



## **MonoBlock™ Warm-up/Seasoning procedure**

After initial installation and/or after periods of idle time (Idle time is defined as X-ray output being disabled), Spellman High Voltage recommends the following warm-up schedules are followed. This ensures proper operation for the X-ray Tube. Disregarding this may cause irreversible damage to the X-ray tube and/or decrease life expectancy. **(For units with a maximum output current of less than 2.5mA, a minimum warmup current of .3mA should be used. See 160kV, 1.25mA example on page 5).**

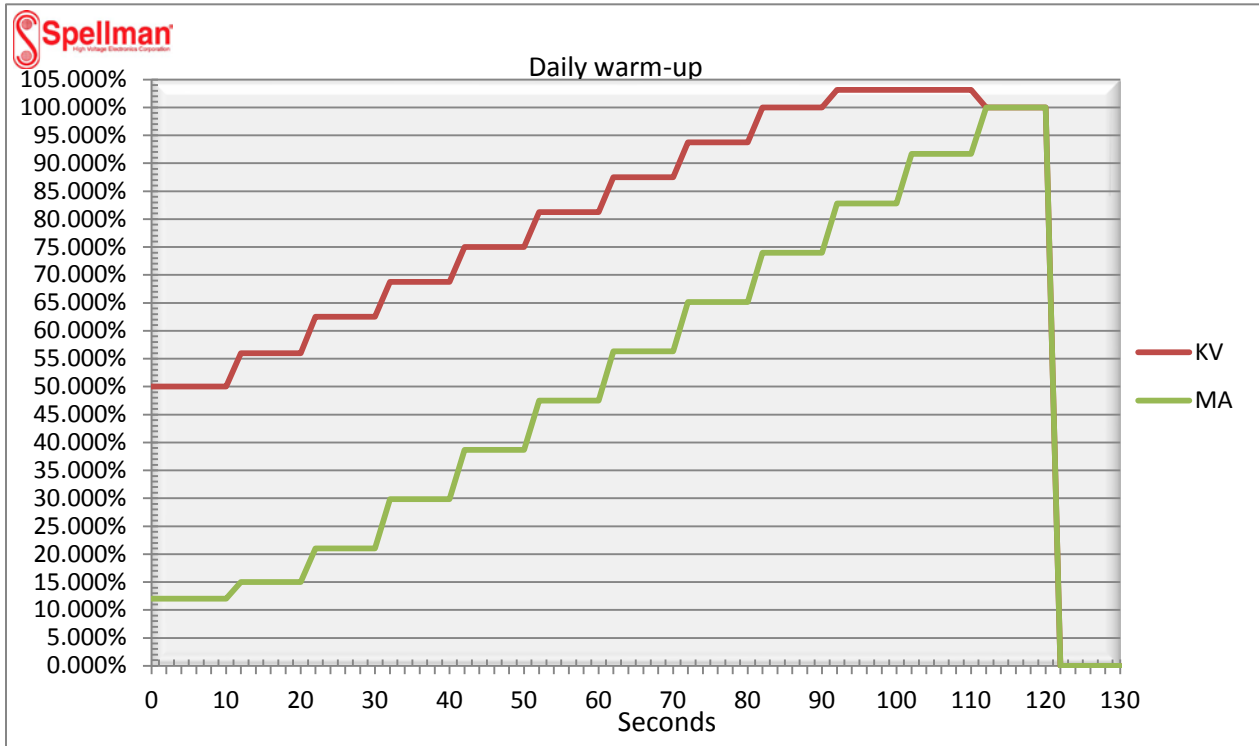
Idle time >12hrs	Daily warm-up (approx. 120 seconds)
Idle time 2-30 days	Short warm-up (approx. 360 seconds)
Idle time 1-3 months	Long warm-up (approx. 720 seconds)
Idle time >3 months	Extended warm-up ( approx. 60 minutes)

**Notes:**

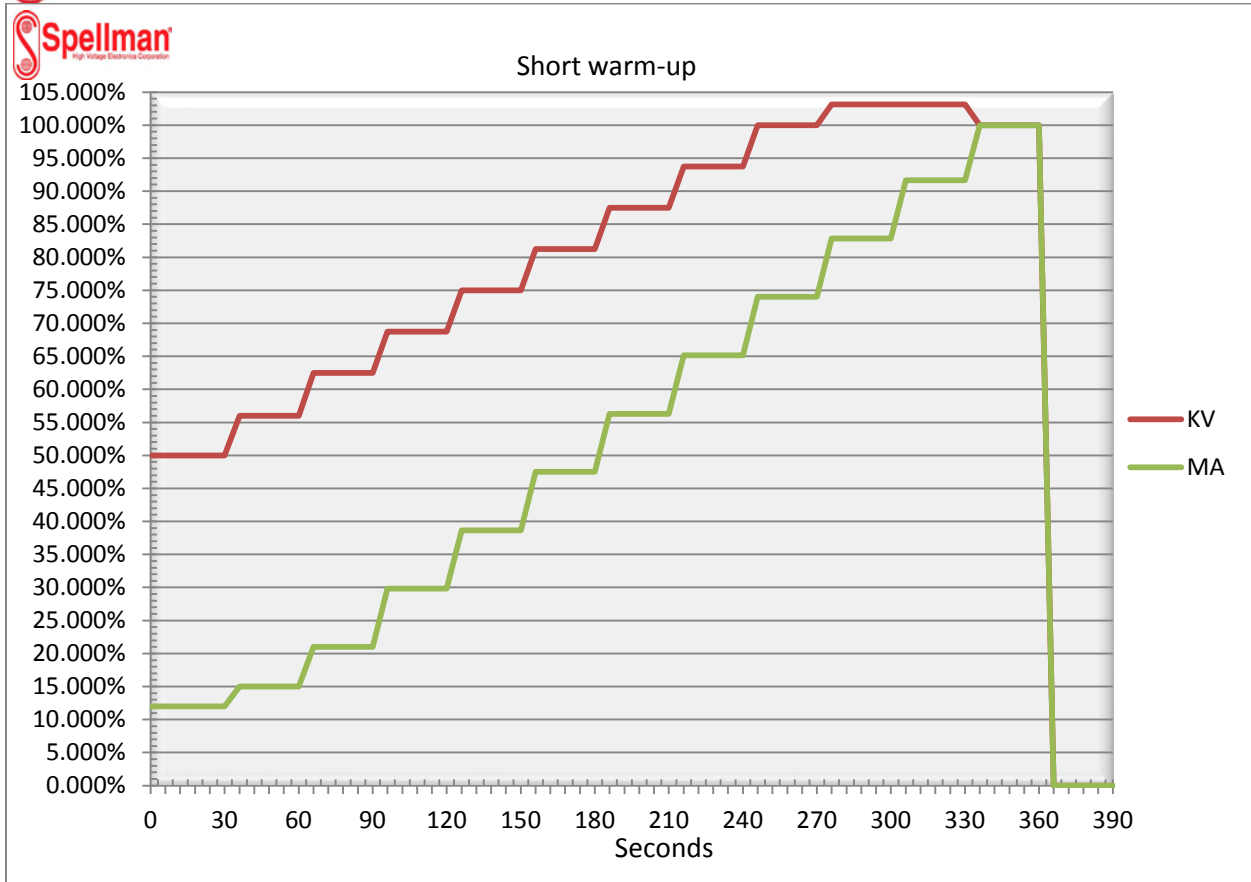
- 1. Below are general warm-up charts. Always use the chart supplied for your specific Monoblock. When in doubt, contact Spellman for assistance**
- 2. If there is arcing during seasoning, WITHOUT a fault/shutdown, continue on through the whole profile**
- 3. If there is arcing during seasoning, WITH a fault/shutdown, reset the Monoblock and start the profile over from Step 1.**



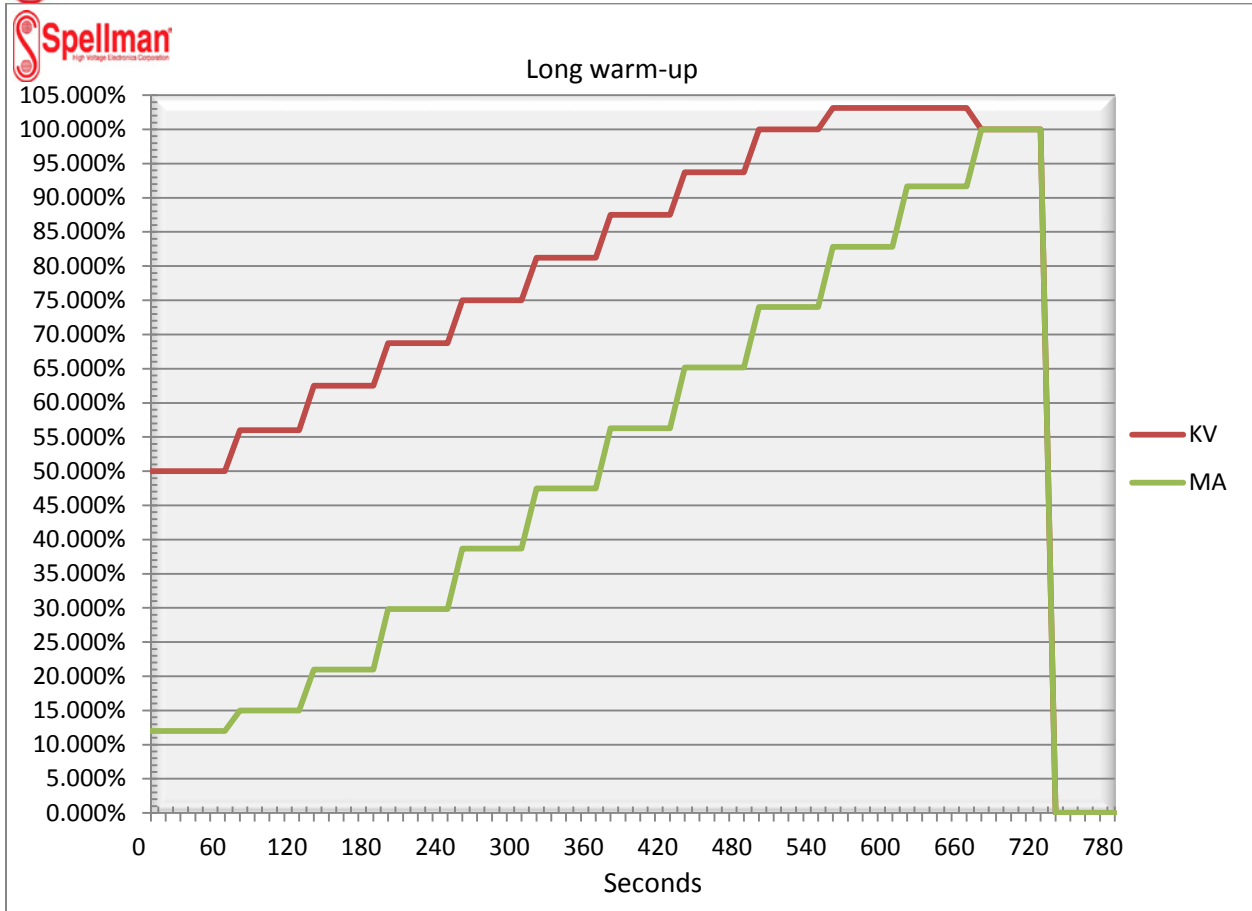
See Warm-up Charts below:



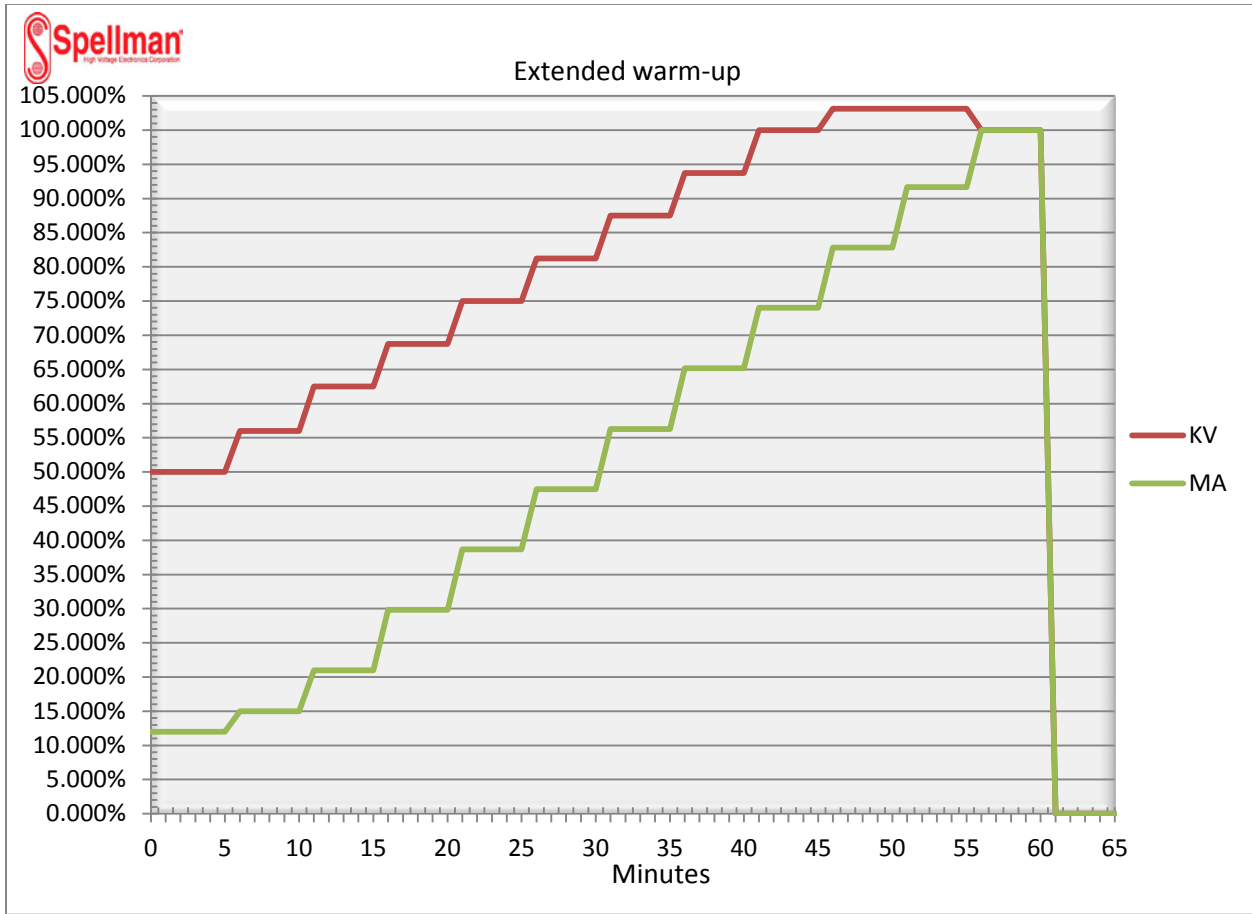
	Daily warm-up											
	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10	Step 11	Step 12
<b>Voltage (kV)</b>	50.00%	56.00%	62.50%	68.75%	75.00%	81.25%	87.50%	93.75%	100.00%	103.12%	103.12%	100.00%
<b>Current (mA)</b>	12.00%	15.00%	21.00%	29.83%	38.66%	47.50%	56.30%	65.16%	74.00%	82.83%	91.66%	100.00%
<b>Time (Seconds)</b>	10	10	10	10	10	10	10	10	10	10	10	10



	Short warm-up											
	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10	Step 11	Step 12
<b>Voltage (kV)</b>	50.00%	56.00%	62.50%	68.75%	75.00%	81.25%	87.50%	93.75%	100.00%	103.12%	103.12%	100.00%
<b>Current (mA)</b>	12.00%	15.00%	21.00%	29.83%	38.66%	47.50%	56.30%	65.16%	74.00%	82.83%	91.66%	100.00%
<b>Time (Seconds)</b>	30	30	30	30	30	30	30	30	30	30	30	30



	Long warm-up											
	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10	Step 11	Step 12
<b>Voltage (kV)</b>	50.00%	56.00%	62.50%	68.75%	75.00%	81.25%	87.50%	93.75%	100.00%	103.12%	103.12%	100.00%
<b>Current (mA)</b>	12.00%	15.00%	21.00%	29.83%	38.66%	47.50%	56.30%	65.16%	74.00%	82.83%	91.66%	100.00%
<b>Time (Seconds)</b>	60	60	60	60	60	60	60	60	60	60	60	60



	Extended warm-up											
	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10	Step 11	Step 12
<b>Voltage (kV)</b>	50.00%	56.00%	62.50%	68.75%	75.00%	81.25%	87.50%	93.75%	100.00%	103.12%	103.12%	100.00%
<b>Current (mA)</b>	12.00%	15.00%	21.00%	29.83%	38.66%	47.50%	56.30%	65.16%	74.00%	82.83%	91.66%	100.00%
<b>Time (Minutes)</b>	5	5	5	5	5	5	5	5	5	5	5	5

See next page for examples



**An example of an Extended Warm-up for a 160kV, 1.25mA unit:**

	Extended warm-up											
	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10	Step 11	Step 12
<b>Voltage (kV)</b>	80.0	89.6	100.0	110.0	120.0	130.0	140.0	150.0	160.0	165.0	165.0	160.0
<b>Current (mA)</b>	0.300	0.300	0.300	0.373	0.483	0.594	0.704	0.815	0.925	1.035	1.146	1.250
<b>Time (Minutes)</b>	5	5	5	5	5	5	5	5	5	5	5	5

\*Minimum warmup current of .300ma

**An example of an Extended Warm-up for a 160kV, 3mA unit:**

	Extended warm-up											
	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10	Step 11	Step 12
<b>Voltage (kV)</b>	80.000	89.600	100.000	110.000	120.000	130.000	140.000	150.000	160.000	164.992	164.992	160.000
<b>Current (mA)</b>	0.360	0.450	0.630	0.895	1.160	1.425	1.689	1.955	2.220	2.485	2.750	3.000
<b>Time (Minutes)</b>	5	5	5	5	5	5	5	5	5	5	5	5