

# DUPLEX-VARIANTIC®-1000

Anti-aging for your forming tools



10/2023 Specifications are subject to change without notice

Forming high-strength sheets with tensile strengths of up to 1,000 MPa poses technical challenges for the tools. The abrasive wear of the tool edges quickly leads to an unclear forming of the sheets. With a coating thickness of around 9 µm, Duplex-VARIANTIC®-1000 significantly minimizes wear and thus extends tool life. The coating structure not only ensures special hardness, but is also so ductile that a very stable coating system is created.

## COATING ADVANTAGES

- » Excellent wear protection for cold forming of high-strength sheet up to 1,000 MPa tensile strength
- » Hard and ductile – approx. 9µm multilayer for long tool life
- » Superb layer stability – even on minimum forming radii

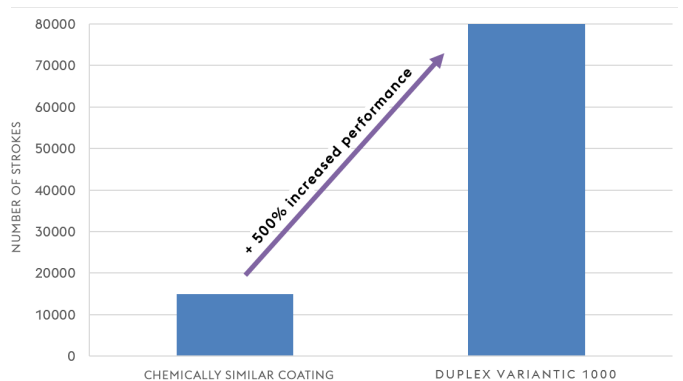
## APPLICATION

- » Drawing, pressing and forming tools for the working of high-strength steels



## COATING PROPERTIES

<b>Hardness</b>	4,000 ±200 HV
<b>Coating thickness</b>	Approx. 9 µm
<b>Maximum operating temperature</b>	800 °C / 1,470 °F
<b>Coefficient of friction against steel</b>	0.2
<b>Colour</b>	Dark red



Tool: Through-punch  
 Tool material: 1.2379 (58 HRc)  
 Workpiece: DP800 with 3.2 mm plate thickness  
 Lubricant: Oil-free, water-based lubricant

	Stainless steel sheets (≤1.5 mm)	Stainless steel sheets (>1.5 mm)	Sheets (<700 N/mm <sup>2</sup> )	Sheets (>700 N/mm <sup>2</sup> and <1000 N/mm <sup>2</sup> )	Sheets (>1000 N/mm <sup>2</sup> )
<b>Punching</b>	(Duplex) VARIANTIC®, TiCN, TiN, DUMATIC, CROSAL®-plus, Duplex-TIGRAL®*	DUMATIC, FORMATIC, TiCN, VARIANTIC®, CrCN* TiN/TiC	(Duplex) VARIANTIC®, TiCN, DUMATIC, TiN, CrCN, CROSAL®-plus, Duplex-TIGRAL®*	Duplex-VARIANTIC®, DUMATIC, FORMATIC, TiC*	DUMATIC, Duplex- VARIANTIC®-1400, FORMATIC, TiC
<b>Pressing</b>	(Duplex) VARIANTIC®, DUMATIC, TiC/TiN, TiCN, TiN*	TiC, TiN/TiC, DUMATIC, FORMATIC, TiCN	(Duplex) VARIANTIC®, TiCN, DUMATIC, TiC/TiN, TiN*	Duplex-VARIANTIC®*, DUMATIC, FORMATIC, TiC, TiC/ TiN*	Duplex- VARIANTIC®-1400, TiC, TiC/TiN, DUMATIC
<b>Bending</b>	(Duplex) VARIANTIC®, DUMATIC, TiCN, TiC/TiN*	TiC, TiN/TiC, DUMATIC, FORMATIC, VARIANTIC®, CrCN, TiCN	(Duplex) VARIANTIC®, TiCN, DUMATIC, TiC/TiN*	Duplex-VARIANTIC®*, DUMATIC, FORMATIC, TiC, TiC/ TiN TiCN*	Duplex- VARIANTIC®-1400, TiC, DUMATIC
<b>Deep drawing</b>	(Duplex) VARIANTIC®, DUMATIC, TiCN*, DLC	DUMATIC, TiCN, FORMATIC, Duplex-VARIANTIC®*	(Duplex) VARIANTIC®, DUMATIC, TiCN*	Duplex-VARIANTIC®*, DUMATIC, FORMATIC, TiC, TiC/TiN*	TiC
<b>Stamping</b>	(Duplex) VARIANTIC®, DUMATIC (TR), TiCN, TiC/TiN*, CARBON-X®	DUMATIC, FORMATIC, TiCN, Duplex- VARIANTIC®*	(Duplex) VARIANTIC®, DUMATIC, TiCN, TiC/TiN*	Duplex-VARIANTIC®*, DUMATIC, FORMATIC, TiC, TiC/TiN*	TiC
<b>Hydroforming</b>	DUMATIC, Duplex-VARIANTIC®	DUMATIC, FORMATIC, TiCN	(Duplex) VARIANTIC®, DUMATIC, TiCN*	Duplex-VARIANTIC®*, DUMATIC, FORMATIC, TiC, TiC/TiN*	TiC
<b>Rolling</b>	VARIANTIC®	TiCN	VARIANTIC®	VARIANTIC®	Duplex- VARIANTIC®-1400
<b>Fine blanking</b>	FORMATIC, DUMATIC, Duplex-TIGRAL®, TiCN, (Duplex) CROSAL®- plus, VARIANTIC®*	FORMATIC + MOX2®, VARIANTIC®, TiCN, DUMATIC + MOX2®, CROSAL®-plus	FORMATIC, Duplex- TIGRAL®, (Duplex) CROSAL®-plus, VARIANTIC®, DUMATIC, TiCN*	(Duplex) VARIANTIC®, DUMATIC + MOX2®, TiCN	Duplex- VARIANTIC®, VARIANTIC®-1400, DUMATIC + MOX2®
<b>Forge</b>	TiC	TiC/TiN + MOX2®	TiC, TiC/TiN*	TiC/TiN, TiC*	TiC, TiC/TiN*
<b>Extrusion</b>	Duplex-VARIANTIC®**, DUMATIC, TiN*, Duplex-TIGRAL®				

\* additionally MOX2® possible for all coatings named before \*\* and Duplex-VARIANTIC®-1000

	Aluminium	Aluminium sheets (Si < 7 %)	Aluminium sheets (Si > 7 %)	Galvanized sheets (≤2.0 mm)	Galvanized sheets (>2.0 mm)	Non-ferrous metals	Plastics
<b>Punching</b>	CARBON-X® (AL), Duplex-CrCN, CrN, ZrN	CrCN **, CrN **, ZrN, CARBON-X® (AL)	CrN, CrCN **, CARBON-X® (AL), TiCN, ZrN	Duplex-VARIANTIC®*, TiCN, CARBON-X® (AL), DUMATIC *, TiCN, CrN, CrCN	Duplex-VARIANTIC®*, CrN, TiCN, TiC*, Duplex DUMATIC *, CARBON-X®, CrCN	CrCN **, CrN **, CARBON-X® (AL), ZrN	CrN, CrCN, CARBON-X®
<b>Pressing</b>	CARBON-X® (AL), Duplex-CrCN, CrN	(Duplex) CrCN **, CARBON-X® (AL), CrN **	CrN, TiC, (Duplex) CrCN **, CARBON-X®	Duplex-VARIANTIC®* ** ***, Duplex-CrCN, TiCN, DUMATIC *, CrN, CARBON-X® (AL)	Duplex-VARIANTIC®* ** ***, Duplex DUMATIC *, TiC*, TiC/TiN *, CrCN, TiCN, CrN	(Duplex) CrCN **, CrN **, CARBON-X® (AL)	CrN
<b>Bending</b>	CARBON-X® (AL), Duplex-CrCN, CrN, ZrN	(Duplex) CrCN **/**, CARBON-X® (AL), CrN **, ZrN	CrN, TiC, ZrN, (Duplex) CrCN **, CARBON-X®	Duplex-VARIANTIC®* ** ***, Duplex-CrCN, TiCN, DUMATIC *, ZrN, CrN CARBON-X® (AL)	Duplex-VARIANTIC®* ** ***, Duplex DUMATIC *, TiC*, TiC/TiN *, CrCN, CrN, CARBON-X®	(Duplex) CrCN **, CrN **, ZrN, CARBON-X® (AL)	CrN, CrCN, CARBON-X®
<b>Deep drawing</b>	Duplex-CrCN, CARBON-X® (AL), CrN	CrN **, (Duplex) CrCN **, CARBON-X® (AL)	CrN, CARBON-X®, (Duplex) CrCN **, EXXTRAL®-Silber, TiC	Duplex-VARIANTIC®* ** ***, Duplex-CrCN, TiCN, CrN, CARBON-X® (AL)	Duplex-VARIANTIC®* ** ***, Duplex DUMATIC *, TiC*, TiC/TiN *, TiCN, CrN, CrCN	(Duplex) CrCN **, CrN **, CARBON-X® (AL)	CrN
<b>Stamping</b>	Duplex-CrCN, CARBON-X® (AL)	CrN **, CARBON-X®, (Duplex) CrCN **	CrN, (Duplex) CrCN **, CARBON-X®, TiC	Duplex-VARIANTIC®* ** ***, Duplex-CrCN, CrN CARBON-X® (AL)	Duplex-VARIANTIC®* ** ***, Duplex DUMATIC *, TiC/TiN *, CrN, CrCN CARBON-X® (AL)	(Duplex) CrCN **, CrN **, CARBON-X® (AL)	CrN
<b>Hydroforming</b>	DUMATIC, Duplex-CrCN	DUMATIC, Duplex-CrCN	DUMATIC, Duplex-CrCN	DUMATIC, CrN, Duplex-CrCN	DUMATIC, CrN Duplex-CrCN	DUMATIC, Duplex-CrCN	
<b>Rolling</b>	CrCN	CARBON-X®	EXXTRAL®-Silber	TiCN, CrN, CrCN	DUMATIC, CrN, CrCN	CrN	
<b>Fine blanking</b>	CrCN, ZrN *, CARBON-X®	CrCN *, ZrN *, CARBON-X®	CrCN **/**, CARBON-X®, ZrN	VARIANTIC®, DUMATIC, CrN, CrCN	TiCN, CrN *, CrCN, VARIANTIC®	CrCN *, CrN, CARBON-X®, ZrN	CrCN, CARBON-X®
<b>Forge</b>		CARBON-X®				CARBON-X®	
<b>Extrusion</b>	CARBON-X® (AL), Duplex-CrCN						
<b>Presshardening</b>			MOLDADUR®, Duplex-TIGRAL®	MOLDADUR®, Duplex-TIGRAL®			

\* additionally MOX2® possible \*\* additionally SUCASLIDE® possible \*\*\* and Duplex-VARIANTIC®-1000