

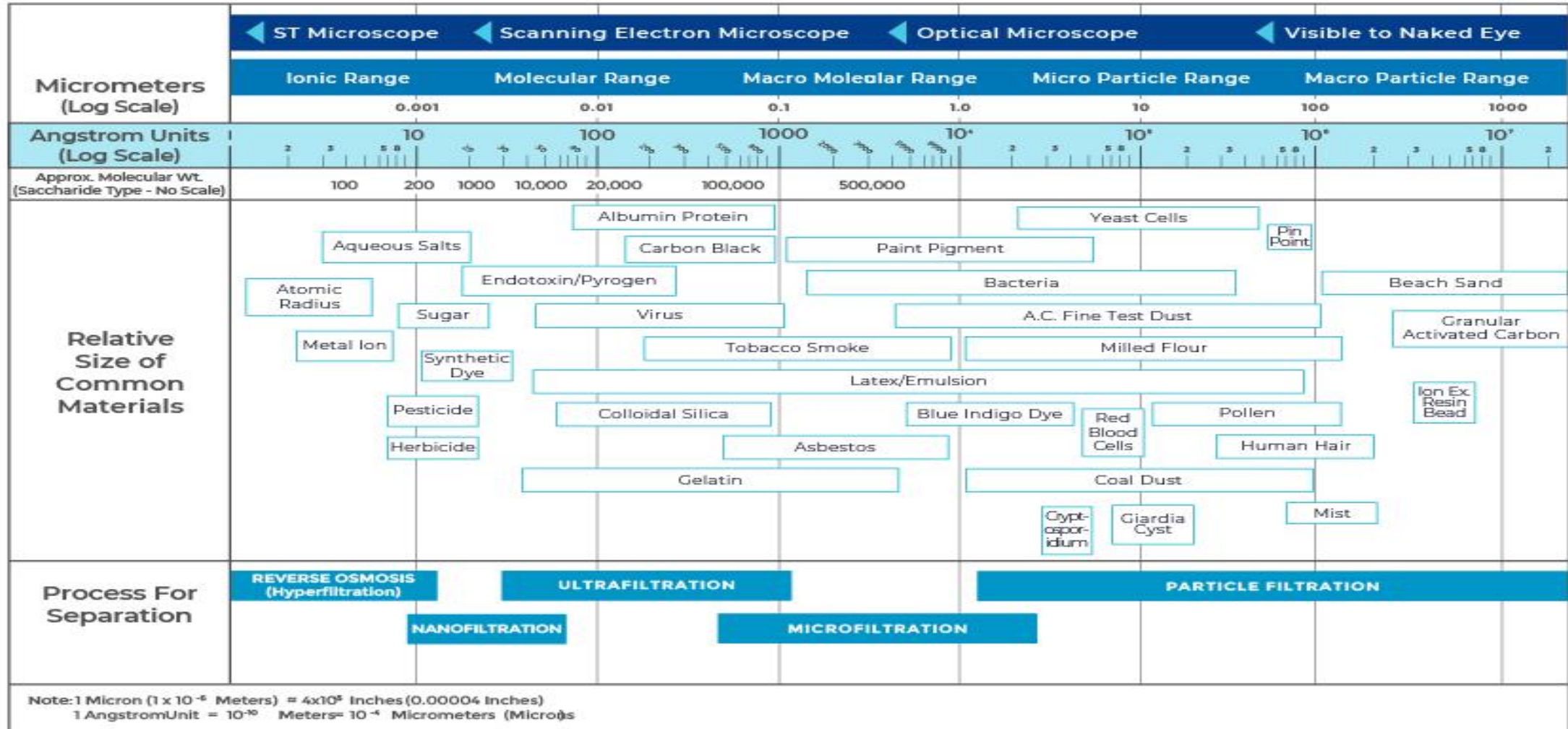


# FLUID TECHNOLOGY INTERNATIONAL PVT. LTD.

# MEMBRANES FOR DESALINATION

- MEMBRANE PROCESS HAS BEEN PROVEN TO BE THE MOST FEASIBLE & EFFICIENT DESALINATION PROCESS PRESENTLY BRINGING A SIGN OF RELIEF FOR HUMAN RACE TO CONFRONT WITH EVER RISING SCARCITY OF SWEET WATER RESOURCES BECAUSE OF CLIMATE CHANGE.
- DESALINATION PROCESS INCORPORATE DIFFERENT TYPE OF MEMBRANES DEPENDING ON FEED WATER CHARACTERISTICS AND DESIRED QUALITY OF WATER.

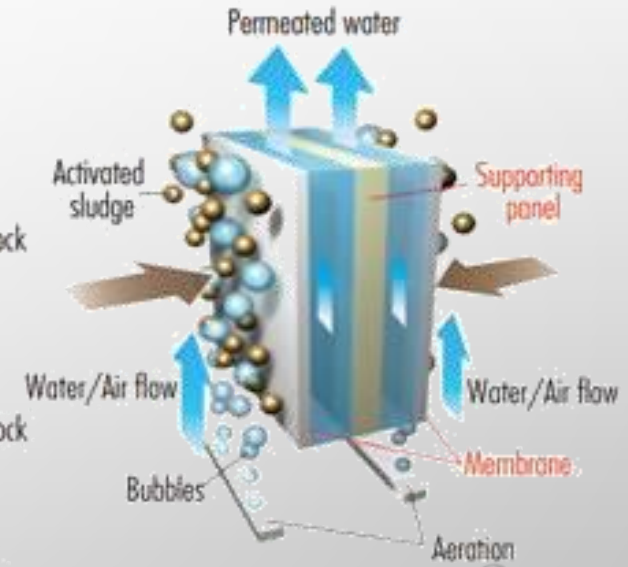
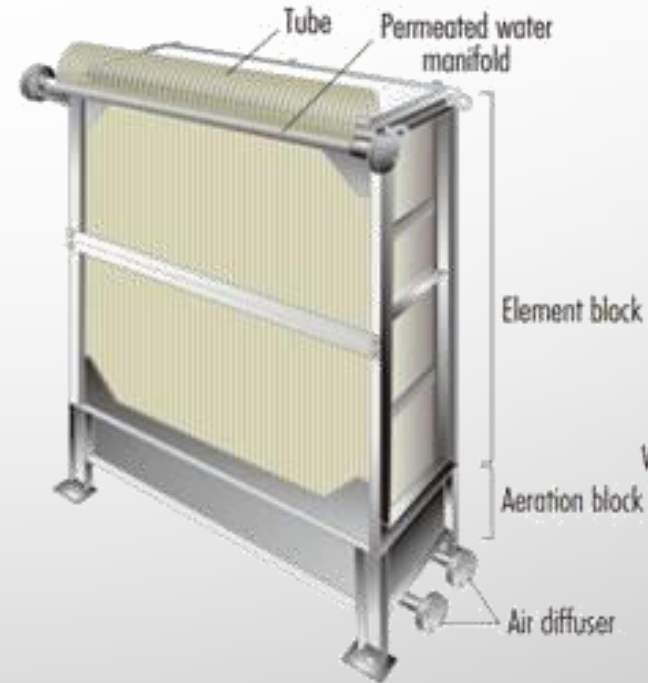
# FILTRATION SPECTRUM



# MEMBRANE TYPES

- **PRETREATMENT MEMBRANES**
  - ULTRA FILTRATION MEMBRANES
- **DESALINATION MEMBRANES**
  - BRACKISH WATER MEMBRANES
  - SEA WATER MEMBRANES


# PRE TREATMENT MEMBRANES



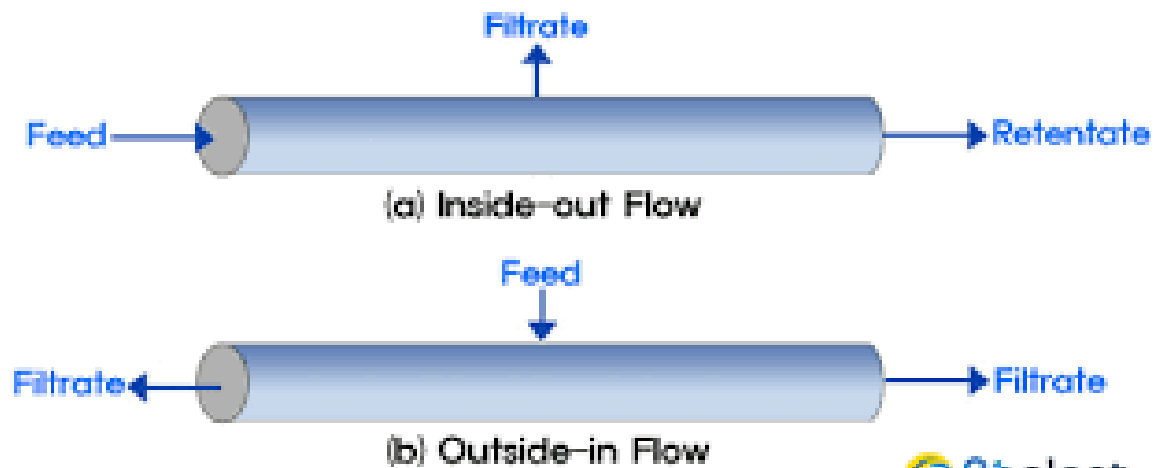
# PRE TREATMENT MEMBRANES



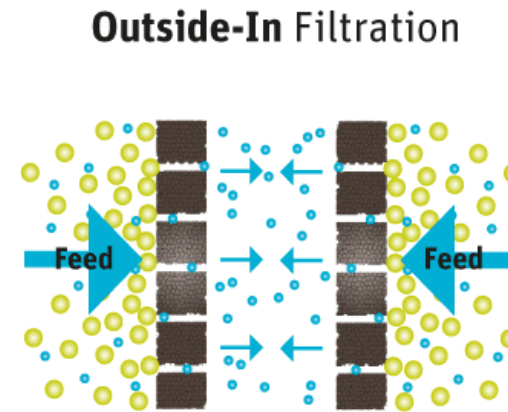
# PRE TREATMENT MEMBRANES

- ULTRA FILTRATION MEMBRANES
  - MATERIAL OF CONSTRUCTION – HYDROPHILIC MEMBRANE COMPOSED OF A BLEND OF POLYVINYLPIRROLIDONE  $(C_6H_9NO)_N$  AND POLYETHERSULFONE (PES)
  - OPERATING PHILOSOPHY
    - INSIDE / OUT
    - OUTSIDE / IN
- 

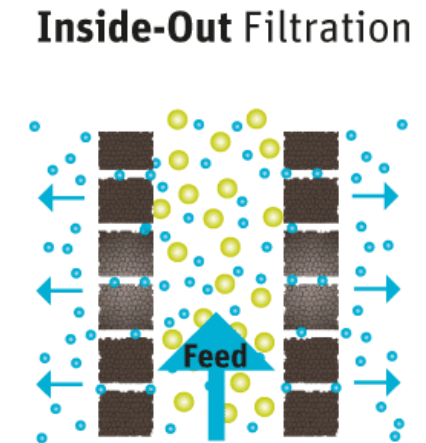
# PRE TREATMENT MEMBRANES



<Individual Fiber Flow Pattern>



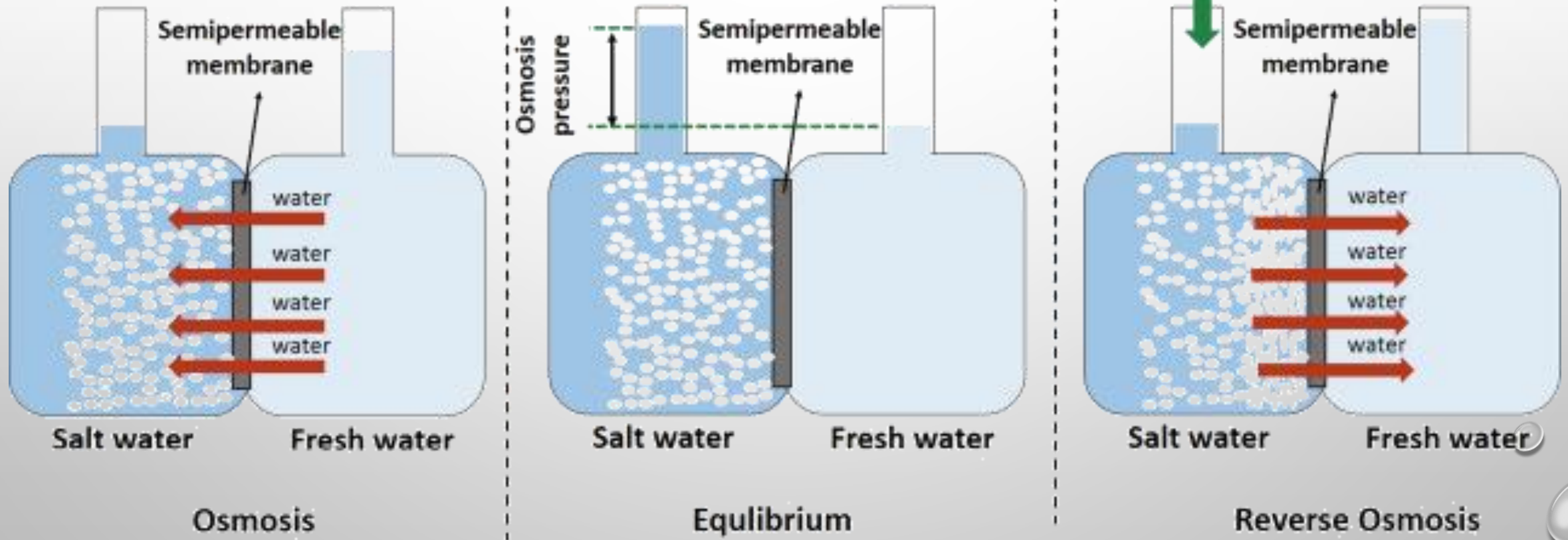
- Higher fouling
- Lower flux
- Harder to clean



- Superior fouling resistance
- Higher sustainable flux
- Easier to clean



# DESALINATION PROCESS



# DIFFERENT CAPACITY DESALINATION SYSTEMS



# DESALINATION MEMBRANES

## BRACKISH WATER MEMBRANES

- MATERIAL OF CONSTRUCTION : POLYAMIDE ,  
CELLULOSE ACETATE
- FEED WATER TDS RANGE : 500-12000PPM
- OPERATING PRESSURE RANGE : 50 450 PSI
- SALT REJECTION : 95-98%
- SIZES : 2.5" X10",  
2.5" X 20",  
4" X 40",  
8" X 40"
- CHEMICAL SENSITIVITY : EXTREMELY SENSITIVE AGAINST  
OXIDIZING CHEMICAL LIKE  
CHLORINE ETC
- TYPE : HIGH REJECTION,  
LOW ENERGY,  
LOW FOULING

### Brackish Water Reverse Osmosis Membranes



# DESALINATION MEMBRANES

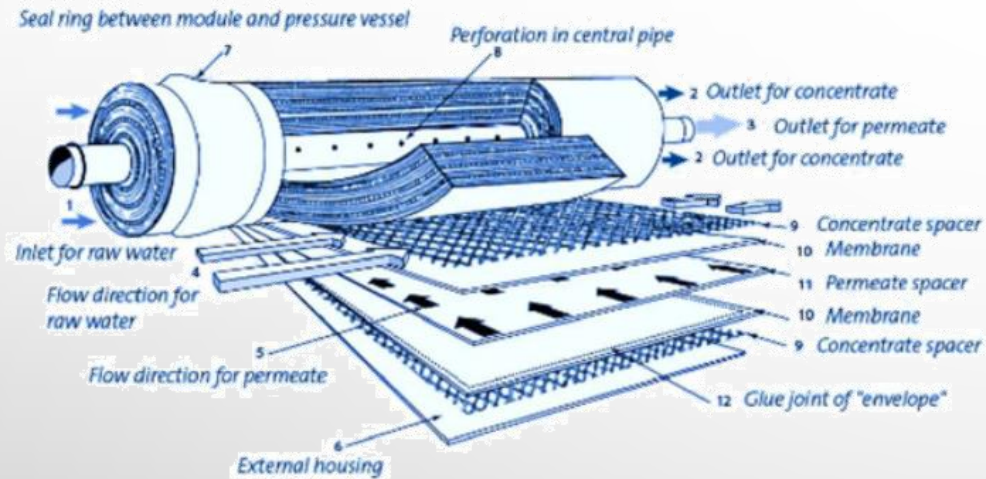
## SEA WATER MEMBRANES

- MATERIAL OF CONSTRUCTION : POLYAMIDE ,  
CELLULOSE ACETATE
- FEED WATER TDS RANGE : 12000-45000PPM
- OPERATING PRESSURE RANGE : 500-1200 PSI PSI
- SALT REJECTION : 99-99.9%
- SIZES : 4"X40",  
8"X40"
- CHEMICAL SENSITIVITY : EXTREMELY SENSITIVE  
AGAINST OXIDIZING  
CHEMICAL LIKE  
CHLORINE ETC
- TYPE : HIGH REJECTION,  
LOW ENERGY,  
LOW FOULING

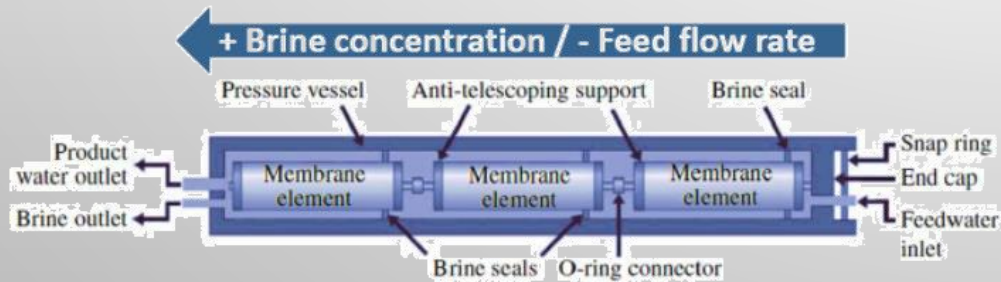
## Saltwater Reverse Osmosis Membranes



# DESALINATION MEMBRANE



Cross section of spiral wound element.



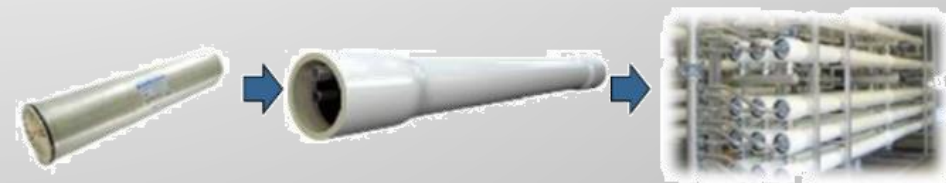
Membrane elements in a pressure vessel.

## Membrane Materials

- Polyamide (Thin-film Composite)
- Cellulose Acetate

## Membrane Configurations

- Spiral Wound
- Hollow fiber
- Flat sheet



# DESALINATION MEMBRANES



# STATUS OF DESALINATION MEMBRANES GLOBALLY

- BIG MULTINATIONAL COMPANIES CONTROLLING THE MARKET UNDER BRAND NAME (DUPONT, HYDRANAUTICS, SUEZ, LG, TORAY,PENTAIR ETC)
- MOSTLY OF THEM FROM USA, EUROPE, JAPAN
- FEW PRODUCTS ARE FROM CHINA AND KOREA

# STATUS OF MEMBRANE IN PAKISTAN

- NO COMMERCIAL PRODUCTION
- ALL PRODUCTS ARE BEING IMPORTED FROM USA, EUROPE, KOREA OR CHINA



# IMPEDIMENT FOR MEMBRANE LOCAL DEVELOPMENT

- LIMITED FACILITATION BY GOVERNMENT FOR R&D
- ADAPTATION AND COMMERCIALIZATION OF TECHNOLOGY
- DOMINATION OF BIG BRANDS ON DESALINATION TECHNOLOGY
- LACK OF WILL FROM AUTHORITIES & INTERFERENCE TO ADOPT LOCAL PRODUCTS
- LIMITED EXISTING MARKET BASE

# EXPECTED PLANS

- AS A FIRST STEP LOCAL ROLLING OF MEMBRANE MIGHT HELP TO PROCEED IN A DIRECTION TO DEVELOP POLYMER LOCALLY
- POLICIES PURSUANCE WITH AUTHORITIES TO CREATE AND DEVELOP NEW USAGE AREA AND MAKE ENVIRONMENT LUCRATIVE FOR LOCAL PRODUCTS TO BE CONSUMED LOCALLY AND CONSUMED INTERNATIONALLY

# AREAS OF DEVELOPMENT OF MEMBRANES

- SINCE WATER SOURCES ARE DEPLETING AND WE ARE GETTING INTO THE SITUATION WHERE WE NEED TO DEVELOP ALTERNATE AND RELIABLE SOURCES FOR POTABLE AND AGRICULTURE WATER
- **SEA WATER DESALINATION**
  - TO PROVIDE ALTERNATE AND RELIABLE SOURCES FOR POTABLE WATER FOR COASTAL AREAS
- **BRACKISH WATER DESALINATION**
  - THE SUB SOIL WATER QUALITY IN PAKISTAN IS GETTING BAD IN TERMS OF SALINITY, MAKING IT UNUSABLE FOR HUMAN OR AGRICULTURE REQUIREMENT



Thank You