

REFEX™
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"The First to Last"



Invented in
Germany

NEW PATENT - granted

Chlor-Alkali Processes by Electrolysis

**REFEX pH and ORP electrodes - Non-porous
reference interface - New and Patented**



S8-CA-2001-120mm
and S8-CA-2001-225mm

EC-3/4"-CA-2001-Pt1000-LE
(1m, 3m, 5m and 10m)

EC-1"-CA-2001-Pt1000-LE
(1m, 3m, 5m and 10m)

YG-CA-2001-120mm
and YG-CA-2001-225mm

EC-FT-YG-CA-2001-Pt1000 - 120mm
(cables 1m/3m/5m/10m) pH
EC-FT-YG-CA-2001-Pt1000 - 225mm
(cables 1m, 3m, 5m and 10m)

EC-FT-YG-CA-2002 - 120 mm
(cable 1m, 3m, 5m and 10m)
EC-FT-YG-CA-2002-225mm
(cable 1m, 3m, 5m and 10m)

Brine solution is over saturated NaCl @ 60-80 C.

Applications

Accurate pH Measurement and Control of the brines pH 2.00 - pH 4.00 (HCl) and > pH 10.00 (NaOH)

1. To optimize chlorine yield and to minimize corrosion damage to the electrolysis cell an exact pH balance has to be controlled between pH 2.00 and pH 4.00 by the addition of HCl. The lower the pH the higher the chlorine yield the lower the pH the higher the corrosion.
2. To remove the impurities from the brine and recycled brine by precipitation the pH has to be > pH 10.00 - by the addition of NaOH.

Made in
Ireland

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free evaluation for new customers

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Chlor-Alkali Brine Generation circuit :

1. Brine Saturation Tank
2. Clarifier (chemical addition NaOH) pH 9.5-pH 11.00 (removal of Mg₂, Ca₂, SO₄, SR₂, Ba₂ by precipitation)
3. Primary Filter
4. Secondary Filter
5. Ion Exchange
6. HCl addition pH lower the pH 2.00 - pH 4.00)
7. Electrolytic Cell
8. Depleted Brine re-circulation (pH 2.00 - pH 4.00 @ 80C)
9. Re-chlorinated
10. NaOH addition pH 9.5-pH 10.00
11. Brine Heater
12. Back to Brine Solution Tank

pH Problems with Porous/open/leaking reference electrodes and pH vs pNa differential electrodes

1. Potential Differences create significant mV errors in the reference electrode junction.
2. High Temperatures accelerate KCl diffusion over the junction.
3. High Currents close to the electrolysis cell creates 'Ground-Loop Currents'
4. Electrode Fouling and poisoning of the Ag/AgCl half cell.
5. Slow pH Response - Wastage of Correcting Chemicals.

Note: All Chlor Alkali pH problems are related to the porous reference junction.

Note: pH / pNa Differential electrodes are unreliable and inaccurate and slow to respond to pH change and unstable because they are dual high impedance and also because the Na concentration of the brines varies.

Solution to pH Problems:

The Reflex Solid-State **NON-POROUS** reference interface - this is an electrochemically active ionically conductive interface that doubles as an immobilized electrolyte and more importantly as an impenetrable interface/barrier that separates the brines from the Ag/AgCl in 2.8 mol /l KCl electrolyte.

1. Reflex Electrode is immune to differential errors - Its Non-Porous
2. Reflex Electrode is immune to KCl loss/diffusion - Its Non Porous (No liquid contact/exchange)
3. Reflex Electrode is immune to Ground-Loop currents (A liquid Earth should always be used)
4. Reflex Electrode is immune to Fouling and Poisoning - It's Non-Porous

Conclusion

The Reflex/pH and Reflex ORP combined electrodes are the only ones that withstand all Chlor-Alkali application challenges.

The Patented NON-POROUS reference interface has solves all the problems of the past.

1. Reflex electrodes are available as direct retrofits to existing instrument/ flow cells/ connecting cables.
(PG13,5 2. Head Cap, Yokogawa Head Cap, 3/4" NPT, and 1" NPT)
2. Accurate
3. Instant response to pH change (No Over-shoot beyond pH set points - No chemical wastage)
4. Almost Maintenance Free
5. No mV drifting (constant E_o zero mV integrity assured - Ag/AgCl half cell protected by the Reflex impenetrable interface)
6. Long Life 5 times longer than all others.
7. Higher Chlorine Yields
8. Big Operational Savings especially correcting chemicals
9. Minimized corrosion

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	pH electrode types	ORP/Redox electrode types	Compatible	Replaces
	S8-CA-2001-120mm S8-2001-2001-225mm	S8-CA-2002-120mm S8-CA-2002-225mm	Mettler/Toledo	IMPRO 4850 i
	EC-3/4-CA-2001-Pt1000-LE (1m/3m/5m/10m)	EC-3/4-CA-2002 (1m/3m/5m/10m)	Yokogawa and BAT	
	EC-1"-CA-2001-Pt1000-LE (1m.3m.5m10m)	EC-1"-CA-2002 (1m/3m/5m/10m)	Emerson Process	
	YG-CA-2001-120mm	YG-CA-2002-120mm	Yokogawa Flow Cell FF20/FS20	SC24V-120mm SC24V-225mm

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