



American Pan®

Industrial Baking Pans & Coatings

A BUNDY BAKING SOLUTION

TECHNICAL BULLETIN

Baking Pan Bottom Abrasion

WHAT'S COVERED

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to Know

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Baking pan bottom abrasion can be a major issue for bakeries. Although impossible to avoid, there are steps that can be taken to minimize the effects of baking pan bottom abrasion in your operation. From understanding the entire bakery line process to selecting baking pans designed specifically for your operation, the issue of failing pans and metal contamination on finished products will be one less thing to worry about.

KEY TAKEAWAYS

- Aluminized steel pans are most durable and long-lasting.
- Baking pans should be made to fit with existing equipment.
- Glazed pan bottoms can significantly reduce abrasion.

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Top 8 Things You Need to Know:

1. Stainless steel conveyors will always abrade aluminized steel pans.
2. Abrasion occurs the most with brand new baking pans.
3. Tighter turns on proof and bake conveyors increase abrasion.
4. The stronger the conveyor magnets, the stronger the force, resulting in more abrasion.
5. Larger/heavier pans increase the rate of abrasion.
6. Mould center guide spacing must be wide enough to prevent binding.
7. Glazed pan bottoms reduce friction and abrasion.
8. A dry-run, break-in period for new pans can alleviate contamination concerns.

Understanding the Cause & Finding Solutions

When new baking pans are put into production at a bakery, you may notice metal dust coming from the bottom of the pan. This is caused when metal pan bottoms come in contact with metal conveyors, conveyor guides, magnets, or other sharp objects. In many cases, the abraded metal will fall directly onto the floor; however, if abrasion occurs while pans are above your baked product, such as on a spiral conveyor, the metal could fall on top of your product and result in metal contamination. This bulletin will explain why pan bottoms abrade and steps that you can take to avoid product quality issues.

Baking Pan Material

The majority of industrial baking pans are made of aluminized steel. Aluminized steel is steel that has been hot-dip coated on both sides with aluminum-silicon alloy. This process assures a tight metallurgical bond between the steel and its aluminum coating, producing a material with a unique combination of properties possessed neither by steel nor by aluminum alone. This includes corrosion resistance, durability, and excellent heat transfer properties.

American Pan exclusively manufactures pans using aluminized steel that is made from a special classification coating process that provides the highest quality application for surface appearance, hardness, and adhesion; however, even the highest quality aluminized steel will abrade in unfavorable conditions. Fortunately, this abrasion will reduce over time as the aluminum alloy layer is removed.

Causes of Abrasion

Metal Conveyors

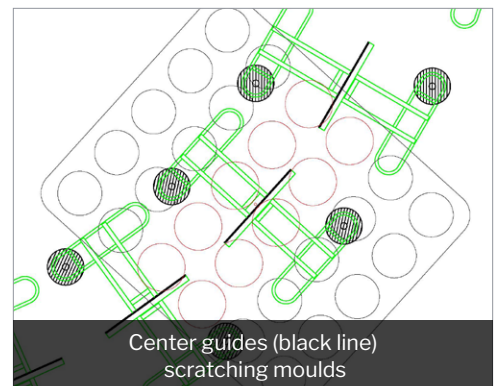
Stainless steel proofing grids or conveyors cause abrasion because the stainless steel is much harder than the aluminum alloy layer on aluminized steel pans. The stainless conveyors scratch the pan bottom and create metal dust that falls under the conveyor. Wider baking pans have more surface area in contact with the conveyor grids, thus increasing the amount of abrasion. The abrasion factor increases on tight radius turns in spiral conveyors. Note that any other sharp points on the conveyor can also scratch the bottom of the pan and create metal dust.

Magnets

Conveyor systems with magnets can also contribute to increased abrasion to baking pans. Strong magnets increase the force between the pan and the stainless steel grid increasing the rate of abrasion and thus the amount of metal dust coming off the pan.

Spiral Conveyor Center Guides

Center guides on existing conveyor systems were typically positioned for a specific pan when originally installed. When larger pans are introduced to an existing system, care must be taken to ensure there is adequate spacing between the pan moulds for the center guide to not bind as it travels around the curves of a spiral conveyor. Notice how the center guides (black lines) shown in the drawing to the right begin to rub against the pan moulds (red circles) as it travels around the curve of an existing spiral conveyor. This, coupled with



the strength of the magnets, can significantly add to the abrasion of pan bottoms. Increasing pan widths can lead to binding if the pan is not designed for a specific conveyor guide system.

Minimizing Abrasion

Abrasion of the pan bottoms is inevitable. There are steps that can be taken, however, to minimize abrasion during initial break-in period and avoid detectable metal levels in your product.

System Considerations

When purchasing new pans for an existing system, be sure to review the system with your American Pan representative. Information required to provide proper pan design includes the curve radius of conveyors, type of grid, magnet location, and if utilized, the center guide details.

Metal Conveyors	Magnets	Conveyor Center Guides
Confirm that pan width and center spacing is compatible with conveyor system. Eliminate any sharp edges that will cause abrasion.	Check that the magnets are strong enough to hold pans but not so strong as to increase abrasion due to unnecessary force.	Ensure pans have the right center space and size for system and conveyor guides.

Pan Considerations

In addition to reviewing your system, there are other ways to decrease the rate of abrasion.

Glazed Pan Bottoms	Dry Run Pans
Purchasing pans with glazed bottoms will provide lubrication and protection of the aluminum alloy coating and can significantly reduce the amount of abrasion when pans are first put on the line. See chart below.	Run pans through system without product and with oven off for an initial break-in period. Please consult your American Pan representative for more details.

