

Revolutionary Technology: *Noborigama* Climbing Kilns

Like the *anagama* and *ōgama* kilns that preceded them, *noborigama* (climbing kilns) were introduced from China. This new kiln design transformed the ceramics industry in the seventeenth century with its vastly expanded capacity and reduced fuel consumption.

As shown in the diagram, the *noborigama* kiln is made up of a series of linked firing chambers that ascend a slope. A kiln with a single firing chamber, such as an *ōgama*, must be left to cool for several days before the pieces can be removed. As a result, the residual heat is wasted, and the temperature inside the kiln must be built up again for the next firing. In a *noborigama* kiln, the excess heat from the first firing chamber is used to heat the second chamber. Potters can then use the loading entrance on the side of the second chamber to stoke the kiln and bring the second chamber to firing temperature. This process can be continued with each chamber in sequence, gradually “climbing” up the hill. In addition to being much more efficient, this design allows the heat inside each chamber to be regulated to a specific temperature, making it possible to fire different types of wares simultaneously.

Using large *noborigama* kilns capable of firing over 100,000 pieces, Mino potters were able to ramp up production to meet robust demand for the new—and vastly popular—style of Mino ceramics called “Oribe ware.”