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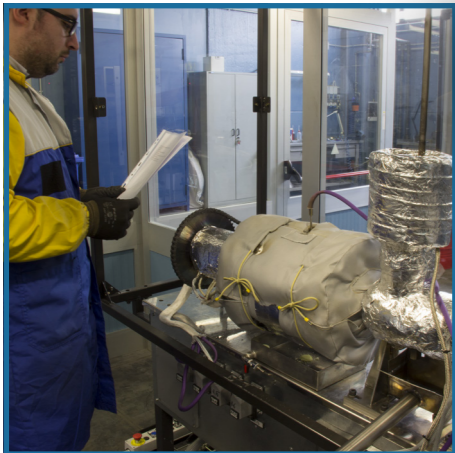
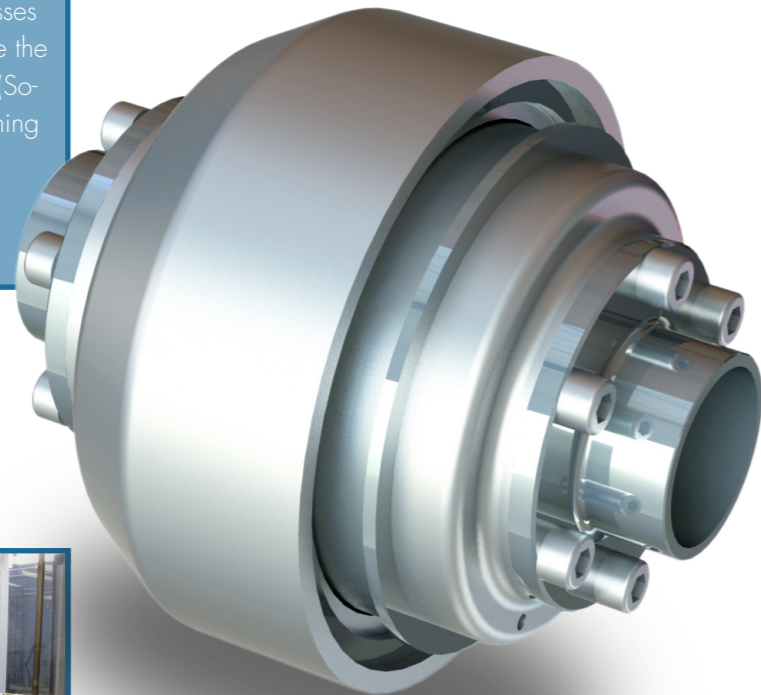


Rotary Joint
for CSP plants

The Rotary Joint Technology

One of the key aspects in CSP parabolic trough technology is the connection of a SCA (Solar Collector Assembly) both with a manifold or in the crossover (in the middle of the loop). The flexible hose has to withstand torsional stresses specially when the SCA is connected to a stationary pipe: in this case the flexible hose lifespan drops down and catastrophic failure can happen. Rotary joint avoids completely this issue increasing the reliability of the plant.

- ADVANTAGES**
- Reliability of flexible hoses increases because of rotary joint doesn't transmit torsional stresses
 - Since Rotary Joint has to have the same rotational axis of SCA (Solar Collector Assembly), draining valve are not necessary
 - Very low torque
 - No maintenance

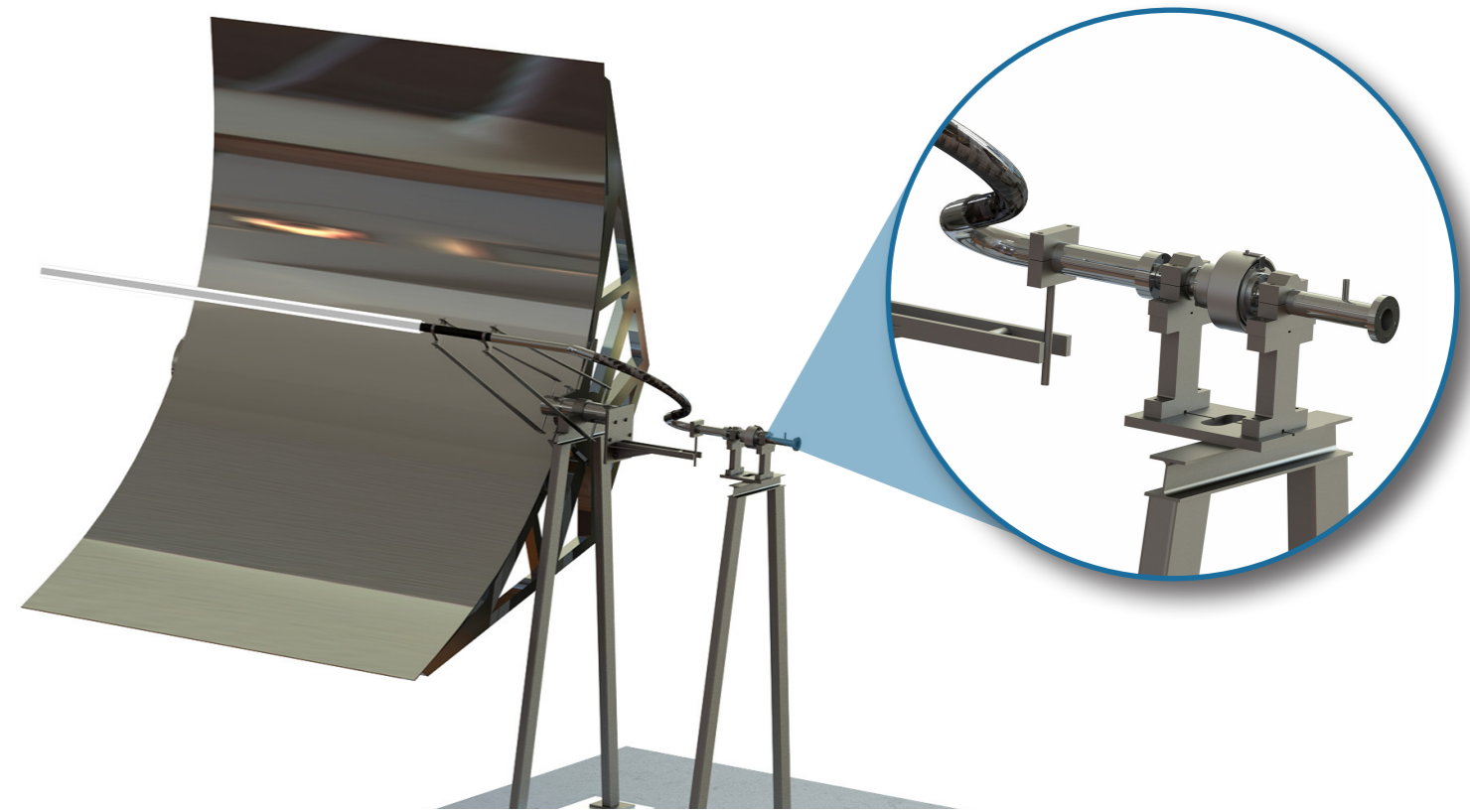


- 3 Test benches to simulate:**
- Temperature = 550°C max
 - Pressure = 40 bar max
 - Media = Molten salt / Diathermic oil
 - Movement = Rotation >240°
 - Rotation speed = 210°/1' to real speed (0,02 rpm)
 - Thermal cycling



HTF (Heat Transfer Fluid) = Molten Salts

Dimensions and Geometry	
Rotary Joint Length	250 mm
Pipe Size (Inner Diameter)	52,5 mm
Allowed Overall Rotary Angle	> 240°
Loads	
Driving Torque [Nm]	< 60 Nm
Design Conditions	
Fluid	60%NaNO3 + 40% KNO3
Htf Temperature	550°C
Pressure	20 BAR
Leakage	As allowable for rotary joint (cosmetic leakage)
Heating Method	
The Rotary Joint has a patent pending heating setup. It can be connected with the joule-effect heating system.	



HTF (Heat Transfer Fluid) = CO₂

Dimensions and Geometry	
Rotary Joint Length	278 mm
Pipe Size (Inner Diameter)	58 mm
Allowed Overall Rotary Angle	> 240°
Loads	
Driving Torque [Nm]	< 120 Nm
Design Conditions	
Fluid	CO2
Htf Temperature	550°C
Pressure	100 BAR
Leakage	0,07 l/h (100 bar)

Under Development
HTF (Heat Transfer Fluid) = Diathermic oil

Design Conditions	
Fluid	Therminol VP1
Htf Temperature	400°C
Pressure	40 BAR
Targets:	
<ul style="list-style-type: none"> • Low cost design • Maintenance free. • Long lifespan, more than 11000 cycles. • Zero leakage. 	