



# Extruder Basic Principle

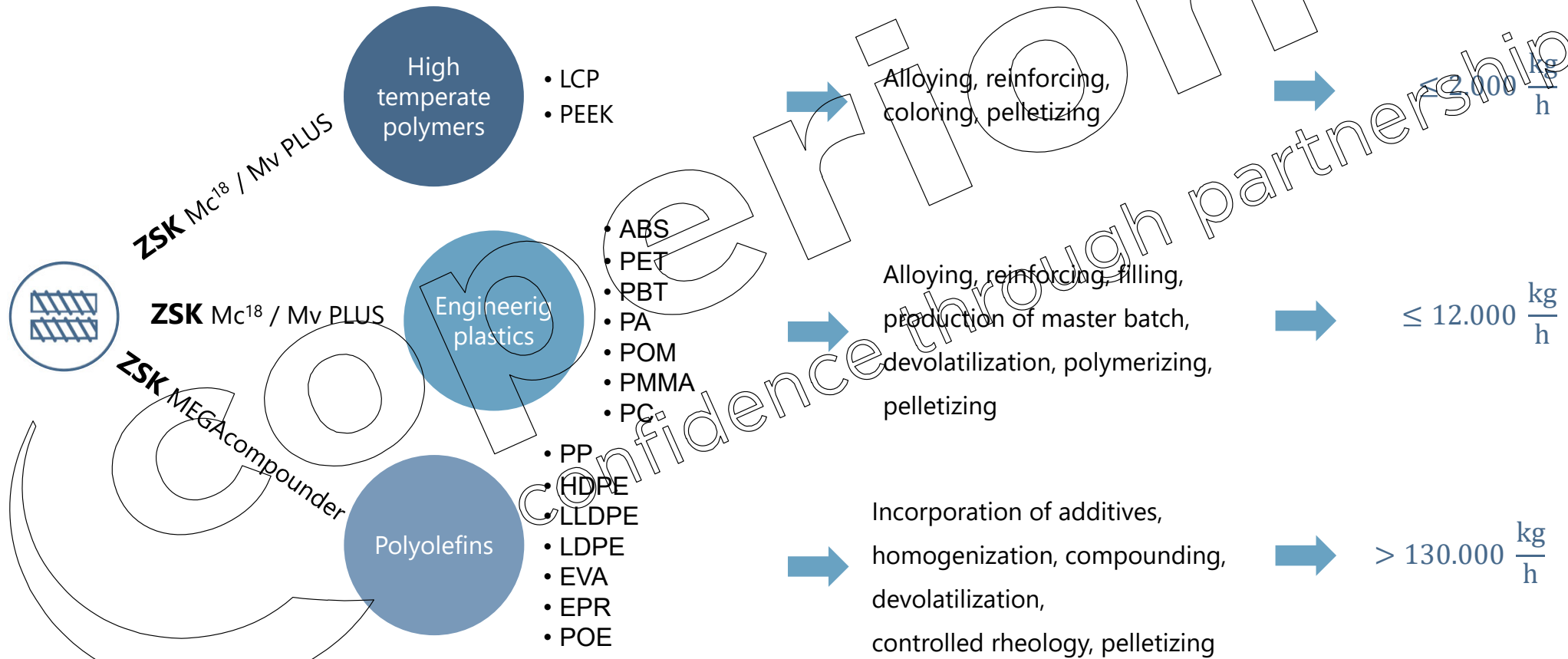
Claus Hermann - General Manager Extrusion Systems Large



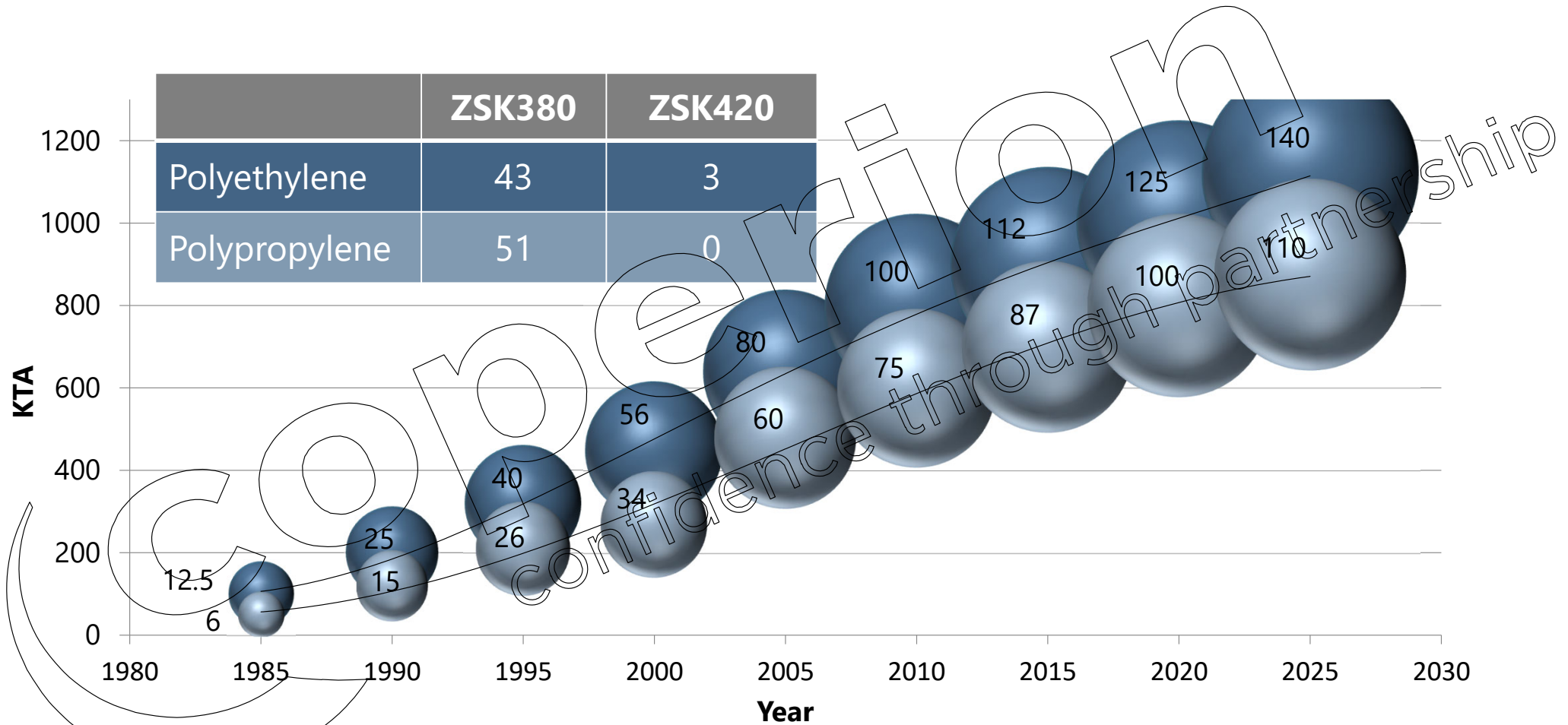
Coperion Technology Update 2025

# Co-rotating Twin Screw for Polymer Compounding

## Range of Applications

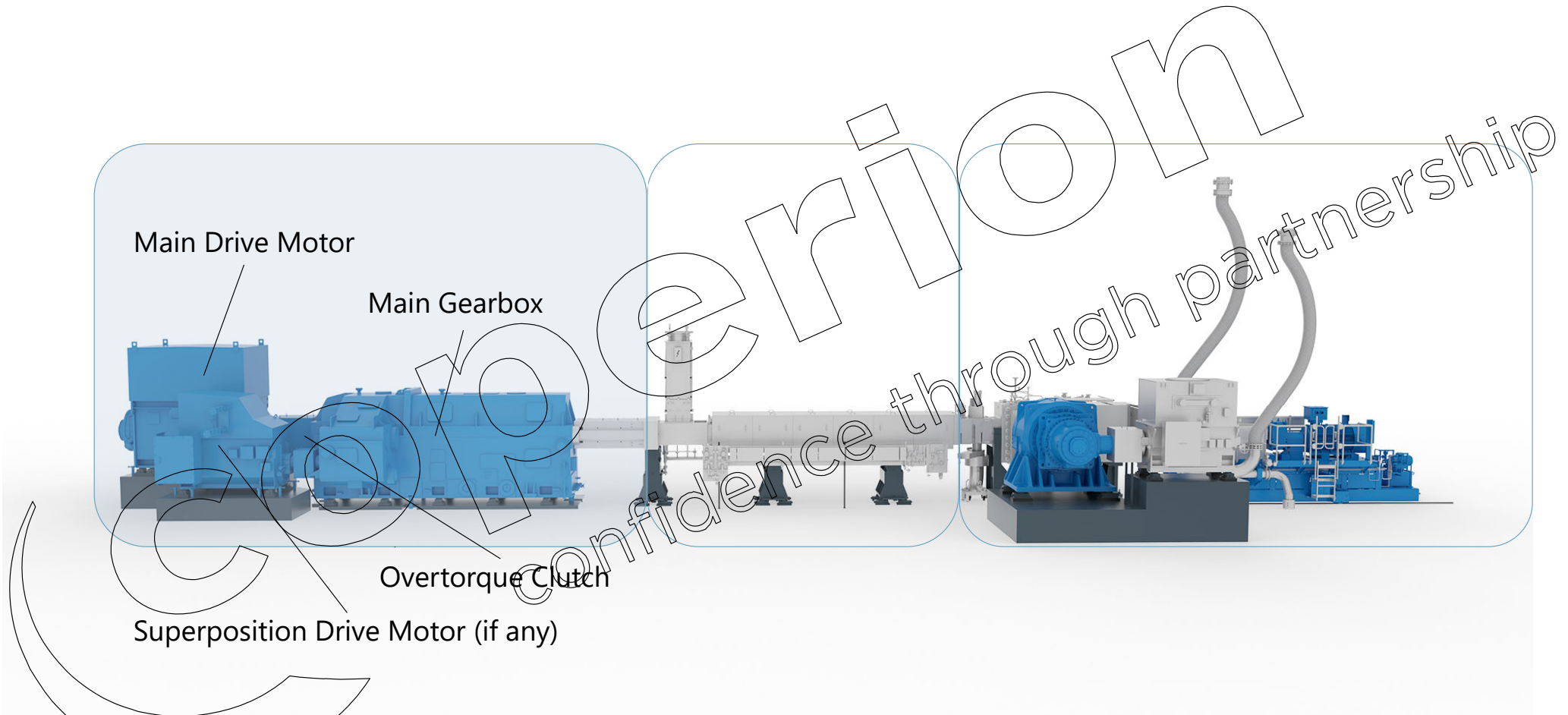


# Capacity Growth in Polyolefin Plants

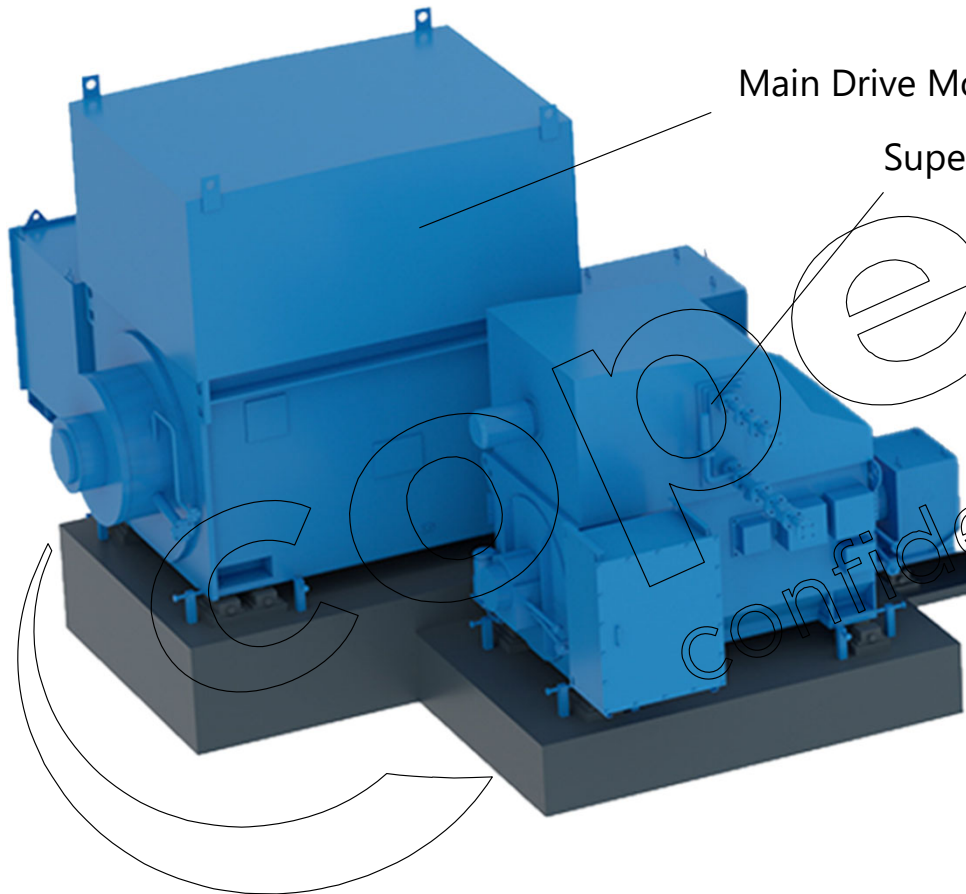




# Main Drive System



# Main Drive and Superposition Drive Motors

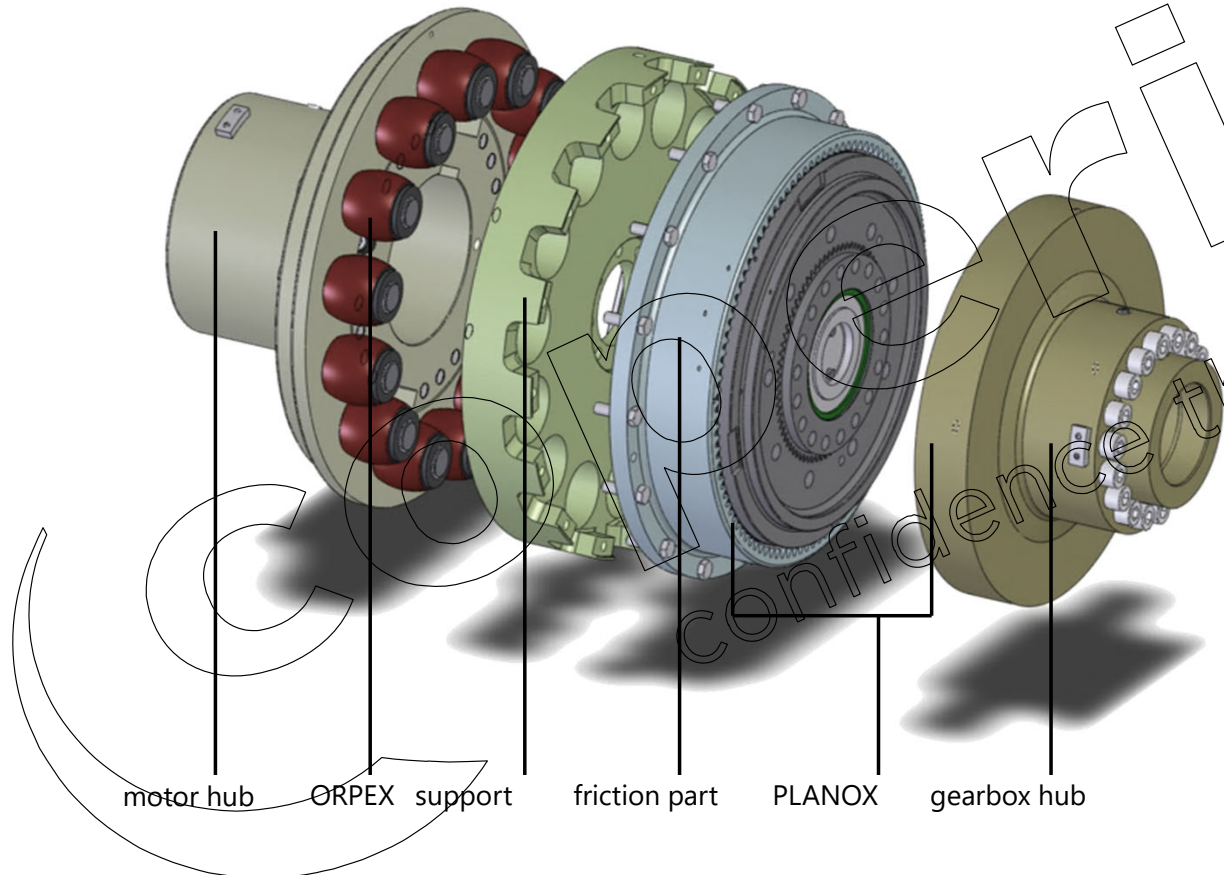


Main Drive Motor with up to 20 MW – Power

Superpositioning Motor is only required in case of planetary gearbox

# Mechanical Clutch

Desch – PLANOX ORPEX coupling



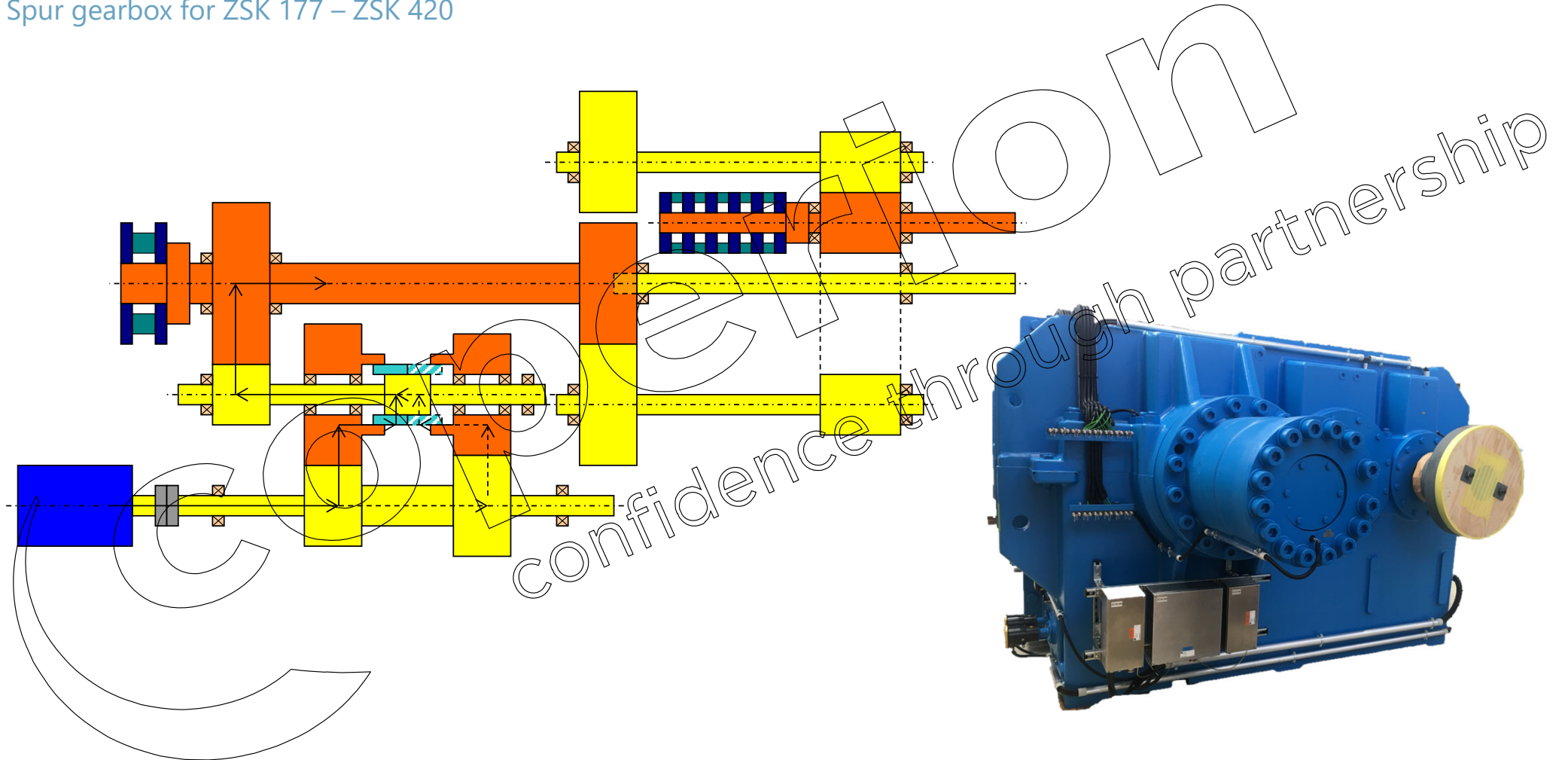
## Main advantages

- non-destructive
- very accurate
- disengages without mechanical destruction



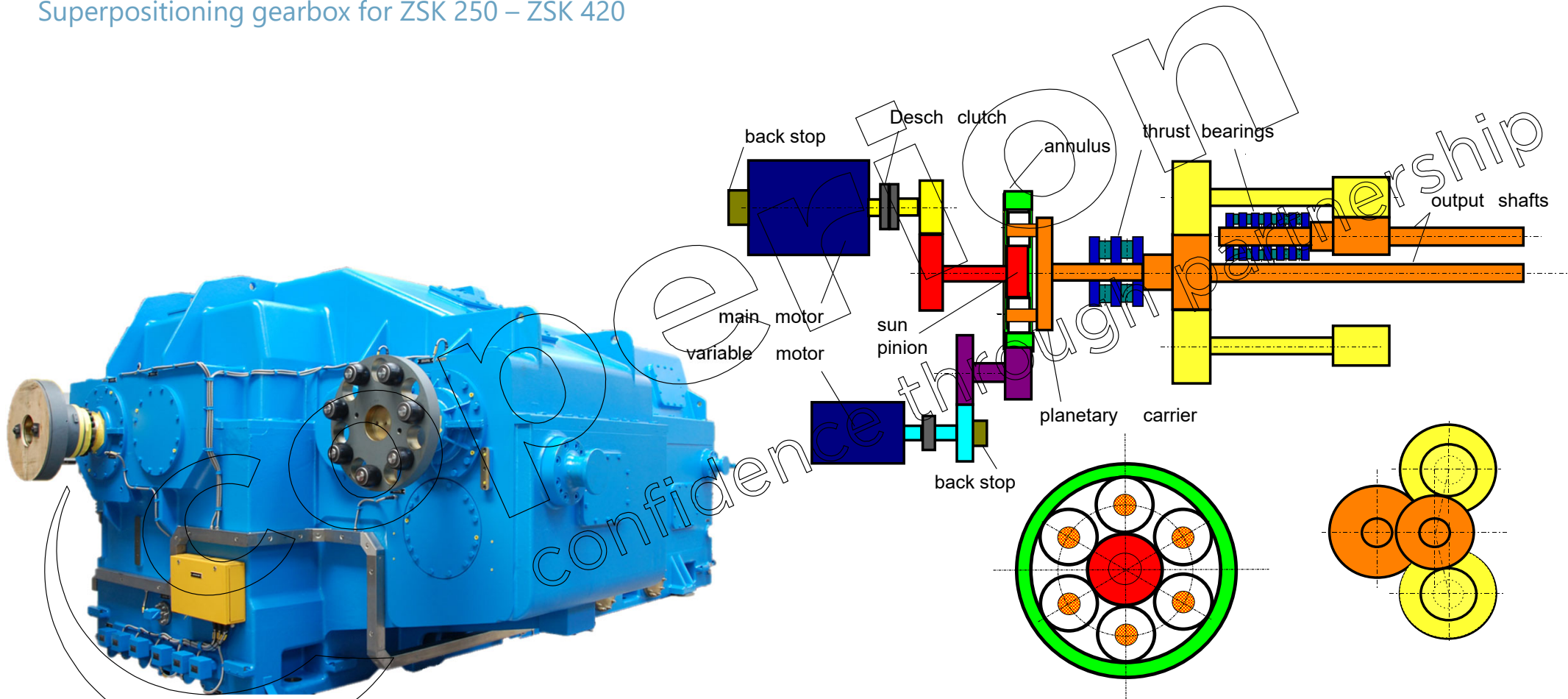
# Main Gearbox

Spur gearbox for ZSK 177 – ZSK 420



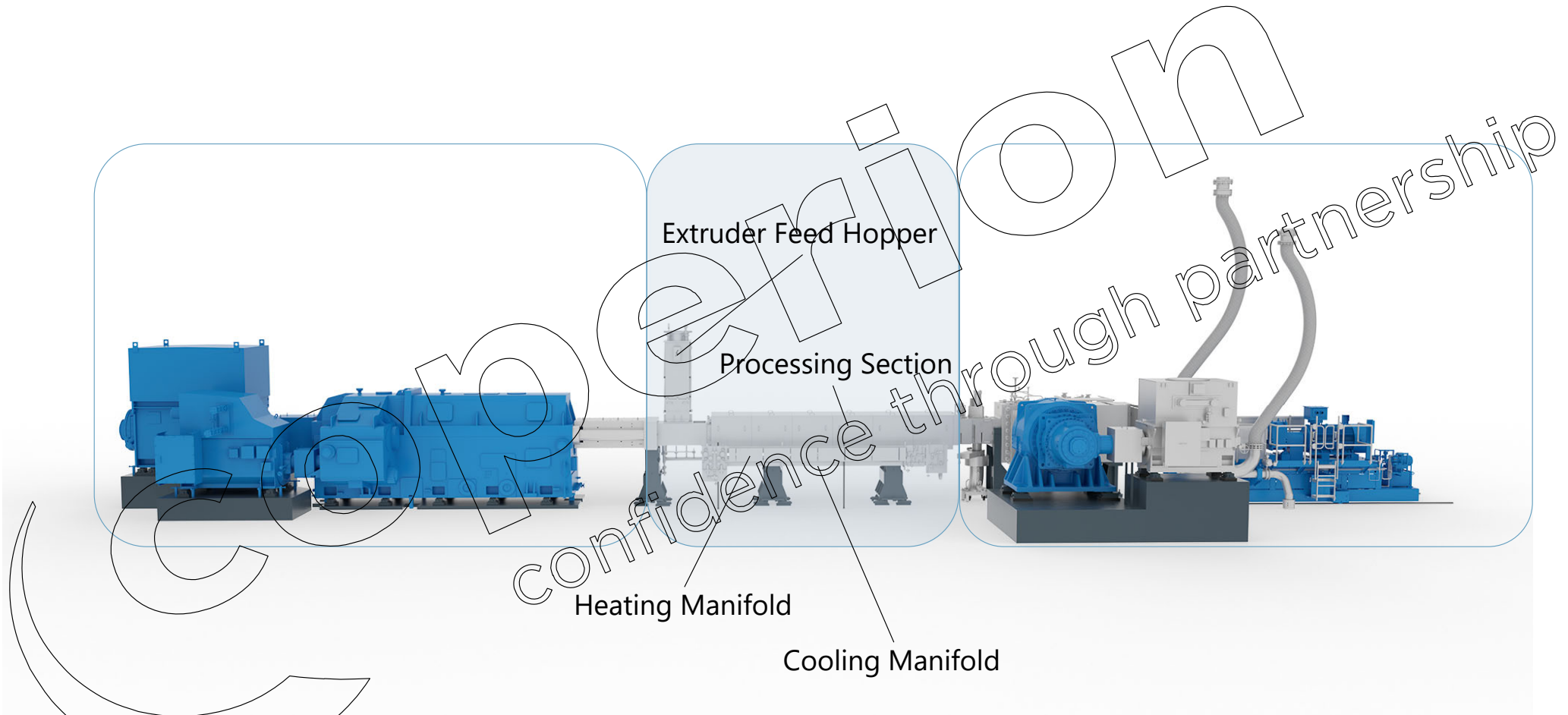
# Main Gearbox

Superpositioning gearbox for ZSK 250 – ZSK 420



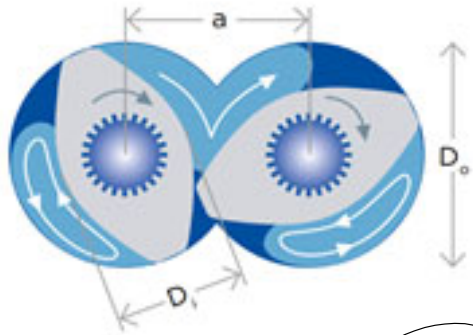


# Processing Section



# Co-rotating Twin Screw – ZSK

Fully intermeshing screw profile



Cross-section of the two co-rotating screws

$D_o/D_i$  = diameter ratio, determines average shearing, devolatilization and powder intake

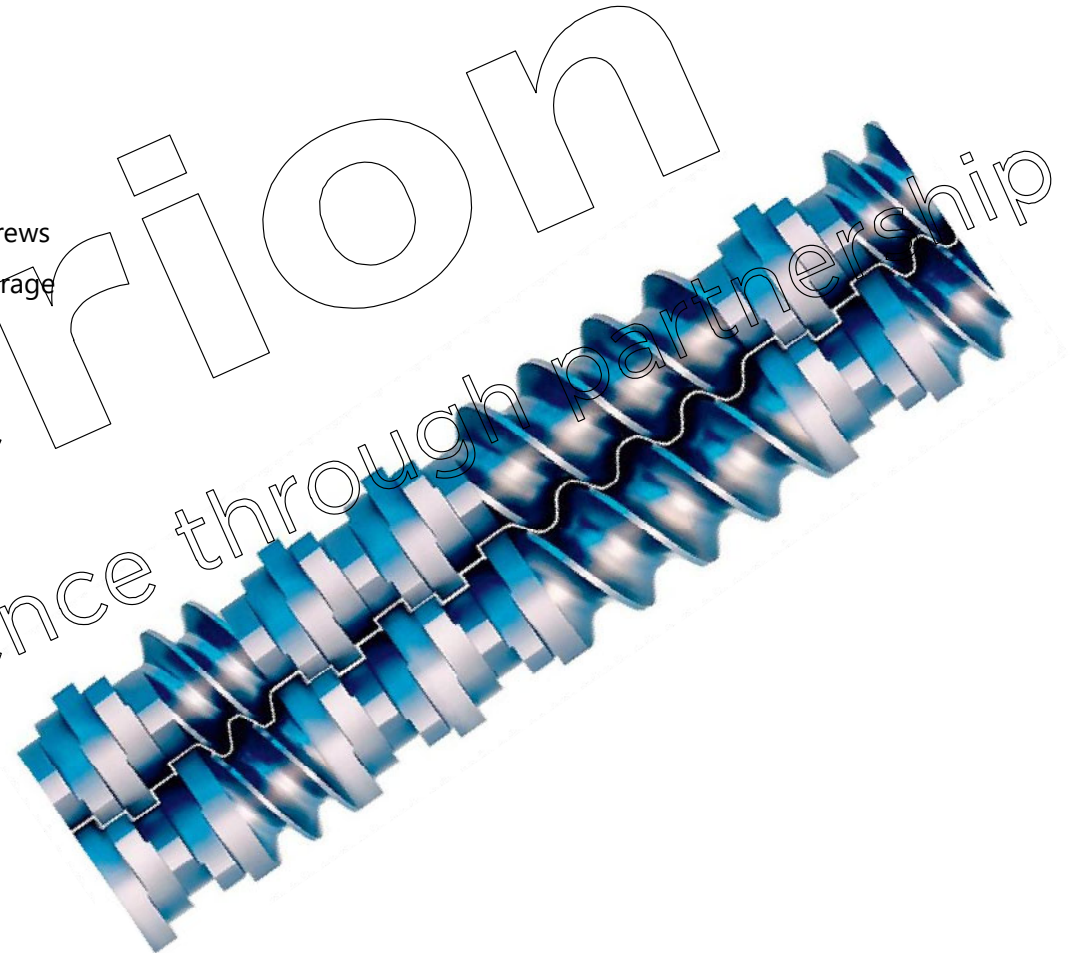
$Md/a^3$  = specific torque, determines power density and degree of fill

$n$  = screw speed, determines shearing and mixing

$D_o$  = outer diameter

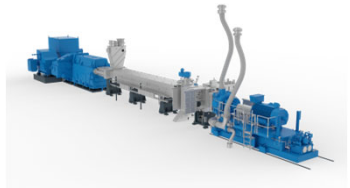
$D_i$  = inner diameter

$a$  = centerline distance

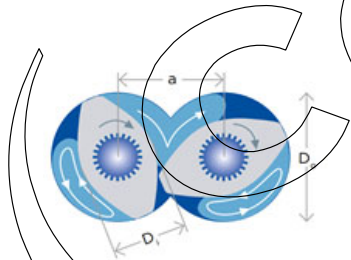


# Co-rotating Twin Screw vs. Continuous Mixer

Coperion ZSK vs. Continuous mixer



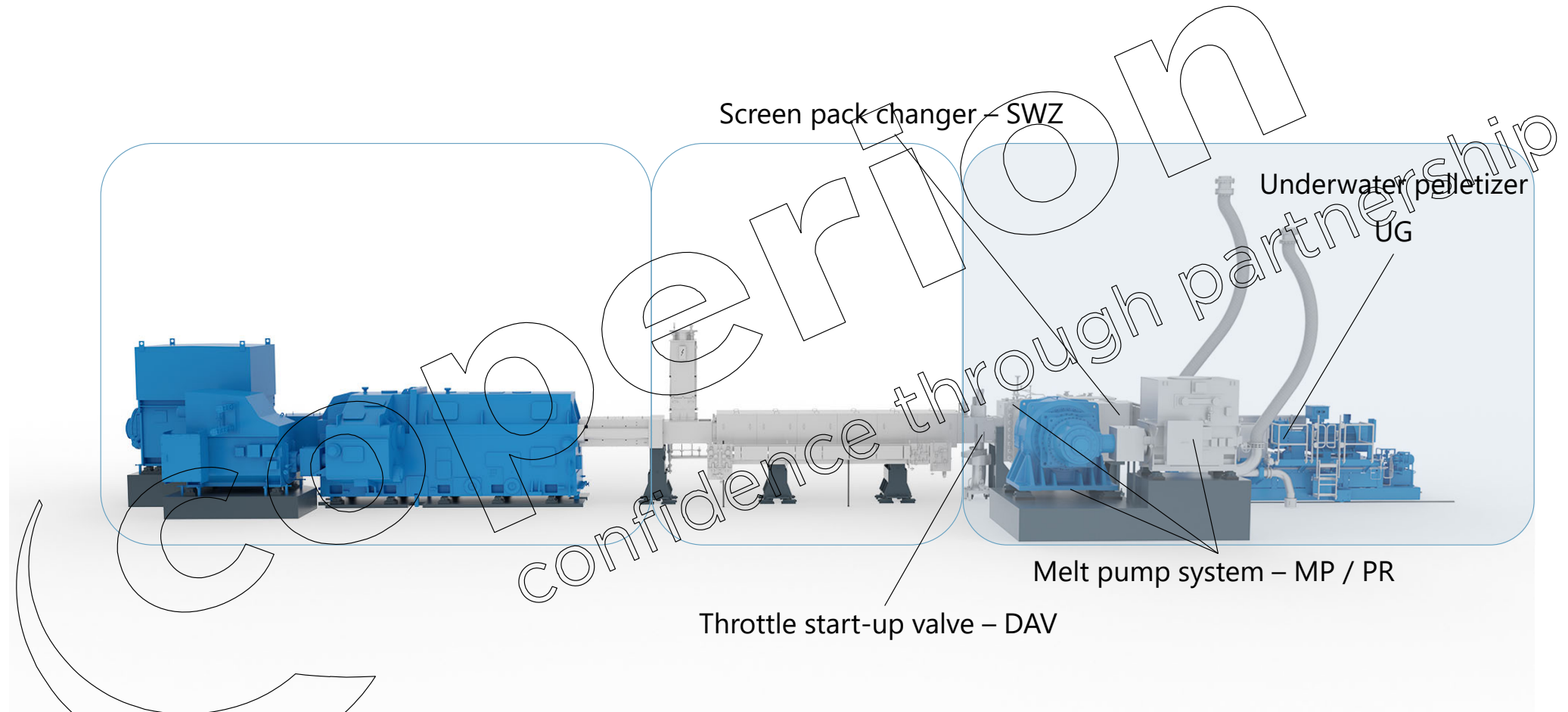
ZSK MEGAcopounder



Co-rotating twin screw	Counter-rotating continuous mixer
Straight design (small footprint), benefits in multiple line arrangement	L-shape (larger footprint), wide building is required
Operation without melt pump possible	Operation without melt pump not possible
Modular barrel and screw elements for highest flexibility	Fixed process arrangement with less flexibility in screw design
Low radial screw forces (radial bearings in gearbox only, with $L_{h10}$ up to 100,000 h)	High radial screw forces (bearings on both screw ends necessary)
Self cleaning intermeshing	Intermeshing (not self cleaning)
Color change transition time 5 hours ( <b>separate presentation</b> )	Color change transition time With no time warranty



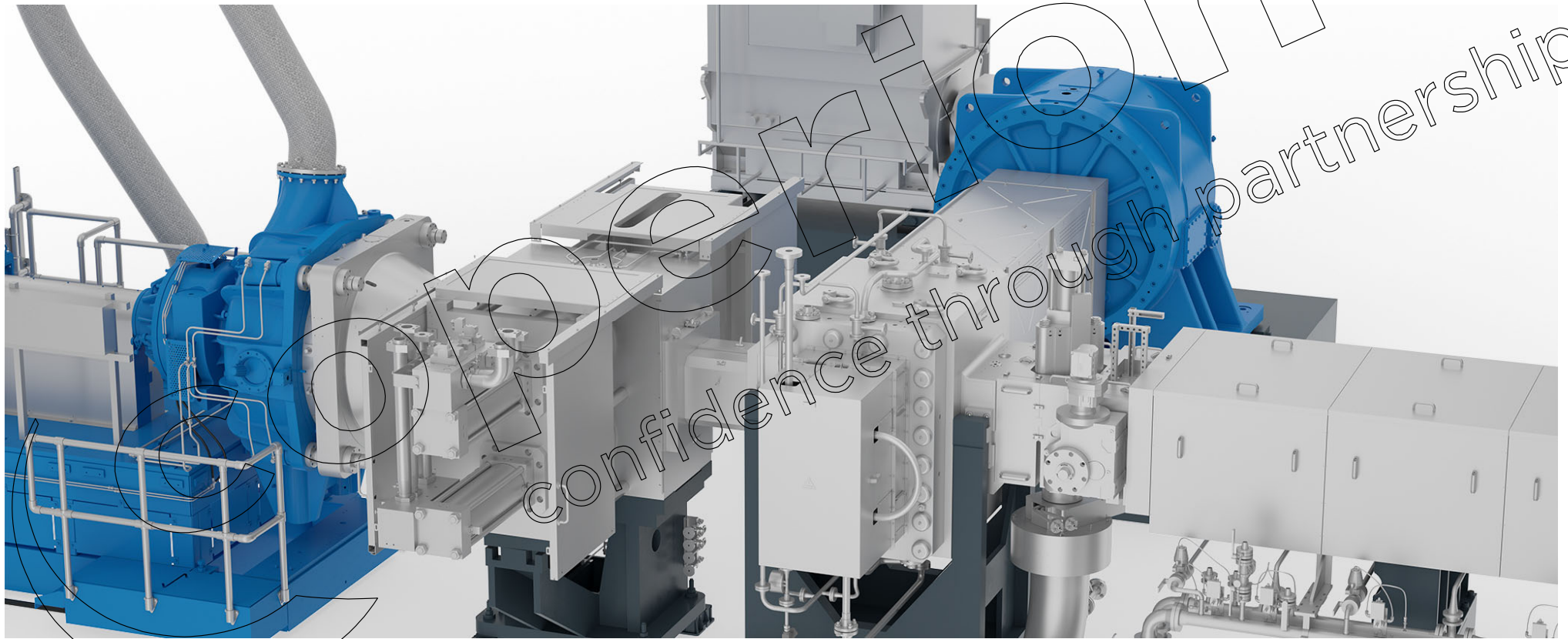
# Discharge Equipment





# Discharge Equipment

Full assembly



# Underwater Pelletizer – UG



UG 1250 – with 1250 mm cutting diameter







Thank you very much for your attention.

Coperion Technology Update 2025