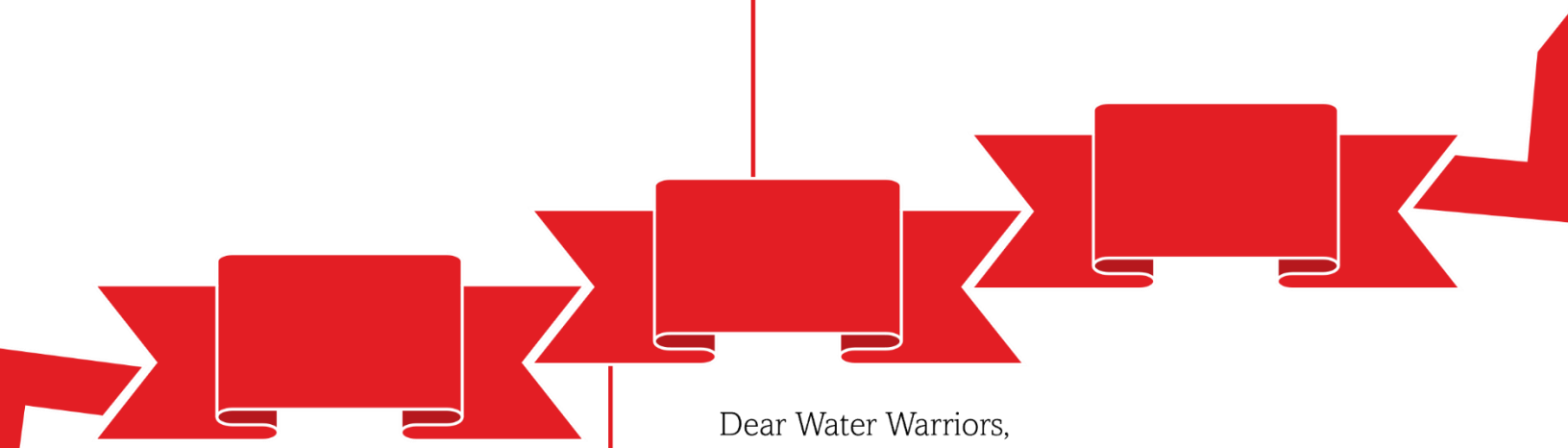


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Wignity, *adj.* - to add
dignity to the world of
water management



Dear Water Warriors,
Biological & Inorganic sludge treatment has seen a long history from Sludge drying Beds to modern Helical Screw Press. Utilizing the gravity advantage, thickening and dewatering is now more efficient.

Further different choices of material for membrane for hydrophilicity, strength and cleanability, the UF and MBR have more choices.

Enjoy reading !

Nidhi Jain
Editor



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With development of STPs and ETPs for pollution abatement, two important points are of consideration for designers namely treated water quality and reduction in sludge volume.

This edition we focus on Screw Press technology and advancement in MBR module developments. These know-hows come from established technology suppliers with several working installations.

As we progress, in time, the sludge volume reduction would be a “Designer Priority” and therefore this edition of Wignity will be a stepping stone before we discuss sludge consistency from 18-20% to 75% and above.

For more, read on:

Screw Press...Transforming Waste into Value

We thank Dynamic Equipment's Pvt. Ltd. that contributed technical points on the Screw Press for this edition of Wignity. Currently, DEPL offers solid liquid separation solution for more than 24 models and capacities ranging from 0.3 m³/h to 78 m³/h for up to 5% w/w solids concentration.

With a dedicated design engineering and product development division our products have an application of intensive cutting-edge research and development. Moreover, with an experience of making 150000 equipment, Dynamic group has extensive experience in precision manufacturing which reflects in the quality, workmanship and built of its Multi Disc Screw Press.

The multi disc screw press uses the torque and force accumulated by the gear box transmitting to a centrally driven tapering screw surrounded by alternating fixed and moving discs spaced 200 microns apart. This squeezing action along with addition of flocculant in case of sludge, provides a straining action for the solid and liquid. Moreover, the discs are self-cleaning and with each rotation of the screw, all moving discs are displaced from its location again moving back to the same position after each rotation.

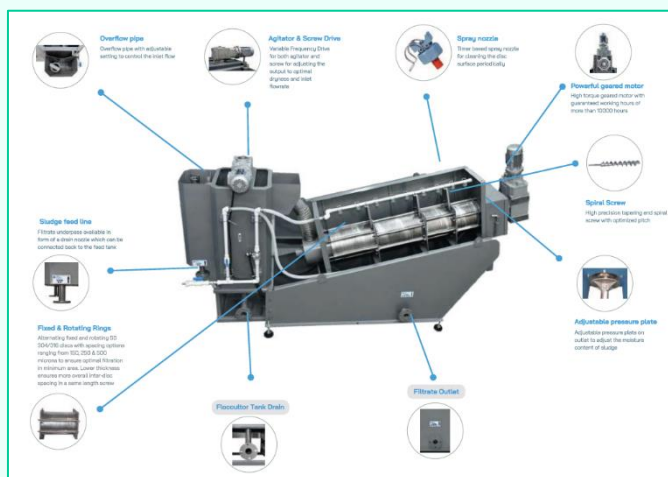
Multidisc Screw press Technology – New Age Solid Liquid Separation

Our multi disc screw press – A sludge dewatering equipment that work on the principle of mechanical filtration after coagulation – flocculation of sludge with single unit capacities ranging from 0.5 to 45 m³/h, at solids concentration ranging from 0.5% to 10% w/w.

The screw press is built with series of alternate fixed and moving discs and Helical Screw. While the helical screw facilitates



forward movement of the sludge (Diameter Range: 100mm – 550mm), the moving discs ensure self-cleaning.



Working Philosophy or operating Principles

Entire the process goes through 4 different segments:

- A. Flocculation
- B. Thickening
- C. Dewatering
- D. Filtrate Recycling



Glass Filter Media



BEST FILTRATION MEDIA FOR DRINKING WATER

What is Nature Works® - Glass Media?

Our Nature Works® Glass Filter Media is a filter media made from virgin granulated glass, **designed to replace the silica sand in the drinking water industry.**

Being NSF certified for drinking water applications, our glass media provides maximum performance; reusability; energy, water and chemical savings; certified purity and total safety during installation.



UNMATCHED FILTRATION AND TSS REMOVAL FOR DRINKING WATER APPLICATIONS

Why choose Nature Works® Glass Media as your filtration technology?



Helps with Significant Water Savings - Allows for high reusability of the filtered water, thanks to its outstanding filtration and bacteria resistance.



Significant SDI & Turbidity Reduction - It's superior filtration capacity is as low as 1 micron, leading to lower TSS, SDI and turbidity in the outlet.



Protection to RO & UF Membranes - The significant removal of TSS load provides added protection to RO and UF membranes, increasing membrane life and saving costs.



No Biofilm/Slime problems - The anti-compaction technology of our media prevents channelling, which helps in preventing algae/slime formation.



PURE WATER ENTERPRISES PVT. LTD.

308, Matharu Arcade, Subhash Road, Vile Parle East, Mumbai - 400056.

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Flocculation Stage

The sludge enters the inlet nozzle by a sludge feed pump. Sludge flows through a triangular weir and baffle where polyelectrolyte is dosed.

Then, the sludge gets coagulated, and flocculation is enhanced in the flocculation tank equipped with a VFD controlled slow moving mixer.

The coagulated sludge subsequently enters the first screw chamber through the flexible hose

(Adjustable weir coupler is provided to control the feed flow and returning the excess flow to the feed tank)
(Based on the sludge characteristics anionic or cationic polyelectrolyte is dosed)
(ranging from 12-22 RPM)

Thickening & Dewatering Stage

In first screw chamber, the water gets filtered from the discs and sludge starts becoming dryer and thicker.

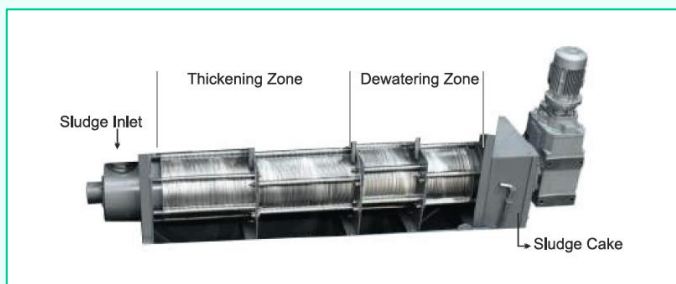
The last compartment opens against an adjustable pressure plate. Which can be adjusted based on the dryness of the sludge cake required using gauge strips.

The dryness can be varied based on requirement from 70-85% moisture (Two adjustments of 3 mm and 5 mm is possible)

Filtrate Recycle Stage

The filtered water collected in the sump will be returned as per requirement.

Self-cleaning water jet arrangement cleans the disc surface in case of any sludge leakages outside the discs ensuring clogging free, reliable and consistent operations.



Key Data required for selection of the right product

1. Type of sludge chemical or biological
2. Sludge flow rate in m³/h
3. Sludge consistency in % w/w
4. TDS and chloride in ppm
5. Whether any abrasives are present or not?

A PFD of treatment scheme would be an additional comfort.

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Filtration...The Cornerstone of Effective Water Treatment

We thank MANN+HUMMEL that contributed technical points on the Filtration for this edition of Wignity. Their core competency, filtration, is the basis of their business and their responsibility. They are convinced that filtration makes the difference, and MANN+HUMMEL provides key technologies helping to enable a cleaner planet. By separating the useful from the harmful, they are contributing to common goals.

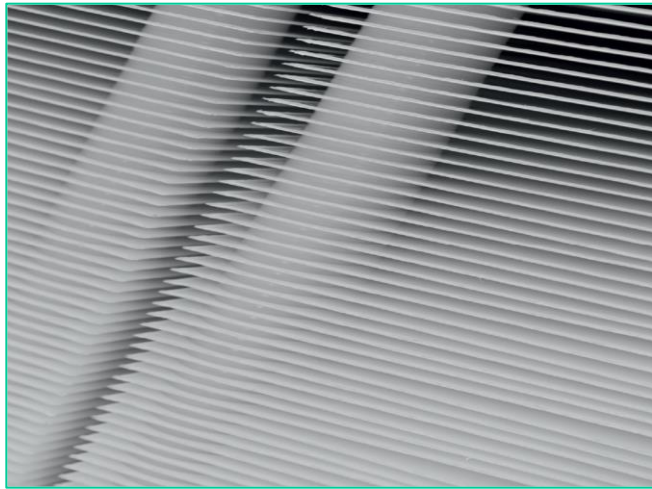
Their solution covers the entire span of filtration technologies, from prefiltration to reverse osmosis.

MBR technology has proven its worth across a wide and versatile range of applications – spanning municipal wastewater treatment, industrial effluent purification, and large-scale water reuse initiatives.

This advanced membrane solutions deliver improved effluent quality, enhanced biological efficiency leading to a 30-40% reduced environmental footprint, and the flexibility to effortlessly handle variable flow rates – making MANN+HUMMEL membrane biological reactors the ideal choice for tackling diverse wastewater treatment challenges.

New UV400 High Flux UF MBR Membrane

It's offering up to 20% higher average flux and 40% higher peak flux compared to the previous generation.



Key Features

- Specifically developed for MBR application
- High clean water permeability
- Excellent mechanical stability
- High durability
- High chemical resistance
- Narrow pore size distribution
- Excellent effluent quality for reuse

UV400 PVDF Ultrafiltration Membrane

Membrane chemistry	Nom. Pore Size	Clean Water Permeability
Polyvinylidenefluorid (PVDF)	0.06 µm	>1200 LMH/bar (48 GFD/psi)

BIO-CEL+ MBR Series Module Configurations

BIO-CEL series stand out as a cutting-edge solution that seamlessly integrates the advantages of both flat sheet and hollow fiber membranes, creating a robust and highly efficient MBR system:

1. BIO-CEL EASY
2. BIO-CEL L+ Series
3. BIO-CEL L2 Series
4. BIO-CEL M+ Series

BIO-CEL EASY

The BIO-CEL EASY is small but mighty and each module can treat 12 to 24 m³/d. The module can be also delivered pre-assembled in a stainless-steel tank which can be easily transported by forklifts through standard doors.

Due to its low space requirements, it perfectly fits into the existing infrastructure. The construction time can be reduced significantly due to its built-in filtration tank. The effluent can be reused for instance for irrigation purposes within the infrastructure of i.e. motels or ships.



BIO-CEL offers a patented self-healing laminate technology, which is a proven technology since 15+ years and combines the advantages of flat sheet and hollow fiber membranes, allowing for backwash capability and increased durability. The modules offer easy assembly and installation; fast and simple design; and flexible configurations, which saves on installation costs, engineering hours, and investment costs.

BIO-CEL EASY Tank



The BIO-CEL EASY module fits perfectly in the filtration tank. The perfect pair of tank(s) and module(s) ensures a plug-and-play experience. As an added benefit, the tank can be installed with a forklift, no crane required; it is compact and fits through the normal door size for ease of installation.

Membrane Material

Polymer: PES

Membrane Type: Ultrafiltration

Support Layer: Polyester

Drainage: Polyester

Specifications & Dimensions

Type	Membrane Area [m ²]	Membrane Area [ft ²]	Dimensions [mm]	Dimensions [ft]	Housing Material
Module	50	538	674 x 590 x 1351	2.2 x 1.9 x 4.4	Stainless Steel
Tank	-	-	1066 x 706 x 2036	3.5 x 2.3 x 6.6	Stainless Steel

Note: nominal values

BIO-CEL M+

The BIO-CEL M+ is available in 100 and 200 m² and can treat up to 120 m³/d per single module. The BIO-CEL M+ was specifically developed to meet the dimensions of containerized high cube containers and is ideal for medium sized plant sizes.

In contrast to conventional activated sludge wastewater treatment systems, the BIO-CEL M+ offers the highest packaging density in order to build modular systems based on 20- or 40-feet containers.



BIO-CEL offers a patented self-healing laminate technology, which is a proven technology since 15+ years and combines the advantages of flat sheet and hollow fiber membranes, allowing for backwash capability and increased durability. The combination of flexible laminate sheets and 360-degree accessible design offers the lowest ease of maintenance within the market.

Membrane Material

Polymer: PVDF

Membrane Type: UV400

Support Layer: Polyester

Drainage: Polyester

Pore size: 0.06 µm

Module

BIO-CEL M+ MBR modules are designed for use in high cube containers. The module is expandable due to its advanced cassette system. Its high-performance ultrafiltration membrane makes the modules more efficient and durable. The module can be combined with activated carbon for the elimination of trace substances.

Available Module Types

Module Type	Membrane Material	Membrane Area [m ²]	Membrane Area [ft ²]	No. of Cassettes	Dimensions [LxWxH, mm]	Dimensions [LxWxH, ft]	Pore Size
M+100	PVDF	100	1076	1	1084 x 1221 x 1328	3.56 x 4.01 x 4.36	0.06 µm
M+200	PVDF	200	2152	2	1084 x 1221 x 2122	3.56 x 4.01 x 6.96	0.06 µm

BIO-CEL L Series

The BIO-CEL L Series is available with PES and PVDF Ultrafiltration membranes and can be assembled in 480 up to 1920 m².



- BIO-CEL 2 offers best maintenance due to 360-degree access.
- BIO-CEL L Stack is the optimum solution for standard tanks with optimized footprint.
- BIO-CEL XL-2 offers one connection point for permeate and air for the total membrane area of 1920 m².
- BIO-CEL L-2 Stack is the ideal solution for deep filtration tanks between 5.2 and 6 meters, offering an outstanding packing density of 495 m² active membrane area per square-meter footprint. It is the ideal solution for maximizing performance and tank usage in your membrane bioreactor applications.

A. BIO-CEL L-2 Stack MBR Module

High Effluent Quality: BIO-CEL MBR is the cost-effective and scalable solution for meeting challenging effluent requirements for wastewater treatment.

The BIO-CEL MBR membrane serves as an effective physical barrier for the retention of solids and bacteria. The BIO-CEL MBR modules produce a high volume of superior quality effluent at a consistent flow rate and is especially useful for water reuse applications.

Simple Maintenance: The open design of the BIO-CELL-2 module enables 360deg access of the membrane stack.

This greater access improves cleaning capabilities and significantly reduces maintenance time.

Superior Packing Density: Reach new heights of performance with BIO-CEL L-2 Stack:

With an outstanding packing density of 495 m² active membrane area per square-meter footprint, BIO-CEL L-2 Stack is the ideal solution for maximizing performance and tank usage in your membrane bioreactor applications.

Material Data

Membrane area	960 m ² (10334 ft ²)	Connection for permeate	G 2 1/2" BSPP inner thread, Stainless Steel
Recommended air scour rate (Vn)⁽¹⁾	90 Nm ³ /h (5.3 SCFM)	Dry Weight	693 kg (1528 lb)
Length	1509 mm (5.2 ft)	Membrane	NADIR® UP150
Width	1285 mm (4.2 ft)	Housing Material Options	Stainless Steel 1.4301/304 (V2A) On request: SS 1.4571/316Ti (V4A)
Height	4921 mm (16.1 ft)	Drainage Layer	Polyester (PET)
Connection for aeration	DN80 (PN10) Pipe End, Polypropylene ⁽¹⁾	Diffusor	Membrane hose: Silicone Support tube: PP

B. BIO-CEL L-2 MBR Module

Material Data:

Membrane area	480 m ² (5167 ft ²)	Connection permeate	2 1/2" G thread, Stainless Steel ⁽¹⁾
Recommended airflow rate (Vn)	90 Nm ³ /h (5.3 SCFM)	Dry Weight	540 kg (1190 lb)
Length (with diffusor unit)	1524 mm (5.0 ft)	Membrane	PES
Width	1080 mm (3.5 ft)	Housing	Stainless Steel
Height (with diffusor unit)	2435 mm (8.0 ft)	Drainage	Polyester
Connection aeration	Lapped flange DN80, PN10/16, PP ⁽¹⁾	Diffusor	Membrane hose: Silicone (SI) Support tube: Polypropylene (PP)

Note: (1) nominal values // (2) adapters available

C. BIO-CEL XL-2 MBR Module

High effluent Quality: Submerged MBR modules are state-of-the-art technology and MANN+HUMMEL Water & Fluid Solutions developed BIO-CEL to meet the needs of biological wastewater treatment plants around the world.

The increasing acceptance of MBR technology worldwide not only results in growth of the MBR market but also in an increase in largescale projects with more than 10,000 m³/d inflow to the MBR plant.



To address these demands, MANN+HUMMEL Water & Fluid Solutions developed the BIO-CEL XL-2 module. With this module, there is only one connection point for permeate and air for the total membrane area (1,920 m²), this roughly equates to > 1,000 m³/d of wastewater to be treated. For customers with large-scale applications, the BIO-CEL XL-2 modules could be the perfect fit.

Material Data

Membrane area	1920 m ² (20667 ft ²)	Connection permeate	Lapped flange DN125, PN10, PVC
Recommended air scour rate	360 Nm ³ /h (21.2 SCFM)	Dry Weight	750 kg (1653 lb)
Length	3200 mm (10.5 ft)	Membrane	PES
Width	2750 mm (9.0 ft)	Housing	Stainless Steel
Height	2750 mm (9.0 ft)	Drainage	Polyester
Connection aeration	Lapped flange DN125, PN10, PP	Diffusor	Membrane hose: PUR / SI Support tube: PP

Note: (1) nominal values

D. BIO-CEL L+960H MBR Module

Module Specification

Housing Material Options	Stainless Steel 1.4301/304 (V2A) On request: SS 1.4571/316Ti (V4A)
Drainage Layer	Polyester (PET)
Diffusors Material	Membrane hose: Silicone (SI) Support tube: Polypropylene (PP)
Nominal Membrane Area	960 m ² (10333 ft ²)

E. BIO-CEL L+480 MBR Module

Module Specification

Housing Material Options	Stainless Steel 1.4301/304 (V2A) On request: SS 1.4571/316Ti (V4A)
Drainage Layer	Polyester (PET)
Diffusors Material	Membrane hose: Silicone (SI) Support tube: Polypropylene (PP)
Nominal Membrane Area	480 m ² (5167 ft ²)

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STRONGER
Together

Strength in Unity

Collaborative Excellence in Water Treatment



Join us in embracing the "Stronger Together"
This initiative aims to unite us all in our efforts, emphasizing collaboration, support, and synergy within our community.

Let's join hands and make a difference together!

