Our Rotoform system has long been the industry benchmark against which all other solidification systems are judged.

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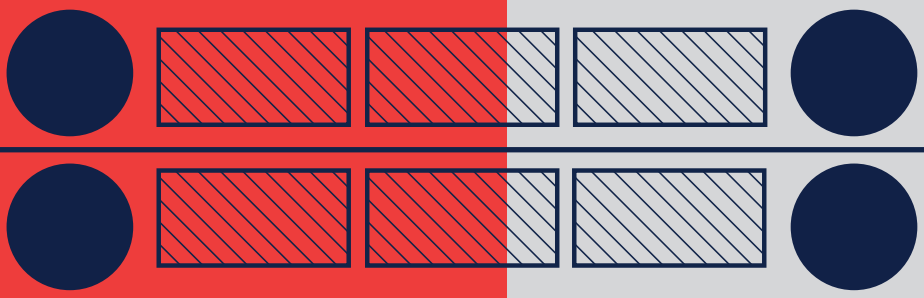
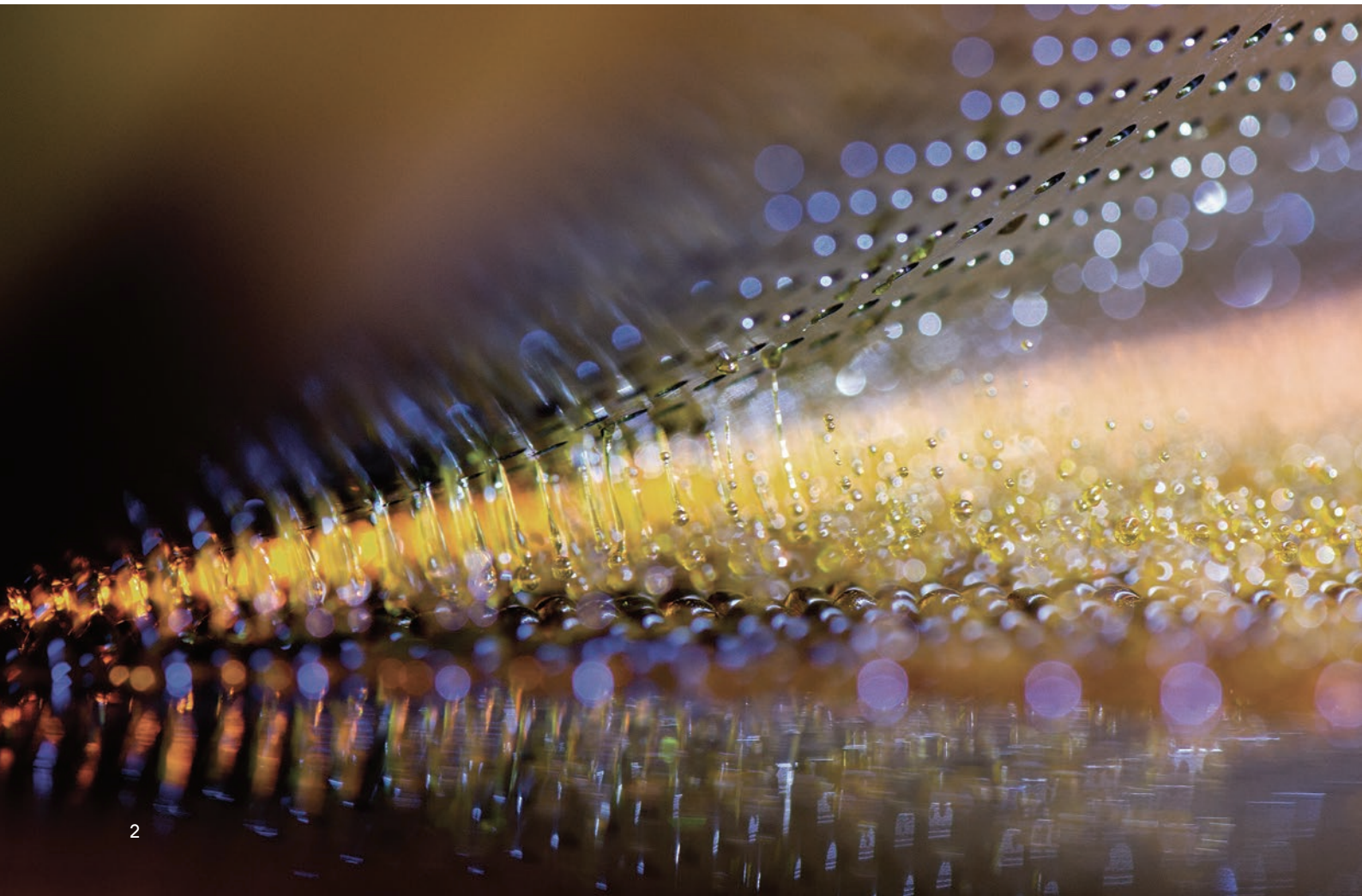
ROTOFORM PASTILLATION FOR PREMIUM PRODUCTS



——A SUCCESS STORY BUILT ON PERFORMANCE, RELIABILITY AND IPCO SERVICE

From its introduction in the late 1970s right up to the present day, our Rotoform system has set the standard against which other solidification systems are judged.



Rotoform installation in clean room.

Its groundbreaking performance – delivering an end product of consistent shape and size – has seen the process adopted as the solidification solution of choice for hundreds of products across the chemical and food industries.

The required properties of a granule will vary from one product to another of course, but in general terms, successful processing will deliver granules that are:

- Consistently sized (diameters from 0.8–36 mm).
- Free-flowing.
- Dry.
- Dust free.
- Easy to dispense.

The IPCO Rotoform system delivers on all counts. More than 2 000 have been installed to date, and this has given us unparalleled expertise in different product types, flow conditions, and the many other parameters of this process.

We continue to develop and enhance the process, introducing new models – like our 4th generation RF 4G – that enable customers to gain further market advantage through improved product quality and productivity.

Choose to work with IPCO and you can be sure of receiving the support you need to gain maximum return on your investment, whether you're a small family business or an international group. Our worldwide service and spare parts operation means we're there when you need us, the investment we make in initiatives such as our Productivity Center means we can support you on product and process development.

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Quality, versatility and reproducability – The Rotoform principle

The IPCO Rotoform system delivers pastilles of highly uniform shape, stability and quality – properties that can be reproduced again and again – in an environmentally friendly manner.

The system also offers a high degree of versatility, enabling products of different viscosities to be processed or pastilles of different sizes to be produced simply by exchanging the rotary shell and nozzle bar.

How the Rotoform system works
A pump delivers the molten product from a vessel or pit to the Rotoform system via heated pipes and a filter.

The Rotoform itself consists of a heated cylindrical stator – which is supplied with liquid product – and a perforated rotating shell that turns concentrically around the stator. Drops of the product are deposited by the nozzle bar across the whole operating width of a continuously running stainless steel belt.

A system of baffles and internal nozzles built into the stator provides uniform pressure across the whole belt width, providing an even flow through all holes of the perforated rotary shell.

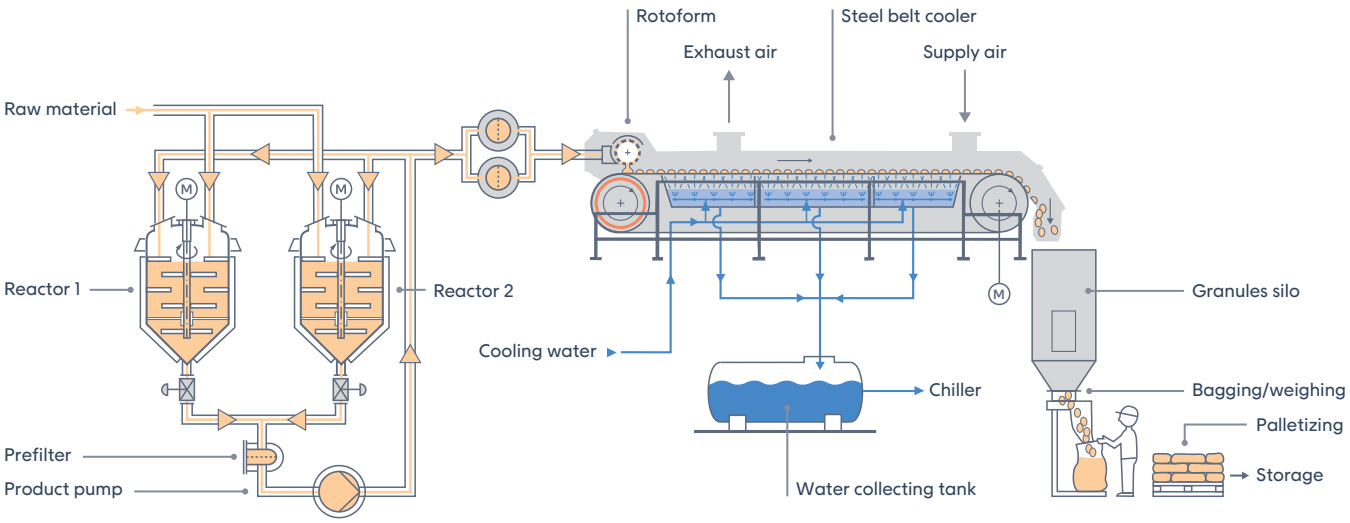
This ensures that all pastilles are of uniform size, from one edge of the belt to the other.

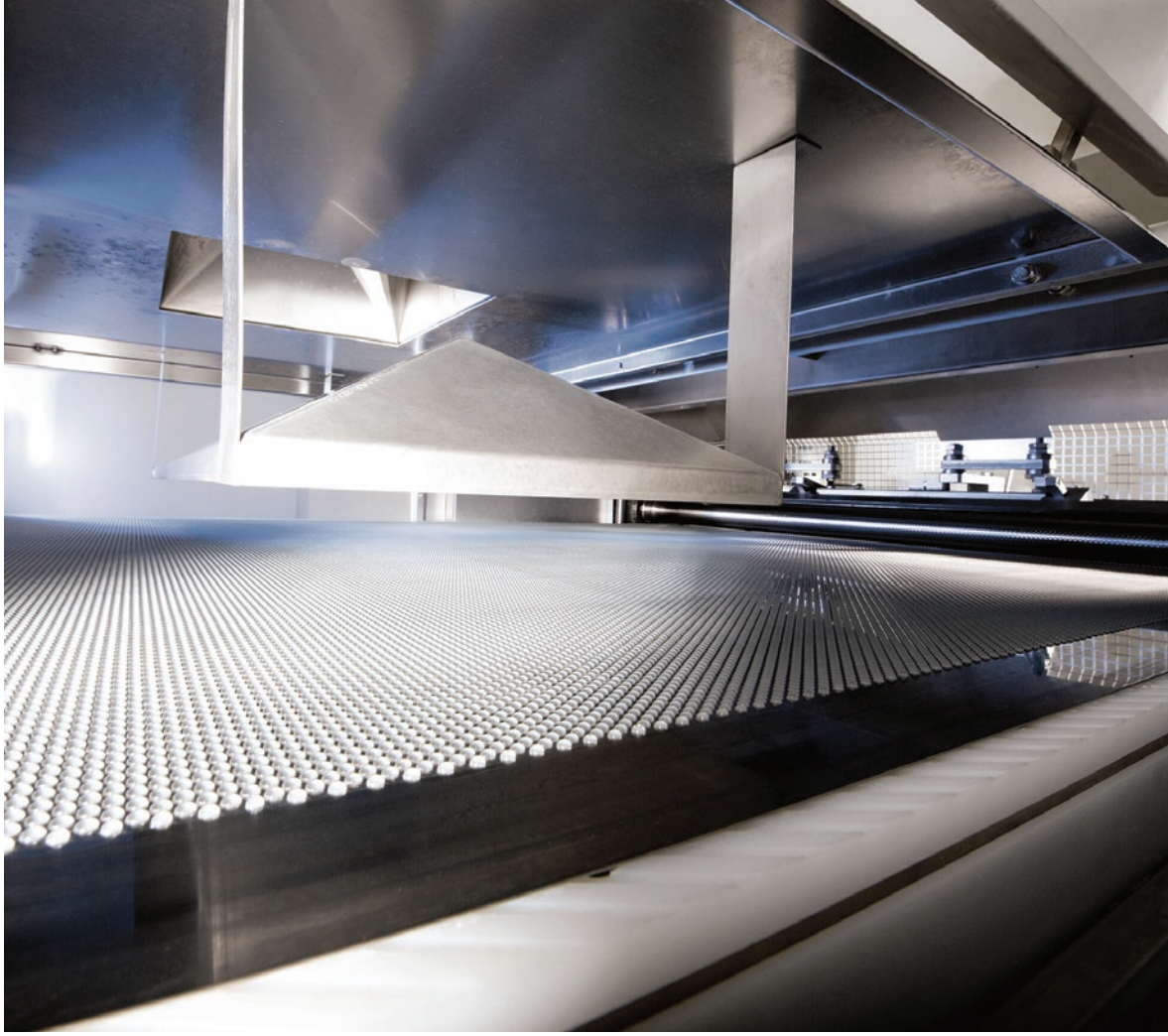
The rotation speed of the Rotoform is synchronized with the speed of the belt to allow a gentle deposition of the liquid droplets onto the moving belt. Heat released during cooling and solidification is transferred via the steel belt to cooling water sprayed underneath.

This water is collected in tanks and returned to the water recooling system; at no stage does it come into contact with the product.

After the drop has been deposited onto the steel belt, some product residuals could remain to the outer shell. A heated refeed bar forces this product back into the Rotoform and keeps the outer shell clean.

Hot Melt Pastillation System



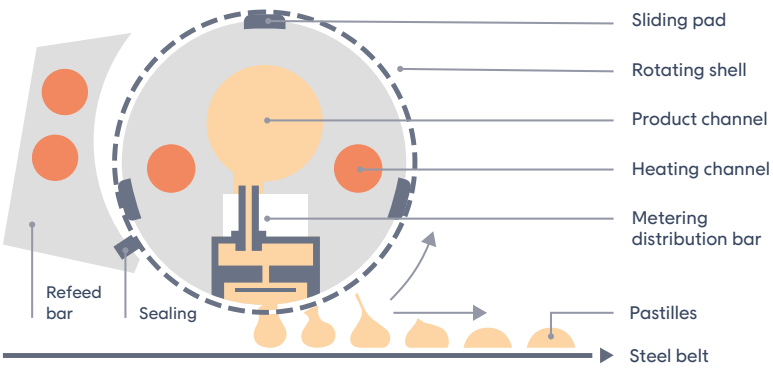


Hot melt solidification plants around the world are based on IPCO Rotoform technology.

Key benefits of Rotoform based pastillation

- Pastilles solidified directly from the melt, eliminating the energy and equipment costs associated with subsequent crushing, breaking or grinding processes.
- Pastilles are of a highly uniform shape and stability– dust-free production.
- Pastilles are free flowing and ideal for handling, blending, storage and further processing.
- Higher bulk density and better packing properties than bulky flakes.
- Environmentally friendly production as cooling media (water) and product are kept apart – no possibility of crosscontamination.
- Fast cooling on the belt means very few vapor vapor or gas can get into the atmosphere and minimizes oxygen contact of the hot product.
- Melts with widely varying properties can be handled including viscosities from 10 to 40 000 mPas and temperatures up to 300 °C.
- Pastilles can be produced with diameters from 0.8–36 mm.

Rotoform process



One basic principle, a model for every application

The Rotoform technology has been developed over many years to meet the different process requirements of a wide range of different products.

Building on the principle that has been behind the Rotoform's success for more than three decades – efficient and continuous pastillation by means of a Rotoform drop depositor and a steel belt for cooling – we now have systems suitable for the production of pastilles from a wide range of chemical melts and food products.

The development of this comprehensive product range has led not only to faster and more efficient pastillation, but has also opened up new opportunities for chemical processing. Some products have an extremely high melt tempe-rature of up to 300 °C. Some are characterized by their abrasive, sedimenting or corrosive properties. Others fall into the category of subcooling melts.

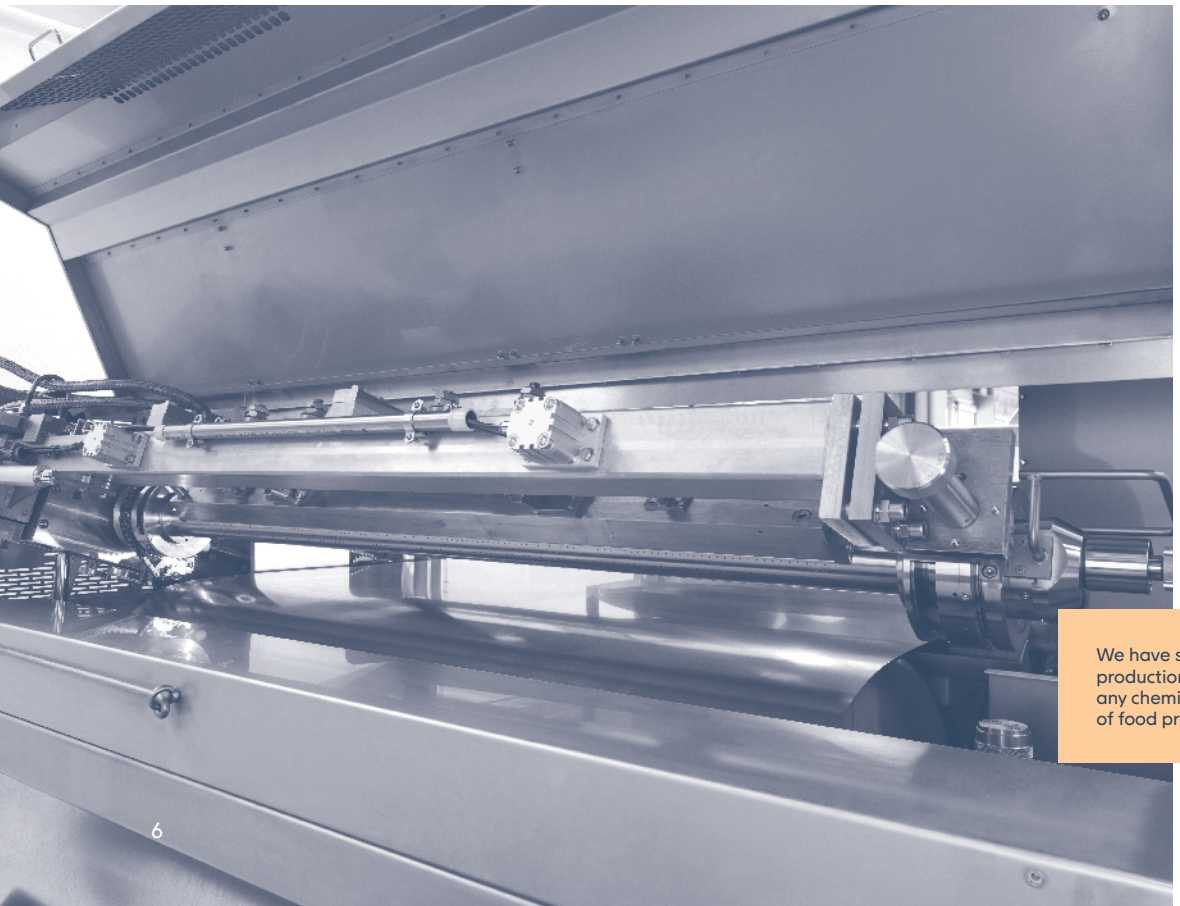
Whatever challenge you need to overcome, whatever your production requirements are, we have the Rotoform system to match.

Rotoform 4G – the foundation of a modular system design

The RF 4G is the latest model to form the foundation of the Rotoform family. Its name comes from the fact that this is now the 4th generation Rotoform, and it is the result of the expertise gained through the development, manufacture, installation and commissioning of every previous system.

This is an extremely versatile model, one capable of solidifying low and high viscous melts (up to 40 000 mPas) at temperatures up to 300 °C, and is widely used for products such as hot melt adhesives, resins and waxes.

It is also the basis for a modular systems design, one on which we have built a series of specialized systems for particular applications – the Rotoform family.



We have systems suitable for the production of pastilles from virtually any chemical melt and a wide range of food products.

Premium solidification with Rotoform system.
IPCO's Rotoform feed device.

Rotoform Family

			Temperature °C (max)	Viscosity mPas (max)	Pastille size mm (max)	Capacity t/h (max)	Typical products
Rotoform 4G	RF 4G	Basic model – standard unit for solidifying low and high viscous melts	250	40 000	40	4	Hot melt adhesives, resins, wax
	RF 4G HT	For melts which feed in at high temperature (up to 300 °C)	300	40 000	40	4	Bitumen, high temperature resin, PET, pitch
	RF 4G	FD Meets the special requirements of the food industry in terms of hygiene and ease of dismantling/cleaning	200	40 000	40	2.5	Chocolate, cheese, chewing gum base, emulsifier, fat, soup concentrate
	RF 4G AS	For abrasive & sedimenting products	250	40 000	40	5	Catalyst, stearate, sulphur bentonite, other suspensions
	RF 4G SC	For pastillation of subcooling melts in supercooling plants	200	20 000	15	2	Agrochemicals, photochemicals, plastic additives, rubber chemicals, stabilizer
	RF 4G CR	For corrosive products	250	40 000	40	2.5	Calcium chloride, magnesium chloride
	RF 4G MC	For production of micropastilles down to 0.8 mm diameter	250	1 000	2	0.5	Additives, UV stabilizer, waxes
Rotoform S8	RF S8	Special Rotoform design for the requirements of the pastillation of sulphur	125–145	10	3–5	5.5	Sulphur
Rotoform High Speed	RF HS	Specially designed for high speed, high capacity pastillation of lower viscose products	180	100	3–5	11.5	Sulphur, urea, caprolactam
Rotoform MI	RF MI	For laboratory, R&D and small capacity production (<20 kg/h)	200	5 000	12	0.02	Laboratory use, small scale production
Rotoform High Performance	RF HP	Specially designed for increased homogenity	250	40 000	40	4	Chocolate, resin, hot melt

Rotoform HS (High Speed) – high capacity processing

The Rotoform HS (High Speed) granulator builds on the same basic principle as the standard 4G models but features a much larger rotating shell that enables significantly higher capacity and speed.

This high performance Rotoform system is ideal for products with a short cooling time and low viscosity, like sulphur, Bisphenol A, caprolactam, MA (Maleic Anhydride) and naphthalene, as well as a wide range of fertilizer products including urea.

The main difference between the Rotoform HS and the base model Rotoform 4G is the much larger diameter of the rotating outer shell that actually deposits the molten product onto the steel belt.

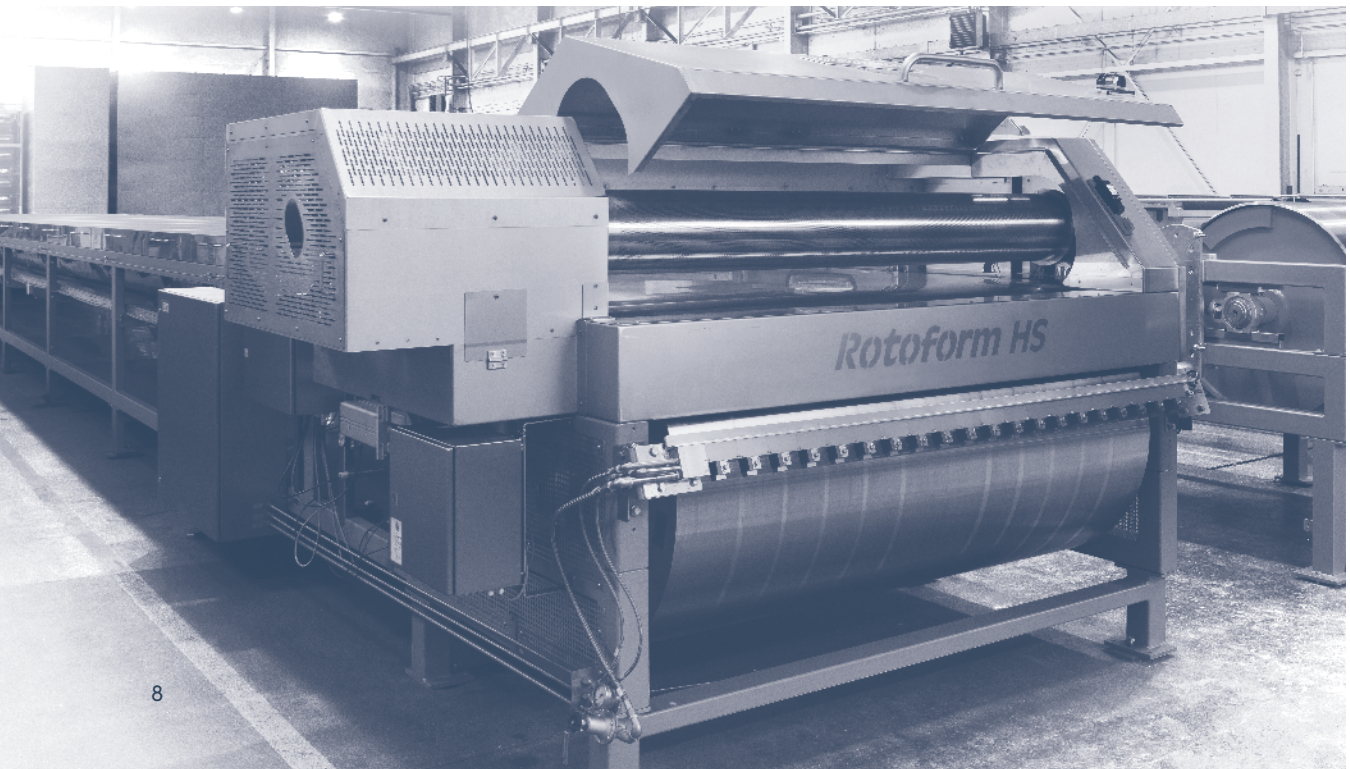
This means the influence of centrifugal force on the drop shape is reduced. the system can be operated at a higher speed while maintaining control of end product quality – still delivering a consistent pastille with a regular, hemispherical shape.

The engineering that goes into producing a dropforming device with much bigger diameter and 30 000+ accurately positioned holes is impressive enough.

The Rotoform HS is suitable for use with low and medium viscosity, fast cooling (<20 Seconds) products. As product cooling times are unaffected by the process itself, a system running at twice the speed needs twice the cooling length (up to 120 meters/minute).

Typical capacity of a 1 500 mm wide unit will be:

Sulphur	11.5 t/h
Urea	5.0 t/h
Caprolactam	4.0 t/h



Rotoform HP (High Performance) – reliable, high performance processing

The Rotoform HP (High Performance) rotary depositing system is built on the proven strengths of our Rotoform 4G while providing particular benefits to the challenges of processing of high viscosity products at higher volumes.

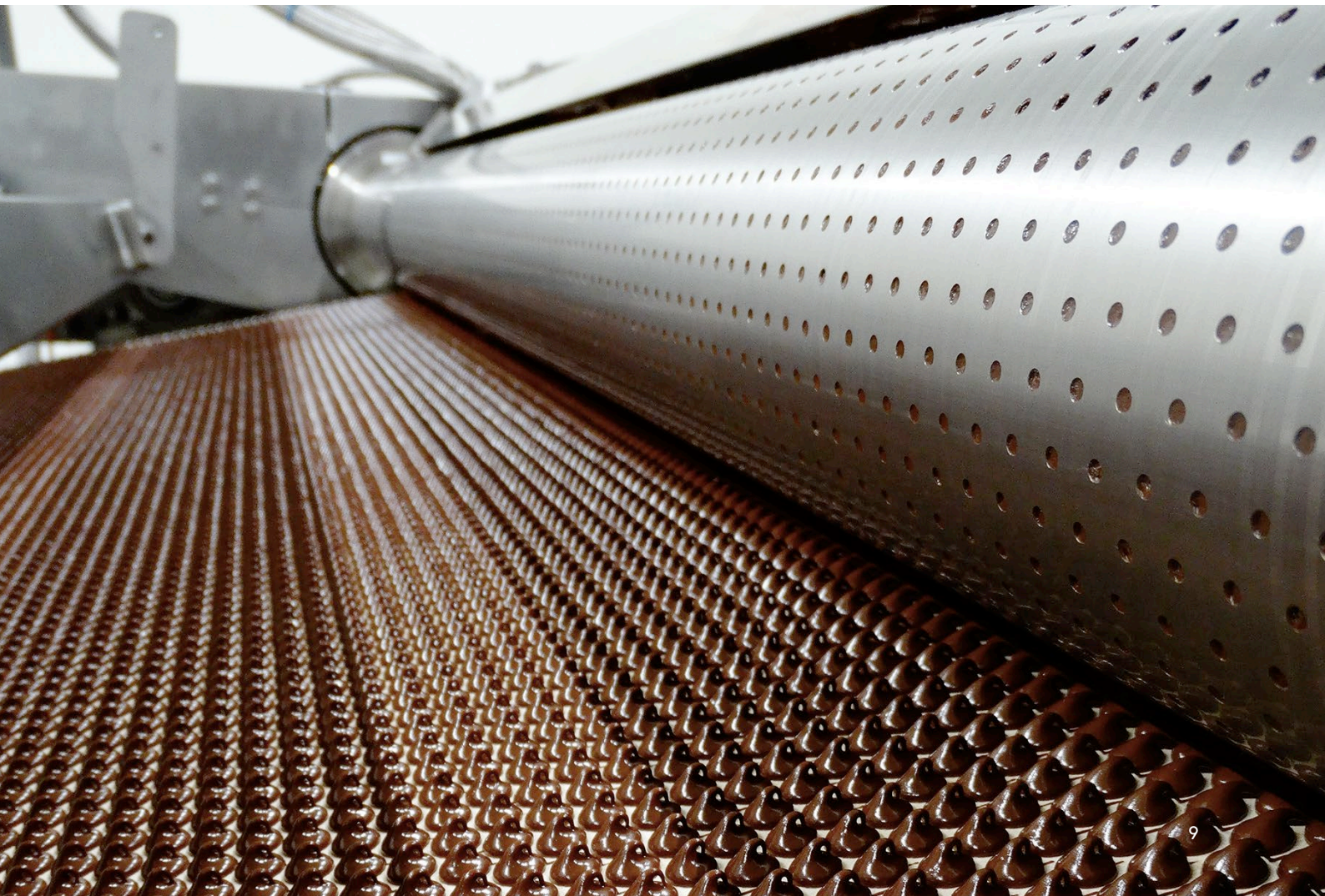
The key difference between the Rotoform HP and our standard 4G model is a significantly larger product distribution channel coupled with an increased outer shell diameter. This enables increased efficiency in terms of even and consistent distribution of the melt across the full width of the steel belt cooler, ensuring precise pastille uniformity.

This is particularly beneficial in terms of higher capacity processing of high viscosity products such as chocolate, but the inherent flexibility of this system means it will handle other viscous materials with optimal efficiency.

Other improvements incorporated into the development of this next generation Rotoform model include innovative and patented fea-tures to influence the product distribution during production. It allows the optimization of the system to achieve maximum possible pastille uniformity.

Reliable, versatile and easy to use, the Rotoform HP is available on new systems or as a replacement of existing drop forming systems.

Rotoform HP producing chocolate.



Rotoform MI (Mini) unit for laboratory use

Delivering all the benefits of our standard Rotoform system but on a very small scale, the Rotoform MI (Mini) is ideally suited to use in laboratory testing operations to define quality, production rates and other key parameters of products in the development stage.

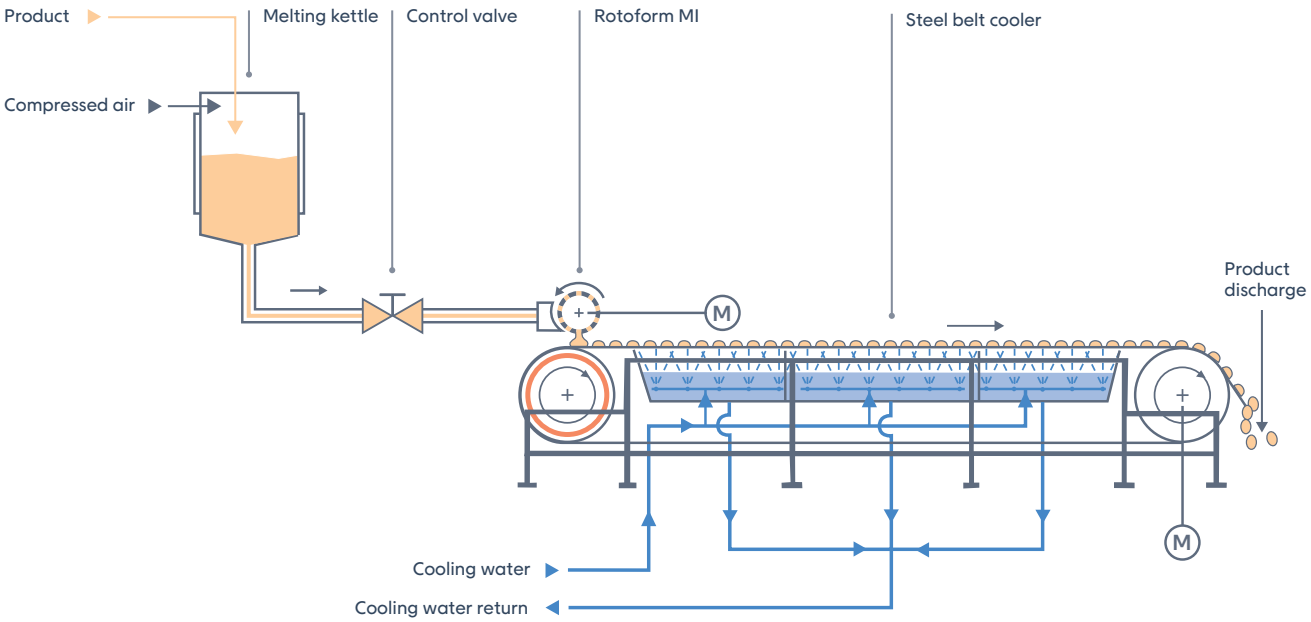
System capacity depends on the products being processed and can be up to 20 kg/h. Maximum melt temperature is 200 °C and products with viscosities from 10–5 000 mPas can be handled successfully.

The key advantages of this system are:
- Maximum system versatility.
- Premium quality Rotoformpastilles.
- Simple operation and accurate system control.

The Rotoform MI granulation system is based on a small scale steel belt cooler and matching Rotoform feeding device, consisting of a stator, metering bar, rotating shell, refeed bar and the drive.

The melt is brought via compressed air or inert gas to the Rotoform MI system where a needle valve guarantees exact dosing onto the belt. As with all Rotoform systems, the feed and steel belt cooler are perfectly synchronized. Cooling is carried out by means of cold water sprayed onto the underside of the steel belt.

Typical Rotoform MI Plant



Rotoform MI installation used with a filled wax.

Different products from A–Z

Since the introduction of the first Rotoform system and the development of the full product range, it has been possible to pastillise many different chemical products, from bulky mass products such as sulphur or fertilizer, all the way through to fine chemicals such as those used in the cosmetic and pharmaceutical industries, plus a wide range of plastic and food products.

Additives
Alkane sulphonate
Antioxidants
Antiozonants
Anthracene
Asphalt
Bisphenol A
Bis-hydroxyethyl-terephthalate (BH ET)
Bitumen
Calcium nitrate
Calcium stearate
Caprolactam
Carbazol
Catalysts
Cobalt naphtenate
Cobalt stearate
Crotonic acid
Detergents
Diaminodiphenyl-methane (DMA)
Emulsifier
Fat chemicals
- Fatty acid
- Fatty alcohol
- Fatty amide
- Fatty ester
- Fatty stearate

Food products
- Cacao mass
- Cheese
- Chocolate
- Edible fats
- Gelatine
- Gum base
- Sauces
- Soup concentrates

Fungicides
Herbicides
Hot melt adhesives
- Based on ethylene vinylacetate, polyurethane, polyamide, polyester

Reactive hot melt
Insecticides
Lactam 12
Magnesium chloride
Magnesium nitrate
Maleic anhydride
Master batch
Naphthalene
Neopentylglycol (NPG)
Nickel catalyst
Paradichlorbenzol
Pesticides
Photo gelatine
Phthalic acid
Polyethylene glycol
Polyvinylacetate
Powder paints
PVC additive
PVC stabilizers
Resins
- Acrylic
- Colophonium
- Epoxy
- Hydrocarbon
- Phenolic
- Polyamide
- Polyester
- Silicon
- Tall oil

Rubber chemicals
Sodium sulphide
Sorbitol
Stabilizers
Stearic acid
Subcooling melts
Sulphur
Sulphur + Bentonite
Surfactants
Synthetic soap
Tar pitch
Tensides
Toluene-diisocyanate (TDI)
Triazole (BTA, TTA)
Trimellitic anhydride (TMA)
Triphenyl phosphate (TPP)
Urea
UV-stabilizers
Waxes
- Paraffin
- AKD
- Microcrystalline
- PE-wax
- PP-wax
- Bee-wax
- Filled wax
- Flavored wax
- Wax colors
- Montan wax
- Coating wax

Zinc stearate

PREMIUM PRODUCTS ROTOFORM PASTILLATION

07-2019