PLEASE CONTACT YOUR LOCAL NORLEX CHEMICALS PARTNER FOR MORE INFORMATION ON THESE TYPES OF PRODUCTS.

NORLEX CHEMICALS A/S
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NORLEX IS A DANISH PRIVATELY OWNED COMPANY AND A NORDIC LEADER IN CHEMICALS (NORLEX CHEMICALS A/S) AND WATER TREATMENT SOLUTIONS (NORLEX SYSTEMS A/S), COMMITTED TO HELPING OUR CUSTOMERS ACHIEVE OPTIMAL PERFORMANCE.

We always utilise best available technology and enable our customers to get the most out of their processes with environmentally friendly products. We are always in the forefront of developing sustainable technologies.

NORLEX helps Municipalities and Industries meet strict demands in all water treatment processes.

NORLEX has a passion for helping customers, ensuring secure and fast delivery of products with highest quality and service.

NORLEX was founded in 2011 as Copenhagen Chemicals A/S. The company has grown organically and through acquisitions and is now one of the largest suppliers of products for water treatment within the Nordic region.

NORLEX has warehouse locations throughout Denmark.

NORLEX’s joint venture company Alumichem owns the Danish manufacturer of functional aluminates Nordisk Aluminat A/S (www.aluminate.eu) and the Canadian based Waterhouse Environmental Services Corp. (www.waterhousechemicals.com) a supplier of water treatment chemicals in the North Western US and Canada.

All NORLEX employees are dedicated to service its customers quickly and effectively and with the highest level of integrity.
Norlex Chemicals CC KLEAN, MBR KLEAN, BIO KLEAN and DISPERSE membrane program includes a full range of specialised cleaning, antiscalant and biocide chemicals for all membrane applications, including a range of innovative MBR membrane cleaners.

All membranes will eventually foul – either from organic or inorganic foulants. How often depends on many factors, including the application, the water source, how well the pre-treatment protects the membranes and the operational parameters that the system is operated under.

Depending on the above factors membranes need cleaning anywhere between every week and once or twice a year. Our CC KLEAN and BIO KLEAN series cleaners and membrane biocides include products suited for any application, to provide the most effective and economical cleaning result.

In many applications, the fouling can be reduced by using antiscalants. Antiscalants are dosed continuously as an effective and economical means of keeping scaling under control during operation. Our DISPERSE series antiscalants include products to control any type of scale formation, that causes fouling.

**OTHER CLEANERS**

Norlex Chemicals VIKING cleaning program includes a full range of products for cleaning and disinfecting surfaces. Applications include products for cleaning tanks, pipe systems, process equipment and transport equipment.

Our specially developed VIKING series cleaners are used within transport, food & beverage, industrial production and any other surface cleaning needs.

Our products include environmentally friendly alternatives, that replace more traditional products, that can be challenging from an environmental point of view.
The goal of a cleaning procedure is to restore the flux of the membranes to a level that is as close as possible to the designed level. If flux is not restored to satisfying level, the cleaning has not been effective or the membranes has been compromised.

The cleaning procedure and the type of chemicals to be used will depend on the type of fouling, the type of membrane and the system design.

Norlex Chemicals offers a complete range of products for cleaning membranes in reverse osmosis, nanofiltration, ultrafiltration and microfiltration units. Our range include both high pH, low pH, neutral pH and enzymatic cleaners each designed to give superior performance in combination with low cost in specific applications for both organic and ceramic membranes.

From our wide range of products any membrane cleaning challenge can be solved, including scaling problems, biological fouling and complex cleanings of membranes in food industry applications.

To identify the most suitable cleaner, several factors must be considered:

- The water analysis, indicating what parameters may become an issue
- The membranes used
- The recovery rate of the system
- Environmental restrictions
- Experience
- Other

Our Membrane Cleaner Overview provides general information on each of our most used cleaners making the choice of cleaner easier.

Other highly specialised cleaners are available for special applications.

YOUR LOCAL NORLEX CHEMICALS PARTNER WILL BE HAPPY TO HELP YOU SELECT THE BEST COMBINATION OF CLEANERS FOR YOUR SPECIFIC APPLICATION.
LOW PH CLEANERS

CC KLEAN 015: Low pH liquid formulation specifically designed to remove metal hydroxides, calcium carbonate and other scales from membrane based water treatment units such as reverse osmosis (RO), nanofiltration (NF) and ultrafiltration (UF). Not suitable for Aluminium Oxide ceramic membranes. Also used for inactivation of enzymatic cleaners.
- Suitable for use with all thin film or cellulose membranes
- Buffered to maintain a pH of 1.5 (1%)

CC KLEAN 018: Low pH liquid formulation for use in organic water treatment membranes and all ceramic membranes. Can be used for inactivation of enzyme-containing cleaning agents. The product is safe in use and developed with care for the environment as it does not contain N, P and Halogens. Suitable for use in food processing industry.
- Buffered to maintain a pH of 1.8 (1%)
- Inhibits bacterial growths and preserves membranes.

NEUTRAL PH CLEANERS

CC KLEAN 385: A neutral pH liquid cleaner designed for ceramic membranes in applications with high level of oils or fat. Due to the product’s low foaming tendency, the product is also very suitable for use in CIP-units. Provides very effective abilities in dispersing and dissolving fat and oils.

HIGH PH CLEANERS

CC KLEAN 105: A moderate pH (10.5 at 1%) liquid cleaner designed to remove organics and mineral deposits from water treatment membranes.
- Suitable for use in conjunction with enzymatic membrane cleaners
- Excellent results for systems running on hard water sources.

CC KLEAN 115: A moderate pH (11.5 at 1%) liquid cleaner that effectively removes fat, proteins, whey precipitations and milk residues. Must not be used on aluminum or other non-alkaline resistant surfaces. Mainly used in dairy applications.
- Can be used in conjunction with chlorine addition
- Used for spiral wound ultrafiltration membranes

CC KLEAN 120: A medium pH (12.0 at 1%), liquid cleaner designed to remove fat, proteins and mineral deposits from water treatment membranes. Excellent for cleaning brine units in combination with chlorine addition (maximum 150 ppm chlorine). Very suitable for water sources with high hardness.
- Specially formulated for cleaning of Brine units in combination with chlorine.
- Does not contain EDTA. Contains Phosphor.

CC KLEAN 125: A medium to high pH (12.5 at 1%), liquid cleaner designed to remove fat, proteins and mineral deposits from water treatment membranes. Excellent for cleaning membranes working under demanding applications and high hardness water.
- Excellent results in demanding applications.
- Does not contain Phosphor. Contains EDTA.

CC KLEAN 127: A powerful high pH (12.7 at 1%), powder cleaner designed to remove organics, silt, proteins, fat and other particulate deposits from membranes. Meets the general requirements for products used in the food industry.
- Specially formulated for temperature and alkaline resistant membranes.
- Excellent results are achieved when used to eliminate biological slime.
- Very powerful cleaner to recover most fouled membranes.
- Approved for food applications

ENZYMATIC CLEANERS

CC KLEAN 065E: A neutral pH, liquid enzymatic cleaner designed to be used in combination with moderate alkaline pH cleaners like CC KLEAN 105 and CC KLEAN 115. The special formula combining cleaning active tensides and protein splitting enzymes gives unparalleled performance when used to clean membranes treating milk, whey, blood or similar substances.

CC KLEAN 095E: A gentle slightly alkaline and highly effective powder based enzymatic membrane cleaning product. It effectively dissolves protein and other organic coatings and is extremely gentle to the membrane. Effective in water of any hardness due to the special formulation of the product. Also ideal for soaking for the purpose of effective dissolving of protein and other organic materials. May be left in the system during the weekend.
MBR units operate under conditions that are very demanding for the membranes used. There is a constant tendency for sludging that need to be controlled. The type of foulants found in the sludge and the fouling mechanism are very different from other membrane applications. The sludge can have a tendency to stick to the membranes making cleaning very difficult. To prevent the sludge from fouling the membranes and stick to the surface, air scouring is often used to create turbulence over the membrane surface. To some extent this will help to keep the sludge from sticking to the membranes.

Back flushing with either permeate or a cleaning solution is another initiative often used, where the type of membranes allow for it.

Norlex Chemicals have developed a new range of cleaners – MBR KLEAN – that demonstrates superior cleaning results in MBR systems. MBR KLEAN are moderate pH cleaners and is a blend of solubilizing and active cleaning ingredients, combining superior flux restoration, energy savings, lower quantities of chemicals to be handled and a safer working environment.

MBR KLEAN can be used on both external and submerged type MBR systems and is suitable for both back flush and CIP.

**MBR KLEAN 212:** Alkaline powder cleaner designed to remove fouling and sludge from MBR membrane surfaces. Provides effective cleaning improving sludging control, reducing energy consumption and prolonging system running time. Contains phosphates.
- Effectively releases sludge from membrane surface.
- Superior cleaning results with high flux recovery.

**MBR KLEAN 210:** Moderate alkaline powder cleaner designed to remove fouling and sludge from MBR membrane surfaces. Similar to MBR KLEAN 212, but operates at lower pH and contains a reduced amount of phosphates.
- Effectively releases sludge from membrane surface.
- Superior cleaning results with high flux recovery.
DISPERSE antiscalant series are water based, NSF approved (NSF-ANSI Standard 60) products for preventing different types of scales and fouling in nanofiltration (NF), reverse osmosis (RO) and recirculated/reversible electro dialysis (RED) equipment. Without some means of scale inhibition membrane elements will scale and plug due to precipitation of salts, such as calcium carbonate, calcium sulfate, barium sulfate and strontium sulfate. Membrane systems operates with high recovery ratios, so the concentrate water oftentimes exceeds the solubility limits of gypsum and calcite, which leads to crystallization on membrane surfaces. The build-up of scale results in permeate flux decline, which leads to a need for cleaning the membranes.

There are three methods to control scale:

- Acidification – where you add acid to reduce pH
- Ion exchange softening
- Antiscalant addition

Antiscalants are often the best method, giving better economy and excellent control. Antiscalant products are surface active materials that interfere with precipitation reactions in three primary ways:

- **Threshold inhibition**: Increases the solubility limit of soluble salts.
- **Crystal modification**: Distorts crystal shapes so scale crystals appear more oval in shape, and less compact. The result is a soft scale that is less likely to foul the membrane.
- **Dispersion**: Adsorption of product on scale crystals and colloidal particles to create a high anionic charge, which keep the crystals separated. The high anionic charge also repels the particles from the membrane surface that has a fixed anionic charge present.

Our DISPERSE series are produced using NSF certified raw materials (NSF-ANSI Standard 60).

**ANTISCALANT SELECTION:**

Norlex Chemicals base the product selection on our NORScale method. NORScale is a software application that calculates the probability of different low solubility compounds fouling the membranes or other technologies. The software utilizes a conversion process for the concentration of salts. Based on the calculations performed by the program, the optimal treatment product, the required dosing and the optimal recovery rate for the system is given.
### DISPERSE SERIES
#### MEMBRANE ANTICALANTS

| DISPERSE 735: | Product based on organophosphonic derivatives (sodium salt). Works by inhibition and dispersion of low solubility salts in the water source. |
| DISPERSE 739: | Product based on organophosphonic derivatives in acidic form. Works by inhibition and dispersion of low solubility salts in the water source. |
| DISPERSE 752: | Product based on polyacrylic and organophosphonic derivatives. Works by inhibition and dispersion of low solubility salts in the water source. |
| DISPERSE 753: | Product based on organophosphonic derivatives in acidic form. Works by inhibition and dispersion of low solubility salts in the water source. |
| DISPERSE 786: | Product based on organophosphonic derivatives (sodium salt). Works by inhibition and dispersion of low solubility salts in the water source. |