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ADVANCER® KILN SHELVES SAFETY, USE & PRODUCT GUIDE

Important Safety & Storage Requirements for ADVANCER® Shelves

Slow and medium firing cycles are recommended for most full and half Advancer Shelves for top loading electric kilns. We do not recommend exceeding 163°C (325°F) per hour from ambient temperature up to 538°C (1000°F). We do not recommend exceeding 163°C (325°F) per hour during cooling from 528°C (1000°F) to ambient temperature. Force cooling, propping the kiln lid open and pulling peeps is not recommended. Dense loads such as solid sculpture or thick tile may require slower ramp rates. **Failure to follow the recommended ramp and cooling rates may result in shelf failure (cracked or broken shelves).**

WARNING

ADVANCER® Kiln Shelves are refractory components and should be stored in a dry, enclosed area. Do not expose ADVANCER® Shelves to prolonged moisture. Do not store ADVANCER® Shelves outside or directly on the floor (including cement and concrete surfaces). Avoid direct contact with any weather elements including rain, snow, bare ground or any place where standing water could occur. **If ADVANCER® Shelves have been exposed to prolonged moisture, follow the Dry Out Procedure for ADVANCER® Shelves before use. ADVANCER® refractory components exposed to prolonged moisture penetration may result in catastrophic failure (steam explosion) during any firing of the kiln.** Contact an application specialist if you have further questions – (612) 331-1345.

****The application of kiln wash, glaze and damp sponges on ADVANCER® refractory components is an acceptable practice and is not considered a source of prolonged moisture exposure. ADVANCER® shelves do not absorb moisture through the air from humid environments.**

Dry Out Procedure for ADVANCER® Shelves

Use a minimum of 2.5 cm (1 in.) spacing (posts) between shelves whether they are stacked horizontally or arranged vertically in the kiln. A programmable electric kiln is preferred for maximum control.

1. Heat from ambient to 190°F (88°C) at a rate of 50°F (10°C)/hour and hold for 24 hours.
2. Heat to 210°F (99°C) at 50°F (10°C)/hour and hold for 12 hours.
3. Heat from 210°F (99°C) to 230°F (110°C) at 50°F (10°C)/hour and hold for 12 hours. Ensure that the entire load has reached the soak temperature before the timing of the soak has begun.
4. Raise temperature to 350-500°F (177-260°C) at a rate of 100°F (40°C)/hour.
5. Hold soak temperature for at least 12 hours ensuring that the entire load has reached the soak temperature before the timing of the soak has begun.
6. Let temperature fall naturally to ambient by turning off the heating source.



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Electrical Conductivity Warning

Silicon carbide is an electrical conductor; however, the electrical resistance of ADVANCER® shelves depends on several variables, making the likelihood of an electrical shock minimal. It is important to place shelves so that they are centered properly within the kiln maintaining a 2.5 cm (1 in.) minimum gap between the shelf edge and kiln wall/element grooves. **Do not use a shelf that is too large for your specific kiln model.** As with any type of powered equipment, observing common sense rules, precautions and maintenance recommendations will eliminate potential hazards. For instance, ADVANCER® shelves should not be used in kilns that are in poor repair with unpinned elements protruding out of their grooves. **Operators should never reach into an electric kiln while powered on.** More detailed information can be obtained from an application specialist.

Porcelain & B-mix Clay Bodies

When using ADVANCER® kiln shelves, a release is needed for porcelain or heavily fluxed B-mix clays. Stoneware and Earthenware will not stick to the shelves. The flux or Feldspar in porcelain and B-mix clay bodies will interact with the glassy surface layer of the ADVANCER® shelves, which can cause plucking (clay sticking to the shelf). When in doubt, the best thing to do is test how your clay interacts with the bare shelf surface. A thin layer of Alumina Hydrate based kiln wash can be applied to the shelves. Only a thin layer of kiln wash is required to mitigate plucking and does not need to be reapplied after every firing unless there is heavy grinding of the shelves.

B-mix clay bodies may not stick to the surface of new ADVANCER® shelves. Over time and after use of the shelves B-mix clay bodies may start plucking/sticking. This is due to several factors; continuous surface oxidation, firing temperature and clay body composition. All nitride-bonded silicon carbide products will oxidize at high (glaze firing) temperatures to some degree. The result of this is increased surface oxidation/glassy build up on the shelf surface. A stoneware clay body may contain around 12% Feldspar and will not stick to an ADVANCER® shelf. B-mix clay bodies tend to contain a higher Feldspar content of around 25%. The higher Feldspar content in B-mix clay bodies along with continuous surface oxidation and general debris build up on the shelf surface all contribute to the potential for plucking. Some customers use B-mix with no kiln wash and have no sticking/plucking. If you have questions after reviewing, please contact Smith Sharpe Refractory.

Silica based kiln washes may intermix with the glassy surface of ADVANCER® shelves and stick.

If kiln wash is not preferred, Alumina Hydrate may be used between the bottom of a ceramic vessel and the shelf surface. Mix 1 tablespoon of Alumina Hydrate per 1 cup of liquid wax and apply it to the bottom of your pot or sprinkle a dusting of Alumina Hydrate directly on the shelf surface. Always wear a respirator when handling any dry powdered ceramic material.



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Recommend kiln wash formula for ADVANCER® Shelves (by weight):

50% Alumina Hydrate

25% Kaolin (EPK)

25% Calcined Kaolin (Glomax)

- Slowly add water mixing with a whisk until you achieve a light cream or paint like consistency, not thick like a heavy whipping cream or paste.
- Using a brush apply 1-2 thin layers of kiln wash letting it fully dry between coats.
- Re-apply wash as needed; applications generally last for multiple firings depending on your specific glazes, shelf maintenance and firing schedules.
- Since ADVANCER® shelves will never warp and don't need to be flipped between firings there is no need to apply wash to both sides of the shelves. This also decreases the risk of any kiln wash flaking off into your pots during firing.
- Store mixed wash in an airtight container and re-mix before repeated use, adding water as needed to maintain a paint like consistency.
- Dipping the ends of posts in Alumina Hydrate wash will prevent them from sticking to ADVANCER® shelves.

Due to the ultra-low surface porosity of ADVANCER® shelves (<1%), the wash will not immediately appear to be dry since moisture cannot soak down into the matrix of the shelf as it does with more porous shelves such as Cordierite or Conventional SiC. For this reason, applying kiln wash to ADVANCER® shelves does not constitute a moisture hazard. Once fired to cone 6 or above, the surface of an ADVANCER® shelf with our kiln wash will be smooth to the touch with little to no surface dusting. Always wear a respirator when handling any dry powdered ceramic material.

Stacking & Kiln Furniture

You can use all your existing kiln furniture with ADVANCER® shelves. This includes other kiln shelves, posts and stilts. There are no special posts required for ADVANCER® shelves. We do not recommend using full hard bricks for posts with ADVANCER® shelves. Keep bottom shelves 1.25 cm (.5 in.) off of the kiln floor. If kiln has a floor element keep bottom shelves at a minimum of 2.5 cm (1 in.) off the kiln floor.

3-point stacking is recommended whenever possible. If using a combination of full and half shelves, 4 posts may be used. Ensure posts are placed in a vertical column and carry the load through the stack down to the kiln floor. Either a 3 or 4-point stack (one or the other) should be maintained throughout the whole kiln stack. Ensure all posts have even contact with ADVANCER® shelves.

ADVANCER® shelves are rated to hold up to 40 kg (90 lbs.) per shelf, with an evenly distributed load on a 3-point stack. Slow ramp and cooling rates must be used for extremely dense, concentrated or heavy loads.



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Applications

Do not use ADVANCER® Shelves for Raku firing. Fast firing, crash cooling or other rapid temperature changes can result in thermal shock failure.

Do not spray soda solution directly onto ADVANCER® Shelves. Soda media should be introduced through the firebox.

Opening ports on the kiln can result in thermal shock failure from rapid temperature changes.

Do not allow direct flame impingement in gas, soda or wood firings. Place shelves away from burner ports, fireboxes, stoking slots and bag walls.

Heavy Salt firing can weaken or deteriorate the bond strength of NSiC over time, especially in small kilns where the alkali and steam vapor are more concentrated. This may manifest as surface spalling (small cracks on the surface). With that said, ADVANCER® kiln shelves will provide a longer service life in this application than virtually any other product on the market.

ADVANCER® Shelves are generally not recommended for wood firing but have successfully used in second and third chambers of large wood kilns.