Average Paper Mill
CEPI Case Study

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MAN ES Heat Pumps

Compressors

- **MAN Energy Solutions** owns a range of compressor types suitable for use in heat pumps.

- **Referenced pressure and temperature levels** exceed by far those levels required by vapour or transcritical (based on CO2) compression cycle heat pumps.

- **MAN ES Compressor casings up to ~ 60 MW** (for one casing) shaft power with electric drive have been installed and are operated throughout the world.
• Vapour compression cycle heat pump to generate low pressure ~1.2 bara steam from the moist air heat source
• Subsequent steam compression to 9 bara with an extraction at 5 bara
• Pressure let down from 5 bara or 9 bara line to required levels
• Refrigerants Butane or NH3 depending on the size of the heat pump. R1233zd on request.
• One geared compressor for heat pump sizes of about 30 MW for both heat pump and steam compression services
• COP highest for NH3. COP comparable for Butane and R1233zd
• Absolute COP depending on further boundary conditions, e.g. ratio of humid air flow over steam flow
Thank you very much!

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