

**25**

MEMBRANE ULTRAFILTRAZIONE  
ULTRAFILTRATION MEMBRANES



Hydrotechnologies

## DESCRIZIONE MODULI DI ULTRAFILTRAZIONE DUPONT / DUPONT ULTRAFILTRATION MODULES DESCRIPTION



Questo capitolo rappresenta una descrizione dei moduli DuPont Ultrafiltration SFP / D-2660, SFP / D-2860, SFP / D-2880, IntegraFlux™ SFP / D- 2860XP, SFP / D-2880XP, IntegraPac™ IP / D-51, IntegraPac Moduli e skid™ IP / D-77, IntegraPac™ IP / D-51XP, IntegraPac™ IP / D-77XP e moduli IntegraFlux™ UXA-2680XP.

### Caratteristiche del modulo di ultrafiltrazione DuPont

I moduli di ultrafiltrazione DuPont sono realizzati con membrane a fibra cava ad alta resistenza aventi le seguenti caratteristiche:

- Pori con diametro nominale di 0,03 µm idonei alla rimozione di batteri, virus e particolati inclusi i colloidi.
- Compatte fibre in PVDF per un'elevata resistenza meccanica e un'eccellente resistenza chimica per garantire lunga durata e maggiore affidabilità.
- Fibre in PVDF idrofilico per una facile pulizia e bagnabilità per un mantenimento a lungo termine delle prestazioni.
- Flusso dall' esterno verso l' interno per un'elevato carico di solidi in alimento e una migliorata pulibilità con aria.
- Il guscio estero in PVC-U è caratterizzato da un' ottima resistenza ai raggi UV ed elimina la necessità di vessels ad alta pressione.
- Inoltre i moduli XP offrono una permeabilità superiore fino al 35% rispetto ai moduli della generazione precedente, migliorandone così l'efficienza e la produttività.

La configurazione di flusso dall' esterno verso l' interno, consente una migliore pulizia con aria e migliora sia la rimozione delle particelle che il recupero. La modalità operativa in "dead-end" consente maggiori recuperi e sensibili risparmi energetici. Il design del modulo elimina la necessità di disporre separatamente i vessels e il loro orientamento verticale consente sia lo svuotamento per gravità che l' eliminazione dell'

This section includes the description of DuPont Ultrafiltration SFP/D-2660, SFP/D-2860, SFP/D-2880, IntegraFlux™ SFP/D-2860XP, SFP/D-2880XP modules, IntegraPac™ IP/D-51, IntegraPac™ IP/D-77, IntegraPac™ IP/D-51XP, IntegraPac™ IP/D-77XP modules and skids and IntegraFlux™ UXA-2680XP modules.

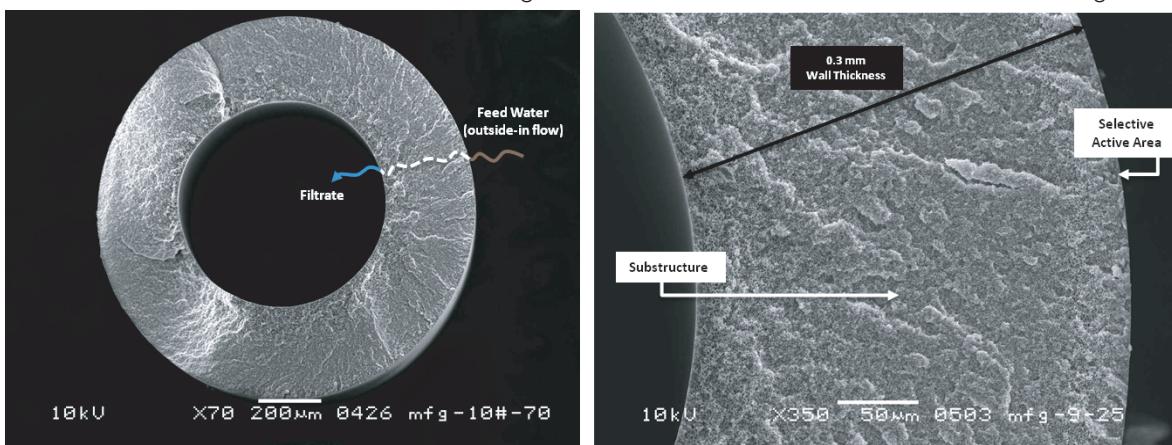
### DuPont Ultrafiltration Module Features

The DuPont Ultrafiltration Modules are made of high strength, hollow fiber membranes with features and benefits including:

- 0.03 µm nominal pore diameter for removal of bacteria, viruses, and particulates including colloids.
- PVDF fibers free of macro voids for high mechanical strength with excellent chemical resistance offering long membrane life and reliable operation.
- Hydrophilic PVDF fibers for easy cleaning and wettability that help maintain long term performance.
- Outside-In flow configuration for high tolerance to feed solids and the use of air scour cleaning.
- U-PVC housings eliminate the need for pressure vessels and are resistant to UV light.
- In addition, the XP fiber products provide up to 35% higher permeability than previous generation modules improving operating efficiencies and productivity.

The outside-in flow configuration allows the use of highly effective air scour cleaning which enhances particle removal and improves recovery. A dead-end flow format achieves higher recovery and energy savings. The module housing design eliminates the need for separate pressure vessels while the vertical orientation allows gravity draining and facilitates the removal of air from cleaning and integrity testing processes.

Una sezione trasversale della fibra è mostrata in figura 7/A cross section of the standard fiber is shown in Figure 7.



La figura 7 mostra la sezione standard di una fibra / Figure Wall Cross Section of the Hollow Fiber

aria nei processi di pulizia. Le membrane a fibra cava hanno un diametro esterno di 1,3 mm e interno di 0,7 mm e sono realizzate con polimero in PVDF. Le fibre sono resistenti grazie al polimero in PVDF, una sottostruttura densa con strato attivo e selettivo disposto verso il lato di alimentazione della fibra. Le membrane in PVDF offrono un'elevata resistenza chimica, permettendo concentrazioni di NaOCl fino a 2000 mg/L e temperature di 40 °C. L'idrofilia delle fibre in PVDF è ottenuta in produzione grazie ad un trattamento a marchio brevettato. La dimensione nominale dei pori da 0,03 µm combina elevate prestazioni con alte portate. I pori più piccoli rispetto alle membrane di microfiltrazione offrono prestazioni più stabili a lungo termine.

#### Certificazioni DuPont ultrafiltrazione

La tabella 4 illustra le certificazioni per il portafoglio dei prodotti di Ultrafiltrazione della DuPont.

The hollow fiber membranes are 1.3 mm outside diameter and 0.7 mm inside diameter and are made from PVDF polymer. The fibers are strong because of a combination of the PVDF polymer, dense substructure and selective active layer formed on the feed side of the fiber. The PVDF membranes offer high chemical resistance, coping with NaOCl concentrations up to 2000 mg/L, and are tolerant to temperatures of 40°C. The hydrophilicity of the PVDF fibers is increased by using a proprietary treatment during manufacturing.

The 0.03 µm nominal pore size combines high filtration performance and high flux. The smaller pore size provides stable long term filtration performance compared to microfiltration membranes.

#### DuPont Ultrafiltration Certifications

Table 4 covers the certifications for the DuPont Ultrafiltration product portfolio.

**Tabella 4 - Informazioni sui Regolamenti e certificazioni / Table 4. Regulatory Certifications Information**

Product Name	SFP/SFD			IntegraFlux™		IntegraPac™		IntegraPac™XP	
Product Model	SFP/D-2660	SFP/D-2860	SFP/D-2880	SFP/D-2860XP UXA-2680XP SFP/D-2880XP		IP-51 IPD-51	IP-77 IPD-77	IP/D-51XP IP/D-77XP	
NSF/ANSI Std. 61 <sup>[1]</sup>	D typeonly	D typeonly	D typeonly	D typeonly	Yes	D typeonly	D typeonly	D typeonly	D typeonly
NSF/ANSI Std. 419 <sup>[1]</sup>	No	No	D typeonly	D typeonly	Yes	No	D typeonly	D typeonly	D typeonly
CADPH Drinking Water	No	D typeonly	No	No	No	No	No	No	No
CDPH Water Recycle Criteria (Title 22)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
China (MOH)	No	D typeonly	D typeonly	D type only	Yes	No	No	D type only	
Italy Drinking Water Certificate (D.M. 174)	No	D typeonly	D typeonly	D typeonly	No	Yes	Yes	Yes	Yes
Poland Certificate (NIPH-NIH)	No	D typeonly	D typeonly	No	No	D type only	D type only	No	

**Notes:**

[1] Fare riferimento alla lista della pagina web NSF per le certificazioni / Refer to NSF listings webpage for certifications.

Per rimuovere il liquido conservante presente nei moduli DuPont, questi devono essere risciacquati prima dell'avvio. Il lavaggio deve essere prolungato fino a quando non si vede più schiuma nell'acqua di lavaggio. A seconda del tipo di applicazione, può essere necessario un ulteriore risciacquo e smaltimento del filtrato. I moduli certificati NSF 61 / ANSI richiedono le seguenti procedure di risciacquo prima di produrre acqua potabile:

1. Sciacquare i moduli ad una velocità di filtrazione di almeno 40 LMH per un periodo di 4 ore.
2. Raggiungere un volume di risciacquo totale minimo di 160 LMH ore utilizzando l'acqua disponibile in alimentazione.
3. La velocità di spurgo del concentrato deve essere impostata tra 0 e 20% di quanto filtrato.
4. Durante il ciclo di risciacquo, eseguire i protocolli standard di DuPont specificamente studiati per i tipi di acqua in alimentazione.
5. Il filtrato non deve essere utilizzato come acqua potabile e deve essere raccolto in un sistema di smaltimento appropriato in base alle norme applicabili nel luogo in cui viene effettuato il risciacquo.
6. Le normative locali potrebbero richiedere un ulteriore condizionamento del sistema prima di produrre acqua potabile.

The DuPont Ultrafiltration Modules should be rinsed prior to startup to remove preservative fluid shipped in the modules. Flushing should be performed until no foam is observed in the wash water. Depending on the treatment application, additional rinsing or disposal of the filtrate may be required.

NSF / ANSI Standard 61 certified modules require the following conditioning rinse prior to producing potable water:

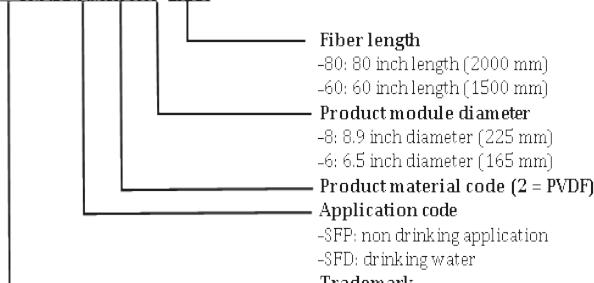
1. Rinse the modules at a feed rate of 40 LMH minimum for a period of 4 hours.
2. Achieve a minimum total rinse volume of 160 LMH hours using the feed water available.
3. The concentrate bleed rate should be set from between 0 – 20% with the balance being filtrate.
4. During the rinse cycle, perform standard cleaning protocols as per DuPont's recommendations which are specifically designed to consider the feed water quality available.
5. The filtrate should be sent to the appropriate disposal system based on the regulations that apply to the location where the conditioning rinse is carried out and not used as potable water.
6. Local regulations may require additional conditioning of the system prior to producing potable water.

**Codici dei prodotti di ultrafiltrazione DuPont**

I codici dei prodotti di ultrafiltrazione DuPont sono costituiti da una stringa di lettere e cifre come di seguito specificati.

- DuPont's UF SFD/SFP series:

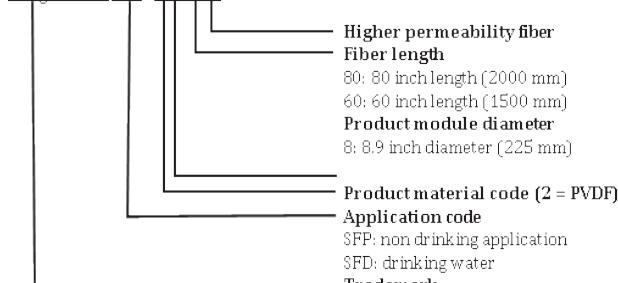
DuPont™ Ultrafiltration SFX - XXX


**DuPont Ultrafiltration Product Code**

The DuPont Ultrafiltration product codes consist of a string of letters and digits as described below.

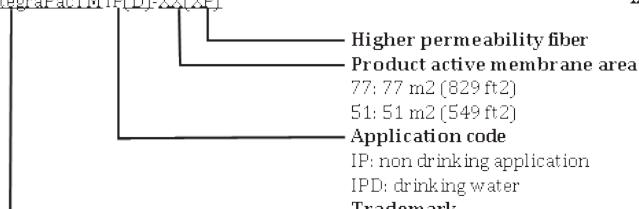
- IntegraFlux™SFD/SFP series:

IntegraFlux™ SFX - XXXXP



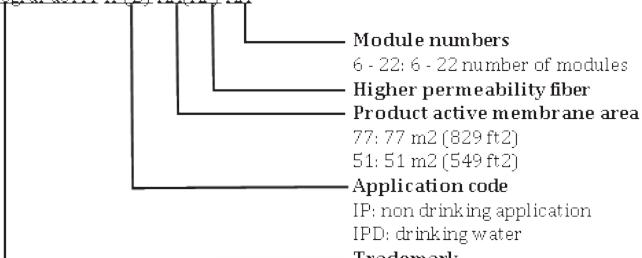
- IntegraPac™Module:

IntegraPacTM IP(D)-XX(XP)



- IntegraPac™Skid:

IntegraPacTM IP(D)-XX(XP)-XX


**Famiglia DouPont moduli di Ultrafiltrazione SFP/D e IntegraFlux™ / Family of DuPont Ultrafiltration SFP/D and IntegraFlux™ modules**

**Moduli IntegraPac™ e IntegraPac™ XP e skids / IntegraPac™ and IntegraPac™ XP modules and skids**


### DESCRIZIONE DEL PROCESSO DI ULTRAFILTRAZIONE DUPONT

Le condizioni operative base dei moduli di ultrafiltrazione DuPont sono riportate di seguito nella Tabella 9. I parametri operativi per le fasi di pulizia sono forniti nella Sezione 6.

Operating Conditions	SI	US
Maximum Inlet Feed Pressure	6.25 bar @ 20°C	90.65 psi @ 68°F
Operating TMP (Maximum)	2.1 bar	30.50 psi
Backwash TMP (Maximum)	2.5 bar	36.25 psi
Operating Air ScourFlow (Recommended)	12Nm <sup>3</sup> /h/module (7Nm <sup>3</sup> /h/module for SFP/D-2660)	7 scfm/module (4 scfm/h/module for SFP/D-2660)
Air ScourPressure	0.35 – 2.5 bar	5.0 – 36.25 psi
Filtrate Flux @25°C	40 – 110LMH	24 – 65 gfd
Temperature	1 – 40°C	34 – 104°F
Operating pH Range	2 – 11	
NaOCl, Cleaning Maximum		2,000 mg/L

All'avvio dell'impianto, i moduli devono essere lavati per rimuovere eventuali residui di sostanze chimiche e/o aria rimasta intrappolata durante l'installazione. Il flusso di risciacquo è all'esterno delle fibre, cioè non viene prodotto alcun filtrato. Una volta terminato il lavaggio, l'impianto può iniziare a produrre. All'avvio, il flusso deve essere aumentato gradualmente fino al raggiungimento delle condizioni di progetto.

### FILTRAZIONE

Il più delle volte i sistemi di ultrafiltrazione operano filtrando tutto il flusso in alimento. L'acqua in ingresso viene pompata attraverso la membrana e convertita in filtrato. In genere tutti i flussi in ingresso vengono convertiti in filtrato, in quella che viene definita filtrazione senza scarto "dead-end" (dversamente dalla filtrazione definita in "cross-flow" in cui una parte dell'alimento viene scartato). In genere i cicli di filtrazione hanno una durata che va dai 20 ai 90 minuti, a seconda delle caratteristiche dell'alimento. La Figura 25 mostra uno schema del ciclo di ultrafiltrazione DuPont.

### DUPONT ULTRAFILTRATION PROCESS DESCRIPTION

The basic operating conditions for the DuPont Ultrafiltration Modules are shown in Table 9 below. Operating parameters for the cleaning steps are provided in Section 6.

At initial plant start-up the modules must be flushed in order to remove any residual storage chemicals or air trapped during the module installation. This flush occurs on the outside of the fibers, i.e., no filtrate is produced. Once the initial flush is done, the plant can begin producing filtrate. When starting the initial filtration cycle the flow should be slowly increased before being put into operation at the design conditions.

### FILTRATION

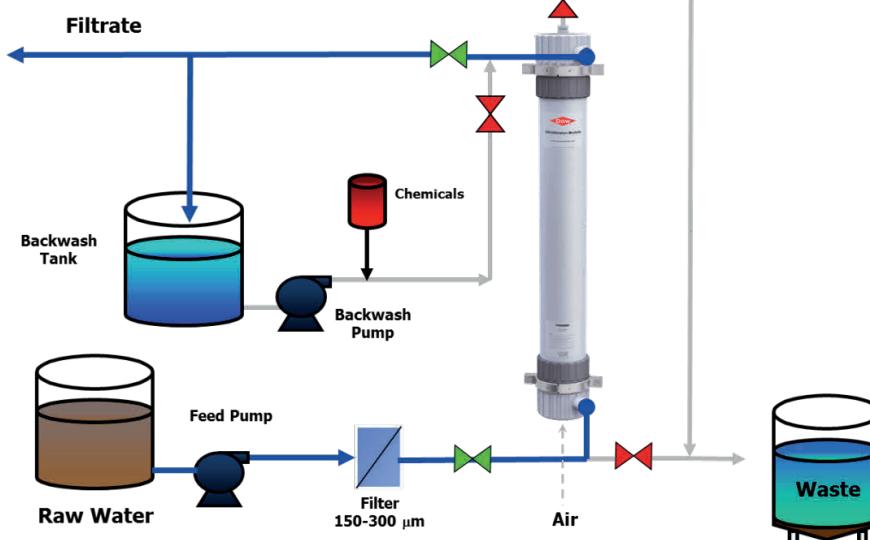
Ultrafiltration systems are most of the time in Filtration mode while in operation. The feed water is pumped through the membrane and is converted to filtrate.

Typically all feed is converted to filtrate, in what is referred as dead-end filtration

(as opposed to cross-flow filtration where a fraction of the feed leaves the system as reject).

Filtration cycles typically range from 20 – 90 minutes, depending on the feed water source and quality. Figure 25 shows a diagram of the Filtration step in DuPont Ultrafiltration Modules.

Fig.25



I sistemi di ultrafiltrazione sono in genere progettati per funzionare a portata costante. Man mano che i solidi si accumulano sulla superficie della membrana, la pressione transmembrana (TMP) aumenta e alla fine i contaminanti devono essere rimossi attraverso un controlavaggio. Il controlavaggio generalmente inizia dopo un certo tempo di funzionamento. In alternativa, può essere avviato anche in base al volume del filtrato o con un differenziale di pressione (quest'ultimo è consigliato quando l'alimento è variabile). Il ciclo di controlavaggio include insuffilamento di aria, scarico a gravità, controlavaggio con flusso diretto all'uscita superiore del modulo, controlavaggio con flusso diretto verso l'uscita inferiore del modulo e un flussaggio finale.

Ultrafiltration systems are typically designed to operate at constant flowrate. As the solids build on the membrane surface, the transmembrane pressure (TMP) increases and eventually the foulants must be removed through a Backwash sequence. The Backwash sequence is generally initiated based on time.

Alternatively, it can be initiated based on volume of filtrate or TMP set point (the latter is more appropriate for highly variable feed water quality). The Backwash sequence includes Air Scour, Gravity Drain, Backwash through the module top outlet, Backwash through the module bottom outlet and a final Forward Flush or rinse.

### INSUFFLAMENTO ARIA (scuotimento fibre)

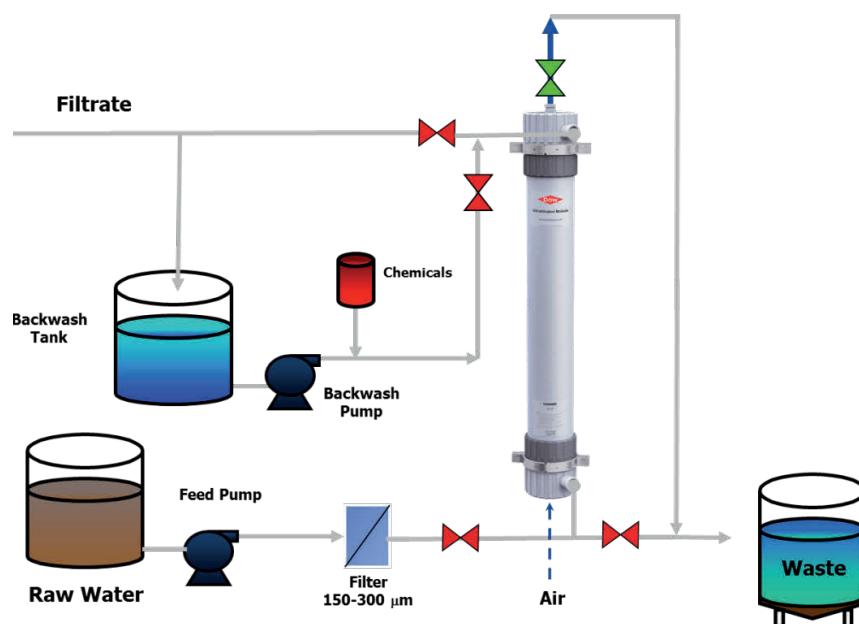
L' insufflamento di aria viene utilizzato per scuotere le fibre agevolando lo staccarsi delle particelle depositate sulle superfici esterne delle stesse. L'aria senza olio (disoleata) viene introdotta attraverso la parte inferiore del modulo creando un flusso di bolle ascendenti che aiutano a rimuovere lo sporco dalla membrana. L' acqua spostata può essere scaricata dalla porta superiore, come mostrato nella Figura 26. Dopo almeno 20-30 secondi di insuflamento continuo, il modulo viene scaricato per gravità.

### AIR SCOUR

The Air Scour step is used to loosen particulates deposited on the outside of the membrane surface. Oil-Free air is introduced through the bottom of the module creating a stream of ascending bubbles which help to scour material off the membrane. Displaced water volume is allowed to discharge through the top port of the module for disposal, as shown in Figure 26.

After a minimum of 20 – 30 seconds of continuous Air Scour, the module is drained by gravity.

**Fig.26**



### SCARICO IN GRAVITÀ

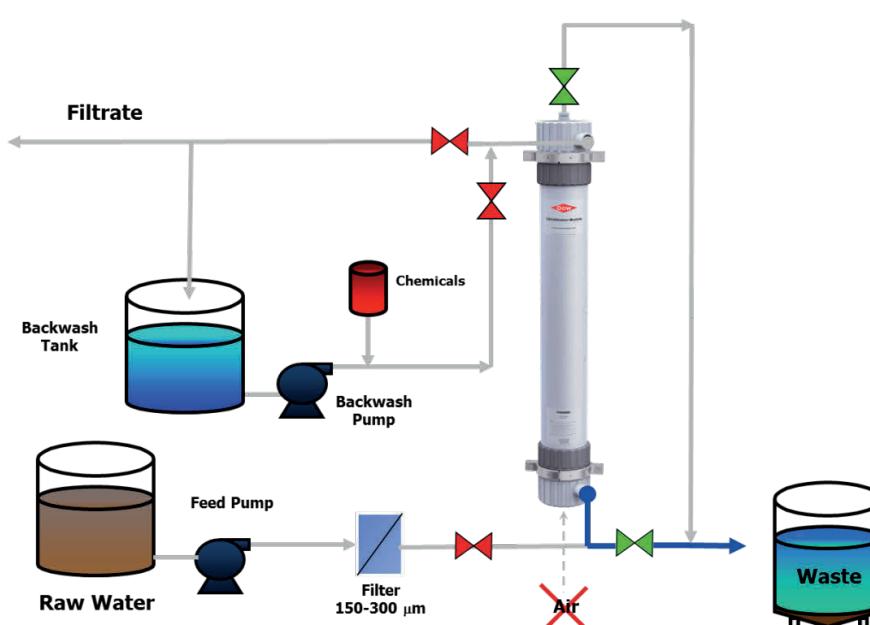
Una volta terminata la fase di Air Scour, il modulo deve essere scaricato per gravità al fine di eliminare dal sistema il materiale rimosso dalla superficie della membrana mediante la precedente fase di pulizia ad aria, come mostrato nella Figura 27. La durata di questa fase dipenderà dal volume del sistema e dalla conformazione delle tubazioni, ma in genere è impostato sui 30 - 60 secondi. Se lo scarico per gravità non è possibile a causa della configurazione del sistema o impiega troppo tempo, può essere sostituito con un flusso forzato attraverso l'uscita inferiore del modulo utilizzando la pompa di controlavaggio, anche se consumerà più acqua ed energia.

### GRAVITY DRAIN

Once the Air Scour step is finished, the module must be drained by gravity in order to flush out of the system the material dislodged from the membrane surface by the preceding air scour step, as shown in Figure 27.

The duration of this step will depend on the system volume and piping layout, but it is typically set to 30 – 60 seconds. If gravity drain is not possible due to the system configuration, or it takes too long, it can be substituted by a forced flush through the bottom outlet of the module using the backwash pump, however this will consume more water and energy.

**Fig.27**

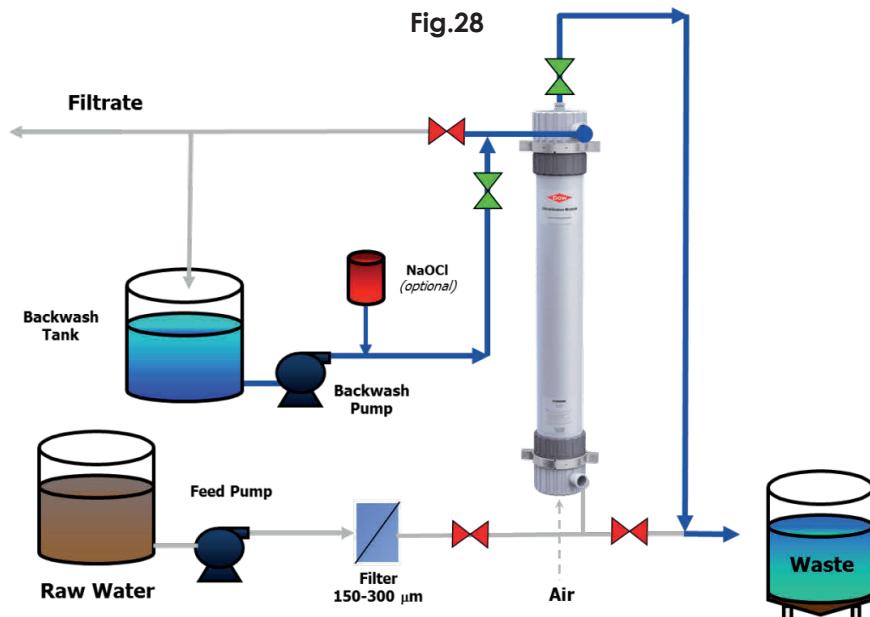


## CONTROLAVAGGIO DALL' ALTO

Dopo la fase di scarico per gravità, viene avviata la fase di controlavaggio. L'acqua filtrata viene pompata al contrario, cioè dall'interno verso l'esterno delle fibre, al fine di spingere il materiale accumulato dalla membrana. Quindi viene espulso per essere scaricato attraverso l'uscita superiore del modulo (vedi Figura 28). Il flusso di controlavaggio varia da 100 a 120 LMH e dura 30 - 45 secondi. A volte, a seconda dell'applicazione, può essere aggiunto al flusso di controlavaggio del cloro per aiutare a rimuovere i contaminanti o inibire l'attività microbiologica. Può anche essere abbinate aria per aumentare l'efficacia di pulizia.

## BACKWASH TOP

After the gravity drain step, the backwash step is initiated. Filtrate water is pumped backwards, i.e., from the inside to the outside of the fibers, in order to push the accumulated material off the membrane. Then it is flushed out to waste through the top module outlet (see Figure 28). The Backwash flux ranges from 100 – 120 LMH, and the duration of the step is 30 – 45 seconds. Sometimes, depending on the application, chlorine might be added to the backwash stream to help remove foulants or inhibit microbial activity. Air scour can be combined with the Backwash Top step to increase cleaning effectiveness.

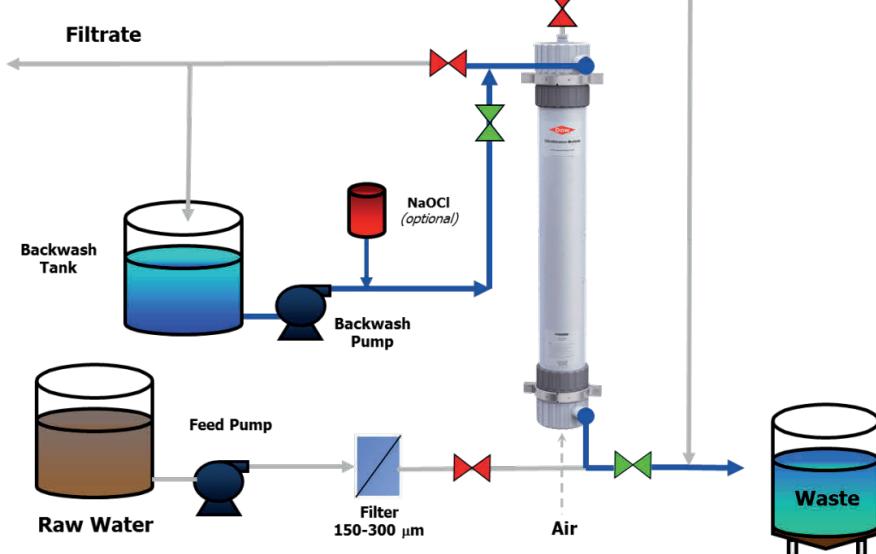


## CONTROLAVAGGIO DAL BASSO

Dopo il ciclo di controlavaggio dall' alto, il filtrato continua a fluire dall'interno della fibra verso l'esterno ma ora viene scaricato attraverso l'uscita inferiore del modulo (vedere la Figura 29), questo assicura che la fibra sia pulita per tutta la sua lunghezza. La pompa di controlavaggio non viene arrestata durante il controlavaggio alto e basso. Per evitare di danneggiare le membrane, le valvole devono essere sequenziate. Come per il controlavaggio alto, quello basso dura in genere 30 - 45 secondi e può essere aggiunto sempre cloro per aiutare a rimuovere i contaminanti o inibire l'attività microbiologica. I cicli di controlavaggio, possono essere ripetuti più volte a seconda del grado d' incrostazione. Il continuo monitoraggio della qualità del controlavaggio delle acque reflue, può essere utile per ottimizzare la durata di questi passaggi.

## BACKWASH BOTTOM

After the Backwash Top step, the filtrate continues to flow from the inside of the fiber to the outside but now it is flushed out through the bottom outlet of the module (see Figure 29), ensuring the entire length of fibers have been cleaned. The backwash pump is not stopped in the transition between Backwash Top and Backwash Bottom. The valves must be sequenced to prevent damaging the membranes. Similarly to the Backwash Top step, the duration of the Backwash Bottom is typically 30 – 45 seconds and optionally chlorine might be added to help remove foulants or inhibit microbial activity. The backwash steps can be repeated numerous times depending on the degree of fouling. Monitoring the backwash wastewater quality can be useful to optimize the durations of these steps.



**FLUSSAGGIO FINALE IN EQUICORRENTE**

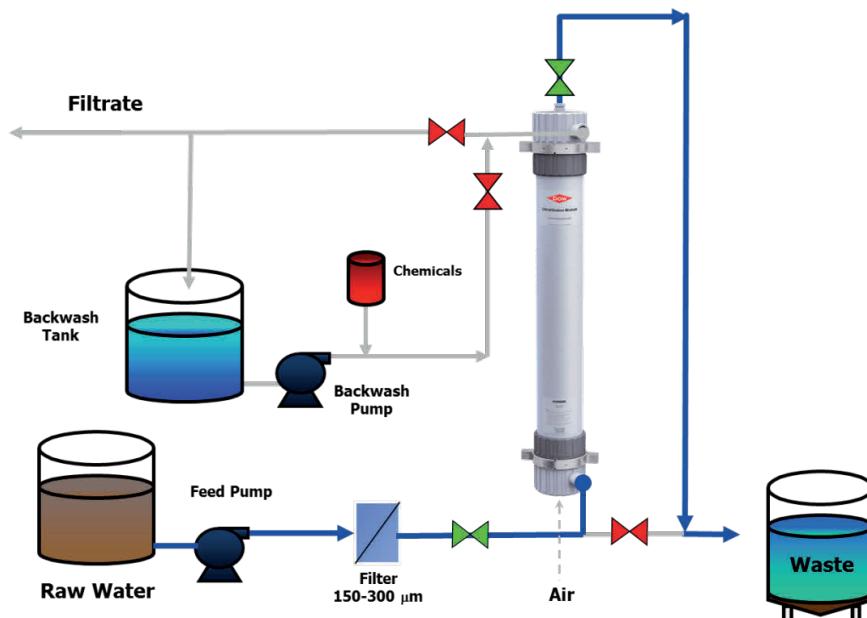
La sequenza dei lavaggi viene completata con un flussaggio in equicorrente. In questa fase, l'acqua di alimentazione viene utilizzata per risciacquare il sistema rimuovendo i solidi residui e l'aria che potrebbe essere rimasta intrappolata nel sistema durante le fasi precedenti. L'acqua scorre all'esterno delle fibre (lato alimentazione) con la valvola del filtrato chiusa, uscendo attraverso la parte superiore del modulo, come mostrato nella Figura 30. Questo passaggio dura in genere 30-60 secondi o abbastanza a lungo per riempire i moduli e spurgare l'aria e l'acqua dall'uscita. Successivamente, il sistema torna alla modalità Filtrazione e il ciclo ricomincia.

**FORWARD FLUSH**

The backwash sequence finalizes with a Forward Flush. In this step, feed water is used to rinse the system to remove remaining solids and the air that might have got trapped in the system during the precedent steps.

Water flows on the outside of the fibers (feed side) with the filtrate valve closed, and exits through the module top outlet, as shown in Figure 30. This step typically lasts 30 – 60 seconds or long enough to refill the modules and purge air and water from the outlet.

After this, the systems returns to Filtration mode and the cycle starts again.

**Fig.30**

## MODULI DuPont SERIE 26 e 28 / DuPont UF and 26/28 SERIES MODULES

Il modulo 2660 è una eccellente scelta per sistemi con produzione fino a 50 m<sup>3</sup> / ora (220 gpm). Questo modulo da 1,5 m (60 pollici) offre efficienze più elevate rispetto a moduli di lunghezza superiore. Il modulo con diametro di 15 cm (6 pollici) consente un design più compatto per installazioni compatte. Il 2860, il più corto, è consigliato per tutti i sistemi dove occorre limitare l' altezza. Il 2880 ha una superficie filtrante superiore al 2860 pur mantenendo la stessa impronta del modello 2860, permettendo la realizzazione di sistemi più economici. Su ogni modulo ci sono quattro connessioni. Il flusso in ingresso entra e viene distribuito nei moduli attraverso la porta di alimentazione laterale situata nella parte laterale inferiore di ciascun modulo. L'ingresso dell'aria si trova nella parte inferiore e viene utilizzato per il lavaggio con aria e per i test d' integrità. Il concentrato (scarico proveniente dall'esterno della fibra) è la porta posta in alto al centro, mentre il filtrato (flusso all'interno della fibra) si trova nella porta laterale e superiore del modulo.

La Tabella 5 mostra le dimensioni, i collegamenti e le specifiche riferite ai moduli di Ultrafiltrazione DuPont SFP/D e SFP/D XP, come illustrato nelle pagine seguenti. Sottolineiamo che le tolleranze di fabbricazione, di espansione termica e lo spessore della clip di base, non sono inclusi nella tabella. Per queste informazioni riferirsi ai disegni d' installazione.

The 2660 module is an excellent choice for systems capacities of 50 m<sup>3</sup>/hr (220 gpm) or less. This 1.5 m (60 inch) length module offers higher efficiencies over a wider range of feed water conditions compared to longer length modules. The 15 cm (6 inch) diameter module allows a more compact design for space constrained installations.

The 2860, which is shorter in length, is recommended for smaller systems and where building height is a concern. The 2880 has higher membrane area for the same footprint offering a more economical design.

There are four connections in each module. Feed flow enters and is distributed into the modules through the side feed port located at the side bottom of each module. The air inlet is located at the bottom of the module and is used for air scouring and integrity testing. The concentrate (discharge of waste flows from the outside of the fiber) is the top central port and the filtrate (inside of fiber) is located at the side top port of the module.

Table 5 shows dimensions, connections and specifications for the DuPont Ultrafiltration SFP/D and SFP/D XP modules family, as depicted in the next pages. Note that manufacturing and thermal expansion tolerances and the thickness of the base clip are not included in the dimensions below. Refer to the installation drawings for this information.

**Tabella 5 / Table 5**

Product Name		DuPont Ultrafiltration SFP/D and IntegraFlux™SFP/D XP modules family					
Product Model		SFP/D-2660		SFP/D-2860 SFP/D-2860XP		SFP/D-2880 SFP/D-2880XP	
Units		SI	US	SI	US	SI	US
Active Area		33 m <sup>2</sup>	355 ft <sup>2</sup>	51 m <sup>2</sup>	549 ft <sup>2</sup>	77 m <sup>2</sup>	829 ft <sup>2</sup>
Fibers Length		1500 mm	59.1in	1500 mm	59.1in	2000 mm	78.7in
MaxModuleInlet Pressure @ 20°C/68°F		6.25 bar	90.65 psi	6.25 bar	90.65 psi	6.25 bar	90.65 psi
MaxModuleInlet Pressure @ 40°C/104°F		4.75 bar	68.89 psi	4.75 bar	68.89 psi	4.75 bar	68.89 psi
Length - L		1863mm	73.3in	1863mm	73.3in	2363mm	93.0 in
Length - L1		1500 mm	59.1in	1500 mm	59.1in	2000 mm	78.7in
Length - L2		1613mm	63.5 in	1633mm	64.3 in	2133mm	84.0 in
Length - L3		1713mm	67.4in	1823mm	71.8in	2323mm	91.4in
Diameter		165mm	6.5 in	225 mm	8.9 in	225 mm	8.9 in
Width - W1		125mm	4.9 in	180 mm	7.1in	180 mm	7.1in
Width - W2		250 mm	9.8 in	342 mm	13.5in	342 mm	13.5in
Empty/ Shipping/ Flooded Weight		25/30/41 kg	55/66/90 lbs	48/55/83	106/121/183	61/71/100	135/156/220
Volumepер module		16L	4.2 gal	35 L	9.3gal	39 L	10.3gal
FeedPort	DN50 Side Coupling	NPS 2" Side Coupling		DN50 Side Coupling	NPS 2" Side Coupling	DN50 Side Coupling	NPS 2" Side Coupling
	DN50 Side Coupling	NPS 2" Side Coupling		DN50 Side Coupling	NPS 2" Side Coupling	DN50 Side Coupling	NPS 2" Side Coupling
Filtrate Port	DN32 Top Coupling	NPS 1 1/4" Top Coupling		DN50 Top Coupling	NPS 2" Top Coupling	DN50 Top Coupling	NPS 2" Top Coupling
	DN32 Top Coupling	NPS 1 1/4" Top Coupling		DN50 Top Coupling	NPS 2" Top Coupling	DN50 Top Coupling	NPS 2" Top Coupling
Air Scour Connection	G 3/8" (Standard)		G 3/8" (Standard)pr DN32 Glued Fitting (Option)		G 3/8" (Standard)pr DN32 Glued Fitting (Option)		
Housing	UPVC	UPVC	UPVC	UPVC	UPVC	UPVC	UPVC

## Moduli Ultrafiltrazione DuPont Modello SFP-2660 e SFD-2660 / DuPont Ultrafiltration Modules Model SFP-2660 and SFD-2660



### Description

The DuPont ultrafiltration (UF) modules are made from high strength, hollow fiber membranes that have excellent features and benefits:

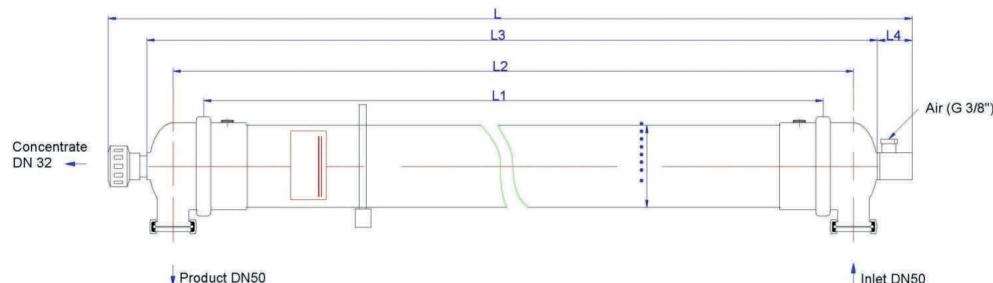
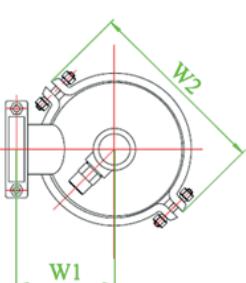
- 0.03 µm nominal pore diameter for removal of bacteria, viruses, and particulates including colloids to protect downstream processes, such as RO
- PVDF polymeric hollow fibers for high strength and chemical resistance allows longer membrane life
- Hydrophilic PVDF fibers for easy cleaning and wettability that help maintain long term performance
- Outside In flow configuration for high tolerance to feed solids that helps reduce the need for pretreatment processes
- U-PVC housing, helping to eliminate the need for costly pressure vessels

This module is an ideal choice for systems capacities of 50 m<sup>3</sup>/hr (220 gpm) or less. The shorter, 60 inch length module offers higher efficiencies over a wider range of feed water conditions compared to longer length modules. The smaller, 6 inch diameter module allows a more compact design for space constrained installations.

DuPont Ultrafiltration Modules can be used for a wide variety of treatment applications such as surface water, seawater, industrial wastewaters, and secondary effluent wastewater.

### Typical Properties

Model	Type	Part #	Membrane area		Module volume		Weight (empty/ water filled)	
			m <sup>2</sup>	ft <sup>2</sup>	liters	gallons	kg	lbs
SFP-2660	Pretreatment	280931	33	355	16	4.2	25/41	55/90
SFD-2660	NSF/ANSI 61 Drinking water	324166	33	355	16	4.2	25/41	55/90

**Dimensions** SFP and SFD 2660 (6-inch diameter)


Properties	Length				Diameter	Width	
Units	L	L1	L2	L3	D	W1	W2
SI (mm)	1863	1500	1610	1710	165	125	250
US (inch)	73.2	59.1	63.4	67.3	6.5	4.9	9.8

**Suggested Operating Conditions**

	SI units	US units
Filtrate Flux @ 25°C	40 – 90 l/m <sup>2</sup> /hr	24 – 53 gfd
Flow Range Per Module <sup>1</sup>	1.3 – 3.0 m <sup>3</sup> /hr	5.9 – 13.1 gpm
Temperature	1 – 40°C	34 – 104°F
Max. Inlet Module Pressure (@ 20°C)	6.25 bar	93.75 psi
Max. Inlet Module Pressure (@ 40°C)	4.75 bar	68.89 psi
Max. Operating TMP	2.1 bar	30 psi
Max Operating Air Scour Flow	12 nm <sup>3</sup> /hr	7.1 scfm
Max Backwash Pressure	2.5 bar	36 psi
Operating pH	2- 11	
NaOCl (max.)	2,000 mg/L	
Particle Size (max.)	300 µm	
Flow Configuration	Outside in, dead end flow	
Expected Filtrate Turbidity	≤0.1 NTU	
Expected Filtrate SDI	≤2.5	

<sup>1</sup> Flow range represents DUPONT™ Ultrafiltration SFP-2660 and SFD-2660 Modules for filtrate flux range shown

**Important Information**

Proper start-up of an ultrafiltration system is essential to prepare the membranes for operating service and to prevent membrane damage. Following the proper start-up sequence also helps ensure that system operating parameters conform to design specifications so that system water quality and productivity goals can be achieved. Before initiating system start-up procedures, membrane pretreatment, installation of the membrane modules, instrument calibration and other system checks should be completed.

Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en).

Avoid any abrupt pressure variations during start-up, shutdown, cleaning or other sequences to prevent possible membrane damage. Flush the ultrafiltration system to remove shipping solution prior to start-up. Remove residual air from the system prior to start-up. Manually start the equipment. Depending on the application, filtrate obtained from initial operations should be discarded.

Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en).

- If operating limits and guidelines given in this bulletin are not strictly followed, the limited warranty will be null and void.
- To control biological growth during extended system shutdowns, it is recommended that storage solution be injected into the membrane modules.

Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en) and Technical Service Bulletins.

**Operation Guidelines**
**General Information**

**Espreso DuPont Modello SFP-2660 e SFD-2660 / DuPont Spare Parts Modules Model SFP-2660 and SFD-2660**

FILE NAME: INSTALLATION DRAWING / GEC-AS-UF-D001

**Fig. 1, Overview**

**Fig. 2, Base Clip Detail**

Base Clip (1)  
Bolt (M8) (3)  
Skid Frame (2)  
Nut (M8)

**Fig. 3, Saddle and Clamp Detail**

Saddle  
Nipple  
Bolt hole  
Skid  
Module Clamp (5)  
Module Saddle (4)

**Fig. 4, T-Adapter Detail**

L1: 30mm  
L2: 45mm  
L3: 51mm  
52 mm  
50 mm  
40 mm  
38 mm  
9 mm

**Installation Instructions:**

1. Install Base Clip (1). Drill one 10 mm diameter hole on Skid Frame. Fix base clip on Skid Frame (2) (by Customer) with Bolt (3) (M8-size, by Customer). The length of the Bolt used for the Base Clip (1) will depend on the thickness of the Skid Frame. Refer to Figure 2, Base Clip Detail.
2. Install Saddle (4) to Skid Frame (2). Drill one 7 mm diameter hole on Skid Frame. Position Saddle nipple into one 7 mm diameter hole on Skid Frame. Tap Saddle with rubber mallet to mount the nipple into the hole. Refer to Figure 3, Saddle and Clamp Detail.
3. Partial install of Module Clamp (5). Drill two 10 mm diameter holes on Skid Frame. Fix one side of clamp with Bolt (6) (M8-Size, 90 mm length, by Dow). Refer to Figure 3, Saddle and Clamp Detail.
4. Drain Preservative. At Opening 1, remove Concentrate Blind (7). At Openings 2 and 3, remove Permeate and Feed Blinds (8, 9). Place UF Module in vertical position to drain out preservative. Appropriate Environmental, Health, and Safety measures should be taken for handling and disposal of the preservative. Concentrate Blind, Permeate and Feed Blinds may be retained for future use.
5. Mount UF Module (10) to Base Clip (1). Chain block or hoist is recommended for handling and positioning of UF module. Base of UF Module will snap into Base Clip.
6. At Opening 1, use Union (11) to connect UF Module concentrate outlet.
7. At Openings 2 and 3, use Coupling (12) and Coupling Gasket (13) to connect UF Module port with T-Adapter (14) (by Customer). The bolts for Couplings should be tightened to torque of 5 to 10 N\*m. The length of T-Adapter will depend on pipework design of the Skid Frame. Refer to Figure 4, T-Adapter Detail.
8. At Opening 4, remove Threaded Plug (15), and fit Quick Tube Connector (16) with Composite O-Ring (17) at the bottom of UF Module. Threaded Plug may be retained for future use.
9. Complete install of Module Clamp (5). Secure Module Clamp (5) around UF Module (10), and secure into Saddle (4) and Skid Frame (2) (with Bolt (6) (M8-Size, 90 mm length, by Dow)). Refer to Figure 3, Saddle and Clamp Detail.

**Notes:**

1. UF Module should be kept preserved, as shipped from factory, until ready for operation. If leakage occurs, refer to DOW™ Ultrafiltration Technical Manual for procedure to replace preservative.
2. Upstream process pipework should be thoroughly flushed prior to installation and commissioning.
3. Preservative consists primarily of Sodium Metabisulfite (about 1% solution).

PACKING LIST				
NO.	PART NAME	QTY.	UNIT	SUB-PART NO.
1	DOW™ Ultrafiltration Module	1	Pc	-- --
2	Quick Tube Connector	1	Pc	SFP.069
3	Module Saddle	1	Pc	SFP.148
4	Module Clamp	1	Pc	SFP.116
5	Bolts	2	Pcs	CPO.244
6	Base Clip	1	Pc	SFP.038

ADDITIONAL MATERIAL LIST (not supplied with modules)				
NO.	NAME	QTY.	UNIT	TYPE
1	T-Adapter	2	Pcs	-- --
2	Bolt and Nut	1	Set	M8
3	Union	1	Pc	DN32

TECHNOLOGY PROVIDER:		PROJECT TITLE:	
 Water & Process Solutions No. 936 Zhangcheng Road Zhangjiang Hi-Tech Park Shanghai 201203, P.R.C. Tel. +86-21-5851-1000		GENERAL	
		DRAWING TITLE:	
		SFX-2660 INSTALLATION DRAWING	
SCALE : N.T.S.			
APPROVED BY	FYW		
CHECKED BY	TD		
DESIGNED BY	BW		
DRAWN BY	JC		
DRAWING NO.:	GEC-AS-UF-D001	SHEET NO.	A
	1	REV. NO.	FYW
		REV.	26-JULY-10
		APPRD. BY	PRELIMINARY
		DATE	
DESCRIPTION			

REUSE OF DOCUMENTS: THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF DOW WATER & PROCESS SOLUTIONS AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF DOW WATER & PROCESS SOLUTIONS.

## Moduli Ultrafiltrazione DuPont Modello SFP-2860, SFD 2860, SFP-2880 e SFD-2880 / DuPont Ultrafiltration Modules Model SFP-2860, SFD 2860, SFP-2880 and SFD-2880



### Description

DuPont Ultrafiltration (UF) modules are made from high mechanical strength, PVDF hollow fiber membranes. The modules provide excellent performance and industry leading membrane area. These modules have the following properties and characteristics:

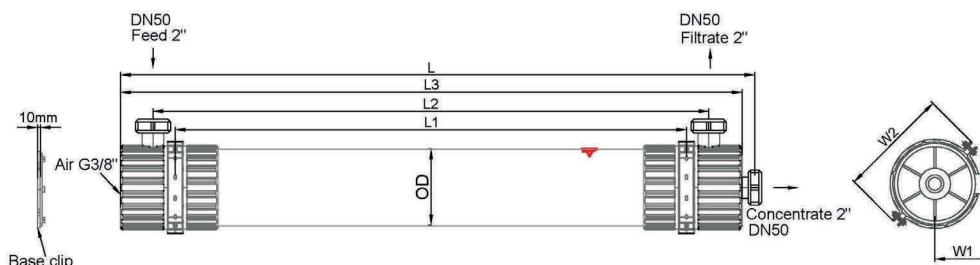
- 0.03 µm nominal pore diameter for removal of bacteria, viruses, and particulates including colloids to protect downstream processes such as RO
- PVDF polymeric hollow fibers for high mechanical strength and chemical resistance providing long membrane life and reliable operation.
- Hydrophilic PVDF fibers for easy cleaning and wettability that help maintain long term performance
- Outside-In flow configuration allowing a wide range of solids in the feed water minimizing the need for pretreatment processes and reducing the backwash volume compared to Inside-Out configurations U-PVC housing, helping to eliminate the need for costly pressure vessels

The 2860 which is shorter in length is recommended for smaller systems and where building height is of concern. The 2880 has higher membrane area for the same footprint offering a more economical design.

DuPont Ultrafiltration Modules can be used for a wide variety of treatment applications such as surface water, seawater, and industrial and municipal wastewaters.

### Typical Properties

Product	Type	Membrane Area		Hold-Up Volume		Weight (empty/water filled)	
		m <sup>2</sup>	ft <sup>2</sup>	liters	gallons	kg	lbs
SFP-2860	Industrial	51	549	35	9.3	48/83	106/183
SFD-2860	NSF/ANSI 61	51	549	35	9.3	48/83	106/183
	Drinking Water						
SFP-2880	Industrial	77	829	39	10.3	61/100	135/220
SFD-2880	NSF/ANSI 61 and 419	77	829	39	10.3	61/100	135/220
	Drinking Water						

**Dimensions** SFP-2860, SFD-2860, SFP-2880, and SFD-2880 (8-inch diameter)


Product	Units	L	L1	L2	L3	Diameter	Width	
	SI (mm)	1860±3	1500	1630±3	1820±3	225	180	342
	US (inch)	73.2±0.1	59.1	64.2±0.1	71.7±0.1	8.9	7.1	13.5
SFP-2880 and SFD-2880	SI (mm)	2360±3	2000	2130±3	2320±3	225	180	342
	US (inch)	92.9±0.1	78.7	83.9±0.1	91.3±0.1	8.9	7.1	13.5

**Suggested Operating Conditions**

	SI Units	US Units
Filtrate Flux (25°C)	40 90 l/m <sup>2</sup> ·hr	24 53 gfd
Flow Range Per Module <sup>1</sup>	2.0 6.9 m <sup>3</sup> /hr	8.8 30.4 gpm
Temperature	1 40°C	34 104°F
Maximum Inlet Module Pressure (20°C)	6.25 bar	90.65 psi
Maximum Inlet Module Pressure (40°C)	4.75 bar	68.89 psi
Maximum Operating TMP	2.1 bar	30.5 psi
Maximum Operating Air Scour Flow	12 nm <sup>3</sup> /hr	7.1 scfm
Maximum Backwash Pressure	2.5 bar	36 psi
Operating pH	2 – 11	
Maximum NaOCl	2,000 mg/L	
Maximum Particle Size	300 µm	
Flow Configuration	Outside-in, dead end flow	
Expected Filtrate Turbidity	≤ 0.1 NTU	
Expected Filtrate SDI	≤ 2.5	

<sup>1</sup> Flow range represents DUPONT™ Ultrafiltration SFP-2860, SFD-2860, SFP-2880, and SFP-2880 Modules for filtrate flux range shown

**Important Information**

Proper start-up of an ultrafiltration system is essential to prepare the membranes for operating service and to prevent membrane damage. Following the proper start-up sequence also helps ensure that system operating parameters conform to design specifications so that system water quality and productivity goals can be achieved. Before initiating system start-up procedures, membrane pretreatment, installation of the membrane modules, instrument calibration and other system checks should be completed.

Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en).

Avoid any abrupt pressure variations during start-up, shutdown, cleaning or other sequences to prevent possible membrane damage. Flush the ultrafiltration system to remove shipping solution prior to start-up. Remove residual air from the system prior to start-up. Manually start the equipment. Depending on the application, filtrate obtained from initial operations should be discarded.

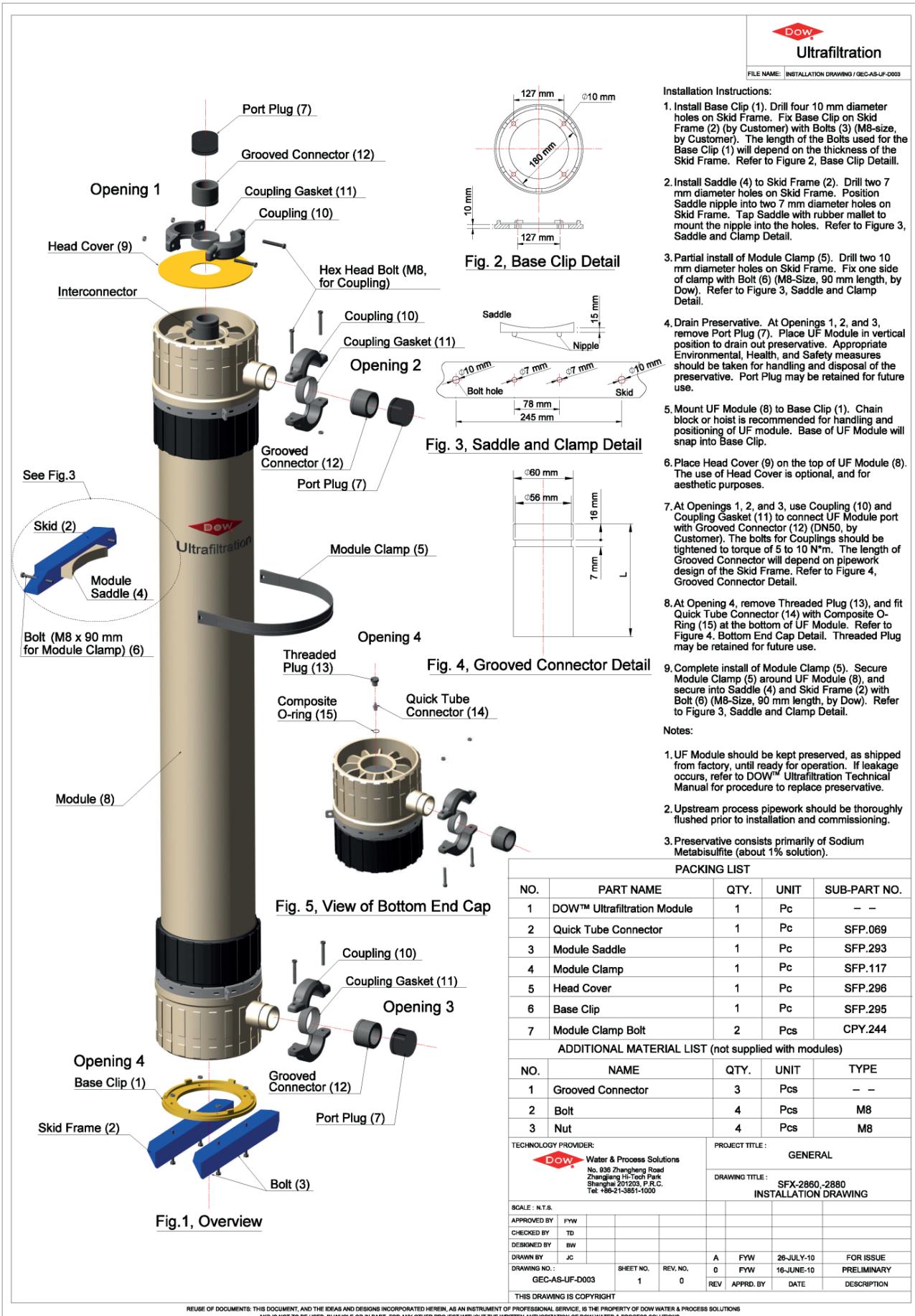
Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en).

- If operating limits and guidelines given in this bulletin are not strictly followed, the limited warranty will be null and void.
- To control biological growth during extended system shutdowns, it is recommended that storage solution be injected into the membrane modules.

Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en) and Technical Service Bulletins.

**Operation Guidelines**
**General Information**

## Espreso DuPont Modello SFP-2860, SFD 2860, SFP-2880 e SFD-2880 / DuPont Spare Parts Model SFP-2860, SFD 2860, SFP-2880 and SFD-2880



## Moduli Ultrafiltrazione DuPont Modello SFP-2860XP, SFD 2860XP, SFP-2880XP e SFD-2880XP / Du-Pont Ultrafiltration Modules Model SFP-2860XP, SFD 2860XP, SFP-2880XP and SFD-2880XP

### Description

IntegraFlux™ Ultrafiltration (UF) modules with XP fiber are made from high permeability, high mechanical strength, hollow fiber PVDF membranes. The modules provide excellent performance, industry leading membrane area with low energy and chemical consumption. IntegraFlux™ modules have the following general properties and characteristics:

- Up to 35% higher permeability than previous generation modules helping to improve operating efficiencies and productivity
- 0.03 µm nominal pore diameter for removal of bacteria, viruses, and particulates including colloids to protect downstream processes such as RO
- PVDF polymeric hollow fibers for high mechanical strength with excellent chemical resistance providing long membrane life and reliable operation
- Outside-In flow configuration allowing a wide range of solids in the feed water minimizing the need for pretreatment processes and reducing the backwash volume compared to Inside-Out configurations

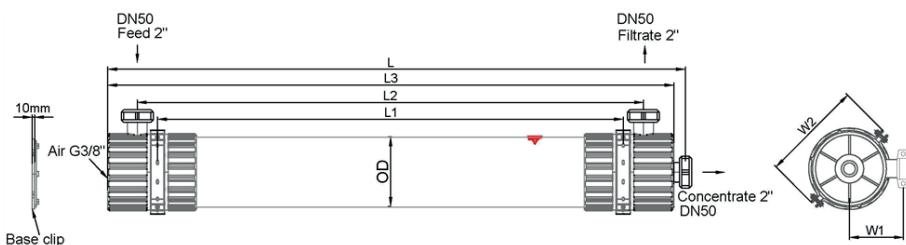


These modules are an excellent choice for systems with capacities greater than 50 m<sup>3</sup>/hr (220 gpm). The shorter SFP-2860XP or SFD-2860XP modules are well suited for installations with limited height. Larger and longer, 8 inch diameter and 80 inch in length, the SFP-2880XP or SFD-2880XP modules offer a high effective membrane area combined with high permeability that provides the most economical and efficient membrane system design.

IntegraFlux™ Ultrafiltration Modules can be used for a wide variety of treatment applications such as industrial and municipal wastewaters, surface water, and seawater.

### Typical Properties

Product	Type	Membrane Area		Volume		Weight (empty/water filled)	
		m <sup>2</sup>	ft <sup>2</sup>	liters	gallons	kg/lbs	kg/lbs
SFP-2860XP	Industrial	51	549	35	9.3	48/83	106/183
SFD-2860XP	NSF/ANSI 61 and 419	51	549	35	9.3	48/83	106/183
SFP-2880XP	Industrial	77	829	39	10.3	61/100	135/220
SFD-2880XP	NSF/ANSI 61 and 419	77	829	39	10.3	61/100	135/220

**Dimensions** SFP-2860XP, SFD-2860XP, SFP-2880XP, and SFD-2880XP (8-inch diameter)


Product	Units	Length				Diameter	Width	
		L	L1	L2	L3		W1	W2
SFP-2860XP and SFD-2860XP	SI (mm)	1860±3	1500	1630±3	1820±3	225	180	342
	US (inch)	73.2±0.1	59.1	64.2±0.1	71.7±0.1	8.9	7.1	13.5
SFP-2880XP and SFD-2880XP	SI (mm)	2360±3	2000	2130±3	2320±3	225	180	342
	US (inch)	92.9±0.1	78.7	83.9±0.1	91.3±0.1	8.9	7.1	13.5

**Suggested Operating Conditions**

	SI Units	US Units
Filtrate Flux (25°C)	40 – 110 l/m <sup>2</sup> hr	24 – 65 gfd
Flow Range Per Module <sup>1</sup>	2.0 – 8.5 m <sup>3</sup> /hr	8.8 – 37.4 gpm
Temperature	1 – 40°C	34 – 104°F
Maximum Inlet Module Pressure (20°C)	6.25 bar	90.65 psi
Maximum Inlet Module Pressure (40°C)	4.75 bar	68.89 psi
Maximum Operating TMP	2.1 bar	30.5 psi
Maximum Operating Air Scour Flow	12 Nm <sup>3</sup> /hr	7.1 scfm
Maximum Backwash Pressure	2.5 bar	36 psi
Operating pH	2 – 11	
Maximum NaOCl	2,000 mg/L	
Maximum Particle Size	300 µm	
Flow Configuration	Outsidein, dead end flow	
Expected Filtrate Turbidity	≤ 0.1 NTU	
Expected Filtrate SDI	≤ 2.5	

<sup>1</sup> Flow range represents DUPONT™ Ultrafiltration SFP-2860XP, SFD-2860XP, SFP-2880XP, and SFD-2880XP Modules for filtrate flux range shown

**Important Information**

Proper start-up of an ultrafiltration system is essential to prepare the membranes for operating service and to prevent membrane damage. Following the proper start-up sequence also helps ensure that system operating parameters conform to design specifications so that system water quality and productivity goals can be achieved. Before initiating system start-up procedures, membrane pretreatment, installation of the membrane modules, instrument calibration and other system checks should be completed.

Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en).

Avoid any abrupt pressure variations during start-up, shutdown, cleaning or other sequences to prevent possible membrane damage. Flush the ultrafiltration system to remove shipping solution prior to start-up. Remove residual air from the system prior to start-up. Manually start the equipment. Depending on the application, filtrate obtained from initial operations should be discarded.

Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en).

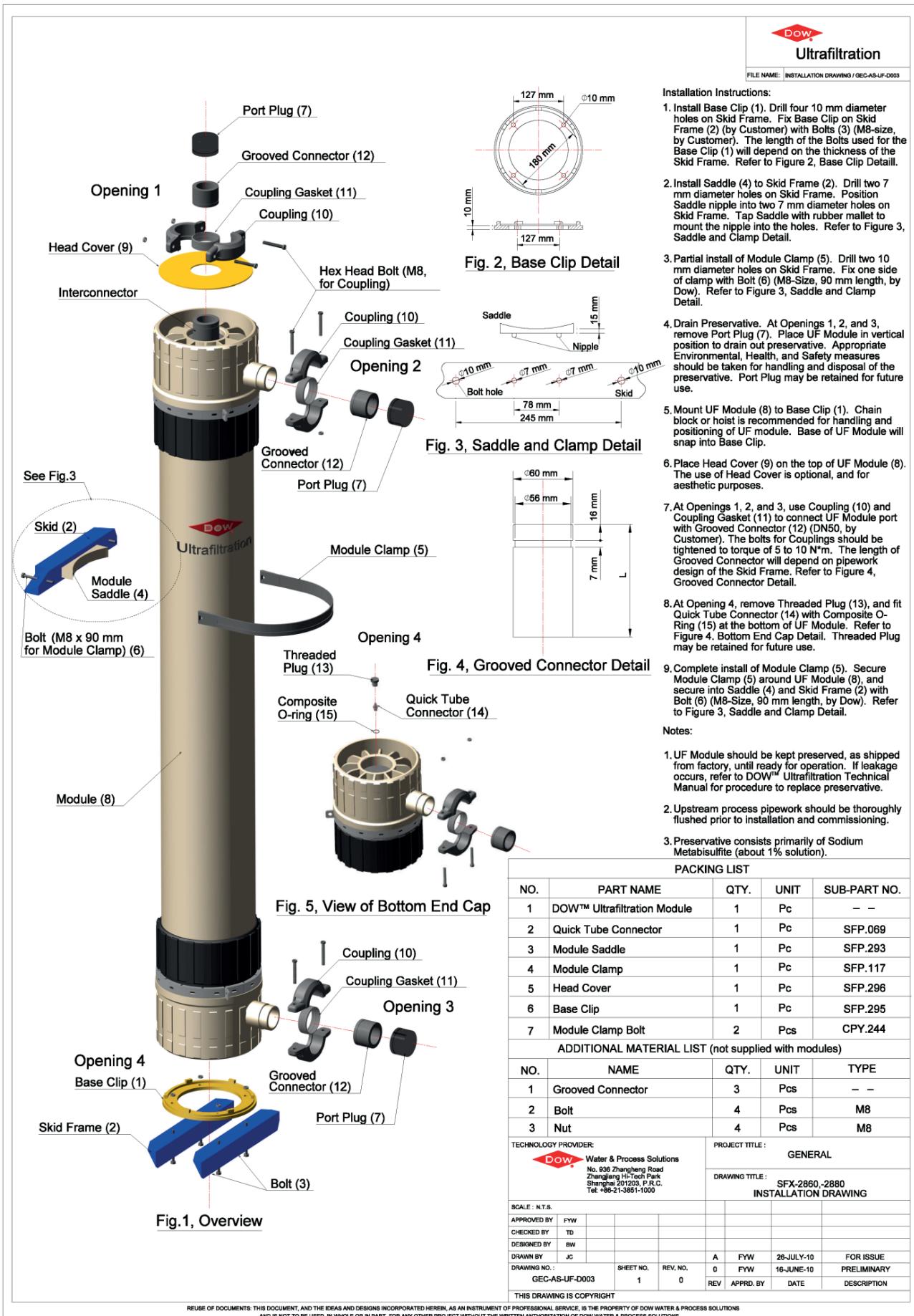
- If operating limits and guidelines given in this bulletin are not strictly followed, the limited warranty will be null and void.
- To control biological growth during extended system shutdowns, it is recommended that storage solution be injected into the membrane modules.

Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en) and Technical Service Bulletins.

**Operation Guidelines**

NSF/ANSI 61 and 419 certified drinking water modules require specific conditioning procedures prior to producing potable water. Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en) flushing section for specific procedures. Drinking water modules may be subjected to additional regulatory restrictions in some countries. Please check local regulatory guidelines and application status before use and sales.

**General Information**
**Regulatory Note**

**Espreso DuPont Modello SFP-2860XP, SFD 2860XP, SFP-2880XP e SFD-2880XP / DuPont Spare Parts Model SFP-2860XP, SFD 2860XP, SFP-2880XP and SFD-2880XP**


## Moduli serie IntegraFlux™ / IntegraFlux™ Series Modules

I moduli di ultrafiltrazione IntegraFlux™ con fibra XP sono realizzati con membrane in PVDF a fibra cava ad alta permeabilità ed elevata resistenza meccanica. I moduli offrono prestazioni eccellenti, una superficie filtrante che la rende leader nel settore grazie ai bassi consumi energetici e di prodotto chimico. I moduli IntegraFlux™ hanno una permeabilità fino al 35% superiore rispetto ai moduli della generazione precedente, contribuendo al miglioramento dell'efficienza operativa e della produttività. Questi moduli sono ideali per la realizzazione di impianti con produzione superiore a 50 m<sup>3</sup>/ora (220 gpm). I moduli più corti, SFP-2860XP e SFD-2860XP, sono adatti per installazioni con altezza limitata. I moduli più grandi SFP-2880XP e SFD-2880XP, hanno un diametro di 20 cm (8 pollici) e un'altezza di 2 m (80 pollici), e offrono una grande area filtrante con un'alta permeabilità per sistemi più efficienti ed economici. Sono presenti quattro connessioni per ciascun modulo. Il flusso da filtrare entra e viene distribuito nei moduli attraverso la porta di alimentazione laterale situata nella parte inferiore di ciascun modulo. L'ingresso dell'aria si trova nella parte inferiore del modulo e viene utilizzato per il lavaggio con aria e i test d'integrità. Il concentrato (scarico proveniente dall'esterno della fibra) si trova al centro nella parte superiore, mentre il filtrato (flusso interno della fibra) è posto sempre nella parte superiore ma laterale.

### Moduli di Ultrafiltrazione IntegraPac™

Il design innovativo del tappo terminale aiuta l'accoppiamento diretto dei moduli IntegraPac™ riducendo la necessità di tubazioni e collettori. Questi moduli sono la scelta ideale per i sistemi che richiedono un ingombro ridotto. I moduli IP-77 e IPD-77 offrono un'area filtrante che contribuisce a un design compatto ed economico. I moduli IP-51 e IPD-51 sono più corti in altezza e sono adatti per applicazioni in cui esiste un vincolo di spazio. Il modulo IP-77XP offre un'area filtrante con fibre ad alta permeabilità capaci di rendere ancora più efficiente ed economico il sistema. Il modulo IP-51XP è più corto in altezza ed è adatto per applicazioni in cui questa rappresenta un limite, massimizzando la produttività e l'efficienza tramite fibre ad alta permeabilità. Il modulo IntegraPac™ viene mostrato in Figura 13. Vi sono sei connessioni su ciascun modulo. Il flusso in alimento entra nei moduli e viene distribuito attraverso le porte laterali situate sul tappo terminale inferiore (flusso out side-in). Il collegamento dell'aria si trova sul lato terminale del tappo inferiore e viene utilizzato per il lavaggio con aria e per i test d'integrità. Il concentrato (scarico proveniente dall'esterno della fibra) si trova al centro nella parte superiore, mentre il filtrato (flusso interno della fibra) è posto sempre nella parte superiore ma lateralmente.

IntegraFlux™ Ultrafiltration Modules with XP fiber are made from high permeability, high mechanical strength, hollow fiber PVDF membranes. The modules provide excellent performance, industry leading membrane area with low energy and chemical consumption. IntegraFlux™ modules have up to 35% higher permeability than previous generation modules, helping to improve operating efficiencies and productivity.

These modules are an excellent choice for systems with capacities greater than 50 m<sup>3</sup>/hr (220 gpm). The shorter SFP-2860XP or SFD-2860XP modules are well suited for installations with limited height. Larger and longer, 20 cm (8 inch) diameter and 2 m (80 inch) in length, the SFP-2880XP or SFD-2880XP modules offer a high effective membrane area combined with high permeability that provides the most economical and efficient membrane system design.

There are four connections in each module. Feed flow enters and is distributed into the modules through the side feed port located at the side bottom of each module. The air inlet is located at the bottom of the module and is used for air scouring and integrity testing. The concentrate (discharge of waste flows from the outside of the fiber) is the top central port and the filtrate (inside of fiber) is located at the side top port of the module.

### IntegraPac™ Ultrafiltration Modules

Innovative end-cap design helps direct coupling of IntegraPac™ modules reducing the need for piping and manifolds. These modules are an ideal choice for systems requiring a small footprint. The IP-77 and IPD-77 modules offer a high effective membrane area, which contributes to a more economical membrane system design. The IP-51 and IPD-51 modules are shorter in height and are suitable for applications where there is a head space constraint. The IP-77XP module offers a high effective membrane area combined with high permeability fibers that offer an economical and efficient membrane system design. The IP-51XP module is shorter in height and is suitable for applications where height is a constraint while maximizing productivity and efficiency with high permeability fibers. The IntegraPac™ module is shown in Figure 13. There are six connections on each module. Feed flow enters and is distributed into the modules through the side feed ports located on the bottom end cap. Feed flow enters the module on the outside of the fiber. The air connection is located on the side of the bottom end cap and is used for air scouring and integrity testing. The concentrate (discharge of waste flows from the outside of fiber) and filtrate port (inside of fiber) are located on the top cap. Included with the module are the couplers, air fitting, and transparent filtrate elbow.



Modulo IntegraPac™ / Figure 13. IntegraPac™ Module

La tabella 6 mostra le dimensioni, i collegamenti e le specifiche dei moduli IntegraPac™ IP-51, IntegraPac™ IP-77 e IntegraPac™ IP-51XP, IntegraPac™ IP-77XP. Notare che le tolleranze di fabbricazione, di espansione termica e lo spessore della clip di base non sono inclusi nelle dimensioni seguenti. Per queste informazioni fare riferimento ai disegni d'installazione.

Table 6 shows dimensions, connections and specifications for the IntegraPac™ IP-51, IntegraPac™ IP-77 and IntegraPac™ IP-51XP, IntegraPac™ IP-77XP modules family. Note that manufacturing and thermal expansion tolerances and the thickness of the base clip are not included in the dimensions below. Refer to the installation drawings for this information.

**Tab.6**

Product Name		IntegraPac™family			
Product Model		IP/D-51 IP/D-51XP		IP/D-77 IP/D-77XP	
Units		SI	US	SI	US
ActiveArea		51m <sup>2</sup>	549 ft <sup>2</sup>	77 m <sup>2</sup>	829 ft <sup>2</sup>
Fibers Length		1500mm	59.1in	2000 mm	78.7in
MaxInlet Pressure @ 20°C/68°F		6.25 bar	90.65 psi	6.25 bar	90.65 psi
MaxInlet Pressure @ 40°C/104°F		4.75 bar	68.89 psi	4.75 bar	68.89 psi
Length - L		1998mm	78.28in	2488 mm	97.95 in
Length - L1		1500mm	59.1in	2000 mm	78.7in
Length - L2		1689mm	66.5 in	2189mm	86.2 in
Length - L3		1864mm	73.4in	2364mm	91.3in
Diameter		225mm	8.9 in	225mm	8.9 in
Width - W1		360 mm	14.2in	360 mm	14.2in
Width - W2		342mm	13.5in	342mm	13.5in
Empty/ Shipping/ FloodedWeight		53/60/102	117/132/225	66/72/119	146/158/262
Volumeper module		49 L	13gal	53 L	14gal
FeedPort		DN100 Side Coupling	NPS 4" Side Coupling	DN100 Side Coupling	NPS 4" Side Coupling
Filtrate Port		DN40 Top Union	NPS 1 1/2" Top Union	DN40 Top Union	NPS 1 1/2" Top Union
Concentrate Port		DN100 Side Coupling	NPS 4" Side Coupling	DN100 Side Coupling	NPS 4" Side Coupling
Air ScourConnection		G 3/8"		G 3/8"	
Housing		UPVC	UPVC	UPVC	UPVC

## **Moduli Ultrafiltrazione modello IP-51, IPD-51, IP-77, e IPD-77 / IntegraPac™ Ultrafiltration Modules Model IP-51, IPD-51, IP-77, and IPD-77**

### **Description**

The IntegraPac™ ultrafiltration modules are made from high strength, hollow fiber membranes engineered to reduce design and fabrication requirements with features and benefits including:

- 0.03 micron pore size for removal of bacteria, viruses and particulates, a 6 log removal of bacteria, a 2.5 log removal on viruses, and a <2.5 SDI guarantee with proper operation
- PVDF fibers which offer strength, chemical and fouling resistance; which allows for extended membrane life and consistent long-term performance
- Outside-in flow configuration allows higher TSS feed waters, while maintaining reliable system performance and high quality filtrate
- Innovative end-caps enable direct coupling of modules, eliminating the need for piping manifolds
- The IPD-51 and IPD-77 are tested and certified by NSF International under NSF/ANSI standard 61
- The IPD-77 is tested and certified by NSF/ANSI Standard 419 for Public Drinking Water Equipment on module IPD-77

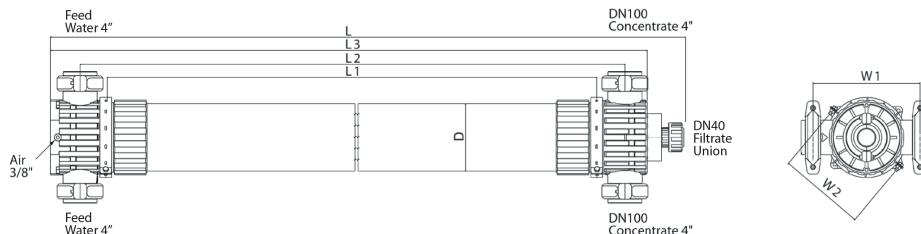


These modules are an ideal choice for systems requiring a small footprint. The IP-77 and IPD-77 modules offer a high effective membrane area, which contributes to a more economical membrane system design. The IP-51 and IPD-51 modules are shorter in height and are suitable for applications where there is a head space constraint.

IntegraPac™ ultrafiltration modules can be used for a wide variety of treatment applications, such as groundwater, surface water, seawater, industrial and municipal wastewaters.

### **Typical Properties**

<b>Product</b>	<b>Type</b>	<b>Membrane Area</b>		<b>Weight (empty/water filled)</b>		<b>Hold-Up Volume</b>	
		<b>m<sup>2</sup></b>	<b>ft<sup>2</sup></b>	<b>kg</b>	<b>lbs</b>	<b>liters</b>	<b>gallons</b>
<b>IP-51</b>	Industrial	51	549	53/102	117/225	49	13
<b>IPD-51</b>	NSF/ANSI 61	51	549	53/102	117/225	49	13
	Drinking Water						
<b>IP-77</b>	Industrial	77	829	66/119	146/262	53	14
<b>IPD-77</b>	NSF/ANSI 61 and 419	77	829	66/119	146/262	53	14
	Drinking Water						

**Dimensions**

Product	Units	Length				Diameter	Width	
		L	L1	L2	L3		W1	W2
IP-51 and IPD-51	SI (mm)	1988	1500	1689	1864	225	360	342
	US (inch)	78.3	59.1	66.5	73.4	8.9	14.2	13.5
IP-77 and IPD-77	SI (mm)	2488	2000	2189	2364	225	360	342
	US (inch)	98.0	78.7	86.2	93.1	8.9	14.2	13.5

**Suggested Operating Conditions**

	SI Units	US Units
Filtrate Flux (25°C)	40 – 90 l/m <sup>2</sup> /hr	24 – 53 gfd
Flow Range Per Module <sup>1</sup>	2.0 – 6.9 m <sup>3</sup> /hr	8.8 – 30.4 gpm
Temperature	1 – 40°C	34 – 104°F
Maximum Inlet Module Pressure (20°C)	6.25 bar	90.65 psi
Maximum Inlet Module Pressure (40°C)	4.75 bar	68.89 psi
Maximum Operating TMP	2.1 bar	30.5 psi
Maximum Operating Air Scour Flow	12 Nm <sup>3</sup> /hr	7.1 scfm
Maximum Backwash Pressure	2.5 bar	
Operating pH	2 – 11	
Maximum NaOCl	2,000 mg/L	
Maximum Particle Size	300 µm	
Flow Configuration	Outside In	
Expected Filtrate Turbidity	≤ 0.1 NTU	
Expected Filtrate SDI	≤ 2.5	

<sup>1</sup> Flow range represents DUPONT IntegraPac™ IP-51, IPD-51, IP-77, and IPD-77 UF Modules for filtrate flux range shown

**Important Information**

Proper start-up of an ultrafiltration system is essential to prepare the membranes for operating service and to prevent membrane damage. Following the proper start-up sequence also helps ensure that system operating parameters conform to design specifications so that system water quality and productivity goals can be achieved. Before initiating system start-up procedures, membrane pretreatment, installation of the membrane modules, instrument calibration and other system checks should be completed.

Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en).

Avoid any abrupt pressure variations during start-up, shutdown, cleaning or other sequences to prevent possible membrane damage. Flush the ultrafiltration system to remove shipping solution prior to start-up. Remove residual air from the system prior to start-up. Manually start the equipment. Depending on the application, filtrate obtained from initial operations should be discarded.

Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en).

- If operating limits and guidelines given in this bulletin are not strictly followed, the limited warranty will be null and void.
- To control biological growth during extended system shutdowns, it is recommended that storage solution be injected into the membrane modules.

Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en) and Technical Service Bulletins.

**Operation Guidelines****General Information**

## Moduli Ultrafiltrazione modello IP-51XP, IPD-51XP, IP-77XP, e IPD-77XP / IntegraPac™ Ultrafiltration Modules Model IP-51XP, IPD-51XP, IP-77XP, and IPD-77XP

### Description

IntegraPac™ Ultrafiltration (UF) modules with XP fiber are made from high permeability, high mechanical strength, hollow fiber PVDF membranes. The modules provide excellent performance, industry leading membrane area with low energy and chemical consumption. IntegraPac™ modules have the following general properties and characteristics:

- Up to 35% higher permeability than previous generation modules improving operating efficiencies and productivity
- 0.03 µm nominal pore diameter for removal of bacteria, viruses, and particulates including colloids to protect downstream processes such as RO
- PVDF polymeric hollow fibers for high mechanical strength with excellent chemical resistance providing long membrane life and reliable operation
- Outside-In flow configuration allowing a wide range of solids in the feed water minimizing the need for pretreatment processes and reducing the backwash volume compared to Inside-Out configurations Innovative end-caps enable direct coupling of modules, eliminating the need for piping manifolds



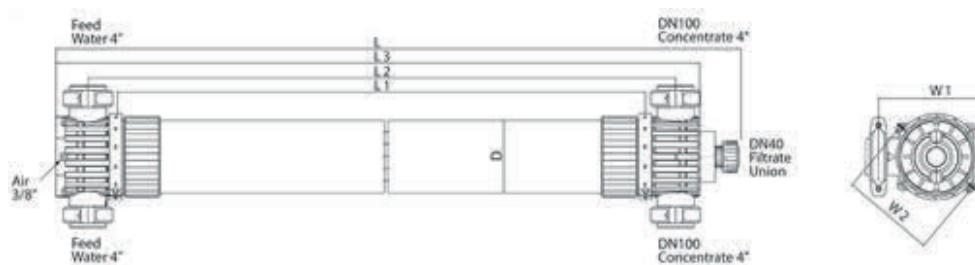
These modules are an excellent choice for systems requiring a small footprint. The IP-77XP module offers a high effective membrane area combined with high permeability fibers that provide an economical and efficient membrane system design.

The IP-51XP module is shorter in height and is suitable for applications where height is a constraint while maximizing productivity and efficiency with high permeability fibers.

IntegraPac™ ultrafiltration modules can be used for a wide variety of treatment applications, such as groundwater, surface water, seawater, industrial wastewaters and municipal wastewater polishing.

### Typical Properties

Product	Type	Membrane Area		Weight (empty/water filled)		Hold-Up Volume	
		m <sup>2</sup>	ft <sup>2</sup>	kg	lbs	liters	gallons
IP-51XP	Industrial	51	549	53/102	117/225	49	13
IPD-51XP	NSF/ANSI 61 and 419	51	549	53/102	117/225	49	13
IP-77XP	Industrial	77	829	66/119	146/262	53	14
IPD-77XP	NSF/ANSI 61 and 419	77	829	66/119	146/262	53	14

**Dimensions**

Product	Units	Length			Diameter	Width		
		L	L1	L2		W1	W2	
IP-51XP and IPD-51XP	SI (mm)	1988±3	1500	1689±3	1864±3	225	360	342
	US (inch)	78.3±0.1	59.1	66.5±0.1	73.4±0.1	8.9	14.2	13.5
IP-77XP and IPD-77XP	SI (mm)	2488±3	2000	2189±3	2364±3	225	360	342
	US (inch)	98.0±0.1	78.7	86.2±0.1	93.1±0.1	8.9	14.2	13.5

**Suggested Operating Conditions**

	SI Units	US Units
Filtrate Flux (25°C)	40 – 110 l/m <sup>2</sup> /hr	24 – 65 gfd
Flow Range Per Module <sup>1</sup>	2.0 – 8.5 m <sup>3</sup> /hr	8.8 – 37.4 gpm
Temperature	1 – 40°C	34 – 104°F
Maximum Inlet Module Pressure (20°C)	6.25 bar	90.65 psi
Maximum Inlet Module Pressure (40°C)	4.75 bar	68.89 psi
Maximum Operating TMP	2.1 bar	30.5 psi
Maximum Operating Air Scour Flow	12 Nm <sup>3</sup> /hr	7.1 scfm
Maximum Backwash Pressure	2.5 bar	36 psi
Operating pH	2 -11	
Maximum NaOCl	2000 mg/L	
Maximum Particle Size	300 µm	
Flow Configuration	Outside-in	
Expected Filtrate Turbidity	≤ 0.1 NTU	
Expected Filtrate SDI	≤ 2.5	

<sup>1</sup> Flow range represents IntegraPac™ IP-51XP, IPD-51XP, IP-77XP and IPD-77XP UF Modules for filtrate flux range shown

**Important Information**

Proper start-up of an ultrafiltration system is essential to prepare the membranes for operating service and to prevent membrane damage. Following the proper start-up sequence also helps ensure that system operating parameters conform to design specifications so that system water quality and productivity goals can be achieved. Before initiating system start-up procedures, membrane pretreatment, installation of the membrane modules, instrument calibration and other system checks should be completed.

Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en).

Avoid any abrupt pressure variations during start-up, shutdown, cleaning or other sequences to prevent possible membrane damage. Flush the ultrafiltration system to remove shipping solution prior to start-up. Remove residual air from the system prior to start-up. Manually start the equipment. Depending on the application, filtrate obtained from initial operations should be discarded.

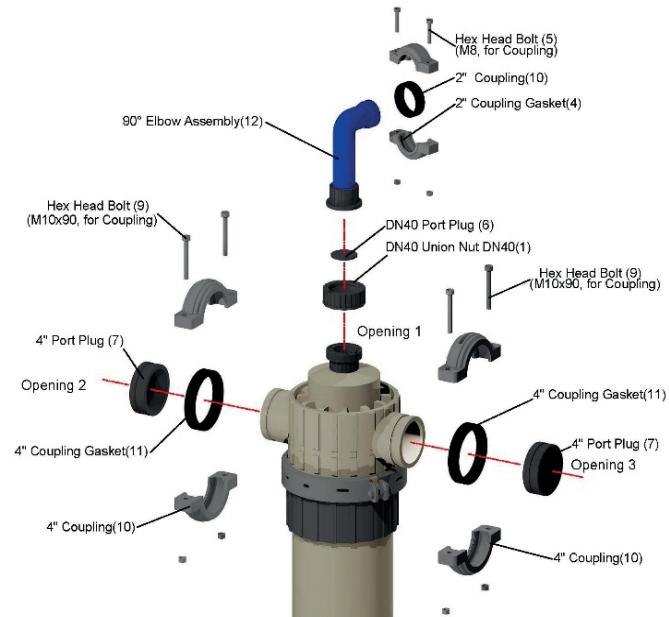
Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en).

- If operating limits and guidelines given in this bulletin are not strictly followed, the limited warranty will be null and void.
- To control biological growth during extended system shutdowns, it is recommended that storage solution be injected into the membrane modules.

Please refer to the Ultrafiltration Technical Manual (Form No. 45-D00874-en) and Technical Service Bulletins.

**Operation Guidelines****General Information**

## Espreso modello IP-51XP, IPD-51XP, IP-77XP, e IPD-77XP / Spare Parts Model IP-51XP, IPD-51XP, IP-77XP, and IPD-77XP

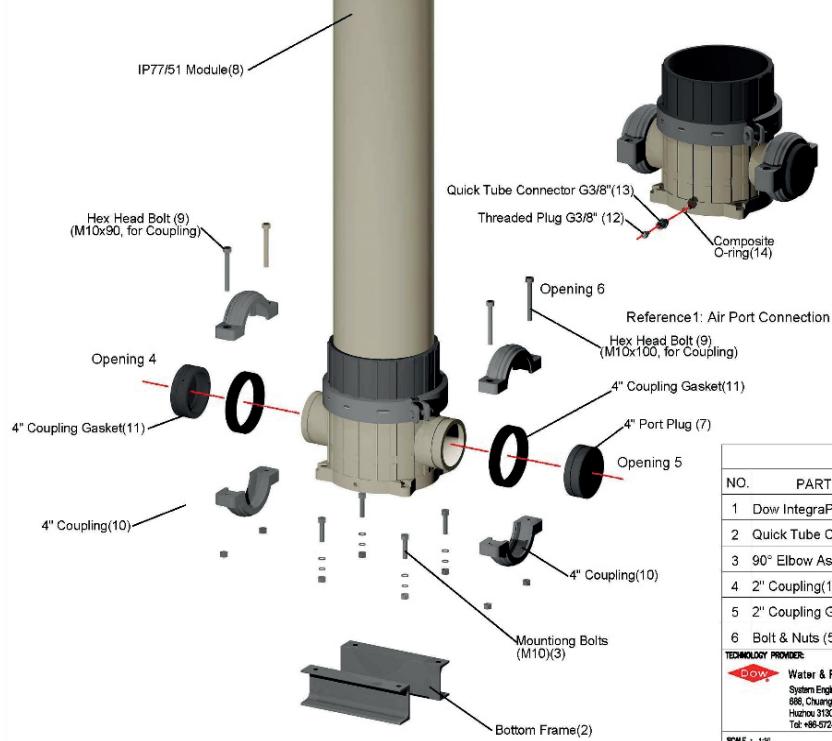


### Installation Instructions:

1. Assemble the bottom frame (2).
2. Install the air header on the bottom frame (2), between the two rows of modules or by custom design.
3. Drain Storage solution from modules. Replace the threaded plug (12) with quick tube connector (13) to the bottom end cap. All the removed port plugs (7) and threaded plugs (12) need to be retained for future use.
4. Mount modules one by one to the bottom frame (2) using appropriate lifting device. Put bolts (3) on the bottom end cap without fastening.
5. After each module is mounted, connect air hoses using quick connector (13) to the bottom end cap.
6. Use the 4" coupling (10) to connect modules. Do not tighten the bolts (9) on the couplings until all modules are installed.
7. Tighten all bolts on the bottom end caps and 4" couplings between modules to torque of 12 to 15 N·m.
8. Install the top frame and filtrate header supports on the top end caps.
9. Install the filtrate pipe on the top of the skid.
10. Use the union nut (1) to connect the transparent 90° elbow assembly (12) to the top end cap. Use the 2" coupling (10) to connect the transparent 90° elbow assembly (12) to the filtrate header. The bolts of 2" couplings should be tightened to torque of 5 to 8 N·m.
11. Connect the two modules on the "near" end of the skid to the main feed and concentrate pipes (provided by customer).
12. Connect the air and filtrate headers to main pipes (provided by customer) according to the pipe layout drawing.

### Notes:

1. UF Module should be kept preserved, as shipped from factory, until ready for operation. If leakage occurs, refer to DOW Ultrafiltration Product Manual for procedure to replace storage solution.
2. Fasten the bottom frame to the even ground or foundation with expansion bolts before installing modules and putting skid into operation.
3. Upstream process pipework should be thoroughly flushed prior to installation and commissioning.
4. Storage solution consists primarily of Sodium Metabisulfite (about 1% solution).
5. All pipes, which connect with skid, should be firmly supported and fixed, make sure these pipes will not influence the stability of the skid when operating.



PACKING LIST				
NO.	PART NAME	QTY	MATERIAL CODE	GMID
1	Dow IntegraPac™ Module(8)	1	IP-77/51	10410040/10410645
2	Quick Tube Connector(13)	1	—	10410926
3	90° Elbow Assembly (12)	1	IP.09	10409998
4	2" Coupling(10)	1	SFP28-021A	10385944
5	2" Coupling Gasket(4)	1	SFP28-022(A-2)	10385964
6	Bolt & Nuts (5)	2	—	10385968

**TECHNOLOGY PROVIDER:**  Water & Process Solutions  
System Engineering  
688 Chuangye Avenue  
Huzhou 313000, P.R.C  
Tel: +86-572-2668888

**PROJECT TITLE :** Dow IntegraPac™ Module

**DRAWING TITLE :** IP77/51Module Installing Drawing

SCALE : 1:50

APPROVED BY	B He
CHECKED BY	JH Xu
DESIGNED BY	CC.Gao
DRAWN BY	CC.Gao

## Skid Ultrafiltrazion IntegraPac™ / IntegraPac™ Ultrafiltration Skids

Lo skid IntegraPac™ con moduli IP / D-51 (XP) o IP / D-77 (XP) è basato su un design standard pre-ingegnerizzato costituito da moduli di Ultrafiltrazione IntegraPac™, accessori e tubazioni. È progettato per semplificare significativamente la fase di progettazione, assemblaggio e installazione, comprimendo al massimo i costi, facilitare il montaggio e riducendo gli ingombri e i tempi di consegna. Le caratteristiche peculiari sono:

- L'accoppiamento diretto dei moduli elimina le tubazioni extra, aiutando a ridurre gli ingombri e i costi.
- Kit modulare e scalabile per progettazioni che coprono una vasta gamma di portate.
- Materiali di alta qualità e resistenti alla corrosione grazie ad un'ampia compatibilità chimica.
- Spedito in kit non assemblati per una riduzione dei costi di trasporto e minori rischi di rotture dovute allo stesso.
- I componenti standardizzati e prefabbricati, eliminano la misurazione, il taglio, l'incollaggio e la saldatura.
- Facilmente accessibile per le ispezioni, manutenzioni o sostituzioni.
- Raccordo per il filtrato a gomito di facile utilizzo e di colore trasparente, progettato per una facile verifica d'integrità.
- Idoneo per alta pressione per consentire l'alimentazione diretta con la pompa ad alta pressione dell'impianto osmosi.

La Tabella 7 illustra i dettagli degli skid per IntegraPac™ IP / D-51, IntegraPac™ IP / D-77 e IntegraPac™ IP / D-51XP, IntegraPac™ kid IP / D-77XP, illustrati nella Figura 15 e nella Figura 16.

The IntegraPac™ skid with IP/D-51(XP) or IP/D-77(XP) modules is a pre-engineered, standardized skid design consisting of IntegraPac™ Ultrafiltration Modules, auxiliary parts and piping. It is designed to significantly streamline design, assembly and installation, making possible lower skid costs, reduced engineering design costs, easy assembly, smaller footprint and shortened delivery schedule. Features include:

- Direct coupling of modules eliminate ancillary piping, help saving costs and reducing footprint.
- Modular and scalable for design across a wide range of flowrates.
- Materials of construction selected for corrosion resistance and chemical compatibility.
- Shipped unassembled to lower transportation cost and help prevent damage in transit.
- Standardized and pre-fabricated components eliminate measuring, cutting, gluing and welding.
- Easily accessible for physical inspection or replacement at end of life.
- Operator-friendly transparent filtrate elbow designed and located for easy visual integrity inspection.
- High pressure rating to enable direct feed to reverse osmosis feed pumps.

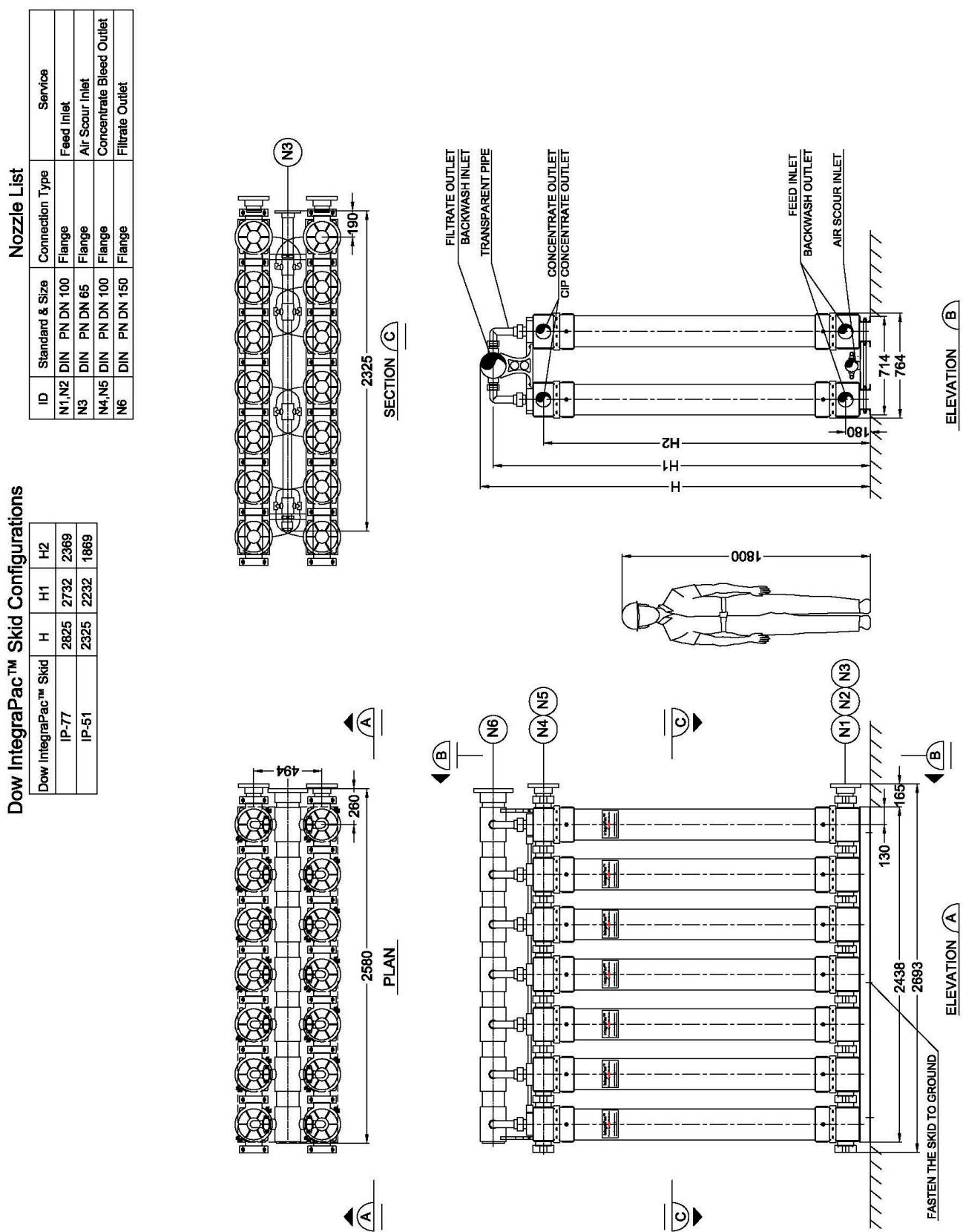
Table 7 shows skid details for the IntegraPac™ IP/D-51, IntegraPac™ IP/D-77 and IntegraPac™ IP/D-51XP, IntegraPac™ IP/D-77XP skids, as depicted in Figure 15 and Figure 16.



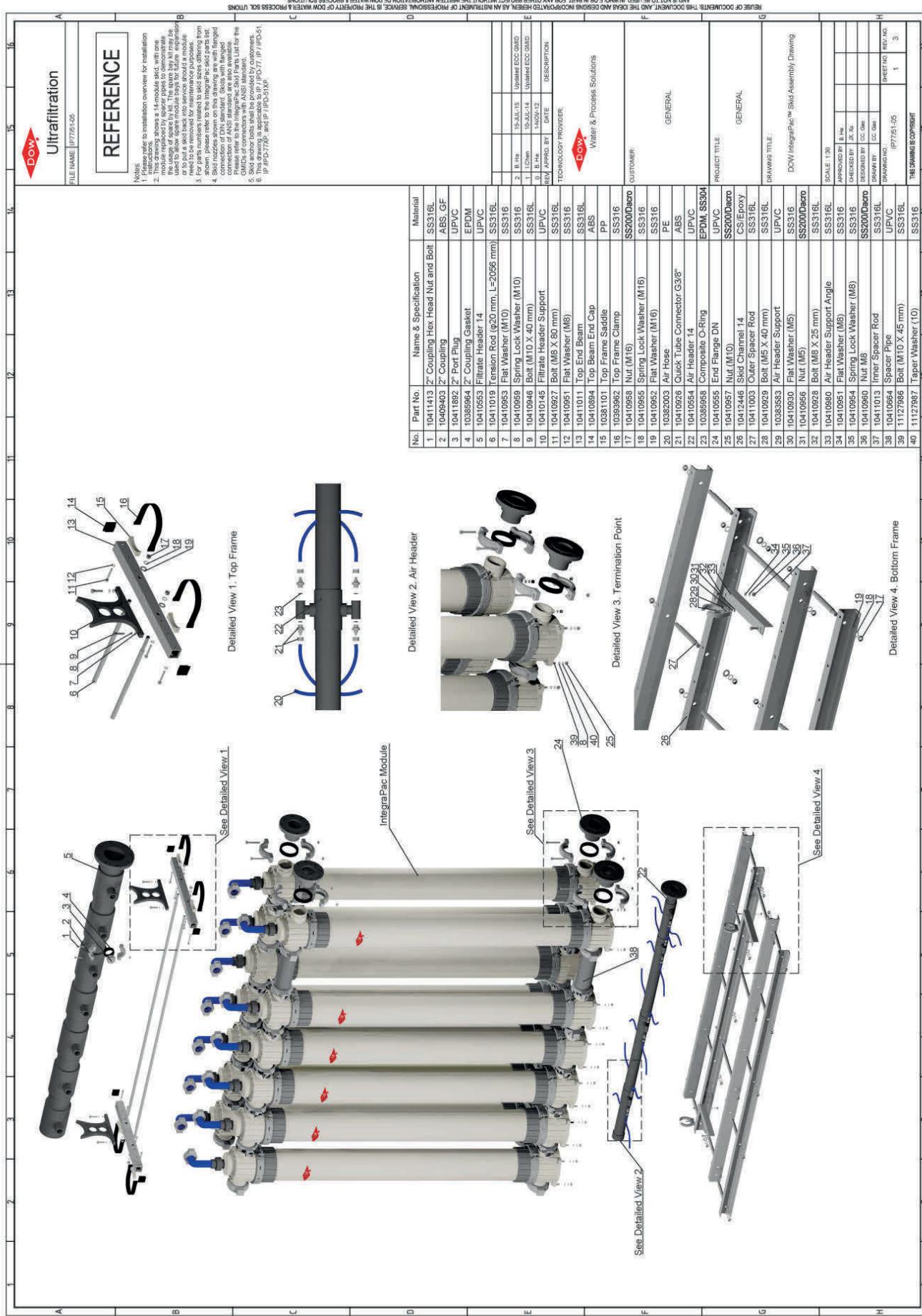
Tab.7

Skid Configuration with IP-77 Modules																	
Number of modules	IntegraPac Skid	Total Membrane Area		Flow @ 65 lmh (38 gfd)		Length (L)		Width		Height (H)		Weight, dry (incl. modules)	Weight, filled (incl. modules)	Hold-Up Volume m <sup>3</sup>	Hold-Up Volume US gal		
		m <sup>2</sup>	ft <sup>2</sup>	m <sup>3</sup> /h	gpm	mm	ft	mm	ft	mm	ft						
6	IP-77-06	462	4974	30	132	1241	4.1	764	2.51	2875	9.43	496	1093	840	1852	0.32	84
8	IP-77-08	616	6632	40	176	1604	5.3	764	2.51	2875	9.43	644	1420	1102	2429	0.42	112
10	IP-77-10	770	8290	50	220	1967	6.5	764	2.51	2875	9.43	791	1744	1364	3007	0.53	140
12	IP-77-12	924	9948	60	264	2330	7.6	764	2.51	2875	9.43	939	2070	1626	3585	0.64	168
14	IP-77-14	1078	11606	70	309	2693	8.8	764	2.51	2875	9.43	1091	2405	1893	4173	0.74	196
16	IP-77-16	1232	13264	80	353	3056	10	764	2.51	2875	9.43	1249	2754	2165	4773	0.85	224
18	IP-77-18	1386	14922	90	397	3419	11.2	764	2.51	2875	9.43	1401	3089	2432	5362	0.95	252
20	IP-77-20	1540	16580	100	441	3782	12.4	764	2.51	2875	9.43	1554	3426	2699	5950	1.06	280
22	IP-77-22	1694	18238	110	485	4145	13.6	764	2.51	2875	9.43	1706	3761	2966	6539	1.17	308

Skid Configuration with IP-51 Modules																	
Number of modules	IntegraPac Skid	Total Membrane Area		Flow @ 65 lmh (38 gfd)		Length (L)		Width		Height (H)		Weight, dry (incl. modules)	Weight, filled (incl. modules)	Hold-Up Volume m <sup>3</sup>	Hold-Up Volume US gal		
		m <sup>2</sup>	ft <sup>2</sup>	m <sup>3</sup> /h	gpm	mm	ft	mm	ft	mm	ft						
6	IP-51-06	306	3294	20	88	1241	4.1	764	2.51	2375	7.79	418	922	738	1627	0.29	77.7
8	IP-51-08	408	4392	27	117	1604	5.3	764	2.51	2375	7.79	540	1190	966	2130	0.39	103.6
10	IP-51-10	510	5490	33	146	1967	6.5	764	2.51	2375	7.79	661	1457	1194	2632	0.49	129.4
12	IP-51-12	612	6588	40	175	2330	7.6	764	2.51	2375	7.79	783	1726	1422	3135	0.59	155.3
14	IP-51-14	714	7686	46	204	2693	8.8	764	2.51	2375	7.79	909	2004	1655	3649	0.69	181.2
16	IP-51-16	816	8784	53	234	3056	10	764	2.51	2375	7.79	1041	2295	1893	4173	0.78	207.1
18	IP-51-18	918	9882	60	263	3419	11.2	764	2.51	2375	7.79	1167	2573	2126	4687	0.88	233
20	IP-51-20	1020	10980	66	292	3782	12.4	764	2.51	2375	7.79	1294	2853	2359	5201	0.98	258.9
22	IP-51-22	1122	12078	73	321	4145	13.6	764	2.51	2375	7.79	1420	3131	2592	5714	1.08	284.8

**Tab.15**


Tab.16



## ■ MEMBRANE INGE® PRODOTTE IN GERMANIA PER APPLICAZIONI MF & UF / INGE® MEMBRANES GERMAN MADE UF AND MF SOLUTIONS



dizzer® XL



dizzer® L



dizzer® P



T-Rack® 3.0

**dizzer® XL:** Moduli di Ultrafiltrazione per soluzioni personalizzate su skid

### dizzer® L Series

Moduli di ultrafiltrazione a cartuccia per una semplice sostituzione del singolo modulo in un impianto.

### dizzer® P

Moduli di Ultrafiltrazione a cartuccia per applicazioni su piccola scala, ad es. al punto d' uso e al punto d' ingresso.

### T-Rack 3.0®

Skid ottimizzato per l'uso su impianti di grandi dimensioni, ad es. sistemi di pretrattamento per la dissalazione dell'acqua di mare e il riutilizzo delle acque reflue.

### LA FAMIGLIA DI PRODOTTI INGE®

#### • Tecnologia a membrana Multibore®

La membrana Multibore® sviluppata da inge GmbH (vedi Figura 2.1-1) combina sette capillari dello stesso diametro in un'unica fibra. Ciò fornisce una stabilità meccanica significativamente più elevata rispetto alle convenzionali membrane a fibra cava a singolo foro. Le membrane Multibore® vengono generalmente utilizzate in modalità senza uscita e vengono lavate ad intervalli regolari. In linea di principio è anche possibile il funzionamento a flusso tangenziale a basse velocità, sebbene venga utilizzato solo in determinate circostanze.

**dizzer® XL:** Ultrafiltration modules for custom rack solutions in an open platform configuration.

### dizzer® L Series

Cartridge type ultrafiltration modules for streamlined replacement of individual membrane filtration elements.

### dizzer® P

Cartridge type ultrafiltration modules for small-scale applications, e.g. point-of-use and point-of-entry.

### T-Rack 3.0®

Optimized rack for use in large-scale plants e.g. pretreatment systems for sea water desalination and waste water reuse.

### THE INGE® PRODUCT FAMILY

#### • Multibore® Membrane Technology

The Multibore® membrane developed by inge GmbH (see Figure 2.1-1) combines seven capillaries of the same diameter into a single fiber. This provides significantly higher mechanical stability than conventional singlebore hollow fiber membranes. Multibore® membranes are typically operated in dead-end mode and are backwashed at regular intervals. Crossflow operation at low velocities is also feasible in principle, though it is only used in certain circumstances.



Figure 2.1-1 - Membrana Multibore® membrane sviluppata da inge GmbH  
Figure 2.1-1 - Multibore® membrane developed by inge GmbH

Inge GmbH offre membrane Multibore® con diametri dei capillari da 0,8 a 1,5 mm (da 0,032 a 0,059 pollici) per soddisfare i diversi tipi di applicazioni. Il diametro più utilizzato è di 0,9 mm (0,035 pollici) ed è generalmente più grande della maggior parte delle altre membrane capillari tipicamente utilizzate in applicazioni simili. Questo maggior diametro consente alle fibre di far fronte a un contenuto solido più elevato. Altro beneficio è una significativa riduzione delle perdite di carico lungo le singole fibre rispetto ai capillari più piccoli. Ciò si traduce in una distribuzione più uniforme dell'acqua lungo i capillari. Un altro vantaggio di questo design è che migliora il processo di controlavaggio: i contaminanti accumulati vengono rimossi in modo più efficiente, il che si traduce in minori

Inge GmbH supplies its Multibore® membranes in a choice of capillary diameters from 0.8 to 1.5 mm (0.032 to 0.059 inch) to cater to different types of applications. The most popular diameter of 0.9 mm (0.035 inch) is actually larger than most other capillary membranes typically used in similar applications. This larger diameter enables the fibers to cope with a higher solid content. It also leads to a significant reduction in the hydraulic pressure drop along the individual fibers in comparison to smaller capillaries. This results in a more uniform distribution of the water along the capillaries. Another advantage of this design is that it improves the backwash process: the accumulated foulants are removed more efficiently, which generally means you need smaller quantities of

portate di controlavaggio e una minor area della membrana (impianto più piccolo). Le fibre con un diametro capillare maggiore di > 0,9 mm (> 0,035 pollici) sono la scelta per quelle applicazioni con elevati livelli di solidi, come ad esempio le acque di controlavaggio di filtri convenzionali o i sistemi UF di 2° stadio (trattamento dell'acqua di lavaggio non chimica di un sistema UF di 1° stadio). Come indicazione, questi capillari più grandi, dovrebbero essere impiegati per acque con concentrazioni di solidi sospesi superiori ai 50 mg / l. La decisione finale e la scelta del diametro, dipende da diversi fattori come: il tempo di filtrazione, il tempo di controlavaggio e la natura delle particelle. Un diametro più grande aumenta significativamente la quantità di solidi che possono essere gestiti dai capillari e, in linea di principio, consente velocità di flusso più elevate e minori perdite di carico nei sistemi semi-tangenziali. La membrana Multibore® viene "filata" in una singola fase di produzione e ricavata da una sola soluzione polimerica in un processo brevettato. La rotazione delle membrane tramite l'utilizzo di un solo materiale, crea una membrana "integrale". A differenza delle membrane composite, che sono costituite da più strati di vari materiali, le membrane integrali non presentano il rischio di distaccamento dei singoli strati. Questo è un enorme vantaggio in termini d'integrità del prodotto. Il materiale della membrana a base di PES, viene modificato in modo da aumentare l'idrofilia della stessa. Questa maggiore idrofilia riduce la tendenza che ha la superficie della membrana ad assorbire sostanze organiche, migliorandone così le prestazioni a livello di incrostazioni. Il processo di produzione da origine ad una superficie filtrante sottile definita (interfaccia) con all'interno sette capillari con bassissima resistenza alla permeabilità e con pori interni che misurano circa 20 nanometri (vedere Figura 2.1-2). Questa dimensione dei pori è sostanzialmente inferiore rispetto alle altre membrane ad ultrafiltrazione a bassa pressione presenti sul mercato. Ciò garantisce una reiezione del virus di oltre 4 log senza la necessità di pretrattamento (come ad es. la coagulazione), apportando anche una migliore rimozione dei contaminanti utilizzati per gli impianti ad osmosi inversa. Nonostante i pori più piccoli, la membrana Multibore® mostra una permeabilità sostanzialmente più elevata grazie alla sua maggiore porosità. Questo si traduce in un alto risparmio energetico. I singoli capillari sono saldamente collegati tra loro da una struttura di supporto omogenea che ha una permeabilità di circa 1.000 volte superiore a quella dell'effettiva interfaccia di filtrazione dei capillari. Questi sono posizionati a distanze definite tra loro per garantire una distribuzione uniforme dell'acqua all'interno della membrana Multibore® garantendo altresì una stabilità complessiva superiore. Pori più piccoli, pressione più bassa, resistenza ineguagliabile a pulizie chimiche con alti valori di pH per la rimozione di sostanze organiche e, naturalmente, la sua stabilità, sono solo alcune delle caratteristiche che rendono Multibore® PES unica.

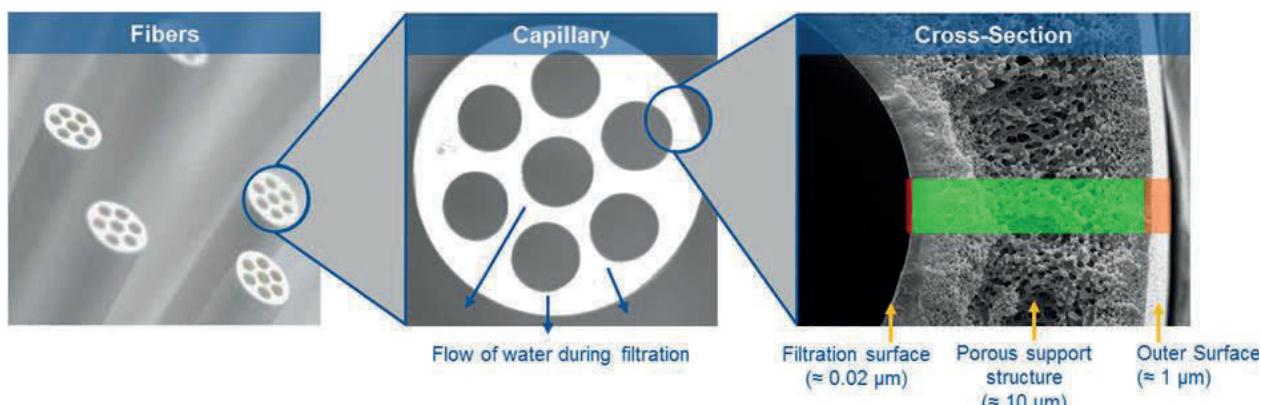
backwash water and a smaller membrane area. Fibers with a capillary diameter larger than > 0.9 mm (> 0.035 inch) are the choice for applications involving continuously high levels of solids – for example backwash waters of conventional media filters, or 2nd-stage UF systems (treating the non-chemical backwash water of a 1st-stage UF system). As a first indication these larger capillaries should be considered for water with a concentration of suspended solids greater than 50 mg/l. The final decision for the used capillary diameter is depending on different factors like filtration time, backwash time and the nature of the particles. The larger diameter significantly increases the solids content that can be handled by the capillaries and in principle, enables higher flow velocities and lower pressure drops in a semi cross-flow operation, if employed.

The Multibore® membrane is "spun" in a single production step from just one polymer solution in a patented production process. Spinning the membranes using just one material creates what is known as an "integral" membrane. Unlike composite membranes, which consist of multiple layers of various materials, integral membranes do not pose the risk of individual layers peeling away. This is a huge advantage in terms of membrane integrity.

The PES based membrane material is modified in a way that boosts the hydrophilicity of the membrane. This increased hydrophilicity reduces the tendency of the membrane surface to adsorb organics, thereby improving operating performance with less membrane fouling. The manufacturing process produces a defined thin filtration surface (interface) on the inside of the seven capillaries with extremely low resistance to permeation and with inner pores measuring approximately 20 nanometers (see Figure 2.1-2). This pore size is substantially smaller compared to low pressure membranes of most other ultrafiltration membranes on the market. This ensures a virus rejection of more than 4 log units without any pretreatment step like coagulation and in addition a better removal of foulants if used as pretreatment for reverse osmosis plants. In spite of the smaller pores, the Multibore® membrane shows a substantially higher permeability because of the higher surface porosity. This is translated into a very energy efficient operation.

The individual capillaries are firmly connected to each other by a homogeneous support structure that has a permeability some 1,000 times higher than that of the actual filtration interface of the capillaries. The capillaries are spaced at defined distances from each other to ensure a uniform distribution of water within the Multibore® membrane and superior overall stability.

Smaller pores, lower pressure, the unmatched resistance against high pH cleaning for removing organic foulants and of course the stability are only a few unique characteristics of the Multibore® PES membrane.



**Figure 2.1-1 - Sezione trasversale di una membrana Multibore®**  
**Figure 2.1-2 - Cross-section of a Multibore® membrane**

Le membrane di ultrafiltrazione Multibore® funzionano "al contrario", il che significa che l'acqua di alimentazione viene

Multibore® ultrafiltration membranes operate "inside-out", which means that the feed water flows from the inside

filtrata dall'interno verso l'esterno dei capillari, mentre il controlavaggio scorre nella direzione opposta, cioè dall'esterno all'interno dei capillari.

Le membrane di ultrafiltrazione inge® Multibore® rimuovono dall'acqua in modo affidabile, particelle, batteri e virus, anche in condizioni di variabilità dell'affluente. Il mantenimento dell'integrità delle fibre presenti nella membrana è un prerequisito fondamentale per garantire che i contaminanti vengano rimossi correttamente dal sistema. Sebbene i difetti capillari siano estremamente improbabili a causa della straordinaria stabilità delle Multibore®, l'integrità delle membrane o dei capillari può essere negativamente influenzata da sostanze non tollerate nell'acqua di alimentazione e, in particolare, da eccessivi ed impropri stress meccanici.

#### • **Tecnologia dei moduli ditzer®**

Le membrane UF sviluppate da inge, GmbH vengono inserite all'interno di un vessel in pressione. Questi fanno parte della serie inge® ditzer® ovvero dei moduli verticali, che racchiudono caratteristiche e design unici per applicazioni in ultrafiltrazione nel settore del trattamento delle acque. Particolare attenzione è stata prestata all'ottimizzazione delle caratteristiche idrodinamiche del modulo interno al fine di migliorare l'efficienza del controlavaggio e l'integrità della membrana.

#### **MODALITÀ OPERATIVE DELLA MEMBRANA**

##### • **Filtrazione**

Nella modalità di filtrazione, l'acqua da filtrare viene trattata spingendola dentro la membrana di ultrafiltrazione dal lato di alimentazione verso il lato del filtrato. I contaminanti dell'acqua, che vengono bloccati dall'area filtrante, si concentrano sulla superficie interna dei capillari. Il filtrato fluisce nel serbatoio del trattato / controlavaggio, che funge sia da contenitore per l'acqua di controlavaggio che d'accumulo per l'acqua destinata ad ulteriori processi o consumi. In alternativa, il filtrato potrà essere convogliato direttamente alle utenze finali. In questo caso il serbatoio avrà esclusivamente la funzione di stoccaggio per l'acqua di lavaggio. La quantità di acqua che può essere trattata da ciascun modulo UF, dipende da una serie di fattori, incluso l'origine dell'acqua da trattare (ad es. acqua di falda, acque superficiali, acqua di mare o acque reflue pretrattate), le sue caratteristiche (ad es. torbidità, quantità di solidi, sostanze organiche / inorganiche, temperatura) e la strategia di costo prescelta (costo capitale, costi operativi).

I seguenti schemi illustrano le due modalità operative: "Filtrazione dall'alto" e "Filtrazione dal basso" in modalità "dead-end" (senza scarico). La Figura 3.1-1 mostra una "filtrazione dall'alto" (FT) eseguita alimentando il modulo nella parte superiore, mentre la Figura 3.1-2 mostra una "filtrazione dal basso" con alimento del modulo dal basso.

to the outside of the capillaries in filtration mode and flows in the reverse direction, i.e. from the outside to the inside of the capillaries, in backwash mode.

inge® Multibore® ultrafiltration membranes reliably remove particles, bacteria and viruses from a variety of water sources, even if fluctuations in the quality of the feed water exist. Maintaining the integrity of the membrane fibers is a key prerequisite for ensuring that contaminants are properly removed from the system. Although capillary defects are extremely unlikely due to the extraordinary stability of Multibore® membranes, the integrity of the membranes or capillaries can still be affected negatively by factors such as non-approved substances in the feed water and, in particular, by excessive mechanical stress caused by improper operation.

#### • **ditzer® Module Technology**

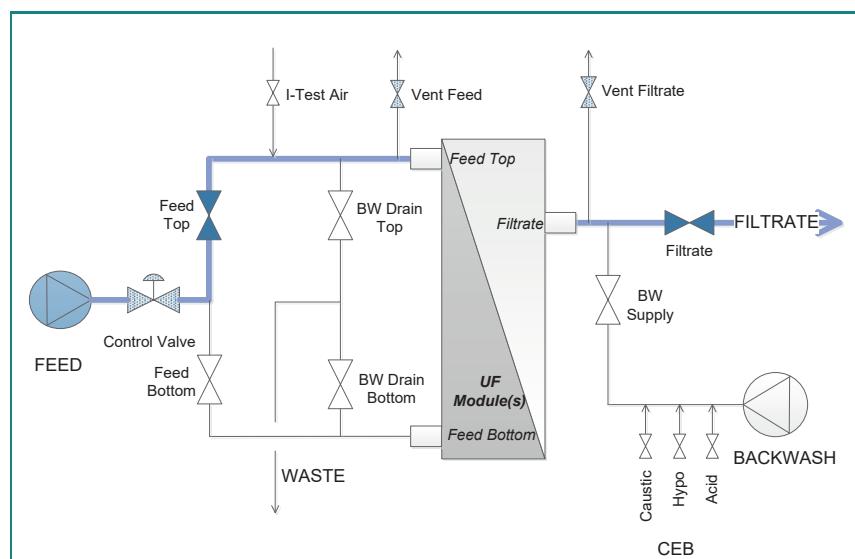
The UF membranes developed by inge GmbH are encased in a pressure housing. The resulting array is known as the vertical inge® ditzer® module Series, which includes unique design features tailored to the specific requirements of ultrafiltration in the water treatment industry. Particular attention has been paid to optimizing the hydrodynamic characteristics of the internal module design in order to improve backwash efficiency and membrane integrity.

#### **MEMBRANE OPERATING MODES**

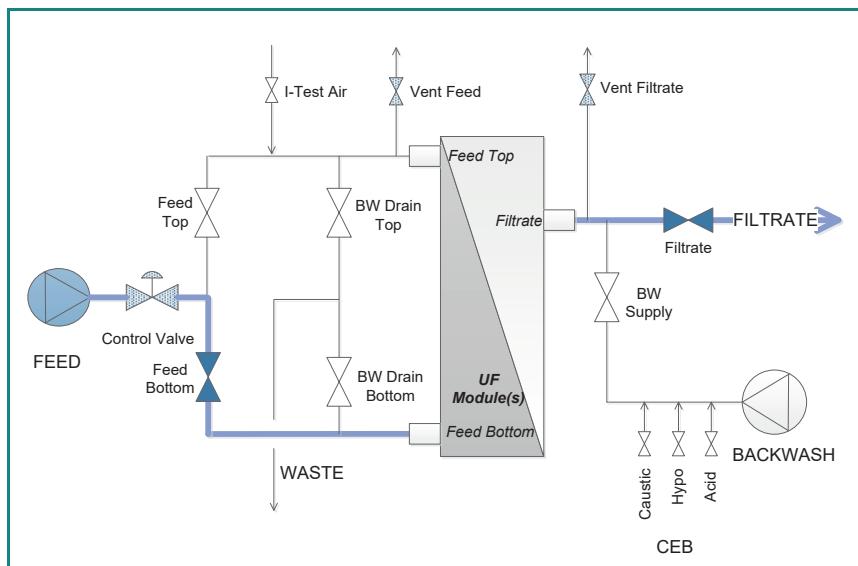
##### • **Filtration**

In filtration mode, the source water is treated by being forced through the ultrafiltration membrane from the feed side to the filtrate side. The contaminants in the water, which are blocked by the filtration surface, accumulate on the inner surface of the membrane capillaries. The filtrate flows into the filtrate/backwash tank, which serves as a storage container for the backwash water and the water that is to be used for further processing or consumption. Alternatively, the filtrate can be piped directly to the ultimate consumers, in which case the tank is used solely as a storage container for backwash water. The amount of water that can be treated by each UF module depends on a number of factors, including the origin of the water being treated (e.g. ground water, surface water, sea water, or pre-treated waste water), the composition of the source water (e.g. turbidity, concentration of solids, dissolved organics/inorganics, temperature), and the chosen cost strategy (capital cost, operating costs).

The diagrams below show the two operating modes "Filtration Top" and "Filtration Bottom" in dead-end mode. Figure 3.1-1 shows filtration being performed from top (FT) with the source-water being fed into the top of the module, while Figure 3.1-2 shows filtration being performed from bottom (FB) with the source-water being fed into the bottom of the module.



**Figura 3.1-1 - Modalità Filtrazione dall' alto (FT)**  
**Figure 3.1-1 - Filtration Top (FT) mode**



**Figura 3.1-1 - Modalità Filtrazione dal basso (FT)**  
**Figure 3.1-2 - Filtration Bottom (FB) mode**

**Serie ditzer® XL W per installazioni in piattaforma / ditzer® XL W Series for Open Platform Installation**

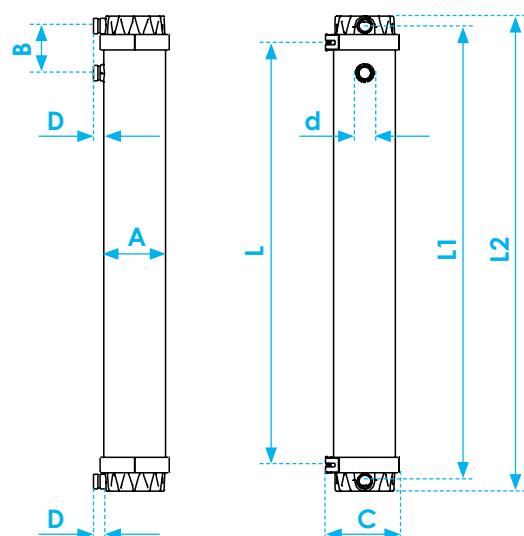
### Module Specifications

Module reference	ditzerXL® 0.9 MB 38 W	ditzerXL® 0.9 MB 60 W	ditzerXL® 0.9 MB 80 W	ditzerXL® 1.5 MB 25 W	ditzerXL® 1.5 MB 40 W							
Part number <sup>[1]</sup>	VK-0070	VK-0068	VK-0109	VK-0071	VK-0069							
Type of membrane <sup>[2]</sup>	Multibore 0.9®				Multibore 1.5®							
Active membrane area	m <sup>2</sup>	ft <sup>2</sup>	38	410	60	645	80	861	25	270	40	430
Shipping weight	kg	lbs.	36	79.4	48	105.8	59	130.1	35	77.2	47	103.6
Module type			1		2		3		1		2	

Module type	1	2	3
Module length (L)	mm	inch	985 ±1.5      38.78
Distance top / bottom feed port (L1)	mm	inch	1100 ±3      43.31
Length with end caps (L2)	mm	inch	1180 ±3      46.46
			1485 ±1.5      58.46
			1600 ±3      62.99
			1720 ±1.5      67.72
			1834 ±3      72.20
			1914 ±3      75.35

### Common Characteristics

Dimensions				
Module diameter (A)	mm	inch	250 ±1.5	9.84
Distance feed top port - filtrate port (B)	mm	inch	190 ±1.5	7.48
Outer diam. end cap coupling max. (C)	mm	inch	295	11.61
Port length (D)	mm	inch	40 ±1	1.57
Filtrate / Backwash port (d)		inch		2

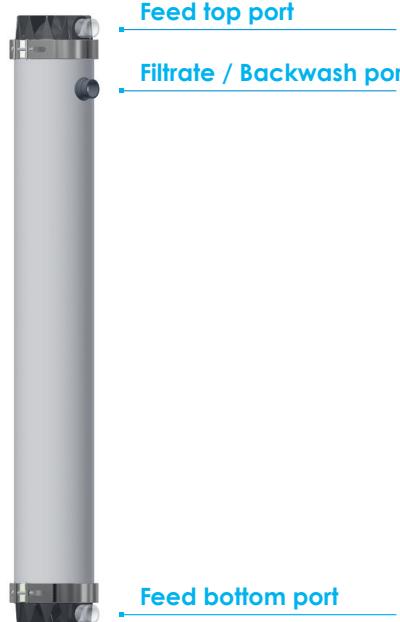


Material	
Housing	PVC-U white
End cap	PVC-U grey
End cap coupling	SS (EPDM sealing)

**dizzer®XL W Series | for Open Platform Installation**
**Operating Parameters<sup>[3]</sup>**

<b>Temperature</b>				
Permissible temperature range	°C	°F	1 – 40	34 – 104
Max rate of temperature change	°C/min	°F/min	5	9

<b>Pressure</b>				
Maximum operating pressure <sup>[4]</sup>	bar	psi	5	72
Maximum rate of pressure change	bar/sec	psi/sec	0.5	7.25



- [1] Module with Connecting Kit (end caps and couplings). Please contact inge GmbH if you want to order replacement modules without Connecting Kit. Modules are delivered with end caps ports aligned with the filtrate / backwash port with a tolerance of  $\pm 3$  mm. In the event that the alignment needs to be modified, the end cap couplings can be loosened to align the end caps ports with the filtrate / backwash port as desired. After alignment, the end cap couplings must be fastened with a torque wrench whose tightening value must be set at 40 Nm.
- [2] Please refer to the latest version of the Multibore® datasheet.
- [3] For membrane related operating conditions, please refer to [2].
- [4] The design pressure corresponds to the maximum permitted operating pressure in continuous operation at the specified design temperature. Higher operating pressures than 5 bar may be possible in certain cases. However, this must first be verified and approved by inge GmbH.

**Note**

The descriptions, designs, data and product information contained herein are presented in good faith and are based on inge GmbH's current knowledge and experience. inge GmbH cannot accept any liability for the accuracy of this product information, which is provided at no charge and for guidance only. inge products are designed to be operated in accordance with the corresponding inge® product documentation. The product information and products are protected by copyright and/or other intellectual property laws worldwide. However, inge GmbH cannot guarantee that the product information and products can be used without infringing third party intellectual property rights. The products and product information may only be used, distributed and marketed with the express prior permission of inge GmbH. No warranties of any kind regarding the products, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose or no third party rights are made, other than as expressly set out in the contractual agreement with the customer. Mechanical stability and full functionality of inge® products can only be provided by genuine inge® parts. inge GmbH reserves the right to modify products and product information at any time without prior information. Current product information can be obtained from the website [www.dupontwatersolutions.com](http://www.dupontwatersolutions.com)

**Serie dizz® XL WR e dizz® Plus WR per installazioni in piattaforma / dizz® XL WR Series and dizz® Plus WR Series for Open Platform Installation**

### Module Specifications

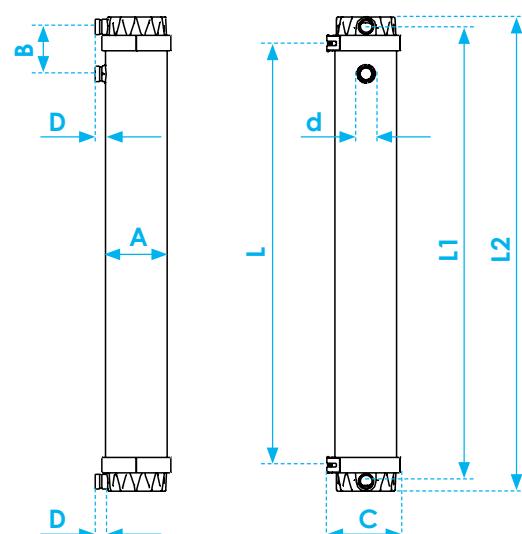
Module reference	dizz® XL 0.9 MB 36 WR	dizz® XL 0.9 MB 60 WR	dizz® XL 1.5 MB 25 WR	dizz® XL 1.5 MB 40 WR	dizz® 3000Plus WR	dizz® 5000Plus WR								
Part number <sup>[1]</sup>	VK-0090	VK-0089	VK-0092	VK-0091	VK-0093	VK-0094								
Type of membrane <sup>[2]</sup>	Multibore® 0.9			Multibore® 1.5										
Active membrane area	m <sup>2</sup>	ft <sup>2</sup>	36	390	60	645	25	270	40	430	30	323	50	538
Shipping weight	kg	lbs.	35	77	48	106	35	77	47	104	34	75	46	102
Module type			1		2		1		2		1		2	

Module type	1	2				
Module length (L)	mm	inch	985 ±1.5	38.78	1485 ±1.5	58.46
Distance top / bottom feed port (L1)	mm	inch	1100 ±3	43.31	1600 ±3	62.99
Length with end caps (L2)	mm	inch	1180 ±3	46.46	1680 ±3	66.14

### Common Characteristics

Dimensions				
Module diameter (A)	mm	inch	250 ±1.5	9.84
Distance feed top port - filtrate port (B)	mm	inch	190 ±1.5	7.48
Outer diam. end cap coupling max. (C)	mm	inch	295	11.61
Port length (D)	mm	inch	55 ±1	2.17
Filtrate / Backwash port (d)		inch		2

Material				
Housing	PVC-U white			
End cap	PVC-U grey			
End cap coupling	SS (EPDM sealing)			



## dizzer® XL/Plus WR Series | for Open Platform Installation

### Operating Parameters [3]

#### Temperature

	°C	°F	1 – 40	34 – 104
Permissible temperature range				

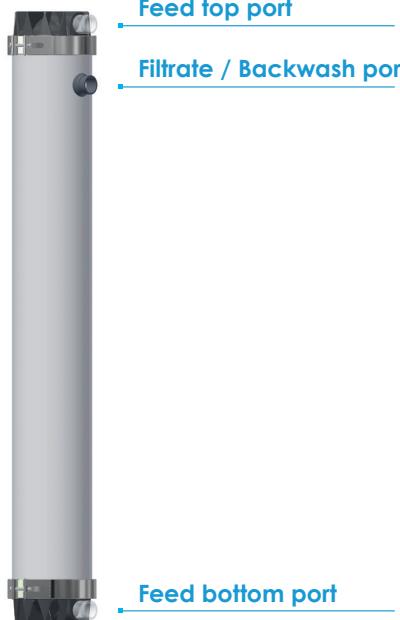
	°C/min	°F/min	5	9
Max rate of temperature change				

#### Pressure

	bar	psi	5	72
Maximum operating pressure [4]				

	bar/sec	psi/sec	0.5	7.25
Maximum rate of pressure change				



- [1] Module with Connecting Kit (end caps and couplings). Please contact inge GmbH if you want to order replacement modules without Connecting Kit. Modules are delivered with end caps ports aligned with the filtrate / backwash port with a tolerance of  $\pm 3$  mm. In the event that the alignment needs to be modified, the end cap couplings can be loosened to align the end caps ports with the filtrate / backwash port as desired. After alignment, the end cap couplings must be fastened with a torque wrench whose tightening value must be set at 40 Nm.
- [2] Please refer to the latest version of the Multibore® datasheet.
- [3] For membrane related operating conditions, please refer to [2].
- [4] The design pressure corresponds to the maximum permitted operating pressure in continuous operation at the specified design temperature. Higher operating pressures than 5 bar may be possible in certain cases. However, this must first be verified and approved by inge GmbH.

#### Note

The descriptions, designs, data and product information contained herein are presented in good faith and are based on inge GmbH's current knowledge and experience. inge GmbH cannot accept any liability for the accuracy of this product information, which is provided at no charge and for guidance only. inge products are designed to be operated in accordance with the corresponding inge® product documentation. The product information and products are protected by copyright and/or other intellectual property laws worldwide. However, inge GmbH cannot guarantee that the product information and products can be used without infringing third party intellectual property rights. The products and product information may only be used, distributed and marketed with the express prior permission of inge GmbH. No warranties of any kind regarding the products, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose or no third party rights are made, other than as expressly set out in the contractual agreement with the customer. Mechanical stability and full functionality of inge® products can only be provided by genuine inge® parts. inge GmbH reserves the right to modify products and product information at any time without prior information. Current product information can be obtained from the website [www.dupontwatersolutions.com](http://www.dupontwatersolutions.com).

**IMPIANTO DI ULTRAFILTRAZIONE LINEGUARD UF-100 / LINEGUARD UF-100 ULTRAFILTRATION SYSTEM**

LineGuard UF-100 è la nuova generazione di impianti di ultrafiltrazione POE (Point Of Entry), in grado di erogare fino a 60 L/min., rimuovendo il 99,99% dei virus e dei batteri. LineGuard UF-100 dispone di due moduli di ultrafiltrazione X-Flow, con miliardi di pori microscopici, sufficientemente piccoli da trattenere tutti i microorganismi, inclusi batteri e virus, cisti, sedimenti e torbidità..

**CARATTERISTICHE TECNICHE**

- Temperatura ambiente: min. +1 °C, max. +50 °C
- Temperatura di stoccaggio: min. +1 °C, max. +50 °C
- Temperatura dell'acqua di alimentazione: min. +1 °C, max. +40 °C
- Umidità relativa: fino al 100%
- Tensione di alimentazione: 90-264 VCA
- Consumo energetico durante la pulizia: max. 20 W
- Consumo energetico durante la filtrazione: max. 1 W
- Pressione in ingresso massima: 4 bar

**SPECIFICHE DEL PRODOTTO**

- Acqua di alimentazione: 22 mm, 3/4" (raccordo a saldare o a pressare)
- Permeato: 22 mm, 3/4" (raccordo a saldare o a pressare)
- Connessione allo scarico: 22 mm, 3/4" (raccordo a saldare o a pressare)

**DIMENSIONI E PESO**

- Prodotto: Altezza 1.150 mm/Larghezza 316 mm/Profondità 209 mm/Peso 38 kg
- Imballo: Lunghezza 1.200 mm/Larghezza 400 mm/Altezza 350 mm/Peso 40 kg

**PRESTAZIONI**

Portata iniziale<sup>(1)</sup>: \_\_\_\_\_ 60 l/min. @ 2 bar, sufficiente per collegare 4 rubinetti  
Capacità totale<sup>(1)</sup>: \_\_\_\_\_ > 5.000 m<sup>3</sup>  
Efficienza impianto<sup>(1)</sup>: \_\_\_\_\_ > 98%  
Cicli di pulizia: \_\_\_\_\_ Control lavaggio e lavaggio in equicorrente  
Superficie della membrana: \_\_\_\_\_ 4,5 m<sup>2</sup>  
Unità di controllo: \_\_\_\_\_ Tipo CWS EC 2  
Menu lingua: \_\_\_\_\_ Inglese, tedesco, spagnolo, francese  
Dati in ingresso: \_\_\_\_\_ Parametri del ciclo di pulizia  
Dati in uscita: \_\_\_\_\_ Volume totale, perdita di carico, indicazione delle prestazioni

**CONFORMITÀ**

Ritenzione biologica: \_\_\_\_\_ Virus<sup>(2)</sup>: > 99,99% (log 4) /  
Batteri<sup>(3)</sup> > 99,99999% (log 7)  
Sicurezza dei materiali: \_\_\_\_\_ Prove di estrazione secondo NSF/KTW  
Integrità strutturale testata a: \_\_\_\_\_ Pressione idrostatica di 12 bar  
NSF P231: \_\_\_\_\_ Conforme  
UL: \_\_\_\_\_ Conforme  
KIWA ATA: \_\_\_\_\_ In attesa di approvazione  
(1) Flow rates and capacity depend on incoming water conditions  
(2) Tested by Vitens water research using MS2 bacteriophages  
(3) Tested by KIWA water research using Legionella Pneumophilia

LineGuard UF-100 is the next generation of Point Of Entry ultrafiltration systems, able to provide up to 60 LPM, removing 99.99% of viruses and 99.99% of bacteria.

The LineGuard UF-100 has two X-Flow UF modules with billions of microscopic pores small enough to retain all micro-organisms including bacteria, viruses and cysts as well as sediment and turbidity

**TECHNICAL CHARACTERISTICS**

- Ambient temperature: min +1°C, max +50 °C
- Storage temperature: min +1°C, max +50 °C
- Feed water temperature: min +1°C, max +40 °C
- Relative humidity: up to 100%
- Supply voltage: 90-264 VAC
- Power consumption during cleaning: max. 20 W
- Power consumption during filtering: max. 1 W
- Maximum inlet pressure: 4 bar

**PRODUCT SPECIFICATIONS**

- Feed water: 22 mm, 3/4 inch (solder or compression fitting)
- Permeate: 22 mm, 3/4 inch (solder or compression fitting)
- Connection to drain: 22 mm, 3/4 inch (solder or compression fitting)

**DIMENSIONS AND WEIGHT:**

- Product: Height 1150 mm/Width 316 mm/Depth 209 mm/Weight 38 kg
- Packaging: Length 1200 mm/Width 400 mm/Height 350 mm/Weight 40 kg

**PERFORMANCE**

Initial flow rate<sup>(1)</sup>: \_\_\_\_\_ 60 l/min @ 2 bar, sufficient for 4 tap connections

Total capacity<sup>(1)</sup>: \_\_\_\_\_ > 5.000 m<sup>3</sup>

System efficiency<sup>(1)</sup>: \_\_\_\_\_ > 98%

Cleaning cycles: \_\_\_\_\_ Backwash and forward flush

Membrane area: \_\_\_\_\_ 4,5 m<sup>2</sup>

Control unit: \_\_\_\_\_ Type CWS EC 2

Menu language: \_\_\_\_\_ English, German, Spanish, French

Input data: \_\_\_\_\_ Cleaning cycle parameters

Output data: \_\_\_\_\_ Total volume, pressure drop, performance indication

**COMPLIANCE**

Biological retention Viruses<sup>(2)</sup>: \_\_\_\_\_ >99.99% (log 4)

Bacteria<sup>(3)</sup> : \_\_\_\_\_ >99.99999% (log 7)

Material safety Extraction: \_\_\_\_\_ tests according to NSF/KTW

Structural integrity tested at: \_\_\_\_\_ Hydrostatic pressure 12 bar

NSF P231: \_\_\_\_\_ Compliant

UL: \_\_\_\_\_ Compliant

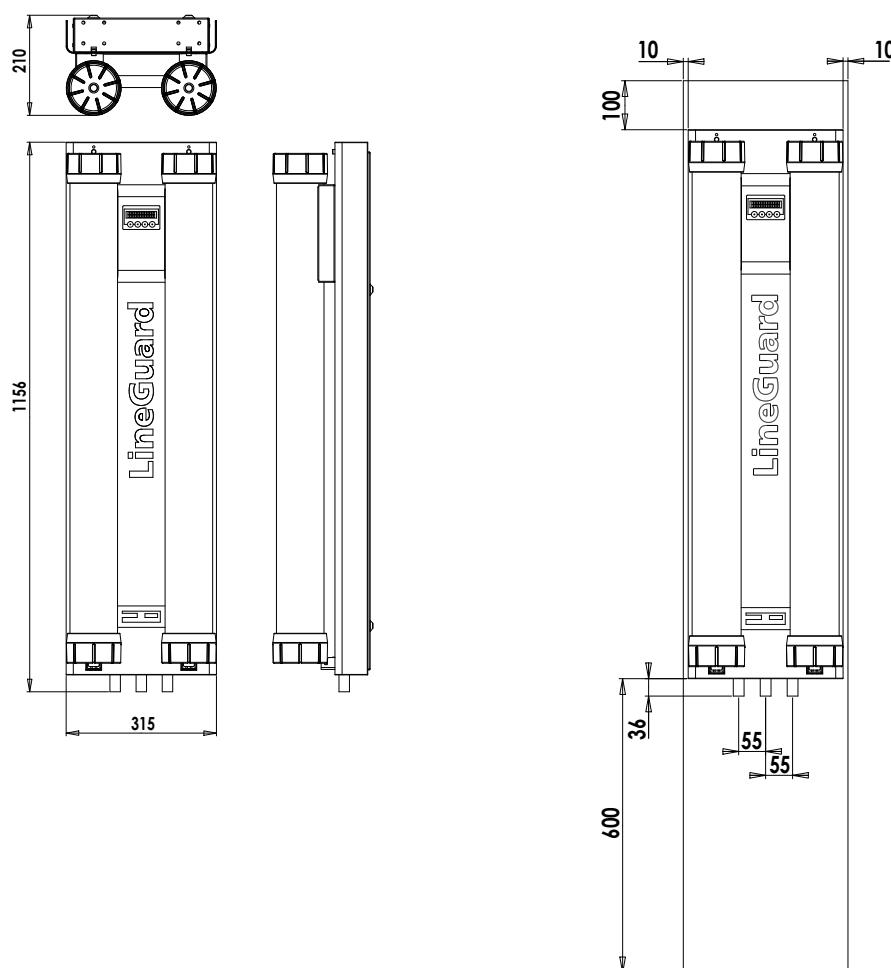
KIWA ATA: \_\_\_\_\_ Pending

(1) Flow rates and capacity depend on incoming water conditions

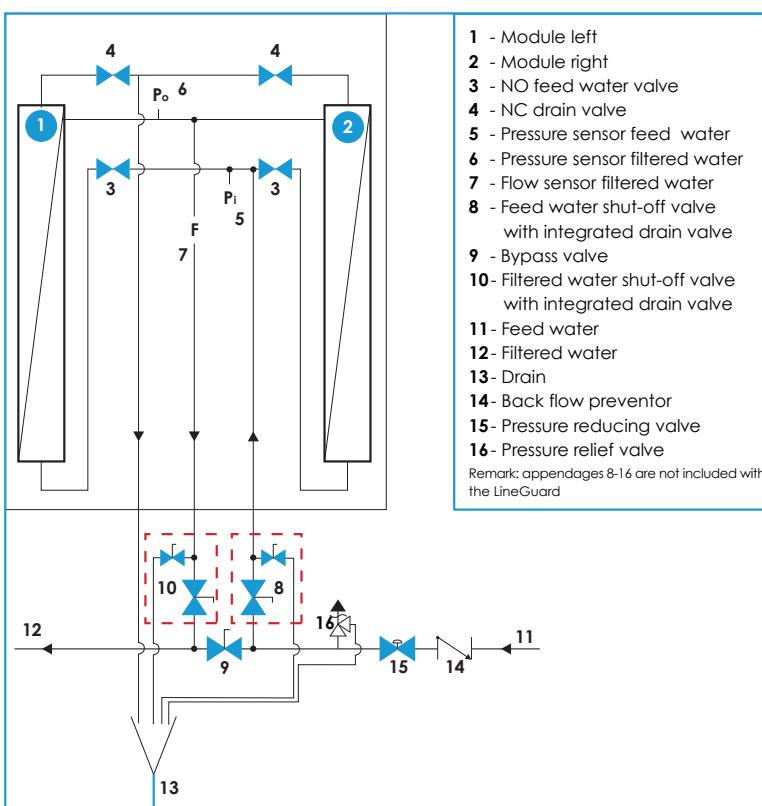
(2) Tested by Vitens water research using MS2 bacteriophages

(3) Tested by KIWA water research using Legionella Pneumophilia

## DIMENSIONI / DIMENSIONS



## COLLEGAMENTI IDRAULICI / HYDRAULIC CONNECTIONS



## Installazione tubazioni / Piping Installation

