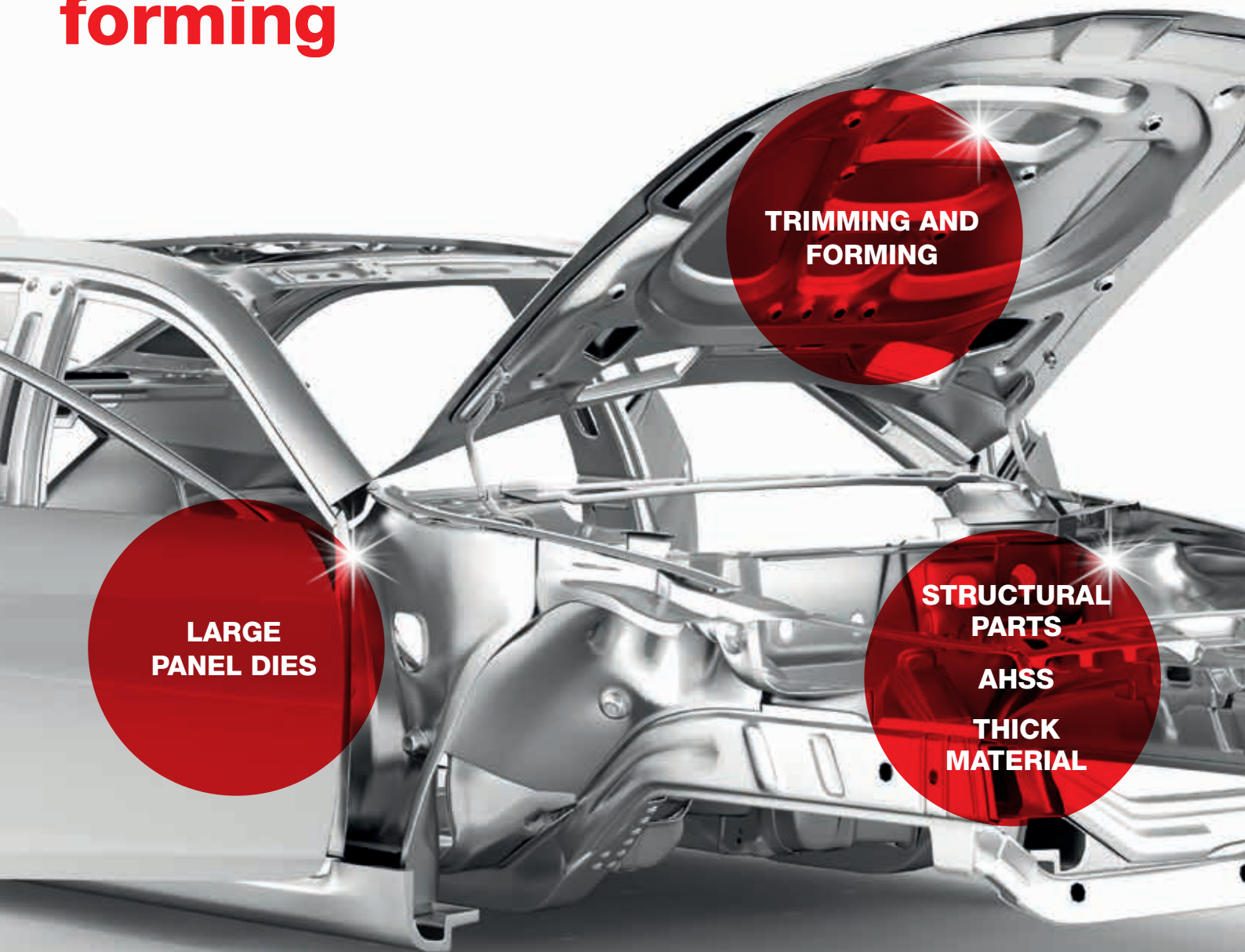


Solutions for automotive chassis and skin panel forming



**LARGE
PANEL DIES**

**TRIMMING AND
FORMING**

**STRUCTURAL
PARTS**

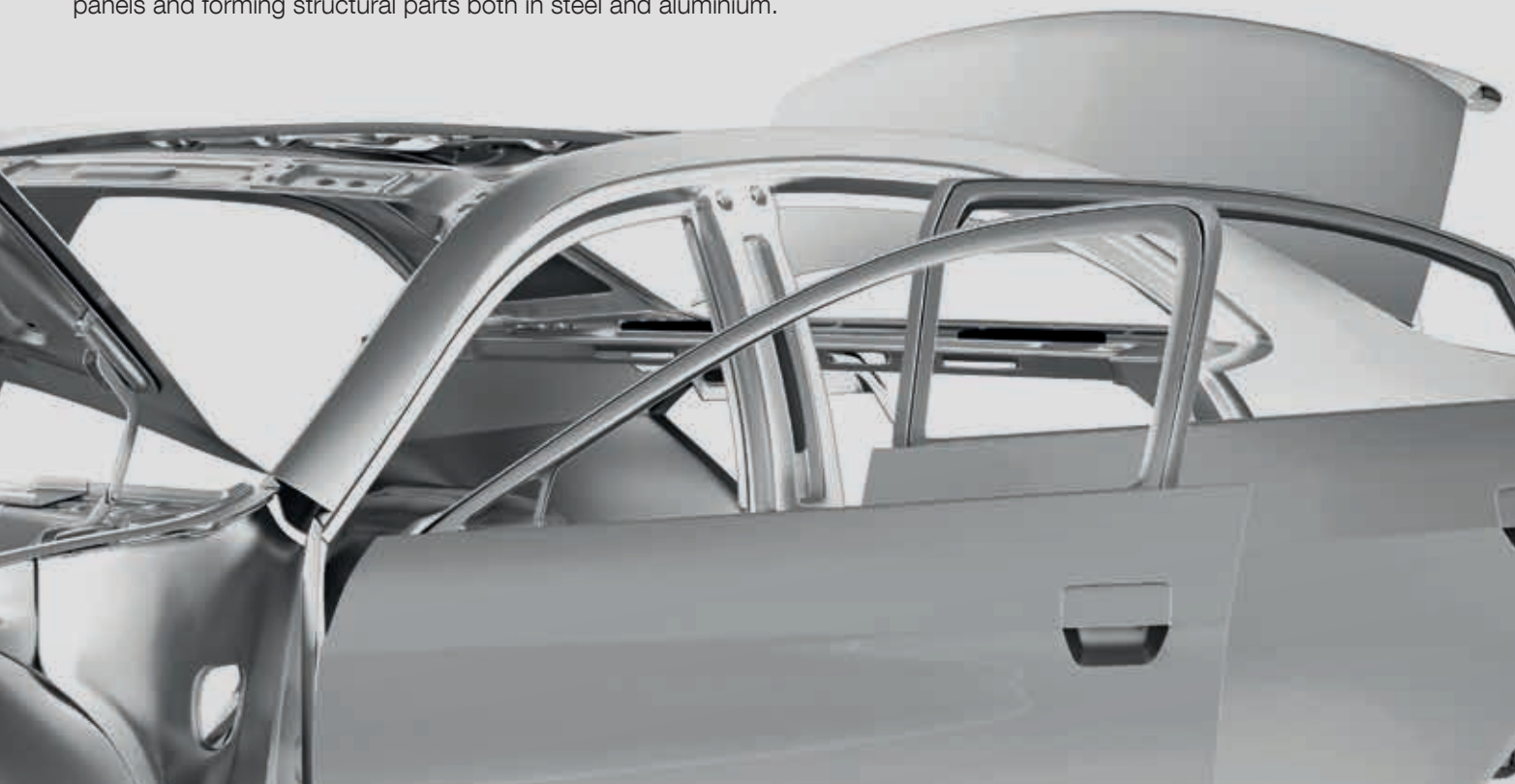
AHSS

**THICK
MATERIAL**



Reducing scrap & re-work costs while improving productivity in the press shop

Each process in the production of automotive body in white chassis presents unique challenges to the press shop. Oerlikon Balzers provides dedicated solutions for each process stage, tailored to solve the challenges of deep drawing, flanging and trimming of skin panels and forming structural parts both in steel and aluminium.



Application	Solution	Description	Treatment description	Process temperature	Treatment zone
Large panel dies	BALITHERM PPD	Complete functional surface protection for mono-block cast iron tooling	Nitrogen diffusion (D) into the material + ceramic like compound layer (CL)	500 – 530 °C	80 – 150 µm (D) + 0 – 12 µm (CL)
	LASER HARDENING	Localised protection for high load areas: Drawing/forming radii Cutting edges Flanging radii	Surface hardening (SH) via controlled laser	900 °C +	1.2 mm to 1.5 mm (SH)
Trimming and forming	BALINIT MAYURA	Anti-adhesive solution for forming and trimming aluminium sheet metal	PVD multilayer ta-C	< 150 °C	Coating 0.3 – 1.5 µm
	BALINIT TRITON STAR		PACVD monolayer a-C:H	< 250 °C	Coating 1 – 3 µm
Forming AHSS	BALINIT FORMERA	Surface solution for tools forming AHSS (advanced high strength steel) and hot forming tools	PVD multilayer CrAlN based	480 °C	Coating 8 – 10 µm

Carbon-based coatings for aluminium forming tools

- Reduces the sticking of aluminium in the forming and trimming operations
- Keeps the press line clean of aluminum slithers and powdering affecting panel quality

Solutions for trimming and forming:

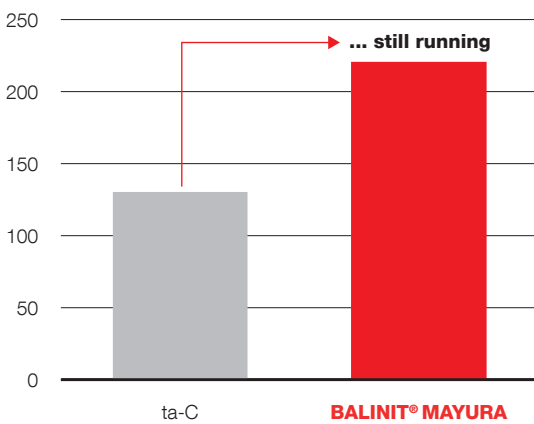
BALINIT MAYURA

BALINIT TRITON STAR

Laser Hardening

BALINIT MAYURA Trimming aluminum

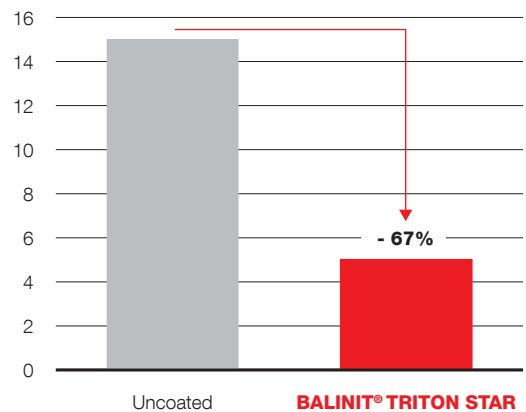
Parts produced with minimal maintenance [1,000 parts]
[Cleaning trim edges with a cloth after every 5,000 parts]



Tool	Trimming dies and punches 1.2379 / D2
Workpiece	Hood
Challenge	Aluminum starting to stick to cutting edges
Solution BALINIT[®] MAYURA	Aluminum build-up over time was reduced

BALINIT TRITON STAR Aluminium trimming and flanging

Scrap panels [%]



Tool	Aluminium trimming and flanging 1.2333/1.2358
Workpiece	Fender/Bonnet/Door/Trunk Lid 5/6000 series Alu
Challenge	Aluminium sticking and high scrap rate
Solution BALINIT[®] TRITON STAR	- Aluminium sticking significantly decreased - Scrap rate has been greatly reduced

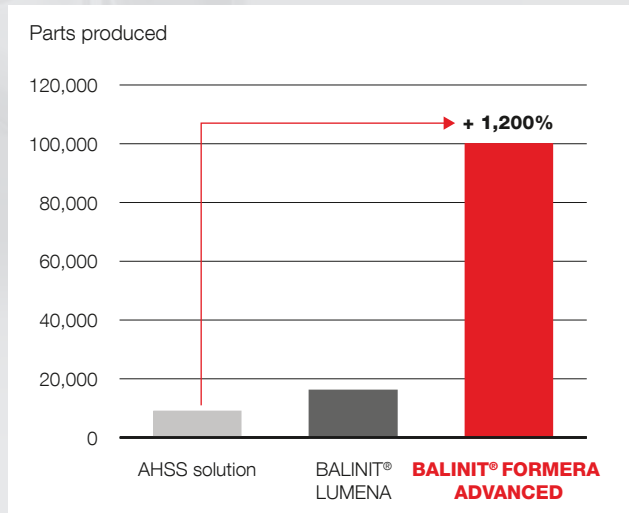
BALINIT FORMERA for forming tough structural parts

- Surface solution designed to protect tools forming Advanced High Strength Material parts and thick material
- Durable, flexible coating. Outstanding performance in shear stress

Solution for forming structural parts, AHSS, thick material:
BALINIT FORMERA

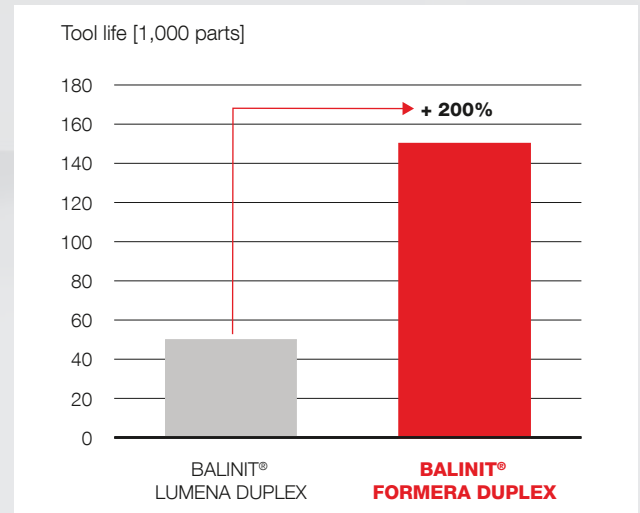
Solutions for large panel dies:
PPD
Laser hardening

BALINIT FORMERA ADVANCED Deep drawing of seat components



Tool	Drawing 1.2379 (D2 / SKD11)
Workpiece	Automobile seat parts 700 MPa, 1.5 mm
Challenge	AHSS drawing Heavy wear
Solution BALINIT FORMERA ADVANCED	- Better surface quality of products - Much longer tool life without obvious wear

BALINIT FORMERA DUPLEX Deep drawing of axle beam

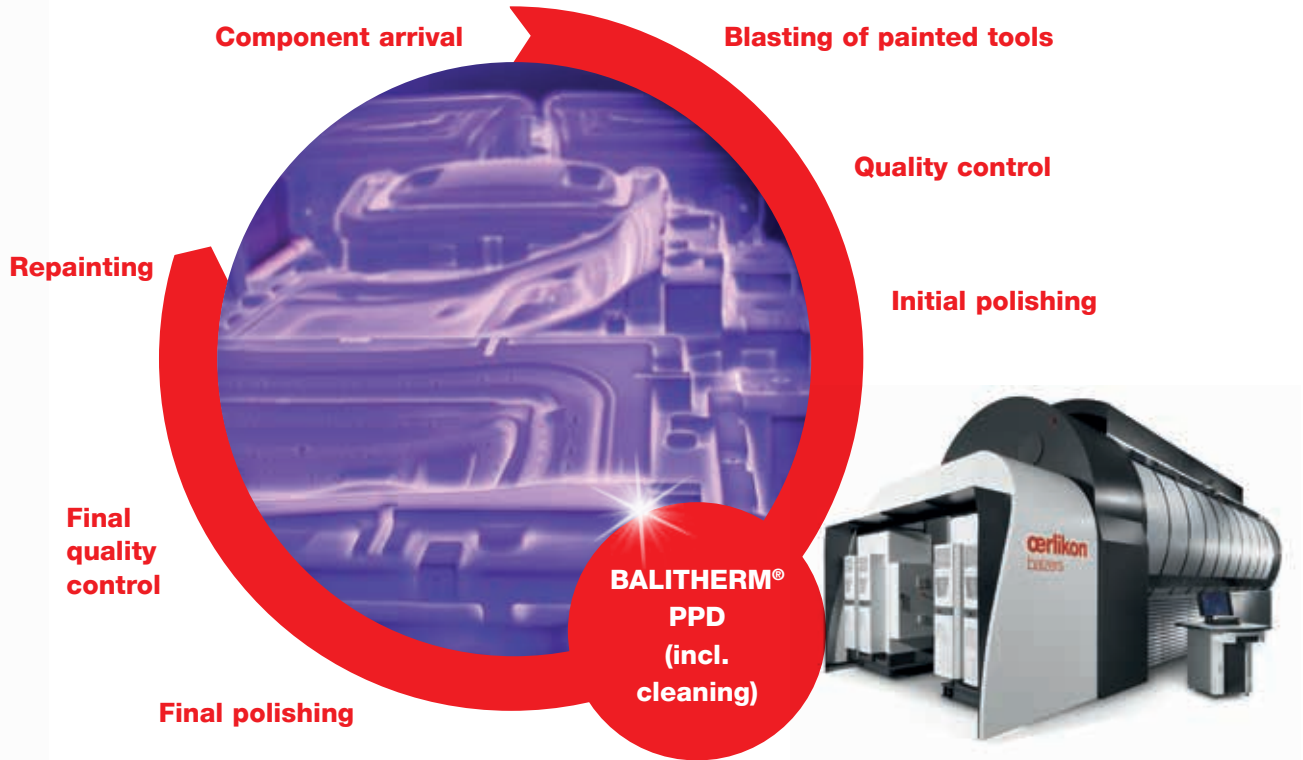


Tool	Draw tool Tool steel (D2 / SKD11)
Workpiece	Axle beam 3.5 mm Tensile strength 590 MPa
Challenge	Deep scratches & material sticking
Solution BALINIT FORMERA DUPLEX	- +200% tool life increased - Scratch/material sticking & polishing is totally eliminated

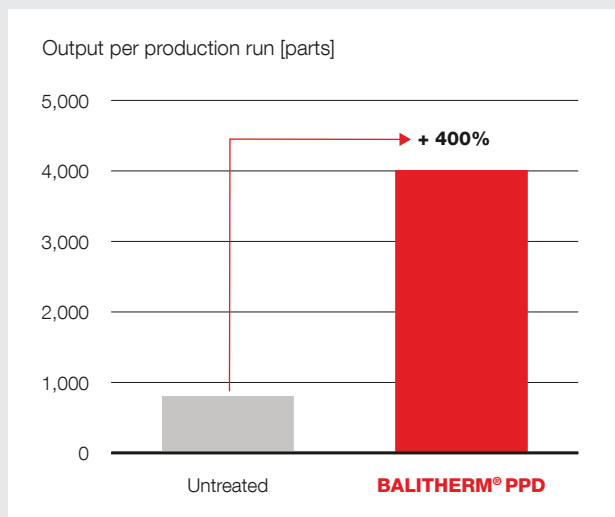
The decisive advantage for more efficiency: BALITHERM PPD for large stamping dies

Our future-oriented plasma-based diffusion process PPD (Pulsed-Plasma Diffusion) is applied in our INAURA systems. They provide a loading capacity of 10 × 3 metres and 40 tonnes. The fully automated process ensures a

stable and controlled wear-protection coating procedure. The combination of hydrogen, nitrogen and electricity means that INAURA operates entirely without the use of poisonous gases and chemicals.

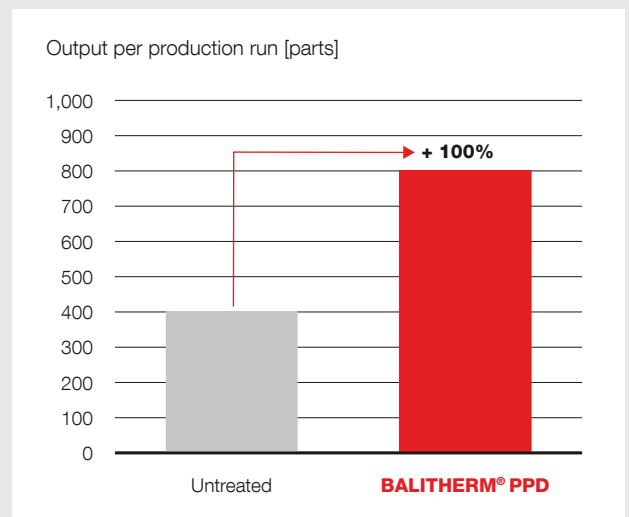


BALITHERM PPD Cold stamping of aluminium bonnet



Tool	OP 20 (stamping), EN-JS 2070
Workpiece	Aluminium bonnet inner / outer (1 mm sheet material)
Challenge	<ul style="list-style-type: none"> - Aluminium adhesion - Wear on the sheet aluminium and on the forming radius / draw bead
Solution BALITHERM® PPD	<ul style="list-style-type: none"> - No maintenance polish needed during production - Better surface quality of parts

BALITHERM PPD Cold stamping of trunk lid outer



Tool	OP 20 (stamping), EN-JS 2070
Workpiece	Trunk lid outer (0.7 mm sheet metal)
Challenge	<ul style="list-style-type: none"> - Zinc adhesion - Wear on the sheet metal part and on the forming radius / draw bead
Solution BALITHERM® PPD	<ul style="list-style-type: none"> - No maintenance polish needed during production - Making longer production run possible - Better surface quality of parts

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*** PPD customer centres**



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