GRAFiL
Intelligent Flow

technorbital
An ISO 9001:2000 Certified Company

ULTRAFILTRATION MEMBRANE

The sheet provides basic guideline for the use of GRAFiL Ultrafiltration membranes for industrial water and waste water management applications for removal of small particulates, colloids and microbial contaminations.

1. Flux GUIDELINE

Type of Feed Water	Unit	Operational Flux Guidelines						
		Filtration Cycle						Backwash
		Dead End		Cross-Flow				
				With Media Filter		Without Media Filter		
		Time, min	Flux, $l.m^{-2}.h^{-1}$	Time, min	Flux, $l.m^{-2}.h^{-1}$	Time, min	Flux, $l.m^{-2}.h^{-1}$	$l.m^{-2}.h^{-1}$
Bore Water	$l.m^{-2}.h^{-1}$	0.5	80	NA	NA	NA	NA	160
Surface Water	$l.m^{-2}.h^{-1}$	0.5	50	1	85	0.5	70	160
Treated Sewage	$l.m^{-2}.h^{-1}$	NA	NA	1	70	0.5	50	160
Treated Effluent	$l.m^{-2}.h^{-1}$	NA	NA	0.5	60	0.5	40	160
Effluent with Solvent*	$l.m^{-2}.h^{-1}$	NA	NA	0.5	50	0.5	40	160
Sea Water	$l.m^{-2}.h^{-1}$	NA	NA	0.5	40	0.5	30	160

*Use of GRAFiL depends on the type of solvent present in the effluent. For example we don't recommend GRAFiL for effluent having solvents like DMF, DMAc, DMSO and NMP.

2. Process ENGINEERING

Ultrafiltration Module	Unit	All Model
Mode of Operation		Out - In
Maximum Applied Feed Pressure	$kg.cm^{-2}$	2
Maximum Trans-membrane Pressure	$kg.cm^{-2}$	< 1.5
Backwash Duration	s	30-60
Backwash Frequency	min	15-60
Backwash Flux	$l.m^{-2}.h^{-1}$	160
Typical Clean water Flux Range	$l.m^{-2}.h^{-1}$	200 - 250
Minimum Operating Temperature	°C	5
Maximum Operating Temperature	°C	40
Operating pH Range		3.5- 10.5
Cleaning pH Range		2-12
Instantaneous Chlorine Tolerance	$mg.l^{-1}$	200
Maximum Instantaneous Feed Turbidity	NTU	100-300
Maximum shell inlet pressure	$kg.cm^{-2}$	3.5
Continuous FRC	$mg.l^{-1}$	0.2
Process Cycle		Process-Backwash
Chemical Cleaning Method		CIP

3. Physical PROPERTIES

Ultrafiltration Module	Unit	All Model
Configuration		Cross-flow / Dead End
Membrane Type		Hollow Fibers
Membrane Material		PolyNorbit
Housing Material		UPVC
Fiber Dimensions OD|ID	mm	1.2|0.8
Pore Size	micron (µ)	0.02
MWCO (Nominal)	kDa	75
System Integration		Modular Rack

4. Chemical COMPATIBILITY

Ultrafiltration Module	All Model
Disinfection Chemicals	$NaOCl$ / H_2O_2
Cleaning Chemicals	Citric Acid
Cleaning Chemicals	Na_2CO_3

5. Performance GUARANTEE

Ultrafiltration Module	Unit	All Model
Filtrate Turbidity	NTU	< 0.5
Bacteria Removal	log reduction	6
Virus Removal	log reduction	4
Total Suspended Solids	$mg.l^{-1}$	<1
Silt Density Index SDI_{15}		<3

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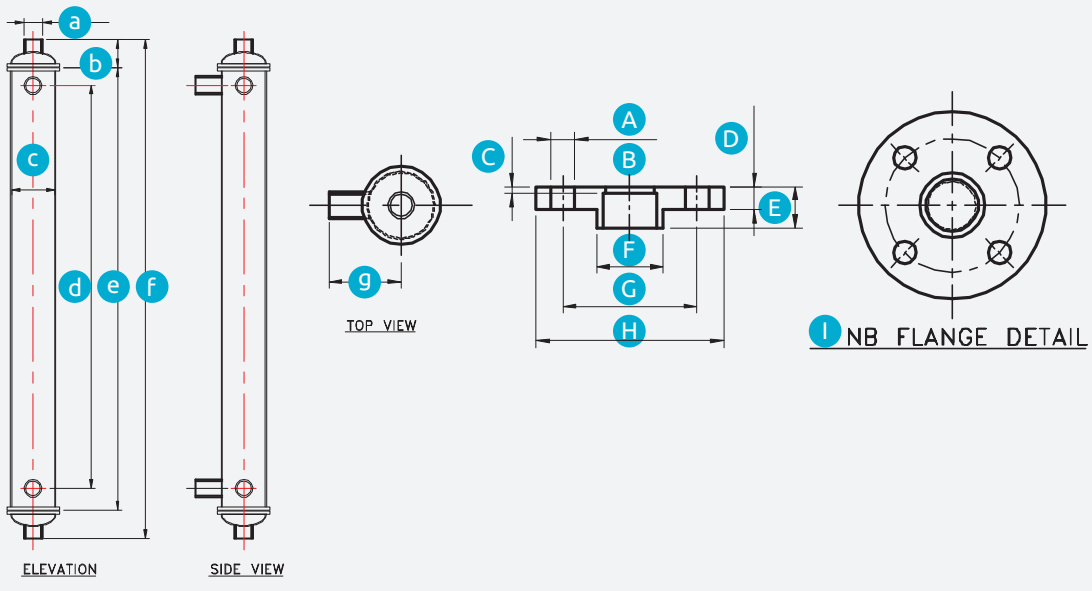
6. Engineering SPECIFICATIONS

Membrane	4040	6040	8040	8060	10050	10060
Weight (kg)	7	16	26	38	45	55
Membrane Area (m2)	9	26	37	55	75	100
a	32	40	50	50	50	50
b	65	137	142	142	133	133
c	100	175	215	215	250	250
d	926	915	880	1388	1353	1500
e	1016	1016	1016	1524	1524	1625
f	1146	1290	1300	1808	1670	1766
g	110	170	190.5	190.5	125	125
A	18	18	18	18	18	18
B	4 NOS	4 NOS	4 NOS	4 NOS	4 NOS	4 NOS
C	5	5	5	5	5	5
D	17	19	21	21	21	21
E	31	36	43	43	43	43
F	50	61	75	75	75	75
G	100	110	125	125	125	125
H	140	150	165	165	165	165
I	32	40	50	50	50	50
8060 module dimensions are same as 8040 except length that is 20" more.						



7. Storage PROTOCOL

GRAFiL pressurized UF Modules shall be stored between 5°C and 35°C (41°F to 95°F) intact in original factory packaging for up to 18 months. Do not expose the membrane module to sources of heat, ignition, flooded water or direct sunlight (UV light).

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