

Industrial Plants

Everything from a single source

As the supplier for coating colour preparation systems, GAW technologies has decades of experience and impressive worldwide references in the planning, delivery, installation and commissioning of complete coating colour kitchens.

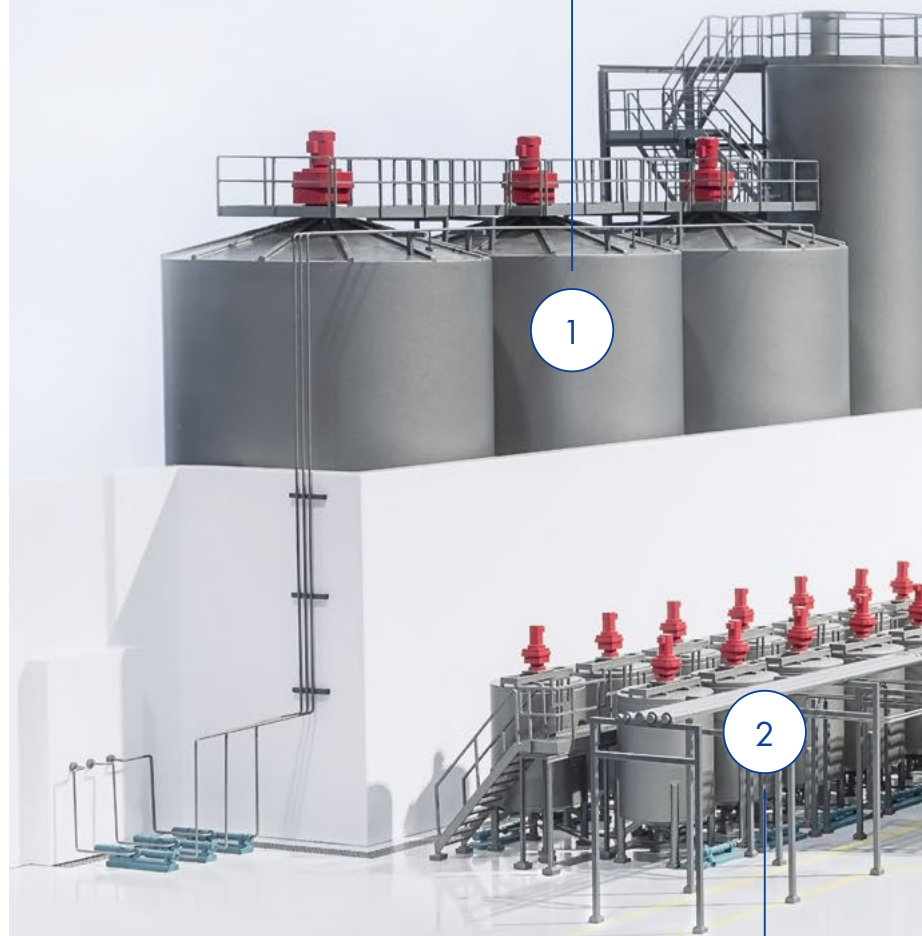
In the coating colour kitchen, the coating colours are processed by dosing and dispersing individual components in a special mixing unit according to the given recipe, based on quantity and time sequence. The coating formulations depend on the application of the paper, the paper machine, the coating process and the location. Depending on the desired technical and optical properties of the paper quality (e.g. surface weight, density, strength, roughness, brightness, whiteness, opacity, gloss), pigments, binders and additives are used in the dispersion. Dispersing is therefore the central, quality-determining step in coating colour preparation.

For this reason, GAW technologies has persistently improved the process and technology of its dispersing units in dependable partnerships with key customers and developed them into highly efficient dispersing systems.

The GAW dispersing machines are the heart of every coating colour kitchen and are constructed under the premises of energy efficiency, consistent and reproducible qualities, scalability, preservation of the medium and optimal process connection.

SUPPLY, UNLOADING AND STORAGE

In the area of delivery, unloading and storage, media are pumped via a fine filter into the storage container. The delivery of the products is mostly by truck, railway wagon or container.



CHEMICALS PREPARATION

Auxiliary substances are also referred to as additives. They are either mixed directly into the paper stock or applied to the paper at certain points on the paper machine or by a coater.

STARCH PREPARATION

Starch powder is mixed with water to form a slurry and reduced or cooked depending on the application.

DISPERSING MACHINE

In the dispersing machine, the heart of the coating kitchen, pigments and additives are dispersed into a coating.

COATING COLOUR STORAGE

The dispersion is pumped into the coating colour storage and gently stirred to prevent segregation and sedimentation.

WORKING STATION

The working station is a circulatory system, via which homogenized coating colour, surface glue and other coating agents from the storage containers of the coating colour kitchen are pumped via filters into working containers. They are then pumped via further filters to the coating heads.

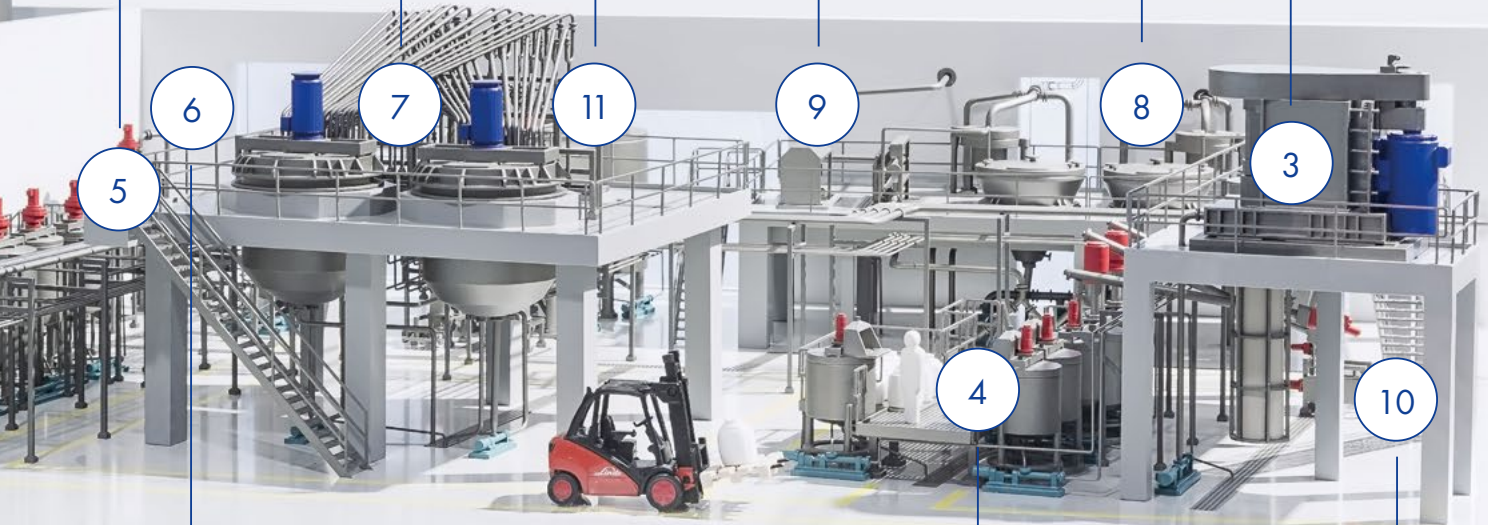
DEAERATOR

Deaerators extract air from the coating compound, enabling the bubble-free coating application on the paper.

GCC

PREPARATION

The GAW Ultramill grinds calcium carbonate into fillers and the finest coating pigment. The system achieves fineness levels of $60\% \leq 2$ microns, to $75\% \leq 2$ microns, up to 90%, 95% and $98\% \leq 2$ microns.



HEAT RECOVERY SYSTEM

The heat recovery system uses the heat energy that escapes while cooking the starch.

POWDER PREPARATION

In powder processing, pigment powders are processed into a suspension in GAW mixers.

SODIUM DITHIONITE SOLVENT SYSTEM

Sodium dithionite is a bleaching and reducing agent used primarily in the textile, paper and mineral industries.



STATION 1

Supply, unloading and storage

In the area of supply, unloading and storage, media are pumped via a fine filter into the storage container. The delivery of the products is mostly by truck, railway wagon or container.

For over sixty years, GAW technologies has been engaged in the planning and turnkey construction of equipment for the handling and storage of products used in the manufacture and refining of paper and cardboard.

GAW technologies not only plans and delivers the unloading station, but also sets up the complete unloading system including all elements, as well as piping systems and automation. The complete process of unloading is carried out in fully automatic operation. Only the hose needs to be manually connected to a fixed pipe.

Operational safety, protection of personnel and the environment – these are our directives. For this reason, GAW unloading stations are state-of-the-art and meet the highest safety requirements.

Take the advantage of getting a system from a single source.

“Excellent warehouse logistics for every product.”





STATION 2

Chemicals preparation

Paper and cardboard are mainly made from fibres and fillers. In order to achieve the desired properties of the product, specific chemicals, so-called auxiliary substances, are also used.

Auxiliary substances are also referred to as additives. They are either mixed directly into the paper stock or applied to the paper at certain points on the paper machine or by a coater. There is a difference here between paper additives and process chemicals.

Paper additives are components of the finished paper. They remain mainly in paper during production and serve to give the paper necessary or desirable properties. The paper additives include sizing agents, dry and wet strength agents, pigments, dyes, optical brighteners and coating binders.

Process chemicals in turn serve to control and improve the manufacturing process as well as keep the system clean. They usually only remain in the paper in traces. The process chemicals include, among others, retention and fixative agents, flocculants and slimicides as well as defoamers and deaerators.

For an efficient production and coating process, the masterful preparation and exact dosage of the excipients are critical.

“We get the best out of every product.”





STATION 3

GCC preparation

Ground calcium carbonate (GCC) is used in papermaking as a filler as well as a coating pigment for surface finishing, whereby the ultimate fineness of the final product is achieved only by single or multi-stage milling processes using GAW Ultramill technology.

With its unparalleled vertical design, the GAW Ultramill embodies an extension of horizontal grinding ball technology, enabling the preparation of customized particle sizes.

Since the successful launch of the GAW Ultramill in 1994, customers rave about the “excellent milling technology designed to make money”.

To date, several hundred GAW Ultramills of various sizes have been installed worldwide for the dry and wet grinding of calcium carbonate. The capacities of the individual systems range from 30,000 tons to 1,000,000 tons per year. It achieves levels of fineness of $60\% \leq 2$ microns for filler, to $75\% \leq 2$ microns for the precoat, and up to 90%, 95% and 98% ≤ 2 microns for the topcoat.

“Ultrafine grinding technology with the highest added value.”





STATION 4

Powder preparation

Pigments are colourants and are used in papermaking both as a filler and as a coating pigment.

The most important reason for adding filler to paper – in addition to the massive cost savings – is the improvement of the whiteness, brightness and covering capacity. Coating pigments usually consist of the same minerals as the fillers, differing from these essentially by the grain fineness.

The most common fillers and pigment minerals are ground calcium carbonate (GCC), kaolin, talc and titanium dioxide.

GAW technologies is a world-renowned specialist when it comes to total solutions for the storage, processing and dosing of these powder products, which must be handled with the utmost care.

“Excellence in
extraction, dosage
and processing.”





STATION 5

Starch preparation

The history of starch in papermaking is as old as the printed word itself. Starch is applied in various stages of the paper or board manufacturing process, be it as an additive for internal sizing, surface sizing and finishing, or in the preparation of the coating colour.

The adequate cooking of the starch is an essential requirement for any application. The preparation of the starch includes all process steps, starting with the storage of the starch powder, to the dispersion, the gelatinisation and dilution for the intended purpose.

GAW technologies starch processing systems are either supplied as standardized "skid units" or tailored to the customer's special requirements.

In recent years, the patented GAW Heat Recovery System has been successfully installed in many starch processing systems. This system makes use of the heat energy that escapes during the cooking of starch, leading to a massive energy saving in the treatment.

"Our strength,
your profits."





STATION 6

Heat recovery system

The cooking of starch is a staple element of the paper making process, no matter what kind of starch is applied. In this step, the starch is heated under pressure and by direct steam.

This is followed by relaxation in a cyclone, whereby the resulting expansion steam and heat energy contained therein is oozing unused into the atmosphere. Then the starch is stored.

So why evaporate your money? In times of climate change and the accompanying climate agreements, we cannot allow ourselves to let this heat energy escape unused into the atmosphere. That's why GAW technologies has developed a compact modular system that recovers the energy through heat exchanger. The energy of the suspension is fed back in at the inlet to the Jet Cooker, thus reducing the amount of direct steam.

The patented GAW Heat Recovery System at starch preparation lines is well established in the market, enabling energy savings of over 50% for the inactivation of the Jet Cooker.

“Protects the climate and lowers costs.”





STATION 7

Dispersing machines

Dispersing, mixing and agitating are central and quality-determining steps in process engineering. The aim of these processes is to produce uniform and homogeneous mixtures of various raw materials as intermediates or final products. The ways to achieve this goal are as different as the properties of the raw materials and the final products.

GAW dispersing machines, the heart of every coating colour kitchen, are constructed under the premises of energy efficiency, consistent and reproducible qualities, scalability, preservation of the medium and optimum process connection. In decades of reliable partnerships with key customers, the processes and technology of the dispersing aggregates have been continuously improved and developed into highly efficient dispersing systems.

The focus is always on the goal of increasing the productivity and energy efficiency of our customers' plants, minimizing their operating costs and increasing environmental protection through the development of tailor-made customized technologies.

GAW dispersing machines, from simple dispersing discs to "Variable Shear Technology" dispersing units, are already used in various industrial sectors.

"Excellent dispersion
for every application."





STATION 8

Working station

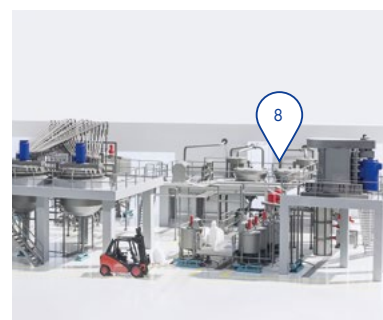
The working station is a circulatory system, via which homogenized coating colour, surface starch and other coating agents from the storage containers of the coating colour kitchen are pumped via filters into working containers. They are then pumped via further filters to the coating heads. Surplus coating colour is returned to the working tank after passing the coating unit via return lines.

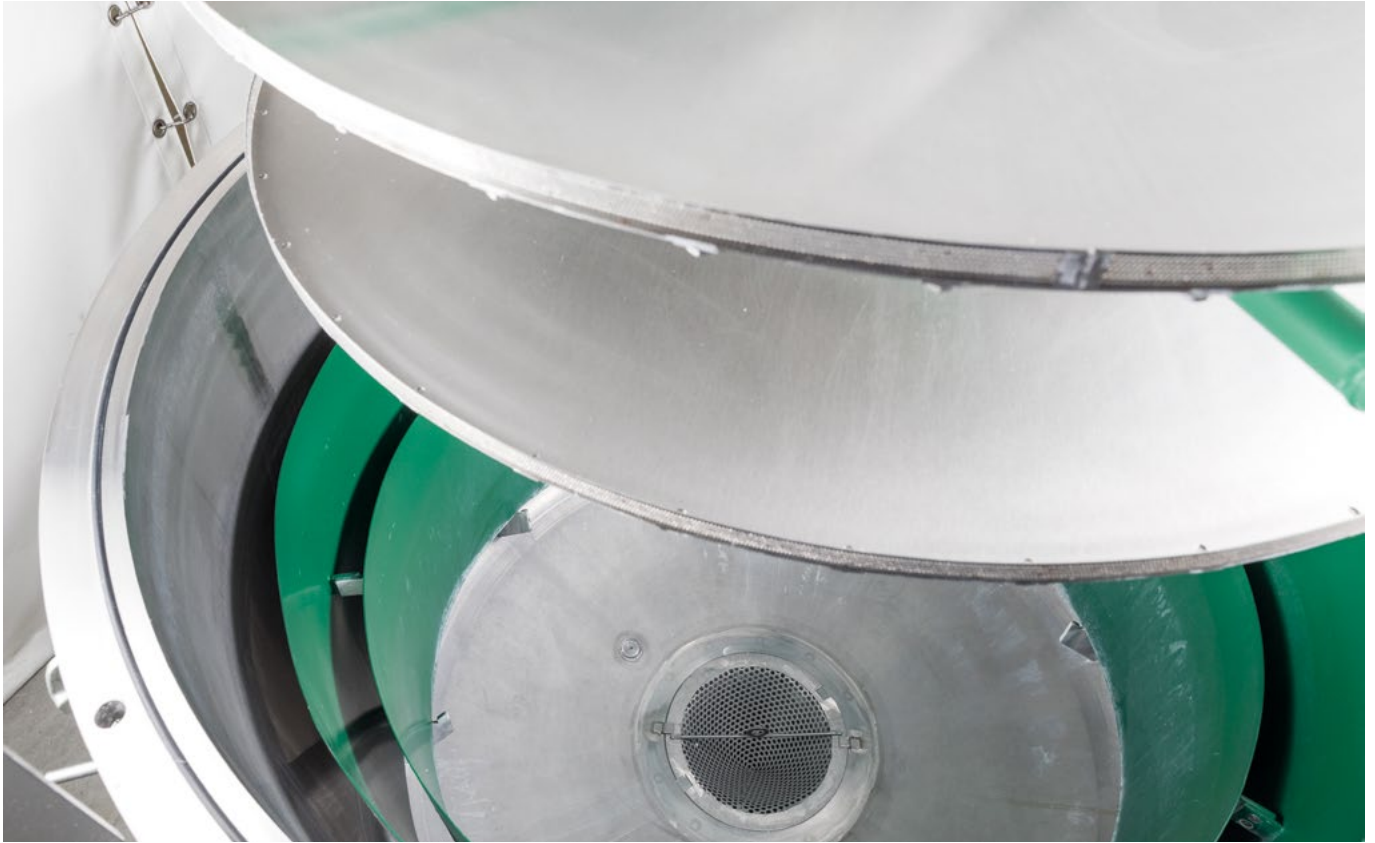
In order to avoid disturbances in the coating strokes (e.g. squeegee strips), GAW deaerators are used in addition to filter systems such as the ECO-R and ECO-S. The deaerators remove air and gas bubbles from the coating colour.

Depending on the design of the coating heads, the working stations are tailored to the application and adapted with quality control instruments. A big advantage of the GAW working stations is the unique piping, which minimizes the air content of the coating mass from the outset and prevents the build-up of agglomerates.

GAW has decades of experience in all of the established coating heads – hundreds of references from around the world make clear the excellence of our work.

“Excellent symbiosis of feeding system and coating head.”





STATION 9

Deaerators

The first non-contact systems for applying coating colour and emulsions with a barrier effect on paper or cardboard had to be withdrawn from the market for a variety of reasons, but mainly due to the inefficient deaeration of the coating.

Special requirements for the coating materials for a curtain coater made it necessary to make further considerations with regard to coating colour properties and equipment requirements for coating colour bleeding. Here, the deaeration of coating colours turned out to be the essential process step in curtain coating, since air bubbles are not rubbed on paper or cardboard, but occur as imperfections in the form of oval-shaped, uncovered areas.

GAW deaerators are designed to reduce air in the coating colour to as much as 0.1%, depending on the coating colour properties and process parameters.

“Excellent deaeration,
high volume,
perfect coating.”





STATION 10

Sodium dithionite solvent system

Sodium dithionite is a bleaching and reducing agent used primarily in the textile, paper and mineral industries.

Sodium dithionite makes it possible to replace a costly raw material like pulp with a less expensive one such as recovered paper. This saves money and is better for the environment. In addition, the reduction of contaminants protects the cellulose fibres.

GAW sodium dithionite solution systems are in use worldwide, providing excellent homogenization and mixing capabilities. The systems are compact, easy to start up and offer low maintenance costs.

Under the maxim of guaranteed operational safety, the GAW sodium dithionite solution systems ensure maximum performance and minimum product losses.

“Safe.
Effective.
Compact.”





Coating colour kitchen

GAW dispersing machines, the heart of every coating colour kitchen, enable excellent dispersion for every application.

In the coating colour kitchen, the coating colours and coatings are processed by dosing and dispersing up to twenty different components in a special mixing unit according to the given recipe, based on quantity and time sequence. The coating formulations depend on the application of the paper, the paper machine, the coating process and the location.

Depending on the desired technical and optical properties of the paper quality (e.g. surface weight, density, strength, roughness, brightness, whiteness, opacity, gloss), pigments, binders and additives are used in the dispersion.

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Coating colour recovery system

System for the recovery of pigments from wastewater containing paint.

By flushing the coating equipment and changing the production, large quantities of high-quality pigments have been lost in the production process for coated papers and board.

These effluents, contaminated with dirt and agglomerates, have only a low solids content, which makes the direct return to the process impossible.

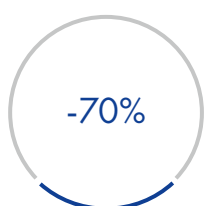
The valuable pigments flow with the production wastewater into the sewage treatment system, where they are

separated and disposed of to landfill as so-called "paper sludge".

The operation incurs considerable costs – for the disposal of the paper sludge on the one hand and for the replacement of the lost pigments on the other.

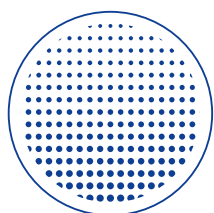
GAW technologies has developed, patented and established a process that enables the recovery of pigments from wastewater, e.g. that found in paper mills producing coated papers.

In the GAW coating colour recovery process in paper production, 100% of the pigments are recycled back into the process, resulting in considerable potential savings for the benefit of the environment.



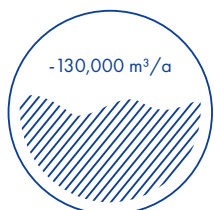
Less energy consumption

For example, about 70% less energy is required for reprocessing than for the grinding of a fresh pigment.



CO2 emissions completely eliminated

The CO2 emissions that result from the replacement of the lost pigment by production and transport are completely eliminated.



Reduction of wastewater

The amount of wastewater is considerably reduced because the separated sewage water is also returned to the process, which means less work for the wastewater treatment system.



Elimination of the pigment disposal

This also eliminates the disposal of thousands of tons of pigments that otherwise end up in the wastewater treatment system and thus in the paper sludge.



Membrane separation plants

In the paper industry, the economic benefits of membrane separation technologies come first and foremost through the optimized use of resources. Unused potential for saving water, energy and raw materials can be fully exploited by means of these technologies.

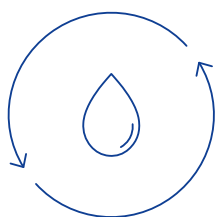
OSMO Membrane Systems, a highly specialized company within the GAW Group, develops and builds high-quality industrial membrane separation systems for various process applications. The focus here is on tailor-made special plants, filtration and reverse osmosis systems as well as solutions for water and wastewater treatment.

The membrane separation technologies applied by OSMO use the process steps of micro- and ultrafiltration, nanofiltration, reverse osmosis and membrane degasification as well as further steps for the separation of e.g. particles, viruses, bacteria and interfering molecules or ions by means of a selective separation process.

Membrane separation process and water treatment – state of the art in the paper industry

Water used in paper and pulp production contain ingredients that can be critical for high system availability in the paper process. Regulatory requirements and high wastewater costs require efficient membrane separation plants to reduce water and energy consumption.

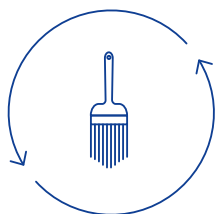
Typical applications of OSMO systems in the paper industry:



Ultrafiltration / Reverse osmosis

Reduction of freshwater requirements

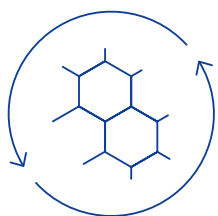
Well and surface water treatment suitable for removal or reduction of solids, microorganisms, turbidity and suspended solids to supply internal consumers and as a precursor to reverse osmosis. The high-quality water quality reduces the specific consumption and increases the chemical efficiency.



Reverse osmosis / Ion exchanger

Energy efficient water and condensate treatment

Safe production of demineralised water for boiler supply. The Factor X process step developed by OSMO can achieve yields of > 90%, which considerably reduces the wastewater quantity and improves the efficiency.



Ultrafiltration / Reverse osmosis

Reduction of wastewater volumes Reverse osmosis

Combined systems from OSMO enable the treatment and recycling of biologically contaminated wastewater from paper production. For more heavily polluted process waters, the COD load or solids can be separated by ultrafiltration, including bleaching wastewater, clear filtrate and coating colours.

Far beyond the state of the art, OSMO and GAW technologies – two excellent synergy partners within the GAW Group that have been cooperating for decades – have future technologies that improve the “energetic footprint” and achieve high operational reliability. With more than 30 years of experience, reliable and efficient process solutions are created to enable low-chemical and low-energy operation and significantly reduce costs.

