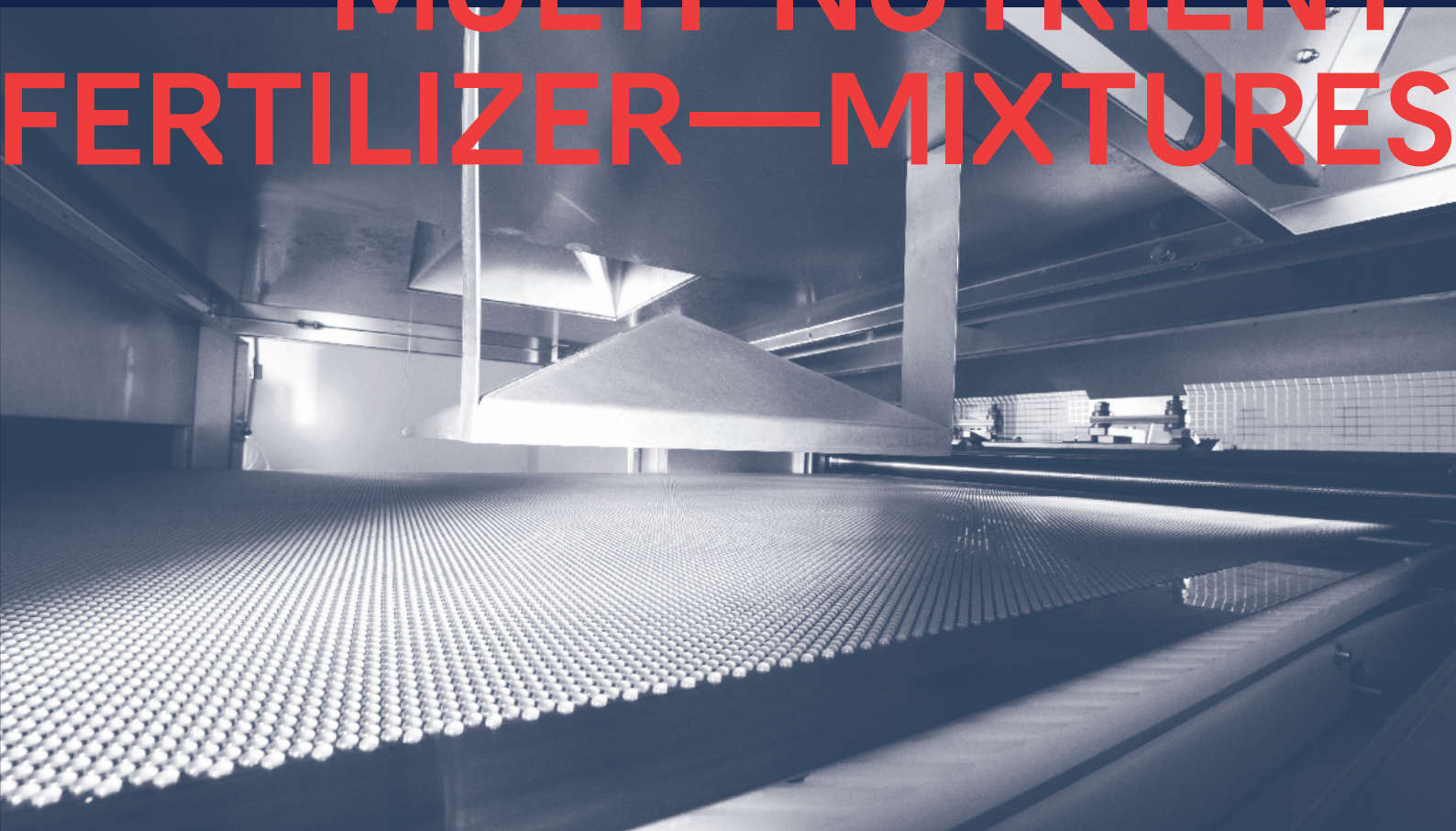




Our Rotoform system is a fast, efficient and clean method of converting fertilizer melts into uniform pastilles in a single step.

ipco.com

**CLEAN — EFFICIENT
PASTILLATION —
UREA —
MULTI-NUTRIENT —
FERTILIZER — MIXTURES**



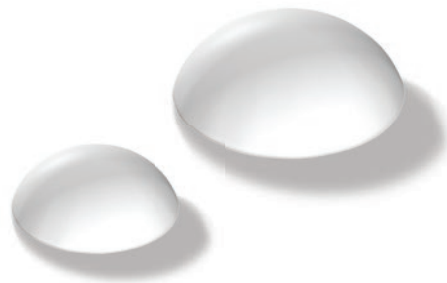
FLEXIBLE FERTILIZER PRODUCTION FOR EVER-CHANGING SOIL CONDITIONS

With the world's population expected to reach 9 billion by 2050, the challenge of achieving global food security will place a huge responsibility on the fertilizer industry.

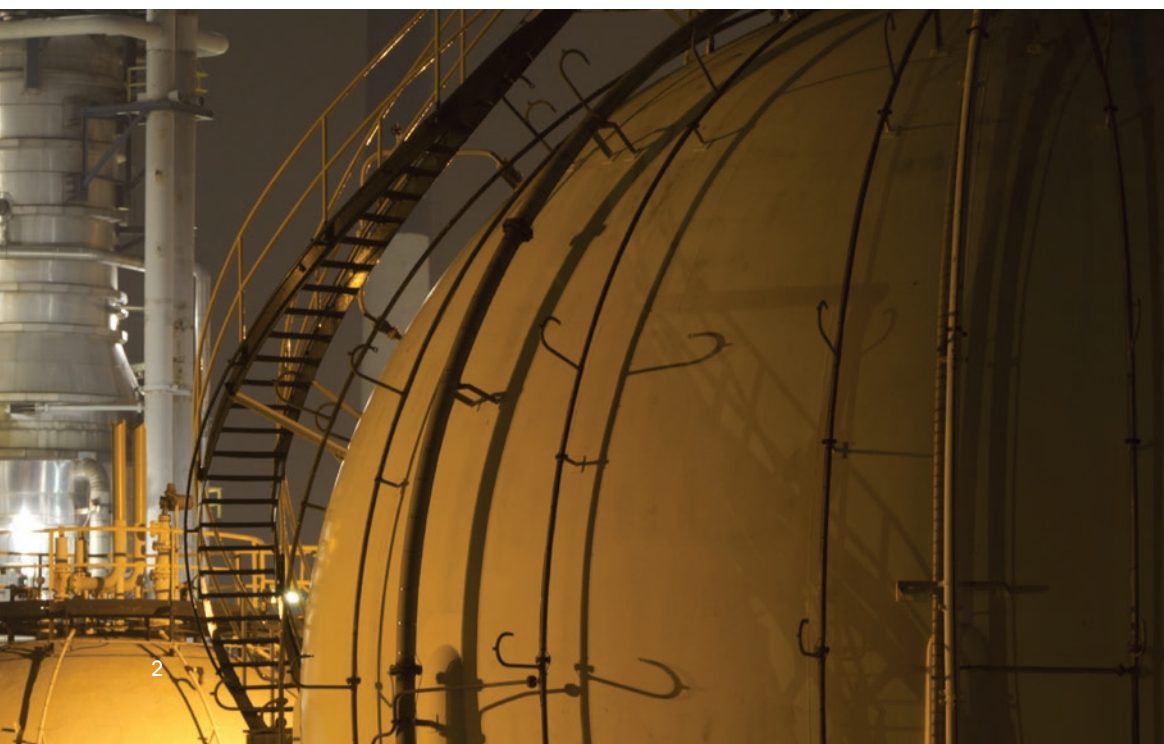
Not only will farmers have to increase crop production to feed these extra mouths, but they will have to do so against a backdrop of nutrient deficiencies in the soil, environmental concerns over the over-use of fertilizers and finite supplies of phosphorus, nitrogen and potassium.

The industry is therefore going to have to develop new, enhanced fertilizers, products that deliver multi-nutrients in the most efficient way possible, maximizing crop production while at the same time meeting environmental concerns.

At IPCO, we have the systems to help.



Develop, test and bring to market new types of fertilizer offering increased crop yields.







A wealth of experience in developing innovative engineering processes for fertilizers

IPCO is a market leader in the design, engineering and installation of specialized fertilizer solidification and handling systems.

Solidification systems for fertilizer plants

Our partnership with the chemical industry extends back more than 50 years and our solidification systems are now firmly established as the default solution for a wide range of products, including fertilizers.

These systems include the Rotoform, a fast, efficient and clean method of converting fertilizer melts into uniform pastilles in a single step, and one that provides an ideal solution for fertilizer producers looking to de-bottleneck or revamp existing process facilities.

Up- and downstream plant for turnkey solutions

The wealth of experience and engineering know-how that exists across IPCO means we can deliver complete turnkey installations including control systems, information technologies and electrical services.

This integrated design capability also covers:

- Mixing/grinding lines.
- Dosing/measuring equipment.
- Heated tanks and pipework.
- Pumps, chillers and cooling towers.
- Elevators/conveyors.
- Storage silos.
- Bag filling systems.

We can therefore provide complete end-to-end systems for the mixing, solidification and down-stream handling of a wide range of products including fertilizer urea, technical grade urea and speciality urea products such as urea + ammonium sulphate (UAS).

From in-line mixing and solidification to downstream handling, storage and bagging.



Environmentally-friendly production of uniform pastilles

The Rotoform pastillation process is simple with low investment and operating costs and minimal environmental impact, making it ideal for upgrade projects, removing bottlenecks or the production of special fertilizer products.

There is no need for recycling, crushing or bulk cooling. Pastilles are free-flowing and uniform in shape, and an almost complete lack of dust ensures safe and easy transportation and stockpiling or bagging.

Proven Rotoform performance

The first Rotoform was installed in the early 1980s and more than 2 000 systems have been installed since. The technology has undergone significant enhancement over the years but the core principle remains unchanged.

Molten product is fed onto a continuously running steel belt in the form of measured droplets. As they travel along the system, heat is transferred from the product to cooling water sprayed against the underside of the steel belt, and the droplets are solidified into consistently sized pastilles.

In this environmentally-friendly process, the cooling water and product do not come into contact with one another so there is no possibility of cross contamination.

Other process benefits include:

- High quality pastilles, adjustable from 1-5 mm.
- High crushing strength (vs prills).
- Very low dust emissions.
- Very low vapor/gas emissions.
- Very low power consumption.

Clean production of high-value technical grade urea

Another key benefit of the Rotoform process – the ability to produce pastilles with a high crushing strength without the addition of formaldehyde – enables the efficient and economical production of technical grade urea. Applications for this include animal feed, pharmaceutical products and Diesel Exhaust Fluid (DEF) used in Selective Catalytic Reduction (SCR) to lower NOx concentration, commonly referred to as AdBlue®.



The outstanding qualities of the Rotoform process make it the chosen solution for dozens of fertilizer products.

Grow market share with enhanced, multi-nutrient fertilizer products

The benefits of multi-nutrient fertilizers are now widely accepted, opening up new market opportunities for producers with the versatility to develop and introduce these products.

Our ability to supply complete in-line mixing, solidification and handling systems provides a low cost, low risk route into this potentially lucrative market.

Upstream mixing solutions

Complementing our Rotoform solidification technology, we supply a range of upstream solutions including blending and grinding units. These can be used to combine liquid and solid products into suspensions, enabling the production of speciality urea products such as:

- Urea + sulphur
- Urea + ammonium sulphate (UAS)
- Urea blended with micronutrients

Other special fertilizers that can be produced on these systems include ammonium nitrate and sulphur bentonite.

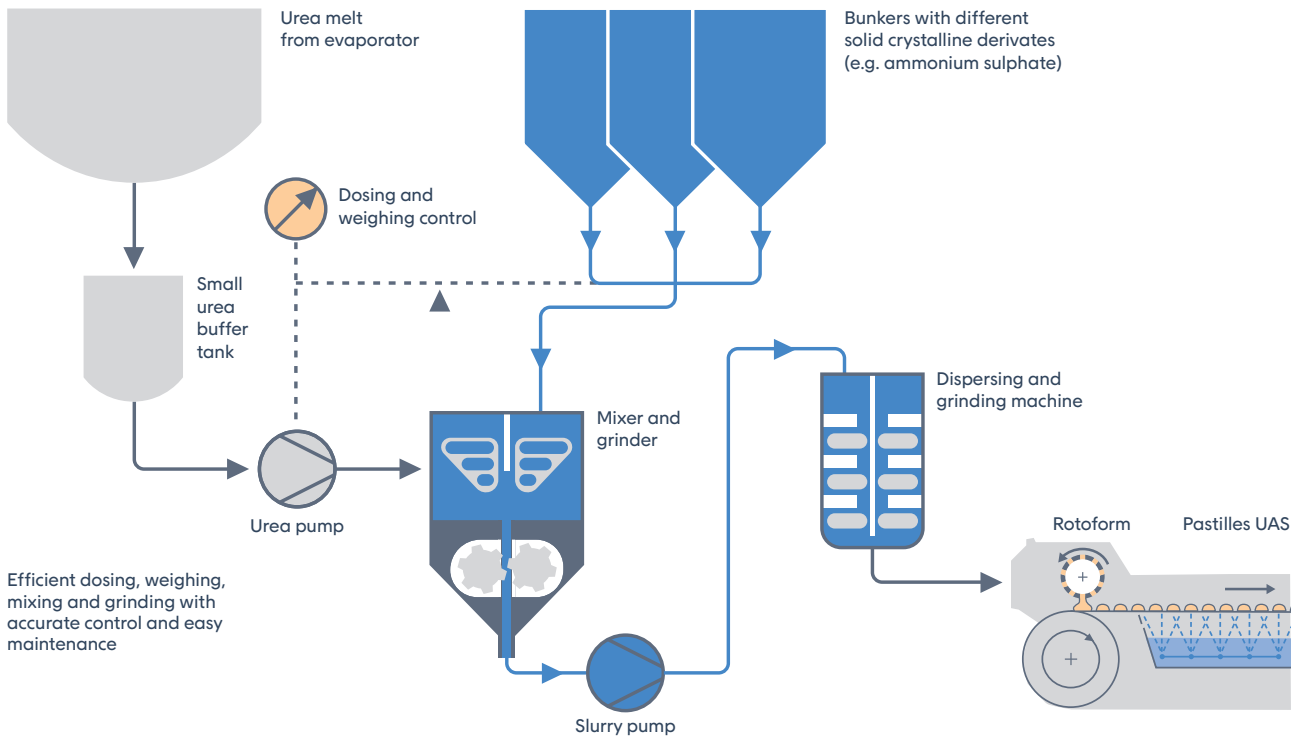
Production flexibility to meet specific crop needs

Precise control of dosing allows product ratios to be varied to meet different needs, while the inherent versatility of the Rotoform system allows quick and easy changeover from one product to another with only minimal modification.

As a result, producers can develop and launch innovative new fertilizers and achieve higher profit margins by adding value to low value products. At the same time farmers can achieve the higher crop yields they're looking for, and more efficient use of fertilizers means reduced environmental impact all round.



Mixing and blending plant



Versatile, expandable modular system for easy integration alongside existing facilities

The flexibility of the IPCO Rotoform system allows easy integration into existing facilities. It can be used for product development, for de-bottlenecking, to enable production of multiple product types or to reduce overall plant emissions by transferring a proportion of existing production to pastillation.

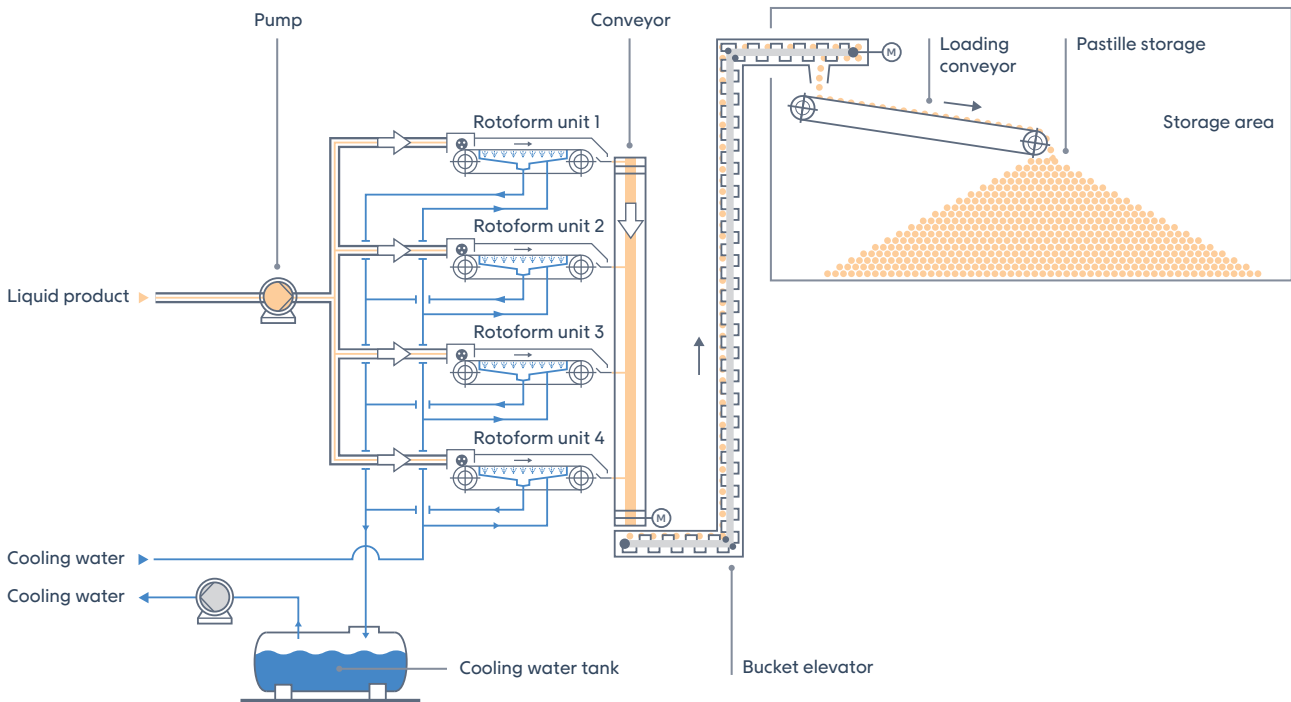
A single Rotoform system will offer a throughput capacity of between 120–170 TPD depending on the product being processed.



Modular design allows a number of Rotoform lines to be run in parallel

The modular design of the system means that a number of Rotoform lines can be run in parallel to deliver capacities of more than 2 500 TPD.

This multiple approach provides the flexibility to switch lines on and off to meet changing throughput requirements.



See the technology in action at our Productivity Center

Rotoform systems are now in operation in fertilizer and urea plants in North and South America, Europe, Asia and Australia.

If you'd like to find out more about the opportunities this system could open up for your company, or to discuss how we can integrate upstream mixing, feed and downstream

handling and bagging to deliver a turnkey solution, we'd be delighted to talk to you.

And if you'd like to really put the Rotoform system to the test, we invite you to visit our Productivity Center in Germany where you can assess its performance or even undertake pilot production of a specific product using your own products.

Increased flexibility for product development, de-bottlenecking, multiple products or reducing emissions.