Cement Production Technology

Cement Grinding

Mechanical Design and Function of Separator

Date I Speaker
thyssenkrupp Industrial Solutions Training

engineering. tomorrow. together.

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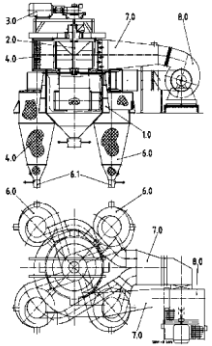
Overview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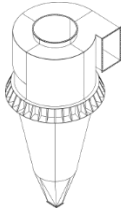

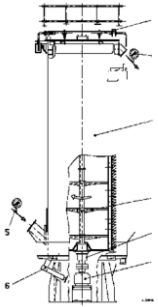
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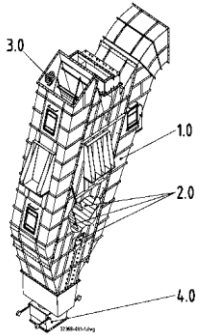
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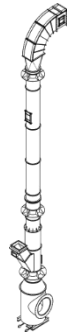

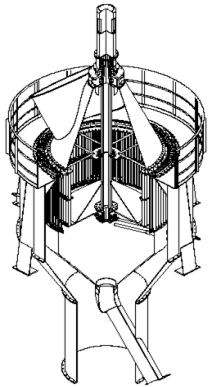

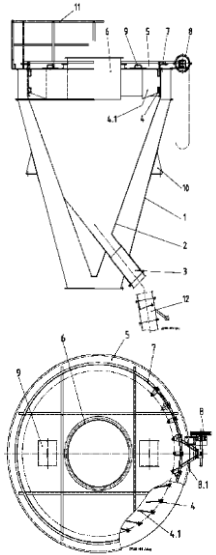
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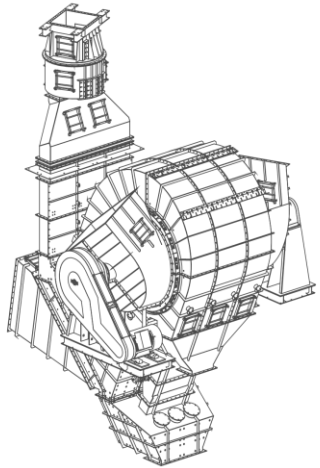

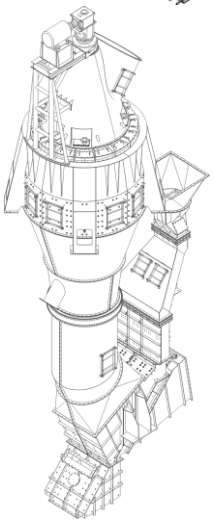

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Separators – General

Definition of Separator Designations

SEPOL = Dynamic **Sep**arator from **Pol**ysius

- ESV = Enhanced Separator Version
- LM[K,R] = Luftstrom Mühle
- HR = Horizontal Rotor
- PC = Polyom Classifier

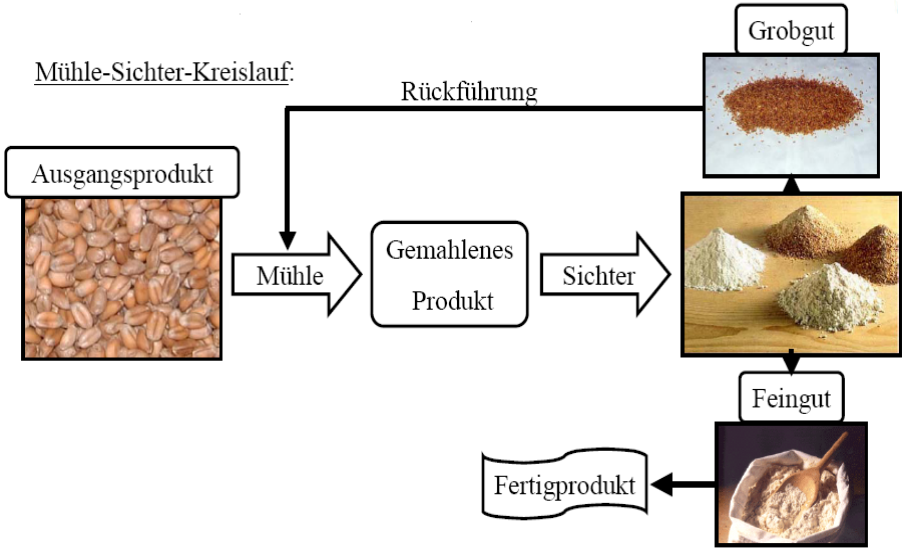
STATOPOL = **Stat**ic Separator form **Pol**ysius

- STATOPOL
- STATOPOL C
- STATOSEP

Separators – General

Major Tasks of Separating

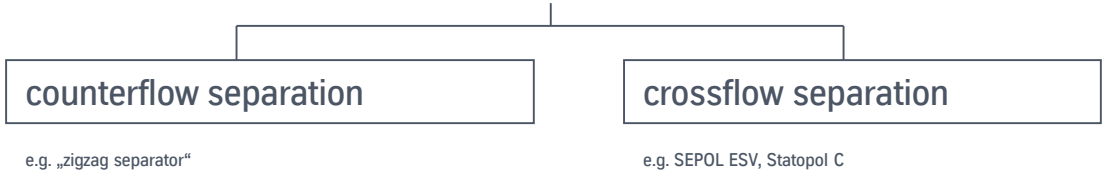
- division of feed material into fine (product) und coarse material (grits)
- isolating of particles readily ground from the mill discharge



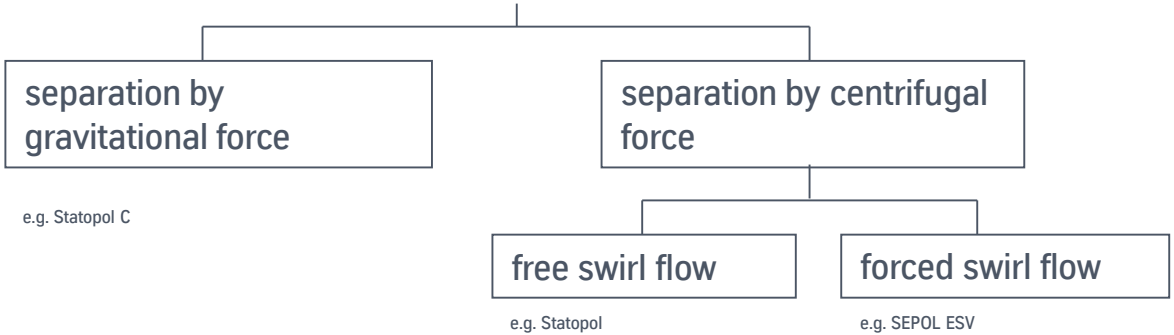
Separators – General

Classification of Separating Principles

- according to flow direction relative to particle track



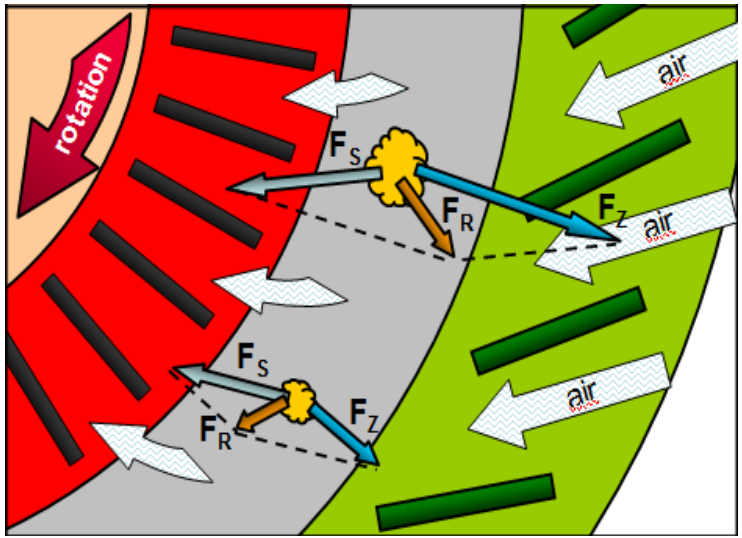
- according to kind of separating field



Separators – General

Classification of Separating Principles

- „critical particle“: balance between mass and flow forces on the particle



F_Z = centrifugal force

F_S = flow force — $F_{tangential}$, F_{radial}

F_R = resulting force

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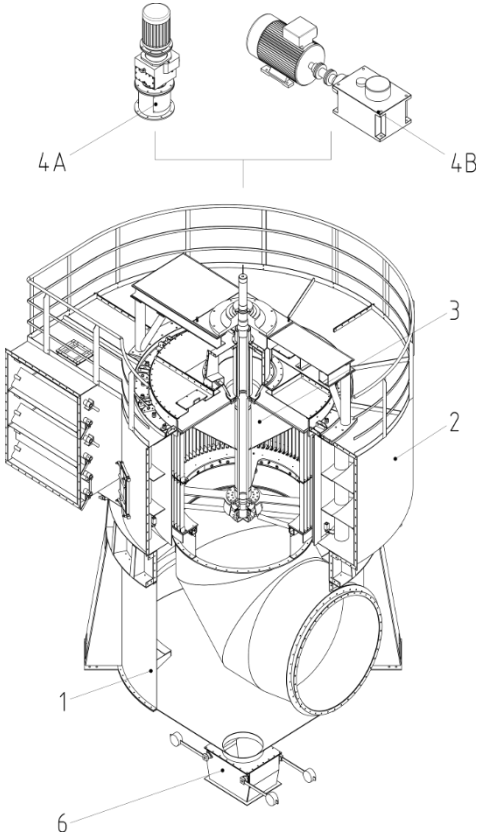
Separators – Structure

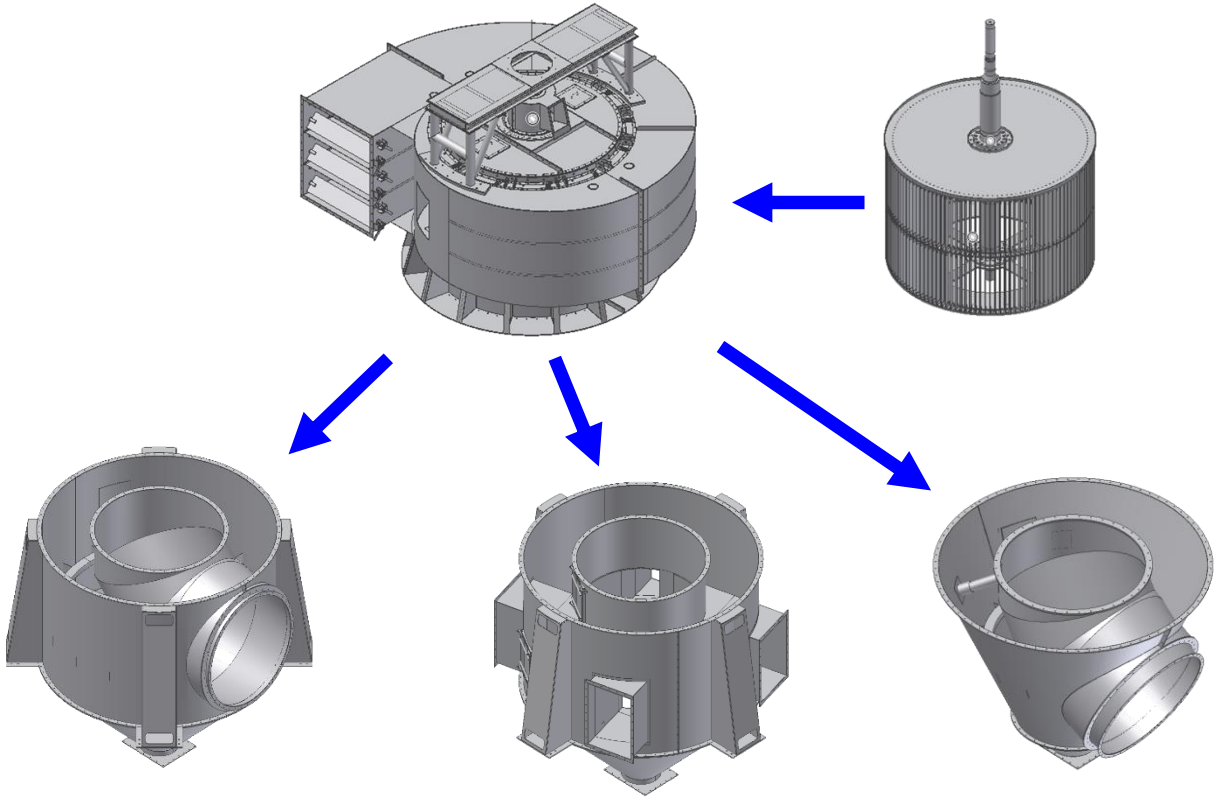
SEPOL ESV



1. Lower housing
2. Upper housing
3. Rotating parts
4. Drive unit, coaxial gear unit (4A) or bevel spur gear unit (4B)
5. Wear protection
6. Flap valve

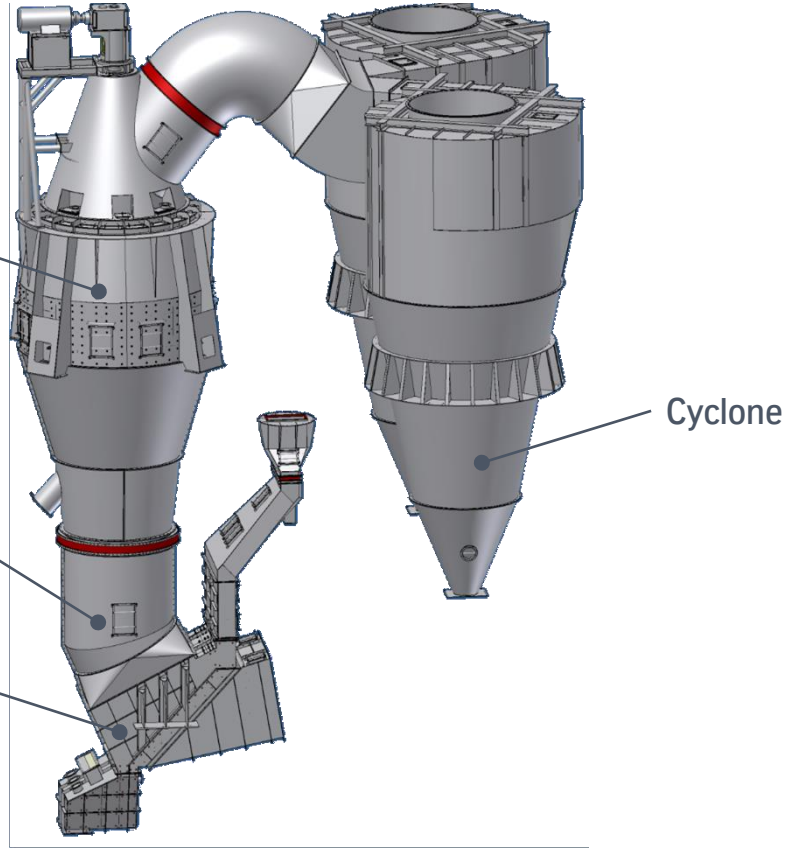
Separators – Structure

SEPOL ESV



Separators – Structure

SEPOL PC



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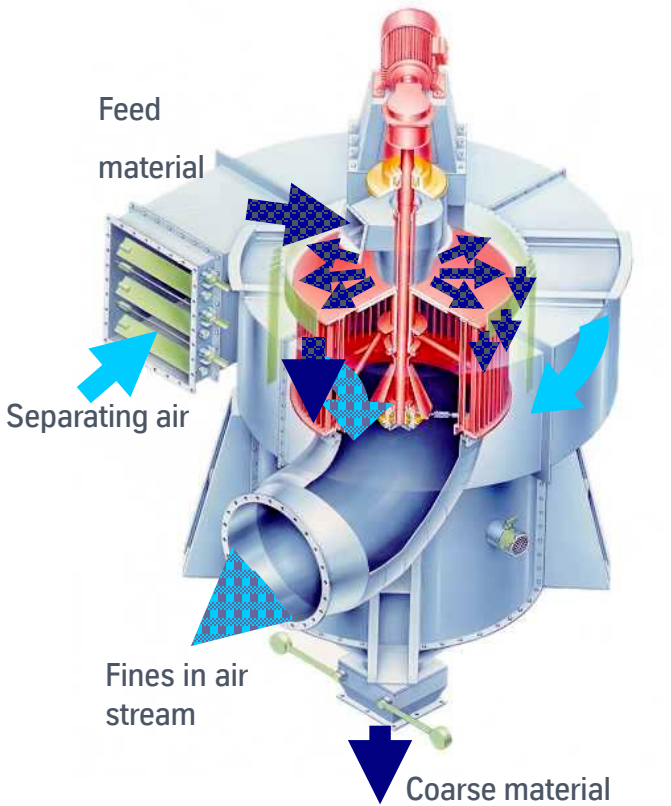
Separator – Mode of Functioning

SEPOL ESV



- Feed material is provided by air slide
- **Material** falls onto centre of dispersion disc, is accelerated radially and distributed evenly in separating area
- Fan blow separating air (recirculation or fresh air) into spiral housing and through the curved guide vanes where a swirl flow is created
- Coarse material falls downwards due to **gravity**
- Fine material follows **flow forces** and is transported out of the machine through the fines outlet

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Separators – Installation Examples

SEPOL ESV

Separators – Installation Examples

SEPOL ESV

Separators – Installation Examples

SEPOL ESV

Separators – Installation Examples

SEPOL PC

Static stage

Dynamic stage

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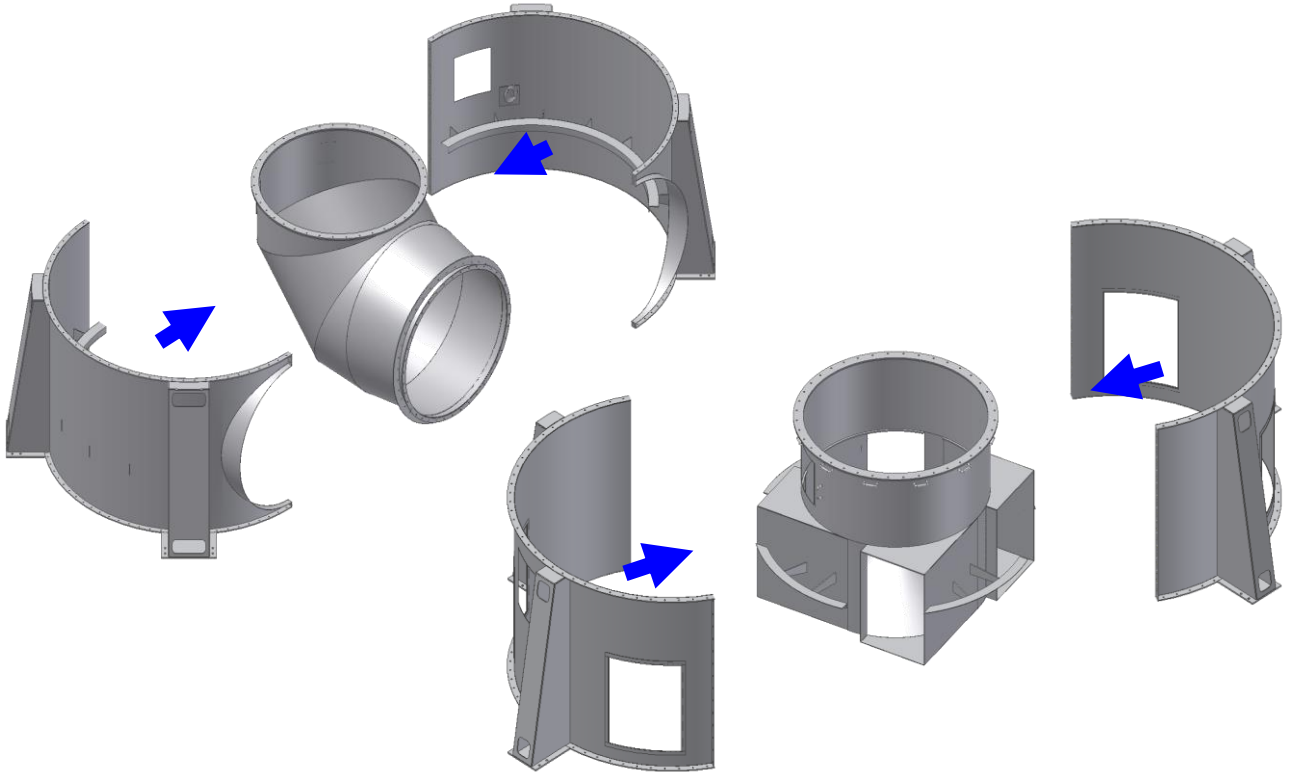
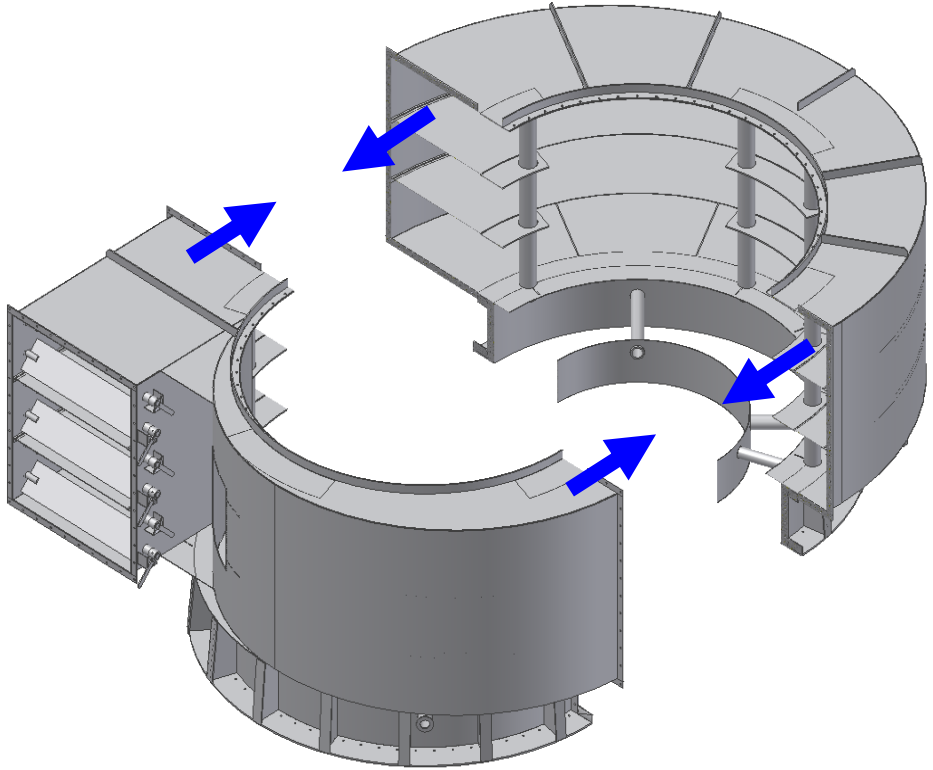
Separators – Assembly

Assembly Process of Separator: Lower Housing



Separators – Assembly

Assembly Process of Separator: Upper Housing



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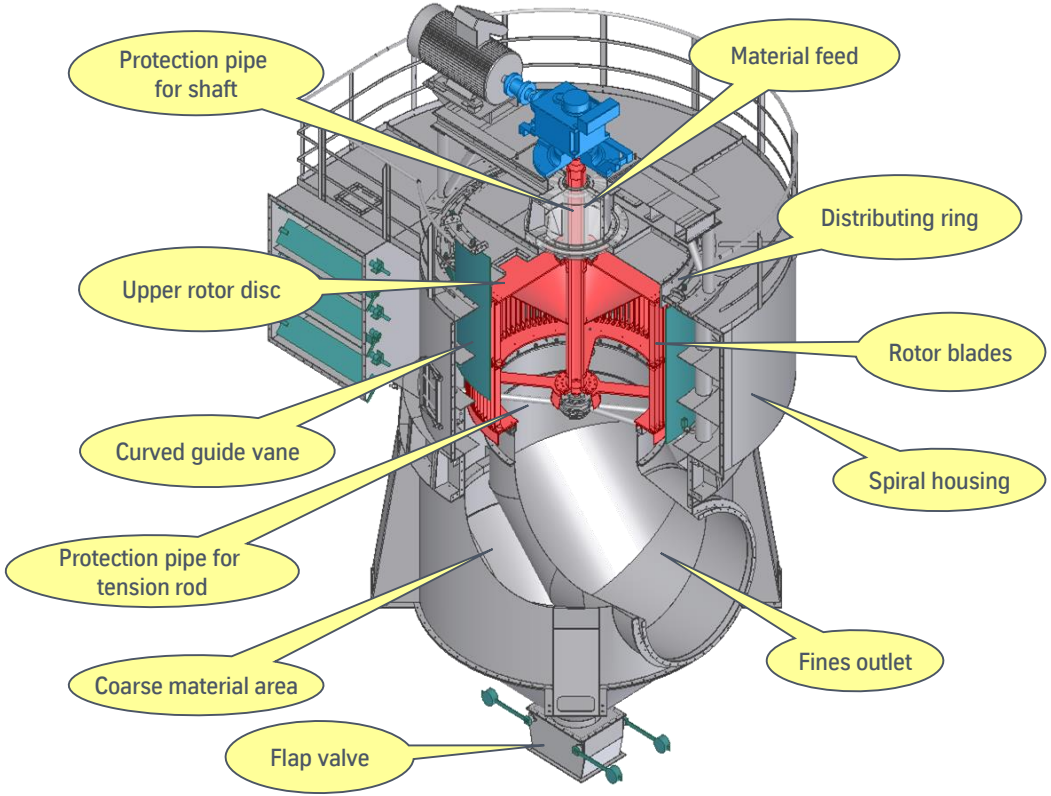
Separators – Maintenance and Wear Protection

- Relubrication of bearings with grease
- Check oil level of upper bearing and gear unit
- Readjustment of labyrinth sealing of the rotor
- Check internals and housing parts for signs of wear

Separators – Maintenance and Wear Protection

Wear Protection Measure for the Separator



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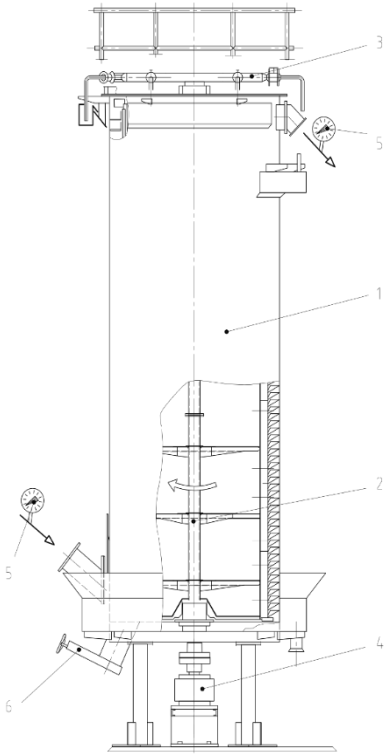
Cement Cooler – Structure

ZEKU



1. housing
2. rotor
3. cooling water distribution
4. drive unit
5. monitoring devices
6. emergency discharge

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Cement Cooler – Mode of Functioning

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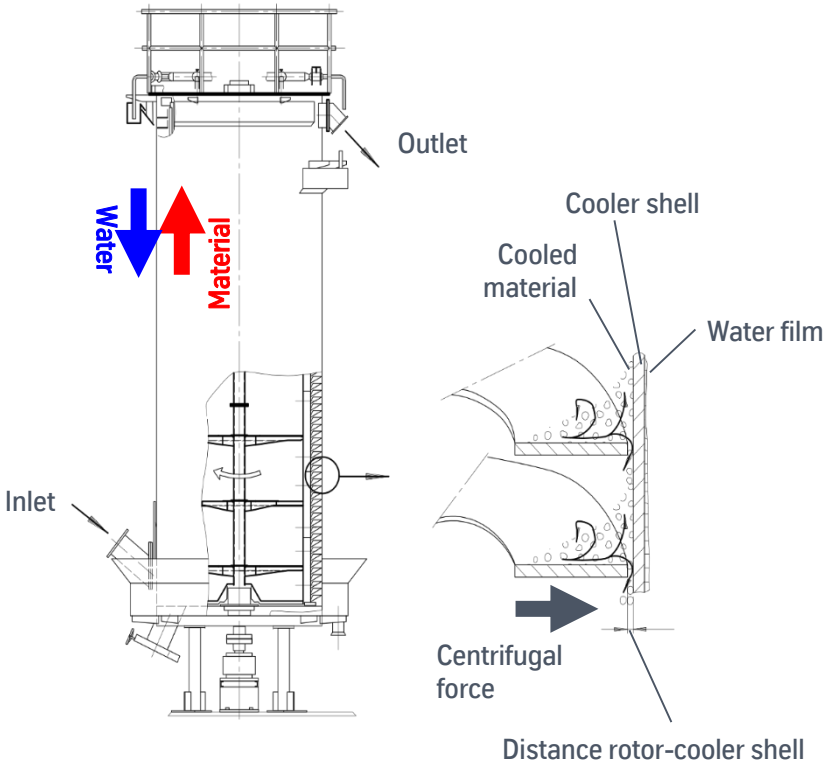

- Material to be cooled is fed through inlet chute and falls onto lower screw flights
- The turning of the rotor transports the material upwards to the outlet chute while it is permanently recirculated at the inner wall of the cooler shell
- Heat is tranferred over the cooler shell to the water film
- Through the ejection plates at the end of the screw flights, the material is transported out of the machine.

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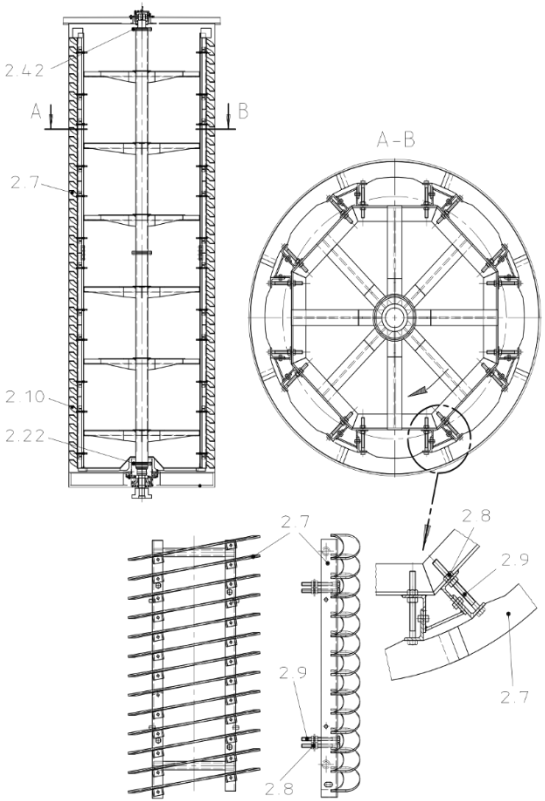
Cement Cooler – Design Details

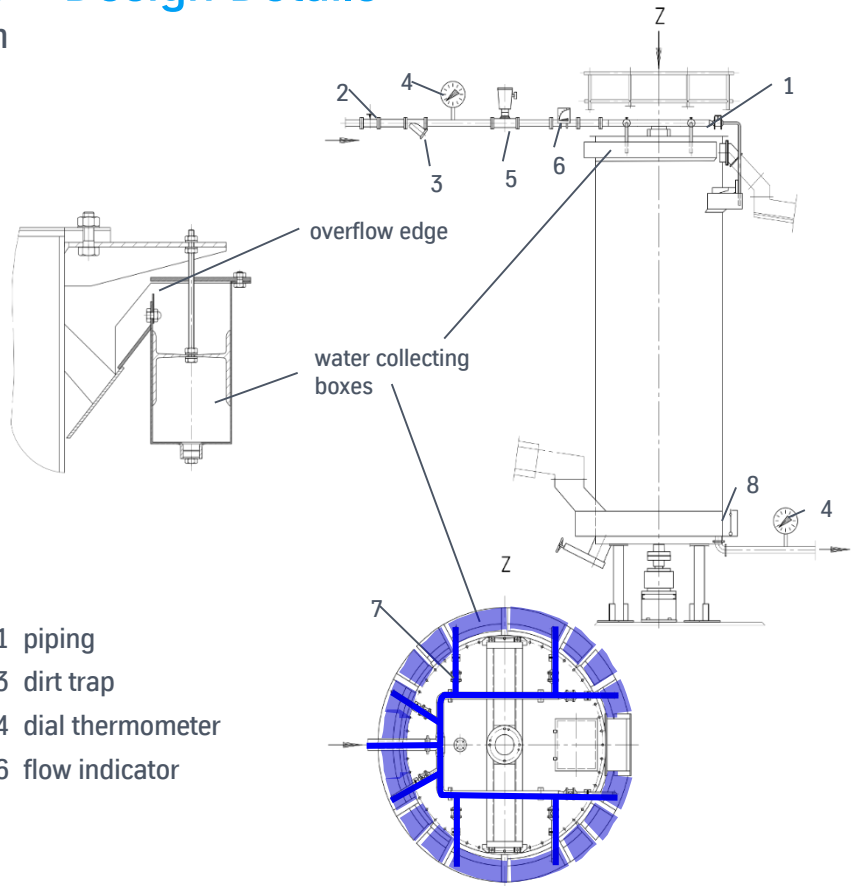
Rotor

2.7	srew flight package
2.8	nut
2.9	threaded spindle
2.10	screw flight package with mounted screw flights
2.42	bearing housing



Cement Cooler – Design Details

Cooling Water System



1 piping
3 dirt trap
4 dial thermometer
6 flow indicator

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Cement Cooler – Maintenance

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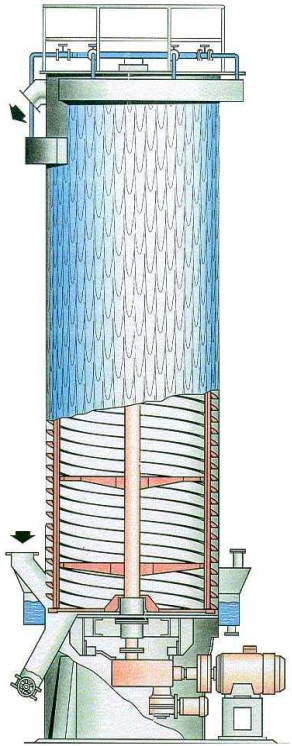

1 Lubrication lower and upper bearing

2 Readjustment of gap rotor – cooler shell

3 Removal of caked cement

4 Adjustment of water collecting boxes

5 Maintenance gear unit and motor

Thank you for your attention.

Any questions?