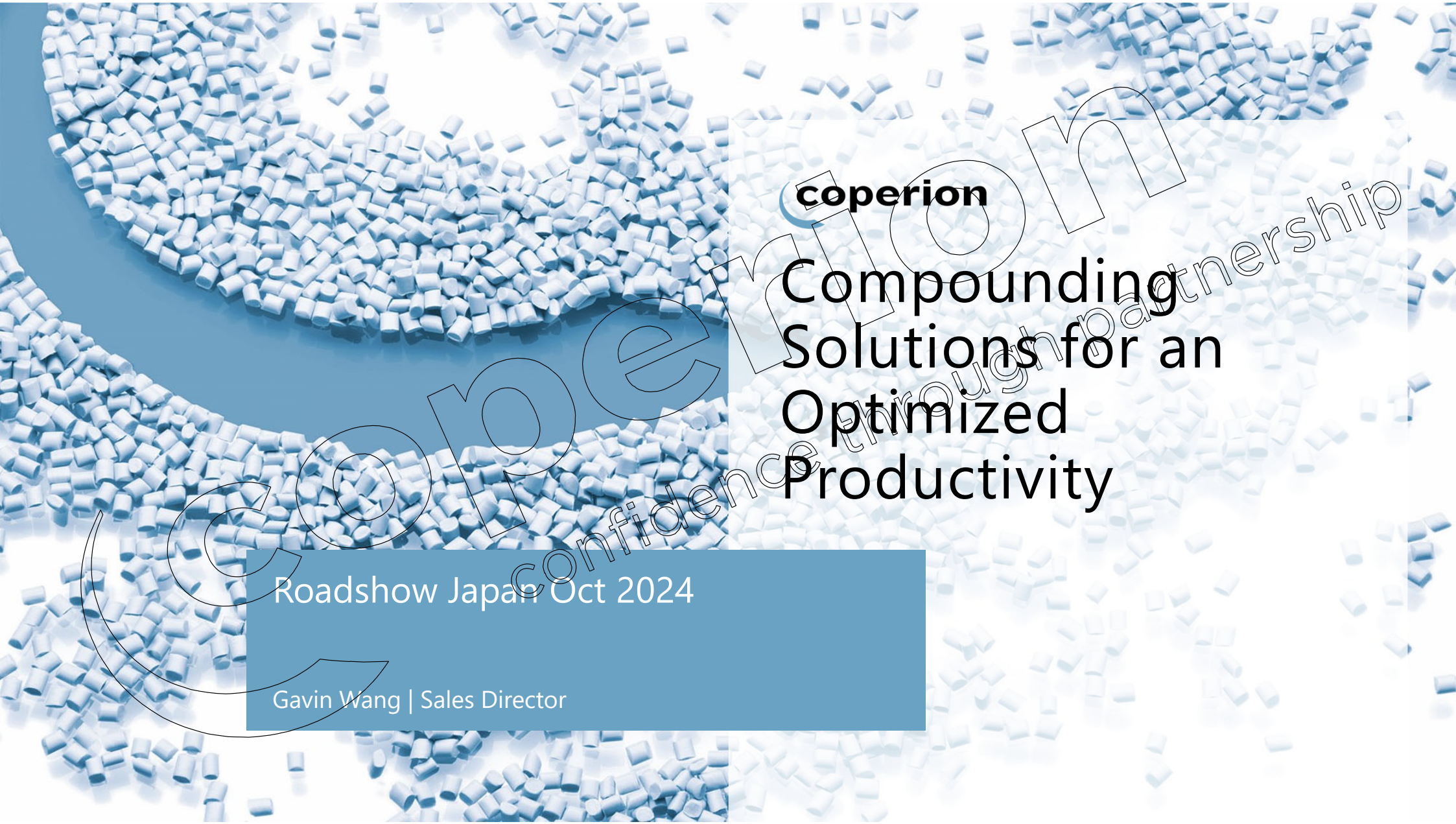


coperion

Compounding Solutions for an Optimized Productivity

Roadshow Japan Oct 2024

Gavin Wang | Sales Director

Introduction of Coperion Nanjing

Founded: 2004

Employees: 270+

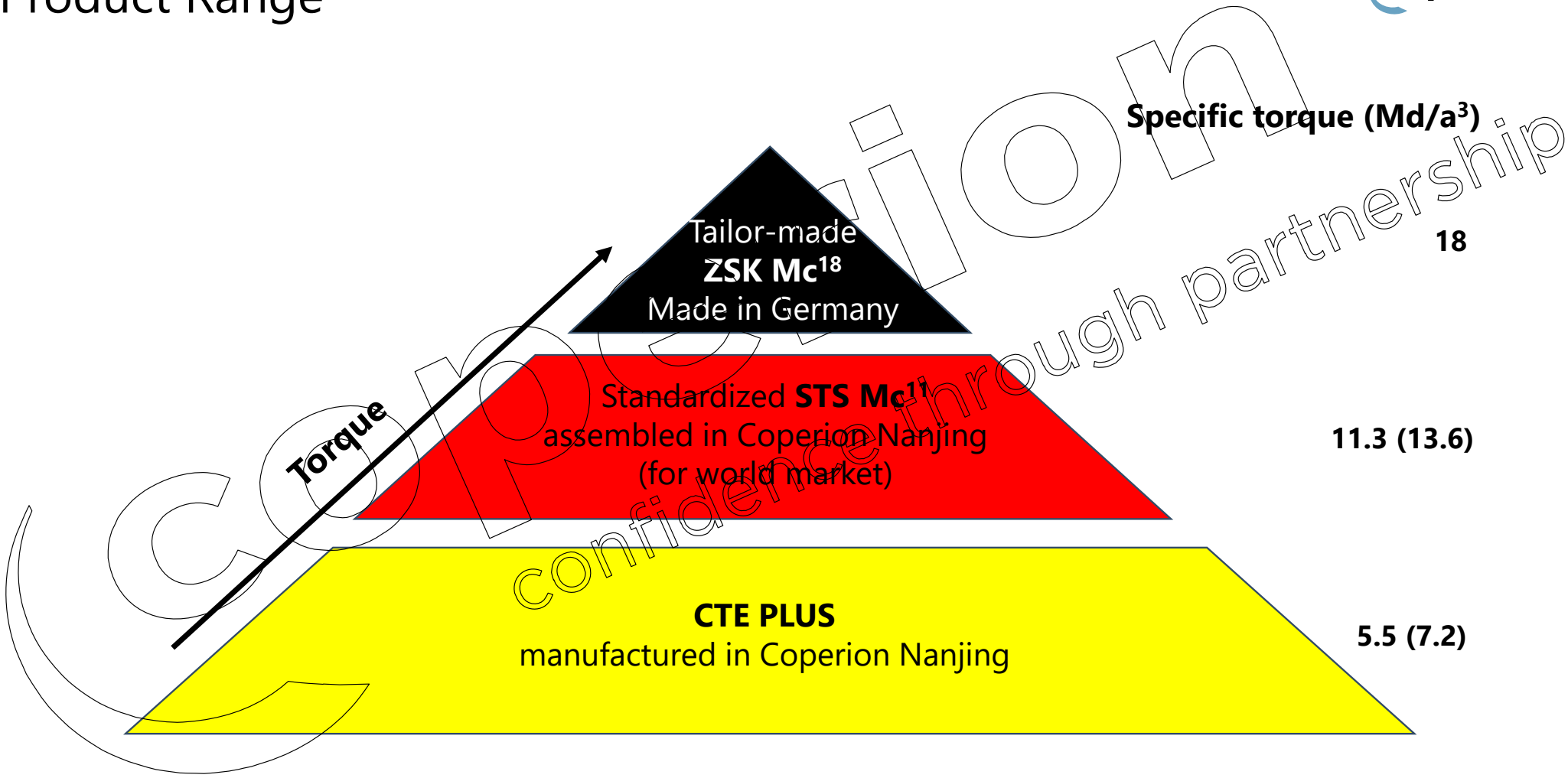
Workshop: 11,000 m^2

Office: 5,000 m^2

Annual production capacity:

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

Product Range



Historical Developments of ZSK and STS

ZSK Standard
1955
D_o / D_i = 1,22
M_d / a^3 = 4.0 Nm/cm³
n = 150 min⁻¹

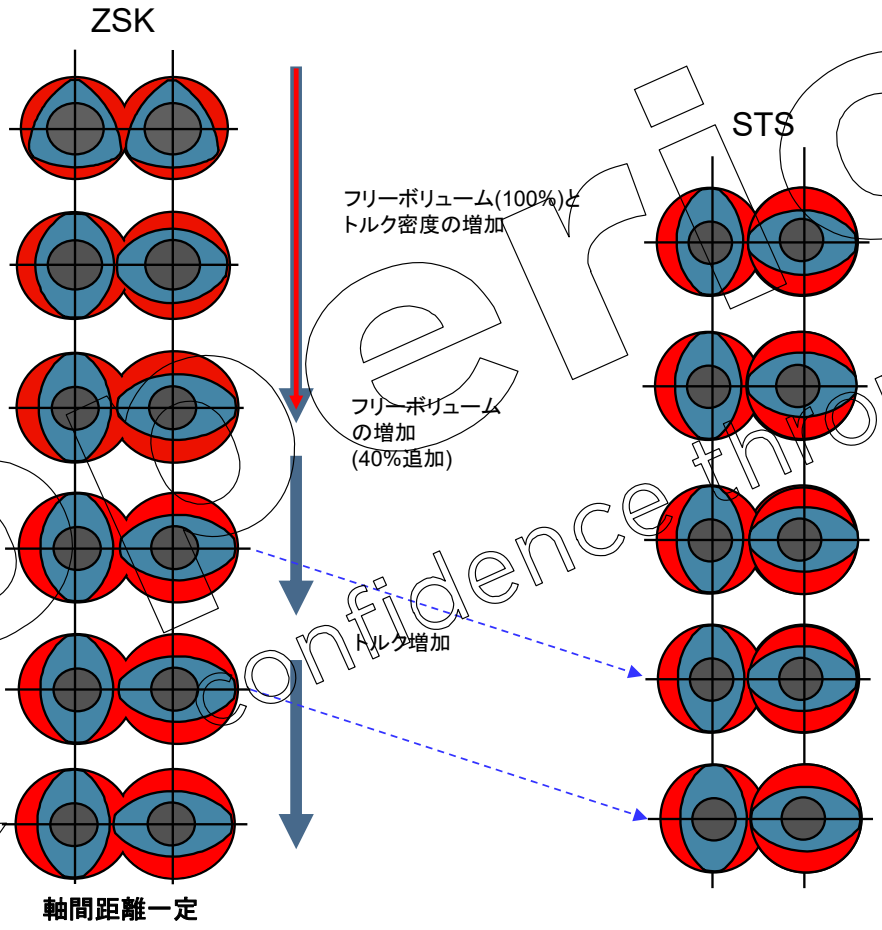
ZSK variable
1963
D_o / D_i = 1,44
M_d / a^3 = 5,0 Nm/cm³
n = 300 min⁻¹

ZSK Supercompounder
1983
D_o / D_i = 1,55
M_d / a^3 = 8,7 Nm/cm³
n = 600 min⁻¹

ZSK MEGAcompounder
1995
D_o / D_i = 1,55
M_d / a^3 = 11,3 Nm/cm³
n = 1200 min⁻¹

ZSK MEGAcompounder PLUS; 2004
D_o / D_i = 1,55
M_d / a^3 = 13,5 Nm/cm³
n = 1200 min⁻¹

ZSK Mc¹⁸
2010
D_o / D_i = 1,55
M_d / a^3 = **18** Nm/cm³
n = 1200 min⁻¹



STS
2004
Do / Di = 1,55
Md / a3 = 8.7 Nm/cm3
n=600 min-1

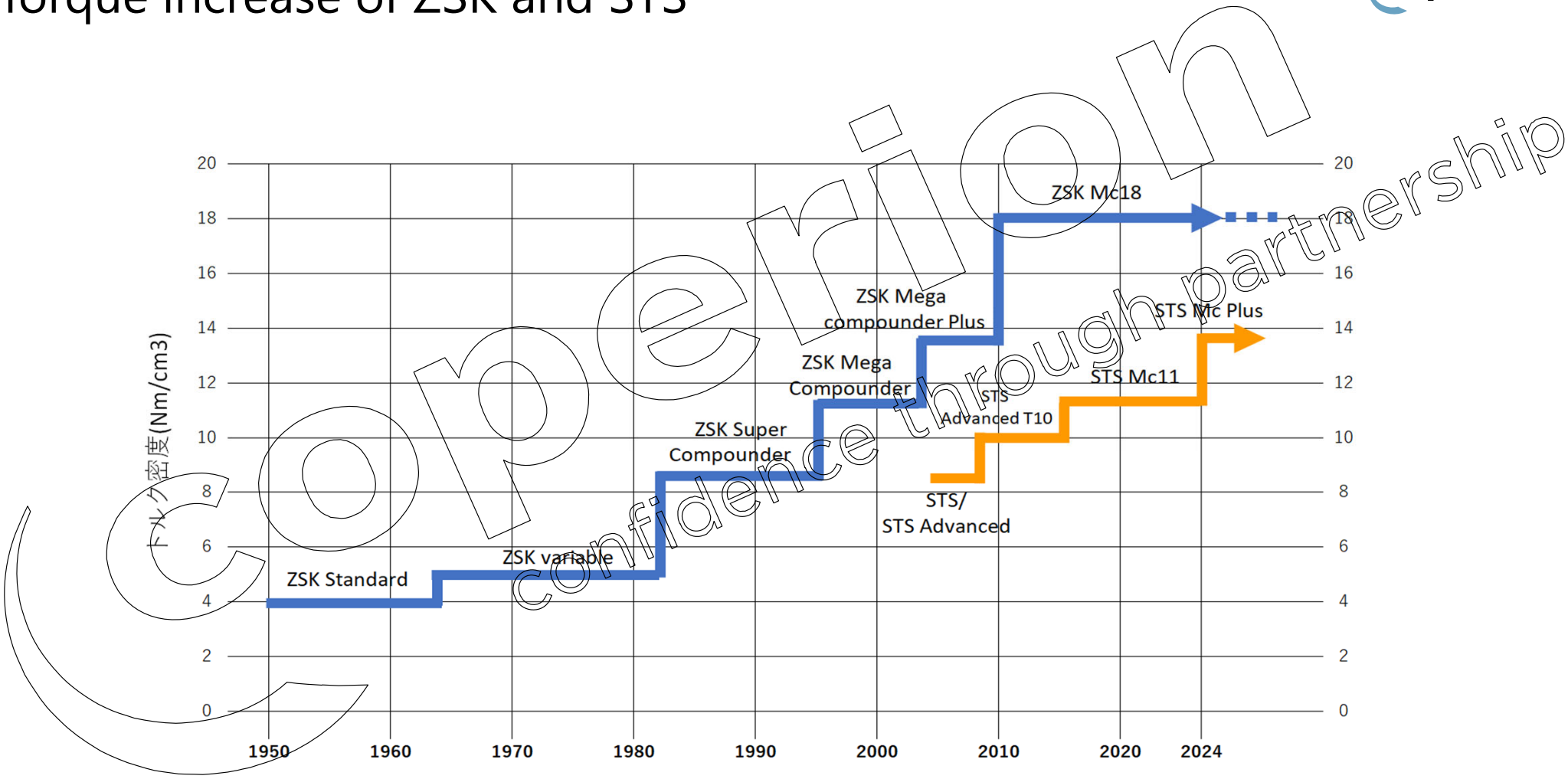
STS advanced
2008
Do / Di = 1,55
Md / a3 = 8.7 Nm/cm3
n=800 min-1

STS advanced
2010
Do / Di = 1,55
Md / a3 = 10.0 Nm/cm3
n=800 min-1

STS Mc11
2015
Do / Di = 1,55
Md / a3 = **11.3** Nm/cm3
n=**900** min-1

STS McPlus
2024
Do / Di = 1,55
Md / a3 = **13.6** Nm/cm3
n=**900** min-1

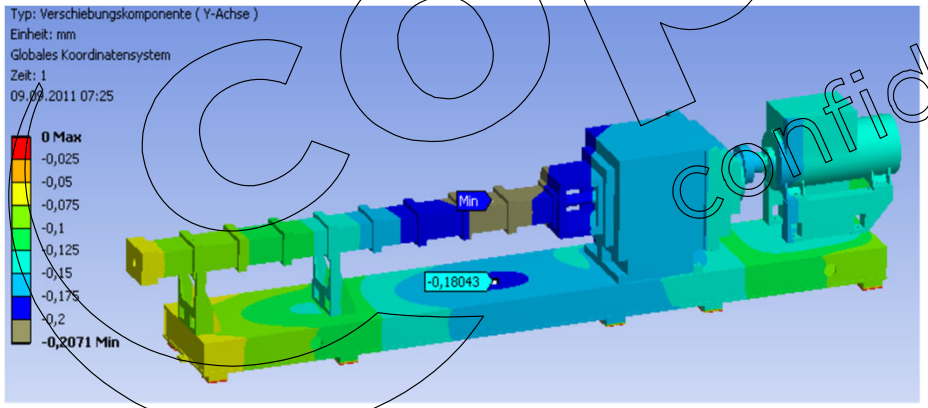
Torque increase of ZSK and STS

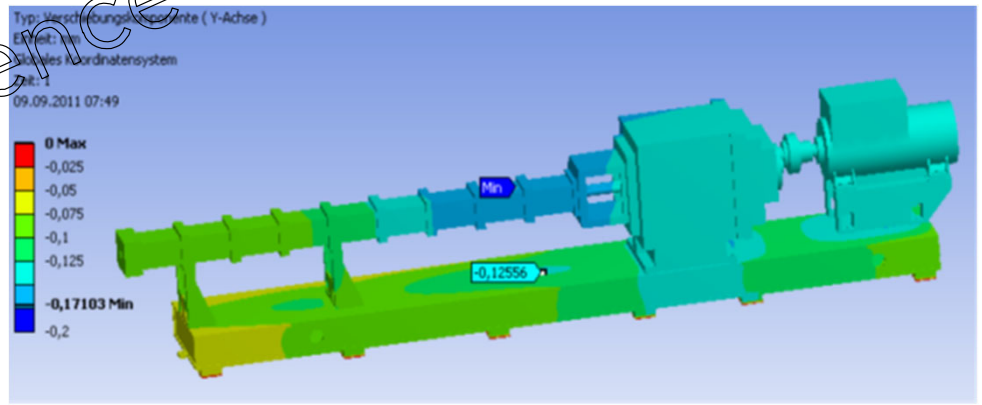


FEA for The Power Train of STS Mc[11]

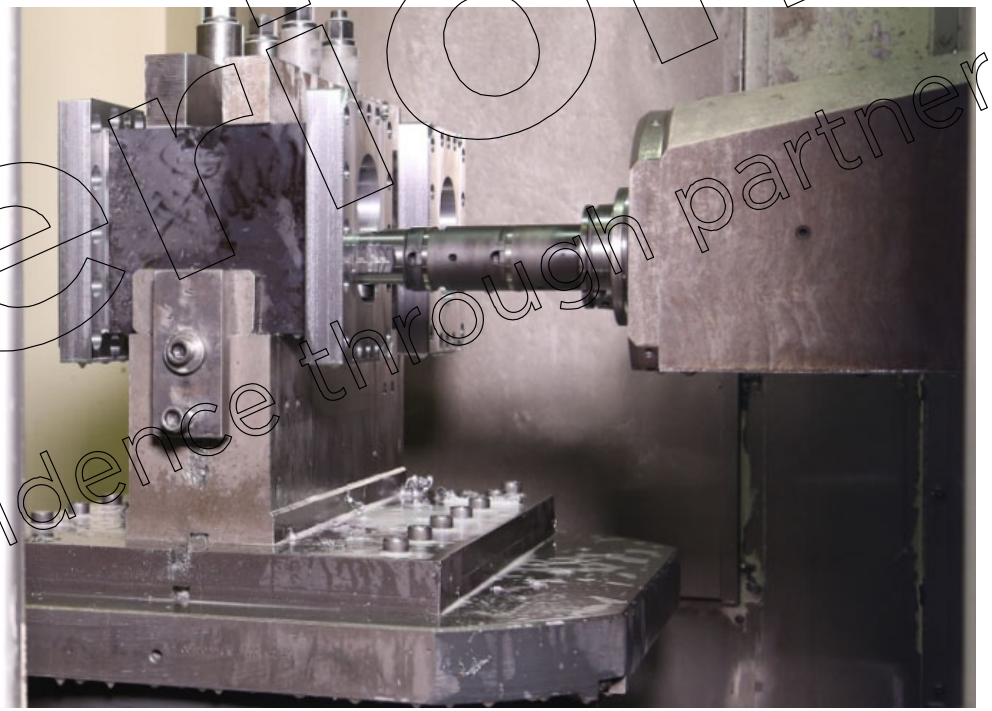
- ✓ Sharing the gearbox design with ZSK extruder, all the T11.3 gearboxes are analyzed in the whole power train to improve the stiffness and reduce the deformation of the extruder.
- ✓ The noise and vibration of the whole machine is reduced effectively

ENGINEERED IN GERMANY





Key Components Manufactured in House



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

Welding of Barrels with Special Welding Process

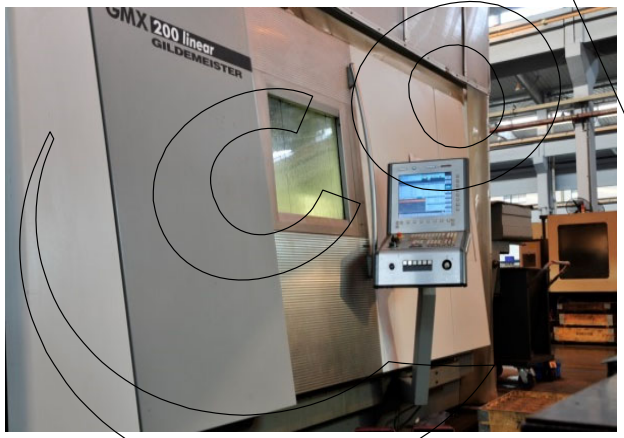
- ✓ Pre-heated in furnace from Germany before welding to avoid stress and afterwards crack and leakage in future.
- ✓ Welding the barrel at high temperature, to avoid stress.
- ✓ Welding with American welding machine to achieve good welding quality
- ✓ Leakage check for every barrel with high pressure

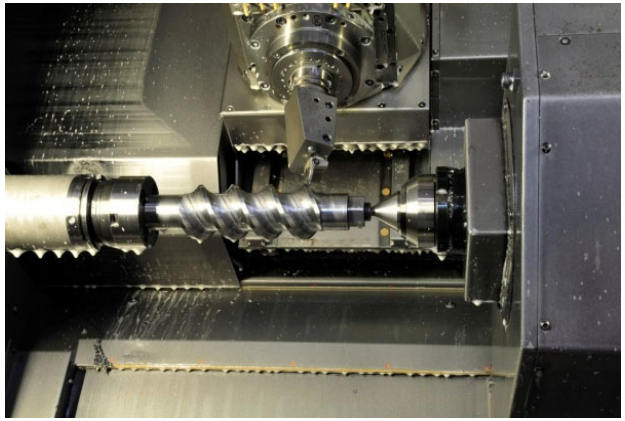
Additional manufacturing procedures to improve machine quality and reliability.

Screw Elements

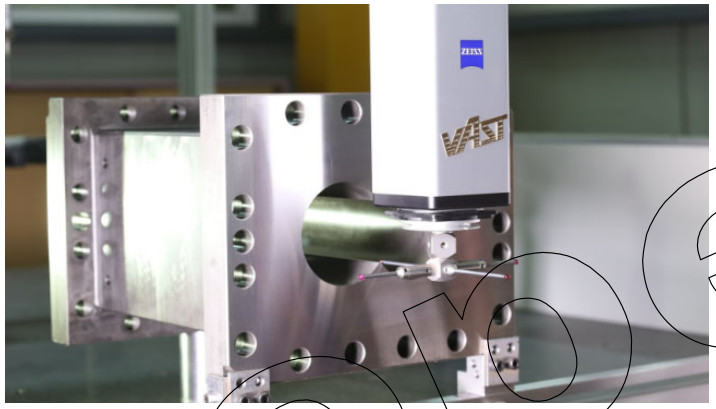
Advantages

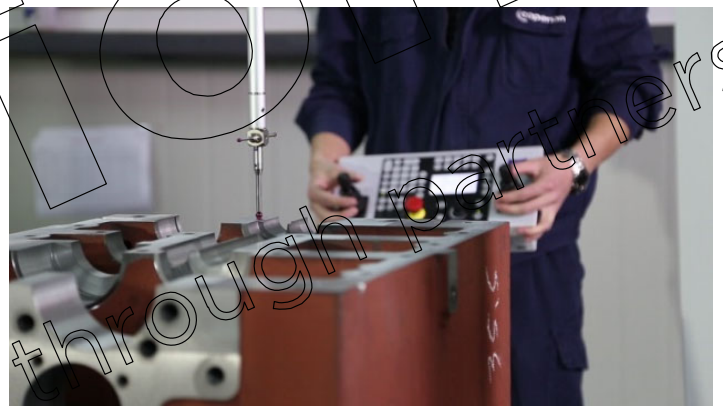
- ✓ High precision of element profiling
- ✓ Better elements conformity
- ✓ High productivity





Zeiss 3-dimension Inspection Center

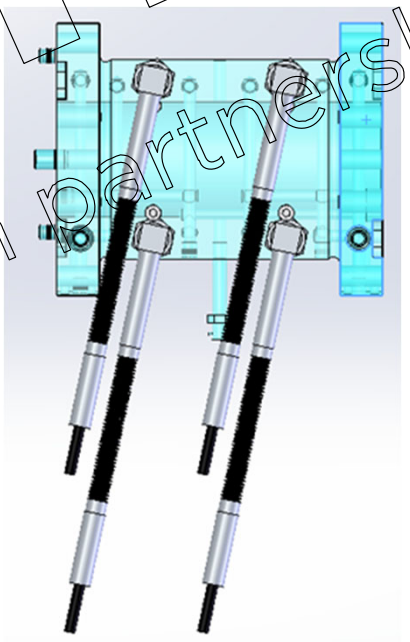




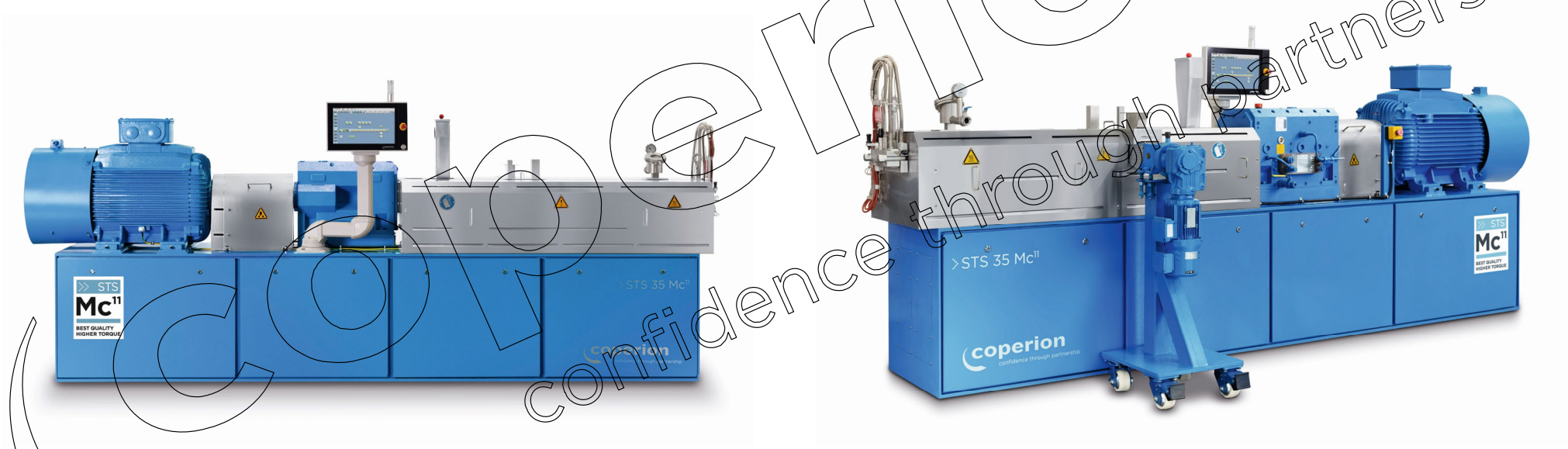
- ✓ Dimension check range up to micron level (measuring accuracy is 1.4 micron)
- ✓ Special designed temperature sensor can offer extremely reliable temperature compensation to ensure the precision
- ✓ Inspection data of every single barrel is around 80 items
- ✓ Inspection data of every CTE gearbox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

Highlights of STS 75 Mc PLUS

- Specific torque (Md/a^3) increased from 11.3 Nm/cm3 to 13.6 Nm/cm3
- 20% throughput increase with torque increase
- Lower melt temperature and SEI due to higher filling degree
- Robust and reliable European gearbox with high safety factors
- Optimized screw shaft sealing to avoid powder leakage
- Heating cartridge design for uniform heating
- Optimized cooling channels for better cooling efficiency
- Cold hammered screw shafts
- All key components manufactured in house
- Coperion quality standards



STS 35 Mc^{11} with Masterbatch Features

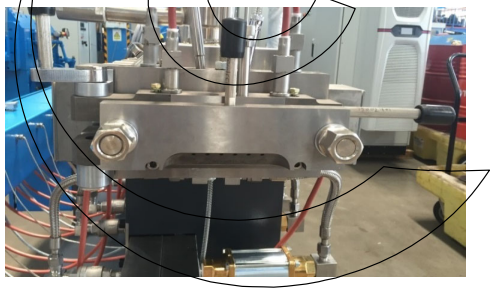


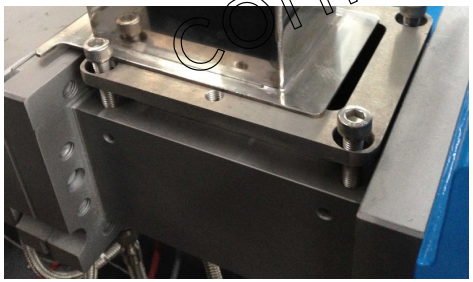
Special designs for masterbatch application (easy cleaning features)
Developed in 2018

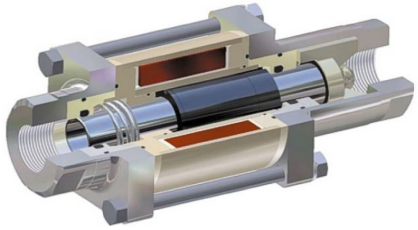
STS Mc^{11} Masterbatch Features

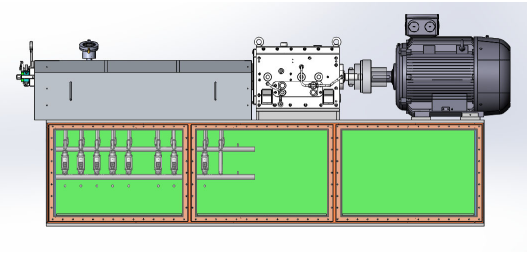
- Improved insulation hoods for easy cleaning and handling
- Easy cleaning feed hoppers and insert
- Masterbatch die heads for optimal flow and easy cleaning (STS 35 to 65)
- “Close the gap” collars around vent ports
- Coaxial solenoid valves for best reliability

EASY CLEANING

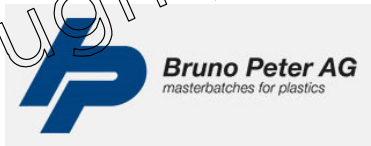








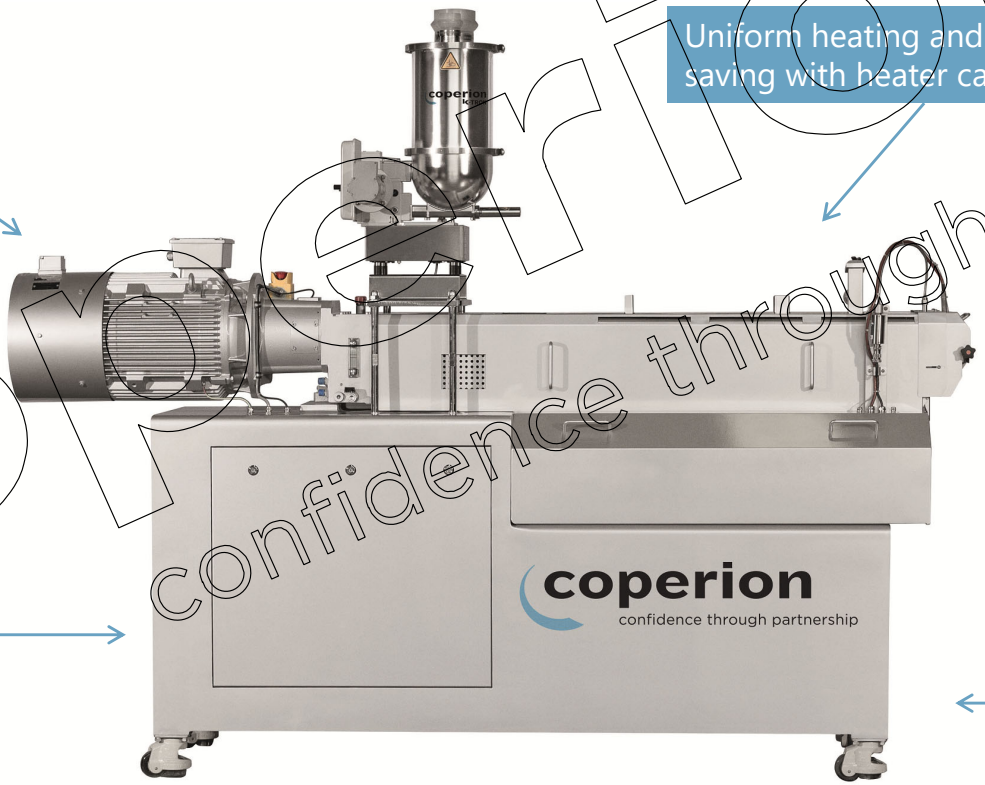
STS Reference Customers for Masterbatch



STS 25 Mc^{11} Lab Line

Easy scale up due to constant Do/Di = 1.55

Uniform heating and energy saving with heater cartridge



Increased flexibility and time saving barrel changes with the tie rod design

Complete base enclosure to ensure easy cleaning

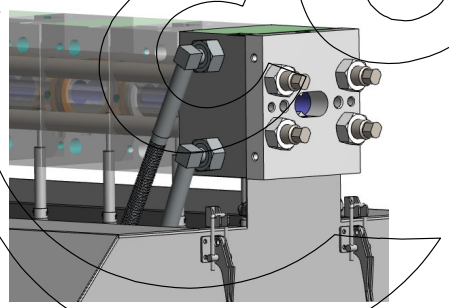
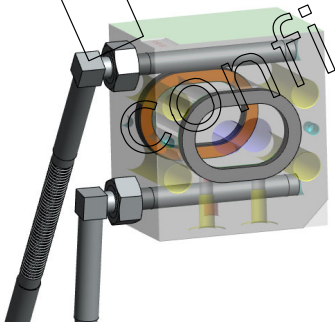
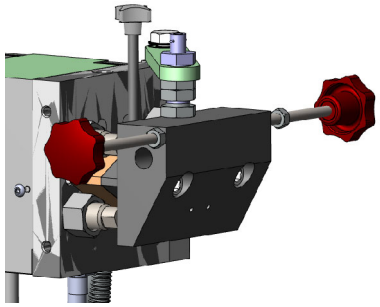
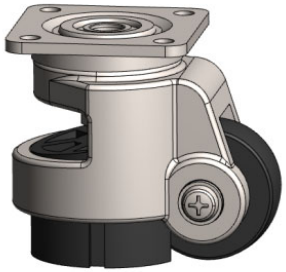
Small space requirement and movable wherever needed

STS 25 Mc^{11} Highlights

- Fully engineered in Coperion Germany
- Production of small quantity, as low as 2 kg for R&D and recipe developments with minimum material loss when recipe change
- Increased availability and profitability due to quick change over
- Output up to 80 kg/h, suitable for representative sampling and small production orders
- Precise scale up due to constant Do/Di = 1.55 within STS family
- Element flight depth of 4.55 mm enables good pellet feeding performance
- Strict CE conformity

STS 25 Mc^{11} Highlights

- Increased flexibility and time saving for barrel exchange with tie rod design
- Heater cartridges for barrel and die head ensure uniform heating and energy saving
- Easy cleaning and user friendly features for the design of base frame, die head
- Small space requirement and movable wherever needed
- Process design flexibility with exchangeable 4D barrels and wide selection of standard screw elements

Summary

- STS is a proven product with 20 years of history and more than 1400 sets installed worldwide.
- All key components are manufactured in house according to Coperion quality standard.
- STS has a very good price and performance ratio.
- Typical applications of STS are engineering plastics, masterbatches, etc.
- STS incorporates the full process and quality know-how of Coperion to offer good product quality and machine reliability to our customers.

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Contact

Gavin Wang
Sales Director

No. 1296 Jiyin Avenue, Jiangning,
Nanjing 211100, China
Phone +86 (0) 25 5278 6288
E-Mail gavin.wang@coperion.com
www.coperion.com

Kenji Baba
Sales Manager

3-7-3, Shin-Yokohama, Kohoku-ku,
Yokohama, Kanagawa 222-0033, Japan

Phone +81-45-595-9801
E-Mail kenji.baba@coperion.com
www.coperion.com

Kazuya Fujisawa
Sales Engineer

3-7-3, Shin-Yokohama, Kohoku-ku,
Yokohama, Kanagawa 222-0033, Japan

Phone +81-45-595-9801
E-Mail kazuya.fujisawa1@coperion.com
www.coperion.com


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