



## Tools Punches | Dies

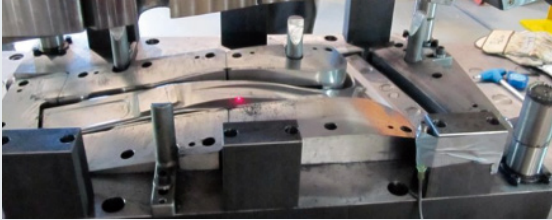
Historical Index	Coating	Composition	Coating Architecture					Applications				Properties			
			Single Layer	Multilayer	Duplex 30-50 µm	Triplex	Gradient	Stock material thickness, mm	Steel Maximum Tensile Strength, MPA	Light Metal Al, Mg	Cu Based	Maximum Thickness, µm	Hardness HV ±200	Coefficient of Friction (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

# FORMALL

Unique combination of hardness and ductility



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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"><li>• Universal coating for hot and cold roll applications</li><li>• Excellent toughness properties</li></ul>	20	3000	0.5	Yellow
New	FORMALL-S	TiSiVN based	<ul style="list-style-type: none"><li>• Demanding applications</li><li>• Multi-layer coating used in HSLA applications</li><li>• Superior wear protection and adhesion properties</li></ul>	10	3500	0.2	Bronze
New	FORMALL-MOLY	Proprietary	<ul style="list-style-type: none"><li>• Ultra-hard coating yet high toughness due to gradient properties</li><li>• Used for UHSLA applications</li><li>• Best coating for very challenging applications, i.e. deep draw, thick materials, high tensile strength applications, etc.</li></ul>	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.