

# Espey WD200/500 for sealing a centrifuge

For the production of HDPE the chemical industry needs decanter centrifuges for the precipitation polymerisation (slurry process). The customer has chosen Thomas Broadbent & Sons Ltd. as supplier – providing latest separation technology.

## **Process description**

In precipitation polymerisation (slurry process), ethylene reacts in an inert gas atmosphere (hydrogen) containing a solvent (hexane) in the presence of catalytic agents to form polyethylene. Under process conditions the ethylene is soluble in hexane but polyethylene is insoluble, and precipitates in the form of a fine suspension. The polymer is separated from the hexane in decanter centrifuges. The separated hexane is returned again to the polymerisation process.

## **Problem and challenge**

Each decanter centrifuge needs 3 seals - two case seals and one feed pipe seal. The seals have to be designed with a split housing and for 12,000 hours continuous operation minimum under radial and axial vibrations - in addition with barrier gas connections. As barrier gas nitrogen shall be used. The operating temperature is 60 °C (140 °F). The bowl shaft rotates with maximum 1,540 revolutions. The operating pressure is 1.07 bar abs. (15.52 PSI). The media contacting the seals are HDPE powder and n-hexane. All seals have to be equipped with a non-split shaft sleeve to protect the centrifuge shaft. The feed pipe seal with a seal diameter of 190 mm (7.48") has to be fitted with connections for leakage, seal flush and seal inlet. The assembly has to allow 10 mm (0.39") axial float of the shaft sleeve and an operational radial float of 1.0 mm (0.04"). The case seals with a seal diameter of 350 mm (13.78") have to be fitted with connections for leakage, seal flush, seal inlet, pressure and temperature measuring. The assembly has to allow 4.0 mm (0.16") axial float of the shaft sleeve.





Decanter centrifuge for the HDPE production

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#### **EagleBurgmann Espey solution**

To fulfil the application requirement of lowest leakages Espey designed for feed pipe and casing seals the carbon floating ring seals type Espey WD200/500 with a width of 190 mm (7.48") for the feed pipe seal and 129 mm (5.08") for the casing seals – all with split housing design for easy installation and maintenance. The housings incorporate connections for leakage, seal flush, seal inlet, pressure and temperature measuring. The seals are assembled with one radial cut PTFE seal ring and 4 overlapped mortised carbon seal rings. In addition each seal is completed with a shaft sleeve type Espey WDB200. The seals guarantee a long-term operation time.

## **Operating conditions**

Application: decanter centrifuge Seal type: Espey WD200/500 Medium: HDPE powder, n-hexane Operation temperature: 60 °C (140 °F) Pressure abs.: 1.07 bar (15.52 PSI) Revolutions: up to 1,540 min<sup>-1</sup> Shaft diameter case seals: 320 mm (12.60") Shaft diameter feed pipe seal: 170 mm (6.69") Radial play: max. 1 mm (0.04") Barrier gas: nitrogen



Feed pipe seal



Case seal with connections for measuring, leakage, flushing and inlet





Decanter centrifuge with case seal

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