



# ATC



**NOVA** SAFETY

## Metal blade A to Z

Picking on the right blade has not been an easy task for everyone involved in any kind of cutting job. If cutting things, box opening, and general material cutting is your daily routine, then you need to pick on the best blade for the task.

While there are thousands of blade options available for you in the blade niche, each blade has its specified function and knowing that is a plus for your safety and efficiency while using it. Therefore, this guide provides you with the must-know information on blade grinding, material, manufacturing process, coating and testing. All this information will aid you in selecting the most appropriate one to use.



Are you feeling confused? Don't, we have 15 years' experience at knife and blade production. This piece presents you with a complete elaboration and illustration all you need to know about metal blades. Here is what would be covered:

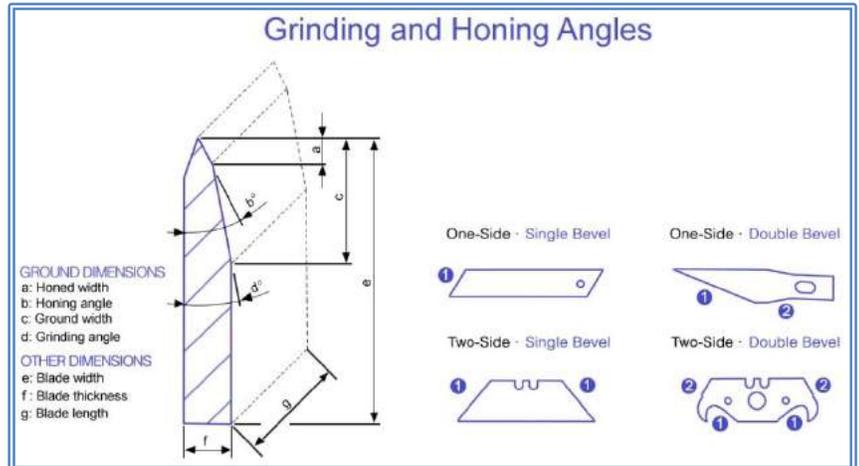
1. Grinding and honing angles
2. Blade Materials
3. Blade Manufacturing process
4. Blade coating
5. Blade testing standard

### 1. Grinding and Honing Angles

First of all, let's warm up with some basic simple jargons about grinding.

- **Grinding:** Grinding basically means sharpening of the blades. When grinding, there is an angle that the blade should take to ensure that it is sharply sharpened. For kitchen knives, the angle should be 17 to 20 degrees. Most of the blades also sharpen well at the grinding angle of between 15 to 20 degrees.
- **Bevel:** A bevel of a blade is the blade surface ground to form the cutting edge of the blade. During grinding, the surface that is ground is what is known as a blade bevel. It forms a blade edge.
- **Bevel width:** Bevel width of a blade is the distance formed by the two edges, the beveled surface edge and the original edge of the blade.
- **Honing:** Honing is the act of pushing the edge of a blade back to its center while straightening the blade.

- Honing angle:** Honing angle is the angle at which a blade is placed when its edge is pushed back towards the center while straightening it. It is always the same as the sharpening angle or the grinding angle.
- The relationship between honing angle and sharpness of a blade:** Honing angle and the sharpness of a blade are much related. The relationship is that when honing is done at a good and appropriate angle, the blade is likely to sharpen properly to attain high sharpness. Like for grinding and sharpening of a blade, the appropriate honing angle should be between 15 and 20 degrees.

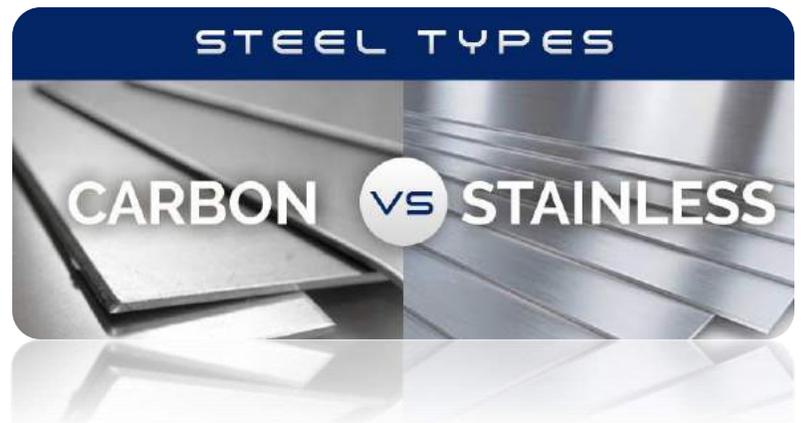


## 2. The Blade Materials

Blades are made of many types of materials. The material with which a blade is made signifies its purpose and the magnitude of the task you can handle. The primary materials used in making blades include:

- Carbon 60:** This is the lowest cost material used in making blades. Carbon 60 is also called the hypo eutectoid steel. This material is used because it is cheaply available and hard enough to sustain the cutting of heavy materials.

It also enjoys high degrees of elasticity while has low instances of plasticity in cold deformations. However, this material does fall short in terms of machinability, hardenability, and weldability.



- **SK5:** this is carbon tool steel used in making blades. It is commonly used in many blades, preferred for its hardness and resistance to wear and tear.

The Sk5 stainless steel material is better than Carbon 60 to make a blade, as SK5 material is relatively harder than carbon 60 and more durable.

- **SK2 ( SK120) :** This is higher class carbon steel that enjoys the presence of high hardness and perfect resistance to wear and tear.

SK2 material is much better material compared with carbon 60 and SK5, it has the best hardness of the three materials, and its flexibility is also better than of the other materials. Of course the price is higher.

- **SKS7:** This is an alloy tool steel that contains high levels of tungsten. Tungsten could make the material harder. It has excellent performance in terms of stamping and a perfect hardenability. SK7 material is not common for the blade production as it is expensive.

SKS7 is also resistant to wear and tear and is more robust than the standard carbon material.

- **Stainless Steel:** Most people believe that stainless steel does not rust, but they don't know that stainless steel has many types. It is only food range stainless steel 304 that does not rust. Other stainless steel types often have more or less change after long time used.

Actually the stainless steel is used for food industry related cutting tools.

### 3. The Blade Manufacturing Process

The methods used in manufacturing blades differ based on the manufacturing company. Therefore, it becomes clear that the process through which a blade gets manufactured depicts and determines its ability to perform a task.

- **Metal coil:** Everything starts from a coil of metal strip.



- **Stamping:** metal strip would go through a high speed stamping machine. The press die will press form the shape, holding hole, snapped lines if any, text on blade. At the end of the process, all the formed stripe will be rolled back to a coil.



- **Heat Treatment:** Purpose of heat treatment is to harden the blade to the desired hardness and flexibility. Normally this process would happen in an oven.

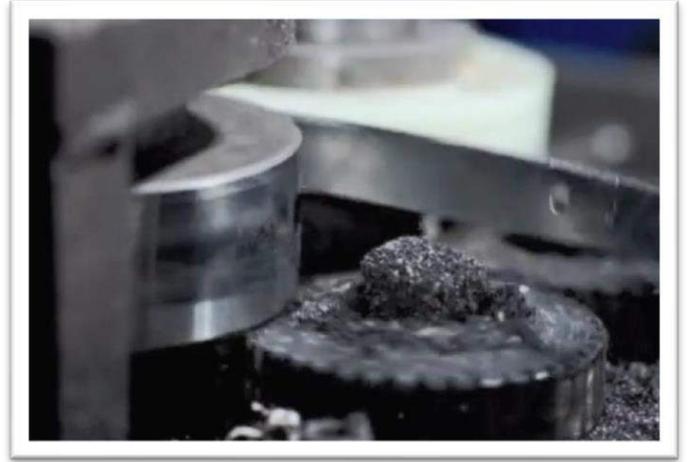
The heat treatment would involve 2-3 cycle of heating up and cooling down to achieve the suitable hardness.



- **Quenching:** This involve heating up the blade up to 850-1100 C. Higher than material's recrystallization temperature. And then the blades are cooled down rapidly inside the furnace. Cooling can be done with either forced air, other gases such as nitrogen, oil, brine, etc. By doing so, the blade's hardness will be raised a lot. But at this moment, it is too brittle to be a good blade.
- **Tempering:** Since the blade cannot be too brittle, different factories will have different process to soft and reduce the brittleness of the blades. Tempering is one of them. Tempering is the process of heating blades to a temperature below its critical range, holding and then cooling. This is done to obtain desirable properties. Tempering is often carried out for previously quenched. Tempering process is useful in reducing the brittleness of quenched steel.
- **Annealing:** The annealing process involves the heating of a metal to or near critical temperature. Heating to such a high temperature makes it suitable to fabricate. After heating, the metal should be cooled slowly to room temperature. This can be done in an oven.

Heat treatment can either be manually done by firing or electrically done. In this case, the treatment is done electrically to ensure the correct hardness of the steel. The electric heat treatment process, like in this case, leads to a stable and consistent hardness. All Nova blades are made by electrical heat treatment.

- **Grinding:** After the electric heat treatment, the blade is ready, and the cutting edge is then subjected to a sharpening and polishing process that brings it to the required sharpness based on its intended purpose. In this stage, good blade and poor blade are differentiated by how stable the grinding machine is. The less vibration, the better. The less chinking of the metal stripe, the better. Nova's grinding machine is one of the best that if you are standing right next to it, you may not even notice it is turning on. In addition, couple sensors are aiming at the blade edge. If the grinding is off, the entire machine will be stopped automatically.



- **Cutting:** After sharpening the blade, the blade will be cut off the roll one by one. It is done by feeding it to a cutting machine with a sensor that is synchronized with the punch press. Now a masterpiece of sharp blade is born.

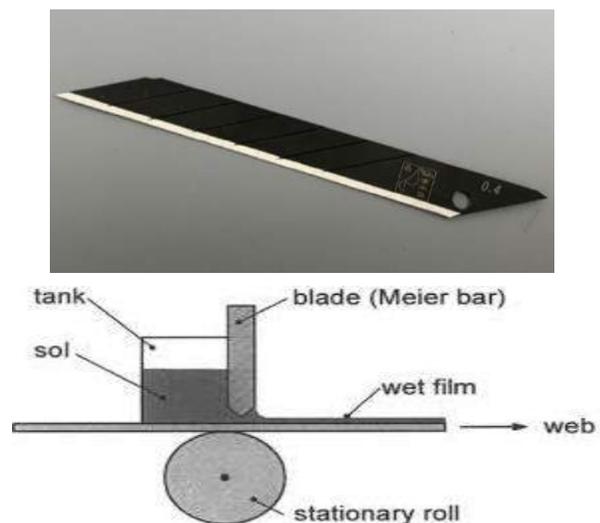
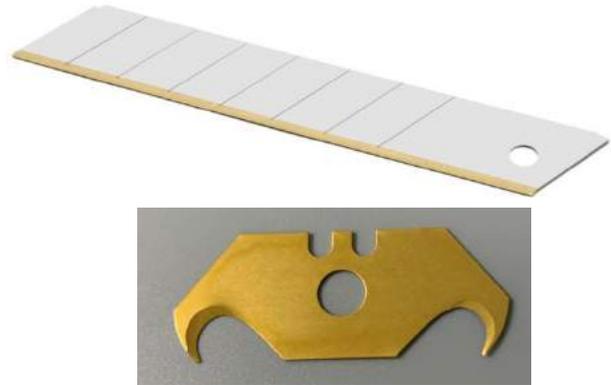


#### 4. Blade Coating

There are different types of blade coating that various firms have used in ensuring that their blades are strong and durable. The basic coating methods include:

- TiN: (Titanium Nitride)** : has a Hardness Rockwell C of 82. This is one of the most famous hard coatings in the industry of blade making. The blade made using this type of coating end up very abrasive resistance. They are also durable to the extent of over two-fold service lifetime.
- TiCN: (Titanium Carbonitride)**: The HRC is 87. TiCN is a thin film coating that was developed from Titanium Nitride. TiCN offers slightly higher hardness compared to TiN and can show a slightly lower friction coefficient in many applications. This is an excellent coating method that consists of both low friction coefficient and high abrasive.
- CrN:(Chromium Nitride)**:CrN is similar properties to TiN but higher temperature resistance and more corrosion protection of the substrate than Tin. This coating method is famous for its ability to considerably limit inherent stress in utility blades. As such, it is one of the best alternatives when it comes to utility blade coating. It is best for a blade that needs high bending leads when working.
- Black Finishing**: This is a process of coating that entails the blackening of unalloyed or even alloyed steel to ensure that their surfaces have a deep layer of black ferrite.

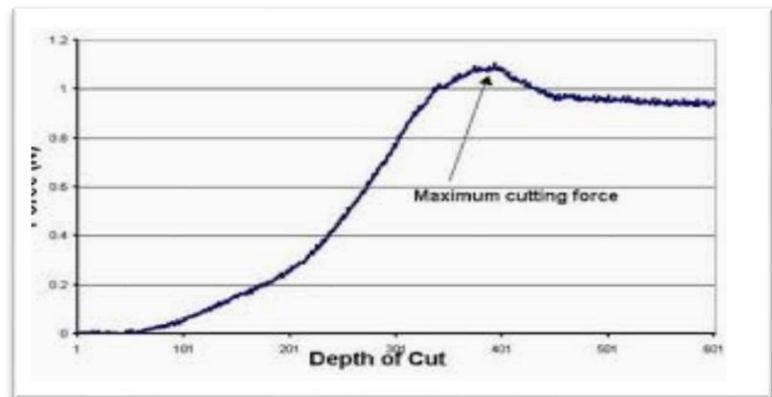
Blades made in this manner, do not rust. They are also sharper and durable since the black finishing on them adds on their quality and strength.



## 5. Blade Test Methods

Blade testing is the act of trying a newly manufactured blade on whether or not it can achieve the purpose for which it was designed. Testing of the blade is useful since it ensures that the blades that get to the market are capable of performing the duties for which they are intended. The testing takes place in a couple of ways, the ICP way and the TCC way.

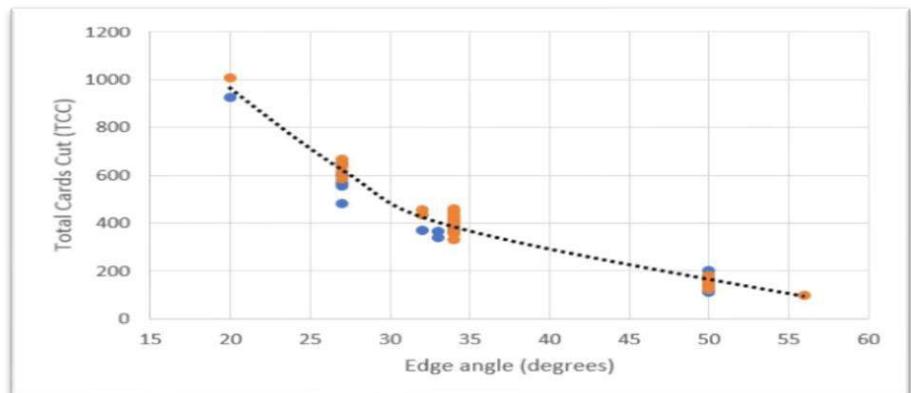
- The Initial Cutting Performance or ICP:** This is a blade testing method used in understanding or identifying the extent to which a blade is sharp. It comes after the sharpening or the polishing of the cutting edge of the blade as shown on the graph below.



According to some international test standards, the blade tested using this method should be able to achieve a minimum of 600mm cut of material.

- Total Card Cut or the TCC Testing:** This is the cumulative amount of card cut, which is measured in millimeters over full test duration.

This test also estimates the life of the blade in terms of its sharpness. It measures in terms of 60 strokes representing the blade's life. The standard cut using the TCC is 200 millimeters at its lowest.



## Conclusion

Understanding a blade is one of the significant steps one can take to ensure proper usage of the blade. In this manner, you will be able to choose the best blade for your task. Knowledge of the type, size, material, and even the manufacturing process of the blade also helps you limit injuries and other negative impacts that may result from using a wrong blade for an illegal purpose. Blade testing is also essential since it gives the manufacturer, the trader, and even the buyer of the blade the ability to understand the nature of the blade and the type of task it can perform.

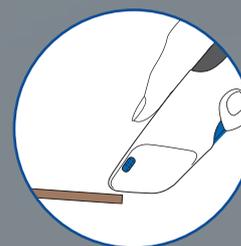
# SMART TRIGGER KNIFE



## SK030

- ⦿ Intelligent retract technology
- ⦿ Good for opening boxes & heavy duty cutting
- ⦿ Extra long blade length up to 28mm

### Blade quick-change



**Intelligent retract technology** – enable blade to instantly retract back once blade leaves cutting surface, even though trigger is still squeezed.

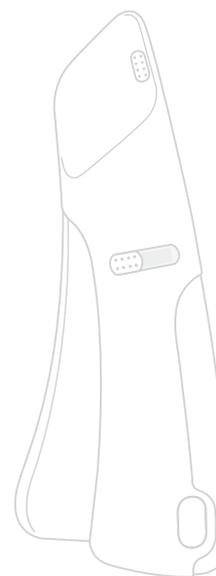
# MINI TRIGGER KNIFE

## SK029

- ⦿ Auto-retractable
- ⦿ Compact design
- ⦿ Product size:  
140 x 55 x 17mm



SK029



SK028



# SQUEEZE TRIGGER KNIFE



Blade quick-change

## SK028

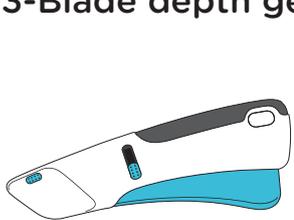
- ① Anti-fatigue ergonomic squeeze trigger handle
- ② Good for opening boxes & heavy duty cutting
- ③ Extra long blade length up to 28mm



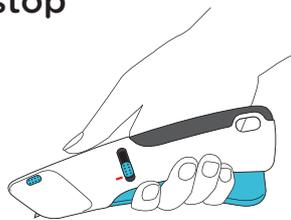
SB010



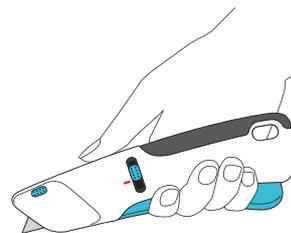
### 3-Blade depth gear stop



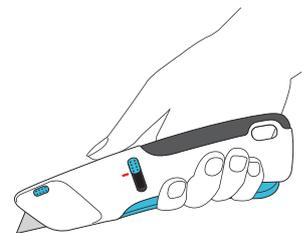
Lock position



1st stop



2nd stop



3rd stop



1st blade length



Half blade length



Full blade length



# COMPACT CUT KNIFE



## SK025

Changeable  
compact cut

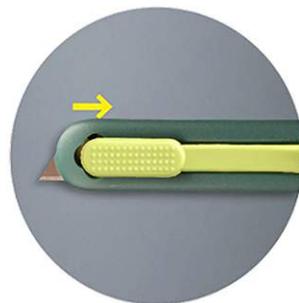


## SK026

Fixed  
compact cut

### Auto-Retract

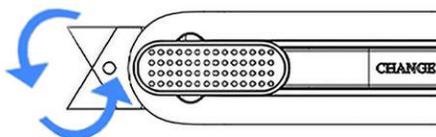
The blade could auto-return  
when you let go of the slider.



### Ambidextrous Feature

It could work for right hand and left hand.

Switch blade orientation for lefties.





# COMPACT CUT KNIFE



## SK025

Changeable  
compact cut



## SK026

Fixed  
compact cut

## Ambidextrous Feature

It could work for right hand and left hand.



## Non-changeable Blade

The SK026 is a disposal design with non-changeable blade, which is suitable for the highest security.



# CRAFT KNIFE



SB011



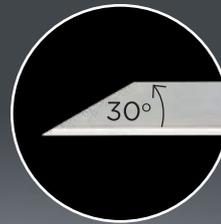
## SK016

- ⌄ Unique retractable precision knife
- ⌄ 3 stops gear for blade length
- ⌄ Good for modeling, craft, industrial cutting

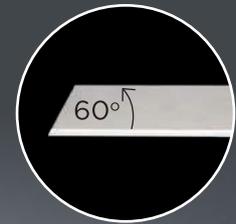




# SLIM ADJUSTABLE CUTTER



SB009P



SB009B

## SK022

- ⦿ Spring load retraction
- ⦿ Blade length from 0 - 40mm



## SK020

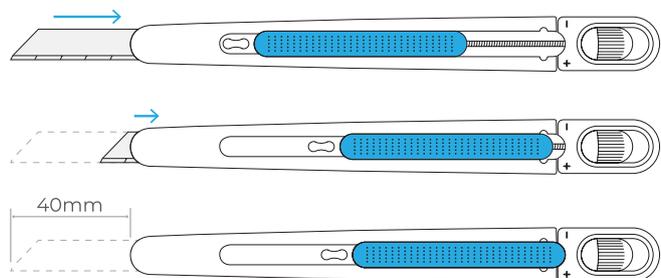
- ⦿ Adjustable blade exposure
- ⦿ Adjustable by every 0.1mm
- ⦿ Blade length from 0 - 40mm



Blade exposure indicator



Adjustable blade length by turning a knob (+/- 0.1mm)



Auto-retract blade



Super slim. Only 5mm thick



# Film Cutter



## PREVENTS PRODUCT DAMAGE

Recessed blade prevents contact with contents, eliminating expensive product damage.





# 10 INCH HEAVY DUTY SCISSOR



SC1000



Full metal core  
handle to perform a  
toughest cutting job



Adjustable  
tension nut



Best cutting  
performance



Protective  
sheath

Avish Tool Company



Amritesh Singh  
Promoter

Maruti Arcade  
Sec-1, Plot No-21  
Koperkhairane, Navi Mumbai

+91-702-137-1699  
avishtool@gmail.com

