The Story of Kitchen Knives

Translated by Masafumi Oshiro

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This article is an English translation of the Japanese article called "包丁の話 [The Story of Kitchen Knives]". The original article is available at the website (http://masahiro-hamono.com/story) of the Masahiro Co., Ltd in Seki city, Japan. Masahiro is one of the excellent kitchen knife manufacturers.

1. Seki City, Gifu Prefecture, the town of cutler

About 700 years ago, during the Kamakura period (1185-1333), a swordsmith from Kyushu named Motoshige came to Mino and discovered that there was good quality "yakibatsuchi" [clay for controlling cooling in quenching process of Japanese sword] at Mukoyama in Seki.
He also discovered that the area was blessed with good conditions for sword smithing, such as easy access to chestnut and pine charcoal. Motoshige therefore moved to this area and started sword smithing. This is the origin of "Seki Kaji" sword smithing.
It is said that the steel was transported by horseback from Yasugi, distant Izumo Province (Shimane Prefecture), and that iron ore from the Seki area was also used.

Many masters of Seki Kaji were born, among them the well-known masters Magoroku Kanemoto and Shizu Saburo Kaneji. The sword smithing industry flourished most during the Muromachi period (1336-1573), when the figure of swordsmiths in Seki is said to have reached 300.
In addition to their high artistic quality, Seki swords were used by many warlords as excellent swords that boasted excellent practicality: they did not break, did not bend, and cut well.

As time went by and sword smithing declined in the middle of the Edo period, some swordsmiths were turned into blacksmiths who made kitchen knives and sickles and began doing business with merchants in the Osaka and Sakai areas. This was the beginning of Seki's hammered cutlery industry.
Furthermore, in 1876 (Meiji 9), the Sword Abolition Ordinance was enacted, and most of the sword smiths turned to the production of practical household knives and sheaths (sayamono).

In 1887 (Meiji 20), Hiroemon Fukuchi began manufacturing knives, taking inspiration from foreign-made cutlery. In 1897, a Canadian trader came to Japan with a sample pocketknife and placed a large order. This was the beginning of the development of export knives.
Gradually, the quality and design of Seki pocketknives improved, and they came to be recognized around the world as "Seki pocketknives”.

In the middle of the Taisho era (1912-1926), production of metal tableware began, and in the beginning of the Showa era (1926-1989), production of replacement blades for safety razors also began. Today, kitchen utensils, nail clippers, scissors, and kitchen knives also account for much of the national market share.
Among these, kitchen knives account for about 60% of the national production.

2. The uses and characteristics of knives

Today, it is difficult to explain the distinction between Japanese and Western kitchen knives because the manufacturing methods, etc. have changed, but it is safe to assume that a Japanese kitchen knife means one derived from knives that have been used in Japan for centuries.

Features of edged blade

What is a single-edged knife?

A knife with a blade that has an indentation on one side.
This is mainly seen in Japanese kitchen knives.

What is a double-edged knife?

A kitchen knife formed by blade sharpening on both sides.
This is mainly seen in Western kitchen knives.

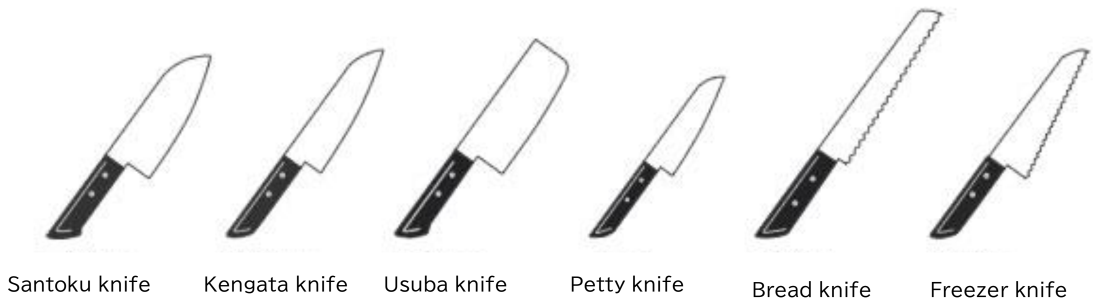
Western Kitchen Knives

Western kitchen knives were introduced from the Western countries after the Meiji period (1868-1912), when Japanese began to eat animal meat at full scale. In addition to the knives below, there are also various types of boning knives for professional use.

Western kitchen knives are made of either stainless steel or hagane (steel), but stainless steel is the most common material for home use.

Santoku knives were invented in Japan, so they can be said to be Japanese knives in nature, but they are classified as Western knives because their usage and manufacturing methods are similar to those of Western knives.

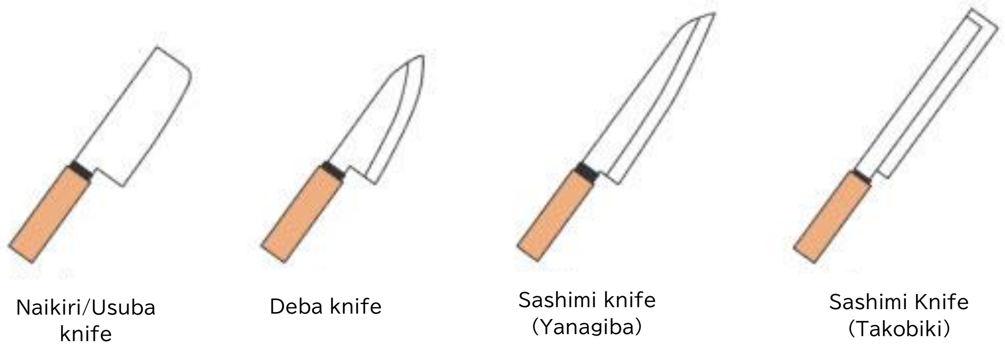
Santoku, sword-shaped, and thin-blade knives are also made of a clad material called three-layer steel. This material has a stainless steel surface and a steel material at the cutting edge, which has good cutting performance and rust-proofing properties.



Knife Types	Purpose of use	Features
Santoku knife	Also called an all-purpose knife, it is used for all kinds of purposes.	This knife was developed in Japan as a kitchen knife that has the advantages of both the Japanese kitchen knife (nakiri knife) and the Western kitchen knife (gyuto knife).
Kengata [sword] knife (Gyuto)	Mainly for cutting meat.	Originally used for cutting meat, it is now in general use.
Usuba [thin blade] knife	Mainly for cutting vegetables.	For home use, a knife with a blade length of around 20 cm is suitable.
Petty knife	Used for small work such as peeling of vegetables and fruits.	The width of the knife is wide and suitable for cutting vegetables.
Bread knife	Used to cut bread, etc.	Generally, a knife with a blade of around 12-15 cm is called a petty knife.
Freezer knife	Used for cutting frozen foods, etc.	A small-sized version of the gyuto (beef knife).

Japanese Knives

In addition to the knives below, Japanese kitchen knives include unagi [eel] saki, soba kiri, hamo kiri, funayuki, kamagata usuba [thin-blade], sushi kiri, fugubiki, and others.
These knives were originally made using Japanese sword techniques such as forging and welding, and the handles were uchikomi [insertion] style.
In recent years, some knives are made of stainless steel and are made in the same way as Western-style kitchen knives, with handles fixed with rivets.



Knife Types	Purpose of use	Features
Naikiri/ Usuba [thin blade] knife	Mainly for cutting vegetables.	The wide blade is suitable for cutting vegetables. The double-edged vegetable knife is used for cutting vegetables into pieces, while the single-edged thin-blade knife is suitable for carving vegetables.
Deba knife	It is used for Sanmai-oroshi [slicing fish into three slices]. Also used for cutting hard fish bones.	The blade is thick so that it can be pounded to cut bones. There are various sizes depending on the size of the fish to be cut. When cutting hard bones, place the blade against the bone and tap the back of the knife against the bone to cut.
Sashimi knife (Yanagiba)	Mainly used for making sashimi.	The blade is long and thin with a single edge, making it suitable for sashimi.
Sashimi Knife (Takobiki)	Mainly used for making sashimi. Also used for slicing fish.	Generally, a knife with a blade length of around 12-15 cm is called a petty knife. A smaller version of the gyuto (beef knife). Osaka area: The blade is slightly wider than that of Kanto, and the blade is thicker, and the tip is sharper. Tokyo area: The tip of the blade is square so that it can be used for serving.

3. What is a good knife?

The first requirement for a good knife is good cutting performance.
If a kitchen knife is not well sharpened under various conditions during production, such as material, forging temperature, quenching, tempering, and grinding burns during processing, it will not produce a good blade no matter how much it is sharpened. If the knife cuts well the first time, there is no need to worry about this.

The next requirement is the sustainability of the cutting performance.
It is perfect if the cutting performance lasts forever without sharpening.
Usually, the higher the carbon content in a material, the harder it is and the more wear-resistant it is.
However, if the hardness is increased without regard to the proper heat treatment of the material, it will have a poor hardened structure and lack stickiness.
Even the same hardness may vary depending on the chemical composition and heat treatment method of the material.
Therefore, the list of ingredients and hardness values can be used as a reference to evaluate knives, but they cannot be used alone to make a judgment. Please be careful.
The table of ingredients gives a rough idea of the properties of the material, but the amount of oxygen, nitrogen, hydrogen, etc., which are not included in the table, also have a relation to whether the material is good or bad.

The next condition is the degree of ease of sharpening.

A knife that has lost its cutting performance can quickly develop a sharp edge by sharpening, in other words, a knife easy to be sharpened is a good knife.

However, if we judge from common sense, a knife that can be sharpened quickly has poor wear resistance, which means that the cutting performance of the knife will not last.

Despite this tendency, there are actually knives that are easy to sharpen but have good cutting performance retention. The products made of high quality materials and subjected to the best heat treatment will become such really good kitchen knives.

When comparing steel and stainless steel, steel is much easier to sharpen. Although steel knives have the disadvantage of rusting quickly, the ease of sharpening is thought to be a major factor in why craftsmen use steel knives.

Now, to sharpen a knife and get a solid edge, the knife must fit perfectly when it is placed on the whetstone, or it will not have a uniform edge. If the edge line is bent, only the protruding part will hit the whetstone harder, causing it to be concaved.

Also, the other side (back side) does not touch the whetstone, so the edge cannot be developed. When you purchase a knife, you can see the distortion of the blade by placing the edge up and looking through the edge with your eye close to the handle end.
You can also see the bend of the edge line when you look through the edge by placing the edge horizontally.
However, in the case of single-edged knives (especially long knives for sashimi, takobiki, etc.), even if the knife is straight at the time of purchase, bends may appear after a long period of time. In this respect, Western-style kitchen knives are probably stable.
However, in Europe, people don't care about bending (warping) so much because of the custom of using a sharpening steel instead of a whetstone for sharpening kitchen knives. If you are purchasing a knife produced outside Japan, please be especially careful about bending.
Furthermore, single-edged Japanese knives need to be careful about "Urasuki [backside of blade]". Ideally, when the back of the blade is placed against the whetstone, the circumference of the knife should be in perfect contact with the whetstone. To check for dents, place a ruler (opaque) on the back of the blade and look through the light to see the edge and the spine touching the ruler.

There are many more requirements for a good knife.
These include the thickness of the blade (thickness of the material), weight, balance (position of the center of gravity), presence or absence of a handle holder and how it is attached, and the material and shape of the handle and how it is attached.
When purchasing a knife in a store, you may not be able to actually hold it in your hand to check it, but at the very least, be sure to select a knife with no cracks or nicks that can be seen by the naked eye on the edge.
The least likely to fail is to go to a knife specialty store or hardware store, tell the store staff what you want, and then ask them to select a knife for you to hold in your hand.

4. About kireaji [cutting performance]

As the word "kireaji [taste of cuting]" implies, the cutting performance of a kitchen knife can be judged differently depending on the individual, just like the human sense of taste, and it is difficult to provide an objective standard for judgment.
In general, "good cutting performance" is considered to be "the ability to cut with little force when cutting".
Now, let me explain the relationship between a knife and cutting performance.

Since an object is a bond of atoms and molecules, to cut it is to break this bond. In order to break them, it is necessary to apply a force greater than the bonding force of the atoms and molecules.
Therefore, let us first consider the end of the edge.
Suppose we make a "tin plate knife", which is simply a tin plate cut out with scissors in the shape of a kitchen knife.
The edge of this tin plate knife has the thickness of the plate.
When cutting an object with such a thick edge, the force applied is distributed over the area of the thickness, so it is difficult to cut an object unless a large force is applied.
To improve the cutting performance, a sharp edge is needed to apply force to the object in a concentrated manner and break the bond.
As soon as the knife begins to cut an object, the wedge principle acts in the shape of the knife's edge to advance the cut. You know how a chef cuts sashimi with a long sashimi knife by pulling it toward the chef as he cuts. When breaking a bond, the force of pulling toward the front or pushing toward the other side is added to the force of pulling down from above, which doubles the breaking force.
Therefore, even if the same knife is used, adding a pushing and pulling motion to the downward force will increase the cutting performance.
(Try this with slicing onions, tomatoes, etc.)

Theoretically speaking, the cutting of an object is done by giving a certain amount of energy to each substance.
By the way, energy is something you may have learned in science class when you were a student, Energy is expressed as follows.
(Amount of force) x (Distance traveled) = (Energy)

Therefore, adding a pushing and pulling motion will increase the "traveling distance" and will require less "amount of force".

As I mentioned at the beginning, humans judge cutting performance by how much force is applied to cut, and the action of moving the knife does not play much of a role in the evaluation of cutting performance.
In other words, even though the energy required to cut is the same, if an object can be cut with less force, humans judge it to be good cutting performance.

Next, let us consider the "amount of force".
There are two types of force: the force to cut an object and the resistance force when the knife breaks into the object to be cut.
The force to cut an object is always necessary, but the resistance force is desired to be as small as possible.
The following are possible ways to reduce the resistance force.
- The angle of the edge must be an acute angle.
- The thickness of the knife should be thin.
- The friction between the blade and the object to be cut must be low (the shape of the knife should be such that the cut area is immediately separated from the object).
- The surface roughness of the knife should be fine.

However, if the angle is too sharp or the thickness of the knife is too thin, the strength of the knife itself will be weakened, cracks will easily occur, and it will not be possible to form a clamshell shape cutting edge where the cut object easily separates from the knife.
Also, if the surface roughness is too fine and mirror-like, the friction surface will be larger and the friction force will be greater.

Furthermore, the cut surface cut with a sharp-edged knife is clean, but with a knife with a crushed edge, the cells on the cut surface are crushed.
Considering this matter, an extra force is applied to the surrounding cells, etc., to crush them in addition to the minimum force required for cutting.

Next, let's move on to the most important explanation of the shape of the end of the edge.
In cutting tools, the shape of the cutting edge varies depending on the purpose of use.
A saw that cuts wood has a serrated edge.
The size of the serration differs between saws designed to cut along the wood grain and those designed to cut against the grain.
Some knives, such as knives for cutting frozen food, have wavy blades.
In other words, the shape differs depending on the object to be cut.
The edge of an ordinary kitchen knife looks like a straight line, but in fact, if you observe about 0.01 mm of the edge of a kitchen knife under a microscope, you will see a jagged edge like a saw.
Also, although the tip of a kitchen knife is thought to be pointed, it has an edge that is 0.002 to 0.005 mm

wide.
The difficulty for knives is that there are many different things to cut, from soft things like sashimi to hard things like fish bones. It is fine if it is a special knife, but in the case of an all-purpose knife, it is difficult to determine the size and condition of these jagged edges.

Many stainless steel knives, especially those sold for general household use, seem to have too small jagged edges because it is difficult to leave such edges in the edging process due to the nature of the material.
We have studied the relationship between the size and condition of the jagged edge and the cutting performance, and have researched the processing method that can produce the best edging.
Based on the results of this research, each knife is individually edged by our craftsmen.
We also perform daily spot checks on the knives that have been edged in order to ensure customer satisfaction."

Evaluating the cutting performance of a knife

Honda cutting performance Tester.

One method of measuring cutting performance is to use a testing machine called the Honda cutting performance Tester.
The knife to be tested is fixed to the machine with its edge up, and a bundle of paper with a certain weight applied is placed on the edge.
When the machine is turned on, it cuts the paper back and forth.
The machine then determines the cutting performance of the knife by how many sheets of paper are cut.
We also have this tester and use it as one of the methods to evaluate the edging process.
The Gifu Prefectural Institute of Product Technology also conducts cutting performance tests using this tester, but the settings of the tester are slightly different.
Our settings are as follows.

-Settings for HONDA CUTTING PERFORMANCE TESTER-
Stroke distance → 80mm
1 stroke time → approx. 6 sec.
Paper thickness and width used → approx. 0.038 mm × 400 sheets (8 mm)
Load weight → 350g
The paper used is the same quality as that used at the Gifu Prefectural Product Technology Research Institute.

5. Hatsuke [Edging-Adjustment of an edge]

Some of older people may have seen a shopkeeper applying a whetstone to a kitchen knife in front of a customer when purchasing a knife at a specialty store, called "edging".
Most of the kitchen knives in the store are blunt-edged by a machine (standard edging).
When a professional chef buys a new knife, he/she resharpen it by himself/herself before using it.
In other words, they resharpen the edge to a suitable edge for the purpose of use.
If you are cutting only soft objects, you sharpen the edge to a sharp angle to increase the sharpness of the edge.
If you are cutting hard objects, sharpen the edge to a blunt angle to prevent it from cracking.
In addition, double-edged knives are sharpened to single-edged, the sharpening of the front and back edges is slightly changed, and the sharpening angle is changed depending on the point of the cutting edge to make the knife suitable for one's own use.
The manufacturer has made the edge sharpening with various purposes in mind, so it is generally sufficient to use the knife as it is.
We occasionally receive complaints of chipped edges on some of our knives that have been sharpened to an extremely sharp angle, which is not something even a professional would do, but we would like you to understand the nature of knives and take better care of them.

The following is an explanation of the sharpening angle of kitchen knives.
It is generally understood that the sharper the edge is, the better the cutting performance is, but there seems to be a misunderstanding in the way of understanding. As explained in the section "4. About kireaji [cutting performance]", a knife with a sharp edge is judged to have good cutting performance only because there is less resistance when the knife cuts into the object to be cut, and it has nothing to do with the ability to cut objects.
For example, when cutting a thin object, the cutting performance is the same whether the knife is sharp or blunt, because there is almost no distance for the knife to cut into the object.
In fact, the cutting edge of a sashimi knife is sharpened with a small edge at an angle of about 45 degrees, which is called a "tome-koba [small edge end] ", and the cutting performance is outstanding. (Ordinary household all-purpose knives are edged at an angle of about 25 degrees.)

The sharper the sharpening angle, the less frictional resistance and the better the cutting performance, but the thinner the edge is, the more likely it is to chip when used to cut hard objects (pumpkin, frozen foods, etc.), or when used with force or pry.
In general, Western-style kitchen knives with an edge at about 25 degrees have a relatively good cutting performance and are less likely to chip.

If you sharpen the blade, please refer to the section "8. How to sharpen and care for your kitchen knives".
If you wish to check the edge angle by yourself, place the sharpened knife on a pencil holding point by laying it down and moving it back and forth, gradually raising the angle at which the knife is placed against the pencil.
Then, at a certain angle, the knife will bite into the pencil and stop moving forward.
The angle formed by the pencil and the knife at this point is the edge of the sharpened knife.
In the same way, the opposite side of the knife is also checked.
Then, adding the edge angles of the back and front sides, you can find the angle of the edge.

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6. About rust

Most metals on earth (except precious metals) are excavated in an oxidized state (rusty state). This is because this is the most stable state.
Iron is no exception, and iron ore is excavated in an oxidized state. The iron from which the oxygen has been removed becomes the raw material for steel. Therefore, if a knife is left in the air, it is not surprising that rust will naturally form.
Oxygen and water (water vapor) exist in the air. First, when water vapor comes in contact with the surface of the steel, it forms a film of water.
(* This is a fairly thin layer.)
Oxygen dissolves into that film, causing a chemical reaction between the oxygen and the iron, resulting in iron oxide (rust).
If the surface of the iron is dirty, the water layer becomes acidic, which accelerates this reaction.
Therefore, to suppress the formation of rust, it is effective to clean the surface and keep it in a dry place.
It is also effective to apply oil such as camellia oil to the surface of the iron to prevent it from being exposed to air (oxygen).
(Rust-preventive oil for knives is also available.)
Rusting depends on the type of metal and the surrounding conditions in which the metal is placed.
The color of the oxide (rust) on each type of metal differs.

The whitish color on the surface of aluminum is a type of aluminum oxide, while copper rust is called "rokusho" [greenish blue], as seen on an old 10-yen coin.

The surface of a stainless steel knife also appears to be rust-free, but in fact the chromium and iron hydroxides contained in the material are present and rusting at a thickness of 1 to 3 nm (nanometers).
The thickness of the rust is so thin that it appears transparent.
(1 nm = 1/1,000,000 mm)
When such an oxidized metal film (oxide film) is formed on the surface of a metal, its interior is not easily oxidized even if it is left in the air. In other words, it becomes stable.

Please remove red rust as soon as it appears.

However, this oxide film is not strong enough to resist salt, acid, and scratches, so care must be taken.
(The fact that the surface of an aluminum lunch box becomes mottled when you keep putting umeboshi [dried salted plums] in it is an example of salt and acid breaking through the oxide film of aluminum.)

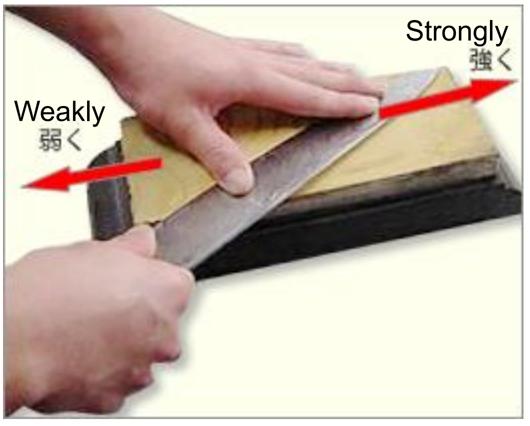
Steel knives can also be coated with an oxide film, although not as strongly as aluminum or stainless steel.
There are two types of rust on steel: red rust, mainly ferric hydroxide $Fe(OH)_3$ and ferric oxide Fe_2O_3, caused by the action of oxygen (O_2) and moisture (H_2O) dissolved in air and water, and black rust, mainly magnetite Fe_3O_4, caused by red rust being attacked by aqueous solutions containing salts.
Once the surface of a steel knife is covered with the latter type of oxide film, "black rust" (light grayish color), the progression of rust is inhibited.
The strength of the oxide film against hydroxyl OH depends on the properties of the steel and the knife manufacturing process. Compared to sheet metal punching knives, forged knives are said to have a greater strength to hydroxyl groups in the oxide film due to the finer and more uniform structure, and therefore, they are said to inhibit the progression of red rust more.
If red rust is left uncared for, it will progress to the inside of the knife, so please remove red rust as soon as it appears.
(Please refer to the section on "8. How to sharpen and care for your kitchen knives")

7. Knife edge breakage

Knife edge breakage occurs when the force exerted on the thin tip of the edge exceeds the total force of the knife due to its viscosity and hardness.
We pay special attention to inspect the quality of our knives at the time of shipment for variations in quality and flaws.
Here, we briefly explain the fluorescent magnetic flaw inspection method, which is a typical flaw inspection method.
First, cleaned knives are magnetized by a machine using a coil. Next, the knife is immersed in a solution containing magnetic phosphor.
If there are scratches or cracks on the knife, the solution will penetrate into them. UV light is then irradiated on the knife after it is removed from the solution. If there are scratches or cracks, the phosphor in the solution emits light and becomes visible to the naked eye. After this, a demagnetizer is used to remove any remaining magnetism from the knife, and it is then cleaned.
It is said that flaws and cracks of about two thousandths of a millimeter (2 microns) can be identified in this inspection.

Very few cases of knife edge breakage are caused by scratches at the time of purchase, but are often caused by carelessness in use, as described next.
Knife edge breakage is most likely to occur when force is applied to the edge from the side, especially when a knife with a thin edge (Gyuto, Santoku, Petit knife, etc.) is used to strike a hard object or when the knife is twisted during cutting.

When cutting hard bones, crab legs, etc., a deba knife or a boning knife is mainly used.
We recommend that you avoid chopping at hard objects and instead use the strength of your wrist to push the knife through, or that you keep the knife perpendicular to the cutting board so that the edge bites into the workpiece and then hit the knife's spine.



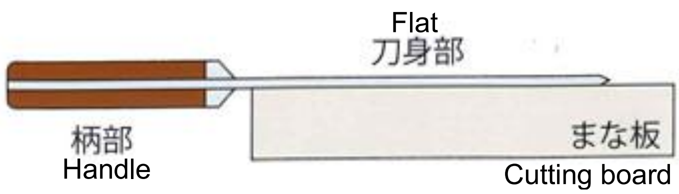
When using a kitchen knife, small knife edge breakages may unintentionally occur.
If you find an edge breakage, please resharpen the edge immediately and remove the breakage. (To check for removal, slowly cut a piece of paper after the knife has been sharpened. If you can cut without resistance at any point, it is fine.)

Any edge breakage, no matter how small, can cause a larger crack if left untreated. If it is a small edge breakage, it does not take much time to resharpen the edge, but if it is a large chip or crack, it will take dozens of times longer.
In addition, if a deep crack is formed from the edge to the flat, it may be difficult to resharpen with ordinary whetstones, or resharpening itself may become impossible (the crack cannot be removed no matter how far the blade is sharpened).

8. How to sharpen and care for your kitchen knives

Rust (stain) removal

New steel knives are prone to red rust. (See the section on "6. About rust").
When red rust occurs, some people scrub the flat part of the knife with a whetstone to remove the rust, but this will also remove the oxide film that has begun to form under the red rust. If you scrub with a whetstone every time red rust appears, the oxide film will not be formed forever. In other words, red rust will continue to form easily.



When red rust appears, as shown in the figure on the right, place the knife on a cutting board or similar surface so that the blade is perfectly flat against it, apply cleanser to a nylon scrubber and scrub the knife's flat to remove the red rust. At this time, light grayish spots under the red rust may remain. You may leave those spots as they are. Please note that if the red rust is left untreated, it will continue to oxidize into the interior of the knife.

Repeat this process about once a day when the knife is new. The red rust will gradually become less likely to appear. If you wipe the knife with a dry cloth after each use like a professional chef, red rust will not occur, and an oxide film will form naturally.
Even if an oxide film is formed, we recommend cleaning the knife with a cleanser once a week for hygiene reasons.
Pots and pans should always be washed after use. Kitchen knives should also be cleaned carefully from time to time.
The same goes for Japanese knives, but the oxide film on the back side is different because the material is

different. Please note that if you do not take care of your stacked structure knife because the surface is stainless steel, red rust will form on the steel part at the edge part, which will lead to a decrease in cutting performance.

Caution
- Please be careful not to scrub the edge with the wrong type of cleanser, as it will reduce the cutting performance instantly.
- After scrubbing with the cleanser, remember to rinse with water and wipe with a dry cloth.
- Rust on the edge can be removed by sharpening the edge with a whetstone.

Sharpening of kitchen knives (about whetstone)

There are various tools for sharpening kitchen knives, such as a simplified whetstone, a sharpening steel, and a whetstone, etc. Each tool has its own characteristics and should be used with attention.

A simplified whetstone is used as a supplemental tool when cutting performance has deteriorated slightly. Since this stone has little ability to sharpen, it cannot be used to repair knife edge breakage.
Also, a type of sharpener with the grinding stone parallel to the line of the cutting edge can cut vegetables, etc., but will not produce a clean cutting edge for sashimi, etc.
A simplified whetstone can only sharpen the tip of the edge, so it is recommended to use a whetstone on a regular basis.

If an inexperienced person uses a sharpening steel, the line of the cutting edge will be partially concaved. The dented part does not touch the cutting board, so when you slice something like takuan [pickled radish], the result may be partially connected. In particular, we do not recommend the use of a sharpening steel for knives made of steel.

By using a whetstone of various coarseness, you can sharpen knives of various conditions into good cutting knives. Please learn how to use and sharpen knives.

About the whetstone to be used

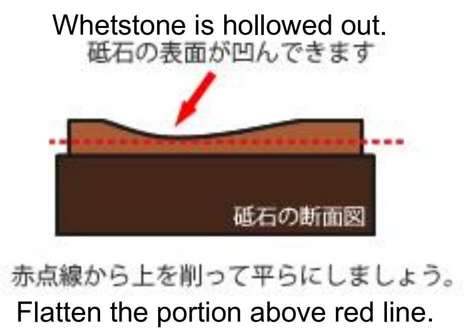
Whetstones are classified into the following categories according to the size of the grains in them.

Type	Grain density
Rough whetstone	No. 100 to 600
Medium whetstone	No. 800 to 1000
Finishing whetstone	No. 1500 to 3000

The grain size is the size of the grains that make up the whetstone, which is calculated by dividing 1 inch (25.4 mm) by the number of the grain density. No. 1000 whetstone is made of grains with a size of 25.4 mm / 1000 = 0.025 mm.
The smaller the grain density number, the greater the ability to sharpen, but the rougher the sharpened surface will be.
In addition, the whetstones with GC grains are harder than those with ordinary WA grains, so they have a greater ability to sharpen knives and are useful for rough sharpening stainless steel knives that are difficult to sharpen. However, the price is a little high.
When you purchase a whetstone, we recommend that you buy a large whetstone with a wide width. It is much easier to sharpen knives.

- Rough whetstone is useful when you are required to take time such as sharpening a chipped edge, or when you need to roughly sharpen a stainless steel knife that is difficult to sharpen. However, the surface to be sharpened is rough and the edge has a large amount of backlash, so the edge will not be sharp enough.
- Medium whetstone cleans the surface sharpened with the rough whetstone and reduces the backlash of the edge.
- Finishing whetstone further cleans the sharpened surface and produces a sharp edge. it also prevents rust.

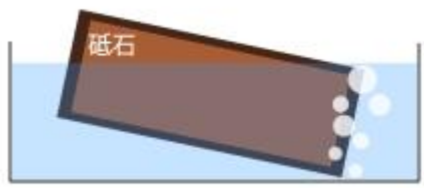
After long use, the center of the whetstone will become worn so that it is difficult to use for sharpening.
In this case, rub two whetstones against each other (there are also special resurfacing stones) or rub a whetstone on a flat concrete to make the surface of the whetstone flat.



How to Sharpen Double-Edged Kitchen Knives (Western Kitchen Knives)

Preparation

Soak the whetstone in plenty of water for about 5 minutes and wait until the bubbles stop coming out.
Remove the whetstone from the water and place it on a wet rag to stabilize it. (Some grinding stones are equipped with a rubber stand.)



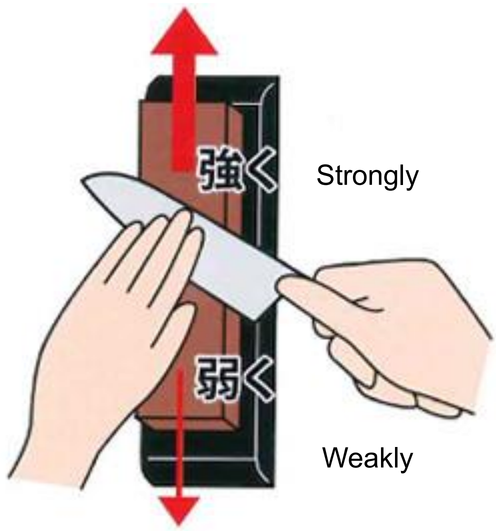
How to sharpen knives for right-handed users

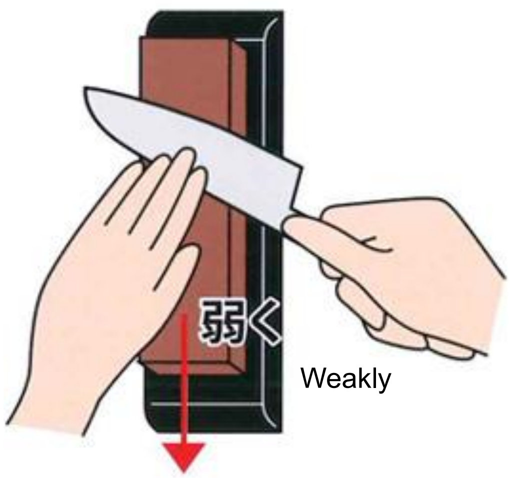
Grip the handle of the knife with your right hand with the edge toward you and press the edge of the knife with your left hand. At this point, place your right thumb on the flat and grip the knife firmly, so that you can easily maintain a certain angle when sharpening.

If you place the knife at an angle to the whetstone, you can use a wider surface of the whetstone and sharpen the knife more quickly. However, if the line of the knife's edge is horizontal to the direction of sharpening, a good edge will not be produced.

The sharpening angle varies depending on the purpose of use, but we recommend an angle of around 10° when cutting only soft foods, and 12° to 15° when cutting somewhat hard foods. Generally, for household knives, it is better to sharpen them at an angle where the width of the edged area, which was attached to the knife at the time of purchase, is perfectly in contact with the whetstone (Angle at which the whetstone rubs about 2 mm from the edge).

Next, start sharpening.
Sharpen by maintaining a constant angle and sliding the knife from the front to the back.
And when returning from the other side to the front, beginners are advised to lift it completely off the whetstone.



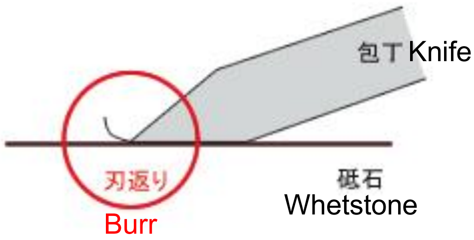


If the sharpening angle is not consistent when returning the knife to the front, the edge will be damaged, and the edge will not be sharp no matter how long it is sharpened. After repeated sharpening, the edge will have a burr on the tip. Gently brush the edge with your finger starting from the spine to the tip of the surface you are pushing with your left hand, and if there is a roughness on the edge, it is OK!
Change the sharpening point and continue sharpening until this roughness is on the entire edge.
If the water on the whetstone runs out during the sharpening, pour water on the whetstone. You can continue to pour tap water on the whetstone as you sharpen it, but only to the extent that the water stained with the color of the whetstone does not become transparent (a drip of water is sufficient). It is a shame to wash away the water stained with the color of the whetstone, since it contains many of the components of the whetstone. However, when the water is stained black, please rinse it clean once.

Next, turn the knife over (with the cutting edge facing away from you) and sharpen the other side.
This time, sharpen the knife by pulling it toward you. Position the knife so that its heel is on the right edge of the whetstone. To remove any edge burrs, slide the knife toward you so that the point of the edge is on the whetstone when you have finished the sliding.
Repeat this process several times, but as before, it is recommended that the knife be completely lifted off the whetstone when you return it. Also, if you reduce the pressure of your left hand at this time, it will make it easier to remove the burrs.
This is the end of the work with the current whetstone.

Sequentially change to a larger number of grain density whetstone and sharpen the front and back surfaces in the same manner. (Repeat sharpening steps of both sides.)
The larger the grain density of the final whetstone (the finer the grain size), the better the cutting quality.

Finally, remove the burr completely.
To remove it, lightly rub the knife against a soft wood, or cut a damp newspaper several times. If the final whetstone is No. 3000, the burr is so small that it can be removed by rubbing it lightly with a cloth.



*How to sharpen for left-handed users... Refer to how to sharpen for right-handed users and assume the left and right sides are reversed.

How to sharpen single-edged kitchen knives (Japanese knives)

To sharpen single-edged knives such as Japanese knives and bone knives, sharpen the front side so that the entire cutting edge (from the tip of the edge to the flat surface of the blade) touches the whetstone, and then sharpen until a burr is produced on the back side of the knife. Once the burr is produced, change to a whetstone of a higher grain density, and sharpen the front side again.
It is recommended to sharpen the back side of the knife only on the final stone. The back side of the knife should be sharpened by placing the knife on the whetstone with a light touch, just enough to bent burrs.
When sharpening the surface of the knife with the final whetstone, a slightly obtuse angle will improve the edge's holding power, but if you sharpen it too hard, the cutting performance will decrease.
From this description, you may think that sharpening knives is difficult, but you will get used to it and become good at it after doing it repeatedly.

9. Material of knives

Iron is categorized into iron, steel, and cast iron according to the percentage of carbon it contains. The amount of carbon in each of these categories is as follows.

Amount of carbon content

Iron	Containing 0 to 0.04% carbon
Steel	Containing 0.04% to 2.1% carbon
Cast iron	Containing 2.1% to 6.7% carbon (industrial classification)

An alloy of iron (Fe) with a certain amount of carbon (C) is called steel. Carbon steel, alloy steel, and stainless steel, which will be explained later, are all steel, but carbon steel is generally called steel (hagane).
Alloy steel (special steel) other than stainless steel is also sometimes called steel. Iron is not used for blades because it does not have the hardness required for blades when hardened.
Also, cast iron is generally not used for knives because of its low caking, or toughness.
(Toughness: the ability of a material to resist the formation and propagation of cracks within it.)

Carbon Steel (steel)

Steel is an alloy of iron and carbon, but in fact, to be precise, it always contains silicon, manganese, phosphorus, and sulfur in addition to carbon. These five elements contained in iron are called the "five elements of steel", and the properties of steel vary depending on the amount of each element.
Carbon steel is steel that contains only the above five elements. Generally, carbon steel used for kitchen knives has a carbon content of 0.8 to 1.3%.
Phosphorus and sulfur are considered impurities, but it is difficult to prevent their contamination in the steel manufacturing process. The lower the amount of contamination, the higher the quality of the material.

Actions of the five elements

Carbon (C)	An essential element for steel, and the most important factor in increasing hardness and strength.
Silicon (Si)	An element used to remove oxygen from molten steel. It also increases strength and hardness. (In terms of tensile strength, it is about 1/10 of the effect of carbon.)
Manganese (Mn)	An element used to remove sulfur from molten steel. It is also an element that allows for better quenching and gives steel caking, or toughness.
Phosphorus (P)	It is a harmful element for steel and causes cold brittleness, i.e., it makes steel brittle when cold. It is a desirable element to have less of it.
Sulfur (S)	Like phosphorus, this is also an undesirable and harmful element. Hot brittleness, i.e., brittleness of steel in red-hot condition. It is desirable to have less of it.

Five-element content (weight %) of general steel (carbon steel)

Carbon	Silicon	Manganese	Phosphorus	Sulfur
0.8〜1.3%	0.35% or less	0.50% or less	0.03% or less	0.03% or less

Alloy Steel (Special Steel)

Carbon steel consists only of the five major elements (C, Mn, Si, P, and S), but materials to which other elements are added are called alloy steels or special steels.
Other elements include chromium (Cr), molybdenum (Mo), vanadium (V), tungsten (W), cobalt (Co), and copper (Cu), which are added to improve blade properties.
Stainless steel, which will be discussed next, is also an alloy steel, but we distinguish it by emphasizing its special rust-resistant performance. Conversely, alloy steels other than stainless steel are not carbon steel because they are not very resistant to rust, but they are sometimes referred to as “hagane knives”.

Effects of various additives

Chromium (Cr)	Copper improves hardenability and corrosion resistance. 13% or more of copper is added to a material to make it a stainless steel.
Molybdenum (Mo)	Carbides are formed and abrasion resistance is improved. Stainless steels also have good corrosion resistance. After tempering, the steel becomes more elastic. It is hard even at high temperatures and has good wear resistance.
Vanadium (V)	Produces very hard carbides, resulting in good wear resistance. Helps to make crystal grains finer. Has an effect of preventing decarburization.
Tungsten (W)	Easy to form carbides and good in wear resistance. Resistant to high temperatures Improves hardenability.
Cobalt (Co)	Strengthens the hardened structure (martensite) and prevents carbide loss. Hard and good wear resistance even at high temperatures.
Copper (Cu)	Although originally an impurity, it is sometimes added in small amounts for its antimicrobial properties.

Stainless Steel

Stainless steel spoons and tableware are marked with symbols such as "18-8" or "18-10" in inconspicuous places.
These symbols indicate the chromium (Cr) and nickel (Ni) content in stainless steel, which is an alloy of mainly iron. "18-8" means that 18% chromium and 8% nickel are contained in iron.
18-8 stainless steel is called SUS304 in the JIS standard, and is classified as austenitic stainless steel and is not used for knives because it is not hardened by quenching.
Among stainless steels, stainless steels that are hardened by quenching and used for knives are classified as martensitic stainless steels, which have high carbon content. Generally, stainless steel used for kitchen knives contains 0.6 to 1.0% carbon and 13 to 16% chromium.

Classification of stainless steel

	Type	Characteristics
Chromium/Nickel type	Austenite type SUS304 SUS316 etc.	- Excellent corrosion resistance. - Not hardened by heat treatment. - Basically, it is Not magnetic. - Contains chromium and nickel and almost no carbon. - Used for spoons and tableware.
Chromium type	Ferrite type SUS410L SUS430 etc.	- Corrosion resistance is inferior to that of austenitic alloys, but it is less expensive. - Not hardened by heat treatment. - Magnetic at room temperature. - Contains chromium in its composition and a small amount of carbon (generally 0.12%). (Generally, less than 0.12%) - Used in bolts, nuts, and home appliance parts.
	Martensitic type SUS420J2 SUS440C etc.	- Corrosion resistance is inferior to that of other alloys. - Hardened by heat treatment. - Magnetic at room temperature. - Contains chromium and high carbon content. - Used for cutting tools, bearings, and gauges.

Cladding

This material means that different types of metals are joined to form a single material.
In the case of Western-style knives, a steel (carbon steel, stainless steel, etc.) that can be tempered is often sandwiched between rust-resistant stainless steel (low carbon content and non-tempered) from both sides, and knives made of this material are called "Warikomi" knives.
The material is also called "three-layer steel" because it is made of three layers. Many Japanese kitchen knives are also made by joining iron and steel by forge welding, so they can be called two-layer claddings.
Recently, three-layer steel and five-layer steel are also used for other items besides kitchen knives. However, both sides are made of rust-resistant stainless steel, and copper, which has good thermal conductivity, is used in the middle. (Clad: means to cover with a coating)

DP process of Warikomi (cladding) knives

Generally, the both sides of a warikomi knife are made of rust-resistant stainless steel which is not hardened with low carbon content and the center is made of steel (sometimes stainless steel) which is hardened with high carbon content.
During quenching, the carbon in the high-carbon steel moves to the low-carbon stainless steel layer at the boundary between the two. The areas with less carbon are less hardened, and the areas with more carbon are slightly hardened. This phenomenon leads to easy rusting and poor cutting performance.
To prevent this phenomenon, high-grade materials are treated with a special process to prevent carbon migration at the border. This treatment is called DP process.

Powder Steel

Powder steel is a material made from fine powder produced by spraying molten steel, which is densely solidified using special sintering and forging methods without being melted. It has a uniform hardened structure with less segregation of components in the material.
This process reduces the occurrence of giant carbides even when the amount of carbon in the material is increased, making it possible to produce blade steels with higher carbon content than before. Even with a high hardening, the microstructure with a large number of fine carbides provides good cutting performance, and resharpening can be done relatively easily.
At present, it is said to be the highest grade of knife steel."

Swedish Steel

Swedish steel is a steel made mainly from sponge iron or virgin wrought iron (Swedish iron), which is made from Swedish ore.
This steel has been used as a high-grade material since ancient times because it contains very few impurity elements such as phosphorus and sulfur in its composition.

Damascus Steel

Damascus steel is a steel made in ancient India, also known as Wootz steel. This steel features a unique pattern that appears on its surface when polished and is said to be rustproof.
It is famous for the huge iron columns called "Delhi Pillars" in India, which were made in the 3rd to 4th century A.D. and are still in good condition. However, it was not originally famous as a pillar steel, but as a cutting steel for knives with cutting performance, toughness, and resistance to rust.
Swords with the unique and beautiful patterns on the surface of Damascus steel were even considered heirlooms of the royal family during the Crusades. It is said that knights were also proud to possess swords made of Damascus steel.
Scientific analysis and investigation of the patterns on the surface of the steel revealed that the steel was manufactured by melting cast steel with a special impurity composition and then slowly solidifying it in a crucible, during which internal crystallization occurred. (Internal crystallization: During cooling, high-melting steel with low carbon content crystallizes first “dendritic crystals”, and then small crystals with low melting point and high carbon content solidify to fill in the gaps between the dendritic crystals).
The resulting steel is forged, heat-treated, and then polished to reveal a complex stripe pattern on the surface.
Today, however, the term "Damascus steel" does not refer to the ancient Indian steel mentioned above, but is used as a generic term for steel that is artificially layered and forged from different types of steel to produce the pattern.
Knife manufactures use a variety of ingenious techniques to produce knives with complex and beautiful wood grain patterns, rather than the monotonous stripes created by mere laminated steel. These knives are prized as high-end cutlery.
However, the beauty of the surface has nothing to do with cutting performance. What determines cutting performance is the quality of the steel used for the cutting edge and the appropriate heat treatment.

Others

In addition, a small number of knives are made from metals other than iron, such as Stellite (cobalt alloy) and titanium alloys, as well as knives made from newer materials such as fine ceramics' high-toughness zirconia and alumina.

10. About tanzo [forging]

When making Japanese swords, swordsmiths dressed in white are hammering hot steel with hammers, which is exactly what forging is. Today, in the case of kitchen knives, this process is done by machine to save labor.

In general, forging is the process of heating a metal and applying a sudden pressure from the outside to bring out more of the metal's characteristics and form it into the required shape. Just as the character "tanzo (鍛造)" says, forge and shape.
In the forging of kitchen knives, steel is heated to a high temperature, and then forged under mechanical pressure (to refine coarse crystal particles in the metal, homogenize the structure, and improve physical properties) using a hammer press or similar machine, while forming it into the required shape. Rather than changing the shape of a knife, the main purpose of forging is to create a base material with a high quality structure, and this is more significant than in the case of forging other products.

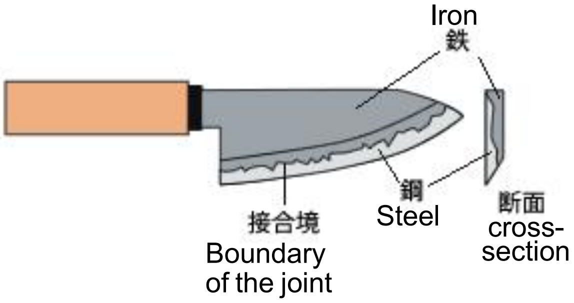
The temperature for hot forging is above the recrystallization temperature at which the crystallization of the particles change, so the forging temperature depends on the material. Usually, steel used for knives and other cutting tools is forged at a temperature of 1,000°C or higher.
The ratio of the cross-sectional area of the material before forging to the cross-sectional area of the material after forging is called the forging ratio, and the material is usually stretched by forging until the ratio is about 1/3 to 1/4.

Forged knives are made by forging shape steel (a long steel material with a certain cross-sectional shape), stretching it into a plate shape, roughly grinding it, and then forming it into the shape of a kitchen knife using a press or other machine. The forging process results in the steel's tenacity and fine particle bonding, which leads to easy blade setting and long-lasting cutting performance.
Most of the Western-style kitchen knives currently on the market are made by passing the material through a rolling roll to produce a plate of the desired thickness, and then using a press machine to punch the material into the shape of a kitchen knife. Knives made in this way are called " Punching knives" and are distinguished from Forging knives.

In the case of Japanese kitchen knives, there are a few forging knives and punching knives that use the same forging method as Western kitchen knives, but most of them are made by the forging method called "tansetsu" (forge welding). Forge welding is an ancient Japanese knife making method.
First, steel and iron (base metal) are forged separately to form a plate. Next, the two are stacked on top of each other, and iron powder, borax, etc. is added to the jointed surfaces and forged again. At this time,

the iron powder placed between the steel and iron is thermally melted and acts as an adhesive, joining the steel and iron together. This method is called forge welding.

As shown in the figure on the right, the color is separated at the border between iron (base metal) and steel. This is a characteristic of welded forged knives. When this surface is carefully finished with a whetstone, the line at the boundary of the joint is not a single line, but a line with a faint appearance, so forged kitchen knives are called "Kasumi [haze]" knives, and this type of sharpening is sometimes called "Kasumi" sharpening.



There are also expensive Hon-yaki knives for professional chefs. These knives are made without forge welding and are made entirely of steel and forged well.

11. About heat treatment

Heat Treatment of Knives

Heat treatment of knives includes annealing, quenching, and tempering.

Annealing

"Annealing" refers to the process of heat-treating a metal material to make it stable when it is in an unstable state during the forming process. Annealing is performed by heating the material to a certain temperature and then cooling it slowly. In the annealed state, the metal is not only in its most stable state, but it is also softer.
During the annealing process, the carbides (Fe_3C) in the steel are adjusted to a fine spherical structure, which is called "spheroidizing annealing" and is a necessary heat treatment for high carbon steel prior to quenching.

Quenching

Quenching is a heat treatment in which steel is heated to an appropriate temperature above its transformation point and then quenched by placing it in water, oil, etc. to increase its hardness and strength. （The transformation point is the temperature at which the metallurgical structure changes when heated further.)
Since the transformation point varies depending on the composition of the steel, it is not possible to state the quenching temperature in general, but a rough guide is around 1,050°C for stainless steel and around 800°C for steel. In the case of quenching, it is important to control the temperature appropriate for the type of steel. The heating temperature, heating time, retention time, and cooling speed (to keep the temperature of the coolant constant) must be kept constant.
By controlling the temperature of the steel sufficiently, uneven hardness of knives can be eliminated, and a good hardening structure can be obtained. The hardness obtained by quenching is 3 to 4 times higher than that before quenching.

Sub-zero treatment (deep cooling treatment)

Academically, if the carbon content in a material is more than about 0.8%, it cannot be completely transformed into a hardened structure (martensite) by cooling to room temperature during quenching. Therefore, materials with high carbon content are cooled once to room temperature during quenching, followed by a cooling process using liquid nitrogen or the like as soon as possible. This second cooling process is called sub-zero treatment. At our company, the temperature is cooled to approximately -70°C.

(The "sub" in "sub-zero" means "below", and the "zero" is the number 0, meaning "treatment below 0°C.")

Tempering

Hardness alone is not enough to prevent kitchen knives from cracking, breaking, and knife edge breakage. Even if hardness is sacrificed a little, it is desirable to have a knife that is easy to sharpen and sticky. The heat treatment to make knives sticky is called "tempering".
There are two types of tempering depending on the heating temperature: high-temperature tempering and low-temperature tempering, the former at 550-650℃ and the latter at 150-250℃. The structure after each treatment is different and has different properties. In the case of knives, the latter type of low-temperature tempering is performed. Steel that has undergone quenching and subzero treatment is heated at approximately 180°C for about one hour and then slowly cooled.

Railroad track rails and press dies are also steel that is subject to heat treatment.
However, it is important to give a knife the best properties for its use as a knife. Each heat treatment is unique to the blade steel. In other words, it is not just about hardness, but to improve cutting performance, tenacity, abrasion resistance, and various other properties that determine the quality of the knife, each knife manufacturer uses its long years of experience, research and development, and technological improvement to perform subtle heat treatment operations using unique heat treatment methods suited to each material.
Heat treatment of kitchen knives is so delicate that a truly subtle difference in heating temperature or a difference in the temperature or type of cooling solution can change the hardening structure.

12. Secrets of knife hardness

About the hardness of knives

Once a knife is heated to a bright red-hot temperature, it is then placed in water or oil and cooled rapidly. This process is called quenching, and it is an indispensable manufacturing process to make knives hard.

When the temperature of steel is lowered, dissolved carbon precipitates in the form of carbides (carbon compounds), but it takes a certain amount of time for carbon dissolved in steel to precipitate as carbides. Therefore, if there is no time for precipitation due to rapid cooling from a high temperature state, the carbon will solidify while being dissolved in the iron. in This microstructure, the dissolved carbon will have the force to move out of the iron, but since the iron is solid, it cannot precipitate out. This is where the large distortion force comes into play and makes it
hard.
Although the principle may not be fully explained academically, I think it can be roughly understood in This way.

We have explained that if carbon is not precipitated as carbides but remains dissolved in the structure, the strain force will work, and the hardened structure will become harder. However, in fact, the amount of carbon that can harden the hardened structure (the amount of carbon that can be dissolved) is only 0.765%, and any carbon above this amount will precipitate as carbides.
You may think that materials with an original carbon content of 0.765% or less cannot form carbides, but carbides will always precipitate. In this case, the amount of carbon dissolved in the iron is reduced, resulting in a slightly softer hardened structure.

Next, I will briefly explain the relationship between the quenched structure and sustaining cutting performance, using the analogy of concrete.
Concrete is a mixture of cement, sand, gravel, and water. If you look closely at a concrete parking lot or other surface, you will see gravel scattered in the gray areas (mortar areas). If you compare it to a knife, the quenched tissue is the gray area (the mortar part). And the carbide is the gravel.
Thinking about the abrasion resistance of cement, the gravel is very hard and prevents the mortar from being scraped away. If the gravel is removed by some impact, the mortar will be scraped away faster than expected until the underlying gravel is brought to the surface again.

Think of the edge of a knife with this condition in mind.
Think of the carbide at the very tip of the knife as being largely responsible for cutting the material. The total amount of carbides is determined almost entirely by the amount of carbon in the material, but it is better to have as many small carbides as possible, scattered in pieces. Also, a harder quenched structure prevents carbides from falling out. Furthermore, the harder the carbide itself, the better. Some blade steels contain various elements in the material to precipitate even harder types of carbides. Molybdenum-vanadium steel is one example.
Now, adding more carbon to the steel to increase cutting performance will increase the number of carbides, but this is not the case. If too much is added, each carbide becomes huge. In the past, stainless steels were limited to about 1% carbon, but recently a powdered steel material has been developed that breaks this limit. This material is made by grinding the metal into a fine powder and hardening it by a special method without melting it, so that even if the carbon content is increased, the carbides do not grow huge during quenching, and many fine carbides are precipitated. It is the highest grade blade steel at present.

Rockwell Hardness Testing

Normally, the hardness of a knife is evaluated by a measurement method using the Rockwell hardness C scale. Let me first explain what this measurement method is.
This method was invented by Mr. Rockwell (USA) in 1919 and is the most widely used in industry worldwide. Rockwell hardness is determined by using a diamond or sphere indenter to first apply a reference load, then a test load, and then return to the reference load, and from the difference in the depth of penetration of the indenter at these two reference loads, the hardness is determined by a dial gauge. The testing machine is provided with a scale, which is a hardness symbol specific to the combination of the type of indenter used for indentation, the size of the test load, and the hardness calculation formula.

ロックウェル硬さ試験機
Rockwell Hardness Tester

In the case of the C scale, if a diamond indenter is used and a reference load of 10 kgf and a test load of 150 kgf are used, and the difference in penetration depth is h (mm), then the difference in penetration depth is calculated by the formula: HRC=100-500h
In other words, if h=0.084 (mm), HRC58 is obtained.

As for the type of scale, JIS (Japanese Industrial Standards) uses ABCEFGHNT, but DKPMLVSRWXY has also been published. The scale used is selected and measured according to the object to be measured.

When indicating the hardness, the symbol of the type of scale used is added after the HR to indicate which scale was used. For example, if the A scale is used for measurement, it is written as HRA80.

Classification	Hardness (HRC)
Inexpensive kitchen knives	HRC 52-56
General household knives	HRC 57-59
Western-style kitchen knives for professional use	HRC 59-62
Japanese kitchen knives for professional use	HRC 60-65

As you can see from the formula, the higher the number, the harder it is.
Usually, knives are as hard as the table on the left.

Generally, people think that the harder the knife is, the better it is, but in fact, there is a big pitfall here. If a good material with a high carbon content is subjected to proper heat treatment, the knife will be hard and tenacious, and its cutting performance will be long-lasting. However, it is possible to make hard knives from inexpensive low-carbon materials by manipulating the heat treatment. In this case, the carbides in the structure become larger, resulting in poor cutting performance, cracking, and breaking. Therefore, although hardness is a standard for judging a good knife, it is dangerous to make a judgment based on it alone.

In recent years, some people who have learned a little about kitchen knives have been seeking knives that are only concerned about hardness, and as a result, we have heard of inferior kitchen knives that have been made by ignoring the hardening structure and improper heat treatment to increase hardness only. We recommend that you choose knives made by reputable and trustworthy manufacturers.

13. Knives one thing and another

The Gift of a Kitchen Knife

Although it is sometimes said that "knives cut off relationships" and are often shunned as gifts or wedding gifts, there are no bad omens with knives according to divination.
In fact, scissors used for cutting the ribbon at road opening ceremonies, axes used at ship launching ceremonies, and knives used for cutting the wedding cake at weddings are all used to celebrate new beginnings.
We have also been selling knife sets with a bookmark of "Kaiun Yakuyoke Kitchen Knife" [lucky charm] as a gift for a long time.
Most of our knives can be personalized. Please feel free to contact us for more information.

Lifespan of a kitchen knife

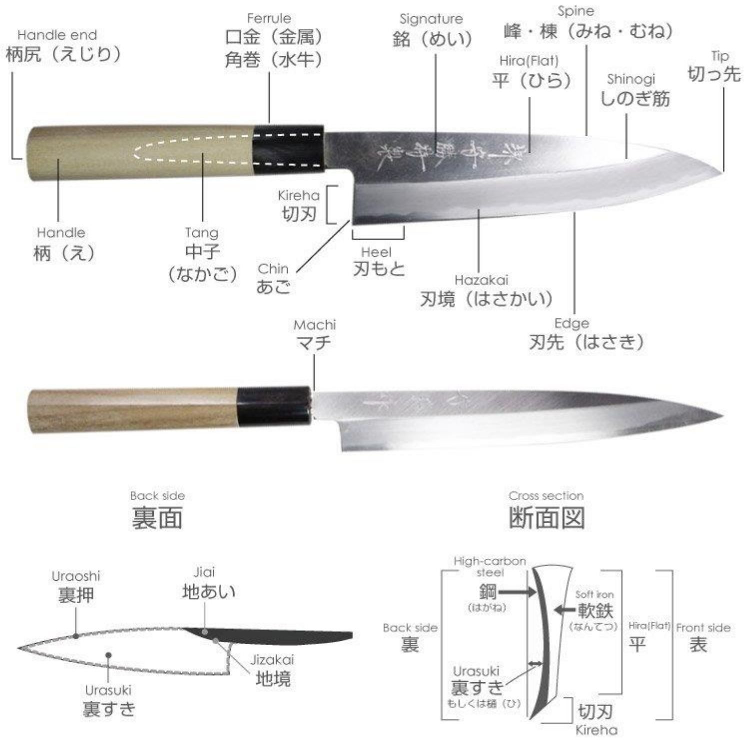
We are sometimes asked "How deep is the steel used in this knife? How deep is it tempered?"
In the case of Western kitchen knives, if you use them well, you can use them until the handle gets in the way and you can no longer sharpen the blade. If you are looking for the answer to the above questions, the answer is "Entire knife". When we look at old kitchen knives, we often find that the blade is still usable, but the handle has been ruined.
In the case of Western kitchen knives, it is difficult to replace the handle, so when you buy a kitchen knife, you need to pay attention to the handle as well. The secret of long life is to wash them with clean water after use and to wipe off dirt and moisture from the handle.
Unlike Western kitchen knives, most Japanese kitchen knives are made of steel, which is wrought steel welded to iron (base metal). In this case, only the steel part can be hardened, so there is a limit to how much sharpening can be done. Even if a knife is made entirely of steel, it is not always possible to harden all parts of the steel.
In addition, the handles of Japanese knives tend to become worn or cracked, and if this happens, please ask a specialized store to replace the handle. They will replace the handle.

Etymology of the word "包丁 [kitchen knife]"

In the ancient Chinese book "Zhuangzi" (荘子), the name of Teishi (丁子) appears as a master cook.
A cooking place was called a "houchu" (庖厨), and Teishi was called "Houteishi" for "Teishi (丁子) in the houchu (庖厨)", and furthermore, he was called "Houtei (庖丁)". This name is said to be the origin of the word "包丁 [kitchen knife]".
In Chinese, "庖" means kitchen and "丁" means a person who works, so "庖丁" also means a chef.
The knife used by a 庖丁 (=chef) for cooking came to be called a 庖丁刀 [chef's knife], and after that, the knife itself seems to have been called a 庖丁 for short. There are many kinds of tools used by chefs, but the fact that the knife used for cooking is called a 庖丁 as it shows how important the kitchen knife was.
*Nowadays, the character "庖" is no longer used in general because it is out of the official Japanese kanji, and "包" which has the same reading is used instead.

Appendix: Names of parts in Japanese kitchen knives

(Reference: https://sakai-fukui.shop-pro.jp/?mode=f1)



(Reference: https://tojiro.net/reading/10379/)