

Date 2015

INDEPENDENT CONSULTANCY & TRAINING SERVICE: [Electrochlorination Technologies](#)

[Chlor Generators](#) offers an independent consultancy & training service for end-users regarding all aspects of electrochlorination technologies

The purpose is to help end-users to have a better understanding of the different electrochlorination technologies, all of which could be very confusing

EXECUTIVE SUMMARY

There are many different electrochlorination technologies available and each come with its own unique set of advantages and disadvantages. Selecting a specific technology for a specific application can become a very complex issue. End-users can avoid expensive mistakes:

- By having enough basic knowledge about the complete range of electrochlorination technologies and all its respective pros and cons
- By selecting the correct type electrochlorination technology for a specific application
- By selecting the correct system design parameters and output criteria during the planning phase
- By implementing correct operational and maintenance procedures
- By making correct engineering decisions when an existing electrochlorination plant is to be: upgraded or replaced

THE CONSULTANCY SERVICE COVERS THREE MAIN AREAS

- General Information & Training: This is to explain and train end-users about all the different electrochlorination technologies available on the international market. Special reference is also made

about the advantages and disadvantages of each specific technology and the preferred technology for specific applications

- Existing Electrochlorination Plants: This is to assist end-users in evaluating existing plants in order to identify problem areas and to see where improvements can be made. This is very likely to increase the plant's chlorine production output and extend its operational lifespan. It may also prevent the continuation of costly operational and maintenance mistakes which are unknowingly made
- New & Proposed Electrochlorination Plants: This is to assist and advise end-users to select the best electrochlorination technology for the specific application. This assistance can be extended if the end-user wishes to use [Chlor Generators](#) as an independent "in-house" consultant all the way, from the bidding process right up to commission and signing off the project

OUR CONSULTANCY SERVICE IS "INDEPENDENT"

We are offering an "independent consultancy service" where honest and unbiased advice and training is given about all the different electrochlorination technologies. During the consultancy service period we will not enter into any promotional or commercial discussions

CHLOR GENERATORS LTD HAS THE KNOWLEDGE & EXPERIENCE

[Chlor Generators](#) has over 25 years of practical experience about the design, manufacture and operation of electrochlorination plants. This includes all the different electrochlorination technologies available on the international market, for example:

- Parallel plate electrolyzers (PPE's) for seawater (conventional single polarity: mono-polar or bi-polar)
- Parallel plate electrolyzers (PPE's) for seawater (reverse polarity auto self-cleaning)
- Parallel plate electrolyzers (PPE's) for artificial brine (conventional single polarity: mono-polar or bi-polar)
- Concentric tubular electrolyzers (CTE's) for seawater (conventional single polarity, bi-polar)
- Concentric tubular electrolyzers (CTE's) for seawater ("CHLORGEN THREETUBE SAFETY CTE")

(Note: These are in principle identical to conventional CTE's which are constructed from "inner" and "outer" titanium tubes, but here, all the electrodes [these titanium tubes] are mounted inside a third outer PVC tube casing. This

ensures: (A) the most compact electrolyser assembly possible (especially for offshore platforms where space is critical), and, (B) the protection of operators against exposure to unsafe high DC voltages which are associated with conventional CTE's. All Intellectual Property Rights of the "CHLORGEN THREETUBE SAFETY CTE's are owned by [Chlor Generators](#))

THE CONSULTANCY SERVICE COVERS ...

1. Existing Electrochlorination Plants:

- To investigate and evaluate the "system logics" of the existing plant. Does it really use the best type of electrochlorination technology and methodology for the specific application?
- To investigate and evaluate the efficiency and output of the plant. Does it really perform as it should? Does it produce the kg Cl₂/h output as claimed by its vendors/suppliers?
- To investigate to see where existing plants can be improved and optimized, preferably still using the same equipment
- Where an existing plant is to be upgraded, to investigate and evaluate to determine what will be the most cost-effective way forward and which components can be re-used or should be replaced
- To investigate and advise on maintenance procedures, which in many cases, are indirectly and unknowingly, a major cause for operational problems and which can cause irreparable damage to the plant

2. New & Proposed Electrochlorination Plants:

- Often end-users are overwhelmed by the different electrochlorination technologies and options available on the market and need expert advice to explain the advantages and disadvantages of each respective technology/option
- Getting true facts about certain electrochlorination technologies can be very difficult especially when vendors/suppliers are "hard selling" and promoting their own products, without acting in the best interest of the end-user
- Often end-users are putting out enquiries or RFQ's unknowingly with conflicting information and data which can mislead vendors/suppliers. Quotes from vendors/suppliers that are based on this can cause unnecessary misunderstandings and delays for the bidding process to be completed

- If required, to assist with the general design of the plant. This covers all the technical design aspects and calculations
- If required, to assist with the clarification and editing of end-user RFQ documents before sending it out to prospective vendors/suppliers in order to avoid vendor/supplier misunderstandings
- If required, to assist with the bidding process, specifically the interpretation of vendors/suppliers technical offers. For example: To figure out what is really meant? To figure out what is hidden in the “small print”?
- If required, to assist with determining which essential conditions should be built into the purchase order of the successful bidder (limited to technical matters only)
- If required, to assist with and overseeing the installation and commissioning of the new plant
- If required, to assist with determining whether a vendor/supplier has performed and supplied within reasonability, and if in doubt, to assist with liaison and/or arbitration

3. Other Chlorine Technologies:

With regard to all other chlorine technologies/options available on the market, to assist by explaining the advantages and disadvantages when comparing:

- gaseous chlorine
- commercial high concentrated sodium hypochlorite
- commercial granular chlorine (calcium hypochlorite)
- electrochlorination (on-site generated sodium hypochlorite)