

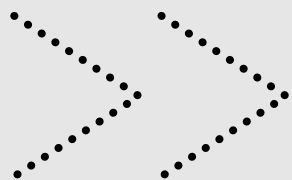


coperion

Compounding Solutions for an Optimized Productivity

Roadshow Vietnam Nov 2024

Gavin Wang | Sales Director | Coperion



1

Introduction of Coperion Nanjing & STS developments

2

How to build a high quality twin screw extruder

3

CTE PLUS: Perfect combination of German quality mindset and Chinese innovation.

4

Masterbatch & PVC cable compound

Introduction of Coperion Nanjing



Founded: 2004

Employees: 270+

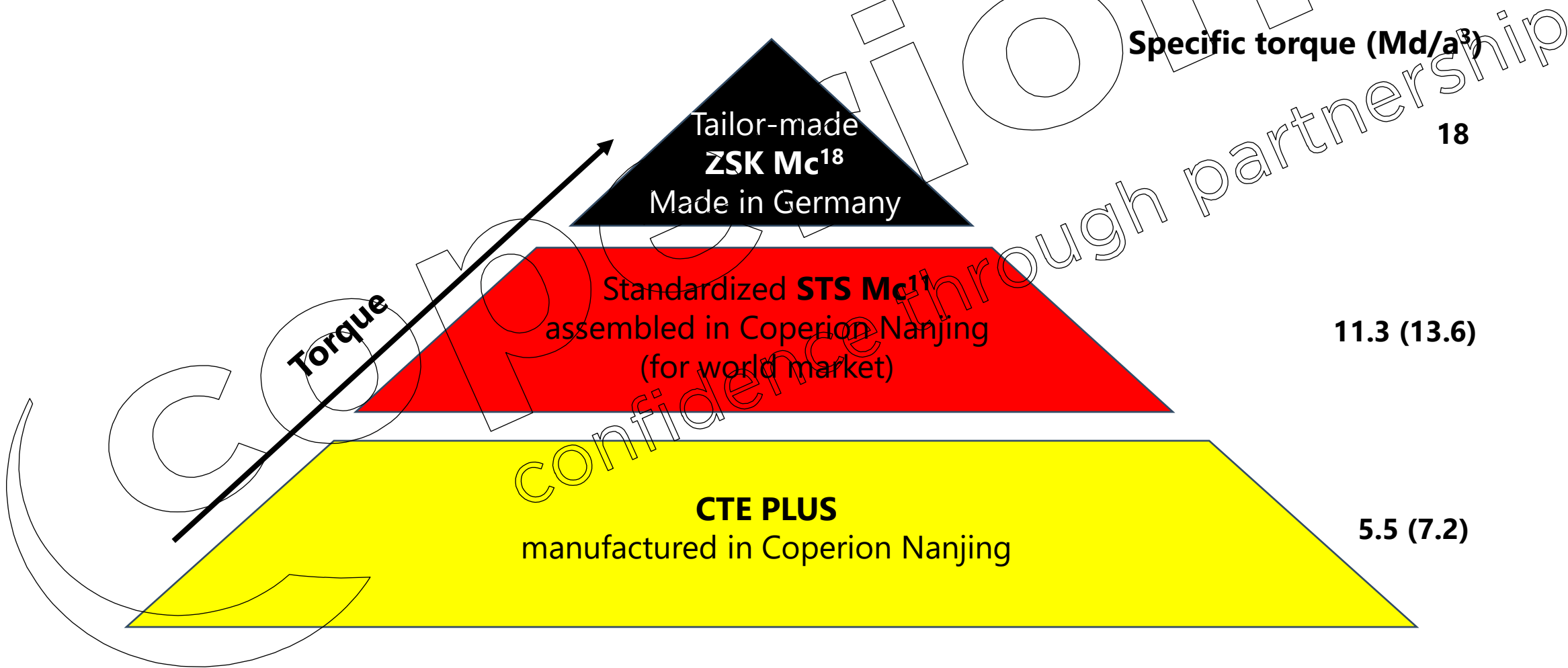
Workshop: 11,000 m²

Office: 5,000 m²

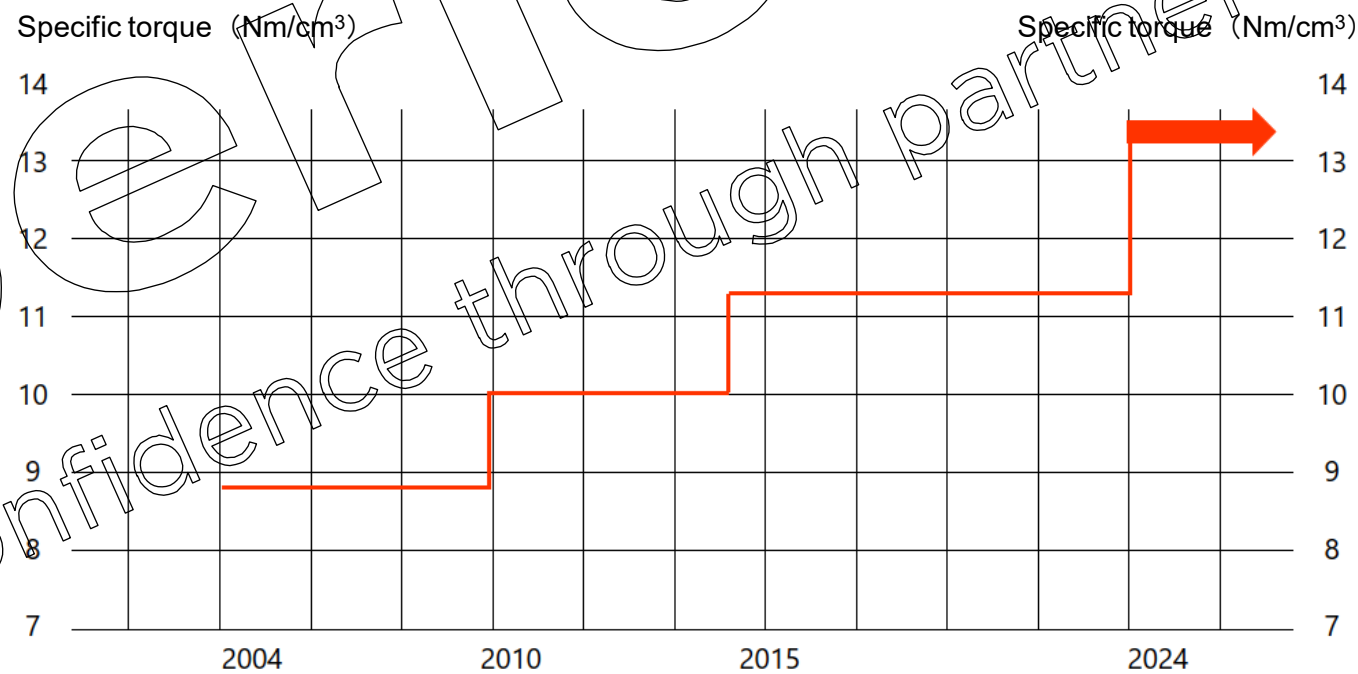
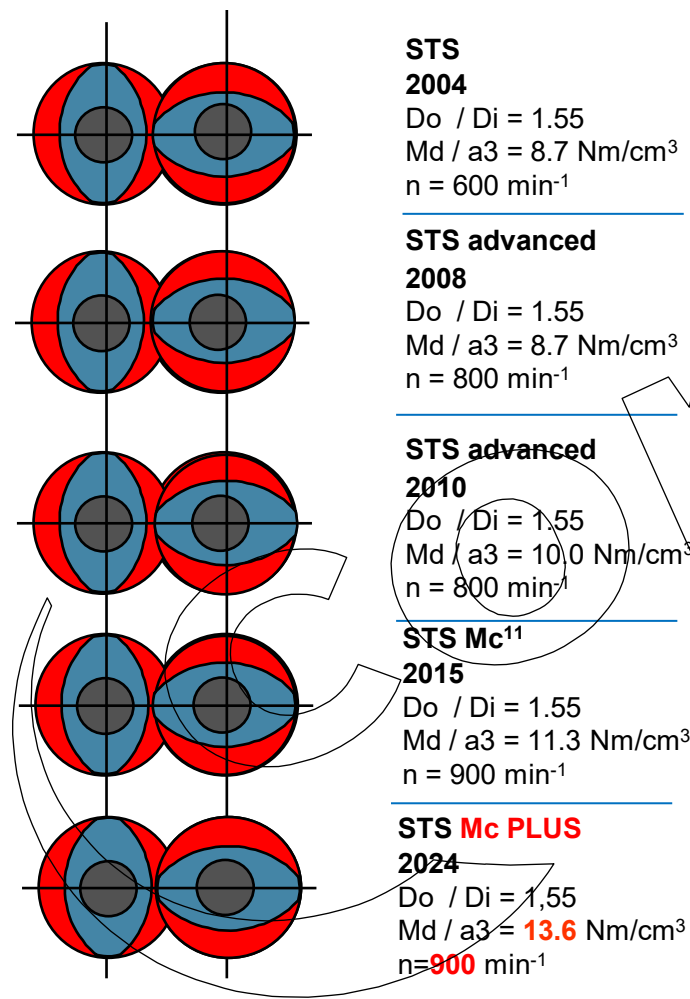
Annual production capacity:

- Twin screw extruder 350 sets
- Loss-in-weight feeder 800 pcs
- Rotary valve 800 pcs
- Gearbox 150 pcs

Product Range

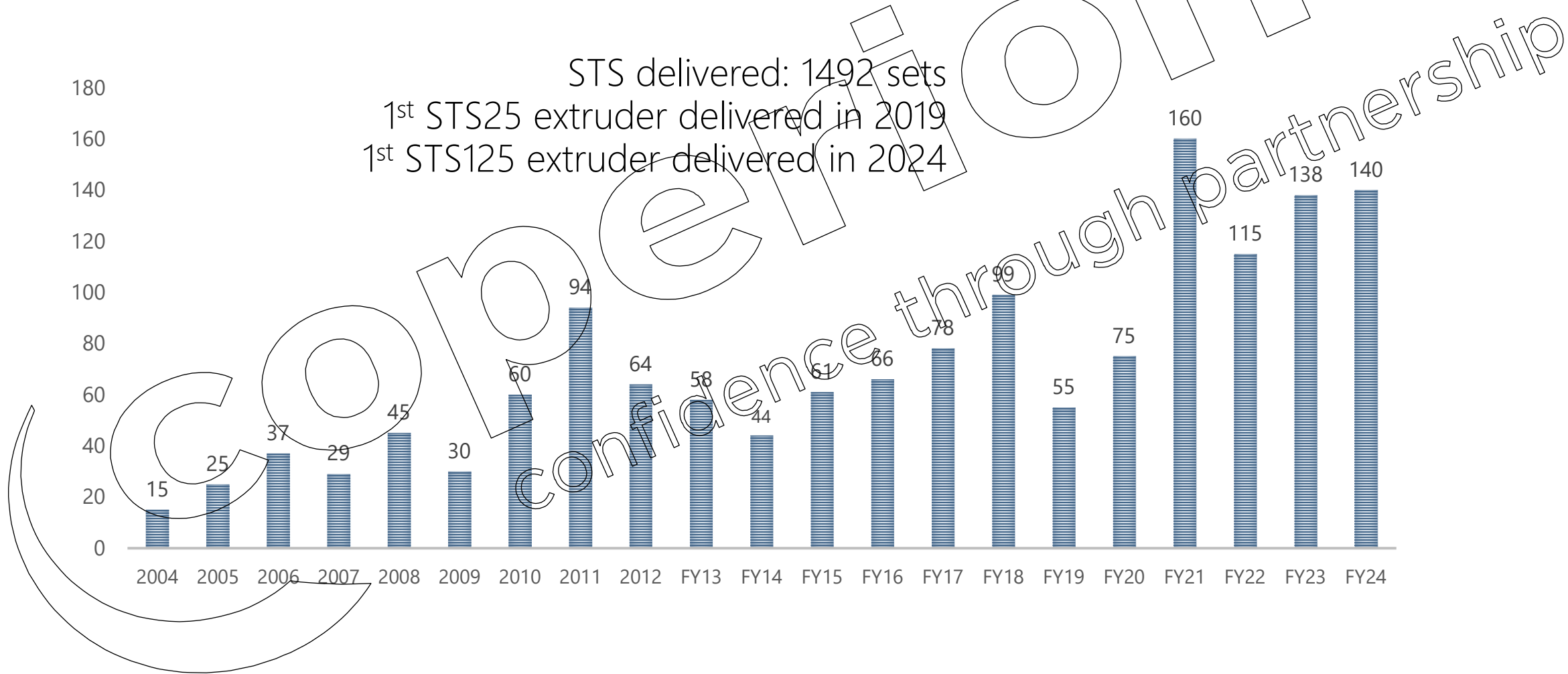


STS developments



Figures and facts

YTD (Year to date) Sep. 30th, 2024



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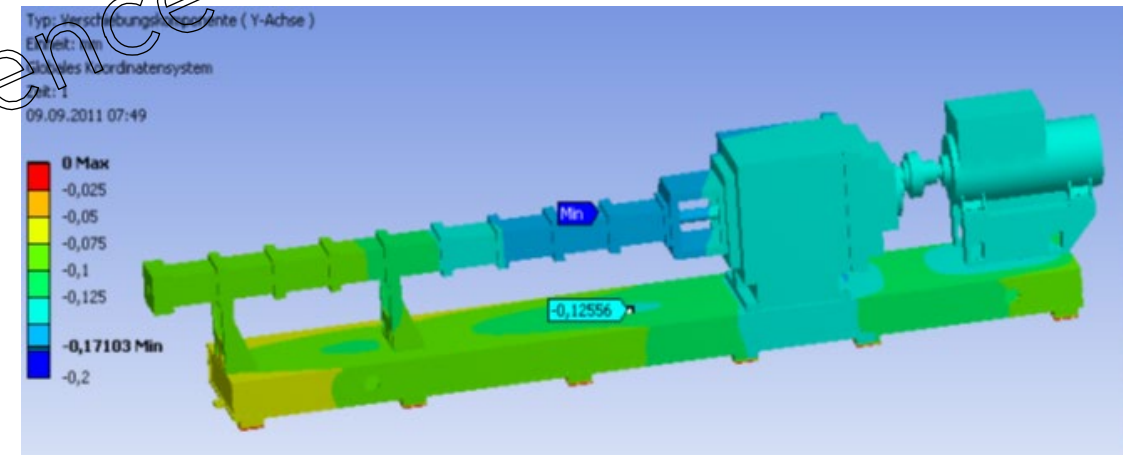
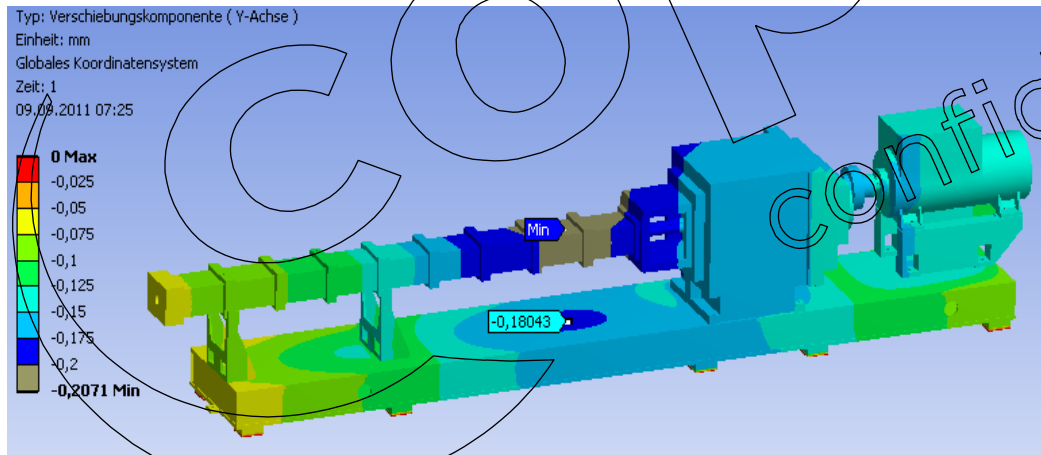
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Masterbatch & PVC cable compound

FEA for The Power Train of STS Mc¹¹

- ✓ Sharing the gearbox design with ZSK extruder, all the T11.3 gearboxes are analyzed in the whole power train to improve the stiffness and reduce the deformation of the extruder.
- ✓ The noise and vibration of the whole machine is reduced effectively

**ENGINEERED
IN GERMANY** 



Key Components Manufactured in House



In-house manufacturing to ensure **optimum quality**

Welding of Barrels with Special Welding Process

- ✓ Pre-heated in furnace from Germany before welding to avoid stress and afterwards crack and leakage in future.
- ✓ Welding the barrel at high temperature, to avoid stress.
- ✓ Welding with American welding machine to achieve good welding quality
- ✓ Leakage check for every barrel with high pressure

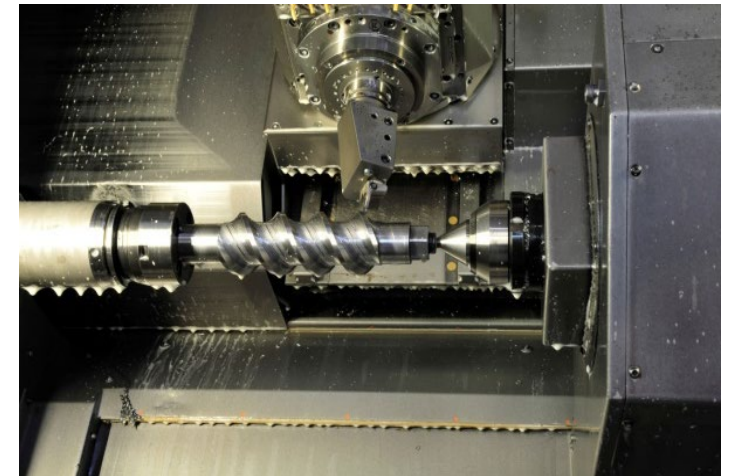
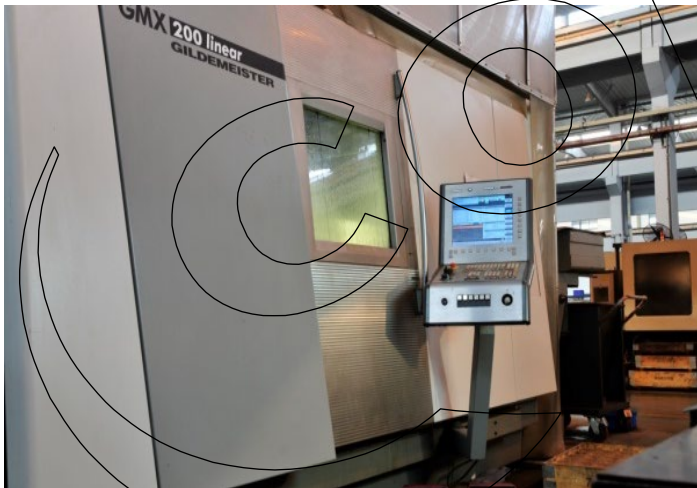


Additional manufacturing procedures to improve machine quality and reliability.

Screw Elements

Advantages

- ✓ High precision of element profiling
- ✓ Better elements conformity
- ✓ High productivity



Zeiss 3-dimension Inspection Center



- ✓ Dimension check range up to micron level (measuring accuracy is 1.4 micron)
- ✓ Special designed temperature sensor can offer extremely reliable temperature compensation to ensure the precision
- ✓ Inspection data of every single barrel is around 80 items
- ✓ Inspection data of every CTE gearbox housing is around 40 items

Final Assembly Alignment Check



Final assembly alignment check for STS with Faro



Final assembly alignment check for CTE with Faro

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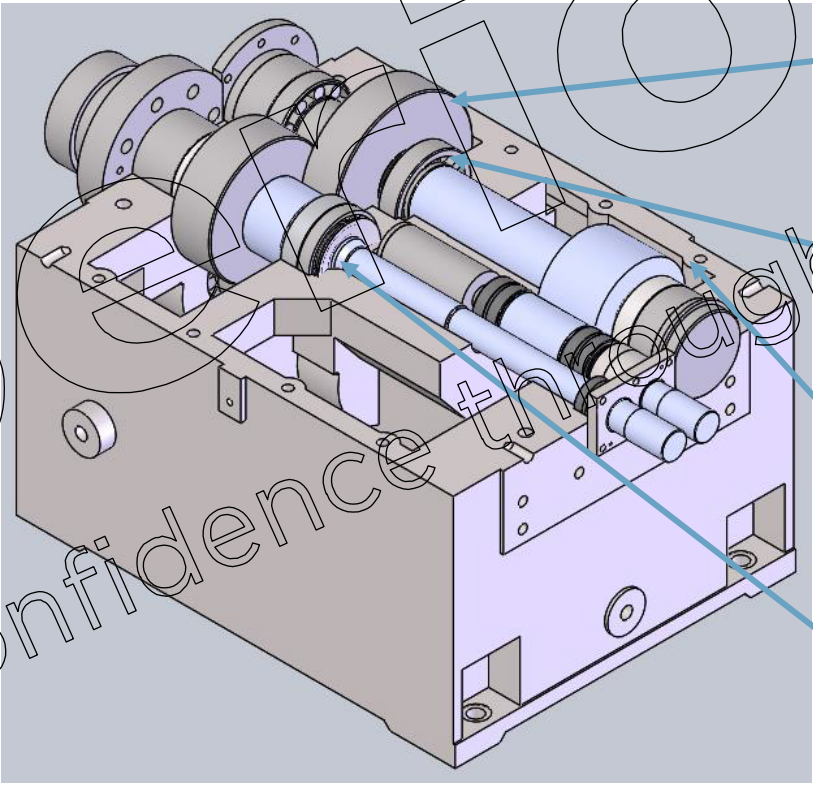
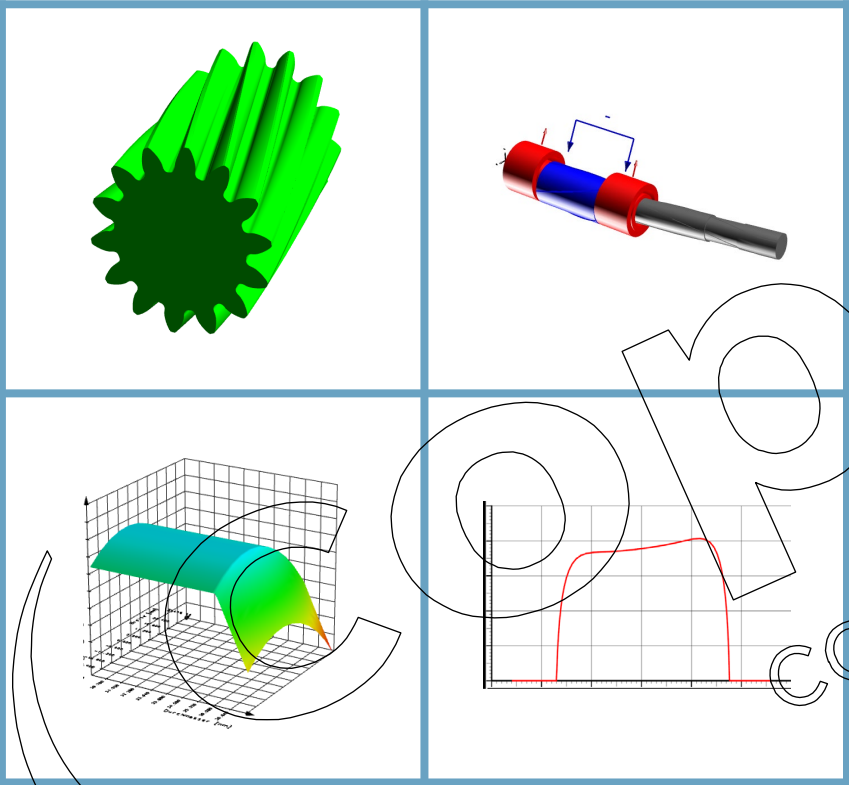
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Upgrade CTE PLUS Gearbox



- Improved gear
- Improved bearing
- Improved machinability
- Thrust-bearing preloaded

CTE PLUS New Features

- Specific torque of gearbox increased from 5.5 Nm/cm³ to 7.2 Nm/cm³
- 30% more safety factor of gearbox increased, further improved lifetime
- Gearbox engineered by Coperion Germany, same dimension, exchangeable with old generations
- Rotating parts of gearbox "re-designed", bearings of gearbox supplied by INA
- Gearbox with enlarged tooth width, new bearing design, improved tooth flank and profile modification, increased intermeshing surface, optimized shaft geometry, adapted cooling and oil supply
- Adapted geometry of gearbox housing, higher stiffness, vibration free

CTE PLUS Gearbox Housing Manufacturing



- All gearbox housing manufactured in-house with Heller CNC machine from Germany. The positioning precision of Heller is 5 μm .
- All gearbox housing will be checked in-house with 3D Zeiss inspection machine from Germany. The precision of Zeiss is 1.4 μm

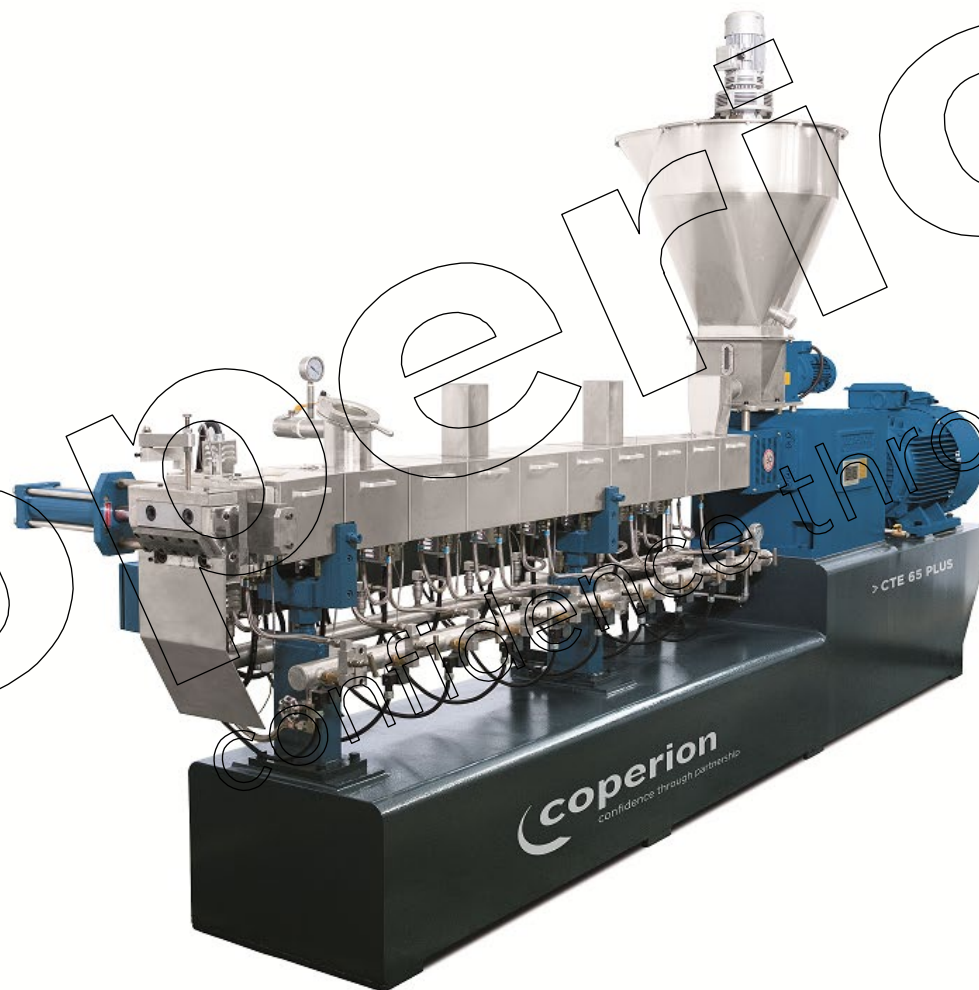
Technical Data of CTE PLUS

Type	Max. torque per shaft [Nm]	Screw Diameter [mm]	Max. Screw Speed [min ⁻¹]	Main Motor Power [kW]	Throughput [kg/h]
CTE 20 PLUS	42	22	600	3 / 5.5	2 - 13
CTE 35 PLUS	194	36	600	18.5 / 22	30 - 90
CTE 50 PLUS	533	51	600	55 / 75	90 - 280
CTE 65 PLUS	1,012	62	600	90 / 132	150 - 460
CTE 75 PLUS	1,555	71	600	160 / 200	260 - 830
CTE 96 PLUS	3,417	94	600	315 / 355	500 - 1,500
CTE 135 PLUS	7,160	132	400 / 600	600 / 900	1,400 - 3,500
CTE 165 PLUS	14,300	165	400	1,200	2,000 - 5,000

Technical Data of CTE PLUS Two-stage

Model	Screw Diameter [mm]	Max. Screw Speed [min ⁻¹]	Main Motor Power [kW]	Throughput [kg/h]
CTE 50 PLUS	51	400 / 600	37 - 55	100 - 380
SE 100	100	60 / 85	18.5 / 22	
CTE 65 PLUS	62	400 / 600	75 - 132	150 - 640
SE 150	150	60 / 85	37 / 45	
CTE 75 PLUS	71	400 / 600	110 - 200	300 - 1,100
SE 180	180	60 / 85	45 / 55	
CTE 96 PLUS	94	400 / 600	220 - 355	600 - 2,000
SE 200	200	60 / 85	55 / 75	

CTE 65 PLUS



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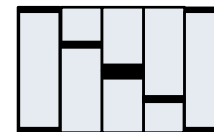
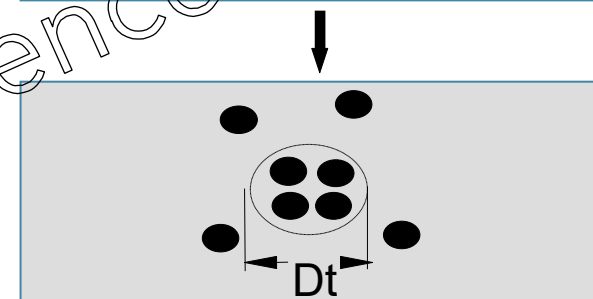
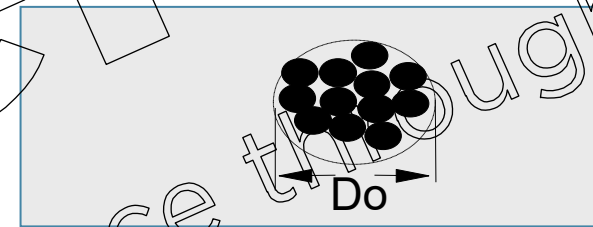
Process Technology

Masterbatch mechanism

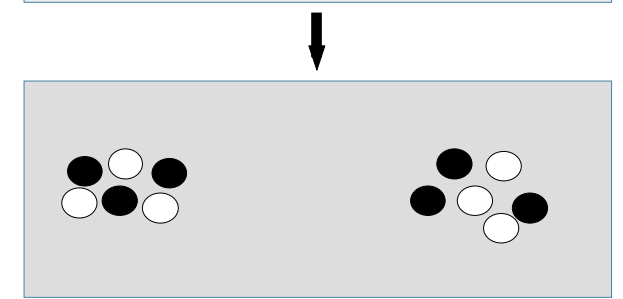
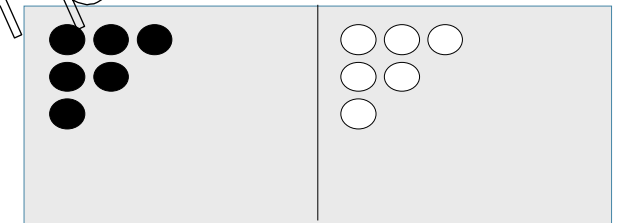
Dispersive and Distributive Mixing is the incorporation of pigments into a carrier by:

1. Wetting of the pigments
2. Shearing the pigments from D_o to D_t
3. Mixing and distributing the pigments into the carrier
4. Stabilization against re-agglomeration

Dispersive Mixing

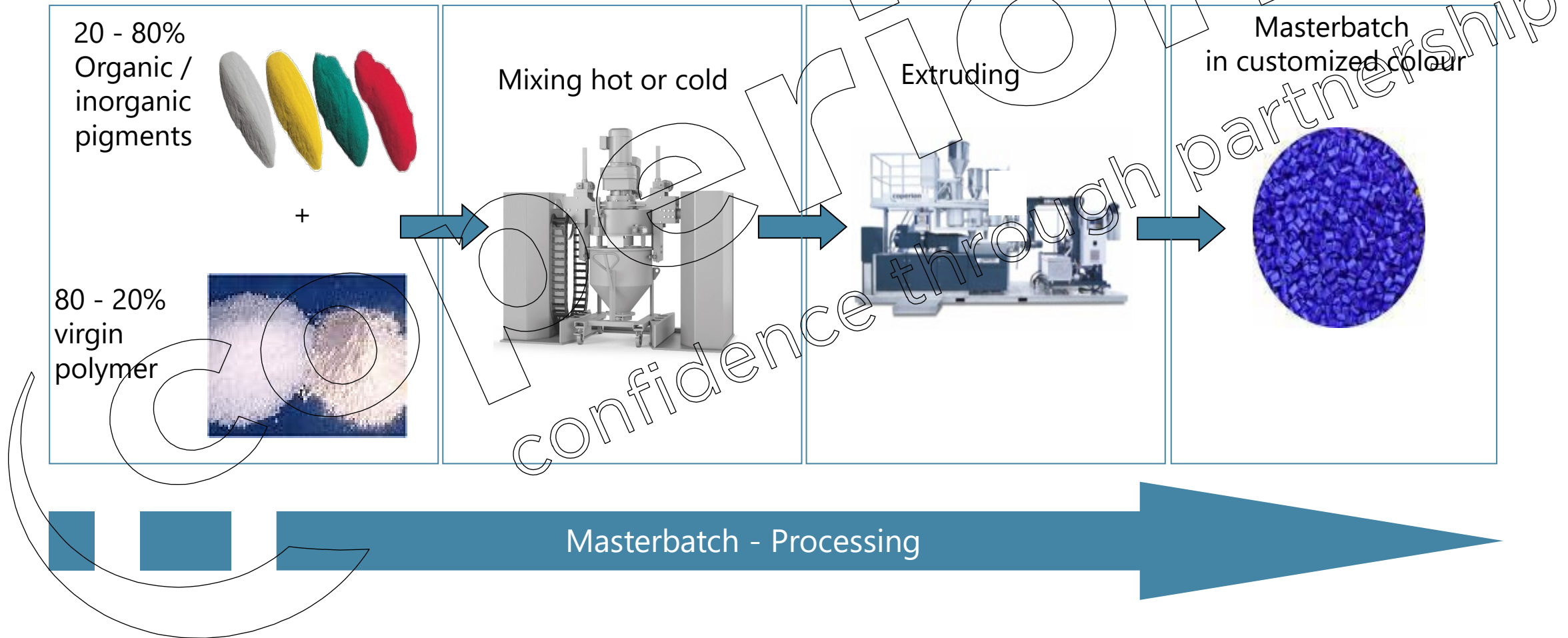


Distributive Mixing



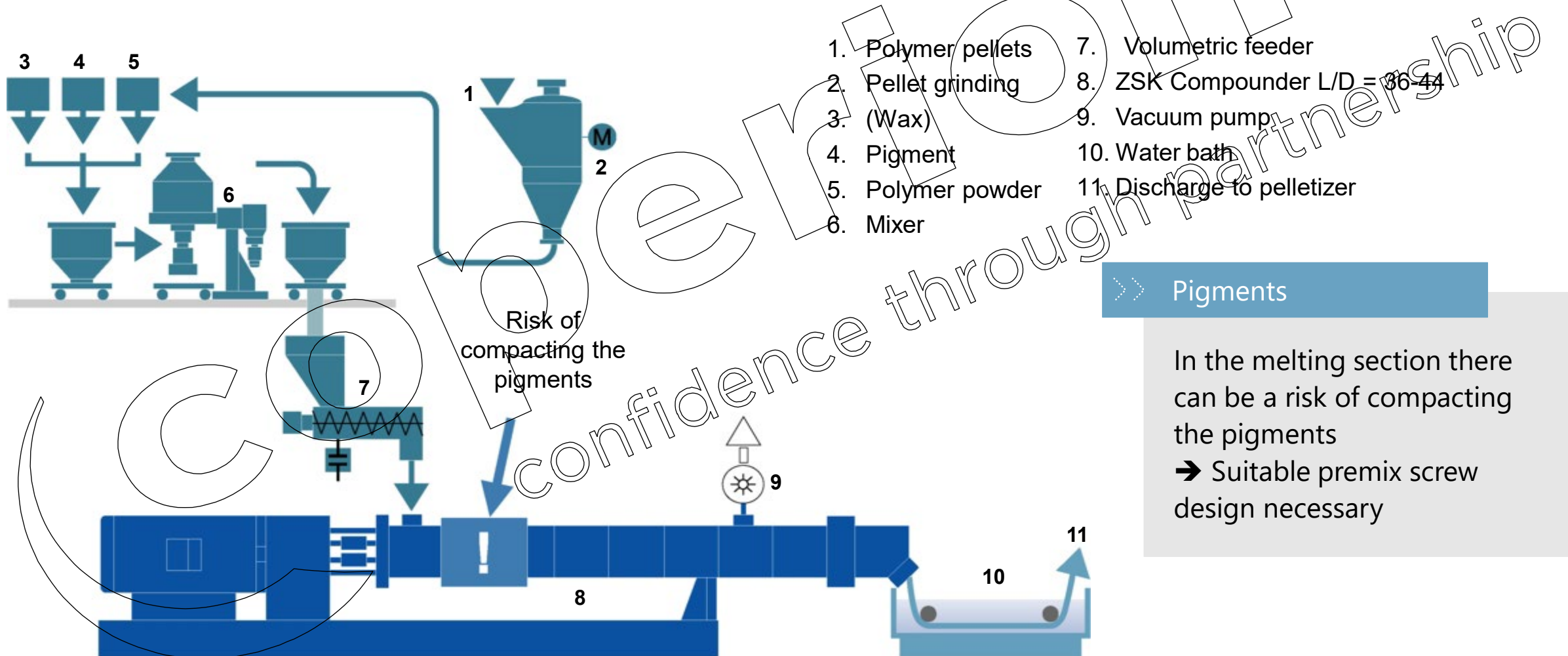
Process setup

Single step production of masterbatch – Premix process



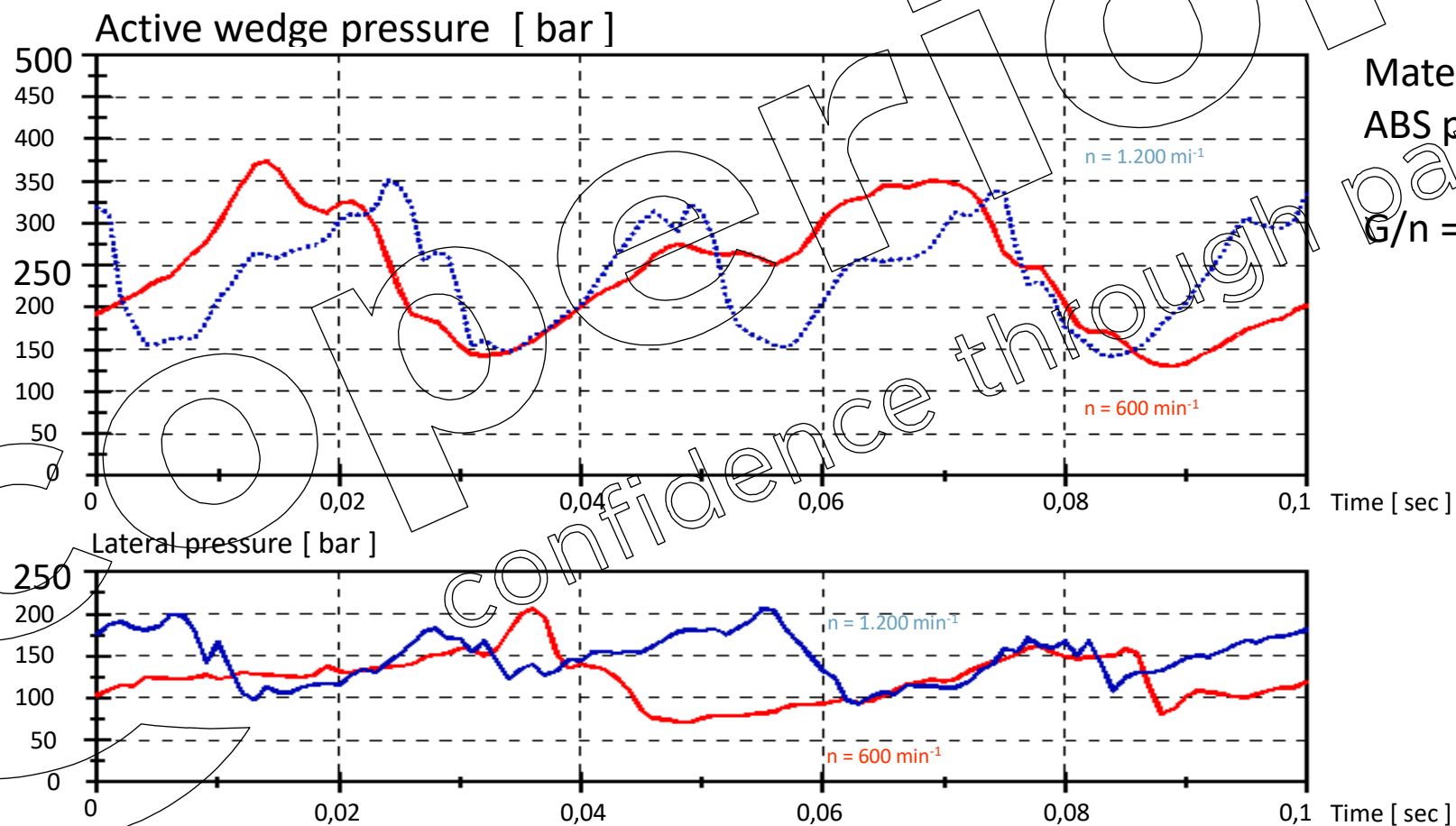
Process setup

Single step production of masterbatch – Premix process



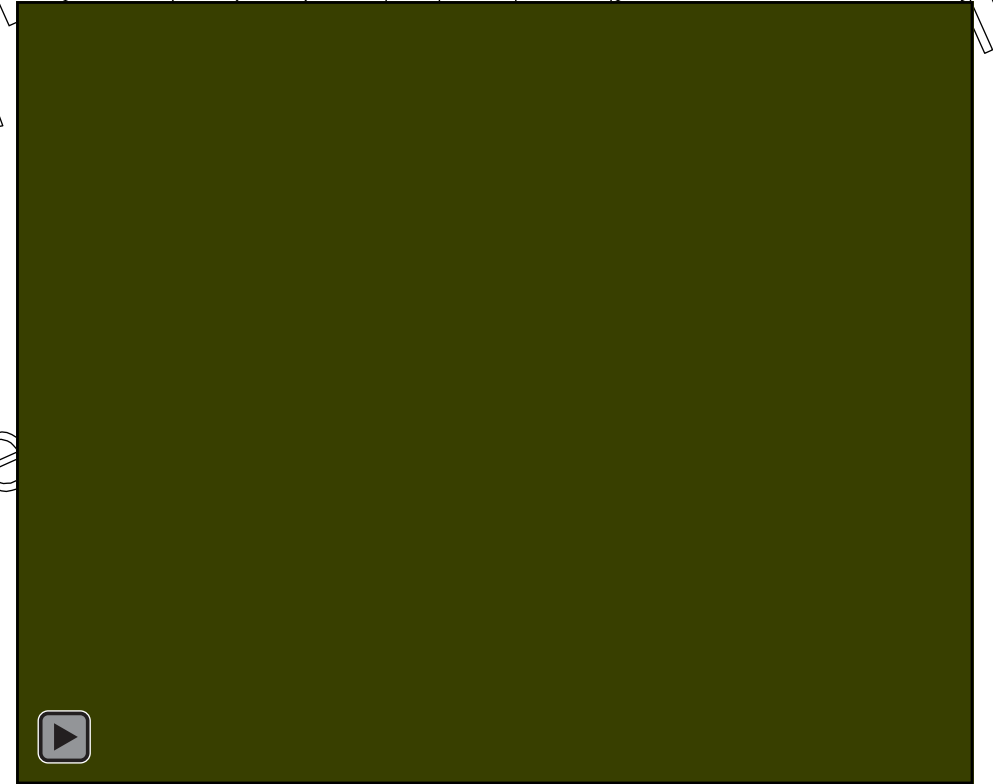
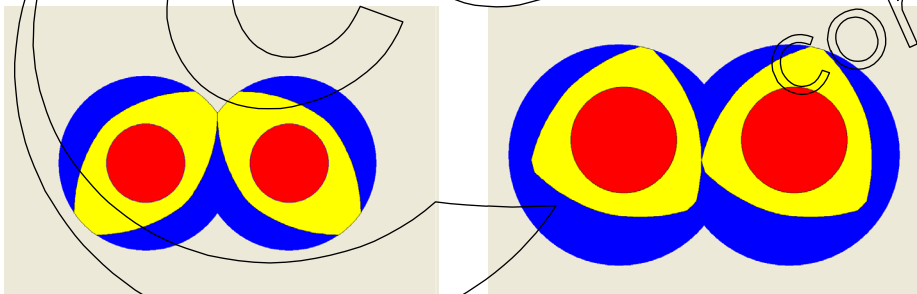
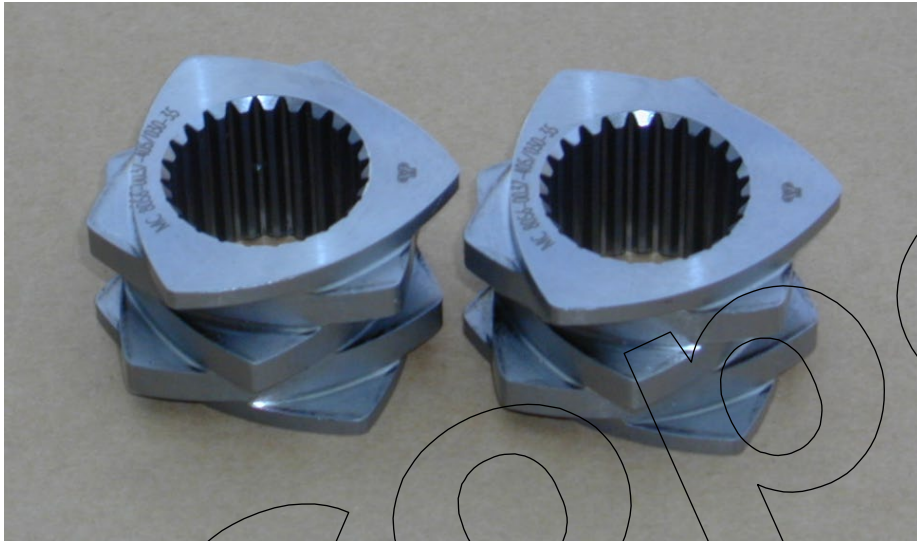
Wedge and lateral pressure.

Measured on the 1st kneading disc



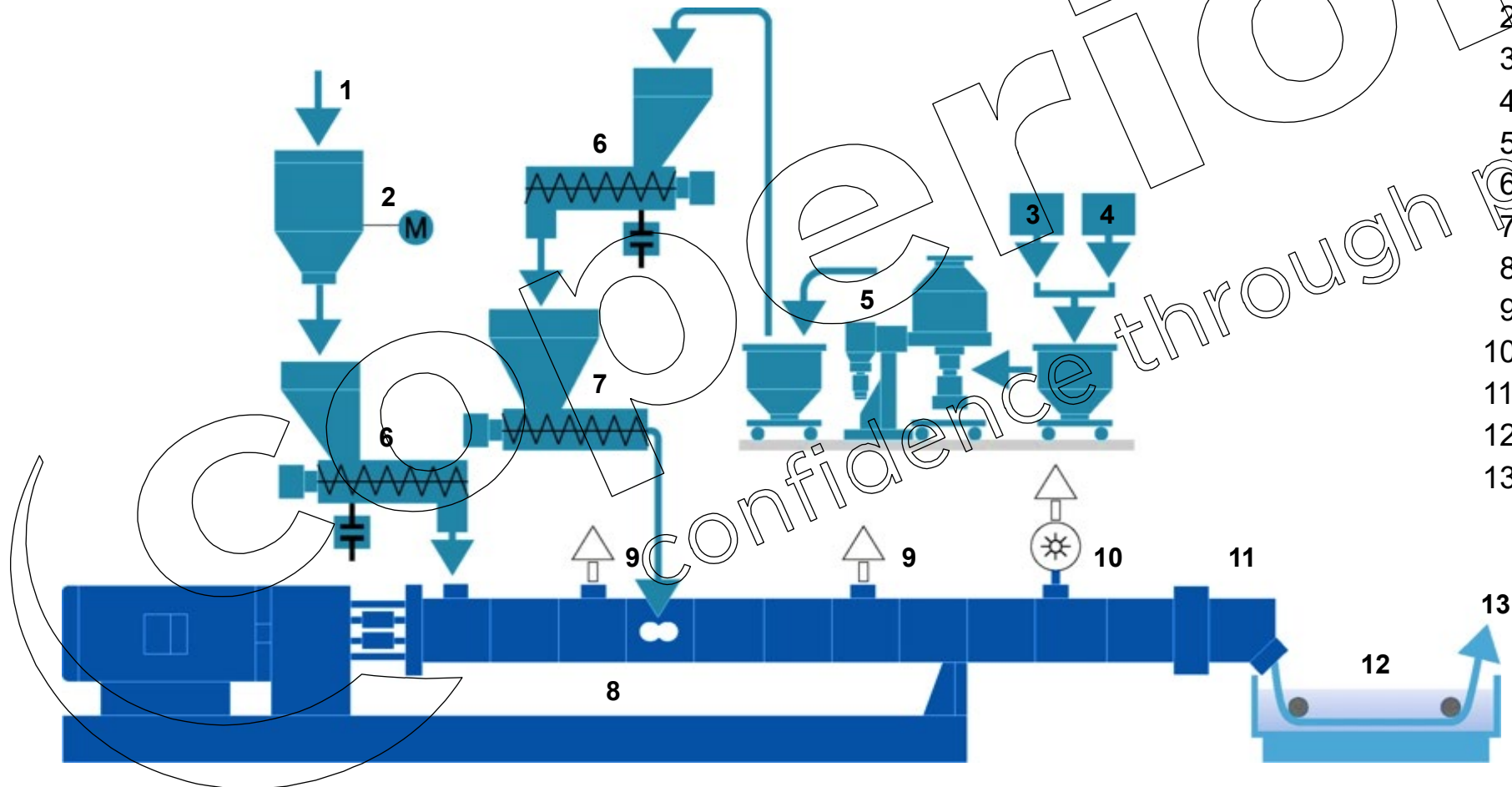
Material:
ABS powder
 $G/n = \text{const.}$

Excentrical 3 lobed kneading blocks in melting section



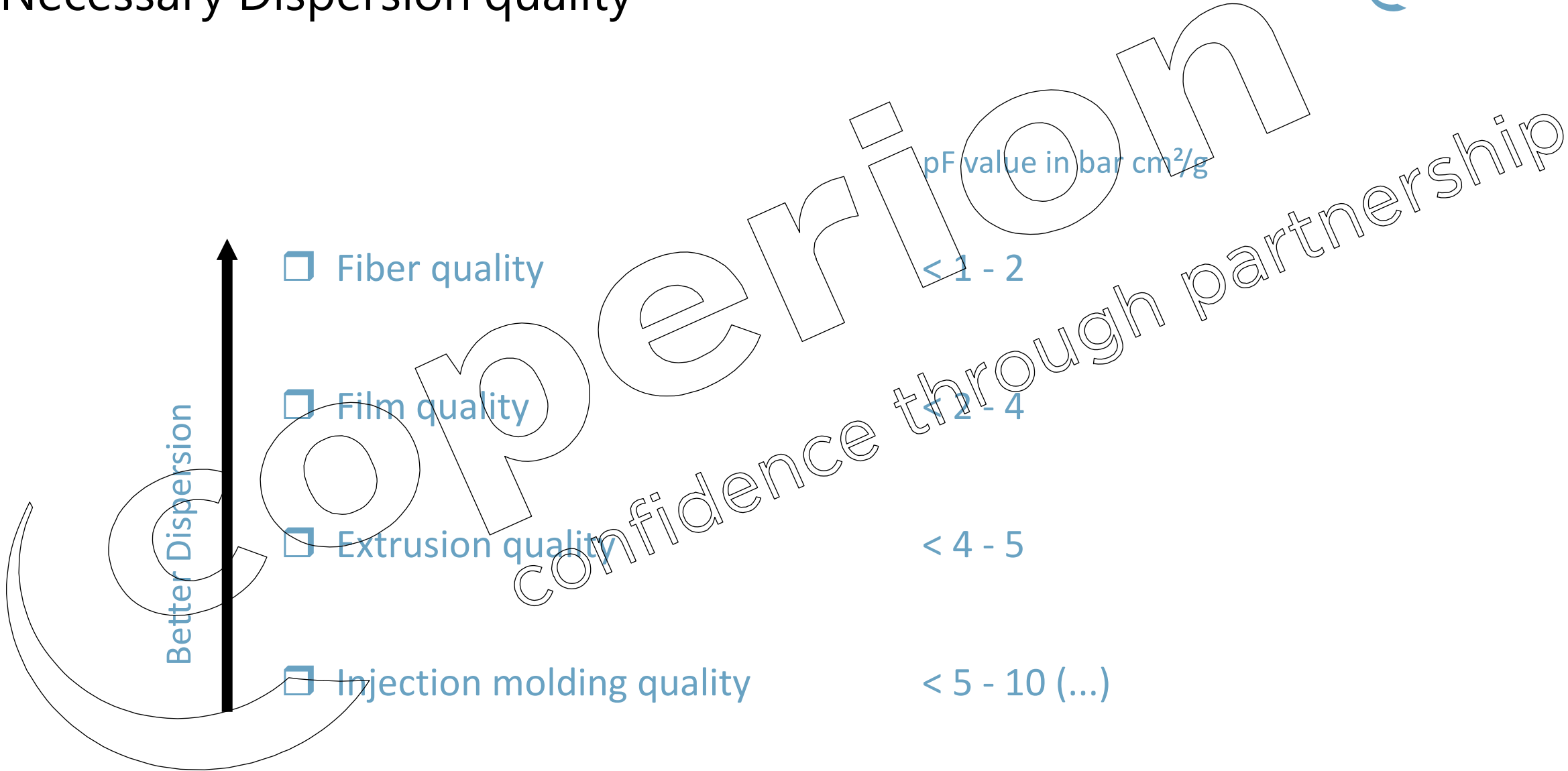
Process setup

Single step production of masterbatch - Split-feed



1. Polymer pellets
2. Polymer silo
3. (Wax)
4. Pigment(s)
5. Mixer
6. Gravimetric feeders
7. Side feeding
8. ZSK compounder L/D = 44
9. Venting
10. Vacuum pump
11. Die head
12. Water bath
13. Pelletizer

Necessary Dispersion quality



STS Reference Customers for Masterbatch



LDPE / LLDPE + 80 % CaCO₃

LLDPE (MFR25) + 80%wt Omyafilm 707: 450 - 600 rpm

STS	35	50	65	75	96
Output at 600rpm	150 kg/h	400 kg/h	750 kg/h	1200 kg/h	2000 kg/h

LLDPE (MFR1) + 80%wt Omyafilm 707: 450 - 600 rpm

STS	35	50	65	75	96
Output at 450rpm	100 kg/h	300 kg/h	550 kg/h	850 kg/h	1600 kg/h

Filler content >80% wt is possible with restrictions in throughput, melt temperature, set-up.



Feeder Layout for Highly Filled Compounds

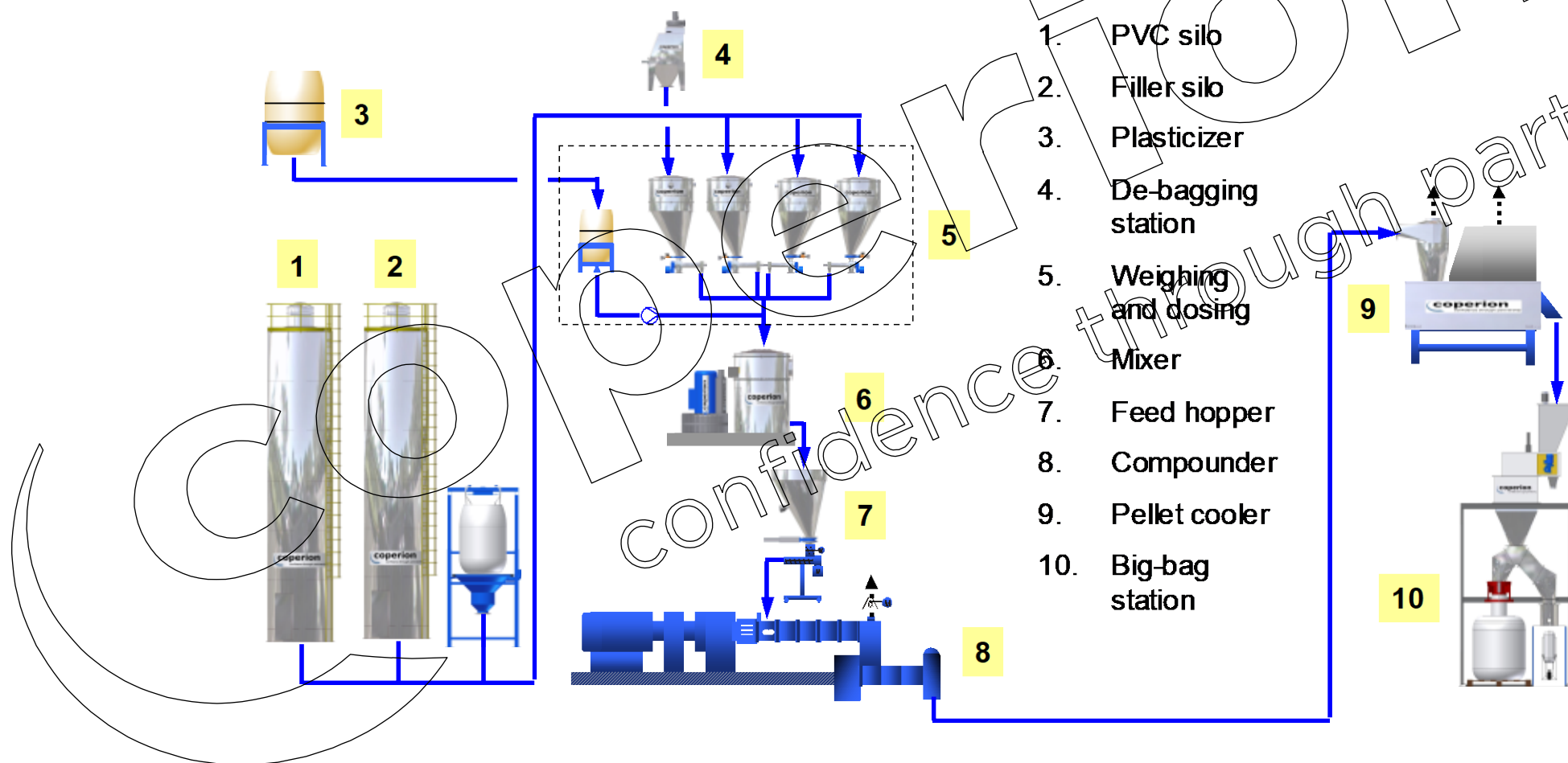


Tip 1: The feeder outlets shall be close to the feeding barrels.

Tip 2: Make sure that the air can be released smoothly.

Tip 3: Anti-bridging design for the silos.

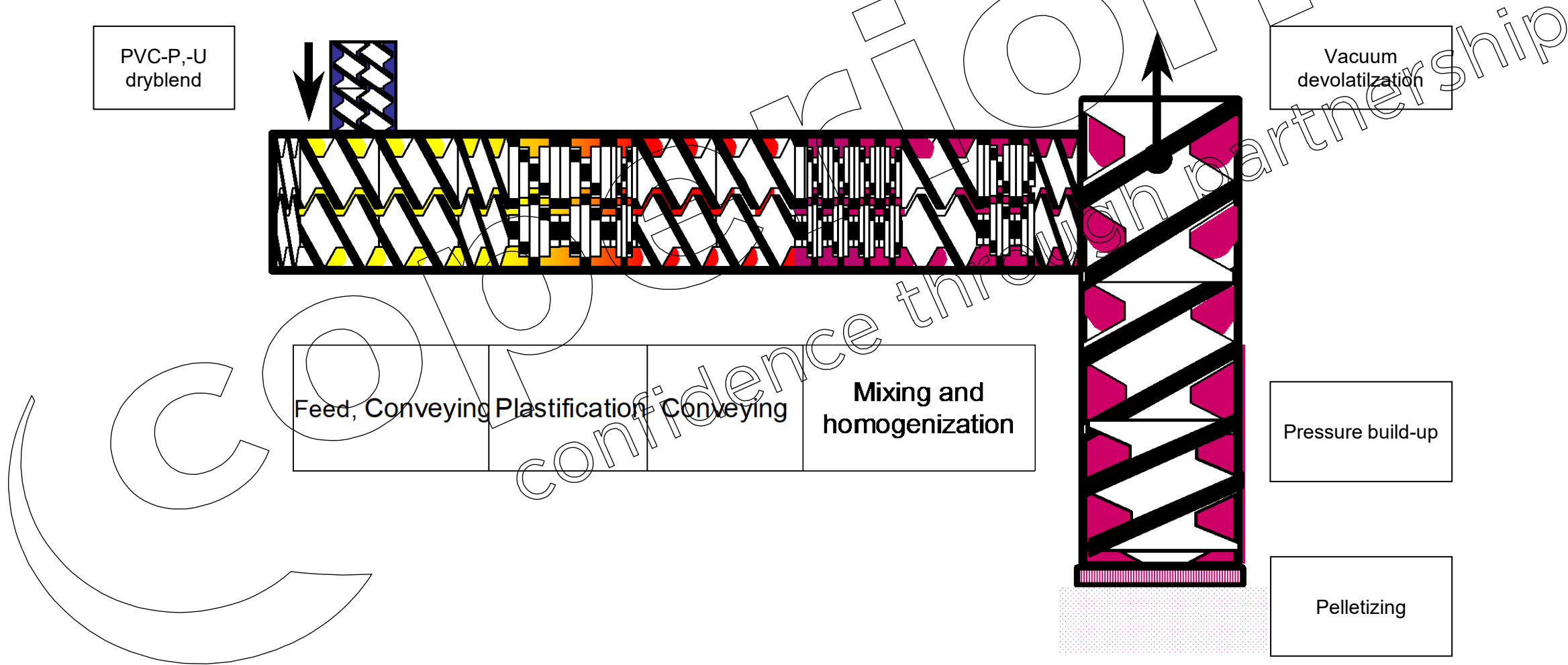
PVC compounding plant



STS Two Stage – Ideal machine for PVC compound



Processing zones for PVC compounding



STS75 / S200 for PVC cable compound



- Output of STS75 / S200 for cable compound: 1200 - 1600 kg/h
- Hot dry blend can be fed into extruder directly without cooling down to room temperature

STS75 / S200 for PVC medical grade



- Output of STS75 / S200 for cable compound: approx. 1000 kg/h
- Different pelletizing system can be provided

PVC (Cable, Medical, Rigid, etc.) and XLPE reference list





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very much for
your attention.

You're very welcome to follow us.

