /hr	240 m <sup>3</sup> /hr	330 m <sup>3</sup> /hr
Electric Motor (Fixed Speed)	30 HP	100 HP	100 HP	100 HP
Supply Voltage	415 V, 3 Phase, 50 Hz			
Max Pump Pressure	50 m Head for water			
Tank (SS 304)	1000 L	2000 L	5000 L	5000 L
Tank Heater (SS 304 tubular)	40 KW	60 KW	80 KW	80 KW
In-Line Heater (SS 304 housing & tubes)	20 KW	20 KW	20 KW	20 KW
Stage-1 Strainer	Bucket Type, 150 mesh, 100% of SS 304 material			
Stage-1 Filter Cartridge Housing	Filter Housing of SS 304 material compatible to applied flow rate having appropriate no. Of filter cartridges for 99.98% Efficiency and High Life. Micron rating can be selected from 25 micron, 16 micron, 10 micron			
Stage-2 Filter Cartridge Housing	Filter Housing of SS 304 material compatible to applied flow rate having appropriate no. Of filter cartridges for 99.98% Efficiency and High Life. Micron rating can be selected from 6 micron, 3 micron			
Return Line Filter Strainer	Bucket Type, 60 micron, 100% of SS 304 material			
Oil Filling	High Pressure Pump for following functions			
Pressurising System	1. Tank Filling from external oil source or barrel 2. Pressurising oil for particle counter function.			
High Pressure Sampling Point for Particle Counter	Sampling point for Particle Counter to have provision of pressure regulation upto 20 bar in order to have minimal effect of air bubbles in NAS Analysis.			
Reverse Manifold System	Combination of Butterfly Valves to achieve easy 2-direction simultaneous flow in the pipeline segment being cleaned / flushed.			

## Specifications

<b>Single Point Drain</b>	Appropriate manifold connecting all filters, strainers, other vessels for single point drain using air purging.
<b>Electrical Controls</b>	Industry Standard Automatic Control Panel to achieve following functions - <ol style="list-style-type: none"> <li>1. Motor Starting by Star Delta Starter System</li> <li>2. Heater protection and control using Temperature Controller</li> <li>3. Tank Level monitoring &amp; subsequent interlocks</li> <li>4. Motor Protections for OverLoad, Over Pressure, Dry Run</li> <li>5. Flow Rate Display</li> <li>6. Indication lamps, switches, fault display etc.</li> </ol>
<b>NAS / Contamination Analyser</b>	Optional Kit based on client requirements - Option 1 – On board, slave type, Online Particle Counter Option 2 – Portable Online Particle Counter Option 3 – Portable Online cum Offline Particle Counter
<b>Hoses &amp; Electrical Cables</b>	Optional accessory set. Not a part of Standard Supply.

## Credentials

Clients	City	Country	Capacity
Al Hareer Grand Trading Company	Dubai	United Arab Emirates	400 LPM
Arabian Industries	Sohar	Sultanate of Oman	3000 LPH
Bahrain Ship Repairing and Engineering Company (BASREC)	Manama	Kingdom of Bahrain	200 LPM
BGR Energy Systems Ltd	Chennai	India	4000 LPM
Cochin Shipyard Ltd	Cochin	India	400 LPM
Dominion Pipeline Process Ltd	Rumuodara Portharcourt Rivers State	Nigeria	580 LPM
Dresser-Rand India Pvt Ltd	Ahmedabad	India	100 LPM
EnerMech Ltd - Azerbaijan	Baku	Azerbaijan	4000 LPM
ESDUP Integrated Services Ltd	Port Harcourt	Nigeria	580 LPM
Garden Reach Shipbuilders & Engineers Ltd	Kolkata	India	100 LPM
Hydratight FZE	Dubai	United Arab Emirates	500 LPM
KOSO India Pvt Ltd - Choke & Severe Service valve Division	Nashik	India	350 LPM
Kudgi Super Thermal Power Plant (NTPC)	Bijapur	India	600 LPM
L&T Energy-Power	Vadodara	India	200 LPM
Mahan Aluminium (Hindalco)	Singrauli	India	300 LPM
Manuli Fluiconnecto Pte Ltd	Gul Drive	Singapore	400 LPM
Mark Freementle	Chonburi	Thailand	7500 LPM
Melwire Rolling Pvt Ltd	Colombo	Sri Lanka	3200 LPM
Petro Middle East	Dubai	United Arab Emirates	350 LPM
Petrofac International (UAE) LLC	Sharjah	United Arab Emirates	3000 LPM
Petroilluxe LLC	Asai	West kazakhstan	4000 LPM

## Credentials

Clients	City	Country	Capacity
R&E Petroleum Equipments Company	Salmiya	Kuwait	5000 LPM
Rohr Rein Chemie (Middle East) LLC	Abu Dhabi	United Arab Emirates	4000 LPM
Rouge LLC	Dubai	United Arab Emirates	3000 LPM
Soda Ash Unit - RSPL	Ahmedabad	India	60 LPM
Solarca SL	Tarragona	Spain	2000 LPM
Sparrow Offshore Services	Singapore	Singapore	100 LPM
Synertek Pipeline Services LLC	Muscat	United Arab Emirates	4000 LPM
Thermax Ltd	Pune	India	200 LPM
TPSC (India) Pvt Ltd	Vijayapura	India	100 LPM
Trading and Agency Services Limited Company W.L.L.	Doha Al Jadeeda Doha	Qatar	80 LPM
Trans Asia Pipeline Services	Sharjah	United Arab Emirates	4000 LPM
Trinity Hydraulic Projects LLC	Dubai	United Arab Emirates	80 LPM
Unisol Services	Al Khobar	Saudi Arabia	500 LPM
V Tech Offshore Services Pvt Ltd	Mumbai	India	150 LPM