BICHLORE™ Electrolyser

Designed by Operators for Operators

John D Hughes
Business Development Manager
Our Experience as Operators and Engineers

- **INEOS** has over 118 years experience in chlor-alkali operation

- **INEOS ChlorVinyls** is a major European chlor alkali producer operating 7 cell-rooms across Europe, total capacity 1.6 million MTPA of chlorine

- **INEOS Technologies** is an expert in cell room technology and is a manufacturer of electrolysers and licences the process knowledge

- **INEOS Technologies** has recently enhanced their electrolyser offering

- **INEOS Technologies** has more than 120 licensees world wide
BiChlor - Global Presence

More than 120 licensees worldwide

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BiChlor Electrolyser – Actual view
BiChlor Electrolyser – Enhanced Attributes

- Zero Gap Technology
- Electrolyser output up to 50,000 MTPA per electrolyser
- Effective Area of modules 3.4 m²
- Normal operating current density 6.0 kA/m²
- Normal Operating Pressure range up to 300 mbarg

**BiChlor electrolyser** have the largest module area. This reduces the number of modules required per tonne NaOH
Looking inside the BiChlor electrolyser – Key Features

- Modular
- Dimple Pan Design
- Short current path and uniform current distribution
- Electrode coatings (Dr Armstrong)
- Advanced Sealing
INEOS Modular Design Enables:

- **Fully Wetted Membrane**
  - Gas/Liquor interface above the membrane
  - Avoids damage and pin-holing of membrane
  - Prevents mixing of Cl\(_2\) / H\(_2\) to avoid explosions

- **Pressure testing before use (to detect and eliminate leaks)**

- **Maintenance work carried out away from the cell room**
  - No risk of electrical shock
  - Clean and safe work area
  - No work carried out on top of the electrolyser
  - Replacement modules can be prepared for rapid electrolyser turn around
Dimple pan design

• **Reduced electrical resistance by**
  • Maximising use of nickel post in cathode pan
  • Minimising use of titanium post in anode pan

• **Strength**
  • Resistant to distortion during in-pan re-coating
  • Resistant to pressure

• **Self alignment of modules at commissioning**
Module construction showing dimples and “spider” structures

Cross Section through module
Module construction showing dimples and “spider” structures

- Each anode and cathode has hundreds of dimples
- Each dimple on the anode and cathode has a offset distribution ‘spider’ attached to it
- Insulated pins redirect the current through the spiders ‘legs’

Benefits
- Membrane fully supported no “flapping”
- Openness of contact points ensures even current distribution with no “hot spots” and no localised high concentration of product formation
- Prevents pinching of membrane
Bichlor open mesh cathode structure

- BiChlor electrolyzers have always used an open mesh cathode

- This provides the following advantages
  - Enhanced catholyte circulation
  - Eliminates stagnation of catholyte

- This means no “hot spots” are generated and that all new high performance membranes can be used to optimise energy efficiency and reduce power consumption
Continued focus on performance
• **Gasket structure evolved over > 25 years**

  • Constructed of EPDM rubber with PTFE protection at the interfaces with the electrolytes

  • Designed to minimise anode flange crevice corrosion

  • Profiled at point of contact with membrane

  • Diminished risk of leakage of products
As Operators what are we looking for?

- Successful Lifespan
- Safe Operation
- Reliability
- Efficiency

Smiley face and money icons
With BiChlor you benefit from

• **Safe Operation**
  - Designed for safety
  - Easy access to electrolyser components, e.g. headers
  - Module maintenance away from the electrolyser area
  - Module design prohibits chlorine and hydrogen explosions

• **Reliability**
  - Proven electrolyser design
  - Membranes guaranteed for 4 years minimum
  - Anode and cathode life up to 16 years
  - Performance backed up by product volume guarantees
  - Engineering and Technical back up help from INEOS team
  - Access to INEOS Technical service team at start up and whilst in production

• **Efficiency**
  - Leading position on power consumption
  - Performance backed up by product quality guarantees
Plus: Our Commissioning and Technical Service offering

- **Extensive commissioning support**
  - Lead commissioning manager plus support as required
  - Operator training
  - Overview of frame and module build
  - Electrolyser start-up

- **Technical service support is part of the deal**
  - No extra cost for standard level of support
  - Designated Technical Service Manager
  - Your link to our full technical team

- **Regular contact**
  - Visits at least once per year
  - Phone & e-mail
  - Performance evaluation and operating advice
  - Technical support
  - Electrolyser maintenance planning

- **Customer forum every 2 years – highly valued by our clients**
Thank you &
Enjoy the remaining Conference