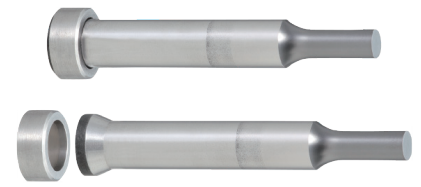






# MISUMI PUNCH COATING OPTIONS FOR HIGH-TENSILE STAMPING

Each Coating Offers Unique Features and Strengths Giving Flexibility for Your Application, Including High-Tensile Stamping

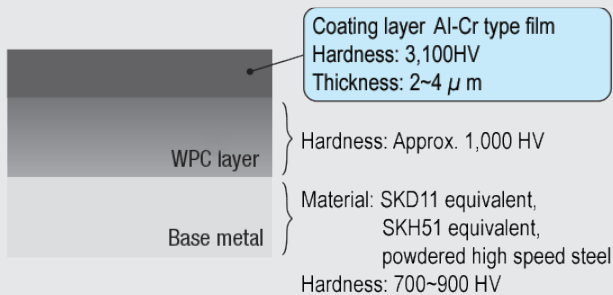


	HW Coating	HX Coating	RW Coating	RX Coating
<b>Coat thickness (μm)</b>	3-5	3-5	2-4	2-4
<b>Hardness</b>	3000HV	3000HV	3100HV	3100HV
<b>Processing Method</b>	PVD	PVD	PVD	PVD
<b>Processing Temperature</b>	about 450 °C	about 450 °C	about 450 °C	about 450 °C
<b>Heatproof</b>	about 400 °C	about 400 °C	about 1000 °C	about 1000 °C
<b>Color tone</b>				
<b>Water resistance</b>	A	A	A+	A+
<b>Peeling resistance</b>	A+	A+	A+	A+
<b>Heat resistance</b>	B	B	A	A
<b>Features</b>	By WPC® treatment, increase surface hardness and toughness of base material, and improve adhesion with TiCN	By nitriding treatment, increase surface hardness and toughness of base material and improve adhesion with TiCN  More suitable for using heavy thickness material from low coefficient of friction and high harden coating	By WPC® treatment, increase surface hardness and toughness of base material, and improve adhesion with Al-Cr film  More suitable for using high tensile material from high harden coating and high heat resistance	By nitriding treatment, increase surface hardness and toughness of base material and improve adhesion with Al-Cr film  More suitable for using heavy thickness material with high tensile strength from low coefficient of friction, high harden coating and high heat resistance
<b>Lead-Time (working days)</b>	+1 day	+7 days	+7 days	+10 days

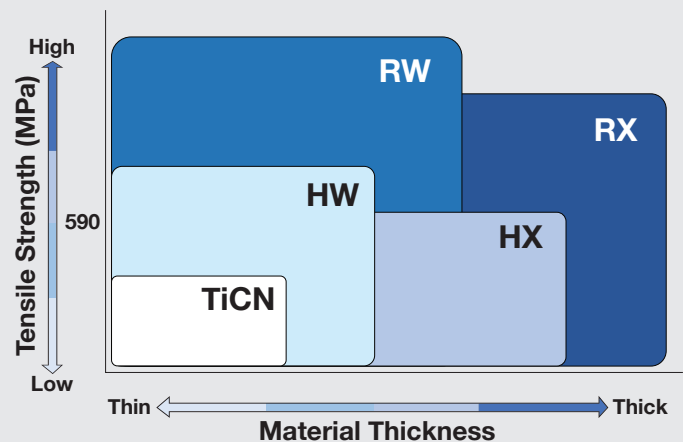
## RW Coating Overview

RW Coating is a composite coating that:

- Undergoes the WPC® layer treatment at the base of the coating
- Coating is lined with a layer of AL-CR type coating on the top
- Contains a hardness degree as high as 3100 HV



## Coating map (assuming a steel workpiece)

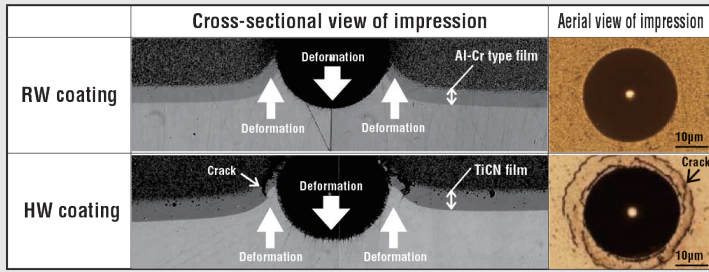


\*This is the image of the MISUMI coating usage area based on the tensile strength and plate thickness of the workpiece. Please refer to this chart to relatively compare our coatings for High-Tensile Stamping.

For more info about our coating offerings, visit:  
[misumi.info/punch-coating](http://misumi.info/punch-coating)



## Evaluation of Adhesive Capability of the Film Through Rockwell Impression Test (RW vs HW)



Test Load: 150kgf Punch Base Material: Powdered high-speed steel

Since RW coating is much harder than its predecessor, it is ideal for customers who have been facing problems with premature wear and tear of the punch cutting edge.

RW coating was able to withstand the deformation of the base layer of the punch and no cracks were observed. It is a superior coating that achieves a balance between both the hardness and the improved adhesive capability of the film.

For reference, HW coating, the TiCN film, could not withstand the bulging in the base layer of the punch, and numerous cracks appeared around the Rockwell impression.

## RW Coating Has Improved Heat and Temperature Resistance

In rigorous pressing treatment of high tensile strength steel sheets or thick plate high tensile strength sheets, the temperature of the cutting edge of the punch will rise steadily.

Increased temperatures of the punch cutting edge will cause the coating to prematurely wear off. That's why MISUMI recommends RW coating, as it offers superior resistance to high temperatures.

## Thick Plate High Tensile Steel Sheet 590 MPa Thickness 10mm Punching Test

### Progression of peeling/wearing in punch cutting edge

	0 shots	50,000 shots	70,000 shots	100,000 shots
RW coating				
HW coating			<b>Punching Conditions</b> <b>Processed material:</b> 590 MPa class high tensile strength steel sheet <b>Sheet thickness:</b> 10mm (0.9mm coining surface) <b>Punching speed:</b> 35spm <b>Lubrication:</b> Oil and chlorine free type coolant <b>Punching shape:</b> φ10.45mm <b>Cutting edge stress:</b> 223kgf/mm <sup>2</sup> <b>Clearance:</b> 7% <b>Punch:</b> Tapped head punch RW coating	
Competitor's Al-Cr coating				

In the HW coating, peeling began to develop at 50,000 shots, and the test had to be suspended, but RW coating, only some minor wearing of the coating was observed even at 100,000 shots. Also, we observed RW coating still very much in usable condition. For the competitor Al-Cr type coating, peeling was restricted to some areas at 50,000 shots, but at 70,000 shots peeling progressed rapidly and the wear and tear of the punch base material was observed.

## Features of RX Coating Punches

The RX coating is a composite coating that undergoes lapping finish and special nitriding treatment at the base material and is lined with a layer of AL-Cr type coating on the surface. Lapping finish and special nitriding treatment improve the adhesive performance of the coating and prevent the coating film from peeling off. Due to the excellent surface roughness of the punch, it improves the sliding property against the work material and prevents galling.