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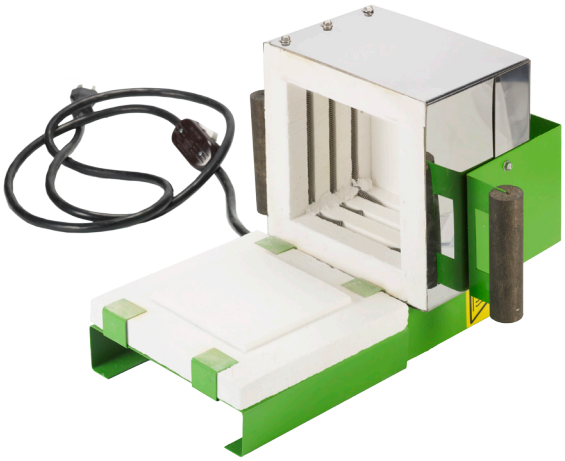
SpeedFire® ElectricMini™ 1600 Instructions

First Time Firing



The SpeedFire® ElectricMini™ (SFEM™) 1600 is made from ceramic fiberboard that is fortified with organic materials. During the manufacturing process most of these organics are burned away; however, some may linger. The first time you fire the kiln there may be a slight odor, but this will dissipate after the first firing. You might want to consider firing the unit to full temperature outdoors one time before continued use. Simply turn it on and let it run for one hour then turn it off and let it cool; that should take care of it. **Please Note:** In the remainder of this document, the SpeedFire® ElectricMini™ will be referred to as the SFEM™ 1600.

Handling the Kiln Top

The handles on the SFEM™ 1600 do get warm, but will not be too hot to safely touch. We strongly recommend that you turn the kiln off and allow it to cool for about ten minutes before removing it from the base. The recommended method is as follows: Standing so that the power cord on the element cover is facing you, lift the cover up to clear your pieces or firing vessel and tip it toward you 90°, to rest the element cover on a heat resistant surface. This puts the open area of the kiln facing safely AWAY from you and allow the kiln to cool more quickly. Be cautious when reaching for your pieces or firing vessel as they may still be hot; use tweezers, tongs and heat-resistant gloves. We strongly recommend that you work on a heat-proof surface such as an 8" square ceramic tile. While firing to maximum temperature, the underside of the kiln base itself generally doesn't exceed 200°F, but it is prudent to protect surfaces from elevated temperatures.

Fires PMC3™ & Art Clay 650 In About 30 Minutes

Because the SFEM™ 1600 ramps up quickly, the minimum firing temperature of 1290°F for PMC3™ and Art Clay™ Low Fire clays is reached in about 21 minutes. In the next 9 minutes of firing, the temperature increases to 1432°F. For PMC3 the hold time at 1290°F is 10 minutes but, because of the additional heat, it can be fired in less than 10 minutes. Art Clay Low Fire calls for a 15-minute hold time, so firing for a period a bit less than 15 minutes also allows the additional heat to achieve appropriate sintering. Silver metal clay cannot be over-fired as long as it is protected from melting. Since the SFEM™ 1600 is limited to a maximum theoretical temperature of 1600°F, this cannot happen.

Fires PMC+™ In Less Than An Hour

The same premise applies to PMC+™ as described for PMC3™ except the times are a bit different. The SFEM™ 1600 reaches 1470°F in about 35 minutes and, after another 25 minutes, reaches about 1560°F. Experience shows that while it does take 30 minutes at 1470°F, it takes less than an additional 30 minutes if the ultimate temperature attained is well above 1470°F. So, the ultimate firing time for good sintering is probably in the range of 45–50 minutes.

Fires FastFire BRONZclay™ In Coconut Carbon In About 55 Minutes

We have tested the SFEM™ 1600 exhaustively and were quite pleased when we put half-dollar coin-sized pieces and a ½" x 1½" five-card thick test strip of FastFire BRONZclay™ in a small stainless steel condiment cup with coconut carbon and achieved a successful firing. The test strip was bent to a 90º angle with no breaking or cracking. No blistering was observed on either of these pieces. We did this using no controller and no pyrometer. We simply turned the inline switch on and, after 55 minutes, turned the switch to off. You may need to adjust the firing time to attain similar results.

Fires PMC Sterling™ Silver Clay

PMC Sterling™ CAN be fired without the use of a controller and pyrometer. We have successfully concluded tests using a Struve Test Bar (STB)—a bar measuring ½" x 1½" x 1mm (4 cards thick)—made of PMC Sterling fired in a small, 2¼" stainless steel container of coconut carbon with a lid.

First, we did the pre-fire step with the STB resting directly on the kiln base and the kiln placed on the base. Simply turn the kiln on, wait 18 minutes, and then turn the kiln off. Allow the kiln to cool to room temperature. If you like, after the kiln drops to 700°–800°, you can remove the kiln top (facing away from you), remove the piece and use a fan to cool the kiln rapidly.

For the final firing, we put a ½" of cconut carbon in a 2¼" stainless steel container, then the STB, then another ½" of carbon, then put on the ceramic or fiber flat lid. We turned the room-temperature kiln on, timed for 42 minutes, turned it off, and allowed the kiln to cool as in the previous step.

The STB sintered fully and was bent to a 90° angle with no cracking or stretch markings or blistering. ***Please Note***: This test series demonstrates the ability of the SFEM™ to successfully fire the PMC Sterling™ STB. Your times could vary depending on line voltage and ambient temperature. Larger creations may require more time.

The firing schedule that comes with PMC Sterling™ calls for a ramp to 1000°F, a hold for 30 minutes, then allowing piece to cool so it can be handled. This step burns away the binders. The SFEM™ 1600 can do this step using the optional temperature controller and digital pyrometer.

After burning out the binders the piece is placed in carbon and fired to 1500°F and held for 30 minutes or more. Note that it says "or more." This means that the time is open-ended; you cannot over-fire PMC Sterling™ with the SFEM™ 1600. Turn the kiln off and allow to cool naturally.

To do these steps you need the optional temperature controller and digital pyrometer.

Firing In Carbon

Limited testing has been done firing non-silver metal clay products. We have successfully fired FastFire BRONZclay™ in a small stainless steel container by placing it in the cold kiln, turning the kiln on and then turning it off after 55 minutes. The half-dollar sized piece and the test bar (½" x 1½" x 5 cards thick) fired with no blistering, and the test bar was bent to a 90° angle and did not exhibit any cracking and did not break. Your results with this firing time may vary. The rule of thumb is to add 25°F of temperature at a time if pieces are not sintering and to reduce temperature by 25° at a time until blisters don't occur. Because the SFEM™ 1600 is a time-based kiln, the approximate equivalent to the 25°F rule is to add or subtract 5 minutes of time.

Instructors: You can run up to five SpeedFire® ElectricMinis™ on a single 20-amp circuit!

Fusing And Slumping Glass

The SFEM™ 1600 is ideal for small glass projects! Small projects may not experience thermal shock as the SFEM™ 1600 increases in temperature evenly though it does so rather quickly. Ramp rates for sensitive or larger pieces can be managed with the optional temperature controller. Our experience at different settings on this device are shown on the chart (page 4). These times and temperatures can vary due to a variety of factors. Do not fuse glass directly on the kiln base; use an appropriate ceramic fiber paper (such as the 12-pack we offer) that is precut to fit the base floor perfectly. We know it is necessary to peek at the progress being made when firing glass. To do so, carefully rock the kiln up on an edge. Do NOT lift the kiln up off the base because a large amount of heat could rush out and cause burns. Do not look into the hot kiln for prolonged periods of time as infrared energy is harmful to your eyes.

Important—Please Note the Following!

- This kiln will not automatically shut off. The power cord features an in-line on/off switch.
- Do not leave the kiln unattended for extended periods of time.
- ***Always*** operate the kiln on a heat resistant surface.
- Locate kiln well away from combustable materials and at least 18" away from any wall or curtain material.
- Do not allow young children to use the kiln unsupervised at any time.
- As with any kiln, there are hot surfaces. Assume they are hot before touching any surface to avoid accidental hot contact.
- Do ***not*** lift the kiln up off the base while at high temperatures as escaping heat could cause burns.
- To check the firing progress when firing glass, gently lift one side of the kiln, look quickly, then let kiln back down gently.
- We strongly recommend that the kiln be turned off and allowed to cool for 10 minutes or more before moving the kiln.

Please Note About Firing

All times and temperatures are given for guidance only. They may vary due to a number of factors including line voltage variations, ambient room temperature, air movement and component tolerance variations in the kiln itself. Also, techniques described may need to be modified for best results.

It is normal for the elements in the kiln to be slightly outside of their channels as part of the manufacturing process. They can also continue to expand as they are heat cycled in use which will cause them to protrude a bit from their channels. As long as one element does not come in contact with another this will not affect firing. DO exercise caution when using metal containers in the kiln and avoid contact with the elements.

Kilns Get HOT!

Kilns get hot inside as well as out! Surface temperatures around the kiln at full temperature will range from 110°F to 280°F at the sides adjacent to the handles. Also note that the underside of the SFEM™ 1600 can get as high as 200°F so please make sure you operate the kiln on a heat resistant surface. Any ceramic tile or other surface designed to resist heat should suffice. To put a bit of perspective on these temperatures, we tested a home waffle iron and found that the top outer surface reached 150°F and the middle exposed area reached 300°F.

Maximum Theoretical Temperature

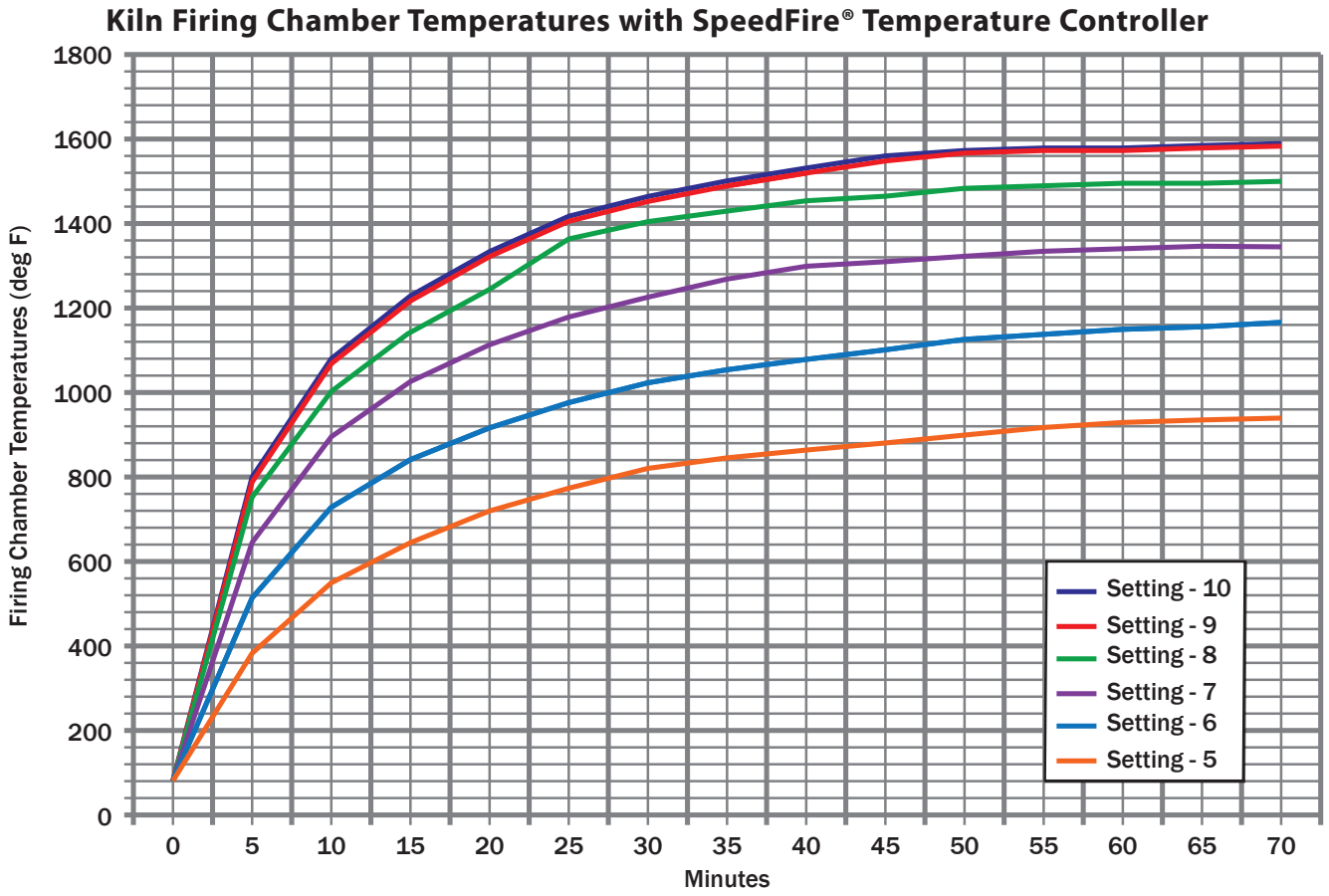
For this version of the SFEM™ 1600 we designed the maximum theoretical temperature to be no more than 1600°F, so you can "plug and play," so to speak; in other words, the kiln can be switched on and left to run until its job is done without risk of melting a fine silver creation. We also took into account all silver clay types, and the SFEM™ 1600 will fire them all except the Original PMC® Silver clay. With alternate non-silver metal clays becoming quite popular, this temperature limit allows "plug and play" capability when firing FastFire BRONZclay™. The temperature firing charts associated with the SFEM™ 1600 show the highest attained temperature to be 1560°F. The reason for the difference is that, based on input voltage, the kiln COULD possibly get to 1600°F but isn't likely to.

Optional SpeedFire® Temperature Controller™

The SpeedFire® Temperature Control™ is ideal for the SFEM™ 1600 because it varies voltage to control temperature as compared to the "infinite switch" found on most manual kilns that alters the flow of current in an on/off cycling. Depending on the setting, the SpeedFire controller is capable of controlling ramp rate as well as maximum temperature obtained. This makes possible the firing requirements of glass and for metals that must be fired in activated carbon. A graph of the temperatures at different settings is provided (page 5), but the results you see can vary due to a number of factors as described previously.

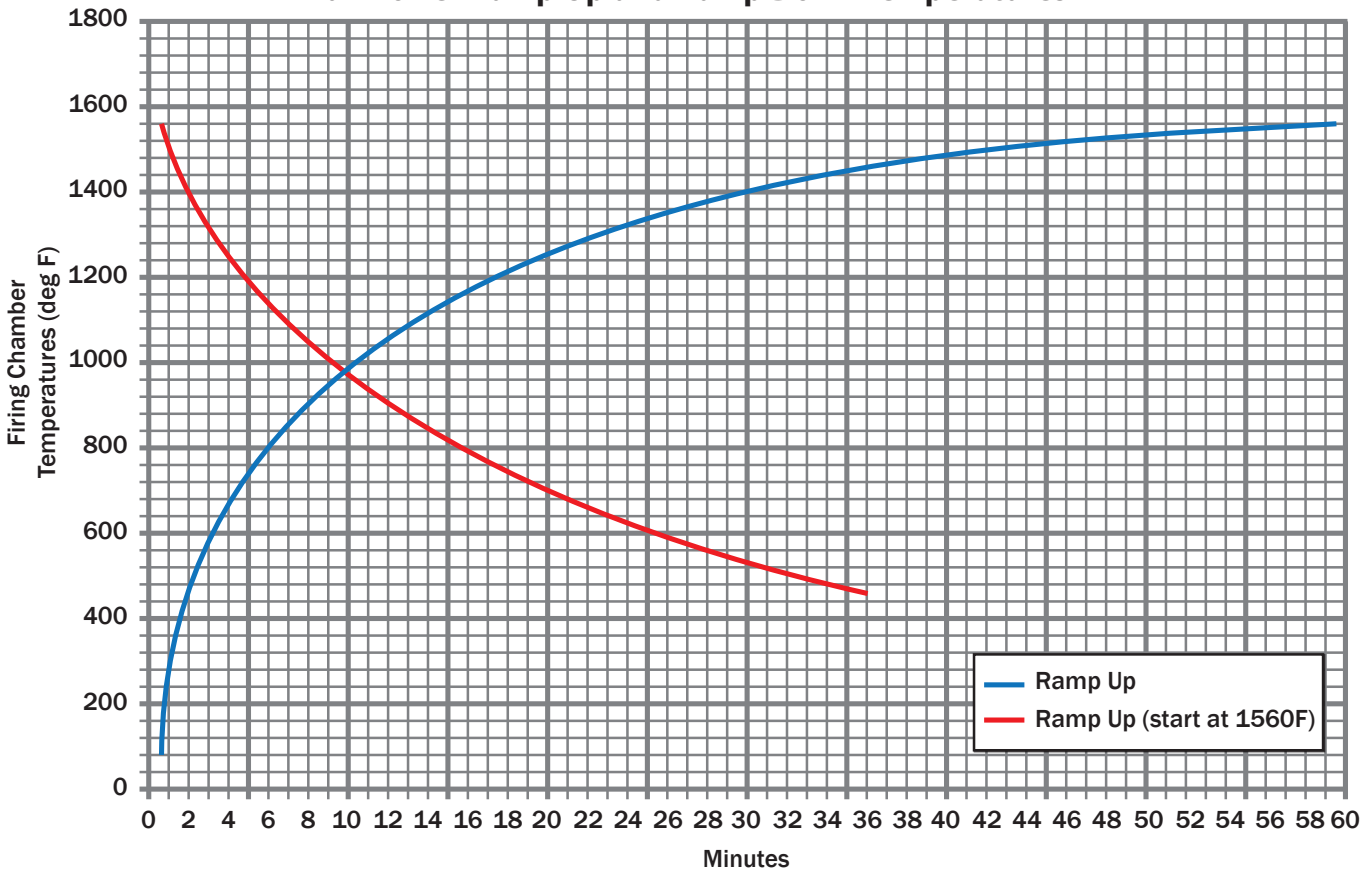
Temperature Read-Out With Optional Digital Pyrometer

The SFEM™ 1600 ccomes pre-drilled with a hole at the top to receive the probe from a digital pyrometer so that internal temperatures can be measured. The probe should be inserted deeply enough that about one inch of the probe end is visible inside the kiln. When you first try to insert the probe, the loop at the end of the probe may be a bit larger than the hole in the top of the kiln. While holding the probe close to the end, just apply gentle pressure and rock it back and forth until it enters the kiln. A pyrometer isn't required when firing fine silver clays since the kiln cannot overheat and melt your creations. Being able to note temperatures would be beneficial when firing some non-silver clays and in glass fusing.



	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70
Setting-10	70	800	1070	1225	1335	1412	1466	1500	1527	1545	1556	1565	1572	1578	1581
Setting-9	70	782	1058	1215	1321	1399	1455	1493	1519	1540	1555	1564	1569	1574	1577
Setting-8	70	742	1000	1146	1246	1352	1397	1428	1451	1468	1478	1486	1492	1498	1500
Setting-7	70	640	898	1021	1108	1178	1231	1268	1294	1311	1324	1334	1340	1344	1345
Setting-6	70	513	709	826	908	970	1018	1054	1080	1102	1124	1139	1148	1156	1164
Setting-5	70	390	550	649	720	770	811	844	868	886	901	913	924	929	934

Full Power Ramp Up and Ramp Down Temperatures



Full Power Ramp Up

Start Temp> 65°F

Line Voltage = 122 VAC

Min	Temp °F	Min	Temp°F	Min	Temp
1	160	21	1300	41	1509
2	339	22	1320	42	154
3	484	23	1338	43	1520
4	596	24	1354	44	1523
5	684	25	1369	45	1525
6	758	26	1384	46	1530
7	820	27	1398	47	1532
8	878	28	1412	48	1535
9	931	29	1421	49	1538
10	978	30	1432	50	1540
11	1020	31	1441	51	1540
12	1060	32	1451	52	1545
13	1098	33	1460	53	1547
14	1130	34	1468	54	1547
15	1166	35	1477	55	1547
16	1187	36	1481	56	1550
17	1214	37	1487	57	1553
18	1236	38	1494	58	1554
19	1258	39	1500	59	1558
20	1279	40	1505	60	1560

Ramp Down

Start Temp> 1560°F

Min	Temp °F	Min	Temp°F
1	1450	21	690
2	1368	22	670
3	1300	23	648
4	1244	24	632
5	1191	25	613
6	1143	26	596
7	1098	27	578
8	1055	28	562
9	1020	29	547
10	986	30	532
11	952	31	518
12	920	32	504
13	888	33	490
14	860	34	478
15	832	35	465
16	806	36	454
17	780		
18	756		
19	733		
20	712		

Actual times & temperatures will vary from those presented here due to variables beyond our control such as voltage, ambient room temperature and air flow.