

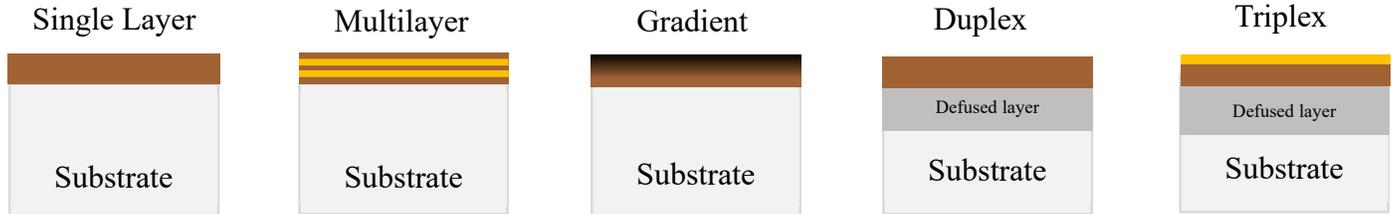
# Stamping, Forming, Punching, and Fine Blanking

## Coating Portfolio



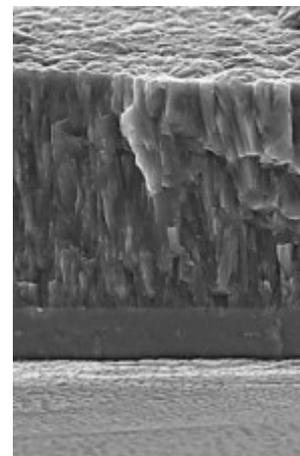
PVD Coating	Composition	Coating Architecture						Application			Properties			
		Single Layer	Multilayer	Duplex		Triplex	Gradient	Stock Material Thickness, mm	Steel Maximum Tensile Strength, MPa	Non-Ferrous alloys	Thickness, $\mu\text{m}$	Hardness HV $\pm 200$	Coefficient of Friction (dry over steel)	Colour
				Nitriding 30-50 $\mu\text{m}$	Provecta 20-30 $\mu\text{m}$									
<b>PERFORMANCE COATINGS</b>		<i>"Coating Thickness capability up to 25 <math>\mu\text{m}</math> available upon request"</i>												
TiN	TiN	*		*	*			1	400		2-5	2,200	0.3	Gold
TiCN	TiCN		*	*	*			1	600		2-5	3,400	0.2	Grey
CrN	CrN	*		*	*			2	N/A	*	2-5	2,000	0.3	Silver
TiAlN	TiAlN	*		*	*			2	600		2-5	3,200	0.5	Grey
CRALON	AlCrN	*		*	*			3	800		2-5	3,300	0.5	Grey
<b>ADVANCE HIGH-PERFORMANCE COATINGS</b>		<i>"Coating Thickness capability up to 25 <math>\mu\text{m}</math> available upon request"</i>												
FORMALL-V10	VN Based	*		*	*		*	$\leq 5$	900		6-12	3,000	0.5	Beige
FORMALL-S	TiSiN Based		*	*	*	*		5	1200		2-12	3,800	0.2	Bronze
FORMALL-MOLY	Proprietary	*		*	*		*	$\geq 5$	> 1200		6-12	4,000	0.25	Champaign
FORMALL-MAX	Proprietary		*	*	*	*	*	$\geq 5$	> 1200		6-12	3,800	0.25	Champaign
FORMALL-ALPHA	VN Based	*		*	*			$\leq 5$	900	*	6-12	2,500	0.2	Champaign
D-ARC	DLC, ta-C	*		*				$\leq 5$	N/A	*	1-3	4,000	0.1	Gunmetal
D-ARC NANO	DLC, ta-C		*	*		*	*	> 5	N/A	*	2-5	3,000	0.1	Gunmetal

**Coating Architecture:**



**Benefits Of Gradient Coating:**

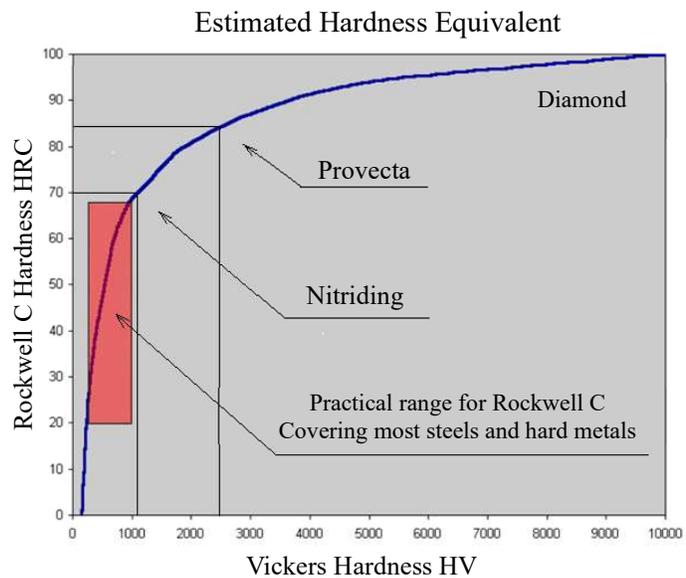
- Optimized Hardness and Toughness Balance*
- Increased Wear Resistance Without Brittleness*
- Optimized Friction and Lubrication*
- Extended Coating Lifespan*
- Customizable Performance*
- Improved Thermal Stability in Hot Stamping Application*
- Improved Adhesion*
- Reduced Internal Stresses*
- Extended Tool Life*
- Better Load Distribution*



Higher Hardness  
  
Lower Hardness  
  
Cr Sublayer  
  
Substrate

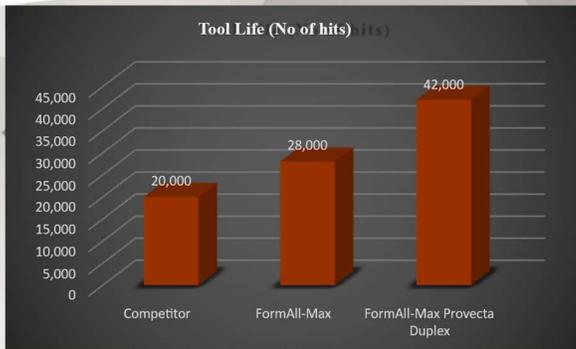
**Duplex Process:**

- **Provecta:** Metallic diffusion process which provides case hardening by increasing hardness to 2,500 HV.
- **Nitriding:** Gas diffusion process which provides case hardening by increasing hardness up to about 1,100 HV.



## Sputtek Capabilities:

- Capable of providing thicker PVD coatings **up to 25  $\mu\text{m}$**
- **Customized coating recipes** tailored to specific applications
- **Dual-Stage** coatings with a DLC top layer for enhanced performance
- **Pre and post polishing** services for optimal surface finish
- **Comprehensive service programs**, including plasma nitriding, heat treatment, welding, grinding, reconditioning of tools, etc. through trusted subcontractors



## FormAll-Max Provecta Duplex Case Study

### Heavy Stamping Application

Material: HSLA  
Thickness: 0.180"  
Application: Forming  
Industry: Automotive  
Coating Hardness: 3,000 HV  
Coefficient of Friction: 0.2  
No of hits: 42,000

### Background:

"In this challenging application, customer could reach max 20,000 hits before stopping the press to repair the forming tools. With FormAllMax Provecta\* Duplex coating customer now has 210% increased tool life and productivity!"



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Quality Services

# All about FORMALL Family

A Unique combination of hardness and ductility

**Sputtek**  
ADVANCED METALLURGICAL COATINGS



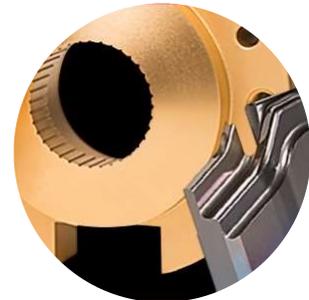
## *Applications:*

- Punches & Dies for Fine Blanking
- Coining & Embossing Dies
- Stamping Dies & Inserts
- Progressive Die Components
- Forming & Bending Tools



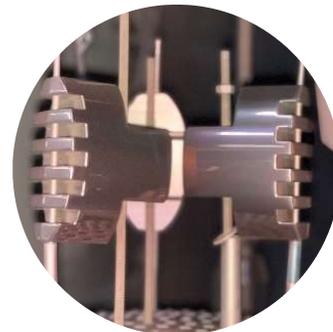
## *Features:*

- Exceptional Hardness & Wear Resistance
- Thin, Precision Coating
- Low Friction & Anti-Sticking Properties
- Corrosion & Oxidation Resistance
- High Load-Bearing Capacity



## *Benefits:*

- Extended Tool Life
- Better Performance on High-Strength Materials
- Improved Part Quality
- Higher Productivity & Efficiency
- Lower Maintenance & Downtime



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