Ingtec Technik AG

Plant Engineering – Mechanical Engineering – Technical Engineering

Ingtec Technik AG

Company History

- *Since 1976 we are in the business fields of plant -, mechanical - & technical engineering.*
- *In 2012 spin-off of the owners with a new founding of Ingtec Technik AG as a specialised company working in the field of high viscous materials, such as Silicones, Adhesives, energetic materials etc.*
- *The target was and is to become the market leader world wide for the mentioned applications.*

Ingtec Technik in a nutshell

Starting out with more than 44 years of experience in mixing and agitation technology, Ingtec Technik developed into its present focus application: Compounding of high-viscous products.

Our top quality machines and plants are employed in sensitive industries like the automotive and aerospace industry. Also other industries rely on our products in the manufacturing of state of the art systems. Ingtec Technik AG is proud to be among the chosen few world-class suppliers for materials with a very high viscosity.

We also offer our services as general contractor in planning, design and assembly of entire plants. Our services include the construction of the machines, process automation, raw material handling and post processing steps.

We can cover greenfield development and we can implement our equipment solutions into existing infrastructure.

With our swiss-made technology you achieve superior quality for your products. Do not hesitate to challenge our performance and contact us with your special construction application.

Ingtec Technik AG

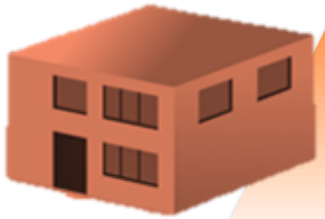
Ingtec Technik Project Network

Client

- *One shop stop solution for our clients*
- *Total Customer Orientation*
- *Maximum Flexibility*
- *Small, High-Performance Organisation*

Long-Term Partnerships

- *Excellence in Manufacturing*
- *State of the art Production Facilities & Technologies*



Ingtec Technik AG

- *Plant Layout*
- *Engineering*
- *Software Design*
- *Project Management*
- *Sourcing*
- *Quality Control*
- *After Sales Service*

Mechanical Manufacturing Partners

Fields of Activity

Fluid Handling

- *Mixing and Dispersion Technology*
- *Mixing and Storage Vessels*
- *Filling and Dosage Technology*
- *Turn-Key Plants*

Bulk Material Handling

- *Storage Silos*
- *Pneumatic Conveyor Systems*
- *Mechanic Conveyor Systems*
- *Weighing and Dosage Systems*
- *Dust containment & Removal*

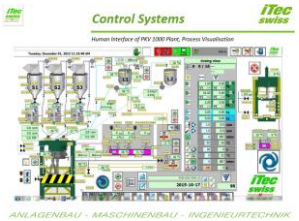
Control Systems

- *Programmable Logic Controller*
- *Parameter Trending and Recording*
- *Process Visualisation*
- *Formulation Management*
- *Integration into superior Control Systems (SCADA, MES, ERP)*
- *Process Control Systems (PCS)*
- *Instrumentation and control engineering*

We are active in several industries:

- ***Construction Materials***
- ***Paints & Coatings***
- ***Food & Feed***
- ***Mineral Products***
- ***Chemical Industry***
- ***Adhesives & Sealants***

and more



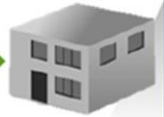
Plant Engineering – Mechanical Engineering – Technical Engineering

Fields of Activity

Ingtec Technik AG, Your partner for challenging tasks and implementations.

Ingtec Technik Project-Network

Customer



Core compentencies

- Productionlayout
- Engineering
- Software Development & Design
- Projekt Management
- Purchasing
- Qualitycontrol
- After Sales Services

- Single source solution
  Only one contact point
- Complete focus on customers
- Very high flexibility
- Small and high efficient organisation

Longterm partnerships

- High precision manufacturing
- Production-technologies on the latest state of the art

Manufacturing-Partners

Colour- and Lacquer-Industry

Multimix
Labor Reaktor-Planetary-Mixer

Automotive-Industry

Labor Dispermill Discovery

Planetary Kneader Vertical PKV

From the lab- up to the production equipment,

from the simple Dissolver to the high complexity of a production site

Ingtec Power Extruder TS 60

Industry for energetic Materials

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Plant Engineering – Mechanical Engineering – Technical Engineering

Process Technology

Batch-wise or continuous Processing?

Mixing and compounding are among the most widespread technological processes. Whenever planning equipment for a mixing process, the first decision for the user to take is which processing principle should apply: Batch-wise or continuous processing.

Traditionally, the starting point is batch processing. But especially mixing tasks are often designed as continuous processes. Ingtec Technik offers solutions for both categories, also for special applications like energetic materials.

Some basic criteria, which may help to decide which technology is suited best for a given task:

PROCESS	Batch-wise		Continuous	
Process Flexibility	++	**Excellent – Multi-Purpose Plant**	-	Dedicated Equipment
Product Quality	-	Fluctuating	+	More Constant
Raw Material Supply	+	Simple	-	Complex
Large Scale Production	-	More difficult with scale	++	**Excellent**
Slow Processes	+	Suitable	-	Difficult (short residence time)
Set-up Time	-	For each batch	+	Only once per run
Processed Volume	-	= Batch Size	+	Small
Application of Energy	-	Low	+	High
Investment	+	Low	-	High
Manpower	-	High	+	Low
Process Automation	+	Low Level feasible	-	High Level mandatory
Start-Up/Shut-Down Procedure	+	Short	-	Complex
Maintenance	+	Relatively simple	-	Complex
Process Safety	-	More difficult with scale	+	Excellent

Process Technology

When processing high-viscous materials, with mechanical sensivity of the material against impact and friction is a critical factor in process design.

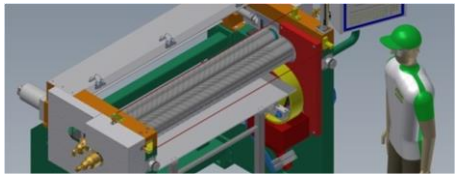
Typically, compounding of materials is performed batch-wise on vertical kneading machines of the PKV type.

Advantages of the PKV:

- *Small but well defined distances of the mixing blades, hard contact of mixing tools or vessel is impossible*
- *Product does not get in contact with shaft sealings of the kneader*
- *No dead zones – The entire useful volume is worked by the mixing blades*
- *Amount of shear is well controlled by the torque, applied*
- *Vacuum degassing*
- *Ingtec Technik exclusively uses hydraulic drives in environments, where explosive atmospheres may occur.*

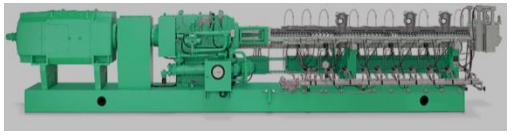
Nevertheless, with increasing batch size, perspective may change:

- *The increasing potential risk of large batches needs to be taken into consideration*
- *Heat exchange is getting slower with increasing batch size*



When processing high-viscous materials, there is also demand for continuous equipment. Ingtec Technik provides two major technologies for continuous processing:

- *Atextruder and*
- *Twin Screw Extrusion*



The outstanding advantage of continuous processing is the comparatively low residence time of the product in the machine.

Fluid Handling

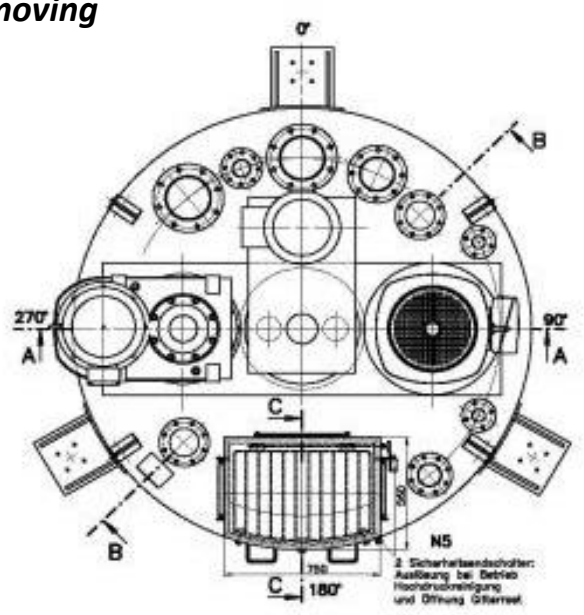
Mixing & Compounding – The basic Process

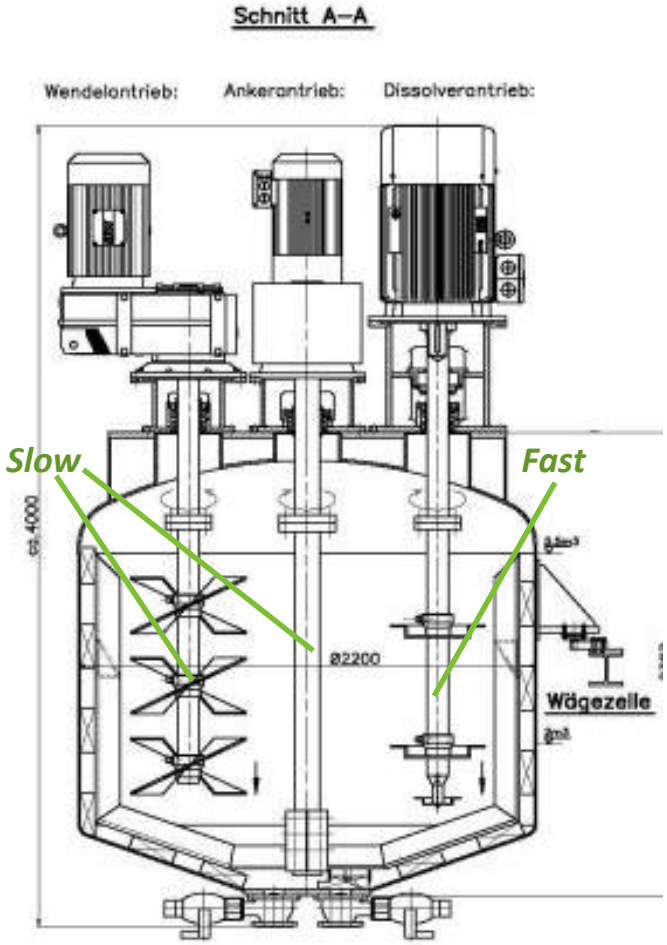
Low and Middle Viscosity

Agitators and Mixing Vessels

Slow moving

Fast moving



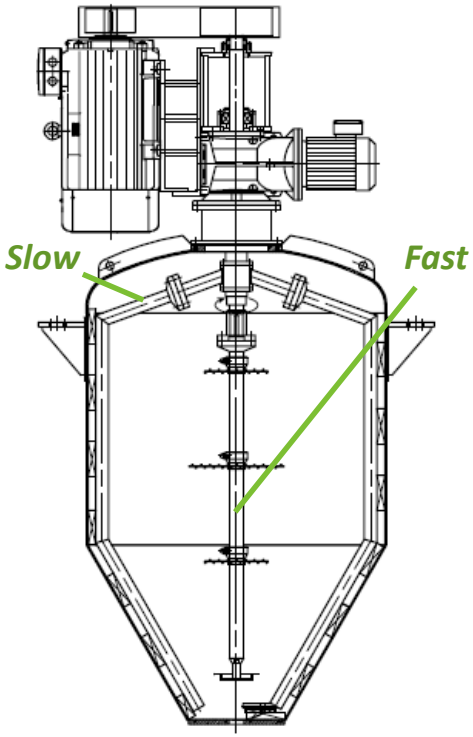


5000 L Mixing Vessel for the Production of Emulsion Paint & Plaster Production, Bosshard AG, Switzerland

Fluid Handling

3500 L Mixing Vessel for the Production of Emulsion Plaster Production, Austria

Fluid Handling



3000 L Conical Shaped Co-axial Mixer KDA for Emulsion Paints and Plasters, Greutol AG, Switzerland

Laboratory Dissolver

Basketmill model	Batch range	Power		Bead charge	Screen
Micromill	750 ml till 2 litre	0,75 kW	1.0 HP	50 ml	0.27 / 0.50 mm
Quartermill	4 till 8 litre	2,20 kW	3.0 HP	180 ml	0.27 / 0.50 mm

A Basketmill combines mixing and milling achieving optimum particle size distribution, increasing production efficiency, and producing extraordinary quality and contribution to profit. Immersion milling is a revolution in processing technology that defies comparison. Its unique design and method of operation surpass all other systems, enabling the entire milling process to take place within a single water-cooled milling chamber. The Patented system uses circulation milling technology by rapidly pumping the slurry through the media field.

The patented basket guarantees an optimal flow and eliminates any possible 'dead-zones'. To accommodate the diversity of product range different baskets are available. Standard upon delivery are 1 basket with 1 screen slot size 0,27 or 0,5 mm. Other sizes can be delivered upon request.

MEDIA SELECTION

All kinds of milling media are applicable from 0,5 up to 2,0 mm in diameter but should be taken with care. The selection and matching of the media choice is still important. Our recommended beads are good for 10000 milling hours.

Dispermill Discovery® 100 with Rotor Stator

Milling system / Basketmill
This Patented system uses circulation milling technology by rapidly pumping the slurry through the media field.

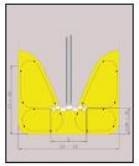
Dispermill Discovery® 100 with Basketmill

CORRECT USE OF THE DISSOLVER

Best results will be achieved by following the guide dimensions as shown in the illustration. The peripheral speed (Tip speed) of the disc should reach 18-22 m/sec. The shaft speed and Tip speed is shown on the display. After premixing raw materials increase the shaft speed till no product is on the vessel wall and the top of the dissolver disc is visible 'Doughnut-flow pattern'.

Dispersing of solid particles into fluids. Dispersing is a process to move and separate an agglomerate particle into smaller particles. The object is to disperse the agglomerate particles into their primary particle size.

Vacuum system for Dispermill® (optional). Several products require processing under vacuum. For this purpose we supply an additional vacuum kit which is easy to fit onto Dispermill®



Vortex or Doughnut pattern
- Guide Dimensions for good dispersion results.
- Peripheral velocity or Tip speed must be 20 m./sec.

Controls of Dispermill®, detail of the functions:
- Digital read out of Speed
- Digital read out of Time
- Countdown Timer
- Automatic Stop
- On/Off Light Buttons
- Adjustable Speed starting from 0 RPM

Dispermill Discovery® 100 with Vacuumunit

Dispermill® Orange

Dispermill® X-proof 150

Dispermill® Pilot Dissolver

CHOOSING THE RIGHT DISSOLVER

With a worldwide network of distributors in more than 25 countries, we are able to provide you locally:

- Personal advice on processing techniques that suits you best.
- Test and demonstration possibilities.
- Fast delivery.
- Excellent after sale service for all our products.
- 24 hour service for spare parts.
- Worldwide warranty.

For carrying out of trials or demonstration with your own product we always have several test machines available. Please contact your local Dispermill® agent for advice, or give us a call.

APPLICATION FIELDS, FOR EACH PROCESS THE RIGHT SOLUTION

Paints, Floor coatings, Ceramics, Colorants, Automotive coatings, Inks, Sealants, PVC liquids, Aerospace coatings , Industrial coatings, Resin, Putties, Decorative coatings, Textile, Additives, Wood coatings, Plasters, Stuco / Wall paints and Adhesives.

Dispermill Discovery®-Line

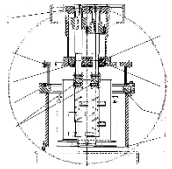
Model	Vessel size	Power		Adjustable Speed	Dissolver Disc	Speed Readout	Torque	Voltage	Dimensions w x d x h	Weight
Orange-line	0.2 till 2 litre	0,30 kW	0.4 HP	0 - 10.000 rpm	40 mm	Yes	0.5 Nm	230 Volt, 50/60 Hz	500 x 360 x 710 mm	25 kg
Discovery 100	0.5 till 10 litre	0,75 kW	1.0 HP	0 - 12.000 rpm	70 mm	Yes	1.3 Nm	230 Volt, 50/60 Hz	490 x 485 x 991 mm	55 kg
Discovery 200	1 till 25 litre	1,50 kW	2.0 HP	0 - 10.000 rpm	90 mm	Yes	2.7 Nm	400 Volt, 50/60 Hz	506 x 485 x 1276 mm	68 kg
Discovery 300	1 till 25 litre	2,20 kW	3.0 HP	0 - 4.500 rpm	100 mm	Yes	7.6 Nm	400 Volt, 50/60 Hz	506 x 485 x 1276 mm	70 kg
Dispermill® Pilot Dissolver	50 till 150 litre	5,50 kW	7.0 HP	0 - 4.000 rpm	125 mm	Yes	7.6 Nm	400 Volt, 50/60 Hz	750 x 610 x 1900 mm	125kg

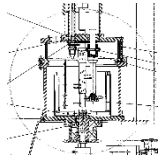
*Other dimensions and powers available on request

Dispermill® X-Proof (ATEX) Versions with frequency inverter

Model	Vessel size	Power		Ajustable Speed	Dissolver Disc	Speed Readout	Torque	Voltage	Dimensions w x d x h	Weight
X-proof 075	0.5 till 8 litre	0,75 kW	1.0 HP	200 - 5.000 rpm	70 mm	Yes	1.3 Nm	400 Volt, 50/60 Hz	500 x 325 x 1060 mm	58 kg
X-proof 110	1 till 25 litre	1,10 kW	1.5 HP	200 - 10.000 rpm	80 mm	Yes	3.6 Nm	400 Volt, 50/60 Hz	510 x 370 x 1350 mm	85 kg
X-proof 150	1 till 25 litre	1.50 kW	2.0 HP	200 - 4.000 rpm	90 mm	Yes	7.3 Nm	400 Volt, 50/60 Hz	510 x 370 x 1350 mm	70 kg
X-proof 220	1 till 25 litre	2,20 kW	3.0 HP	200 – 4.000 rpm	100 mm	Yes	7.3 Nm	400 Volt, 50/60 Hz	510 x 370 x 1350 mm	95 kg
Dispermill Pilot Dissolver X-proof HX-220/400	20 till 150 litre	2.20/4.0 kW		200 – 4.000 rpm	150 mm	Yes	7.3 Nm	400 Volt, 50/60 Hz	750 x 610 x 1759 mm	130 kg

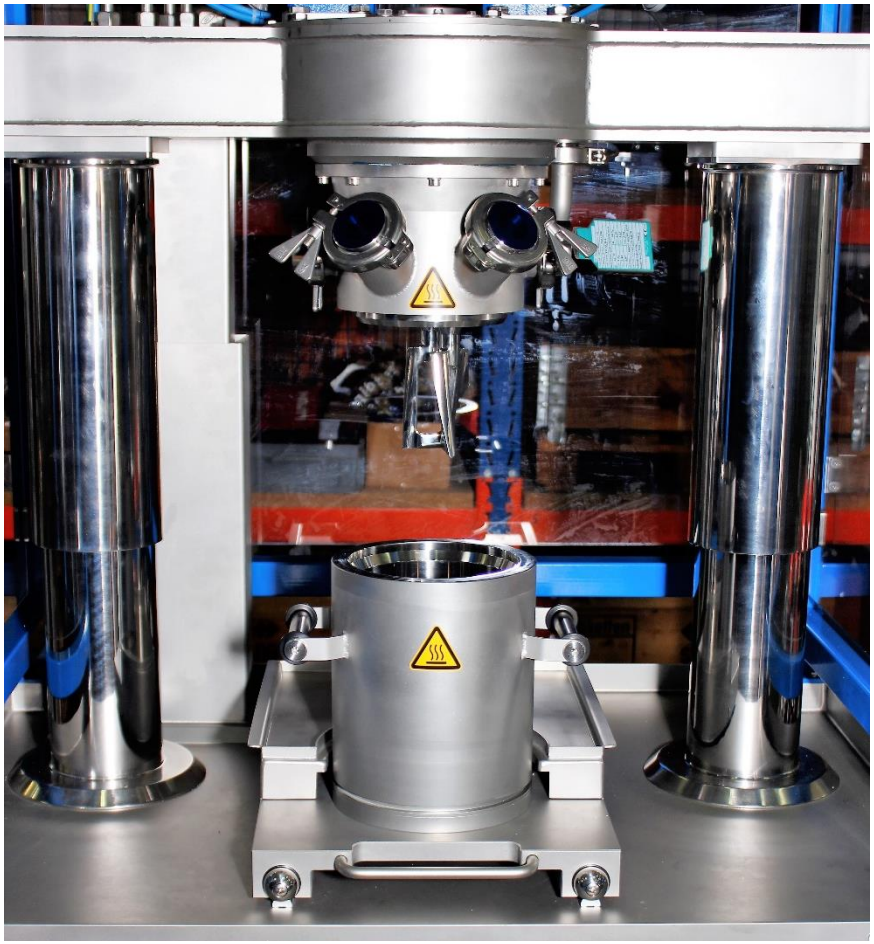
Laboratory Reactor Multimix





Plant Engineering – Mechanical Engineering – Technical Engineering

PKV for Laboratory



Plant Engineering – Mechanical Engineering – Technical Engineering

Equipment for Laboratory R&D
IPE-TS 20 Twin Screw Extruder

Powder Dosing System

High-precision differential dosing scales have been developed by Ingtec Technik AG specifically for difficult powders.

Our focus in development work was not only on the demand for a high-precision weighing process, but also on powders that are difficult to feed.
We have developed a method for making difficult-to-feed powders flow, without using conventional conveying elements, such as e.g. screw elements, which can cause blockages everywhere and are difficult to clean.

Our answer is the 3D impulse technology, which we developed to practical maturity.

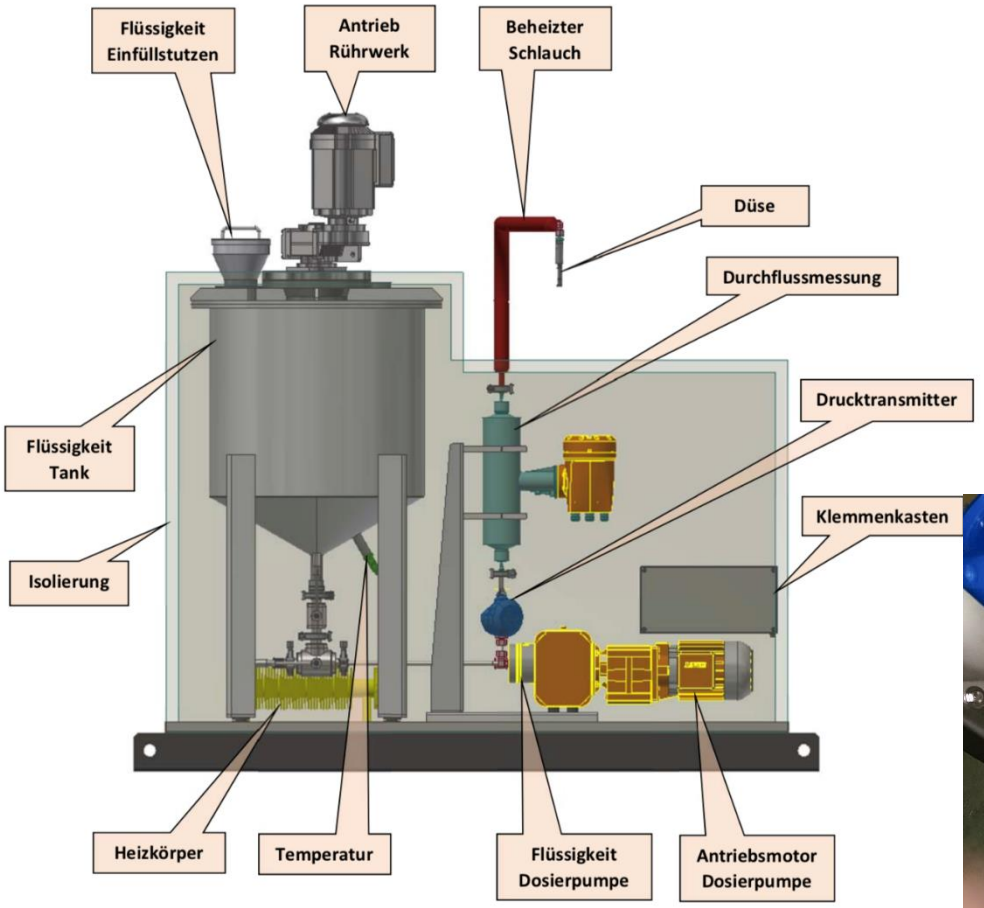
We are now unrivalled in the combination of 3D pulse technology with a precise weighing technology capable of metering difficult materials through a closed channel. No screw elements, thus optimal easy cleaning. All product wetted parts in stainless steel.

Perfectly suited for high-volume dosing processes such as in the food and pharmaceutical industry and related fields.

Version also available for ATEX - Zone 21/22.

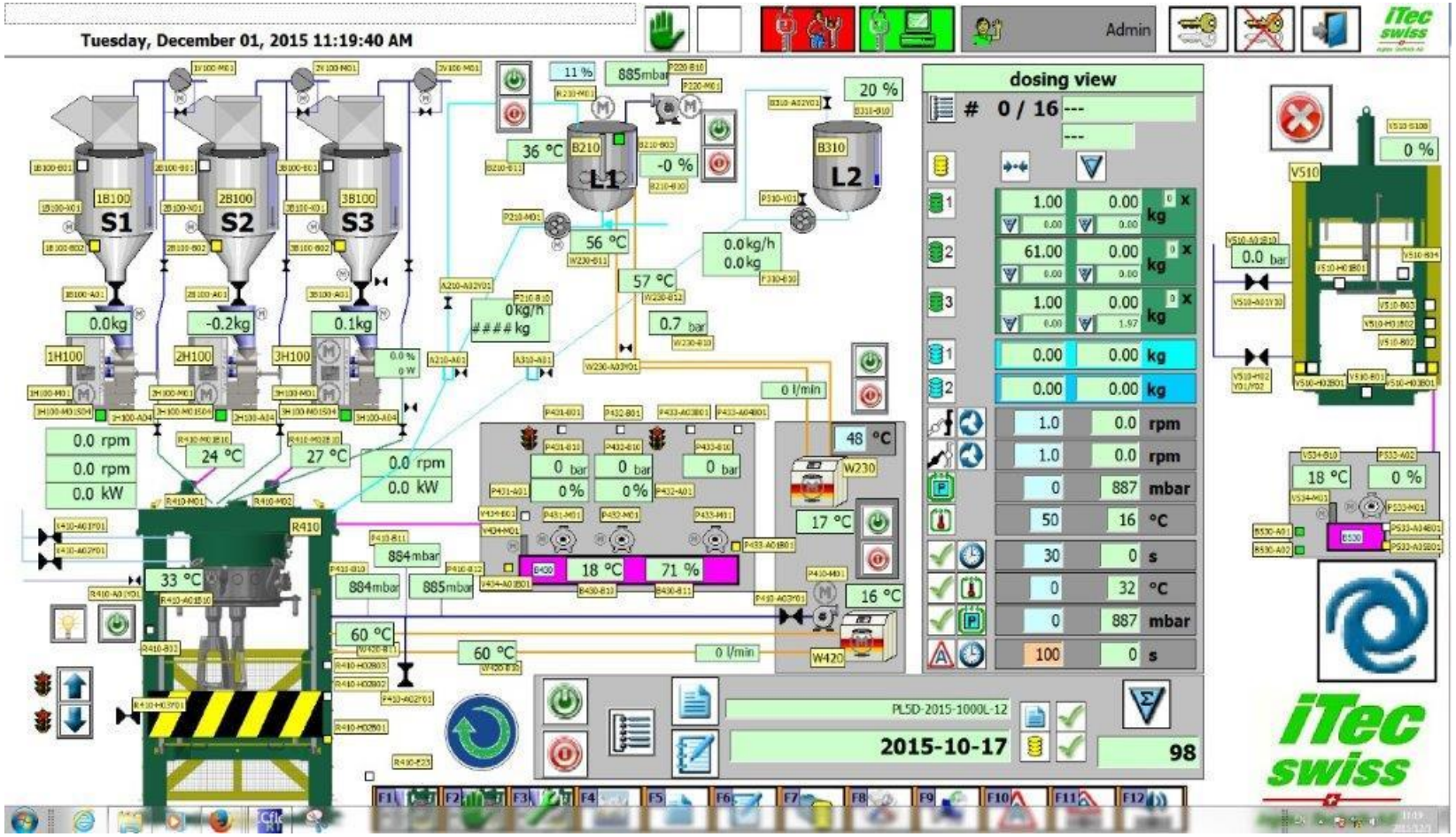
- Highly dynamic dosing system
- Suitable for light / heavy flowing bulk solids
- Stainless steel – execution
- Very easy to clean
- Change vessel for product change
- 3D pulse technology, thus no additional dosing tools required.
- Compact, modular design
- Open control based on PLC
- Optional process control system

Liquid Dosing System



iTec Control Systems

Human Interface of a PKV Plant, Process Visualisation



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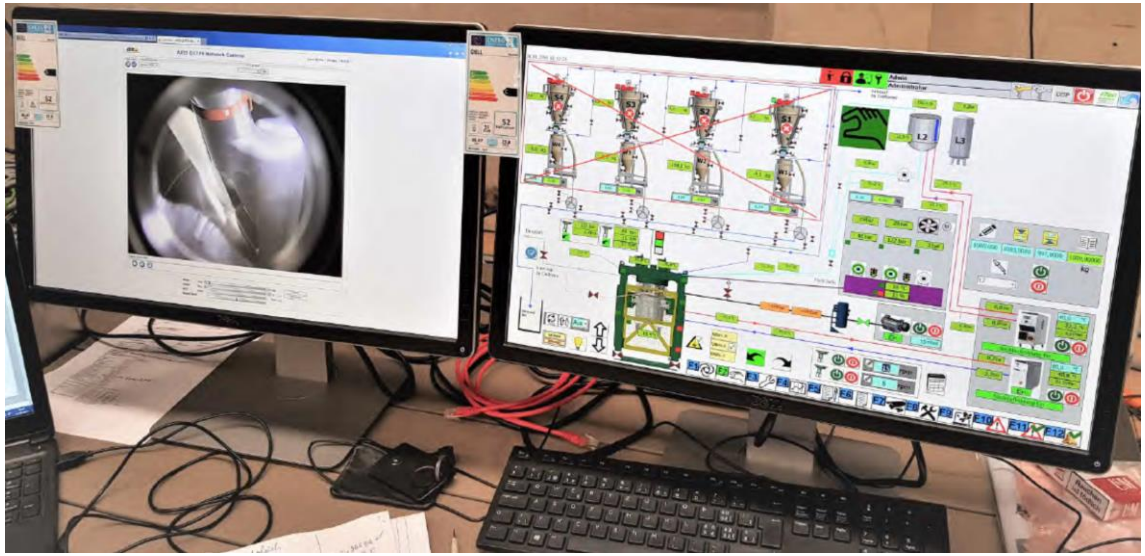
iTec Control Systems

PLC with visualisation

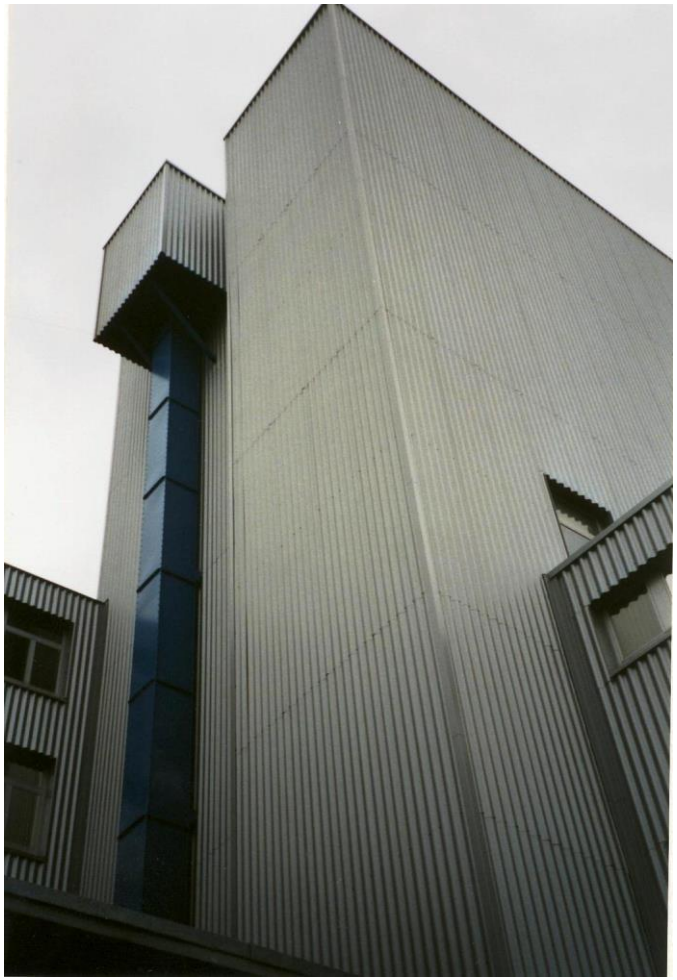
Control in Remote Control Room



Local Panel

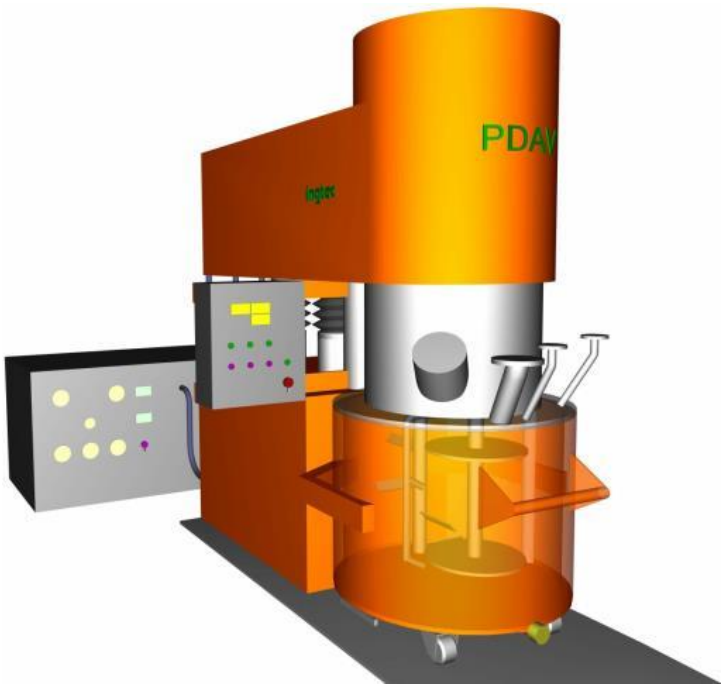
Planning to Reality

3500 L Mixing Vessels on previous slide are part of:



Production Plant for Emulsion Plasters, incl. Bulk Material Handling, Saint-Gobain AG, Switzerland

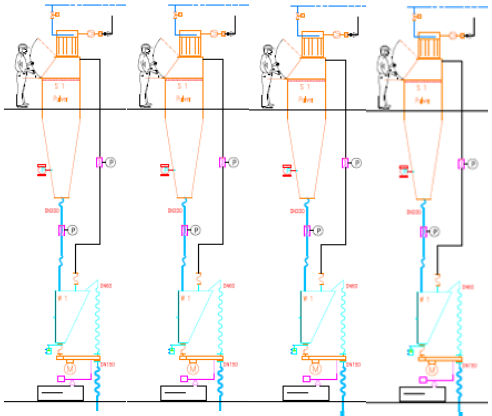
Planning to Reality



Vertical Planetary Mixer 1000 L for Automotive Adhesives, Dow, Germany

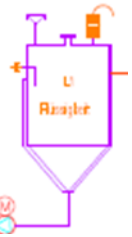
Flow chart:
Planetary Kneader Vertical

Dosing solids



Powdermixing

Dosing liquids

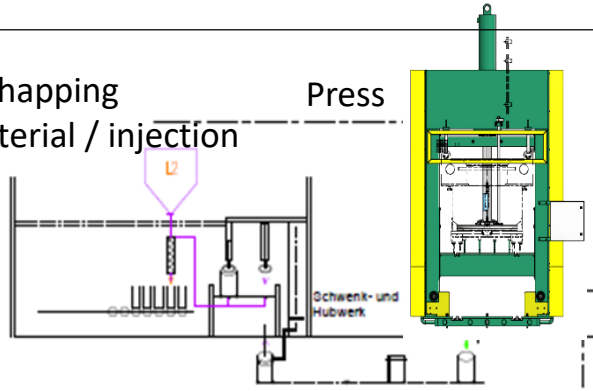


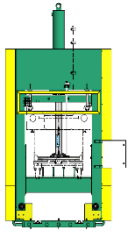
Premix and dosing

Planetary Kneader Vertical PKV

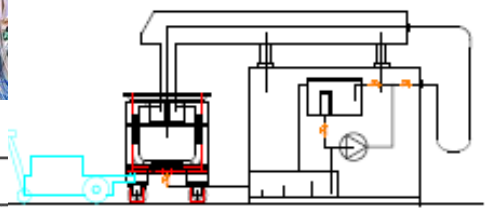
Forming/shapping
of cast material / injection

Press





Cleaningsystem for shovels



Cleaningsystem for vessels

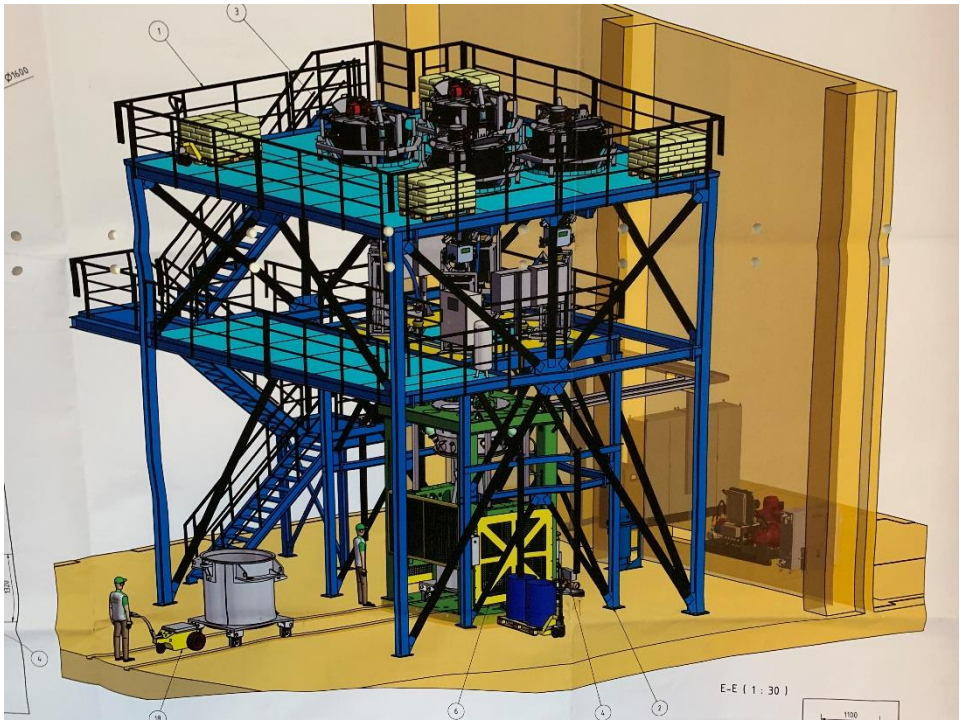
Impressions

PKV 1000 Plant, high-viscous materials, incl. Bulk Material Handling and Discharge Press

Discharge Press

Impression of a PKV 2000 Kneader

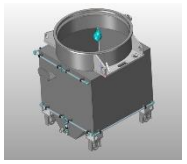
Impressions PKV

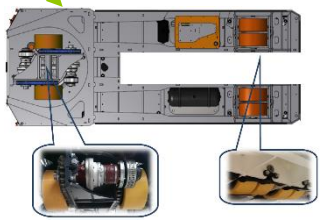


System Options PKV

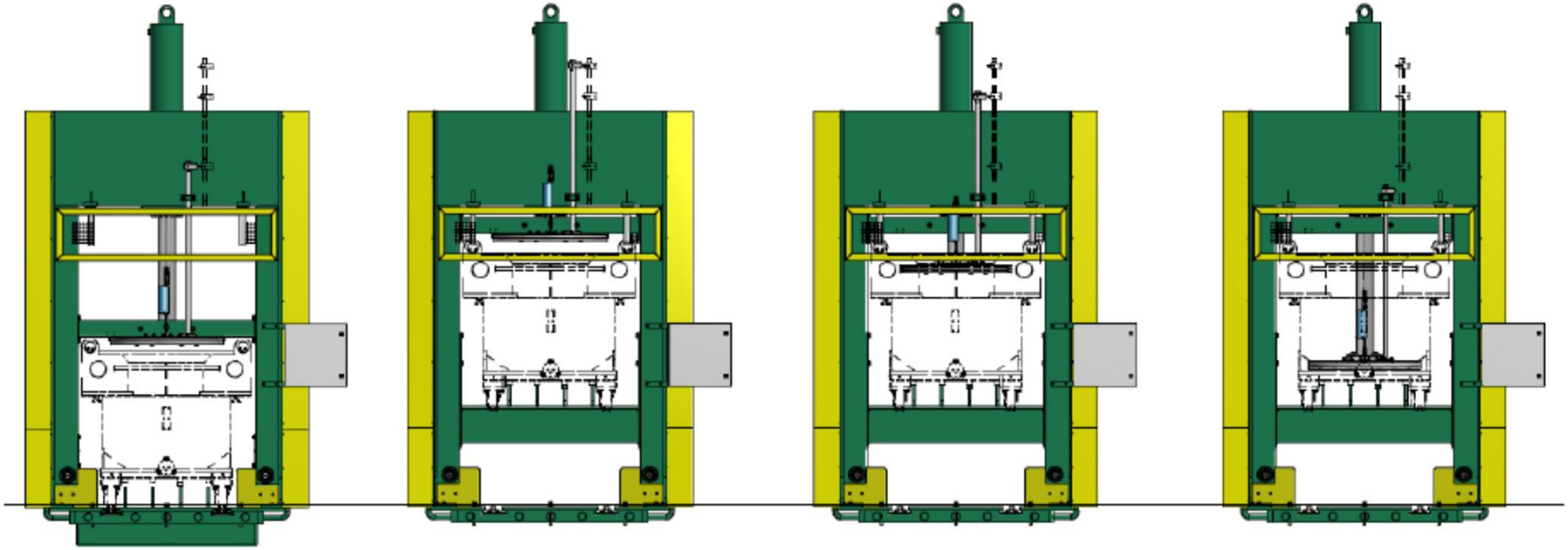
Options

- ***Gravimetric feeders with day bins for:***
  - ***solid raw materials***
  - ***liquids***
  - ***Control to gravimetric feeders***
- ***Steel structure***
- ***Discharge press***
- ***Trough cleaning machine***
- ***Cleaning in place***
- ***Extra troughs***
- ***Mover for troughs***
- ***Automatic Ingtec Transport System "ITS"***
- ***Inert gas station (Nitrogen or Argon)***
- ***UPS (Uninterrupted Power Supply)***

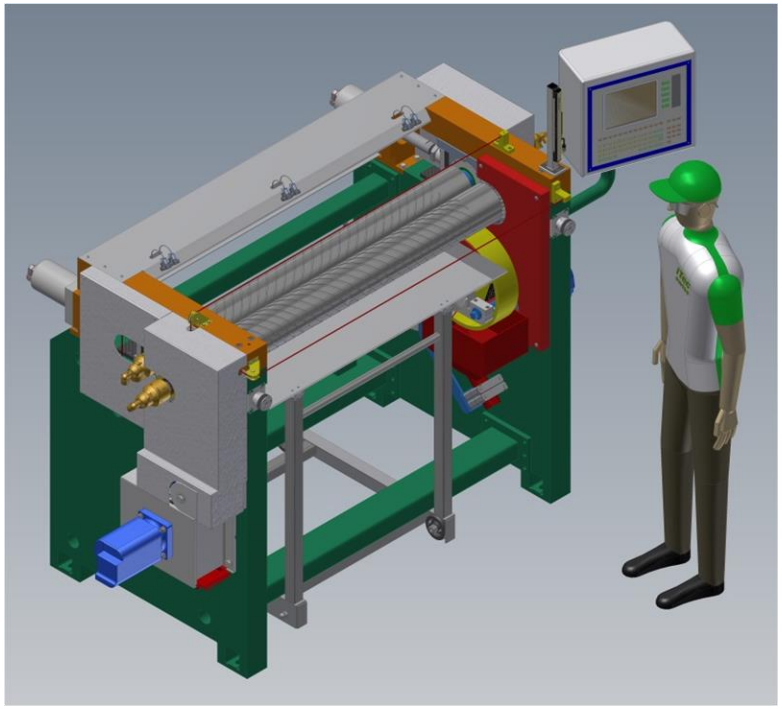




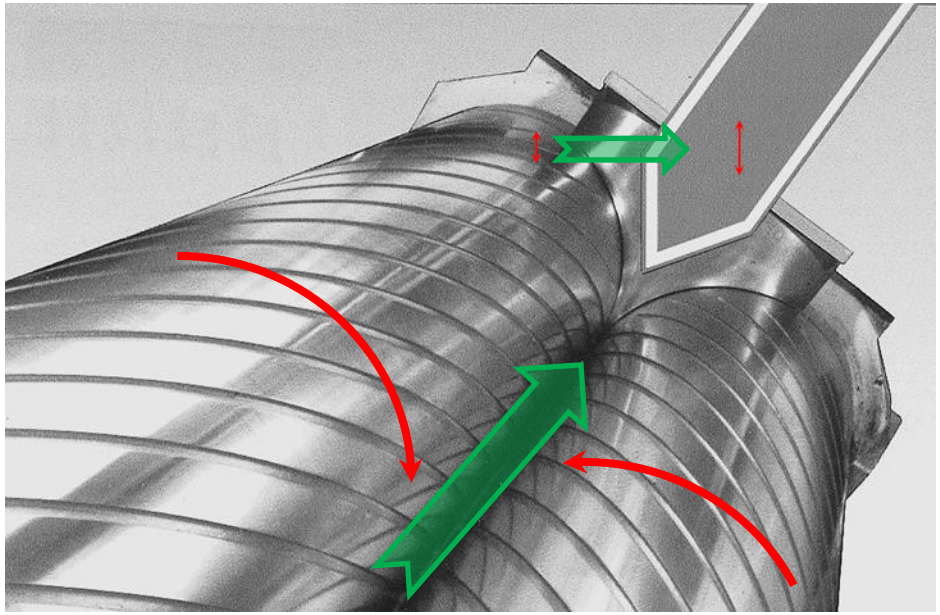
System Option
Discharge Press



Atextruder ATE

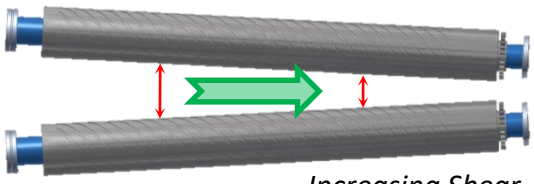


Atextruder ATE

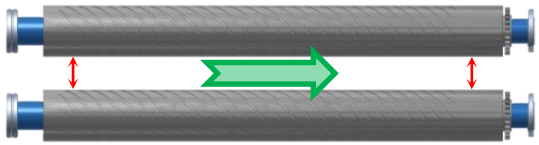


Rotation of grooved Rollers (red) and Material Flow (green)

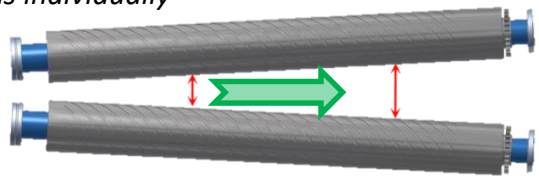
Roller Gap adjustable between 500 - 5000 µm on both ends individually



Increasing Shear



Constant Shear



Decreasing Shear

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ATEXTRUDER ATE

Atextruder Models

There are three sizes of Atextruders available. They cover laboratory development, pilot plant stage and commercial processing.

Type	**Production capacity**	***Operating level***
ATE 100	3 to 30 L/h	*Laboratory*
ATE 200	15 to 150 L/h	*Pilot plant*
ATE 300	75 to 500 L/h	*Production*

Typical PBX product felt on the rollers of an Atextruder

The installed drive performance is between 20 to 90 kW, depending on type and application.

Further specifications, like

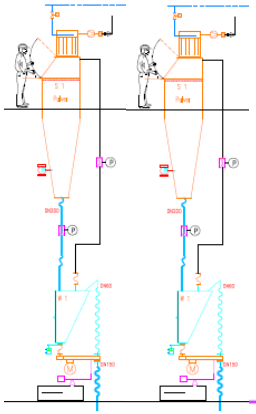
- Typical application and operating environment
- Surface quality of the rollers
- Type of output system
- Type of drive
- Type and number of feeders

will be discussed with the client individually.

Flow-chart of iTec Twin Screw Extruder

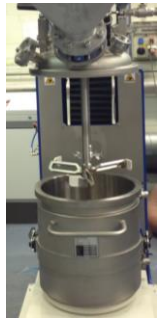
Dosing solids

Powdermixing

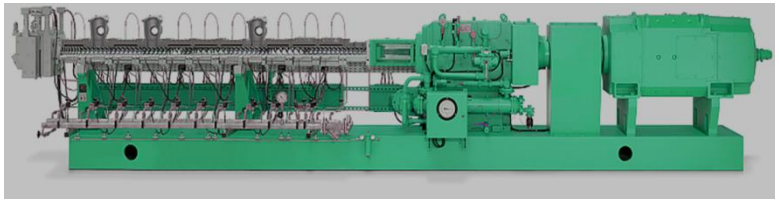


Dosing liquids

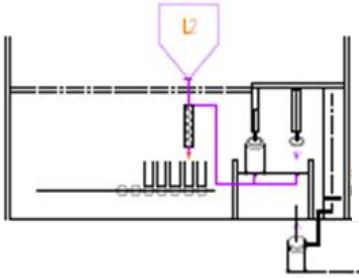
Premix with dosing



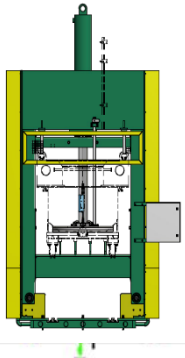
Twin screw extruder IPE-TS



Forming/shaping/injection



Press



Compound

Equipment for Production
IPE-TS 60

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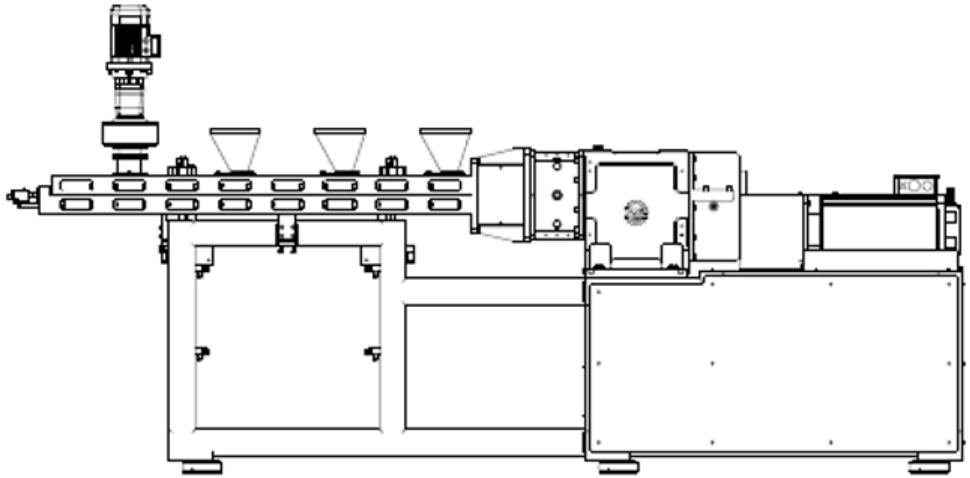
Technical Data of IPE-TS



Type	Screw-Ø mm	Flight depth	Screw speed rpm	Drive power kW	Torque Nm	Axis height mm
IPE-TS 20	20	7.5	200	3,6	2 x 80	1140
IPE-TS 60	60	13.1	200	50	2 x 1100	1200
IPE-TS 98	98	21.7	200	100	2 x 4200	1400
IPE-TS 125	125	27.5	200	220	2 x 10000	1400

Semi-continuous production

Mixing & Compounding – The basic Process

Low and Middle Viscosity

Agitators and Mixing Vessels

Slow moving

Past mix (semi-continuous)

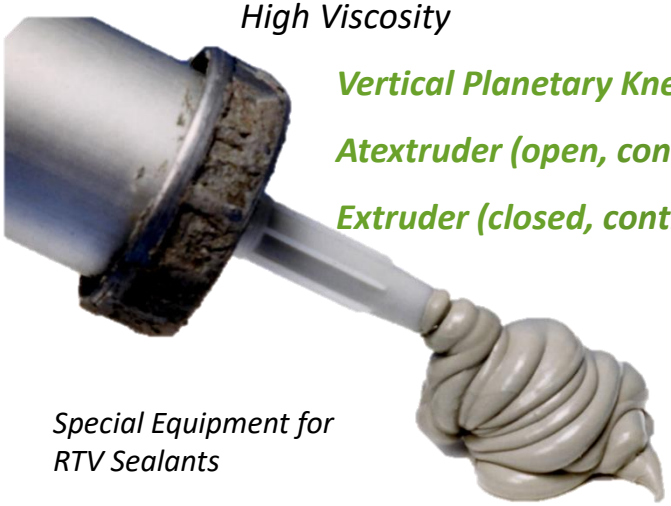
Fast moving

High Viscosity

Vertical Planetary Kneader PKV (batch)

Atextruder (open, continuous)

Extruder (closed, continuous)



Special Equipment for RTV Sealants

PAST mix 1000L for RTV Sealant Manufacturing, Sika AG, Germany

Thank you for your kind attention.

Ingtec Technik Team