



# Orton® - pyrometric cones

## Overview and technical data



- Easy placement thanks to built-in foot, no cone holder or clay base required.
- More accurate control of the temperature as the cone has both the correct height and angle in relation to the base.
- Patented design, prevents incorrect placement that can give incorrect values.
- Simple temperature control, clock method.

Orton® Self supporting Cones

## General

Cones are slender pyramids made with carefully controlled ceramic compositions. Bars are small uniformly shaped rectangles made from the same compositions as cones. Each cone/bar composition is identified with a number such as 04 or 06.

Cones are placed inside a kiln where they can be observed through a peephole. Orton® Self Supporting Cones are free-standing. When cones soften and bend, this indicates that a certain amount of heat has been absorbed by the cone and hence, the ware being fired. Because ceramics and glasses can require different heat treatments, a range of cone numbers are used.

Cone numbers range from cone 022 up to cone 42. Cone 022 is the earliest maturing cone number. That is, it requires the least amount of heat to deform or bend. As the cone is heated, it reaches a point where the tip begins to bend, due to gravity pulling it down. This indicates the cone and the ware are nearing their maturing range. It typically takes 15 to 22 minutes for cones to bend fully. Each higher cone number requires more heat to bend.

Orton® Self Supporting Cones are the most accurate and easy to use cones available. Complete with built-in base, these unique cones require no cone holder or plaque for support on the shelf during firing. Since the correct height and angle are built into the cone, reproducible firings can be achieved time after time.





While a single cone may be used on the shelf to “witness” the firing, it is common practice to use three different cones. A group consists of a Firing Cone - the desired cone for the ware being produced, the Guide Cone - one cone number cooler, and the Guard Cone - one cone number hotter than the firing cone.

These cones are set deep in the kiln, yet should be visible through a peephole. When the Guide Cone starts to bend, the ware is approaching maturity. The bending of the Firing Cone indicates firing is at the correct point. If the Guard Cone has bent, you have exceeded the best time-temperature relationship.

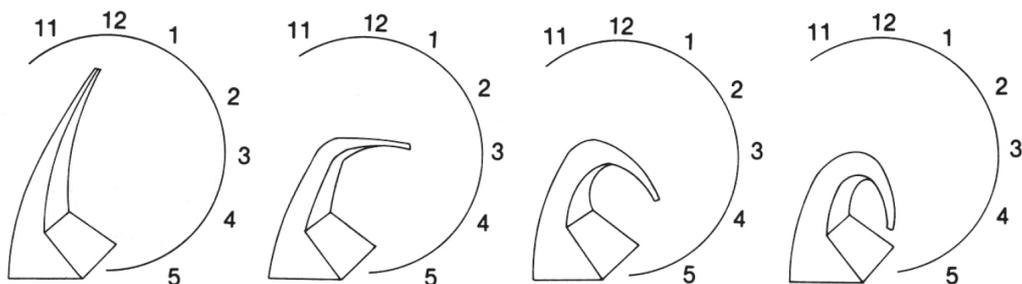
When viewing cones through the peepholes, welders glasses should be used to avoid possible eye injury. Sunglasses are not recommended.

**Gör så här:**

1) Use three cones; Firing Cone - the desired cone for the ware being produced, the Guide Cone - one cone number cooler, and the Guard Cone - one cone number hotter than the firing cone.

2) Place the cones next to each other, centrally placed on an engobed batt or a piece of a broken batt. This applies to cones of the type Orton® Self supporting Cones which have a base, other cones have to be placed in a cone holder or fixed in a piece of clay. If the cones are placed directly on a batt without engobe, there is a risk that it will be destroyed if the cones get stuck in the batt.

3) Make sure that the cones can fall freely and stand flat on their base. A skewed cone has an incorrect angle and gravity gives an erroneous result. Also make sure to note the number of the cones and put them in the correct order.



The temperatures at which cones deform have been determined for selected heating rates, 60°C/h and 150°C/h, see the chart to the right. Use the chart as a guide, the heating rate should be known for the last 200 degrees of the firing.

The “clock method” can be used to describe the position of the cone tip after firing. Unfired, the cone tip is at 12 o'clock, the end point is at 6 o'clock. The difference in temperature between cones in the 5 o'clock position to one where the tip is touching the shelf is typically only a few degrees and is considered insignificant.



3 x 3 sets of cones are placed on each layer for reading the uniformity in the kiln.

Cone	60-150 °C/h	Cone	60-150 °C/h
Orton 022	586-590	Orton 03	1086-1104
Orton 021	600-617	Orton 02	1102-1122
Orton 020	626-638	Orton 01	1119-1138
Orton 019	678-695	Orton 1	1137-1154
Orton 018	715-734	Orton 2	1142-1164
Orton 017	738-763	Orton 3	1152-1170
Orton 016	772-796	Orton 4	1162-1183
Orton 015	791-818	Orton 5	1186-1207
Orton 014	807-838	Orton 5 <sup>1/2</sup>	1203-1225
Orton 013	837-861	Orton 6	1222-1243
Orton 012	861-882	Orton 7	1239-1257
Orton 011	875-894	Orton 8	1249-1271
Orton 010	903-915	Orton 9	1260-1280
Orton 09	920-930	Orton 10	1285-1305
Orton 08	942-956	Orton 11	1294-1315
Orton 07	976-987	Orton 12	1306-1326
Orton 06	998-1013	Orton 13	1331-1348
Orton 05 <sup>1/2</sup>	1015-1025	Orton 13 <sup>1/2</sup>	<1367
Orton 05	1031-1044	Orton 14	1365-1384
Orton 04	1063-1077	Orton 14 <sup>1/2</sup>	<1409