EXTRUSION DAYS
BATCH-TO-CONTI

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Coperion – Complete Solutions from a Single Source

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Coperion – Extruder Modernization

Driving Factors

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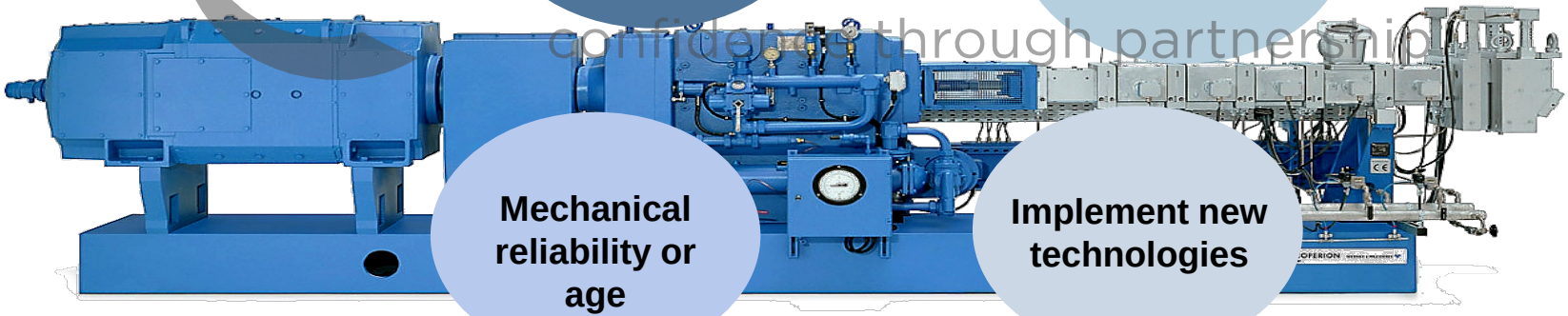
Rate increase or Energy saving

New polymer grades

Spare part availability

Software upgrade

Wear resistance



Mechanical reliability or age

Implement new technologies

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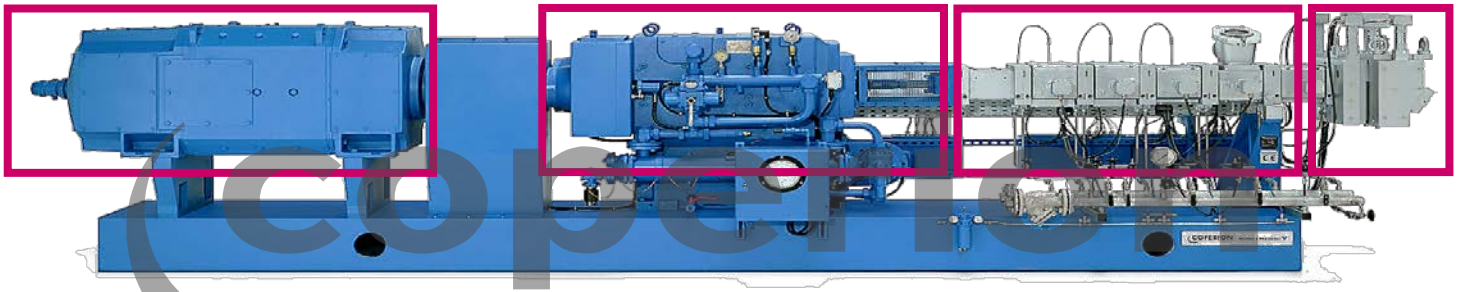
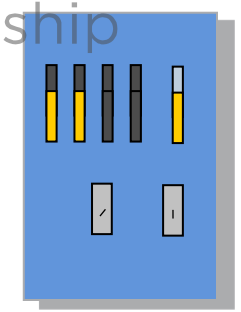
Extruder Line – Value Ratio



- Identify components for improvement



Electrical &
controls ~ 30%

Single Component Change Possible

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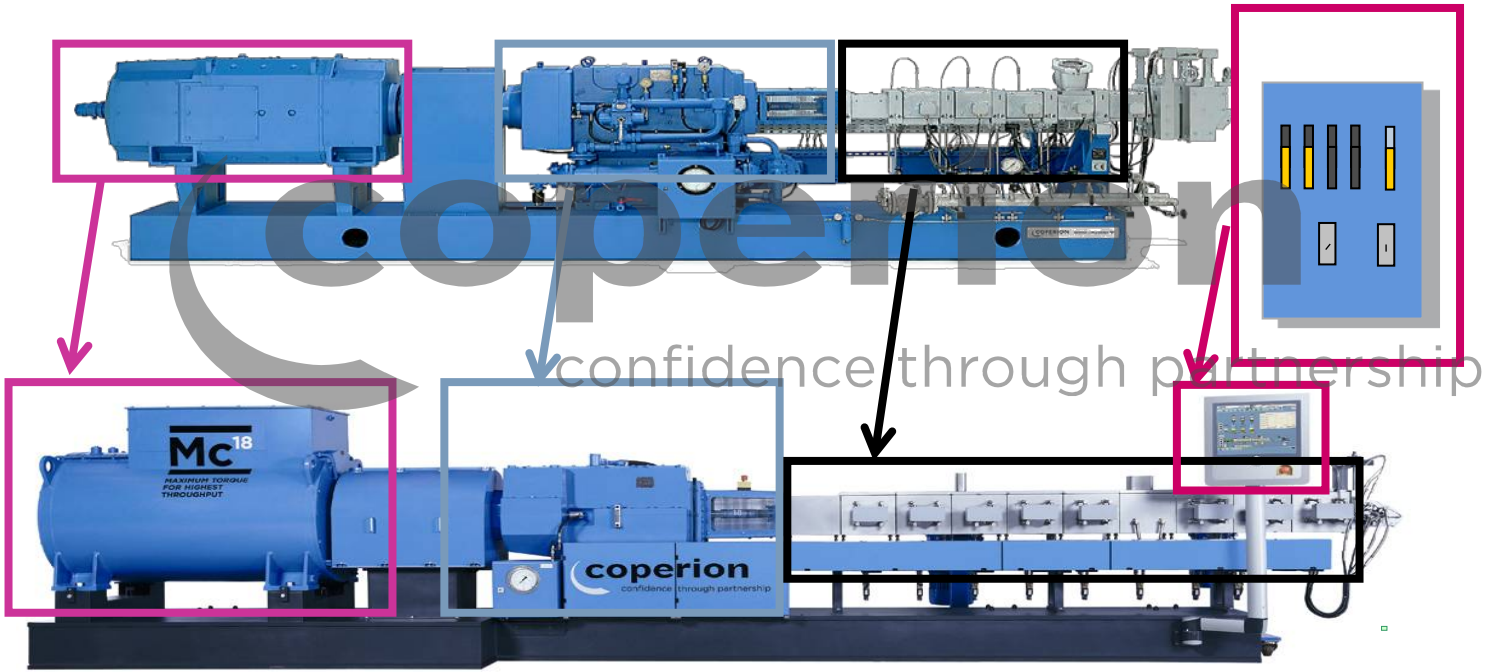

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Knowing and Understanding the System Limits

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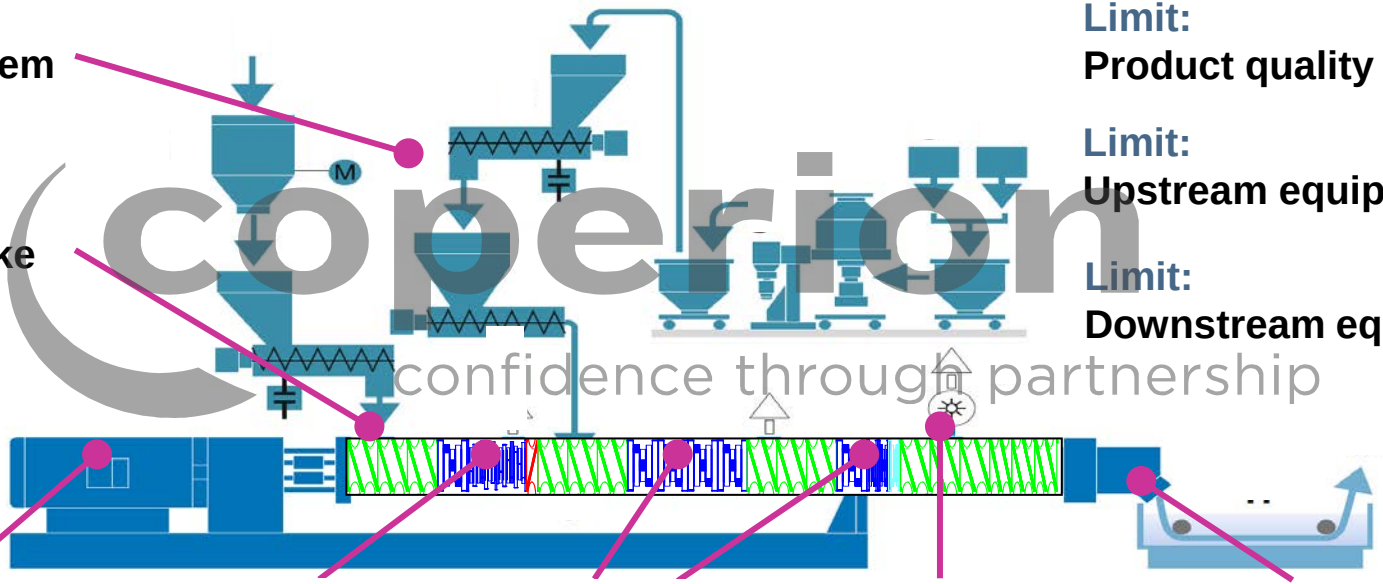
Limit:
Feed system

Limit:
Feed intake



Limit:
Product quality

Limit:
Upstream equipment

Limit:
Downstream equipment

Limit:
Motor power

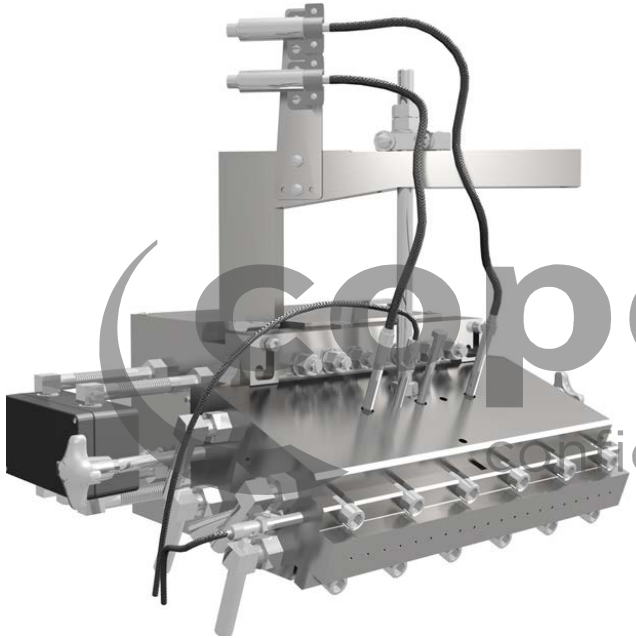
Limit:
Melting

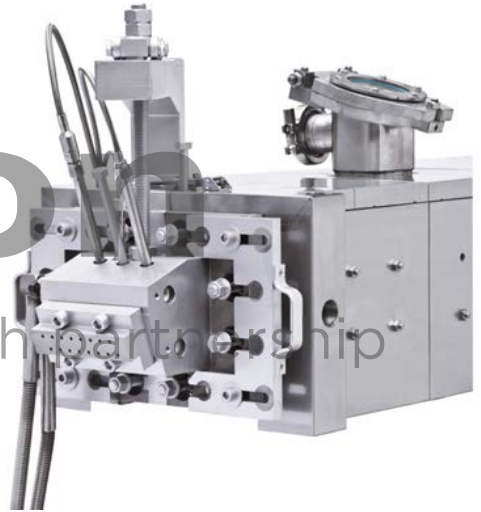
Limit:
Mixing

Limit:
Degassing

Limit:
Discharge

New Die Head Design Features





- Increased heater power
- Separate temperature control zone for side and top heaters

Optimization of Die Heads

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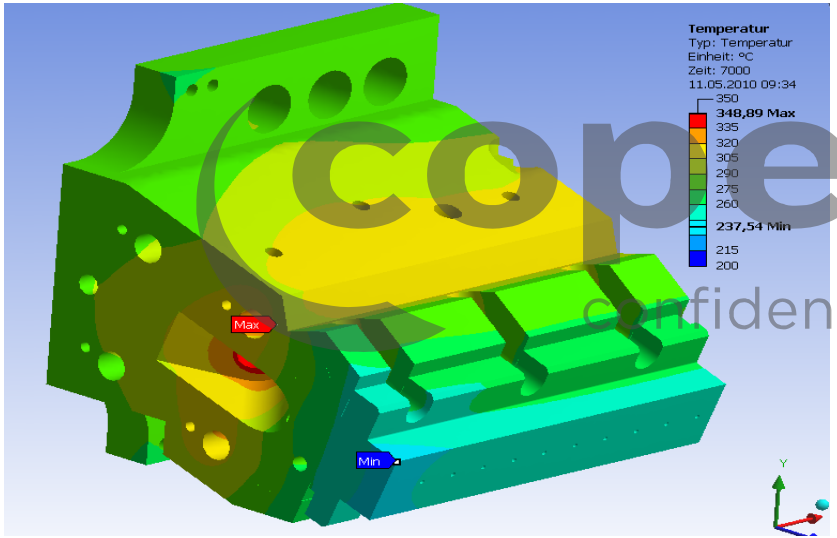
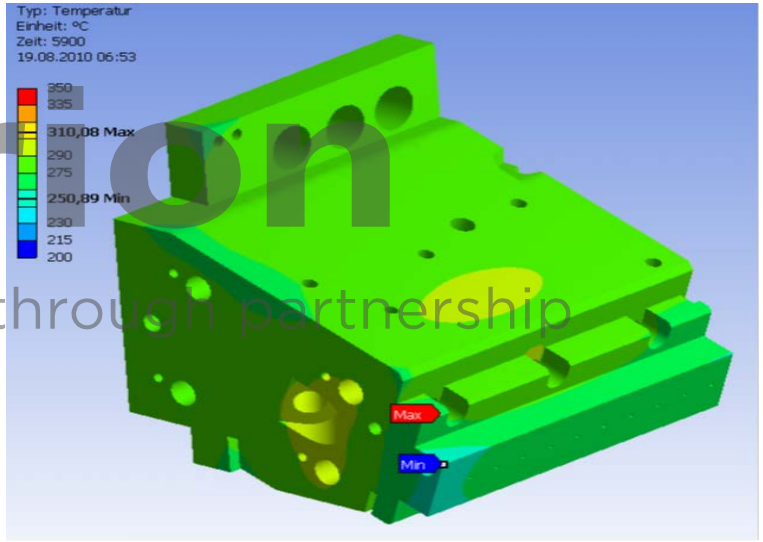
Old Design



Max dt up to 40 K

Current Design



Max dt = 5 K

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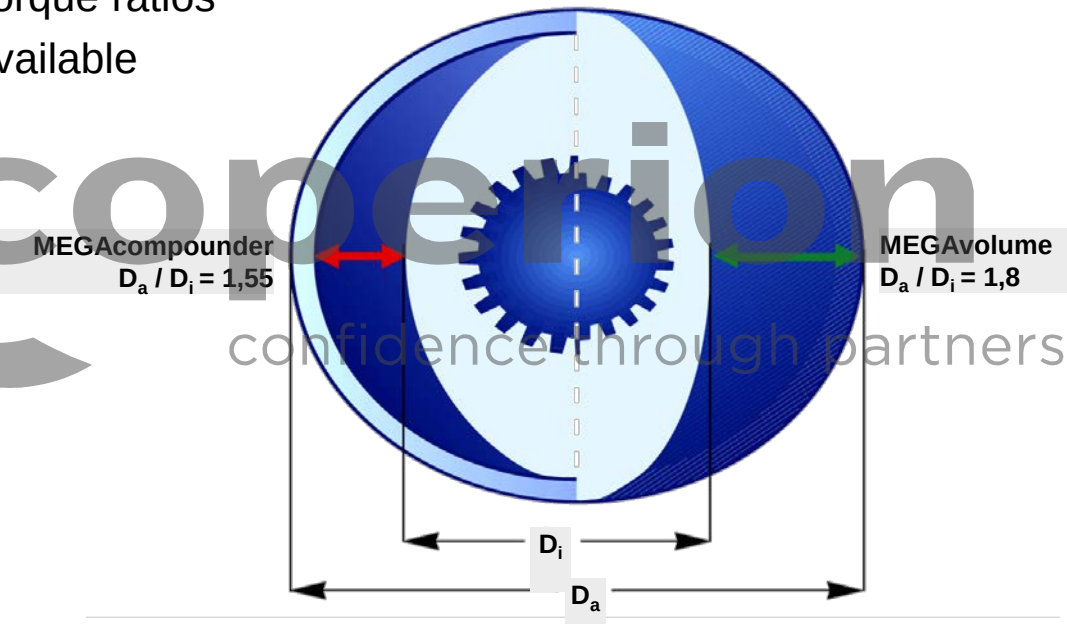
Example
Rate and Energy Improvements

ZSK Process Section Change

Different specific torque ratios
and free volume available



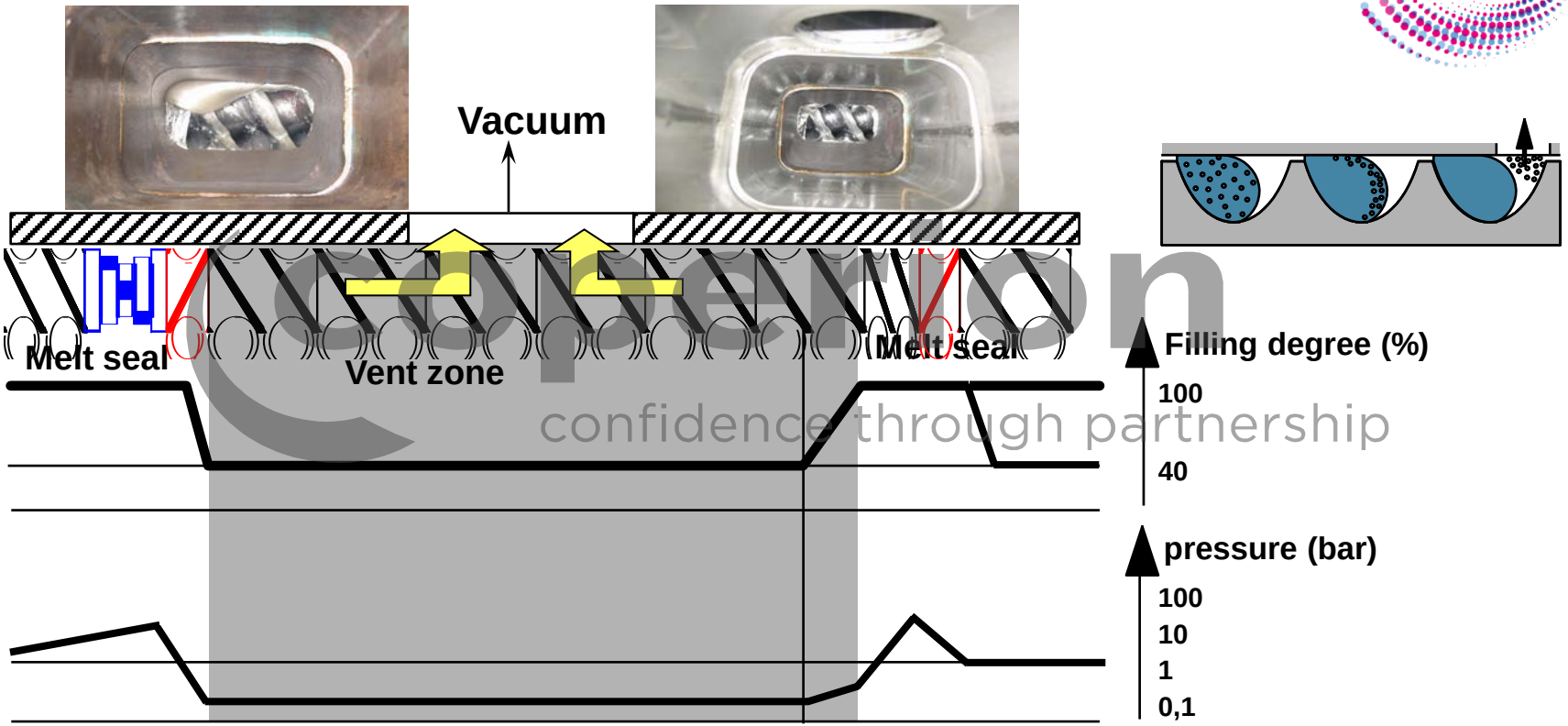
Example for Rate Increase

Modernization	Effect	Equipment	Gain
D_o/D_i 1.44 to 1.55	Increase of free volume	New process section	~ 15% rate / energy
Torque 11,8 to 18	Higher fill	New gearbox	~ 10% - 60% rate / energy
FET on ZS-B	Higher fill	FET side feeder	~ 10% - 100% rate
Screw technology example: involute elements	Screw efficiency	New screw	~ 15%- 100% rate / energy

- Combination of modification can boost the benefit depending on application

Example
Degassing Improvements

Example – Degassing of melt



Vent Stuffers – to Allow High Degree of Fill

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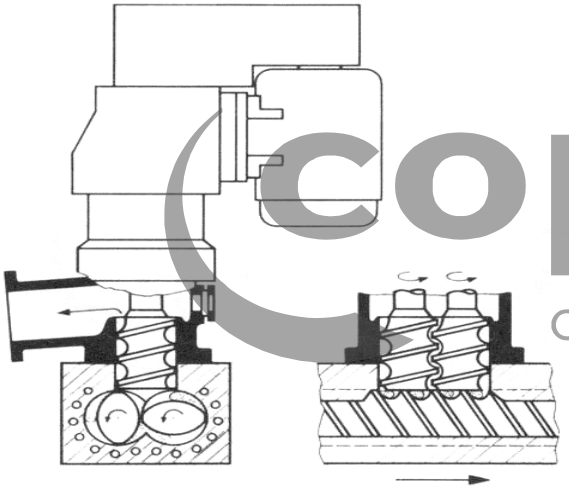
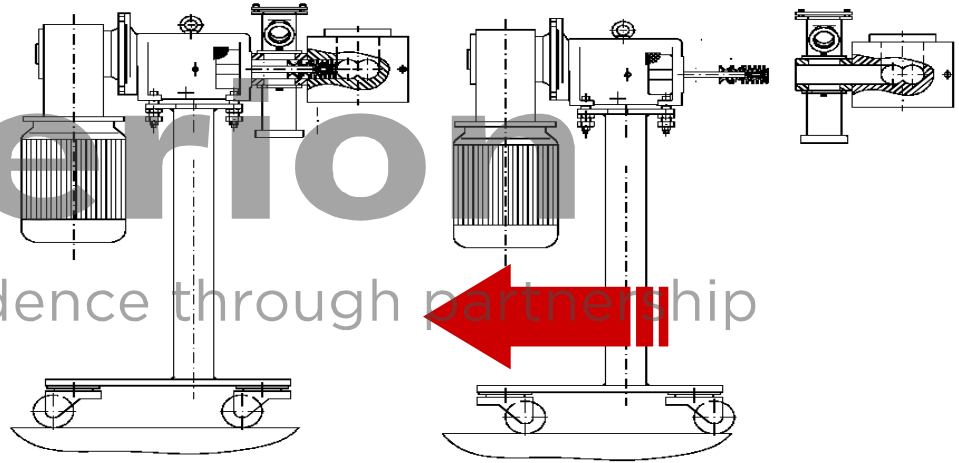
Previous design: DSE principle



New design: ZS-EG principle



Vertical arrangement over the ZSK

Horizontal arrangement on ZSK side

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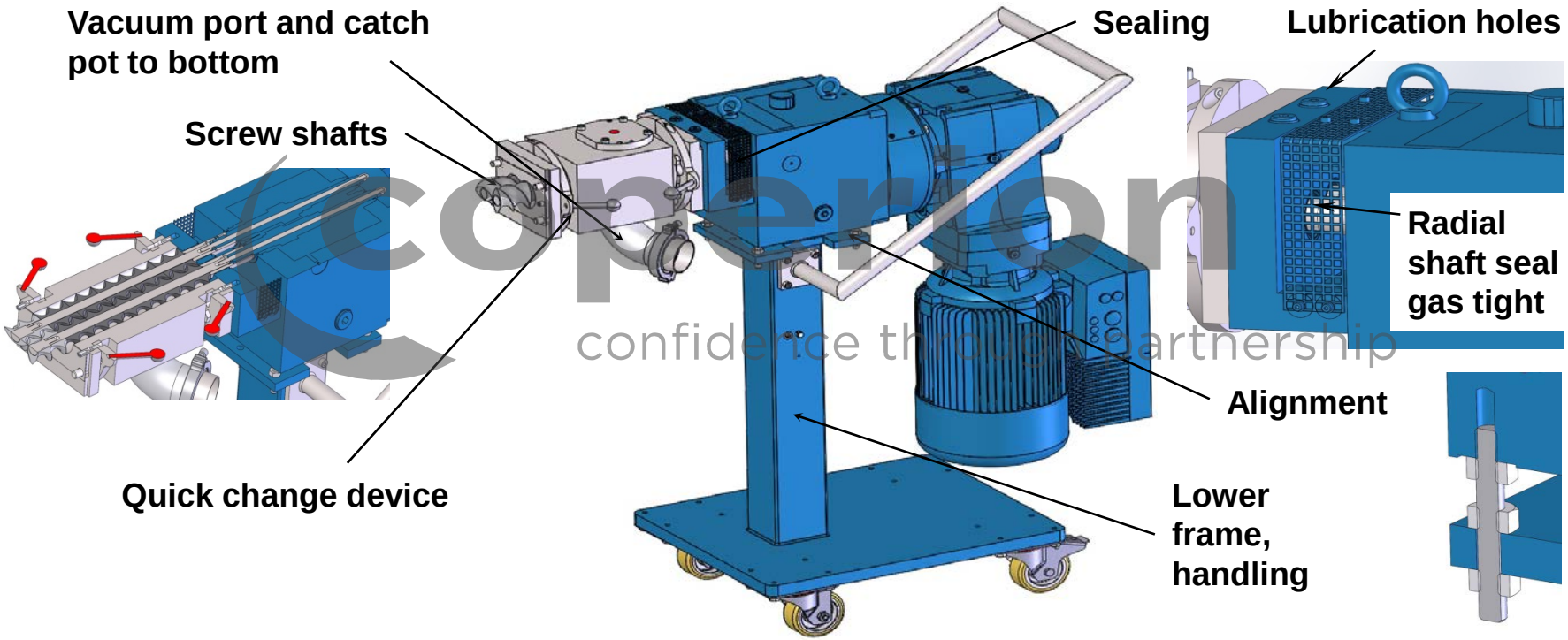
Optimized ZS-EG 58



Example
Material Improvements

Coperion Full Service Agreements

Safe budget planning on operational cost for extruders

Service Contract may include wear and tear parts like:

- Screw elements/shafts
- Extruder barrels
- Gear box bearings/overhauls

Example
Control System Upgrade

Why Control System Modernization

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Old control systems	MODERNIZATION	New control systems
Pushbutton control		Touchpanel control
Old IPC/Panel		Newest technologies
Low spare part availability		High spare part availability
Long, unplaned downtimes		No or short downtimes

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Why Control System Modernization

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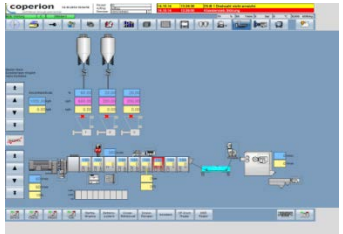
Old control systems

- Epc16, Epc32, …
- CScompact
- CSseperate
- EpcNT (old version)

MODERNIZATION

New control systems

- CSpro basic
- CSpro medium
- EpcNT (new version)



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Overview of Control Units

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Laboratory	Food	Powder coatings	Engineering plastics	PVC	Compounding lines with extended scope	Complete plant control
						

CSpro basic

CSpro medium

EpcNT

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Coperion ServiceBox

- Small size
- 11 Connection possibilities
- On/off switch
- Modern quadcore processor
- High temperature resistance

Thank you very much for your attention!

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