



Electro Deionization: EDI Systems.

Electro Pure EDI, Inc.: *High technology water™*

www.cswaters.co.kr



: EDI Electro Deionization

1. EDI Pure Water System
가?
2. EDI 가?
3. EDI 가 가?
4. EDI 가?
5. EDI ?



EDI

1. EDI

- EDI 가
- EDI

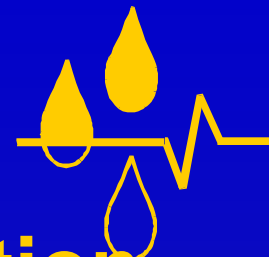
2. EDI

- EDI



EDI

- ◇ 2 : / ED
- ◇ 1950 -1960 :
- ◇ 1960 : Ionics & GE “Filled cell ED”
- ◇ 1977: SRI Electropure EDI prototype
- ◇ 1984: Electropure가 EDI
- ◇ 1985: Millipore 가 EDI
- ◇ 1983-87: EDI
- ◇ 1988: EDI (Electropure)
- ◇ 1993: Ionpure 가 USF
- ◇ 1996: Glegg 가 E-celltm
- ◇ 1998: EDI
- ◇ 2000-2001: DI
EDI 가 DI



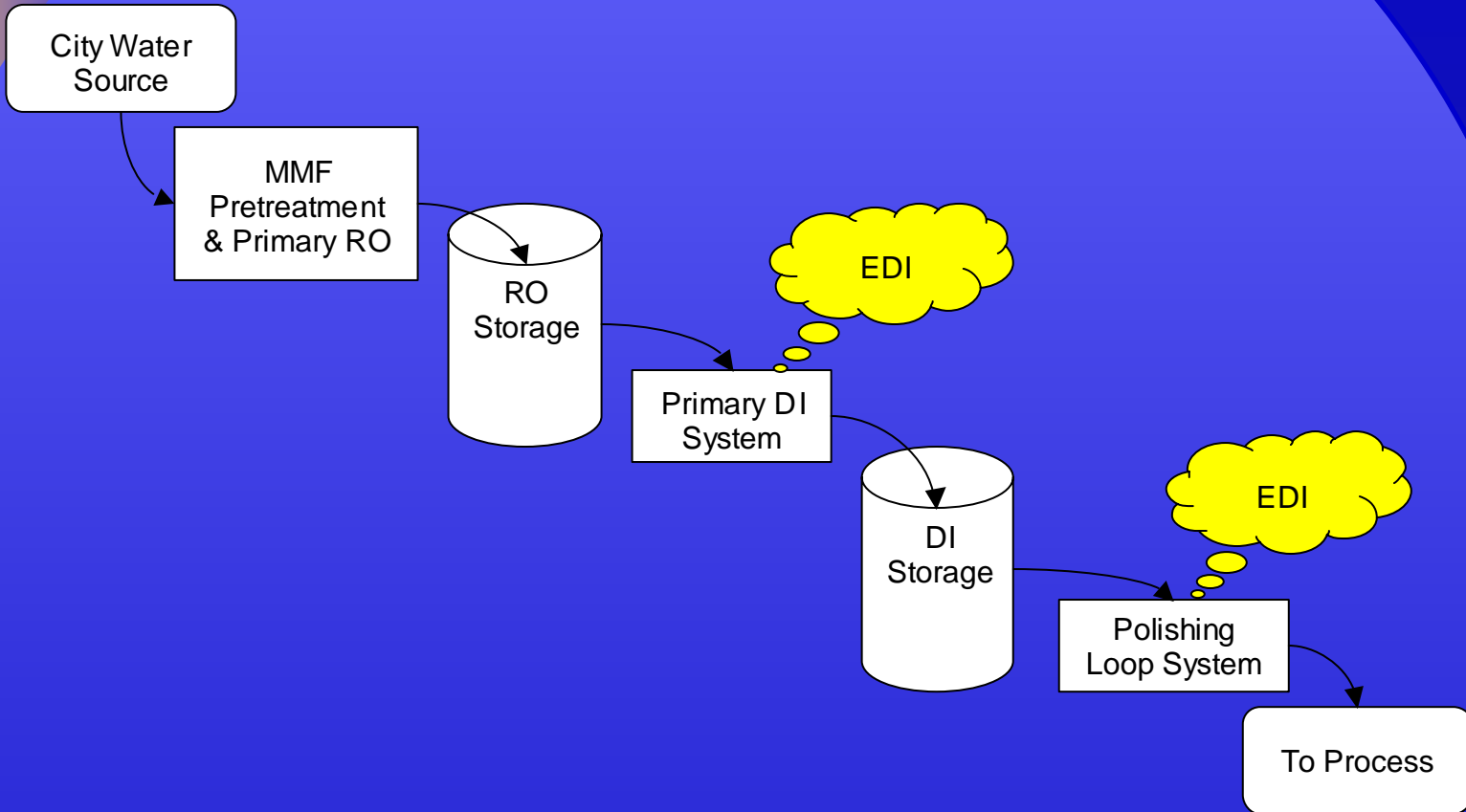
Introduction: EDI Electro Deionization

1. EDI Pure Water System
가?



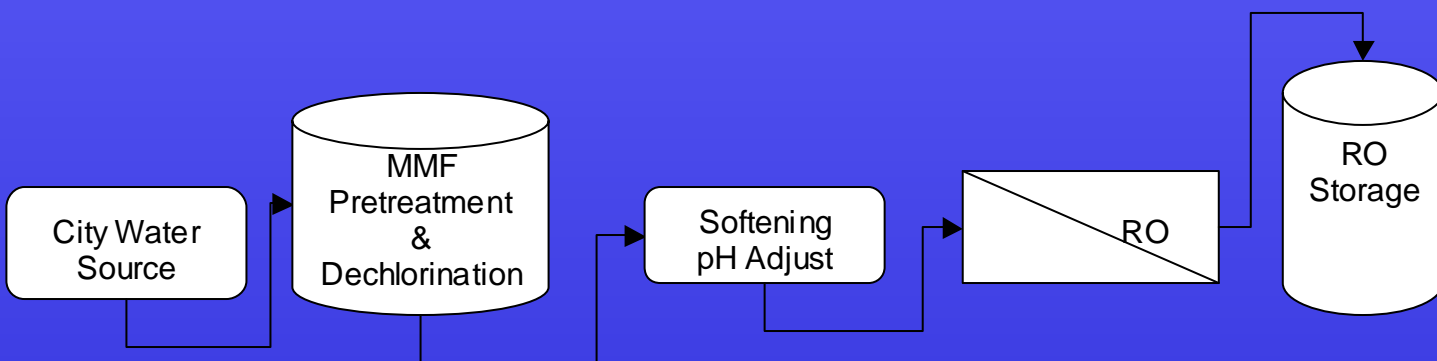
全

EDI





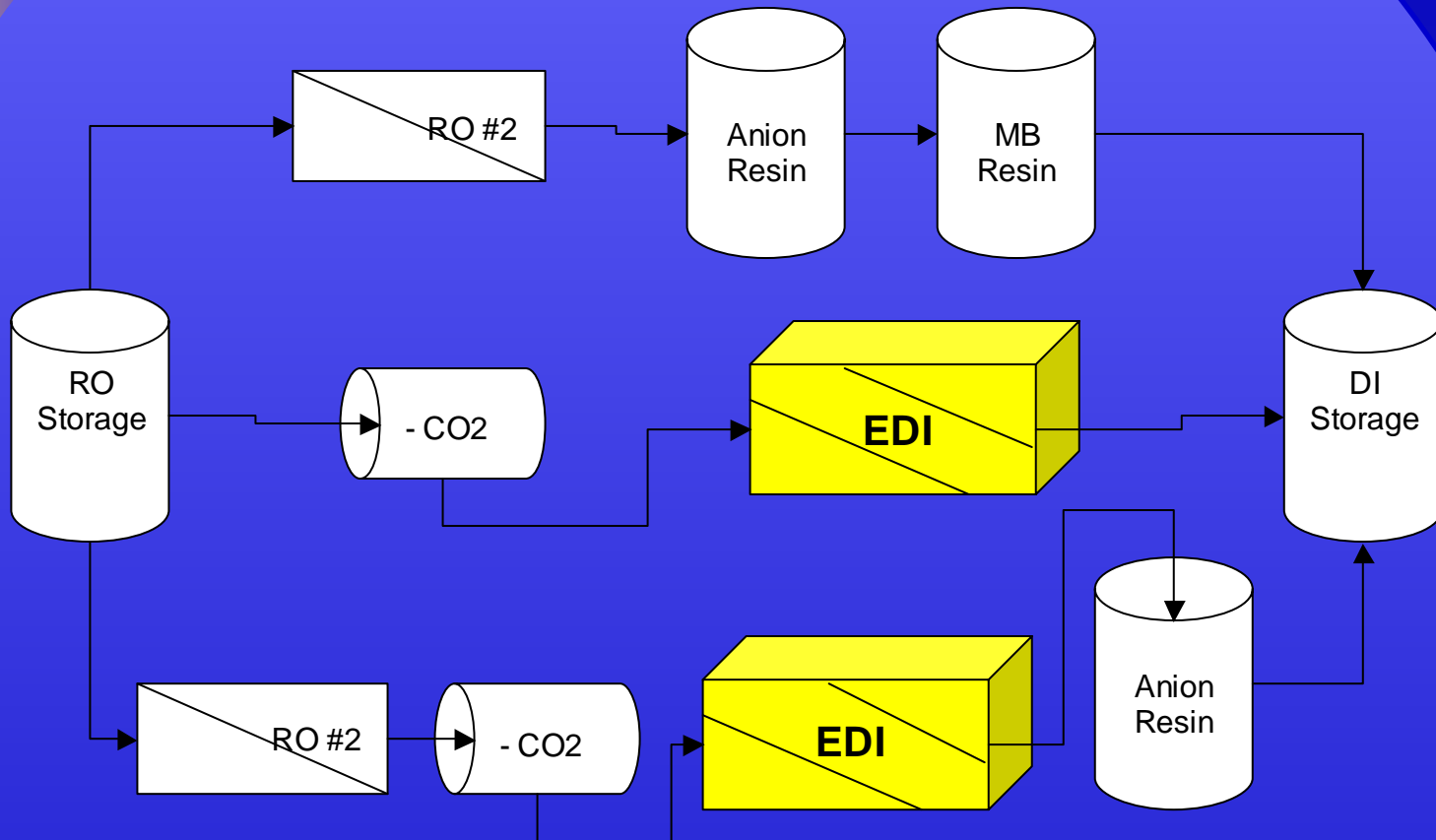
1 : RO & 前 (Pretreatment)





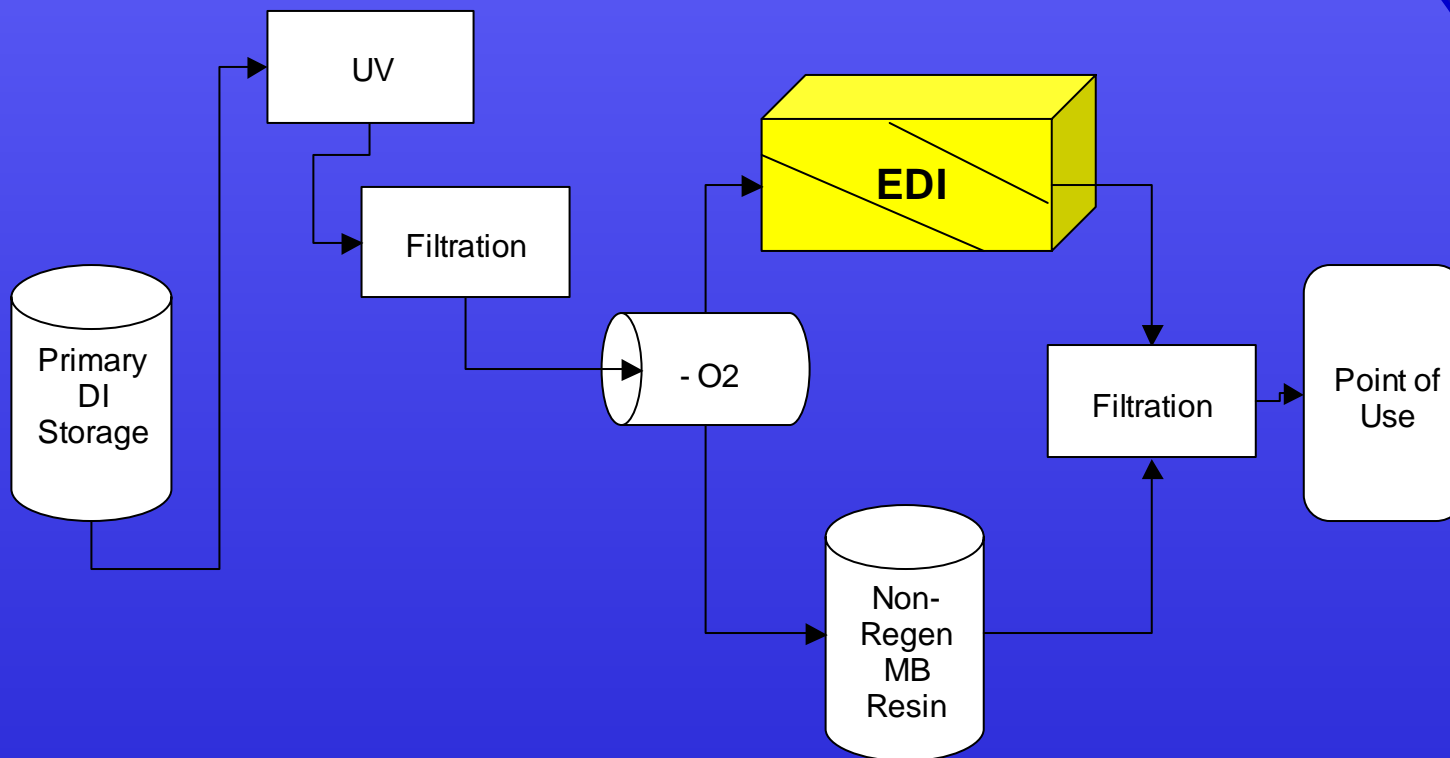
2 : Primary DI System Options

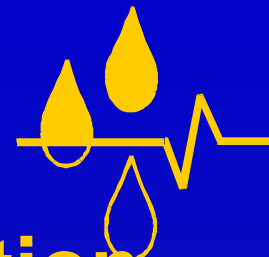
(DI)





3 : Polishing DI System Options()





Introduction: EDI Electro Deionization

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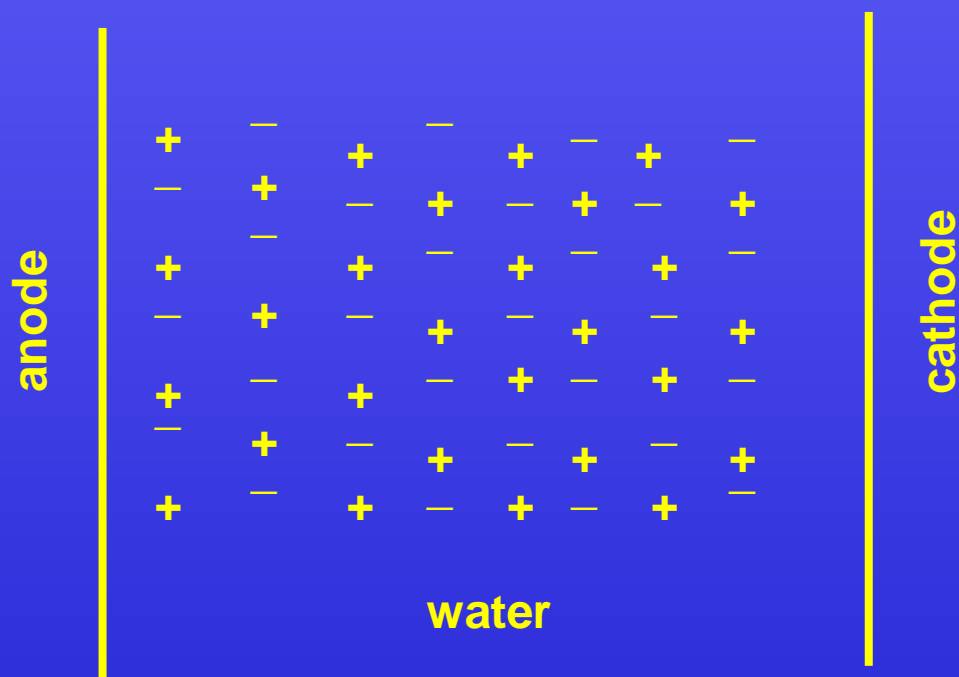
Electro Deionization

가?

- ✧ Electro-Dialysis (ED)
 - ✧ EDI Electro-Deionization
 - Ion exchange resin()
 - Ion selective membranes()
 - DC electricity as a driving force(DE)
- ... DI

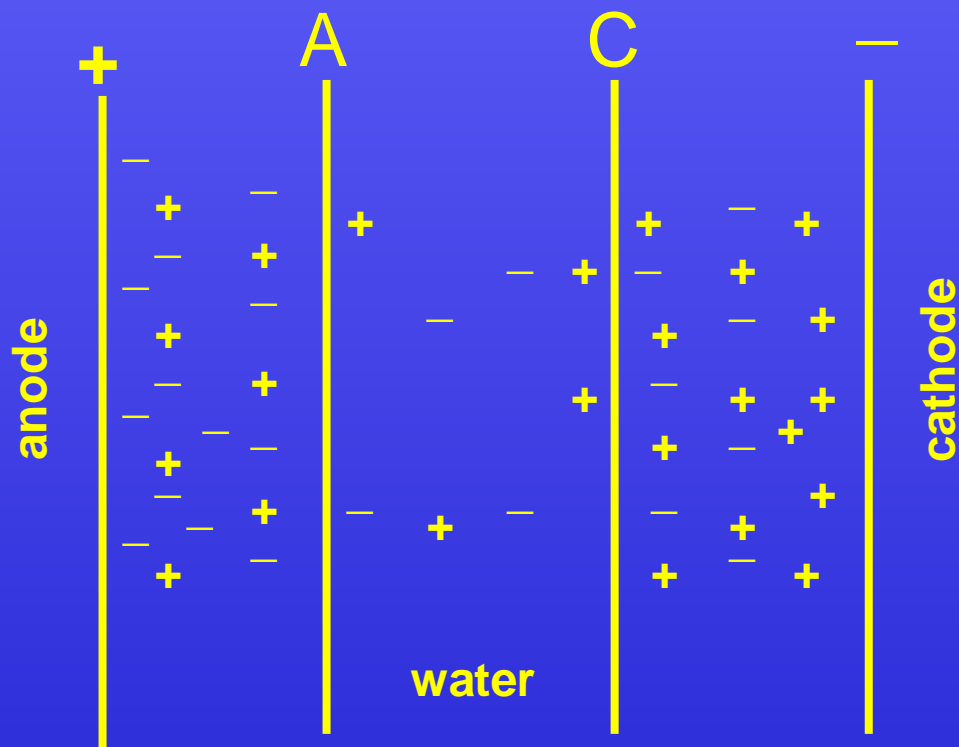


ED Electro-Dialysis





ED Electro-Dialysis





ED (ED limitations for Deionizing Water)

- ✧ 가
- ✧ ()
- ✧ ED module



ED transforms into EDI(EDI)



:



가 .



:

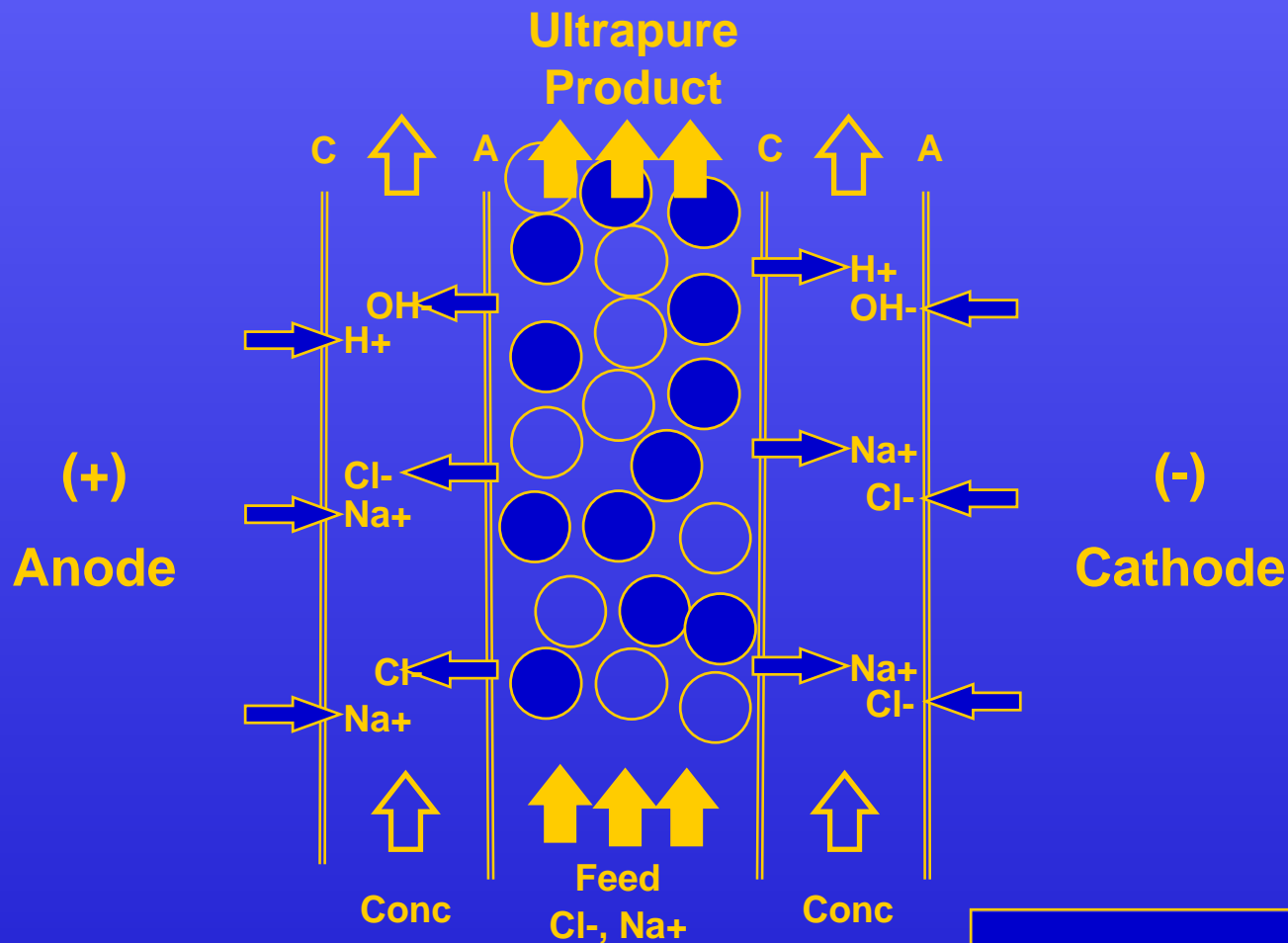
■ IX Resins() 가
100

■ IX Resins() 가

■ IX Resins() 가 H+ OH-
가 .



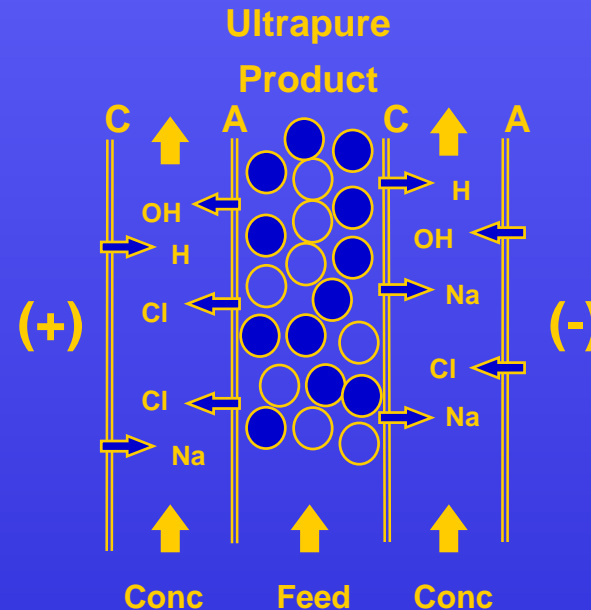
Electropure EDI Technology

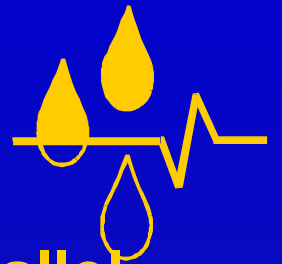




Electropure EDI Technology

- ◇
- ◇ Resins in Steady State (no regen)
- ◇
- ◇ Upflow design
- ◇
- ◇ Thin cells for better ion removal
- ◇
- ◇ Mixed bed resins for best silica removal

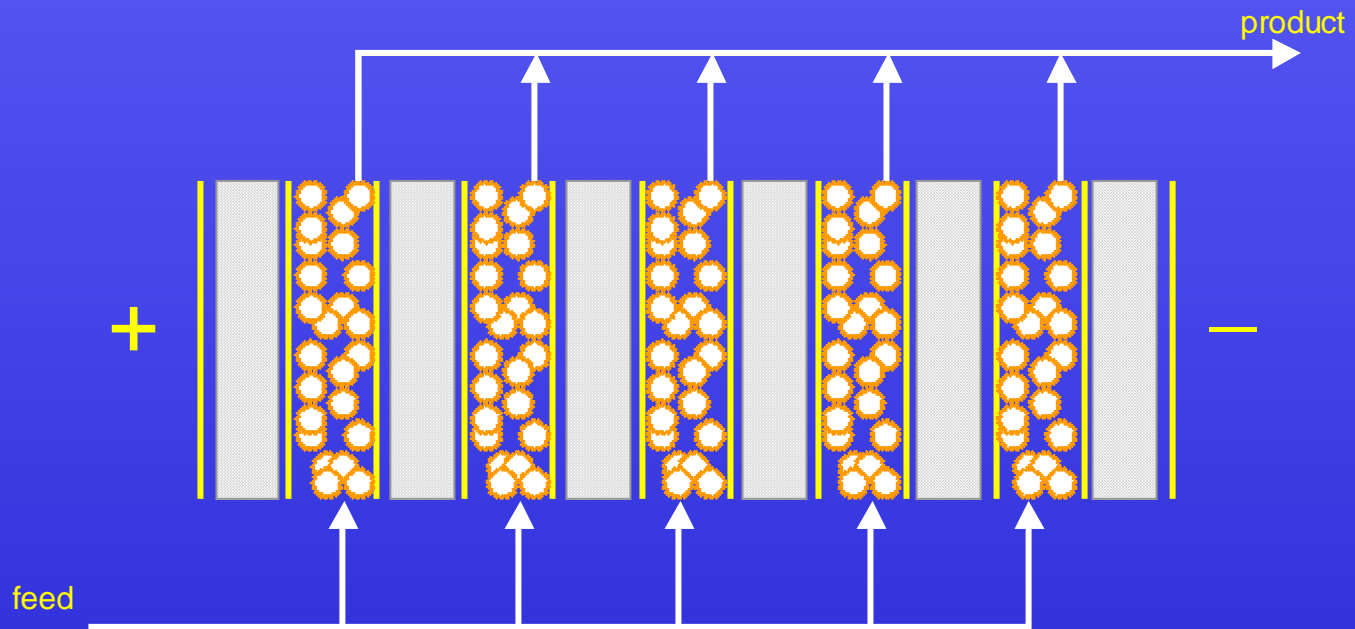




EDI Module:

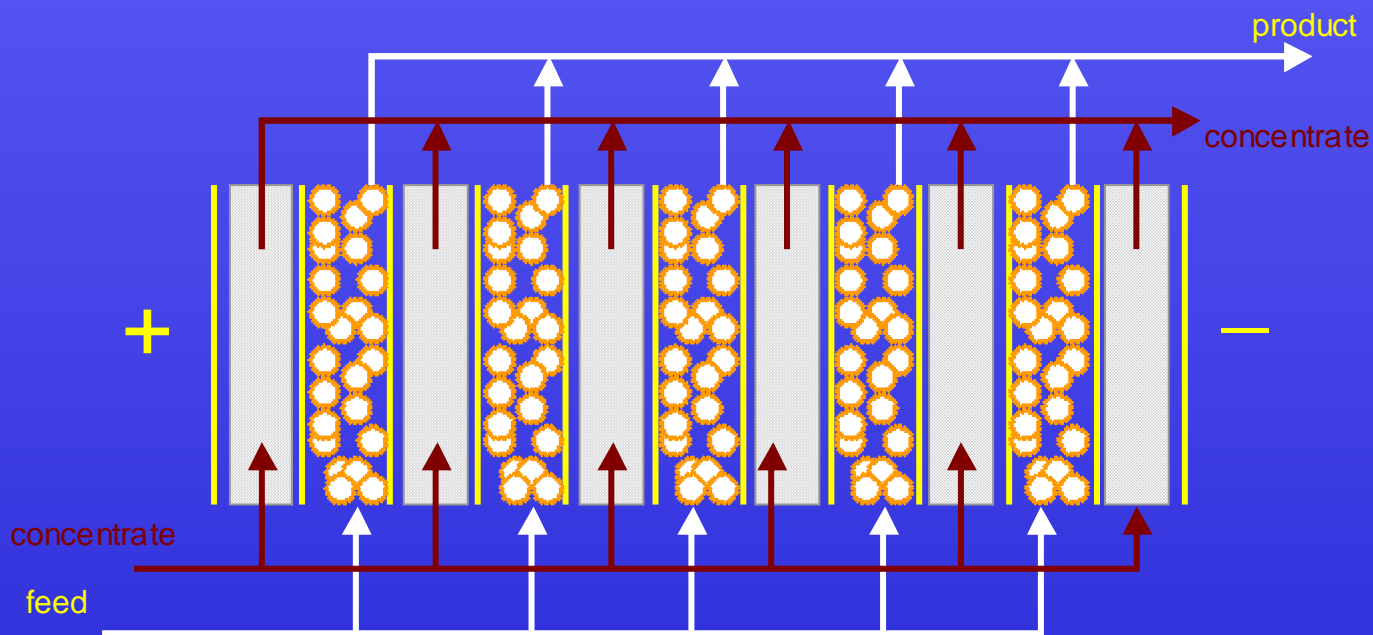


multiple cells in parallel



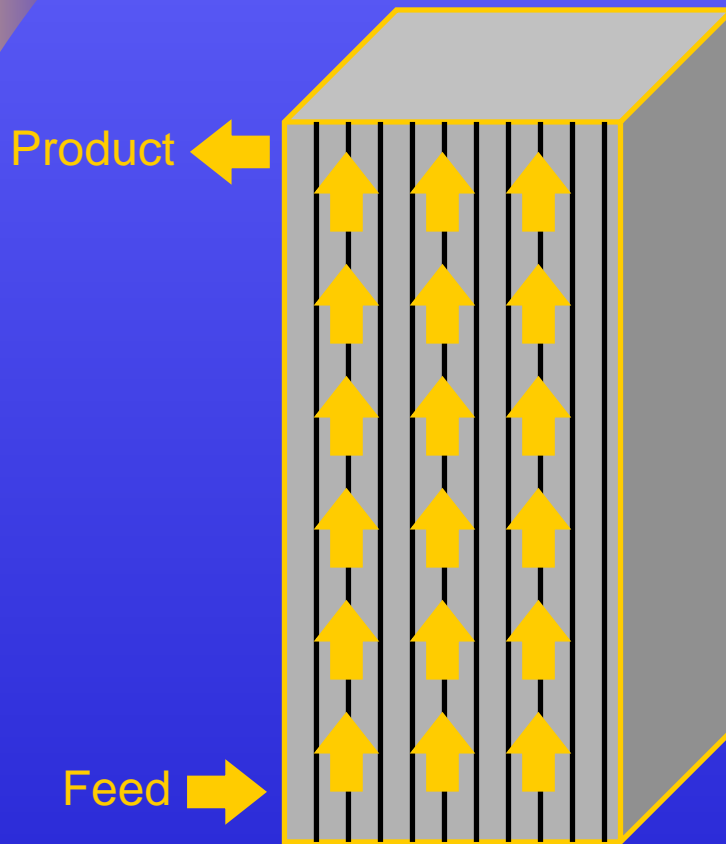


EDI Module: multiple cells in parallel



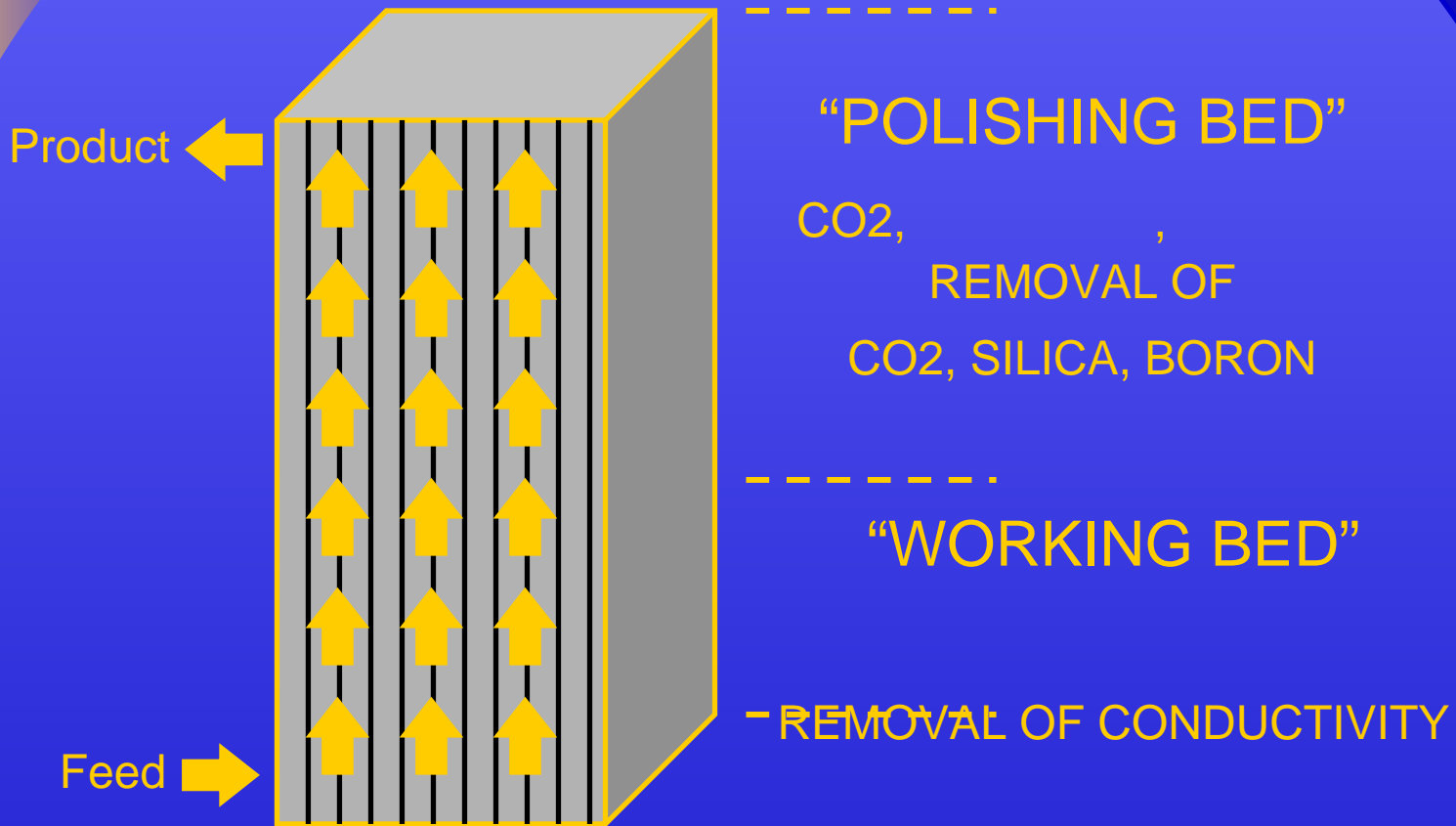


XL by Electropure™





EDI Technology





XL by Electropure™



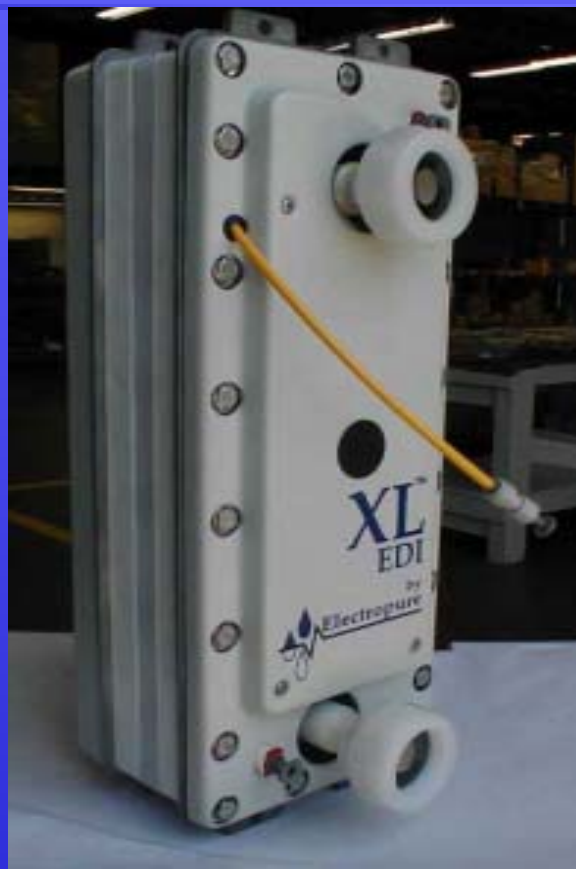
- ◇ :
가
- ◇ 가
- ◇
- ◇
- ◇ 18,1Megohm.Cm
가



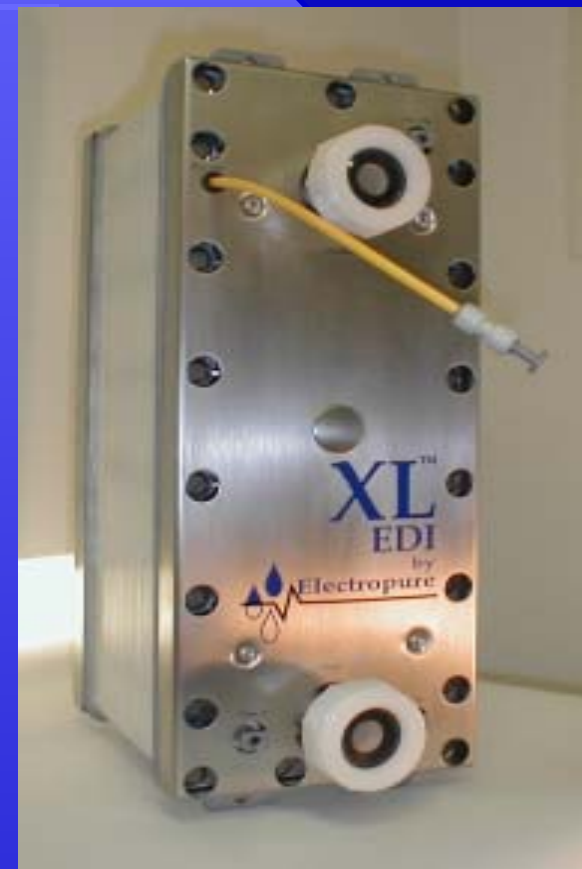
EDI Module



XL-500



XL-100-S



XL-500-HTS



XL by Electropure™



가





XL by Electropure™

Product Flow

XL-500	1,3-2,3 m ³ /h
XL-400	0,7-1,5 m ³ /h
XL-300	300-900 l/h
XL-200	100-300 l/h
XL-100	50-150 l/h



EDI Systems

◇ 100 m³/
가

◇ RO

가



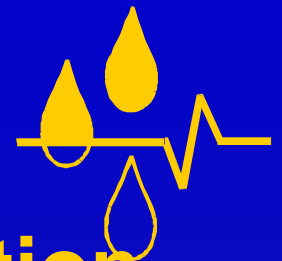


150 gpm Semiconductor System

Customer Photo: Do Not Distribute



Slide 27



Introduction: EDI Electro Deionization

1. EDI Pure Water System
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EDI가 가

- ◇ “ ”
“Easy” ions in feedwater
 - Na^+ , Cl^- , .
- ◇ Fewer ions in feedwater
- ◇ Proper voltage driving force
 -
 - depends on %recovery and temperature
- ◇ , , ,
No oxidizers, no metals, no debris, no organics (TOC)
- ◇ Good internal pressure balance
- ◇ Proper and Simple system design



EDI Performance:

Conductivity

- ✧ XL Performance: 17.0-17.5 Megohm.cm

- ✧ XL Field Performance: 17.9-18.1 Megohm.cm

- ✧ Reduces Ion Load on Mixed Bed Polisher

- ✧ Keys to Performance....

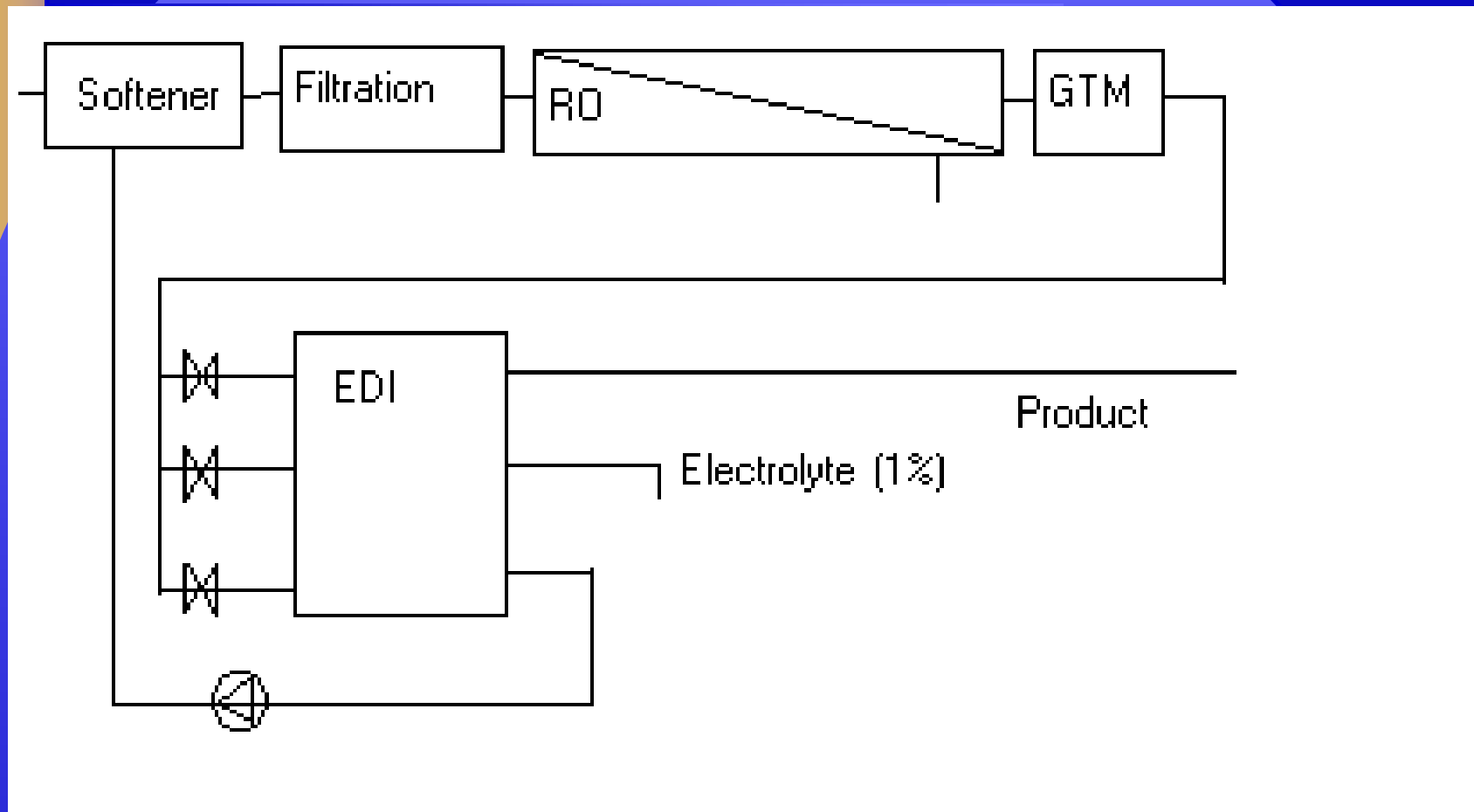


Keys to EDI Performance

- ◇ 前 Proper Pretreatment
- ◇ Proper Feedwater
- ◇ Constituents
- ◇ 5 ppm CO₂
- ◇ Agents Minimum Oxidizing
- ◇ Periodic Torqueing



Simple System Design





Silica Numbers

- ✧ RO Feed: 5-70 ppm
- ✧ RO Silica (Rejection): 99.7% per Hydranautics (CPA4: 2x Chloride)
- ✧ Silica EDI (Inlet Maximum): 0.5 ppm
- ✧ 20 ppm - 99% System - 0.2 ppm to EDI
- ✧ XL: 88-92% by Hach 5000 with 200 ppb feed
- ✧ 20 ppb feed to MB polisher
- ✧ 1-3 ppb from MB polisher



EDI

가?

- ◇ (O₃, Cl₂)
- ◇ 가 (Fe⁺³, Mn)
- ◇ 高 ()
- ◇ ()
- ◇ “가 ” 가 SiO₂, CO₂
- ◇ ()
- ◇ 高 硬軟 ()



EDI

◇ : 3

◇ :

■ “RO 前 ”

◇ : 7-8



EDI

?



- EDI RO
-
- EDI 1
-
- CO2
- SiO₂
- /
- /



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