



纳狮在中国



* 我们利用自主专利的
SPARK纳米技术
为您提供全面的涂层解决方案



纳狮涂层 您最诚挚的伙伴

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* Patented SPARK
Nano Technology
Total Coating Solution For You

Naxau Coating
纳狮涂层

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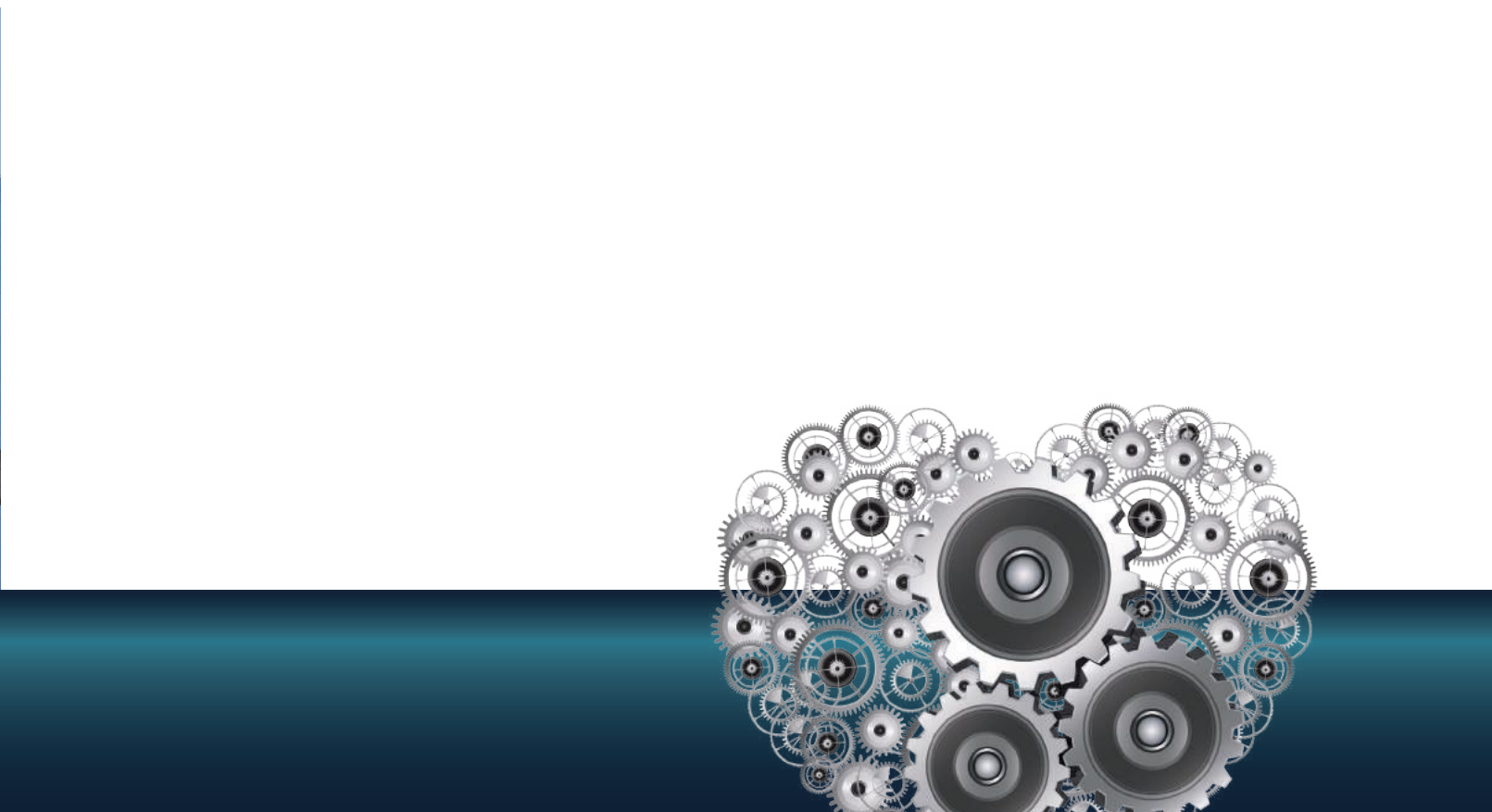




公司简介 Company Profile

纳狮涂层是超晶集团旗下的纳米涂层子公司。我们的使命就是掌握核心技术，自主开发最先进环保的纳米材料与制备，让我们中国的客户在产业升级中拥有世界级的竞争力。纳米技术，将高强度、高硬度、低摩擦系数、低热传导系数、耐腐蚀、绝缘等复杂多元的各种材料特性合成在一个涂层里，是材料世界里最新的革命。纳狮涂层已获得多项核心专利，其中最具代表的就是第六代的无液滴SPARK6技术平台。我们在中国与众不同的地方就是集团投入巨资设立了一个完整的研发中心，我们的研发团队一年不停的为客户伙伴开发独特的涂层来满足特殊需求以及创造竞争差异。技术服务业的基石就是客户的成功与长久的伙伴关系，纳狮目前在中国拥有7个涂层中心，分布于嘉兴、东莞、台州、常州、重庆、西安、成都。纳狮永远贴近客户，随时随刻为您提供及时周全的服务。

Naxau is the premium coating brand of Nano Technology Corporation. Naxau is a coating service provider. We develop state of the art and eco-friendly nano-crystal coatings for advanced tooling and metal components. Nano technology enables modern material scientists to synthesize complex and often contradicting properties such as toughness, hardness, low friction, low thermal conductivity, anti-corrosion, and resistivity all into one nano-material. Naxau had patented several key nano technologies including the 6th generation SPARK nano crystal platform. It is our mission to make sure our customers succeed in the challenge of modern manufacturing. Naxau now operates seven coating centers and a RD center in China, they are located in Jiaxing, Dongguan, Taizhou, Changzhou, Chongqing, Xian, and Chengdu. Naxau services customers around the clock so there is no lead time in your success. We are always there for you.

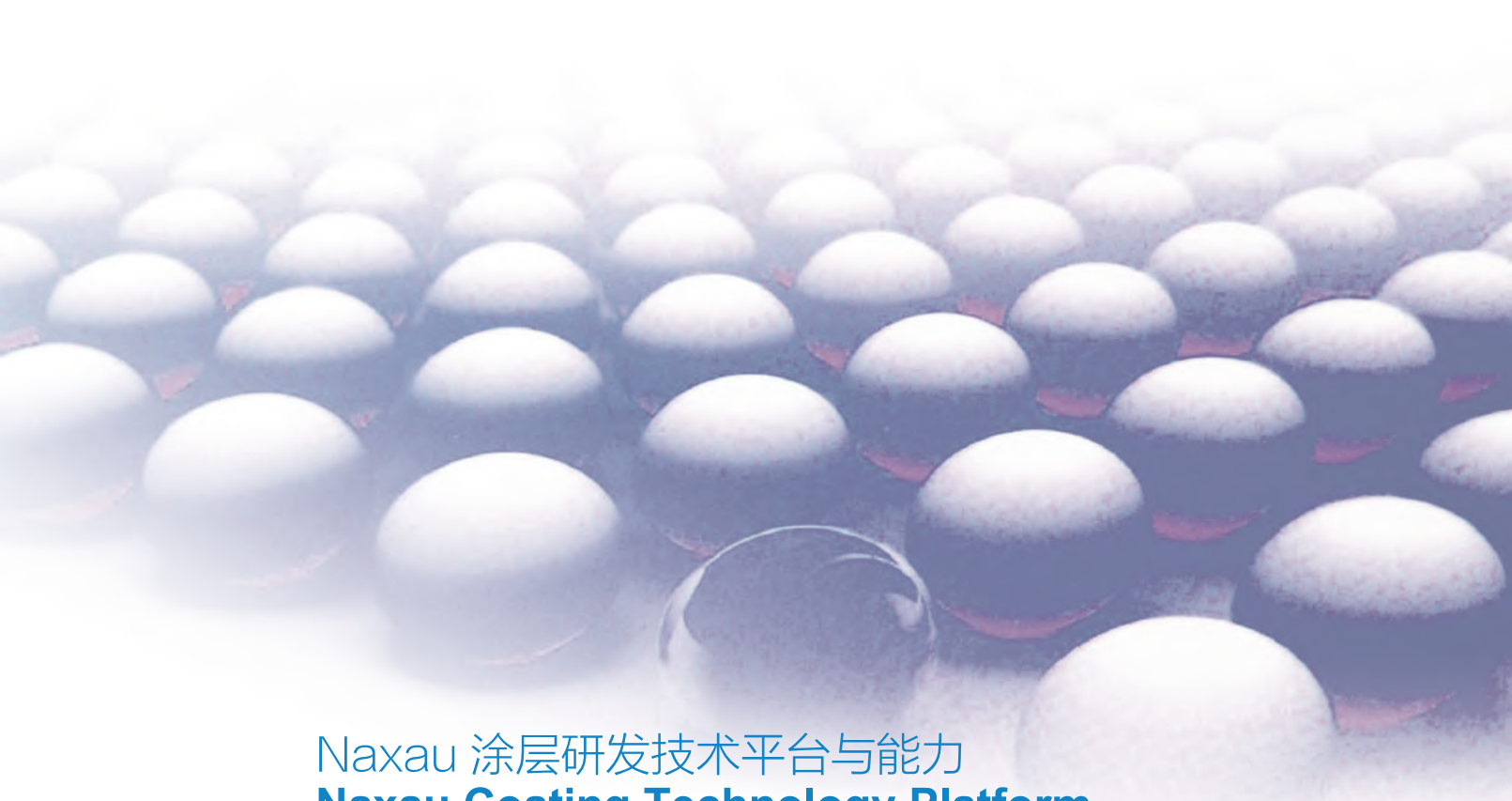


我们的价值观 Our Value

追求真理，热爱生命，创造卓越贡献。
追求真理，这是引导我们行为的最高原则。我们是一个学习型组织，在这里，没有正确答案，只有永无止境的
学习、创新、成长。
不管是生活中的亮点，或是亮点间的宁静，我们享受生命的每一个时刻。我们知道，热爱生命的人，具有强大的
创造力，他们让社会变得更美好。
我们组织工作的目的就是要创造卓越贡献。挑战不可能的任务，让我们的工作变得更有趣。

Pursuit of truth is our highest guiding principle. We are a learning organization. At Naxau, there is no correct answer, just continuous learning, creating and growing.
We enjoy every moments in life, whether it's all the highlights or the serenity in between. We know, people who enjoy life are the ones who create things that make our life a better place.
Our works are organized so we can achieve the highest contribution to society. Challenge the impossibility is just one way we make our job interesting.





Naxau 涂层研发技术平台与能力
Naxau Coating Technology Platform

涂层材料分析实验室
Advanced coating analysis lab

- HCD 电子枪涂层设备
- Sputter磁控 溅射涂层设备
- Planar Arc 矩形弧涂层设备
- Filter Arc 过滤弧涂层设备
- Hybrid HSA HCD+Sputter+Arc 涂层设备
- PN+PVD 复合涂层设备

多样化的涂层设备
Variety of advanced coating equipments

整合全球最先进的
涂层资源

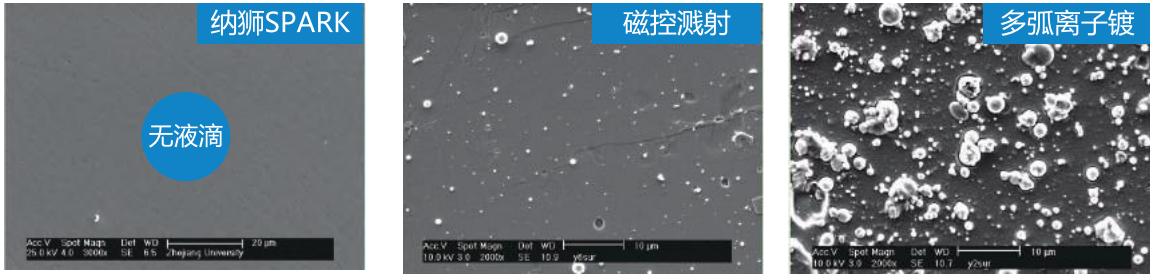
完整的涂层方案
Complete coating solutions

- 高镜面涂层Mirror Finish Coating
- 刀具涂层Cutting Tool Coating
- 模具涂层 Mold Coating
- 汽车零部件涂层 Car Components Coating
- 航天零部件涂层 Aerospace Components Coating
- 医疗涂层 Medical Coating

客户产品模拟实验室
Product simulation test lab

第6代SPARK无液滴涂层
6th Generation Spark Droplet-Free Coatings

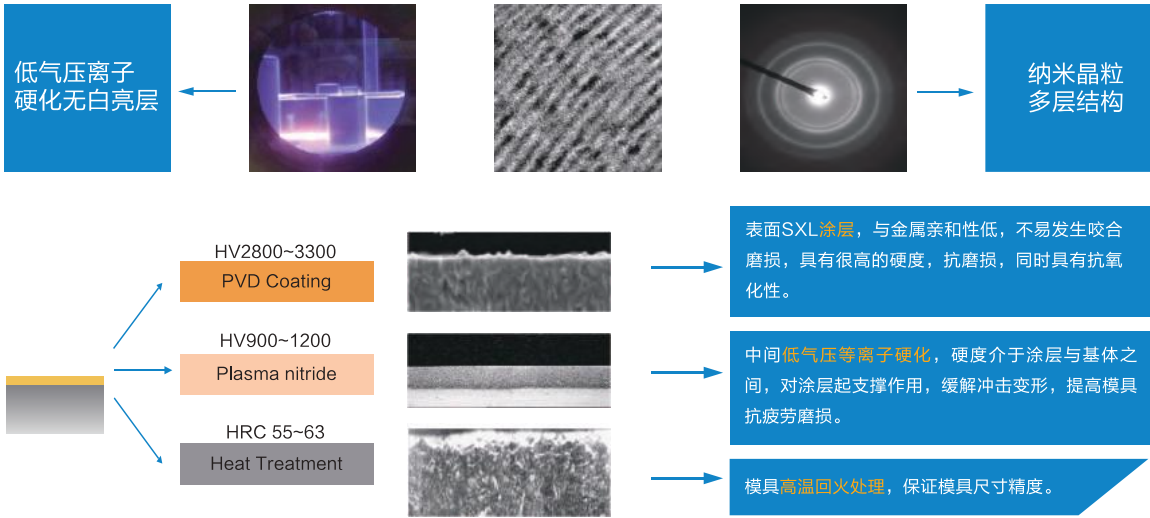
涂层表面，在一万倍的电子显微镜下可观察到肉眼看不出的细节，其中多弧离子镀与磁控溅射都有许多滴液。
Under SEM at 10,000X magnification, SPARK has a flawless coating surface whereas Sputtering and Cathodic Arc process have many droplets.



想要把纳米材料做好，就必须从肉眼看不到的地方下功夫。纳米涂层的基石就是每个等离子体中的分子团，如果等离子体有缺陷，那成长出来的纳米涂层就会有问题。纳狮的科学家多年坚持开发技术难度最高的SPARK无液滴涂层，就是希望从没有缺陷的等离子体中长出完美的纳米晶体，从而沉积出最好的纳米涂层。纳狮SPARK6专利的无液滴平台实现了这个梦想。SPARK6确保了涂层产品长时间使用的稳定性，我们知道，一个1微米的涂层液滴就会破坏5个微米精度要求的加工产品。一个刀具刃口上有一个缺陷，就会造成被加工的部件上有切削纹。一个模具上也只要有一个液滴，就会造成被加工产品上有一个点，这都不是现代加工所能接受的结果。

The building block of a nano coating is every atoms and molecules in the plasma. If there are defects and droplets in the plasma, the accumulated nano coating will have critical flaws in the material and problems when using it. The scientists at Naxau invented the SPARK technology to overcome this challange. As a result, coatings done at Naxau's SPARK6 platform are more durable and consistent than most competitors on the market.

杜霸复合涂层技术
DURA Composite Coating Technology



纳狮涂层选项

Selected Naxau Coatings

涂层名称	涂层类型	硬度 (HV)	膜厚 (μm)	抗氧化温度(°C)	摩擦系数	外观颜色	适合加工材质
TiN	TiN	2000	1.0~3.0	500	0.25	金黄	丝锥的普通钢料加工
TiCN	TiCN	3800	1.0~3.0	450	0.2	灰	丝锥的不锈钢和普通钢料加工
TiAlN	TiAlN	3000	1.0~3.0	800	0.4	紫黑	普通模具钢
AM	AlTiN基	3300	1.5~3.0	900	0.4	灰黑色	HRC≤40模具钢，不锈钢，6/7系铝
ASM	AlTiSiN基	3500	1.5~3.0	1000	0.35	灰黑色	HRC≤45模具钢，不锈钢，粉末冶金，6/7系铝
HM	TiSiN基	3800	1.0~3.0	1100	0.3	古铜	不锈钢，HRC45~50模具钢，钛合金
HMA	TiSiN基	4200	1.5~3.0	1200	0.3	古铜	钛合金，粉末冶金，HRC30~55模具钢
CV	TiAlSiN基	3500	4~6	1000	0.3	金黄	刀片专用仿CVD涂层
APS	AlCrN基	3500	1.5~3.0	1250	0.3	灰黑	HRC45~65模具钢
AG	AlCrN基	3500	1.0	1250	0.3	灰黑	不锈钢高光，亚高光加工专用
AMS	TiAlCrN基	3600	1.0~5.0	1000	0.3	紫黑	滚、插齿刀的各种工况加工，铣刀、刀片 HRC≤50模具钢，铸铁等
AMT	AlCrN基	4000	1.0~3.0	1100	0.3	灰黑	滚齿刀具的高速干切
DLC	类金刚石	1800	1.0~3.0	350	0.1	黑色	有色金属，铜，铝等
TiB2	TiB2	4000	0.5~3.0	1000	0.4	浅灰	铝硅合金，铜合金，镁合金，钛合金
金刚石涂层	金刚石	10000	2.0~12.0	650	0.02~0.1	黑灰	石墨，复合材料，碳纤维

涂层名称	涂层类型	硬度 (HV)	膜厚 (μm)	抗氧化温度(°C)	摩擦系数	性能	应用推荐
TRN	CrN基	2000	7~9	500	0.4	低摩擦系数，高韧性	钛合金热锻
ARS	CrAlTiN	3600	5~7	1000	0.6	高硬度，高强度，高耐磨性能	汽车高强度板冲压
AMS	CrAlN基	3200	5~7	900	0.6	高硬高韧性，耐磨性优异	强度不高于500MPa的普通钢板冲压
AMC	AlTiN基	3400	7~8	400	0.2	高硬高韧性，润滑性优异，摩擦系数低	不锈钢模具冲压
ARP	CrAlTiN基	3600	4~5	1000	0.5	高硬度，高强度，高耐磨性能	不锈钢热冲压模具，精冲，冲棒等
ARK	CrN基	1800	3~5	600	0.6	优异的抗高分子粘连性	塑胶模具，半导体封装模具通用涂层
ARD	CrAlN基	3300	5~7	900	0.5	优异的耐高温性能，抗铝粘连性好	压铸模具类通用涂层

纳狮涂层选项

Selected Naxau Coatings

Coating name	Coating material	Microhardness (HV)	Coating thickness (μm)	Maximum service temperature (°C)	Coefficient of friction against steel (dry)*	Coating colour	Suitable for processing materials
TiN	TiN	2000	1.0~3.0	500	0.25	gold-yellow	steel processing
TiCN	TiCN	3800	1.0~3.0	450	0.2	grey	Stainless steel processing
TiAlN	TiAlN	3000	1.0~3.0	800	0.4	violet-black	die steel
AM	AlTiN-based	3300	1.5~3.0	900	0.4	black-grey	die steel(HRC≤40)，Stainless steel，aluminum alloy
ASM	AlTiSiN-based	3500	1.5~3.0	1000	0.35	black-grey	die steel(HRC≤45)，Stainless steel，powder metallurgy，aluminum alloy
HM	TiSiN-based	3800	1.0~3.0	1100	0.3	copper	Stainless steel，die steel(45≤HRC≤50)，titanium alloy
HMA	TiSiN-based	4200	1.5~3.0	1200	0.3	copper	titanium alloy，powder metallurgy，die steel(30≤HRC≤55)
CV	TiAlSiN-based	3500	4~6	1000	0.3	gold-yellow	CVD like coating for blade
APS	AlCrN-based	3500	1.5~3.0	1250	0.3	black-grey	die steel(45≤HRC≤65)
AG	AlCrN-based	3500	1.0	1250	0.3	black-grey	High degree of finish machining for Stainless steel
AMS	TiAlCrN-based	3600	1.0~5.0	1000	0.3	violet-black	Machining of gear shaper cutter and hobbing cutter，Milling cutter、blade，die steel(HRC≤50)，Cast iron
AMT	AlCrN-based	4000	1.0~3.0	1100	0.3	black-grey	High-speed cutting and dry machining for hobbing cutter
DLC	DLC	1800	1.0~3.0	350	0.1	black	Nonferrous Metals，copper，aluminum alloy
TiB2	TiB2	4000	0.5~3.0	1000	0.4	bright grey	Al-Si alloy，copper，magnesium alloy，titanium alloy
Diamond	Diamond	10000	2.0~12.0	650	0.02~0.1	black-grey	graphite，compound material，Carbon fiber

Coating name	Coating material	Micro-hardness (HV)	Coating thickness (μm)	Maximum service temperature (°C)	Coefficient of friction against steel (dry)*	Coating colour	Properties	Recommended applications
TRN	CrN-based	2000	7~9	500	0.4	silvery white	Low friction coefficient, high toughness	Hot forging for titanium alloy
ARS	CrAlTiN	3600	5~7	1000	0.6	black-grey	High hardness, high strength, high wear resistance	Punch for High strength sheet metal of automobile
AMS	CrAlN-based	3200	5~7	900	0.6	grey	High hardness, high toughness, High wear resistance	Punch for Steel plate stamping(≤500MPa)
AMC	AlTiN-based	3400	7~8	400	0.2	rose gold	Low friction coefficient, High hardness, high toughness,Excellent lubricity	Stainless steel die stamping
ARP	CrAlTiN-based	3600	4~5	1000	0.5	black-grey	High hardness, high strength, high wear resistance	Stainless steel hot stamping die, Fine blanking，Punch stick
ARK	CrN-based	1800	3~5	600	0.6	bright grey	Excellent Resistance sticky to high polymer	Plastic mould，Semiconductor packaging mould
ARD	CrAlN-based	3300	5~7	900	0.5	black	Excellent high temperature resistance, Good adhesion resistance to aluminum	die-casting mould

切削刀具 Cutting Tool



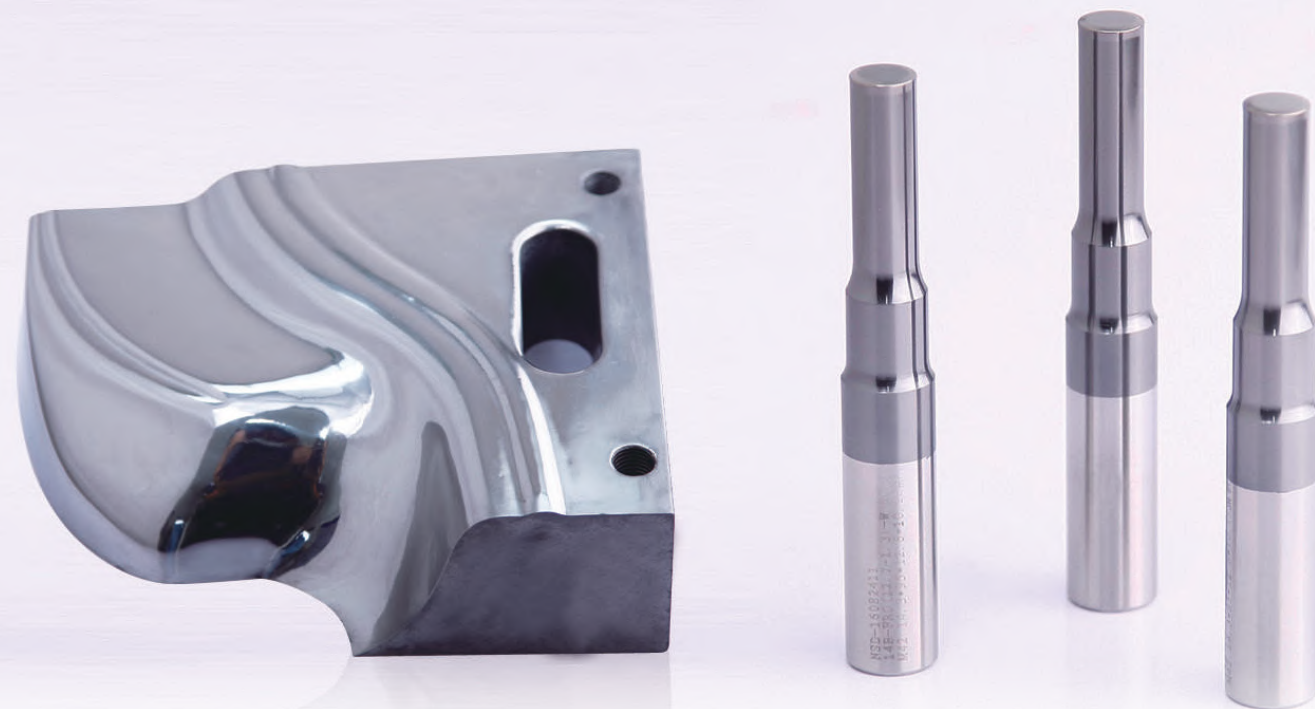
切削刀具 Cutting Tool



- ◆ 针对现代刀具的挑战，纳狮开发出独特的SHRL四层刀具涂层系统。依次为最靠近基材的应力吸收S膜、第二层高硬度的耐磨H膜、第三层抗高温的R膜、与最上面低摩擦系数的L膜。
- ◆ PVD涂层具有超高的硬度，但大部分厂商的涂层都因为太硬而一开始切削就在刃口崩落了。纳狮涂层的工程师在厚的高硬度H膜下设计了一层应力吸收S膜，大幅增加了硬膜的稳定性，让刀具寿命提升2到5倍，是涂层产业的创举。刃口硬涂层没有微崩，切削出来的产品表面更光亮，符合高精度切削要求。
- ◆ 针对高速与干式切削带来的大量温度问题，纳狮涂层在高硬度H膜上设计了一层抗高温的R膜，让切削热尽量排斥在刀具外面，大部分热量被切屑带走。
- ◆ 最表面还需要针对被加工的材料设计一个低摩擦系数的L膜，不同粘性被加工材如不锈钢、钛合金、高温合金等需要设计不同的L膜。

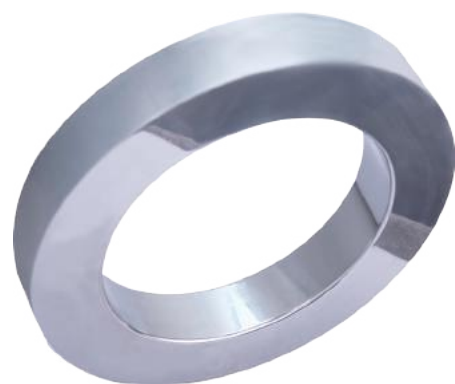
- ◆ Naxau has developed an unique SHRL coating system for cutting tool. The shock absorption S coating is implanted into the substrate, follow a second layer of high hardness thick H coating, then a third thermal resistant R layer and a fourth low friction L layer is deposited on top.
- ◆ Hardness are well know for PVD coatings. But without Naxau's shock absorption S layer the hard coating will just simply fracture off the cutting edge at first contact. Micro fracture at cutting edge will greatly decrease the precision and quality of the surface, this is unacceptable.
- ◆ The third thermal resistant R layer will keep the heat out under high speed and try machining.
- ◆ The fourth low friction L film needs different coatings when facing different sticky materials such as SUS, Ti alloy and super alloy. Please contact your Naxau representatives for the best SHRL cutting tool coating for your application.



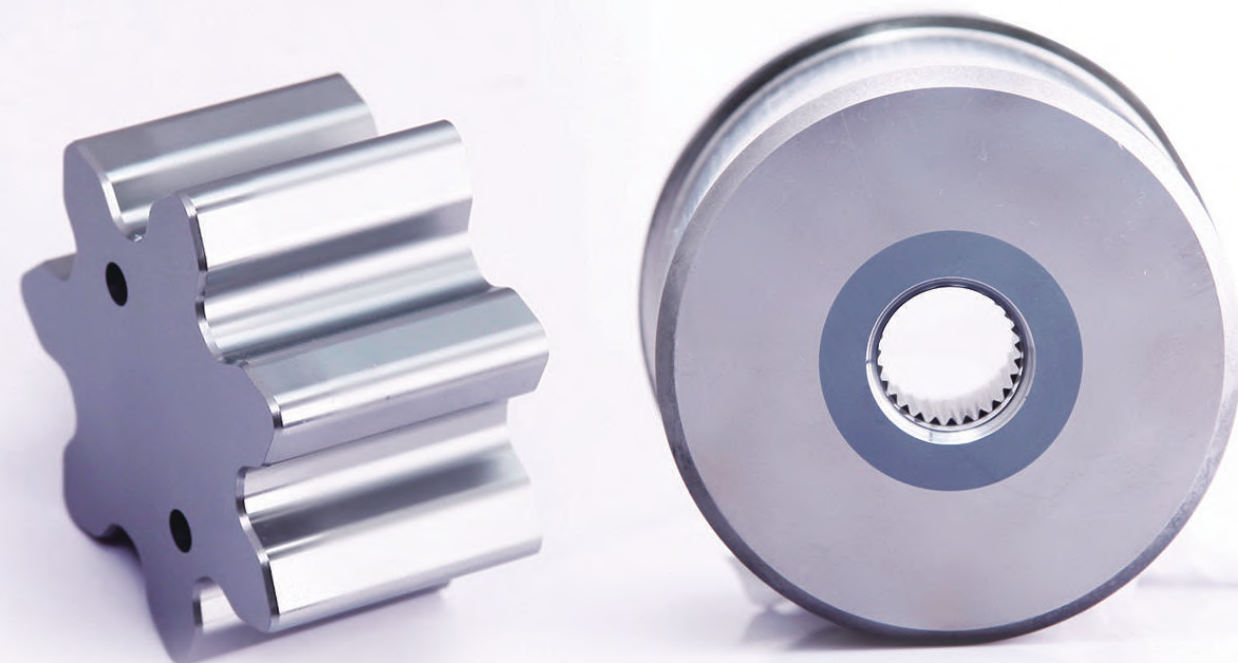


杜霸冲压 DURA Forming

冲压成型模具 Stamping and Forming Dies



- ◆ 针对现代成型模具的挑战，纳狮开发出独特的“杜霸”涂层系列。我们先在模具钢材表面低压渗入一个50-200微米的硬化层，接着在硬化层的支撑上沉积我们独特的SXL膜。依次为应力吸收S膜，再来是一层非常厚的应力吸收膜与高硬度膜交叉累积5000多层的X膜，最上面再沉积一层底摩擦系数的L膜来防止粘料。
- ◆ 杜霸涂层的总厚度最高可达到一般PVD涂层的40倍，所以碰到冲压成型中的硬质点时也不会被拉伤，模具寿命与产品表面精度都大幅改善。
- ◆ 杜霸是一个低温工艺，模具不会变形与开裂。我们甚至能够处理补焊过的模具，超越传统TD工艺的限制。



- ◆ Naxau has developed the unique DURA coating processes for forming dies. DURA consists of a 50 to 200 microns plasma hardening treatment and our unique SXL coating. With the support of the strong plasma hardening layer, we design a shock absorption S layer, a thick X coating consists of 5000 multi-layers of shock absorption layer and hard coating layer, and the top surface finishes with a low friction L layer.
- ◆ DURA is about 40 times thicker than most PVD coatings, so a DURA treated mold have a much longer tool life and better surface quality of the forming parts.
- ◆ DURA is a low temperature process, no shape changes and mold cracks are expected.





杜霸压铸
DURA Die Casting



金属压铸模具 Die Casting Molds

- ◆ 针对现代压铸模具的挑战，纳狮开发出独特的“杜霸”压铸涂层系列。我们先在模具钢材表面低压渗入一个50-200微米的硬化层，接着在硬化层的支撑上沉积我们独特的SGL膜。依次为应力吸收S膜，再来是一层非常厚的低热传导速率膜与高硬度膜交叉累积1500多层的G膜，最上面再沉积一层底摩擦系数的L膜来防止粘料。
- ◆ 杜霸压铸涂层的低热传导速率G膜可有效减缓压铸模具上冷热变化的幅度，延迟模具因快速冷热所产生的热冲击疲劳。同时200微米厚的硬质复合涂层能够承受压铸中的高压并减少表面磨损，保持精度。

- ◆ Naxau has developed the unique DURA coating processes for die casting molds. DURA consists of a 50 to 200 microns plasma hardening treatment and our unique SGL coating. With the support of the strong plasma hardening layer, we design a shock absorption S layer, a thick G coating consists of 1500 multi-layers of heat resistance layer and hard coating layer, and the top surface finishes with a low friction L layer.
- ◆ DURA die casting G coatings can effectively reduce thermal shock during the fast heating and cooling cycle. The thick DURA hard coating can also resist the high pressure and wear during high performance die casting, thus to sustain long term precision consistency.



海科涂层
HYKMAX Plastic

塑料模具 Plastic Mold

- ◆ 针对现代塑料模具的挑战，纳狮开发出专利申请中的“海科”涂层系列。海科涂层是世界上第一个能够同时耐腐蚀又耐高温的超硬涂层。
- ◆ 海科涂层成功发挥了SPARK6无液滴的技术优势，无液滴的海科涂层可完全保持塑料模具各种表面精密的蚀纹与高镜面，模具师傅完美的工艺受到海科涂层坚硬的保护。
- ◆ 海科涂层表面的低摩擦系数L涂层还可以改善塑料流动性，提高充型能力，使脱模更容易。
- ◆ Naxau has developed the patent pending HYKMAX coating series for plastic application. It is the world first corrosion resistant, heat resistant and ultra high hardness coating.
- ◆ HYKMAX coatings are developed on SPARK6 platform, therefore the droplet-free fine particle will preserve all textures and super mirror finish of a plastic mold and protect it from wear and corrosion.
- ◆ The low friction of the top L layer of the HYKMAX coating can improve plastic flow dynamics, making plastic parts ejection easier. That means Less defects and more money in your pockets.

涂层前注意事项

Notification Prior To Coating

纳狮涂层工艺是在高温高真空的环境下进行的，所以对需要涂层的工件有一定的要求。为了更有效的发挥PVD涂层性能，请按注意事项准备您的产品：
Naxau coatings are done at high temperature under high vacuum, to optimize PVD coatings performance, please prepare your tools following these requirements:

可涂层工件材料 Coatable Materials

纳狮需要了解涂层工件的基体材料、硬度及热处理回火温度，以便于提供合理的工艺条件。可以涂层的材料包含：
1. 高合金工具钢、高速钢、不锈钢。 2. 硬质合金。 3. 钛合金。 4. 镍合金。
工具钢必须经过二次以上高于500℃的高温回火处理，并保持可以满足使用需求硬度。需涂层工件必须是导电的。因PVD过程是将整个工件装入炉内进行的，所以无论是否需要涂层的部分，都须符合以上条件。

Prior to coatings, we will need to collect information on the type of the tool material, hardness and tempering temperature. Coatable materials include:
1. High alloy steel, HSS, SUS 2. Carbide 3. Titanium alloy, Nickel alloy 4. Nickel plated parts
Harden steels must have a tempering temperature higher than 500℃ and temper at least twice to attain necessary hardness and minimize stress. The entire parts must be conductive.

涂层部位 Coating Area

请明确标识需要涂层的部位。待涂层的工件需要有可以装夹的部位，不太可能实现全部涂覆。如果有特殊部位不能涂层，需要提前告知我们。
Coating areas need to be specified. Parts need to have a holding area that can have no coating for fixture.

工件表面限制 Limitation on coating surface

1. 工件表面不能做其它的表面改性处理，如电镀、渗氮、渗碳、磷化、氧化发黑、TD或CVD等。

2. 工件表面不能有锈蚀、腐蚀、油漆、胶水等。

3. 表面粗糙度要求：一般的刀具、模具和零配件在满足使用需求的前提下越光滑越好，成型面Ra < 0.2 μ m为宜；对于镜面塑胶模具、蚀纹模具等，则完全以产品需求为准（客户自行处理）。

4. 组合模具或镶嵌工具，能够拆开的必须拆为单独零件。

5. 焊接工件表面需彻底清洁，不能有氧化层或埋孔。

1. No other surface treatments should be done before PVD, such as plating, nitriding, carbonizing, phosphorizing, oxidizing, TD and CVD.

2. Surface should have no corrosion, rust, paint, and glue.

3. Surface roughness requirement: a smooth surface is required for coating. For molds and dies, a roughness of Ra < 0.2μm is required for a good coating result.

4. Inlays and fix pins of a mold need to be removed and disassemble at customer’s site.

5. Welding areas need to be properly cleaned and no black oxide and blind hole should be present.
- ### 包装与运输 Packaging and Shipping
1. 高速钢、工具钢等工件在发货前需涂轻质防锈油，以防工件锈蚀。

2. 工件需要小心独立包装，以免运输途中损伤，尤其是刀具和表面要求高的工件。

3. 高速钢、工具钢等工件在涂层后，我们也会涂防锈油（有特殊要求的除外）。

1. Steel parts need to apply a thin layer of oil to prevent rust.

2. Each part needs to be wrapped individually.

3. A thin layer of oil will also apply to the parts for after coating packaging, please specify if you require otherwise.
- ### 尺寸精度 Dimension
1. 纳狮PVD厚度范围2~5 μ m，且可以通过工艺精确控制涂层厚度，通常不会影响尺寸公差大于5 μ m的工件精度。

2. 如果您的产品尺寸精度要求更高，请预留余量，并事先沟通说明。

1. A normal PVD coating thickness is in the range of 2~5μm.

2. If a part has a high precision requirement, please notify us ahead of time and leave enough room for a coating thickness.
- ### 最大工件尺寸Maximum Coating Dimension
- 纳狮可为最大尺寸不超过900*450*300mm的工件涂层。
The maximum coating dimension is 900*450*300mm.
- ### PVD涂层限制 Limitation of coating parts
- PVD涂层可以涂覆具有复杂形状的工件，但可以涂覆的内孔的径深比（直径与孔深的比值）需大于1:1，且涂层的厚度随孔或槽加深，涂层厚度变薄。
Naxau can coat complex parts, the maximum coating depth is equal to the diameter. The coating will be thinner at the depth of a hole.
- ### 再涂层 Recoating
- 纳狮可以提供工件的退镀重镀服务（某些硬质合金牌号不能退镀）。
Naxau can provide decoating and recoating for your parts. Some carbide grades cannot be decoated so please contact our service engineer for further information.
- ### 客户需提供资料 Critically information for your parts
1. 待涂层的材料及牌号。

2. 回火温度和硬度。

3. 标识涂层的功能面（即涂层的重点面）。

4. 尺寸精度小于5 μ m的工件，需要说明具体精度要求和预留尺寸。

5. 使用场合和被加工材料、加工速度等主要参数，以便于我们推荐最适合的涂层。

1. Steel grade and specification.

2. Tempering temperature and hardness.

3. Highlight and specify the coated surfaces.

4. Notify us if the dimension tolerance is less than 5μm.

5. Specify the application for your parts, so we can recommend a proper coating for you.