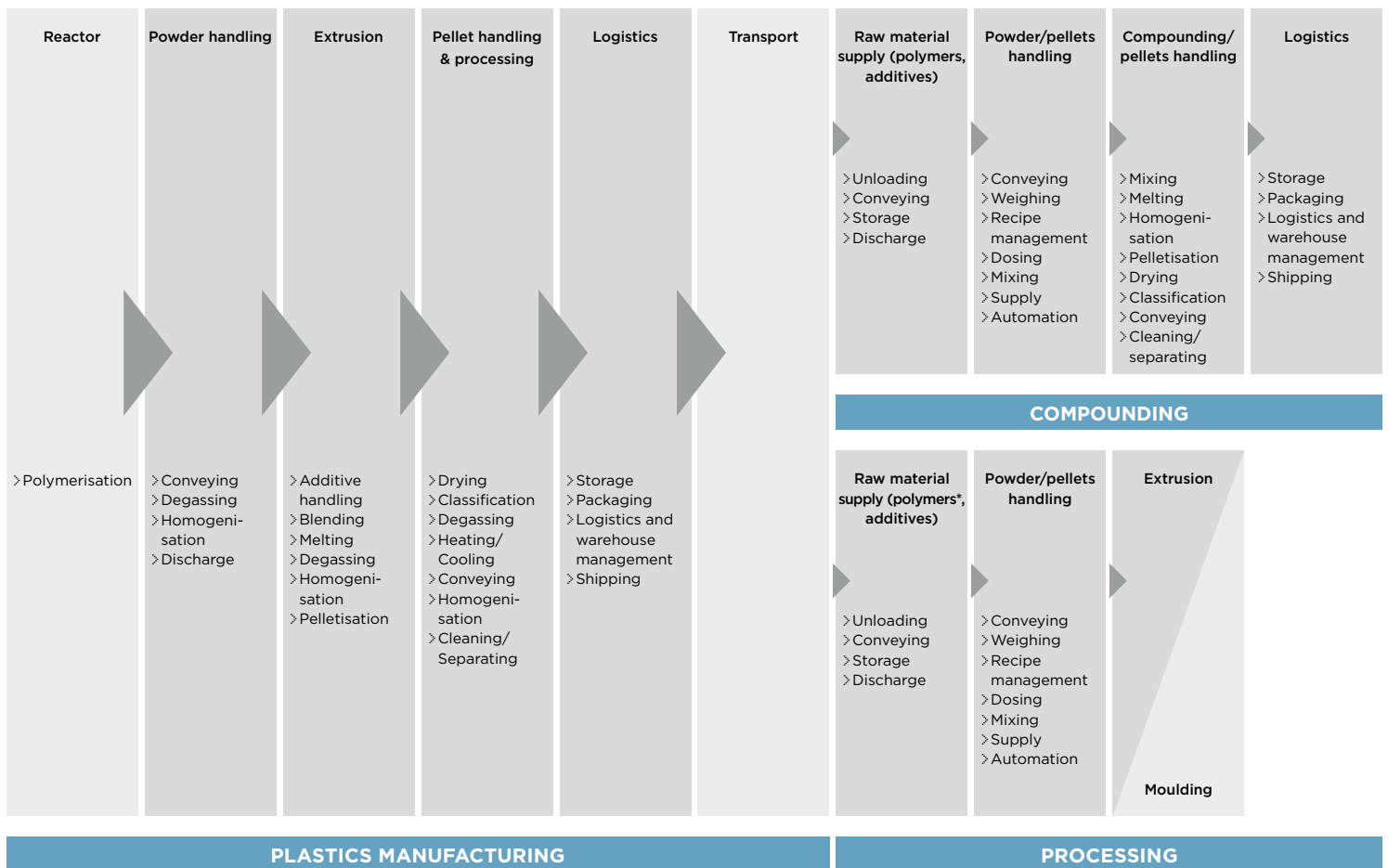




Plants for the Plastics Industry. How we respond to individual application challenges with tailored solutions.



PLASTICS PLANT CONSTRUCTION
from manufacturing through to the end product



* natural or compounds

»» Coperion is the plant constructor for the plastics industry. We are your perfect partner for all bulk solids and processing plants in the plastics manufacturing, compounding and plastics processing sectors. We have the unique know-how for all process stages and also develop and manufacture all key components required for the overall process. We ensure on-budget, on-schedule plant construction to suit customer requirements by means of first-class project management and engineering. That's what we mean when we say "confidence through partnership".

»4

Individual plant designs

» Profit from the versatile interaction of process competence, scope of supply, scope of services and experience in project management.

»6

Plastics manufacturing

» Tailored solutions for overall and sub-systems for bulk materials handling along the entire value-added chain in the plastics manufacturing industry.

»8

Compounding

» Individual system solutions for the compounding industry from one source.

»10

Plastics processing

» Bulk materials processing systems for all applications in the plastics processing industry.

»12

Process know-how

» Processing, thermal processes, conveying, separating, cleaning and mixing etc. – it is only possible to supply detailed solutions which result in decisive improvements throughout the entire process chain with in-depth knowledge of each process stage.

»15

Test centre

» High-tech solutions from our large-scale research department for optimum design of your production plants.

»16

Components / production logistics

» High-performance components and equipment for bulk materials handling.

»17

Network

» The global competence of a world market leader guarantees customer-oriented operations.

» Coperion is the right partner for your individual plant concept. We offer everything you need for your project from one source. With our own process competence and key components we are able to offer our customers individual plant concepts and implement these reliably and economically. We react flexibly to all customer and market demands. This applies to both optimisation of the respective relevant process chain as well as to the definition of the scope of supply and scope of services – the benchmark is always maximum customer benefit. Coperion has the track-proven competence to manage complexity and integrate processes.

Individual plant concepts

Coperion designs and installs all plants to a highly professional standard: we provide the ideal solution for new plants on green-field sites or extensions to existing plants, for production and logistics plants for both the plastics manufacturing and processing industries.

Our many years of collaboration with licensors and plant operators, international contractors and local partners mean that we are able to apply our know-how flexibly and effectively. We make sure that our customers enjoy maximum added value by responding just as the situation demands. We are consultants and planners, supplier of individual systems and also a general contractor for overall plants. We are a competent partner at your side from the outset, starting with the initial concept study and the clarification of all technical and formal matters with the local authorities throughout the entire project handling chain until start-up of the turnkey, tested plant.

Managing processes and interactions – our professional project management

In our view professionalism means minimising complexity for you. Our project managers make sure that your plant is built on time. This includes meeting tight deadlines and coordinating a number of people and processes. Transparency and direct communication are the foundations for efficient teamwork. To achieve structured, reliable and fast implementation of even the largest projects, we network our team around the world with the very latest IT systems to make sure everyone has all relevant data at their immediate disposal. Our worldwide experienced project teams are conversant with national and international standards and regulations.

In addition our worldwide presence enables us to integrate local service providers and global suppliers. Construction and installation companies at the plant installation sites are supervised by our internationally experienced site managers.

OUR FOUR AREAS OF EXPERTISE WHICH YOU CAN ACCESS FLEXIBLY AS REQUIRED:

»» Scope of supply

- > Machines
- > Equipment
- > Steel structures
- > Construction work
- > Power etc.

»» Project management

- > Deadline and budget compliance
- > Coordination of all project participants
- > Compliance with contractual and statutory obligations
- > Multi-layered integration of production data

THE RESULT:

YOUR INDIVIDUAL PLANT CONCEPT

»» Process competence

- > Powder handling
- > Extrusion/Compounding
- > Pellet handling & processing
- > Logistics

»» Scope of services

- > Concept development/ Planning/Basic design
- > Engineering and design
- > Production and supply
- > Installation and site management
- > Commissioning and training

➤ Tailored solutions for plastics manufacturing and basic chemical products – throughout the entire value added chain. Coperion supplies a wide range of solutions for overall plants and sub-systems for handling powder and pelletised bulk materials.

The more complicated the processes and structures, the more important it is to have a competent partner at your side. From reactor charging and discharge through to additive handling in extrusion processes and logistics – Coperion is the number one contact for all solutions in the field of bulk materials handling for all types of plastics. Our scope of goods and services

not only includes pneumatic and hydraulic conveying processes, but also all associated processes such as cooling, heating, monomer discharge (degassing), blending, separating and cleaning. This applies both to the manufacture of basic chemicals such as PTA, BPA and adipic acid and also to production plants for polyolefins and engineering plastics.

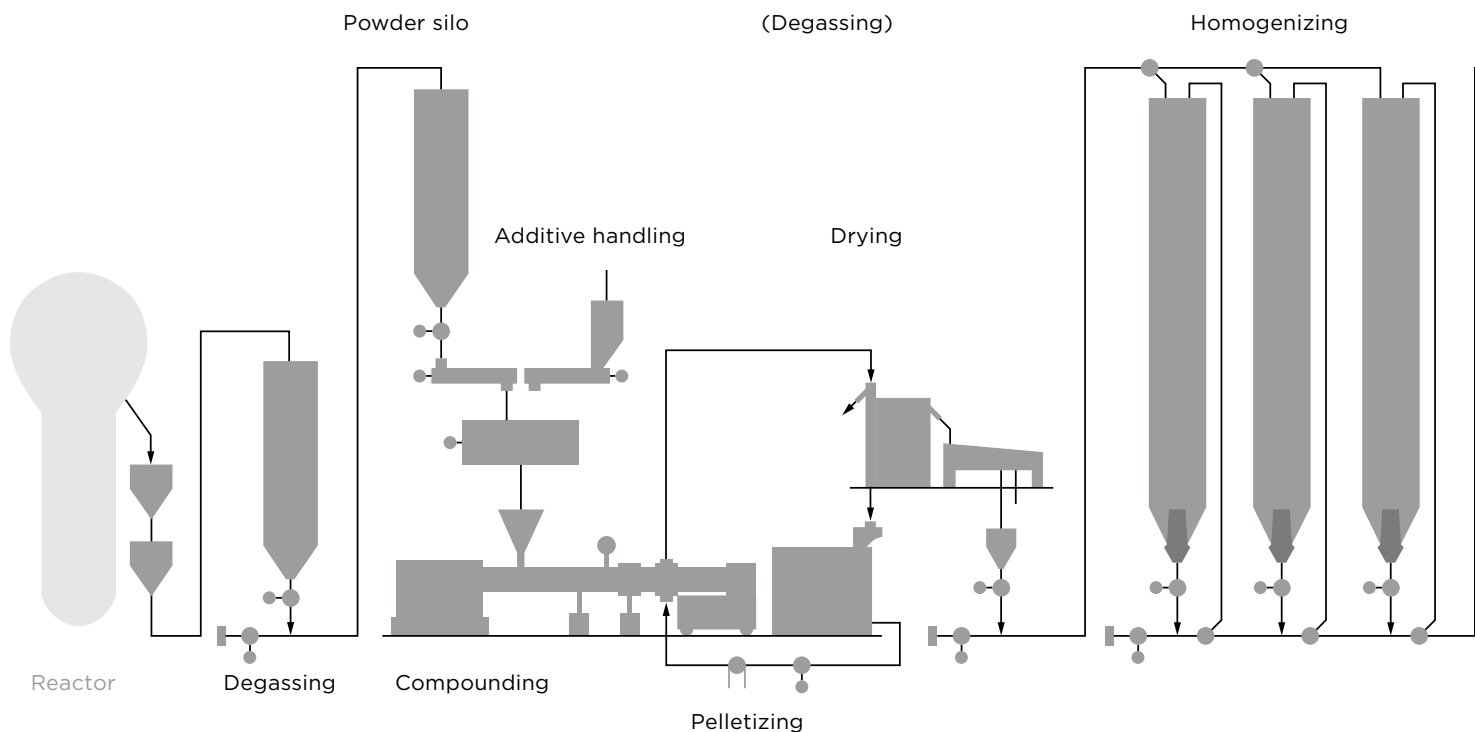
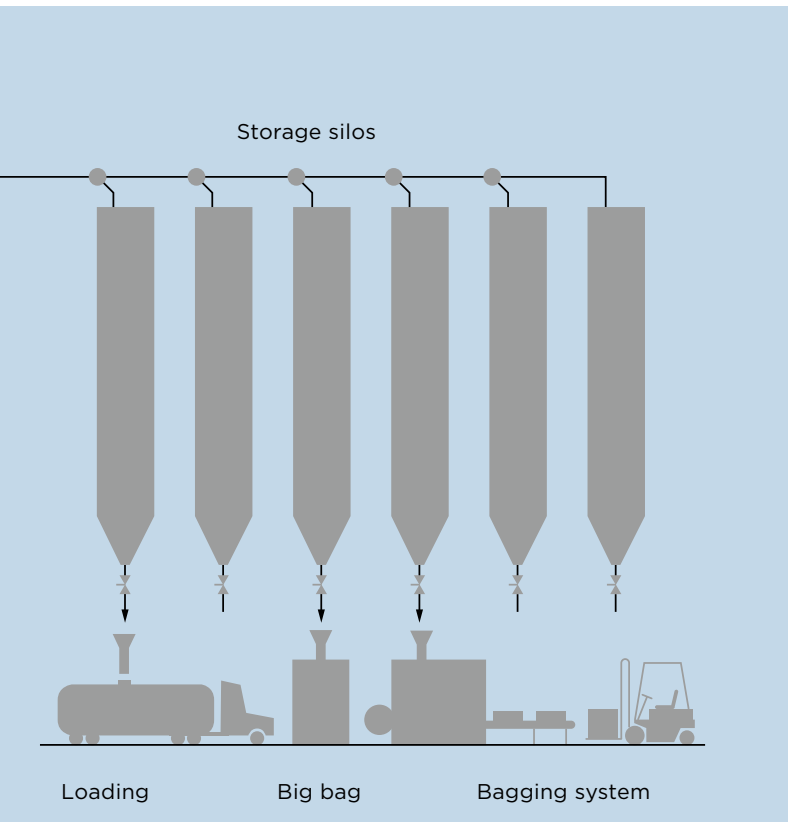


Diagram of a process of a plastics manufacturing plant

Our plants around the world:



**Logistics Management Systems (LMS):
Transparent management**

In collaboration with our partner inonso we organise your logistics in a way that enables you to track all product batches from the production line to the end user in direct communication with the ERP systems at any time. Coperion logistics management systems therefore make a valuable contribution to ensuring your quality.

➤ Turnkey compounding systems. We provide one-stop turnkey solutions from raw material feeding to downstream equipment.

Compounding systems from Coperion have successfully proven themselves on the market for many years. By implementing these complete solutions you benefit from the unique interaction of our Competence Centers Compounding & Extrusion and Materials Handling. From the raw material feeding to the ZSK twin screw extruder and the downstream equipment, we skillfully adapt all the system components to each other. You receive a turnkey compounding plant - in the shortest time at fixed conditions.

Our systems in modular design are a special feature in the segment for turnkey compounding solutions. Such customized compounding systems designed with standardized, pre-assembled modules which are integrated into a steel structure. Before being delivered, they are assembled at Coperion and tested in actual operation with original products in the presence of the customer. They are ready for operation on site in the shortest time after assembly.

Your advantages

One contact and supplier - from engineering and production of key components to commissioning of the plant	Fast assembly and commissioning on site, supported by the worldwide service network of Coperion
Optimum design of the plant to meet your individual product requirements	Easy plant control by a uniform operating philosophy
Efficient, professional project execution and maximum security in costs, schedule and product quality	Numerous solutions for fast product change in production
Short project schedules	High operational reliability
Optimum linking of all process steps	Service for the entire compounding system from one supplier

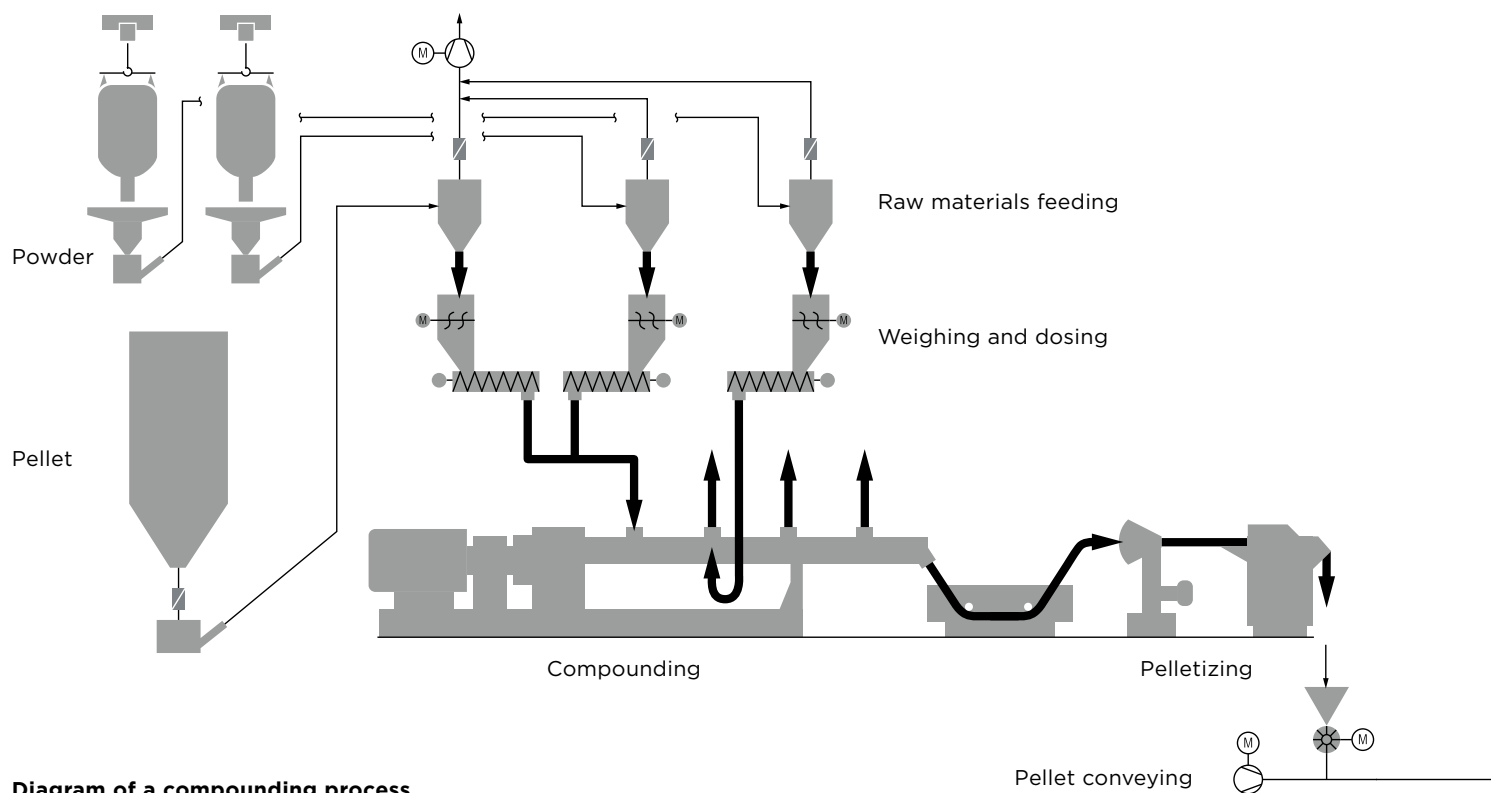
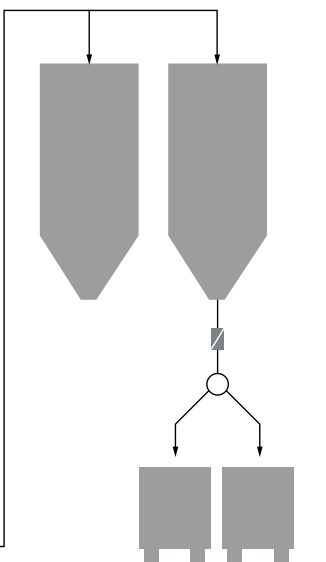


Diagram of a compounding process



Storage silos



Compounding plants in modular design - additional advantages

- › Commissioning of the plants at Coperion in Stuttgart prior to delivery
- › Sampling prior to delivery
- › Training of the operating personnel already before delivery
- › Compounding system relatively independent of the building
- › Fast installation and disassembly by modular design
- › Easy transport by road and ship

»» Our plants offer you decisive competitive advantages in a tough competitive environment. **Plastics processors all over the world use Coperion systems to produce first-class products of outstanding quality.**

No matter whether you need systems for the production of PVC dryblend, PVC compound or moulding plants - our know-how throughout all stages of the process and the experience we have in the integration of the individual stages to create an optimum system is unique on a global scale. Any company looking to satisfy the high demands of the international market needs top-class products. As your partner in the plastics

processing sector we have the know-how that empowers us to supply the right system solution for all bulk materials handling requirements. From the start of a project through to the commissioning stage we work closely with you and are always at your side with after-sales support when we hand over the keys. In addition we offer you solutions for automation, conversion, modernisation and system extension for existing plants

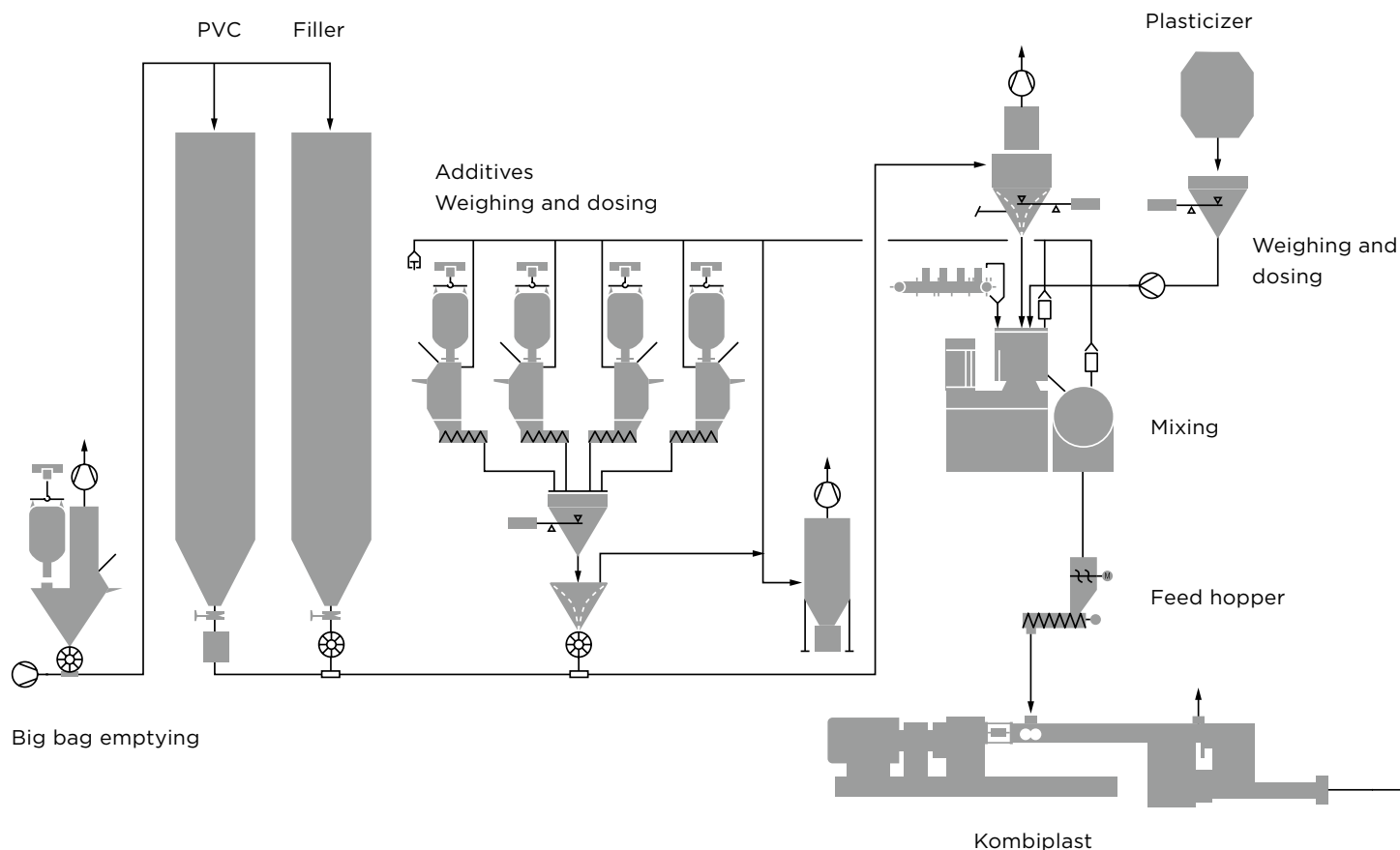


Diagram of a plastics processing process

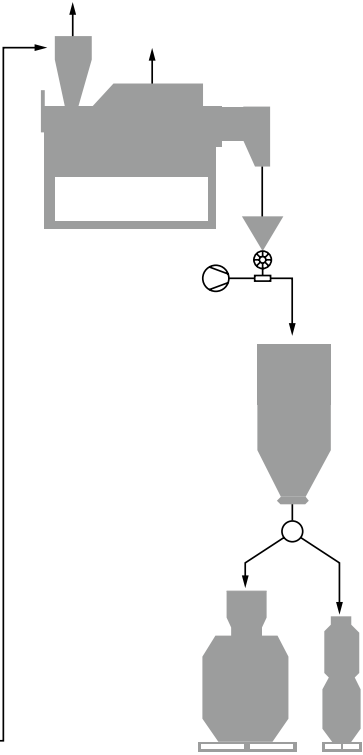
WPC - The optimum automation system for your plant

Coperion has its own WPC automation system which has proven its worth many times over in 20 years of practical operation. It was developed for processing PVC and offers you the following advantages:

- The reliability and experience of practical application in more than 150 plants
- Integration of mixer automation ensuring more reliable and transparent system operation
- User interfaces in the respective national language
- Expert hotline with 24/7 service, 365 days a year
- More than 90 percent of assignments (troubleshooting, modifications, changes to recipes...) can be completed quickly and inexpensively by means of online remote maintenance



Pellet cooler



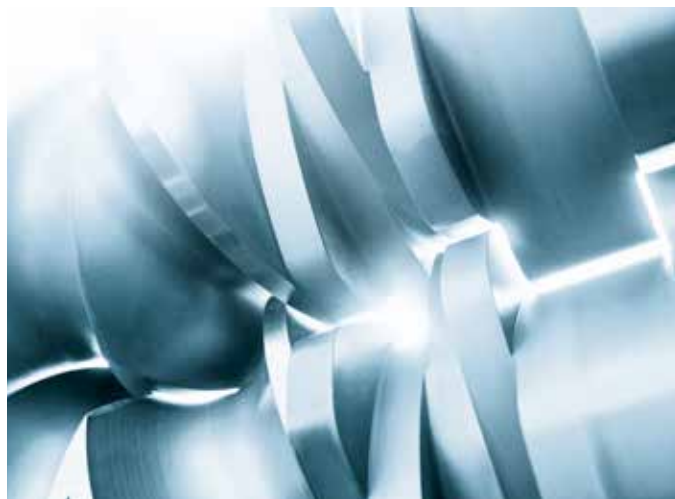
Product filling



➤ From reactor discharge to the moulding process. Coperion controls all process stages down to the last detail and specialises in integrating them to create optimum process flows.

PROCESSING, COMPOUNDING, EXTRUDING

We supply overall processing technology solutions - from raw material supply through to the complete downstream periphery. We guarantee maximum throughput of our extrusion machines and plants with maximum economy and the highest quality by ensuring individual coordination with the applications of our customers. Coperion's continuous R&D work has made the co-rotating twin-screw extruder what it is today: a top quality product which incorporates the most advanced technology. With our comprehensive product portfolio we are therefore able to satisfy the most diverse demands in an ideal manner.



THERMAL PROCESSES

Thermal treatment of the product is required in many bulk solids processing systems, which means it has to be either heated or cooled. The Coperion Bulk-X-Change® bulk materials heat exchanger is a highly-efficient, space and cost-saving device - the ideal solution for thermal treatment of the respective bulk materials in the plastics industry.



Example application for plastics (pellets and powder)

Cooling

- Cooling upstream from pneumatic conveying systems to improve the product quality
- Cooling of plastics after degassing processes (e.g. polyolefins), drying processes (e.g. polyamide, SAP powder) and crystallisation processes (e.g. PET)
- Cooling of plastics with adhesive tendencies after production processes (e.g. TPU) and after pelletisation with a short cooling section or process-related hot pelletisation water (e.g. fibre-glass reinforced products or vacuole-free pelletisation)

- Cooling of powders after production (e.g. PTA powder and other plastic powders)

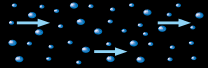

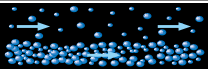









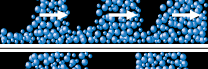

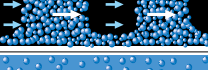

Pre-heating/thermal treatment

- Pre-heating of plastics before degassing processes.
- Thermal treatment of plastics before extrusion to improve/stabilise extrusion conditions (e.g. PET/PA fibre industry)

CONVEYING

When handling both powder and pellets a plant constructor can only design a reliably functioning and economical bulk materials handling system with in-depth knowledge and comprehensive understanding of the complex behaviour of bulk materials. Coperion meets the increasing demands with a wide

and selectively developed range of innovative conveying processes and components. Our conveying technologies are therefore already adapted to tomorrow's continuously increasing production capacities and conveying distances today.

		Type of conveying	Brand name	Speed	Products
		Lean-phase conveying	FLUIDLEAN®	25-40 m/s	Powders, fluffs, pellets
		Strand conveying	FLUIDLIFT® FLUIDLIFT® ecoblue	15-30 m/s	Powders, fluffs, pellets
		Fluid-phase conveying	SUPERDENSE®	8-20 m/s	Fluidizable powders
		Stabilized fluid-phase conveying	FLUIDSTAT®	8-20 m/s	Fluidizable powders
		Stabilized slug conveying	FLUIDSPLIT®	4-10 m/s	Non-fluidizable powders, Abrasive powders
		Slug conveying	CONTI-SCHUB®	4-10 m/s	Pellets
		Slug conveying	TAKT-SCHUB®	4-10 m/s	Pellets
		Hydraulic conveying	CONTICON®	1-5 m/s	Pellets

SEPARATING

The purity of bulk materials is a decisive factor for the quality of the end product. Irrespective of whether the assignment is to minimise attrition, clean products perfectly or to determine the degree of residual dust in line with valid standards – our solutions are an ideal combination of many years of process competence and the most advanced bulk materials know-how

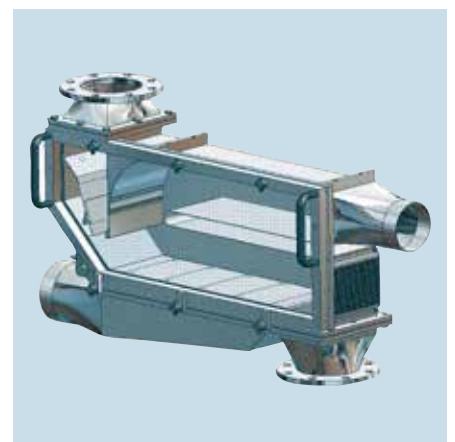
in the world. Our specialists already focus on minimising dust generation when the conveying system is being designed. Minimum conveying velocities, suitable pipe materials and connections ensure minimum attrition during production. A varied range of separator concepts are employed to suit the product properties and application requirements.



> DIVERTING COUNTERFLOW ELUTRIATOR UGS



> GRAVITY ROTATION SEPARATOR SRS



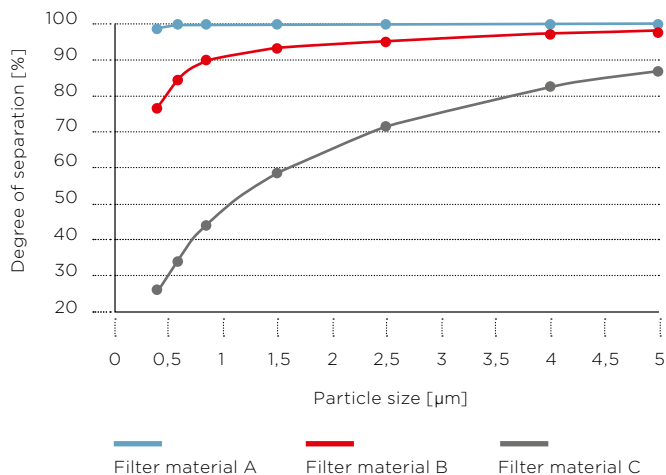
> HORIZONTAL FLUIDBED SEPARATOR HFS

CLEANING

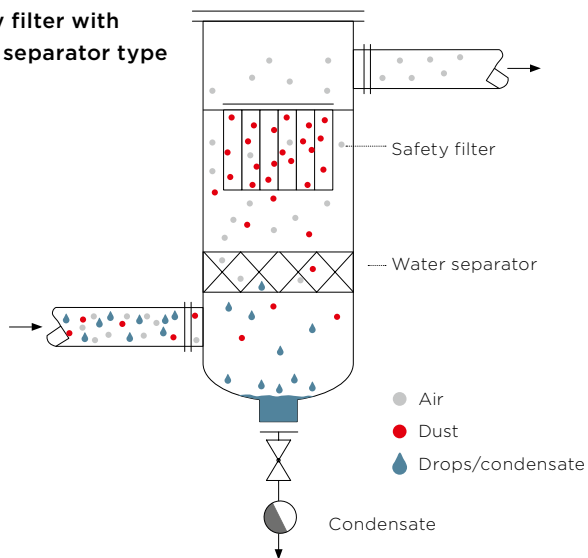
We manufacture a variety of filters and separators ourselves, and each one is just what you need. The principle in all cases is “form follows function”. As we are the quality forerunner when it comes to plant equipment, we not only develop

system components for all applications ourselves, we also know the processes behind them inside out. Our many years of experience encompass even the smallest detail, and we pass this experience on directly to our customers.

Degree of separation of filter materials



Safety filter with water separator type FD*



BLENDING/HOMOGENISATION

Homogeneity is an important quality criterion for your products. Coperion helps you to meet the highest standards. To this purpose we have developed a static homogenisation system with which the products in the silo can be homogenised

with a capacity of up to 1,200 m³. The FCB Fluid Cone Blender and the CFB Combiflow® Blender are recommended by leading companies in the plastics industry.

Filling level

Mixing procedure

Fully homogenised



»» How we are already working on the answers to tomorrow’s questions today. The plastics industry is in a constant state of flux. New materials appear on the market almost every day to satisfy increasing demands and new applications. The initial product batches discharged from the development reactors of our customers are sent regularly to the Coperion Test Centre. Here our engineers investigate the bulk material properties and determine the key data for optimum design of the production plants.

The equipment and options of our test centre are unique on a global scale. Our engineers research the behaviour of bulk materials to ensure that the latest findings are available for the benefit of our customers. Our specialists work on testing the properties of these products and their effects on the individual process stages and achieving reproducible results with a great deal of passion and enthusiasm.

Our R&D department is actually yours. Simple bulk material tests, conveying trials on an industrial scale as well as endurance and durability tests – in close collaboration with our customers we work on producing results and providing the findings for individual assignments. We are dedicated to ensuring that Coperion plants continue to prove their highest standards of economy and operational safety and reliability for a long time to come.



Your advantages:

Comprehensive test centre with more than 50 conveying and separating systems for testing bulk material properties
More than 800 m of conveying routes for trials
Conveying capacities of up to 200 t/h
Archive with more than 10,000 bulk materials samples
Incorporated laboratory for fast analysis of test results



»» Components from our own blueprints. Our products incorporate decades of know-how and experience, and it is not surprising that they are appreciated and renowned as absolute premium-quality devices in the plastics industry.

Our customers benefit from our plant engineering experience with every single Coperion component.

Our product portfolio:

Extruders/Compounders
Rotary valves
Diverter valves
Shut off valves
Separators
Blenders
Filters
Bulk materials heat exchangers
... and a comprehensive range of other components



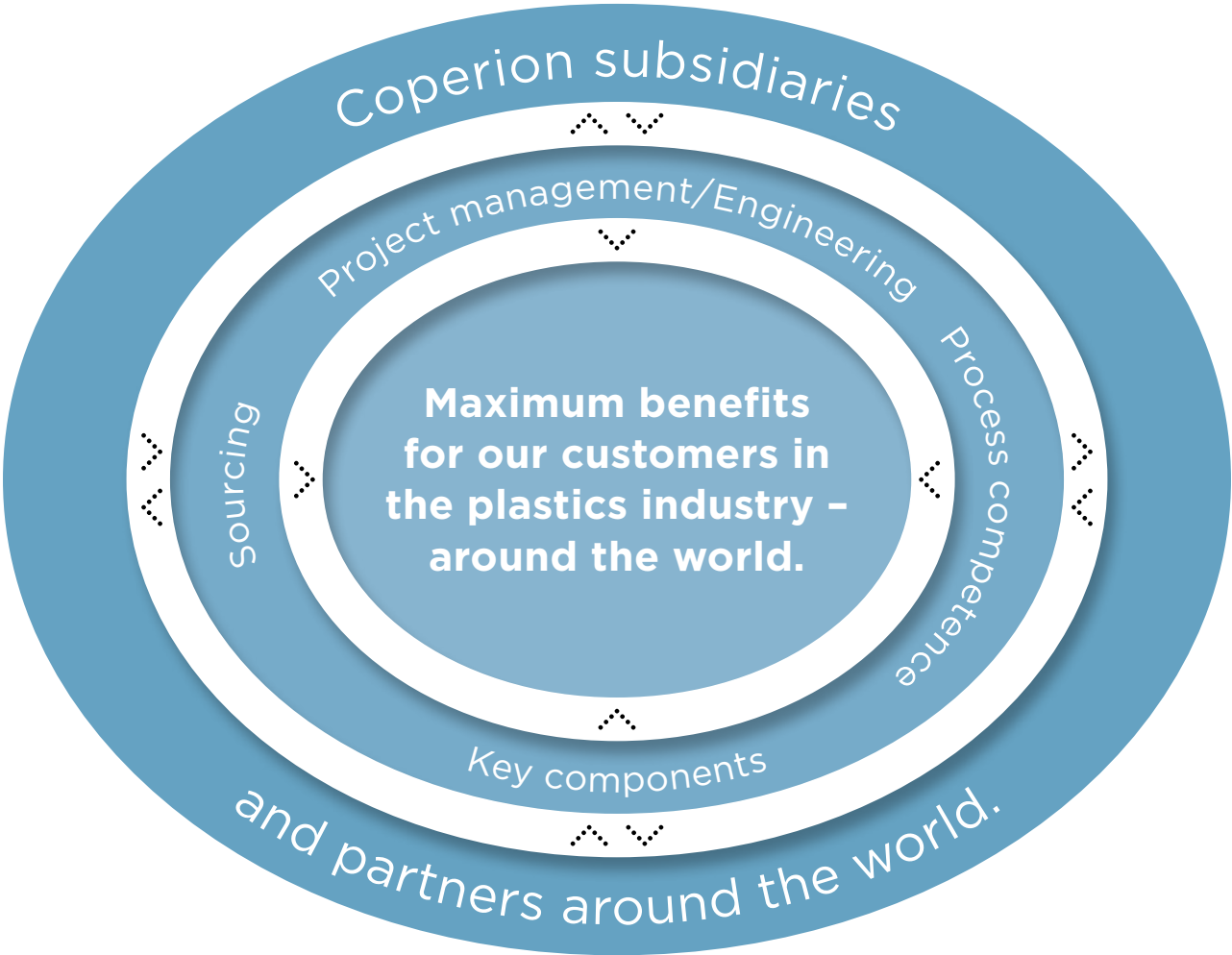
»» Global presence is good – global competence is better. You too can benefit from the know-how of a world-wide market leader. Profit from our global competence. This is subject to constant further development and we make sure we are where our customers are investing their money.

A powerful network which is strong on service

Coperion offers its customers perfect interaction of a wide range of products, the very highest degree of technical process expertise and technological advice. Our extensive experience in bulk materials handling, our global, closely-meshed service network and familiarity with local specifics which has grown over decades means that confidence is quickly placed in our skills all over the world.

Intercultural competence

In addition to our German headquarters Coperion has highly-qualified interdisciplinary and intercultural engineering and project management teams in China, India, Italy, Singapore and the United States. The most valuable dimension of this world-wide presence of a global player is still proximity to our customers. Wherever you invest your money – you can be sure of competent local support from the Coperion team around the world. **That’s what we mean when we say “confidence through partnership”.**



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