NEW GENERATION MEMBRANES clean water for life



clean water for life

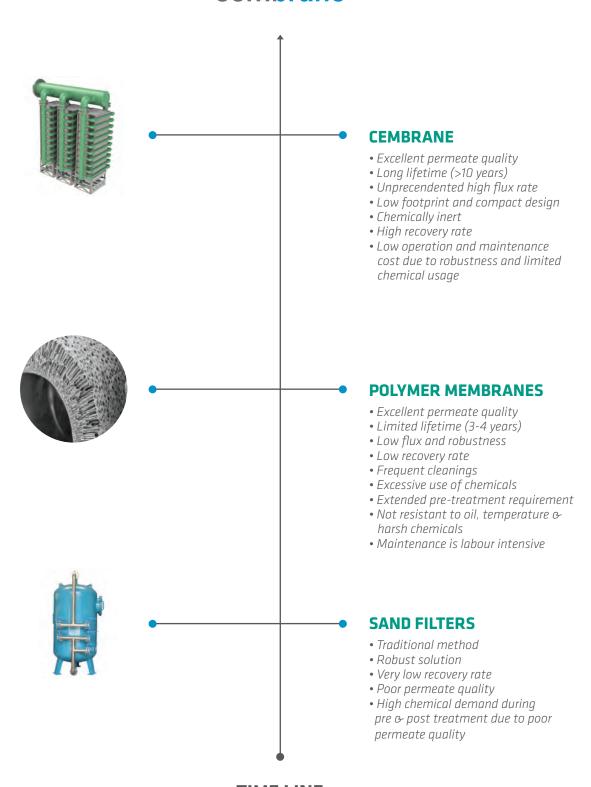
COMPANY *overview:*

- Cembrane Founders: Silicon Carbide Membrane Pioneers
- Production facilities in Denmark capacity of 70.000 m2/year
- Patented membrane technology
- Focus to provide ceramic MF/UF membranes + modules to OEM's
- Silicon Carbide membrane producer for:
 - Drinking water from the Ground-, Surface- and Sea
 - Pre-Reverse Osmosis
 - Industrial waste water (MBR, MBBR, TSE, CMP, etc)
 - Recovery of Sandfilter backwash water



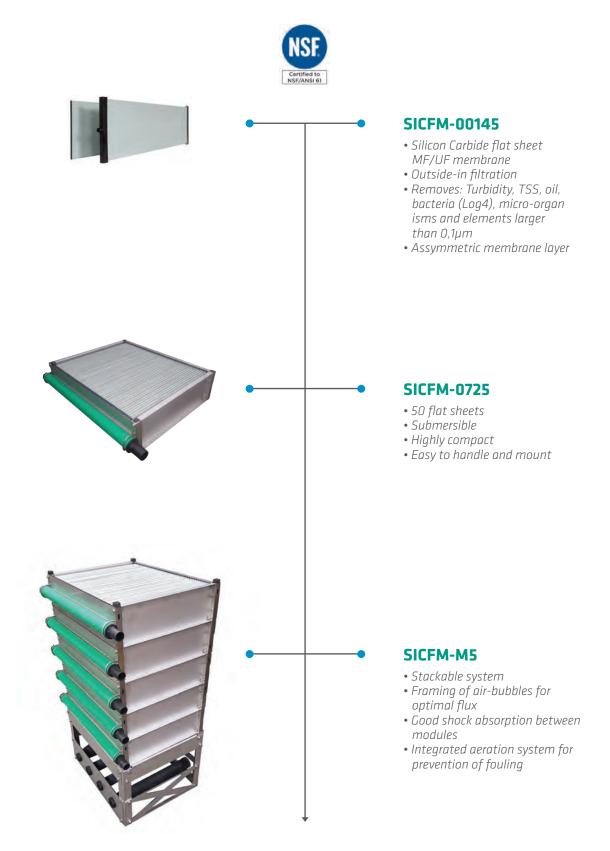
EVOLUTION of filtration:

cembrane



TIME LINE

PRODUCT *scope:*



MODULE & RACK specifications:

- Modular and stackable design easy add-on or removal of individual membrane sheets
- Mobile installations possible due to shock absorbing spacers and connections
- Cleaning is done thorugh scrubbing of coarse air-bubbles from under the membranes
- Membrane applied on the outside for simple integrity testing
- Submerged suction based or pressurized Outside in filtration

SPECIFICATIONS:	SICFM-0725	SICFM-M4	SICFM-M8	SICFM-M10
MEMBRANE MATERIAL	Reaction bonded Silicon Carbide			
END-CAPS	Glass fiber reinforced thermo-plastic (NSF 61 approved)			
NOMINAL PORE SIZE	0,1 µm			
MEMBRANE SURFACE AREA [M²]	7,25	29	58	73
MEMBRANE AREA TO FOOTPRINT RATIO [M²/M²]	20	81	162	204
DIMENSIONS [WXLXH MM] EXCL. AERATION BOTT OM (200MM)	627x570x160	627x570x640	627x570x1280	627x570x1600
MAXIMUM OPERATING TEMPERATURE	80°C			
MAXIMUM BACKWASH PRESSURE	3 bar			
OPERATING RANGE [BAR SUCTION]	0 - 0,7 bar			
CLEAN WATER PERMEABILITY	10.000 ltr./m²/hour/bar			
APPROXIMATE DAILY FLOW IN MBR [M³/DAY]*	8	34	68	85
APPROXIMATE DAILY FLOW WITH GROUND WATER FEED [M³/DAY]	130	520	1.000	1.300

^{*}MLSS: 12 G/LTR



FIELDS OF APPLICATION	Achieved benefits
INDUSTRIAL WASTE WATER	High corrosion & temperature resistance
PRE-TREATMENT TO RO	Low footprint & good and stable RO feed quality
DRINKING WATER GROUND- AND SURFACE WATER	High recovery rate, high flux & good and stable water quality
OIL & WATER SEPARATION	High flux, oil repellent & efficient cleaning
MBR	Limited fouling, stable operation even in MLSS upsets & long lifetime

WHY USE SILICON carbide membranes?

- Unprecedented high flux rate
- Chemical resistance
- Anti-clogging effect due to strong negative charge

UNPRECEDENTED HIGH FLUX RATE:

One of the key benefits of Silicon Carbide is its hydrophilic behaviour, resulting in un-matched flux- and recovery rates:

FLUX RATE		Achieved benefits
Low contact angle between water and SiC		Low membrane surface area required
Super hydrophilic surface	HIGHEST FLUX RATE FOR ANY MEMBRANE MATERIAL	Low footprint & compact designs
Ultrathin membrane layer		Low pressure operation -> low energy
High porosity substrate (50%)		High recovery rate

Below table lists average flux rates in different types of feed waters:

AVERAGE FLUX RATE	REMOVAL	LMH
GROUND WATER	FE, MN, RA, AS	575-1200
SEA WATER PRE-RO	ALGAE, TSS, OIL	200-500
SURFACE WATER	MICRO ORGANISMS, TSS, SILT	200-600
MBR	TSS, BACTERIA, COD, BOD	45-80
MBBR	TSS, BACTERIA, COD, BOD	100-200
TREATED SEWAGE EFFLUENT	TSS, BACTERIA, COD, BOD	100-200
SANDFILTER BACKWASH WATER	COAGULALENTS, TSS, MICROORGANISMS, BACTERIA, ETC.	300-500

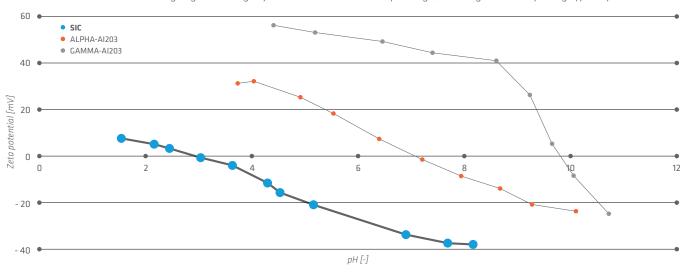
CHEMICAL RESISTANCE:

Silicon Carbide is chemically inert and exhibit close to 0% weight loss in extreme conditions. Below table illustrates the associated benefits:

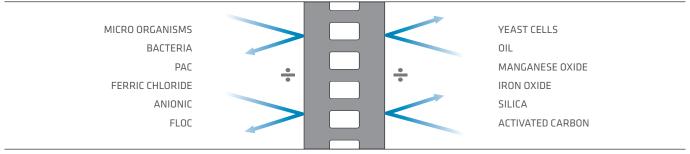
CHEMICAL RESISTANCE		Achieved benefits
CHEMICALLY INERT MEMBRANE IS STABLE membrane material in extreme conditions	Resistant to Ozone	
		Resistant to Solvents
		Resistant to pH 1-12 constant exposure
	in extreme conditions	Resistant to Oxidizing agents
		Enables strong and repeative chemical cleanings
		Long membrane life

ANTI-CLOGGING EFFECT DUE TO STRONG NEGATIVE CHARGE:

Below curve illustrates the strong negative charge of Silicon Carbide on a wide pH range, resulting in an anti-fouling effect of the membrane:



The unique zeta potential of Silicon carbide enables the membrane to repel other negatively charged particles.



Cross section of flat sheet membrane

By repelling negatively charged particles you will achieve limited surface bio-fouling and significantly longer cleaning frequencies:

ZETA POTETIAL	Achieved benefits		
STRONG NEGATIVE charge of SiC at pH 7-8	Limited Bio-fouling		
	Limited risk of clogging	STABLE OPERATION & limited maintenance	
	Extensive backwash frequency		

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