

## SEM-COM Production Glasses

GLASS ID	Softening Point (°C)	Annealing Point (°C)	Expansion (RT-300°C) (x 10 <sup>-7</sup> /°C)	Contraction (AP-25°C)	□ Firing Temp. (°C)	□ Max. reheat temp. (°C)	Electrical Properties		Description
							Vol. Res. @ 350°C	Diel. Const. K	
SCY-1	880	570	3.5	10	1100 <sup>□</sup>	725	4.5	5.4	A special low expansion, copper-containing glass that seals to quartz
SCY-2	875	570	5	10	1100 <sup>□</sup>	725	4.9	6.2	A special low expansion, copper containing glass that seals to quartz.
SCR-3	827	565	32	37	1260	775	6.4	4.6	A borosilicate glass with low expansion and good durability
SCE-4	1020	809	32	45	1250	970	11.3	7.0	A medium expansion, alkali-free alumina-silicate glass for electrical and electronic uses. Used for RF sputtering of thin films.
SCE-3	1070	819	33	42	1350	1030	11.6	5.9	A high-temperature, low expansion alkali-free alumina silicate glass that seals to silicon.
SCS-10	730	493	33	46	990	685	9.4	4.1	A low expansion glass with low viscosity temperature properties.
SCS-9	755	520	35	51	1040	700	7.5	4.6	A borosilicate glass for electrical use where high electrical resistivity is needed
SCQ-2	870	685	38	52	1050	700			A special alumina-borosilicate that is used as a passivating glass in electronic applications. Seals to aluminum nitride
SCE-504	955	761	43		1175	910	11.7	6.2	An alkali-free alumina-silicate used as a resistor glass. Contains 0.4% chromium.
<b>SCE-10</b>	<b>957</b>		<b>43</b>		<b>1200</b>	<b>900</b>			<b>Alkaline earth aluminosilicate Ceramic package binder</b>
SCE-1	960	765	43	56	1200	900	11.7	6.2	An alkali-free alumina-silicate that seals to molybdenum. May be baked out at 700°C.
SCE-2	960	765	43	56	1200	900	11.3		An alkali-free alumina-silicate glass that seals to molybdenum. Resists X-ray discoloration.
SCY-3	912	707	43	56	1120	860	8.7	6.0	An alumina-silicate glass that seals to molybdenum. Has high viscosity-temperature properties.
SCS-14	820	579	43	59	1200	770	5.6	5.5	A medium expansion glass with excellent chemical durability (Type I borosilicate)
SCS-2	790	564	43	55	1120	740	5.7	5.5	A borosilicate amber glass that is UV absorbing.
<b>SCL-4</b>	<b>619</b>	<b>535</b>	<b>45</b>		<b>680</b>	<b>570</b>			<b>Boro zinc composite sealing glass</b>
<b>SCE-505**</b>	<b>870</b>	<b>755</b>	<b>45</b>	<b>41</b>	<b>1190</b>	<b>1200</b>			<b>A high temperature cordierite glass - ceramic</b>
<b>SCE-506</b>	<b>927</b>		<b>45</b>		<b>1175</b>	<b>875</b>			<b>Alkaline earth aluminosilicate Ceramic package binder</b>
SCR-6	715	503	45	57	1010	670			A medium expansion amber borosilicate that seals to molybdenum
SCR-4	715	503	45	57	1010	670	6.9	4.9	A medium expansion borosilicate glass that seals to tungsten and molybdenum
<b>SCL-5</b>	<b>566</b>	<b>480</b>	<b>46</b>		<b>650</b>	<b>530</b>			<b>Copper boro zinc composite sealing glass</b>
SCM-2	834	642	46		1040	790			An alkali-free barium borosilicate.
SCQ-5	716	482	47	63	1050	670	7.2	5.1	An iron-nickel-cobalt sealing borosilicate glass with high resistivity and good chemical durability. Seals to KOVAR
<b>SCC-1002**</b>	<b>640</b>	<b>540</b>	<b>48</b>		<b>700</b>	<b>800</b>			<b>A zinc borosilicate: <u>crystallizing</u></b>
SCR-2	710	510	49	62	1000	660	6.2	5.3	A KOVAR sealing borosilicate that has low electrical resistivity. Also seals to molybdenum.

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							Vol. Res. @ 350°C	Diel. Const. K	
<b>SCL-6</b>	<b>574</b>	<b>478</b>	<b>50</b>		<b>650</b>	<b>550</b>			<b>A copper boro zinc sealing glass</b>
<b>SCL-1</b>	<b>609</b>	<b>532</b>	<b>50</b>		<b>680</b>	<b>560</b>			<b>A boro zinc sealing glass</b>
<b>SCL-2</b>	<b>619</b>	<b>535</b>	<b>51</b>		<b>680</b>	<b>570</b>			<b>A boro zinc sealing glass</b>
SCY-5	1084	790	51		1400	1040			A high temperature alumina silicate glass
SCE-503	860	672	51	62	1090	820	6.3 <sup>□</sup>	6.6	A medium expansion alumina silicate used as resistor glass
SCC-1001**	640	560	52	63	830	830			A medium expansion sealing glass - crystallizing
SCE-6	943	744	52	64	1225	900			A high temperature alkali-free barium alumina-silicate that seals to molybdenum.
SCE-501		705	52						An alumina borosilicate glass with cobalt as colorant.
SCM-6	844	669	52	74	1050	790			A medium expansion, alkali-free barium borosilicate
SCQ-1	723	570	52	76	955	550	6.5	6.2	An alumina-silicate that seals to KOVAR, alumina, beryllia, molybdenum and tantalum.
SCF-2	540	465	55	63	620	500			A medium expansion lead-free sealing glass.
<b>SCL-3</b>	<b>567</b>	<b>480</b>	<b>55</b>		<b>625</b>	<b>520</b>			<b>A copper boro zinc sealing glass</b>
SCS-12	785	575	55	68	1000	740	5.8	5.8	A USP Type I borosilicate. Resists x-ray discoloration.
SCQ-3	710	520	55	71	975	660	5.7	5.8	A medium expansion glass that seals to tantalum.
SCR-1	626	461	56	78	835	580	12.4	4.8	An alumina borosilicate glass with barium and has low electrical loss.
SCQ-4	750	575	59	78	1000	720	5.7		An alumina sealing borosilicate glass with good chemical durability. Seals to alumina.
SCE-7	813	671	61	83	1000	770			A high temperature, medium expansion alumina borosilicate glass
SCE-5	880	730	64	82	1060	830	10.5	10.5	An essentially alkali-free, alumina-silicate glass used for RF sputtering of thin films. Seals to alumina and beryllia.
SCP-1	777	576	65	85	1120	730	5.4	7.0	A medium expansion lime borosilicate with superior chemical durability (USP Type III). Seal to 96% alumina and beryllia.
SCS-17	720		66		1060	680			A black EMA coating for fiber optics
SCS-15	710	545	69	86	940	660			A general purpose borosilicate that seals to materials with an expansion in the 65-75 range
SCP-2	741	562	74	96	1000	690	5.4		A lime borosilicate with good durability (USP Type III)
SCS-6	580	479	74	105	700	530	8.0		A medium expansion borosilicate used as an enamel or sealing glass
<b>SCA-2000</b>	<b>750</b>	<b>610</b>	<b>75</b>		<b>875</b>	<b>700</b>			<b>An alkali silicate</b>
SCS-5	715	544	76	98	1000	670	6.6		A special high expansion borosilicate glass
<b>SCV-2*</b>	<b>445</b>	<b>345</b>	<b>76</b>		<b>480</b>	<b>400</b>			<b>A zinc phosphate composite for soda lime sealing</b>
<b>SCT-1</b>	<b>760</b>		<b>76</b>		<b>900</b>	<b>710</b>			<b>Alkaline earth borosilicate for fiber optic core glass applications</b>

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							Vol. Res. @ 350°C	Diel. Const. K	
SCV-4*	605	495	77		675	560			A zinc phosphate sealing glass
SCM-1002	765	664	81		875	710			A special barium glass used as a fiber optics core.
SCV-3*	452	339	82		480	410			A zinc phosphate sealing glass
SCD-2	770		82		890	720			A black glass used as a fiber optics cladding.
SCA-5	730	544	83	100	1000	690			A soda lime glass that seals to ceramics and other materials with a thermal expansion of 77 to 87.
SCM-1001	862	746	85		990	810			A high index, fiber optics core glass
SCA-4	729	544	87	107	1000	690	5.1		A sodium silicate glass with good chemical durability.
SCM-1004	754	661	88	112	860	700			A special barium lanthanum glass used as a fiber optics core.
SCM-1008	665	460	89	107	1030	610	7.0	6.6	A lead-free barium alkali glass
SCM-3	670	468	89	111	1000	610	7.2	6.8	A lead-free infrared sealing glass
SCM-8	650	450	89	111	1025	600	6.9		A lead-free infrared sealing glass that is high in iron and seals to F-30 alloys.
SCM-5	658	454	90	105	1020	610	6.8	6.5	A lead-free, barium alkali glass
SCM-1	655	456	90	107	1020	610	7.0	6.0	A medium expansion, barium glass that seals to No. 4 Alloy, platinum and titanium
SCA-3	715	533	90	108	1010	670	5.2		A sodium silicate glass with good chemical durability
SCM-1007	675	475	92	111	1030	625	6.7	7.1	A lead-free barium glass with colorants
SCM-1006	744	648	92	115	860	700			A barium lanthanum glass used as a fiber optics core
SCD-1	710	535	93		990	660			A medium expansion glass redrawn into microrods.
SCA-1	700	525	93	114	980	650	5.2	7.3	A general purpose soda lime glass
SCM-1005	705	600	93 □		820	650			A high index fiber optics core glass
SCM-4	695	508	94		980	650			A UV transmitting borosilicate glass
SCA-2002	616	476	95		750	570			An alkali silicate
SCM-1003	730	620	94 □		850	680			A barium lanthanum glass used as a fiber optics core
SCW-1	652	520	94	113	810	600			A pH glass
SCZ-8**	837	725	95		925	1000			An alkaline earth alumino silicate. Glass ceramic (crystallizing) for fuel cells
SCM-1000	678	592	97	120	780	620			A special barium borosilicate glass that is chemically digestible.
SCS-11	555	465	97	139	650	510			A high alkali borosilicate glass. Seals to ferrite.
SCA-2001	697	507	99	116	850	650			An alkali silicate
SCN-1	685	495	99	119	1000	640	7.2	6.0	A lead-free glass that seals to No. 430 alloy. Resists electron discoloration.
SCN-1000	691	503	100	121	980	650	6.9		A lead-free glass that absorbs harmful X-ray radiation.

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							Vol. Res. @ 350°C	Diel. Const. K	
SCS-7	590	480	108	136	775	540			A special borosilicate used as EMA coating. Clear in color.
SCS-8	585	480	109	140	775	540			A special borosilicate used as EMA coating. Dark in color.
SCA-500	664	503	111		950	610			A high expansion soda lime glass. Used in the manufacture of pH meters.
SCY-4	695	524	112	133	1000	645	4.8		A special alumina silicate glass with a high expansion
SCS-1	475	396	117	160	640	440			A high expansion, lead-free glass that seals to iron, nickel, and their alloys
SCU-2	601	470	119	147	790	550	6.7	9.6	A very high expansion, high alkali, titania-silicate glass that seals to iron in certain applications
<b>SCV-5*</b>	<b>433</b>	<b>348</b>	<b>131</b>		<b>470</b>	<b>390</b>			<b>An alkali zinc phosphate sealing glass</b>
SCU-1	550	440	149	176	690	520	5.7	10.2	A very high expansion, high alkali, titania silicate glass that seals to copper and alloys

### New Additions and/or Developmental Glasses

\* Data shown is for a vitreous glass however these glasses will crystallize if fired 30°C to 50°C higher..

### \*\* Crystallizing

- Firing Temperature: The temperature at which the glass flows enough to achieve a seal. This temperature may be varied by up to ± 30°C depending upon the application and configuration of the seal
- Maximum Reheat Temperature: The highest temperature that a seal can be heated before the integrity of the seal is affected. This temperature may vary, depending on the size and configuration of the sealed article. Higher temperatures may be tolerated for a very short period of time. The article must be cooled slowly through the annealing range if stress is a factor.
  - fire in neutral atmosphere @ 1000 to 1200°C
  - tested @ 250°C
  - tested @ 425°C
  - tested @ 400°C