MEMCOR® MBR

SPECIFICATION SHEET

DuPont Water Solutions

Document MC-MBR-RACK-AU-PS-A4-V02_0715
Issue 2
Issue Date 15 January 2020

MEMCOR® MBR Systems

MemRACK™ Assemblies

Figure 1: Typical MemRACK™ MBR nylon Rack Assembly suspended from a Rack Lifting Beam (yellow).

MEMCOR® MBR (Membrane Bioreactor) membrane filtration systems are made up of one or more MemRACK™ nylon rack assemblies. These allow up to sixteen MEMCOR® MBR Membrane Filtration Modules to be assembled onto a single membrane filtration rack. One or more MemRACK™ assemblies are then installed in a Membrane Bioreactor (MBR) Cell. MemRACK™ details and the external equipment (typically supplied by others) required for assembly, installation and maintenance are described in the following pages.

Note:

Design, data and dimensions are subject to modification without notice.

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MemRACK™ Description

To make a MemRACK™ a row of up to sixteen self-manifolding nylon Head Pieces is assembled between two moulded Adapter Plates. Typically, the Adapter Plate at one end of the rack assembly is used to blank off the filtrate and aeration manifolds in the Rack Header Assembly. The Adapter Plate at the other end of the rack assembly provides a Filtrate Spigot connection and an Aeration Spigot connection for the filtrate and aeration manifolds in the Rack Header Assembly. A stainless steel End Plate at each end of the Rack supports each Adapter Plate.

Lifting Plates are fitted to each End Plate and the entire Rack Header Assembly is held together using stainless steel tie rods. Gaskets seal the air and filtrate connections on each Head Piece.

Typically, this Rack Header Assembly is then supported, by means of the two Lifting Plates, in a suitable working area while the square MBR Membrane Filtration Modules (typically PVDF Hollow Fibre Membranes) are fitted. First, the Rack Guide Arm is attached to the stainless steel End Plate at one end of the assembly. This Guide Arm guides and holds the MemRACK™ in position during and after installation into the MBR Cell.

The first Membrane Module is then connected to its Head Piece using four stainless steel studs and nuts and sealed with a gasket. The bottom of the first Module interlocks into the bottom of the Guide Arm. The remaining Modules are then bolted one at a time to each Head Piece, with the bottom of each Module interlocked into the Module next to it. Typically, the maximum number of Modules (16) is fitted, although shorter Racks with fewer Modules can also be supplied.

When all the Modules have been fitted a nylon MemPulse® Aeration Device Assembly is fitted over the base of each Membrane Module. An Air Dropper is also fitted to each Module, connecting the Aeration Air Inlet Manifold in the Head Piece to the Aeration Device at its base to complete MemRACK™ Assembly.

The MemRACK™ can then be installed in the MBR Cell, A locking mechanism ensures that the rack remains in position as the Cell fills and drains in operation. The Filtrate and Aeration Air Manifold termination points on the rack are then connected to the plant aeration air supply and filtrate discharge piping.

Note:

Sufficient clearance should be allowed above MBR Cells for service and maintenance access. A suitable working space is also recommended in an area close to the MBR Cells for MemRACK™ maintenance.

Operation

With the MemRACK™ Assembly installed and operating, activated sludge is recirculated through the Cell while a Filtrate Pump draws filtrate from the system. Liquid is filtered through the Hollow Fibre Membranes of each MBR Filtration Module and passes up into the filtrate manifold in the Rack Header Assembly. It then passes through the Rack Filtrate outlet connection and into Cell Filtrate Manifold, through the Filtrate Pump and is discharged to filtered water storage or service.

Low pressure air is delivered, usually constantly, to the aeration connection on each Rack from the Cell Aeration Header. The aeration air travels along the air manifold in the Rack Header Assembly at the top of the Rack and is distributed to the Bottom Skirt of each Module via the Air Droppers. The air enters the MemPulse® device at the base of each Membrane Module, and is passed intermittently through slots in the base of the Module and up through the Module fibre bundles.

For more information on the MBR process please refer to the MEMCOR® MBR Process Description.

Note:

It is recommended that MEMCOR® MBR (Membrane Bioreactor) Cells are installed under cover with protection from direct sunlight and weather.

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Special Tools

Figure 2: Typical MemRACK™ nylon Rack Assembly fitted with 16 (sixteen) MBR Membrane Filtration Modules and suspended from a Rack Lifting Beam (yellow).

A range of specialised tools is available to assist with the safe assembly and maintenance of MemRACK™ MBR racks and modules. The main tools include a Rack Maintenance Stand, a custom Rack Lifting Beam fitted with safety interlocks, and a Module Test Vessel used for testing and repair of individual Membrane Modules.

For larger plants a moving Service Access Platform or MEMSAP® can be supplied. This is a specially designed rail mounted hoisting platform that simplifies MemRACK™ installation and maintenance.

Please consult Dupont Water Solutions for details of these special tool options.

Features and Benefits

MemRACK™ design offers a number of significant benefits, including:

- A building block approach, which helps to minimise plant design, installation and start up time, while providing expansion capacity and reliable, high quality filtrate in a compact footprint;
- Quality moulded components using high strength and chemically resistant glass filled nylon;
- Only two piping termination points on each MemRACK™ simplifying installation and removal;
- An elegant solution for the connection of membrane modules in MBR plants.

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Standard MBR Rack Assembly Specifications

MemRACK™ Specifications (for typical 16 Module rack)	
Number of Membrane Filtration Modules which can be fitted	Up to 16 (one Module per Head Piece)
Type of Modules [1]	MEMCOR® MBR Hollow Fibre Membrane Filtration Modules (typically B40 Modules with PVDF membranes)
Approximate Overall Rack Dimensions for typical rack of 16 x B40 Modules (L x W x H)	3960 x 280 x 2220 mm 156 x 11 x 88 inches
Approximate MemRACK™ Assembly Mass (complete with clean B40 Modules)	550 – 600 kg (1200 – 1300 lb) Note: Mass will be greater if Modules are heavily fouled.
Recommended Minimum Hoist Capacity	1000 kg (2200 lb)
Rack Filtrate Outlet Connection	80 NS (3 inch) or 100 NS (3 inch) various type options
Rack Aeration Inlet Connection	50 NS (2 inch) various type options

TYPICAL MemRACK™ MATERIALS OF CONSTRUCTION	
Membrane Filtration Modules	Refer to Module specification sheet
Module Head Pieces	Nylon
Adapter Plates	Nylon
Rack End Plates and Lifting Plates	SS316L
Rack O-Rings and Seals	EPDM
Aeration Device Assembly (MemPulse® component)	Nylon
Air Dropper Assemblies	PVC
Support Clips (various)	Nylon
Locator Plates	HDPE
Tie-rods, Miscellaneous Fasteners and Spring Clips	SS316

[1] Please refer to Memcor Module specification sheets for details of temperature, pressure, pH, and other environmental operating limits.

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