

# WATER TREATMENT SOLUTIONS FOR MUNICIPALITIES AND DRINKING-WATER PLANTS





# The Solenis Difference

**Water is a critical resource for the future. According to scientists, 1.8 billion people will be living in countries or regions with absolute water scarcity, and two-thirds of the world population could live under water stress conditions by 2025. Today, more than 30 countries are threatened by water shortage, and the water resources particularly in the Middle East, Northern Africa, Central Asia and parts of Australia are qualitatively and quantitatively at a critical point. Especially in poorer regions, where the effects of population growth and climate change are magnified, many people will not have access to clean water and will be exposed to the many diseases attributable to contaminated drinking water.**

The objective to improve the global water supply is a big challenge – not only in dry, rural regions but also in cities. Alternative methods for providing the approximately 2.5 litres of fresh water each individual requires daily, as well as sufficient industrial water, needs to be found. In many parts of the world — the Middle East, Spain, Australia and China — capacities for seawater desalination need to be increased to keep up with the demand for fresh water.

As a company active in 118 countries across five continents and as a global producer of water treatment chemistries, Solenis combines first-hand experience with an innovative and comprehensive product portfolio of water-soluble polymer flocculants, scaling inhibitors and defoamers. We offer a wide range of customer-focused services that help our customers stay productive, profitable and compliant.

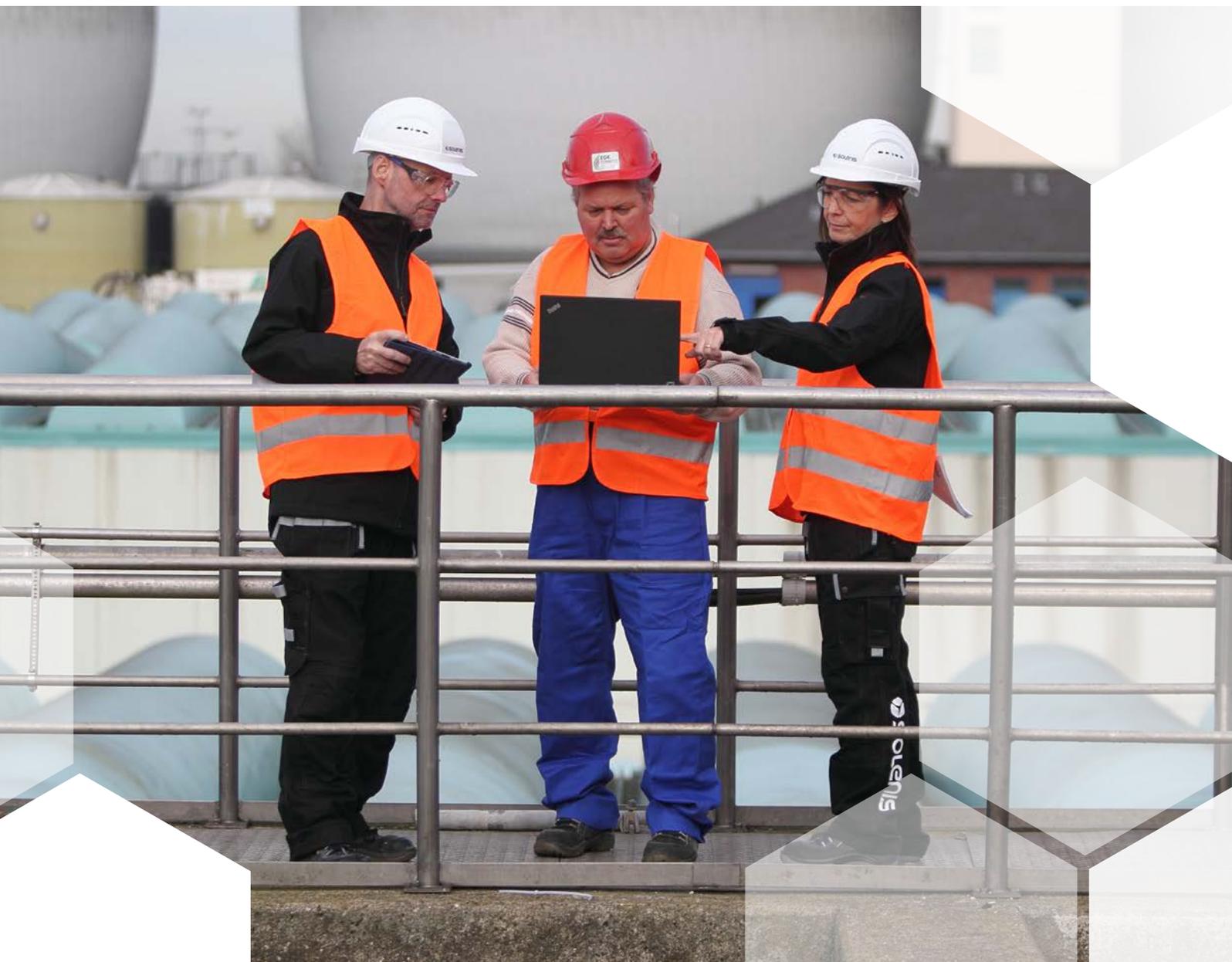
# World-class Products and People

For almost 50 years, Solenis has helped municipalities of all sizes manage their wastewater treatment challenges. We have a dedicated team of professionals who use their advanced expertise in water treatment processes and chemistries to develop and implement tailor-made customer solutions, which meet the highest economic and ecological demands.

These experts are, in turn, supported by one of the industry's largest and most productive R&D organizations. Solenis scientists stay focused on delivering innovations today and are committed to developing new products for the future.

The following applications make up our core business:

- **Wastewater Treatment:** Our most advanced and comprehensive product line for wastewater treatment helps customers in the sludge-dewatering and sludge-thickening operations minimize sludge handling and disposal costs. Solenis offers cost-effective solutions that deliver best-in-class business results.
- **Drinking Water Treatment:** Solenis has a wide range of polymer flocculants and coagulants for use in drinking water plants.
- **Desalination:** Solenis cooperates with a growing number of companies in their seawater desalination programs. We offer state-of-the-art coagulants and flocculants for seawater pre-treatment, as well as stabilizers for desalination processes.



# Product Portfolio

Solenis offers a full and innovative product portfolio to improve the performance of water treatment processes in the municipal sewage plants and drinking water plants.

## Praestol™ Flocculants

Solenis has a long history in solid/liquid separation. Our established range of Praestol flocculants, a worldwide leader, delivers constant quality to customers looking to solve their biggest challenges. Our products are proven in various technical processes, including dewatering and thickening of raw-, digested- or waste-activated sludge.

Praestol flocculants are ideal for:

- Sludge dewatering with high-performance decanters, chamber filter-, membrane filter-, band filter-, and screw-based presses.
- Sludge thickening with decanters, band filters, disk-thickeners and static thickening.

Praestol flocculants are high-molecular, organic, synthetic flocculants based on polyacrylamide. The monomeric building blocks, acrylamide and acrylic acid, are produced via Solenis' discontinuous biotechnological batch manufacturing process, which uses microorganisms to convert acrylonitrile to the desired end products. Solenis uses a special cationic monomer from in-house production that provides unique properties and stability to the polymer by preventing hydrolysis, even in slightly alkaline waters.

Praestol flocculants are available as granulates and emulsions. Our customers can choose the products that best match their operating parameters and storage conditions. Our continuous manufacturing technology for powder flocculants yields consistent high quality, while our innovative isothermal emulsion process allows precise adjustment of the molecular weight and the molecular weight distribution together with an optimized polymer structure.

Additional Praestol products for water treatment include:

- Praestol TR\* flocculants for conditioning of surface and subterranean water for potable use.
- Praestol LX, XL and LXI, the new generation of cationic structured polymer emulsions that are ideal for enhanced economy of thickening and dewatering of sewage sludge.
- Praestol bio-polymers, derived from renewable resources, are acrylamide-free alternative flocculants in municipal water treatment applications.
- Praestol BS-D flocculants have been developed for dewatering applications where foam control is essential for effective equipment operation.

\*These products correspond to DIN EN 1410 or EN 1407, if the amount of polymer applied does not exceed 0.4 mg/l. Certification and approval of ANSI/NSF-Standard 60 (NSF International, Ann Arbor, MI, USA).



## Feed/Makedown Equipment

Solenis' Praestospeed™120 dissolving system represents the latest generation of fully automatic equipment for dissolving granular flocculants. This state-of-the-art dissolving system is faster and more effective than conventional equipment which can take 60 minutes to create 1000 litres of a two-percent polymer solution. Praestospeed 120 needs only 10 minutes to achieve the same results — a highly effective polymer solution that is capable of being dosed immediately.



## Antispumin™ and Drewplus™ Defoamers

Foams at municipal water treatment or desalination plants are generally undesirable and often interfere with operational sequences. Solenis offers a broad portfolio of Antispumin and Drewplus defoamers, which are environmentally friendly to help cities control foam and entrained air in a number of processes and applications, including anaerobic digesters, centrates and filtrates of digested sludge dewatering, biological waste treatment of secondary sedimentation, and thermal seawater desalination for drinking water production.

Our defoamer product line includes:

- Antispumin WA, WA2 or S 664 defoamers, designed to prevent foam building in centrifuges.
- Antispumin AI or ZK defoamers, which are effective in controlling foam caused by filamentous bacteria, such as *Microthrix parvicella*, making them ideal for digesters.
- Antispumin DS defoamers, a high-temperature product for flash distillation of seawater desalination plants.
- Antispumin ZU or KA 55 defoamers for process water treatment in sequencing batch reactors (SBR).



## Polystabil™ and Ameroyal™ Scale Inhibitors

Formation of inorganic or mineral scales can be a significant problem for sewage treatment plants. Scales within pipe systems of a certain thickness may considerably reduce flow rate or even lead to a total blockage and can put increased strain on pumps.

Mineral scales may cause considerable damage to centrifuges, heat exchangers, tubes and pumps.

Polystabil scale inhibitors from Solenis are a family of products that effectively control a variety of scales in sewage water treatment and desalination plants for the production of drinking water. The products are specially formulated co- and terpolymers and offer exceptional stabilization and dispersion properties.

Our broad portfolio is suitable for a wide variety of applications.

- Prevention of carbonate and iron oxide or magnesium ammonium phosphate scales in concentrates of centrifuges for sludge dewatering, pipes and pumps.
- Prevention of scales that form during thermal and membrane desalination of seawater.

Our reliable Polystabil and Ameroyal scale inhibitors include:

- Polystabil KWS is a scale inhibitor specifically developed for the stringent requirements in municipal treatment plants. The molecular design and optimised composition of this product makes it very effective.
- Polystabil NOW is a recently patented terpolymer based on polyacrylate that delivers advanced performance against calcium-/magnesium-based precipitations in the dewatering of sludge, especially in the presence of iron when regular polyacrylates lose efficacy. It also prevents the formation of iron hydroxide or calcium-based magnesium carbonate scales inside centrifuges, pipes and pumps.
- Polystabil KP is based on phosphonic acid and can be used in applications where complexation efficacy against alkaline earth metals is needed together with superior antiscaling properties.
- The Polystabil POC 3000 series has been developed by Solenis to meet the stringent requirements for antiscalants in seawater desalination plants using multi-stage flash distillation (MSF) and multi-effect distillation (MED) technologies. These products are effective at very low dosage rates (< 2 ppm) and temperatures up to 110°C.
- Ameroyal 540 is a high-performance product for reverse osmosis plants for seawater desalination. It can be used in low doses (< 5 ppm) and provides good membrane compatibility.

## Coagulants

Praestol and Chargepac coagulants are used in conjunction with Praestol polyacrylamide or Praestol bio-flocculants for the pre-treatment of sludges in municipal processes and to achieve enhanced dewatering.

Solenis coagulants for the municipal market:

- Praestol 185K and 187K\* are mainly used for clarification of wastewater and in the preparation of potable water.
- Praestol 190K\* is a high cationic, low-to-medium molecular weight synthetic organic polymer. When used in conjunction with a high molecular weight polymer, it functions as a charge neutralizer and coagulant.
- Chargepac 55 and Chargepac 60 are liquid inorganic primary coagulants that can be used to reduce the turbidity in effluents of sewage water plants.
- Chargepac 121, a liquid blend of highly inorganic and organic coagulants.

\* Praestol™ 187K and 190K comply with recommendation XXXVI of the German Federal Institute for Risk Assessment (BfR) and FDA-controlled US law sections 21 CFR Ch. I, sections 176.170 and 176.180.



## Services, Support and Logistics

Solenis has a global footprint. We operate 30 manufacturing facilities and maintain a sophisticated distribution and logistics network. We are capable of providing best-in-class products — efficiently and cost effectively— to any customer worldwide.

Solenis also has two leading research and development facilities located in Wilmington, Delaware (USA) and Krefeld (Germany). Our regional Customer Applications Laboratories are located in Wilmington, Delaware (USA), Barendrecht (The Netherlands), Krefeld (Germany), Shanghai (China) and Leme (Brazil). These facilities house extensive analytical capabilities and innovative instrumentation for application testing.

Health and safety performance of our customers and our organization has the highest priority at Solenis. As

a company, we are committed to the Responsible Care\* program, the chemical industry's unique global initiative that drives continuous improvement in Environmental, Health, Safety & Security (EHS&S) performance, together with open and transparent communication with stakeholders.

Our production sites have a management system certified according to:

- ISO 9001:2008 (Quality)
- RC 14001:2013, ISO 14001:2004 and OHSAS 18001:2007 (Health and Safety)

The certifications are a guarantee to our customers that Solenis is committed to high standards in Quality and EH&S.



# Solenis

## Strong Bonds. Trusted Solutions.

Solenis supplies specialty chemicals for water-intensive industries, including the pulp and paper, oil and gas, chemical processing, mining, biorefining and power markets. Whether you want to increase production, develop new products, reduce costs or simply do more with less, we can help. With our innovative technologies, passionate people and unrivaled experience, Solenis is ready to deliver the solutions you need.

To learn more, contact your technical sales representative or visit us online.

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