

Stamping, Forming, Punches, Fine Blanking

Coating Portfolio

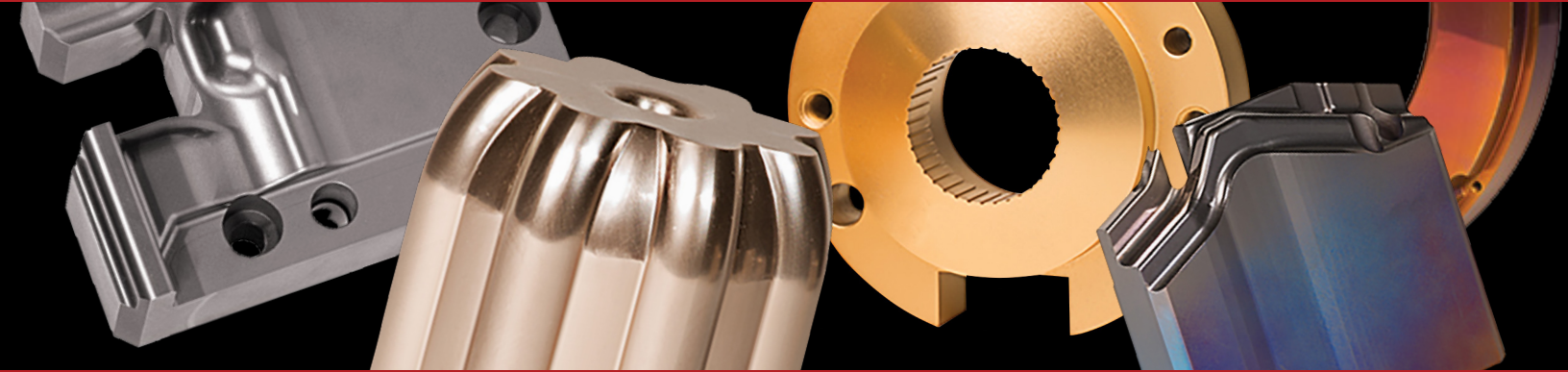


Tools Moulds | Dies | Punches

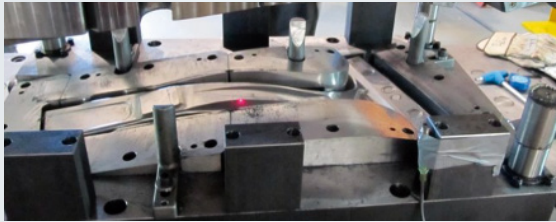
Historical Index	Coating	Composition	Coating Architecture					Applications				Properties			
			Single Layer	Multilayer	Duplex 30-50 µm	Triplex	Gradient	Stock material thickness, mm	Steel Maximum Tensile Strength, MPA	Light Metal Al, Mg	Cu Based	Maximum Thickness, µm	Hardness HV ±200	Coefficient of Friction (dry over steel)	Colour
PERFORMANCE COATINGS															
-	TiN	TiN	+					1	400	-	-	10	2200	0.3	Gold
-	TiCN	TiCN		+	+			1	600	-	-	6	3400	0.2	Grey/Bronze
-	CR(C)N based	CRN, CrCN, CrC	+	+	+			2	-	+	+	12	2000	0.3	Silver
-	TiAlN	TiAl(C)N Based	+		+			2	600	-	-	10	3200	0.5	Grey
-	CRALON	AlCRN Based	+		+			3	800	-	-	8	3300	0.5	Grey
ADVANCED HIGH-PERFORMANCE COATINGS															
New	CRALON-M	AlCRTiSiN Based		+	+	+		5	1100	-	-	8	3400	0.2	Bronze
New	CRALON-S	TiAlVSiN Based		+	+	+		5	1200	-	-	8	3500	0.2	Bronze
New	FORMALL (V10)	VCN	+		+		+	2	900	+	-	20	3000	0.5	Yellow
New	FORMALL-S	TiSiVN Based		+	+	+		5	1200	-	-	10	3500	0.2	Bronze
New	FORMALL-MOLY	Proprietary	+		+		+	>5	Over 1200	-	-	20	4000	0.25	Silver Yellow
New	D-ARC	DLC-Diamond Like Carbon		+	+			2	N/A	+	+	4	4000	<0.1	Grey/Black
New	D-ARC Nano	DLC (M) Based		+	+	+	+	>5	N/A	+	+	10	3500	<0.1	Grey/Black

All about FORMALL

A Unique combination of hardness and ductility



Tools Moulds | Dies | Punches

Historical Index	Coating	Composition	Advantages	Properties			
				Maximum Thickness, μm	Hardness HV ± 200	Coefficient of Friction (dry over steel)	Colour
							
New	FORMALL (V10)	VCN based	<ul style="list-style-type: none"> • Universal coating for hot and cold roll applications • Excellent toughness properties 	20	3000	0.5	Yellow
New	FORMALL-S	TiSiVN based	<ul style="list-style-type: none"> • Demanding applications • Multi-layer coating used in HSLA applications • Superior wear protection and adhesion properties 	10	3500	0.2	Bronze
New	FORMALL-MOLY	Proprietary	<ul style="list-style-type: none"> • Ultra-hard coating yet high toughness due to gradient properties • Used for UHSLA applications • Best coating for very challenging applications, i.e. deep draw, thick materials, high tensile strength applications, etc. 	25	4000	0.25	Silver Yellow

Any process could be performed as duplex with case hardening 40-70 microns or without case hardening.

Major Stamping Applications Deep Drawing, Flanging, Thick sheet metal forming, Trimming, Fine Blanking, Forging, Extrusion, Rolling, Rotary, Swaging, Tread Rolling, Punching, Riveting.

Savings and Productivity Improvements Longer service life, minimizing machine downtime, Higher part quality.

FORMALL Family Unique combination of Hardness and Ductility, Continues Lubrication under friction load.