



SERVO HYDRAULIC PRESSES

STENHØJ HYDRAULIK

What is servo hydraulic ?

	Standard hydraulic system	Servo valve system	Servo drive system
System definition	Force & speed is controlled by proportional valve - Axial piston pump	Force & speed is controlled by high reponse proportional valve with servo controller - Axial piston pumps and accumulators	Force & speed is controlled by servo motor - Fixed displacement pump and on/off valves

Servo Hydraulic – Comparison

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Process control	Good	Excellent	Excellent
Speed	Low	High	Medium
Noise	Medium	High	Low
Energy	Medium	High	Low

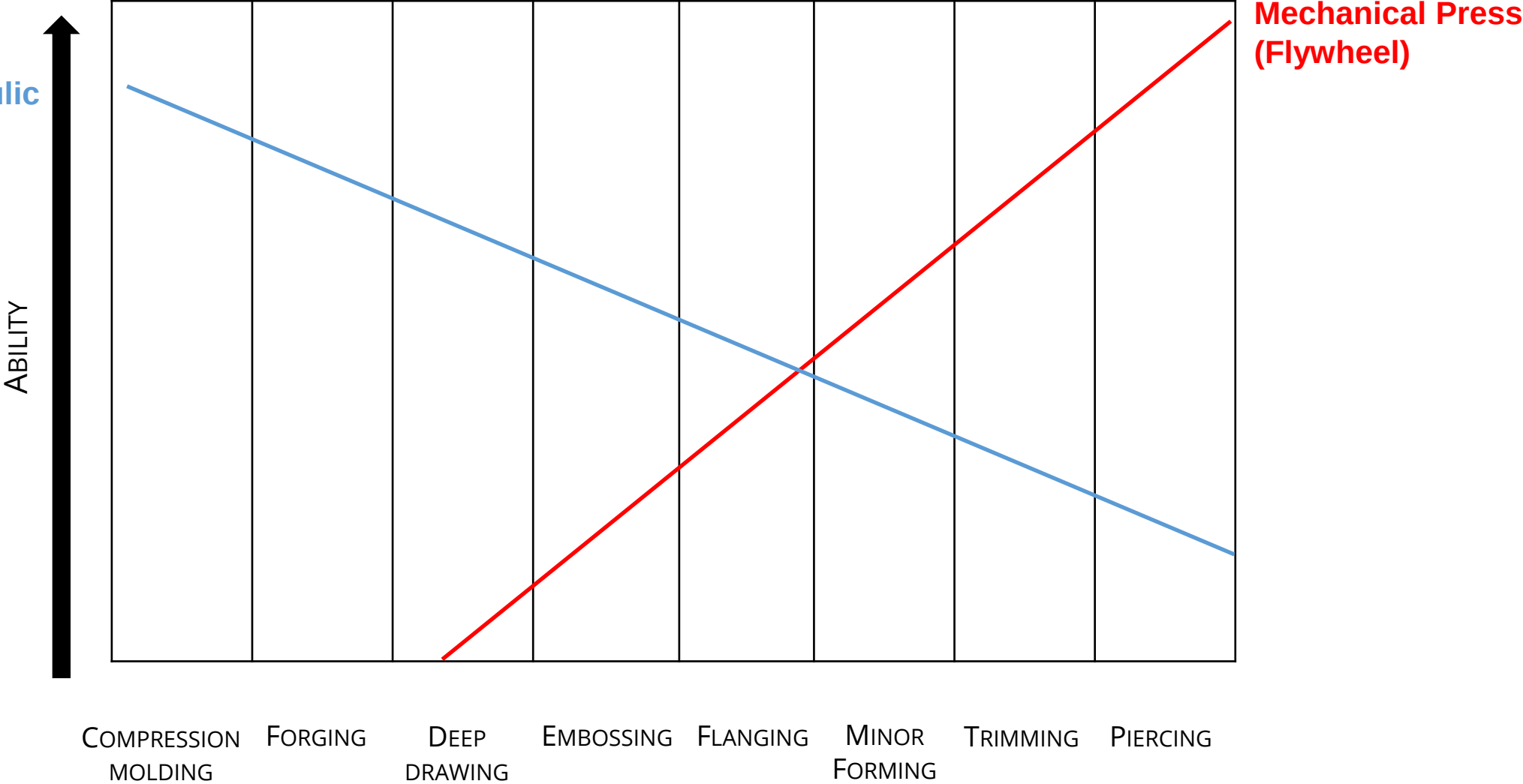
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Stenhøj Servo Hydraulic



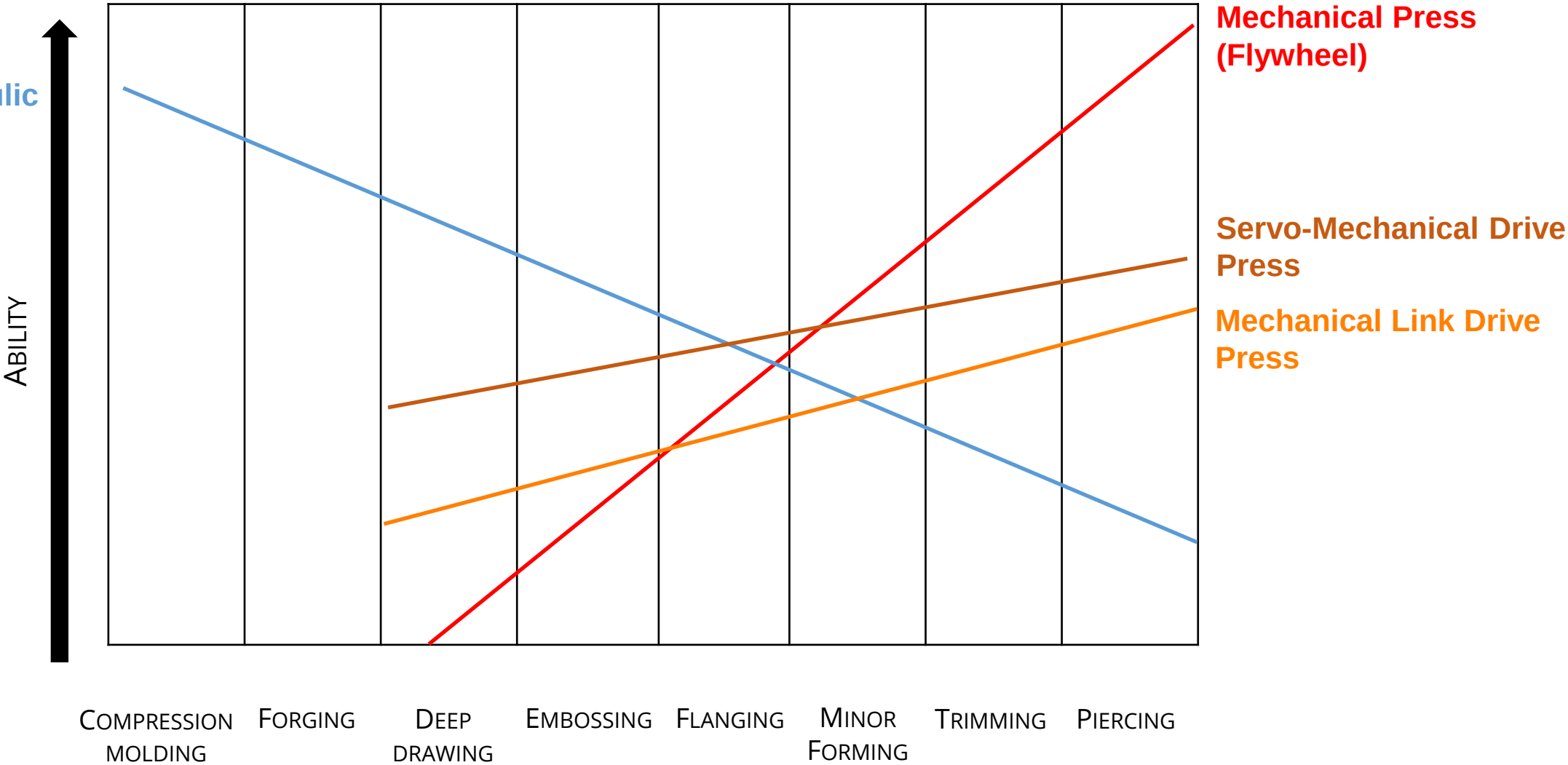
Hydraulic press vs Mechanical press

Standard Hydraulic Press



High-end mechanical presses added

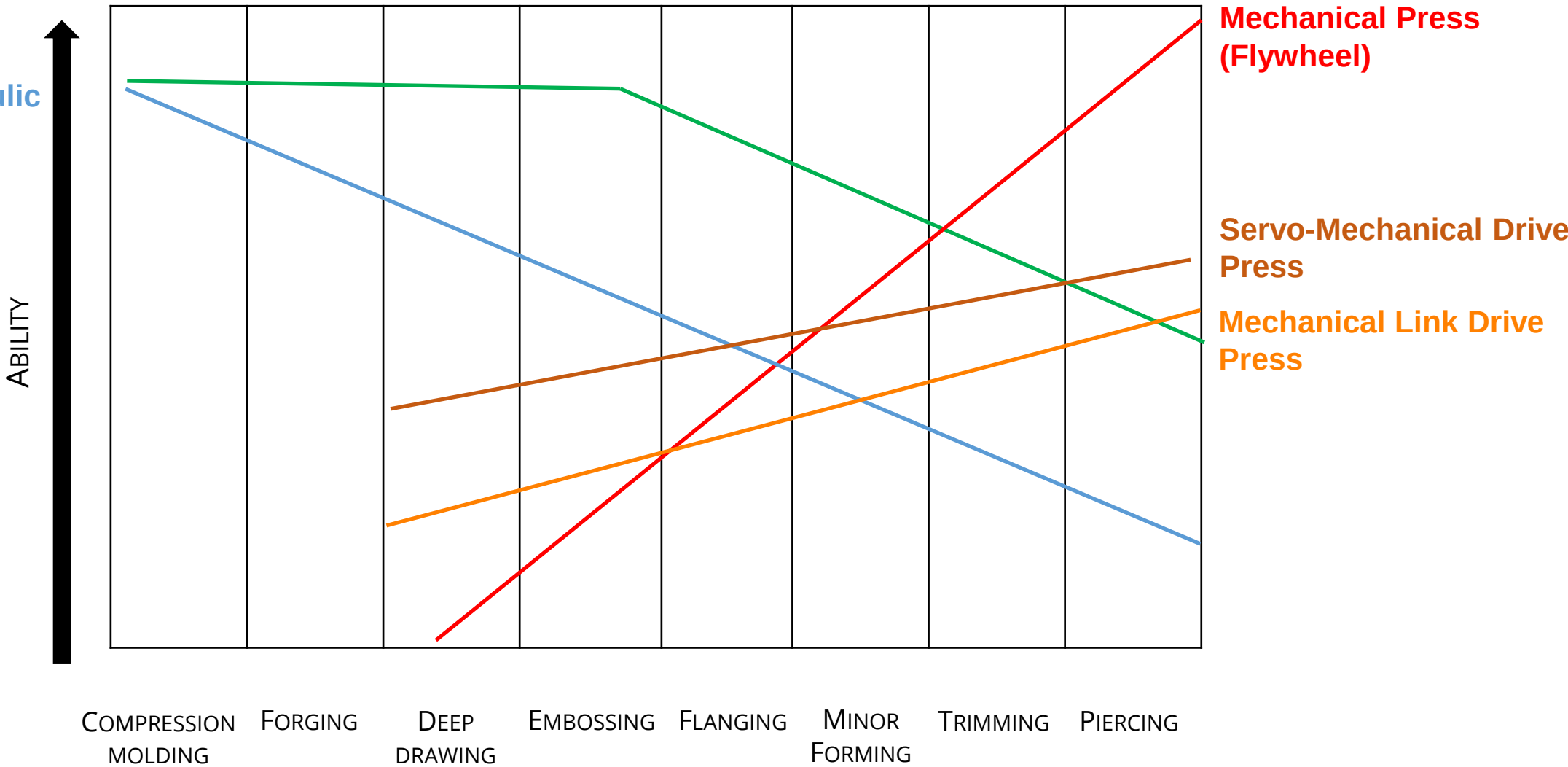
Standard Hydraulic Press



Servo Hydraulic Press added

Servo Hydraulic Press

Standard Hydraulic Press



Benchmark – complex pressing operations

	STD hydraulic press	Mechanical press	Servo mechanical press	Servo hydraulic press
Forming force	Full force at full stroke	Full force only at BDC	Full force only at BDC	Full force at full stroke
Process control	Fully adjustable	Fixed profile	Adjustable	Fully adjustable
Speed	Low	High	High	Medium/High
Die change	Fast	Slow	Medium	Fast
Die wear	Low	High	Medium	Low
Scrap rate	Low	High	Medium	Low
Batch size	Low / Medium	High	Low / Medium / High	Low / Medium / High
Limitation	Speed	Process control, Part depth	High investment, Part depth	

Benefits – Stenhøj Servo Hydraulic

GREEN-Process for the future:

Environmentally friendly process
Less energy consumption in process – 70%
Low noise level in operation < 68 dB(A)

Energy savings up to 70%

With the servo press, a high energy saving is achieved, primarily by:

- Collect falling energy from ram approach
- Main motor stops every time the press has completed its stroke (no idling)
- No energy loss by deep drawing with cushion pins (Single acting die cushion)
- Reduced cooling of hydraulic oil

These parameters lower the power consumption and increase the total efficiency of the press.



Optimum-Process for the future:

Flexible operation conditions
Fast and durable press cycles
Freely programable PLC control

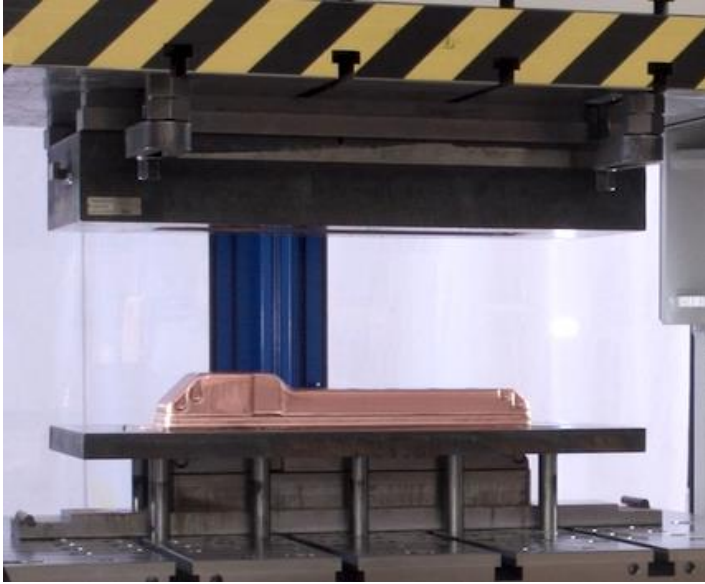
Efficient operation conditions:

- Rapid acceleration and deceleration of ram
- High Speed > 500 mm/sec.- Rapid approach and return
- More than 40 strokes/min
- Full press force over the entire stroke
- High position accuracy on ram
- Single- and double acting cushion
- Fully programable ram and cushion
- 100% convertible with standard press tools



SERVO-Hydraulic system

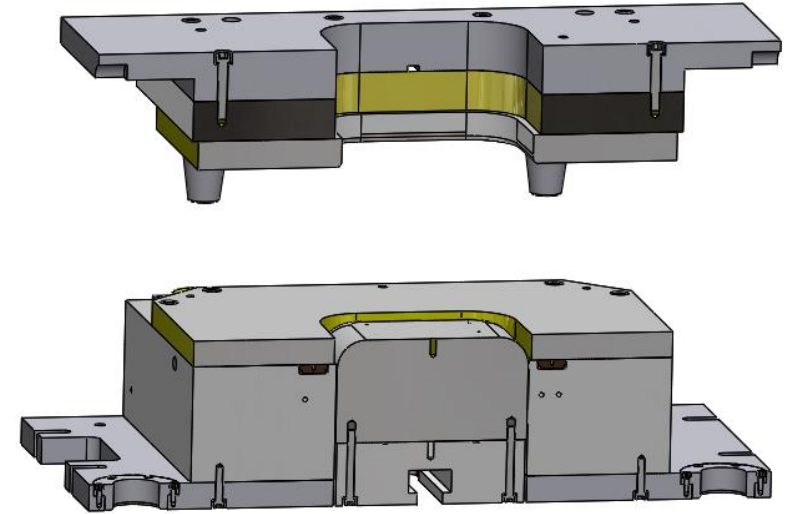
Power saving with Stenhøj Servo Hydraulic



Single acting cushion
with cushion pins (passive)

Energy loss from F_{clamping} is
up to 80% of Energy use

$$\begin{aligned} \text{Work} &= \text{Force} \times \text{Stroke} \\ &\& \\ F_{\text{total}} &= F_{\text{forming}} + F_{\text{clamping}} \end{aligned}$$



Double acting cushion
with punch (active)

Energy loss from F_{clamping} is
up to 10% of Energy use

Power saving example with Stenhøj Servopress:

Production with full-force passive deep drawing at 300bar cushion pressure

Hydraulic oil temperature was raised to 38°C after 8 hours production, where oil cooler starts at 40°C