



Technical Information

Rotary Kiln Brick Installation Guidelines

1. **Rotary Kiln Shell:** Shell should be inspected and free of debris, i.e. scaling, existing refractory, etc.
2. **Reference Lines:** Reference lines should be identified for a basis of evaluating installation accuracy. General recommendation is to place reference lines every five linear feet.
3. **Into the Kiln:** Brick should start against a reference point that is perpendicular to the axis of the kiln. An existing retainer ring and/or refractory should be closely examined for “trueness”. If the reference point is questionable, a “cut-row” is recommended to ensure the brick are closely following the perpendicular axis of the kiln.
4. **In the Kiln:** The brick should be installed in the bottom of the kiln up to the spring-line of the kiln. The brick courses should be installed in a bonded fashion, i.e. overlapping each brick with each additional course. Joints should be staggered from ring to ring by 1/3 the brick width. When the brick meets the spring-line, careful attention should be given to driving the brick down-kiln using a rubber or rawhide-headed hammer. Do not use metal hammers to set brick. We generally recommend bedding-out only 15 linear feet of brick before closing the rings overhead.
5. **Brick Installation:** Brick should be firmly seated on the kiln shell. Brick that tilts or hacks against the shell should be corrected. For magnesia and dolomite brick, correction can be made with metal plates (shims). For fireclay and high alumina brick, corrections should be made with refractory mortar. Do not use chips or rubble to fill voids, or to prop brick. When laying cupola block (RKB's), the brand face (notched) should be alternated to accommodate any draft molded into the shape.
6. **Brick Installation – Overhead:** Brick should be installed using a brick support rig or pogo sticks. We do not recommend the use of adhesives to install brick. As the brick is installed overhead, care should be taken to spread the keyway using a hydraulic porta-power or pneumatic jack. While spreading the ring, brick at and above the spring lines should be inspected for contact with the shell. A general rule of thumb is to exert no more than 75% of the published cold-crushing strength of the installed product. After spreading the ring, the brick should be driven down-kiln using the same technique as described above. The brick should be keyed using fitting brick (key brick) and shims. The fitting should be installed using an alternating placement method, i.e. full brick between fitting brick and never line up fitting brick from brick course to brick course. Placement of key brick should be varied from one course to another. Do not key every ring in the same area of the shell. The brick should be installed tight enough so the brick does not separate from the shell as the rig is released or the pogo sticks removed. The brick needs to be firmly seated against the shell both on the bottom as well as the top of the kiln.
7. **Brick Installation – Sawing Shapes –** Brick should be cut using a brick saw. Do not use a hammer to chip edges or size brick to fit a given area. In addition, cut brick should not be less than 2/3 the original size. When installing cupola block (RKB's), place the cut key away from the center and close with a full, uncut brick.

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8. **Brick Installation – Alignment:** The brick courses need to be referenced on a regular basis to insure the alignment is perpendicular to the axis of the kiln and ensure the rings are straight. The majority of the pressure is placed on the sloped, linear side of the brick.
9. **Brick Installation – Completion:** Careful inspection should be made after completing the brick installation. An attempt should be made to drive shims in brick courses to ensure tightness. If the brick has loosened from the shell, every attempt should be made to re-seat the brick and tighten accordingly. If the kiln is turned cold after installation due to mechanical or other reasons, the refractory needs to be inspected and re-shimmed if necessary.
10. **Shims:** The number of shims used in a brick course should be kept to a minimum by correctly sizing the key bricks, however, each ring must be tightened until no more shims can be driven into the ring. A good rule of thumb is insert only one shim or plate per joint. A large number of shims required in a lining can suggest that installation procedures need to be examined or the kiln shell needs to be inspected for distortion. A two-shape brick system is an option for reducing the need for shims in brick installations.
11. **Brick Installation – Unitab “E”** – When laying Resco Products, Inc patented Unitab “E” expansion design, metal plates or cardboard spacers are not attached (glued) to the brick. Brick chamfer marks easily assist with identifying the hot-face side of the brick. Expansion gaps on both circumferential and longitudinal sides of the brick provide the end-user with additional insurance to assist with increasing operational campaigns.