CIRCULON®

# CRASH COURSE IN **COOKWARE**

For a better understanding of the most widely available and popular options in the Canadian market, Meyer Canada Inc. has put together a crash course in the top three cookware substrates.

## ABOUT STAINLESS STEEL COOKWARE

Stainless Steel is a poor heat conductor. To disperse heat and prevent burning, an aluminum or copper disc must be added to the bottom of the pan.

The performance of stainless steel cookware is largely determined by how well the pan spreads heat, thereby reducing or eliminating "hot spots". This is directly related to the thickness of the copper or aluminum disc. The thicker the disc, the better the heat distribution.

Note: Aluminum requires three times the thickness of copper to get the same heat distribution. Therefore, aluminum discs are always thicker than copper ones. When determining a pan's quality by weight, compare the same kind of pans: copper to copper and aluminum to aluminum.

### COPPER AND ALUMINUM HEAT CONDUCTION RATING CHART

The standard thickness of aluminum or copper discs for stainless steel cookware and the corresponding heat dispersion ratings are as follows:

| ALUMINUM DISC | PAN'S HEAT DISPERSION | COPPER DISC | PAN'S HEAT DISPERSION |
|---|---|---|---|
| 1.5 mm | Poor | 0.5 mm | Poor |
| 2.0 mm | Marginal | 0.8 mm | Marginal |
| 3.0 mm | Good | 1.0 mm | Good |
| 4.0 mm | Very Good | 1.5 mm | Excellent |
| 5.0 mm | Excellent | 2.0 mm | Excellent |

### BASE ATTACHMENT

The two methods of attaching copper or aluminum base discs to stainless steel pans are:

**Brazing,** the only way of applying a copper disc, is the most common method. The disc can only be brazed on the flat portion of the base. The disc may stop short of the side wall, exposing the corners of the pan to the heat source and creating hot spots. Food can burn on the inside corners of a stainless steel pan if the heat source is not monitored.

**Impact (friction) bonding,** is a heat-pressure technology that allows aluminum to be spread to the outside edge of the pan, eliminating "hot spots" and consequent burning in the pan's interior corners.

Note: Brazing aluminum and copper discs requires brazing powder that melts at high heat and bonds the pan to the disc. If the pan is exposed to prolonged overheating or boils dry, the brazing powder might melt, causing disc separation. Because impact bonding does not require brazing powder, the possibility of disc separation due to abuse is eliminated.

**As a safety precaution, regardless of base attachment, your customer should always be reminded to use low to medium heat and never allow a pan to boil dry.**

### THE TRI-PLY ADVANTAGE

Since aluminum and copper are soft metals that tarnish easily, a tri-ply base with a stainless bottom protector is used to increase durability. Exposed copper requires substantial polishing to keep it shiny. Exposed aluminum can't be polished but needs to be scoured regularly, as stovetop burners and food particles can easily discolour it. It also leaves marks on porcelain sinks and countertops.

### CLAD METAL STAINLESS STEEL PANS

Clad metal pans, made of stainless steel and aluminum sandwiched together, need no heat conductor at the base because the entire body is tri-ply material (stainless/aluminum/stainless). The center aluminum core is the heat conductor. These pans conduct heat evenly up the side walls instead of just the base. In short, depending on quality, both tri-ply based and clad metal pans can provide excellent cooking performance when low to medium heat is used.

## ABOUT ALUMINUM COOKWARE

Aluminum is the **most common material** for cookware as it is an excellent conductor of heat and is inexpensive compared to copper and stainless steel. While features such as the lid, handle or finish are important, thickness is the key element of quality; **the thicker the pan, the better the heat dispersion,** which reduces the chance of "hot spots" occurring. Remember, since aluminum pans are all aluminum, heat spreads evenly over the total surface including the side walls. Traditional stainless steel pans spread heat evenly only on the copper or aluminum base.

### ALUMINUM GAUGE THICKNESS CHART

Thickness of aluminum has been stressed as the vital element of quality, so let's put it into perspective. The thicker the metal, the smaller the gauge. The industry follows these standards:

| GAUGE | THICKNESS | |
|---|---|---|
| | In mm | In inches |
| 3 | 6.0 mm | 1/4" |
| 4 | 5.0 mm | 1/5" |
| 6 | 4.0 mm | 1/6" |
| 8 | 3.0 mm | 1/8" |
| 10 | 2.5 mm | 1/10" |
| 12 | 2.0 mm | 1/12" |
| 14 | 1.5 mm | 1/16" |
| 16 | 1.0 mm | 1/25" |

Because of the high heat used in frying and sautéing, skillets usually come in heavier gauges than saucepans or stockpots within the same cookware line. Generally, consumers have made the 10 gauge skillet the industry standard and the 10" diameter skillet the mostly widely sold size in frypans.

### WARPAGE

The most critical element in preventing warpage is a proper base contour. Aluminum expands when heated. If the base of the aluminum pan (or stainless steel pan with aluminum disc) is absolutely flat prior to heating, it will most likely become convex when heated due to metal expansion. This creates what's called a "spinner", making it unstable while cooking. **Good cookware has a concave base** so when it heats up and the metal expands, the base remains flat and steady on the burner. Turn a pan over and put a ruler on the base. The center of the pan's surface should not touch the ruler, but be slightly concave. Even pans with stamped impressions need this feature. A concave base, not the stamped impressions, is the essential deterrent to warpage.

### NON-STICK PERFORMANCE AND DURABILITY

The majority of pans sold in the world today have a non-stick interior. Non-stick performance and durability are determined by the pan's thickness and quality of the non-stick coating. Overheating and utensil abrasion are two factors that most affect non-stick durability. A superior coating on a thin pan makes no sense as the pan will overheat easily. The resulting "hot spots" will damage even the best non-stick coating. **Pan thickness is essential to non-stick longevity.** High heat should not be used with non-stick cookware, other than for very short periods (when searing a steak), or when a pan is filled with food or liquid (when boiling water).

Food release performance is the same for all non-stick brands on the first day of use. How pans release food years later is another issue. The number of coatings can help determine non-stick longevity, with three-coat systems being at the higher end. However, non-stick coating quality only makes a difference when comparing the same gauge pan. For superior non-stick performance, both the coating and the pan must meet high quality standards.

In addition to quality, **non-stick durability is determined by the pan in three ways:**

#### #1 - Type of Pan Surface to Which Coating is Applied

Assuming pans have similar conduction properties, the same non-stick applied to a hard anodized aluminum pan or stainless steel pan is far more durable than when applied to a plain aluminum pan. Likewise, a plain aluminum non-stick pan is far more durable than an enamel on steel pan having the same non-stick coating.

#### #2 - Thickness of the Pan

Repeated overheating deteriorates non-stick coatings. "Hot spots" and the consequent coating deterioration happen much faster on lightweight pans.

#### #3 - Application Method

Non-stick coatings are made from the world's most slippery substance, so permanent bonding to the pan takes a great deal of expertise. Coating manufacturers' labels are used to certify the pan has received the right application method. If a non-stick pan does not have a certified coating label, it's important that the manufacturer be known for quality non-stick products.

### ALZHEIMER'S AND ALUMINUM – NO CORRELATION

FDA reports show there is no direct correlation between Alzheimer's and the eating of food prepared in aluminum cookware. However, it is counterproductive to try and change consumer perceptions. If the customer does not accept assurances that Alzheimer's is not connected to aluminum cookware, simply offer another category of cookware, such as stainless steel.

## ABOUT HARD ANODIZED COOKWARE

The hard anodized surface of aluminum cookware is **twice as hard as stainless steel** and is an **integral part of the pan, not a coating.** Durability of hard anodized cookware is outstanding due to the toughness of the surface. Under the hard anodized surface is an aluminum core that provides excellent heat conductivity and even cooking. This core runs through the entire pan, including the side walls.

The major advantage of a hard anodized non-stick pan compared to a plain aluminum non-stick pan is its durability—the pan's ability to release food long term. Abrasion tests performed on hard anodized substrates and plain aluminum substrates with the same quality coating show hard anodized substrates to be at least **three times more durable** than plain aluminum.

This allows the non-stick coating to permeate the surface and be locked in permanently. However, cooking utensils can break down soft, plain aluminum, damaging the non-stick coating. As the coating slowly wears away, the aluminum surface becomes exposed (shiny lines appear). Food contact creates a chemical reaction with the exposed aluminum, accelerating non-stick deterioration. This can't happen on hard anodized surfaces because of the extreme hardness. The non-stick is well protected and there is no chemical reaction between food and the hard anodized surface.

### HARD ANODIZED NON-STICK DURABILITY

The primary factor in determining which hard anodized non-stick pan will provide the longest durability shouldn't be based on manufacturer's warranty, but on the pan itself. The pan's thickness, ability to spread heat evenly and the quality of the coating determine performance and durability.

### THE BENEFITS OF BI-CLAD

Bi-Clad cookware couples the best qualities of hard anodized construction with clad stainless steel performance. The clad stainless steel interior of the pan offers an elegant and durable finish that is metal-utensil safe. The hard anodized aluminum exterior, permanently bonded to the stainless steel, features all the benefits of this treated aluminum, including exceptional durability and excellent heat distribution. Non-stick coated hard anodized pans are dishwasher-safe. Bi-Clad cookware also tends to be lighter weight than its tri-ply counterpart, as it features one less layer of stainless steel.

## FAQ

### Which is better: a stainless steel pan with an aluminum or a copper base?

For heat control, copper is better. For retained heat, aluminum is better. A copper pan gets hot very quickly and cools off very quickly. North American consumers may prefer good heat control however the benefits of retained heat might be more beneficial. Aluminum heats up more slowly but retains heat after the stove is turned off. This is an advantage for stovetop to table serving. An aluminum based pan will keep food warm during the meal far better than a copper based pan. Delicate sauces can also be cooked in aluminum based pans with proper attention to temperature control.

### What is non-stick made of?

Non-stick used for stovetop cookware is a unique plastic material, designated as PTFE. It's the world's most slippery substance and is the reason why food doesn't stick to non-stick pans. Teflon® is the brand name for DuPont's original non-stick coating. Dupont scientists invented non-stick technology, and DuPont brands are still the best known.

### Will the non-stick hurt me if I swallow it?

**NO.** Non-stick coatings are safe and pose no hazard to human health. If particles of non-stick coating are accidentally ingested, There is no danger because the coatings are inert and nontoxic. The FDA has found the composition of non-stick coatings acceptable for conventional kitchen use.

### Are non-stick coatings and/or PFOA dangerous?

**NO.** PFOA (Perfluorooctanoic Acid) is a surfacant and is vital to the fabrication process for many industrial and consumer products throughout North America, including the manufacturing of ALL non-stick cookware. Research demonstrates that what little PFOA is used to make non-stick coatings is removed during the curing (baking) process through which all non-stick cookware passes so that it's virtually undetectable in the toughest tests. In fact, no study worldwide conducted by any of the regulatory agencies has reported any detectable PFOA quantities in non-stick coatings. In addition, no study has ever shown that trace levels of PFOA (in Americans and most of the world) has ever resulted in illness, including factory workers with extensive exposure to PFOA.