



PVD & DLC COATINGS

Applications Guide

Advanced coatings, handled with uncompromising care.

Engineered surface coatings that increase hardness, cut friction, resist wear and corrosion, and transform the finish of precision parts.



WHY CRYSTALLUME PVD

Coatings from people who make cutting tools.

Crystallume PVD is the coating center of RobbJack Corporation, a premium cutting-tool manufacturer since 1984. We approach every part the way a maker does — with engineering judgment, modern equipment, and genuine care for work that is often irreplaceable.



We make the tools

Decades of tooling expertise sit behind every coating we apply. We understand your parts because we engineer demanding parts ourselves.



Modern equipment

New, state-of-the-art deposition systems mean tighter tolerances, better uniformity, and consistent, repeatable results — batch after batch.



Reverent handling

Every job is received, inspected, tracked, masked, and returned with documented care — so nothing is lost, mixed up, or mishandled.

PVD COATING

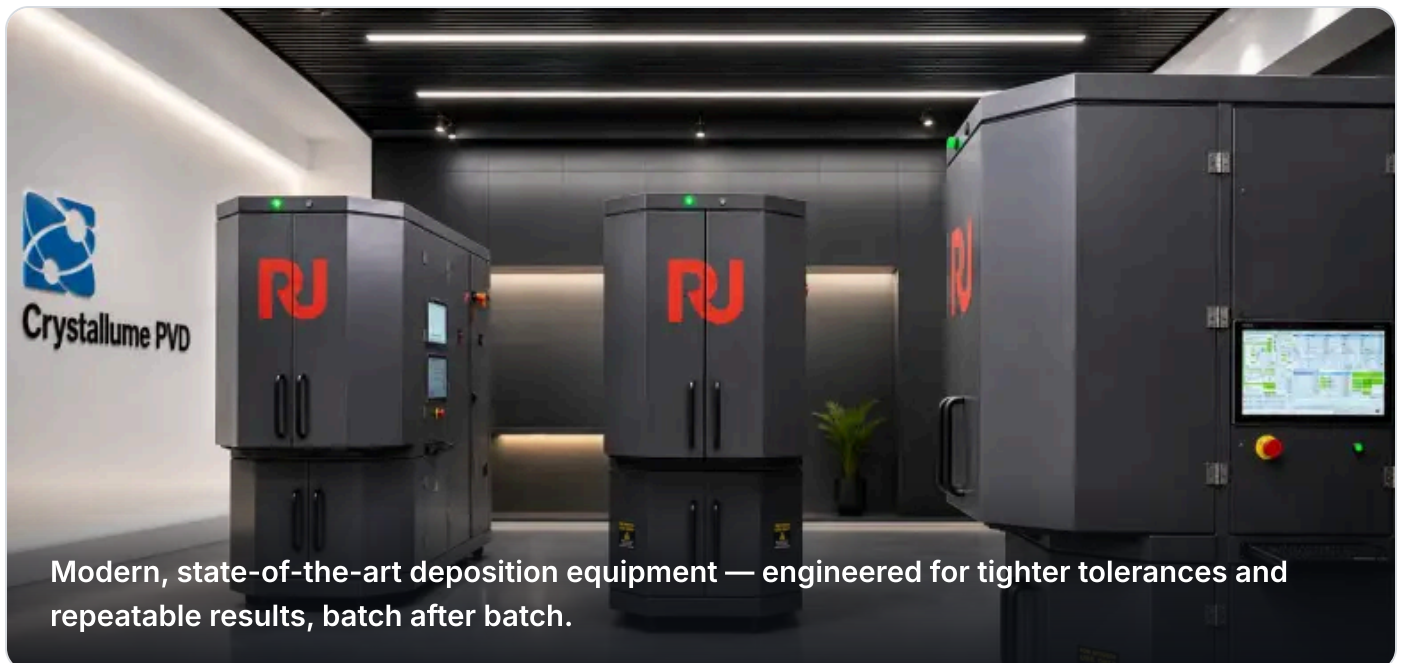
Physical Vapor Deposition

PVD deposits an ultra-thin (1–4 μm), ultra-hard ceramic layer onto your part in a vacuum chamber — a dramatic increase in surface hardness and wear resistance without meaningfully changing dimensions, so tools and components last longer, run smoother, and look the part.

DLC COATING

The Black Series (DLC)

Our Diamond-Like Carbon coatings combine extreme hardness with an exceptionally low coefficient of friction in a deep black finish — in three variants: Black Voodoo for firearms and heavy wear, Black Widow for temperature-sensitive parts, and Black Mamba for cutting tools.






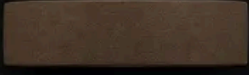

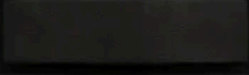


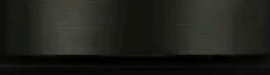
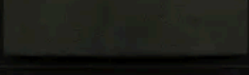
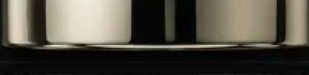
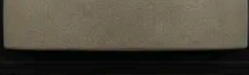

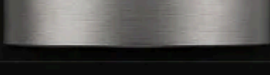
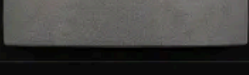


Modern, state-of-the-art deposition equipment — engineered for tighter tolerances and repeatable results, batch after batch.

COLOR & FINISH

Every color, every finish.

The same coating looks dramatically different polished (mirror), ground (satin), or sandblasted (matte). Color is a key choice — especially for decorative work.

COATING TRADE NAME	POLISHED (MIRROR FINISH)	GROUND (SATIN FINISH)	SANDBLASTED (MATTE FINISH)
King Cobra TiN TITANIUM NITRIDE			
Scorpion Stinger AlTiN ALUMINUM TITANIUM NITRIDE			
Python Scales TiCN TITANIUM CARBON NITRIDE			
Hercules Beetle Bronze TITANIUM CARBON NITRIDE			
Black Mamba DLC DIAMOND LIKE CARBON			
Black Widow DLC DIAMOND LIKE CARBON			
Black Voodoo DLC DIAMOND LIKE CARBON			
Murder Hornet ZrN ZIRCONIUM NITRIDE			
Rhino Hide CrN CHROMIUM NITRIDE			




Your parts are received, inspected, masked, and coated on modern equipment — then returned with documented care.

THE CRYSTALLUME PVD LINE

Six PVD coatings.


Each matched to a job — hardness, friction, and temperatures at a glance.



SCORPION STINGER
AlTiN · VIOLET-BLACK · 450°C

HARDNESS	~3,300 HV	FRICTION	0.5–0.6
MAX TEMP	900 °C	THICKNESS	1–4 µm


Best for: High-temperature, high-speed, and dry machining of hard materials.



PYTHON SCALES
TiCN · GREY · 450°C

HARDNESS	~3,200 HV	FRICTION	~0.4
MAX TEMP	400 °C	THICKNESS	1–4 µm


Best for: High hardness and abrasion resistance, especially with coolant.



KING COBRA
TiN · GOLD · 450°C

HARDNESS	~2,800 HV	FRICTION	0.4–0.5
MAX TEMP	600 °C	THICKNESS	1–4 µm


Best for: A proven, versatile all-rounder for ferrous cutting and much more.



MURDER HORNET
ZrN · LIGHT GOLD · 450°C

HARDNESS	~2,800 HV	FRICTION	0.4–0.5
MAX TEMP	600 °C	THICKNESS	1–4 µm


Best for: Aluminum and non-ferrous machining, plus medical work.



RHINO HIDE
CrN · SILVER · 350°C

HARDNESS	~2,000 HV	FRICTION	~0.5
MAX TEMP	700 °C	THICKNESS	1–4 µm

Best for: Corrosion resistance, hot hardness, and thick-film wear protection.



HERCULES BEETLE
TiCN · BRONZE · 450°C

HARDNESS	~3,200 HV	FRICTION	~0.4
MAX TEMP	400 °C	THICKNESS	1–4 µm

Best for: TiCN-grade hardness and abrasion resistance, with a standout bronze finish.

WHY PVD

Built to make parts last.


- ▶ Higher surface hardness
- ▶ Lower friction & less galling
- ▶ Better wear & corrosion resistance
- ▶ Longer tool & part life



THE BLACK SERIES

Three DLC coatings.


Diamond-Like Carbon — ultra-low friction and high hardness in a deep black finish.



Our flagship DLC — ultra-low friction and high hardness in a deep black finish.

HARDNESS	~1,500 HV	FRICTION	0.05-0.08
MAX TEMP	~450 °C	THICKNESS	1-4 µm

Best for: Ultra-low friction and extreme hardness — firearms and heavy wear.




LOW-TEMP

A low-temperature DLC applied at just 200 °C for heat-sensitive parts.

HARDNESS	~2,500 HV	FRICTION	0.05-0.15
MAX TEMP	~350 °C	THICKNESS	1-4 µm

Best for: DLC performance on parts that can't take the heat.



CUTTING TOOLS

A DLC engineered for cutting tools — low friction for clean chip flow and long edge life.

HARDNESS	~2,000 HV	FRICTION	0.05-0.15
MAX TEMP	~450 °C	THICKNESS	1-4 µm

Best for: DLC tuned for cutting tools and non-ferrous machining.

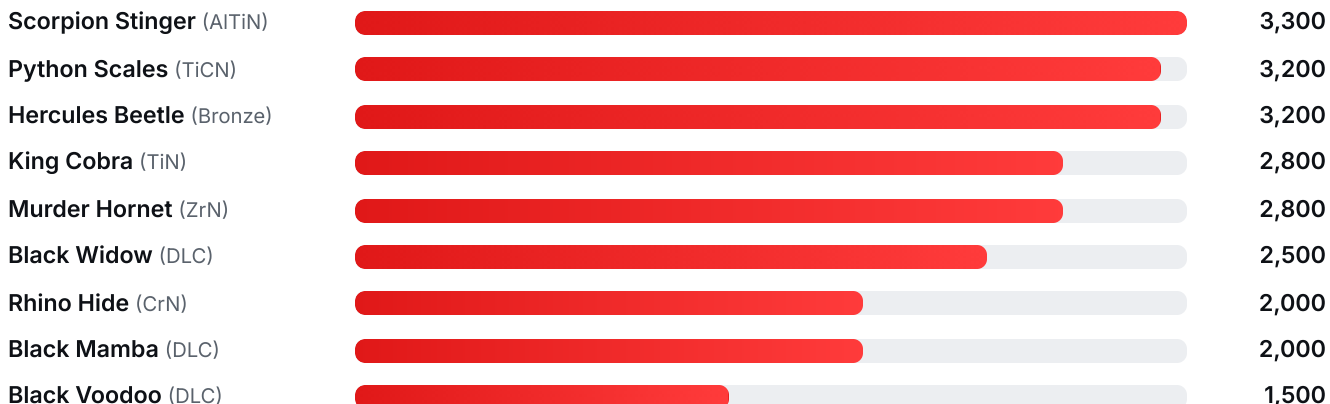
Values are typical published properties for the underlying coating chemistry, shown for general guidance. Coefficient of friction is a system property that varies with the mating material, load, and environment. Final specifications are confirmed per part, material, and application.

PERFORMANCE AT A GLANCE

How the line compares.

The specifications engineers ask about most — hardness, heat resistance, and friction.

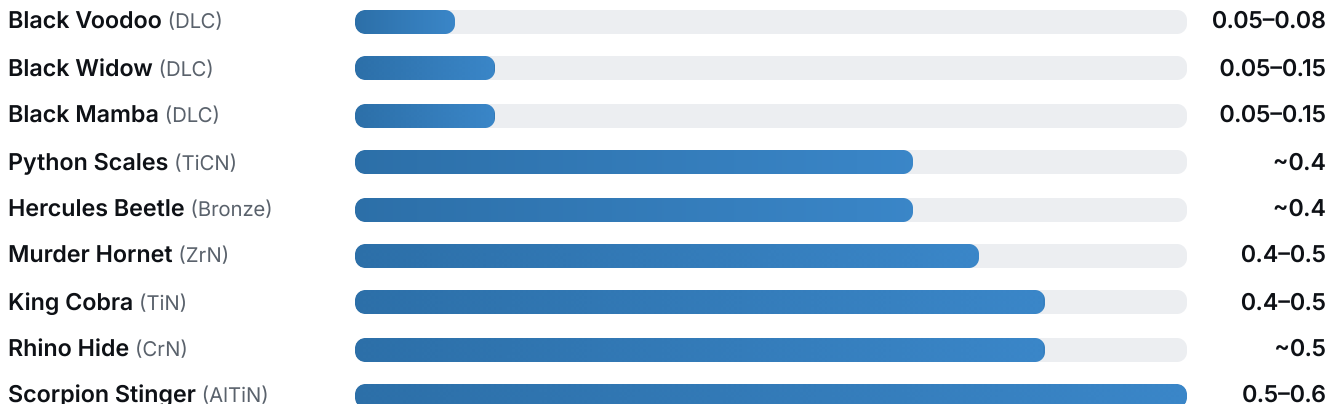
Microhardness (HV) — higher is harder



Max service temperature (°C) — higher runs hotter

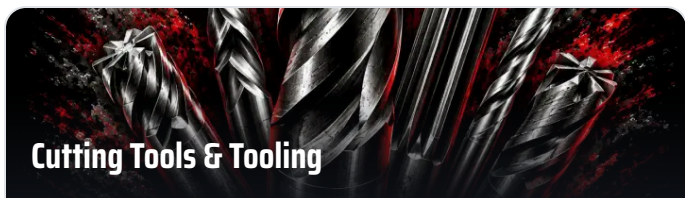


Coefficient of friction — lower is slicker (DLC wins)



Coatings trusted where it matters most.

Recommended coatings for the industries we serve.



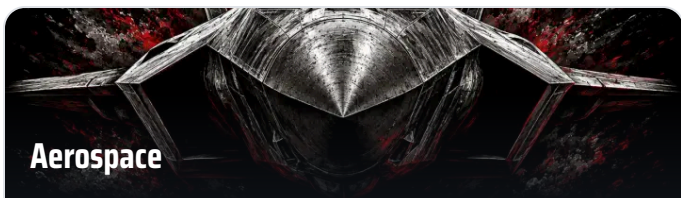
Cutting Tools & Tooling

The right coating for every cut.

Black Mamba · DLC Scorpion Stinger · AlTiN

Python Scales · TiCN King Cobra · TiN

Murder Hornet · ZrN



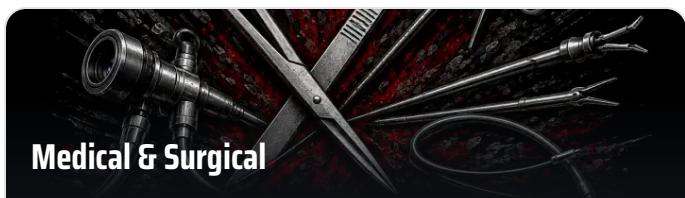
Aerospace

Coatings for parts that cannot fail.

Black Voodoo · DLC Scorpion Stinger · AlTiN

King Cobra · TiN Rhino Hide · CrN

Murder Hornet · ZrN



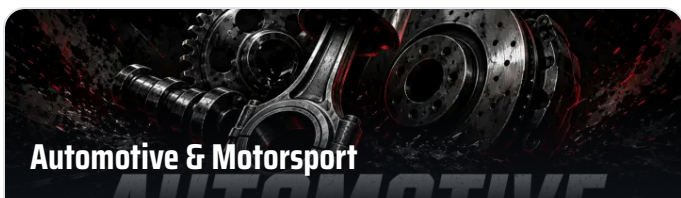
Medical & Surgical

Clean, corrosion-resistant coatings for medical instruments.

Black Voodoo · DLC Black Widow · DLC

King Cobra · TiN Murder Hornet · ZrN

Rhino Hide · CrN

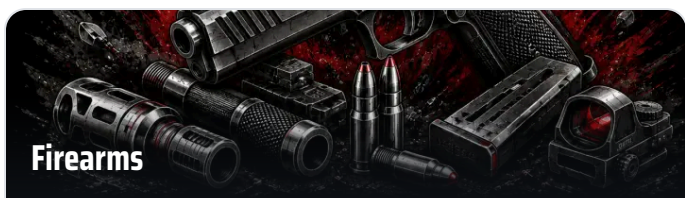


Automotive & Motorsport

Less friction. More performance.

Black Voodoo · DLC Black Mamba · DLC

Scorpion Stinger · AlTiN Rhino Hide · CrN



Firearms

Tougher, slicker, better-looking firearms.

Black Voodoo · DLC Black Widow · DLC

Scorpion Stinger · AlTiN King Cobra · TiN

Hercules Beetle · Bronze



High-Tech & Precision

Thin films for precision parts.

Black Voodoo · DLC Black Widow · DLC

Python Scales · TiCN King Cobra · TiN

Rhino Hide · CrN

Don't see your industry? If it's a precision part, we can probably coat it — tell us your material and application and we'll recommend the right coating.

WHAT OUR CUSTOMERS SAY

Trusted with parts that have to be perfect.

"RobbJack's Die Mold cutters have been a game changer for us. We are cutting 52 HRC material, and the AlTiN coating keeps the tools running far longer than anything else we have tried. The performance is incredible, and our cutting tool costs have been **reduced by over 500%**."

Sam C. — Die & Mold Manufacturer

"RobbJack's rocket engine liner saws with Black Mamba coating delivered a **370% increase in tool life** while cutting abrasive copper material. The results exceeded our expectations and gave us the performance consistency we needed for critical aerospace components."

Anthony M. — Major Rocket Engine Manufacturer

"The parts we make are used in DNA sample testing, so there is no room for inconsistency. Crystallume PVD understood the critical nature of our work and delivered a coating process we could rely on. They helped reduce our out-of-tolerance parts from **45% to less than 1%**, which was a huge improvement for our operation."

Stephan V. — Precision Medical Component Manufacturer

"After testing **38 major cutting tool manufacturers**, RobbJack's A1-303 series with Black Mamba coating was the only tool that could cut our aluminum part fast enough without chatter, galling, or aluminum buildup. In a fully automated cell producing millions of parts per year, cycle time and durability are critical. RobbJack delivered where everyone else failed."

Andy W. — Major Truck Manufacturer



Crystallume PVD
POWERED BY ROBBJACK

Send us your part. We'll handle the rest.

Tell us your material, part, and application — and we'll recommend the right coating and a lead time.

WEB

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