

Sealant Compatibility - Saflex® Clear (R series) PVB interlayer

Saflex® and Vanceva® brands of polyvinyl butyral (PVB) interlayer are plasticized interlayer films that are laminated between two or more plies of glass. The PVB interlayer can react with non-compatible materials with which it may come in contact. As such, direct contact between Saflex and/or Vanceva PVB interlayers with chemicals used in sealants or adhesives should be carefully examined and, in some cases, avoided.

Compatibility testing is conducted between commercially available sealants and our Saflex and Vanceva brand interlayers as warranted by product introductions or modifications. We are not able to test every sealant on the market, due to space and resource constraints, however we do concentrate on commonly used families of sealants from major manufacturers.

Results are reported from the testing, but we do not make sealant recommendations as we cannot and do not control variations and modifications in the sealants we test. Our tests are also performed under a strict protocol so that comparisons can be made between products tested but may not reflect actual performance as installed.

We have not found a commercially available sealant that is consistently compatible with the laminated glass as tested under our conditions. Based on our experience and testing of several silicone based sealants, those sealants that contain acetic acid tend to have the highest amount of edge effects when they are in intimate contact with the interlayer at the edge of the sample.

Sealants and other adhesives are tested for edge effects with laminated glass made with Saflex and Vanceva interlayers in accordance with our published procedures. The sealants and adhesives are made available to Eastman by suppliers, fabricators and manufacturers. Eastman makes no recommendation, either direct or implied, as to the usefulness of this data and states that it is applicable for the materials received and as tested. The data is presented for the informed use of the glazing industry. The results of the testing are periodically reported and updated on the website www.saflex.com.

Edge effects are normally seen as clear, very small, 2 mm – 6 mm (0.08 in – 0.25 in), edge bubbles, sometime continuous along an edge, other times very distinct and isolated depending upon the sealant or adhesive. Edge effects from sealants and adhesives are typically maximized in depth at approximately 10 mm (0.39 in) from the edge, although some may be slightly worse. Although a slight discoloration can occur with sulfide containing sealants and adhesives, normally the edge effect is clear.

Sealants may contain solvents that can be harmful to the interlayer edge. In most cases investigated, the sealants considered neutral in curing are routinely better performers in a compatibility assessment than those sealants that have acids (i.e.: acetic acid).

Occasionally a test cycle will result in minimal to no interaction between the laminate and the sealant or adhesive under the controlled test environment. This does not guarantee the same results in field as application, environmental and material deviations can occur.

Sealants, adhesives, gaskets and setting blocks should be selected firstly on a basis for their desired performance (i.e.: compression, tensile strength, weatherproofing, structural, cosmetic), with edge effects being a consideration after a performance class or family has been established.

For additional information about the chemical nature of Saflex brand PVB, refer to the Material Safety Data Sheet (MSDS) or the website www.saflex.com.

The data in the following tables have been rated and/or calculated as follows (Figure 1):

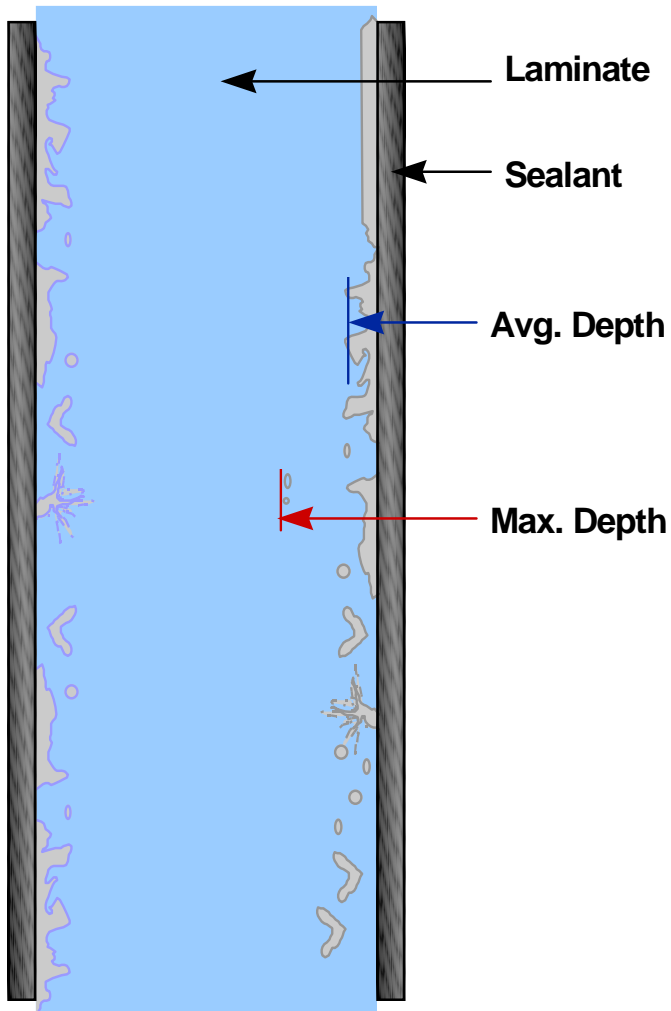


Figure 1: Sealant Rating

Average Depth Edge Effect: The depth on average, as determined visually, at which bubbles, discoloration or haze were observed. This reading is taken from the laminate edge towards the center of the laminate and measured in millimeters (mm). This number is rated at each exposure interval

Maximum Depth Edge Effect: The greatest depth of a bubble, discoloration or haze as measured from the edge of a laminate toward the center. This is the highest number recorded off any edge during any rating interval of a laminate in the set. Maximum depth is reported at the completion of the testing in millimeters (mm).

Length Affected: The sum of the length of the laminate edge to which sealant is applied, measured in millimeters, of which bubbles, discoloration, or haze were observed during the exposure interval.

Percent Length Affected: The average length affected by edge effects divided by the total length of the laminate to which the sealant was applied. The overall length of the laminate with sealant applied is 609 mm.

Average Area Affected: The average depth of edge effect observed multiplied by the average length.

Delamination Plateau: No change in the average depth of defect greater than 1mm (+/-) for the final three consecutive rating periods of the accelerated exposure

Edge effects are measured at 500 hour intervals through the duration of the exposure. Edge effects can “move” throughout the test and may vary from interval to interval. The maximum depth seen at any time throughout the exposure program is reported. The average depth and length at each interval are also measured and used to calculate the average area which is reported. All depth values are reported in whole numbers only using traditional rounding practices.

The data on Saflex Clear (R series) is applicable to Saflex Solar, Saflex UV and Vanceva Colors and Earth Tone products.

Sealant tests have been performed on Saflex® Clear (R series) PVB interlayer with some common sealants. Additional testing with specific sealants may be conducted from time to time and will be reported as updates to this document or on the Saflex website at www.saflex.com.

Evaluation Program Results

Interlayer Type: Saflex® Clear (R series) PVB interlayer

Interlayer Thickness: 0.76 mm (0.030 in)

Exposure Type: UV/Condensation; UV 313 Bulbs;

Total Exposure (Hours): 3500

Exposure Cycle: 16 hours of UV (no condensation) at 66°C, 8 hours of condensation (no UV light) at 60°C.

Total Laminate Edge Exposed (mm): 580

Table 1: Summary Table of Compatibility Results

Sealant	Manufacturer	Percent of Edge Affected (%)	Area Affected (mm ²)*	Delamination Plateau	Average Depth Total (mm)	Maximum Depth for Laminate (mm)	1	2	3	4	5	6	7	8	9	10	11	12
Admark Acrylic Latex	Admark	8	147	**	3.0	4.0												
Aral2000	Araldite	56	325	No	1.0	1.0												
Arbosil LM	Arbo	23	267	No	2.0	6.0												
Sonolastic NP1	BASF	28	641	**	4.0	5.0												
BOSS 315 RTV	BOSS	33	383	**	2.0	3.0												
Simson MSR CA	Bostik	55	317	**	1.0	2.0												
Simson MSR CA SSKF	Bostik	45	263	**	1.0	2.0												
DAP Butyl Flex	DAP	2	41	**	3.0	3.0												
Hybri-seal 2PS	Den Braven	49	284	**	1.0	1.0												
Parasilico Monument	DL chemicals	64	1114	Yes	3.0	7.0												
DC 1199	DowSil	52	1508	No	5.0	8.0												
DC 3363	DowSil	94	2181		4.0	7.0												
DC 3793	DowSil	93	1618	**	3.0	6.0												
DC 399	DowSil	92	3723	**	7.0	12.0												
DC 688	DowSil	69	1201	Yes	3.0	11.0												
DC 756	DowSil	91	1583	Yes	3.0	5.0												
DC 785	DowSil	78	452	**	1.0	3.0												
DC 790	DowSil	42	1467	**	6.0	6.0												
DC 791	DowSil	88	1531	Yes	3.0	7.0												
DC 794	DowSil	81	1409	**	3.0	4.0												
DC 795	DowSil	96	2784	Yes	5.0	8.0												
DC 797	DowSil	49	853	**	3.0	5.0												
DC 799	DowSil	42	724	Yes	3.0	5.0												
DC 813	DowSil	68	1578	Yes	4.0	9.0												
DC 895	DowSil	8	143	**	3.0	4.0												
DC 899	DowSil	92	2655	**	5.0	7.0												
DC 983 (MAS*)	DowSil	27	626	Yes	4.0	6.0												
DC 991	DowSil	67	1166	Yes	3.0	5.0												
DC 993	DowSil	70	1624	Yes	4.0	6.0												
DC 995	DowSil	91	2647	Yes	5.0	6.0												
DC 999A	DowSil	57	1322	Yes	4.0	6.0												
DC Instant Glaze 18578 (MAS*)	DowSil	11	128	Yes	2.0	4.0												
DC TradeMate	DowSil	15	345	**	4.0	6.0												
PrimerP w/ DC 999a	DowSil	0	0	Yes	0.0	0.0												

Table continued on next page.

Sealant	Manufacturer	Percent of Edge Affected (%)	Area Affected (mm ²)*	Delamination Plateau	Average Depth Total (mm)	Maximum Depth for Laminate (mm)	1	2	3	4	5	6	7	8	9	10	11	12
EGO300	EGO	60	1044	Yes	3.0	5.0												
EGO333	EGO	97	1681	Yes	3.0	8.0												
EGO351	EGO	68	1582	No	4.0	9.0												
EGO460	EGO	74	1719	No	4.0	9.0												
Egosilicon151	Ego	71	824	**	2.0	4.0												
THIOVER F	Fenzi	64	742	**	2.0	3.0												
Betaseal HV 3	Gurit-Essex	19	110	**	1.0	3.0												
Betaseal U-400 HV	Gurit-Essex	48	278	**	1.0	1.0												
MS 930	Henkel	0	0	**	0.0	1.0												
MS 931	Henkel	0	3	**	2.0	4.0												
MS 9399	Henkel	6	0	**	0.0	1.0												
T-998 R	Henkel	25	145	**	1.0	1.0												
T-998 RS	Henkel	0	0	**	0.0	0.0												
Terostat 8590	Henkel	36	418	**	2.0	4.0												
Terostat 8593	Henkel	51	296	**	1.0	3.0												
Terostat 998R	Henkel	45	261	**	1.0	1.0												
Terostat MS 930	Henkel	0	0	Yes	0.0	1.0												
Terostat MS 931	Henkel	0	3	No	2.0	4.0												
Terostat MS 939	Henkel	1	6	**	1.0	1.0												
Terostat MS 9399	Henkel	6	35	Yes	1.0	1.0												
Terostat MS939	Henkel	1	6	**	1.0	1.0												
IGK 111	IGK	0	0	**	0.0	0.0												
IGK 130	IGK	0	0	**	0.0	0.0												
IGK 311	IGK	18	104	**	1.0	1.0												
IGK 330	IGK	18	104	**	1.0	1.0												
Safe Seal	Innotec	2	12	**	1.0	1.0												
Ködiglaze P LV	Kommerling	0	0	**	0.0	0.0												
Ködiglaze S	Kommerling	79	1375	**	3.0	5.0												
RGS 7700 (RapidStrength) (MAS*)	Momentive	25	435	Yes	3.0	4.0												
SCS 1000	Momentive	1	30	**	4.0	4.0												
SCS 1200	Momentive	96	2783	Yes	5.0	6.0												
SCS 1800 (Contractor)	Momentive	35	1015	Yes	5.0	6.0												
SCS 2000 (Silpruf)	Momentive	93	1618	Yes	3.0	4.0												
SCS 2350	Momentive	72	1670	Yes	4.0	6.0												
SCS 2700 (SilPruf LM)	Momentive	50	1160	Yes	4.0	6.0												
SCS 2800 (Silglaze II)	Momentive	8	240	Yes	5.0	6.0												
SCS 9000 (SilPruf NB)	Momentive	89	1549	Yes	3.0	5.0												
SSG 4000 (Ultraglaze)	Momentive	92	2127	Yes	4.0	7.0												
SSG 4400 (Ultraglaze) (*MAS)	Momentive	17	296	Yes	3.0	5.0												
SSG 4603B	Momentive	94	1636	No	3.0	6.0												

Table continued on next page.

Sealant	Manufacturer	Percent of Edge Affected (%)	Area Affected (mm ²)*	Delamination Plateau	Average Depth Total (mm)	Maximum Depth for Laminate (mm)	1	2	3	4	5	6	7	8	9	10	11	12
N Silikon	Nordsil	98	2267	**	4.0	6.0												
C 22	Olivé Quimica	90	1566	**	3.0	6.0												
Pecora 860	Pecora	24	416	**	3.0	4.0												
Pecora 863	Pecora	98	2840	**	5.0	9.0												
Pecora 864	Pecora	49	1137	**	4.0	7.0												
Pecora 890	Pecora	43	1242	**	5.0	7.0												
Pecora 895	Pecora	8	188	**	4.0	5.0												
Pecora 896	Pecora	97	2821	**	5.0	8.0												
Pecora 985	Pecora	93	3223	**	6.0	8.0												
Permabond 140	Permapack	71	824	**	2.0	5.0												
Permabond 145	Permapack	44	510	**	2.0	5.0												
Permabond 145S	Permapack	38	220	**	1.0	2.0												
PR 469	Product Research	5	145	**	5.0	10.0												
PTI-707	PTI	1	19	**	4.0	4.0												
PTI-757	PTI	0	2	**	2.0	2.0												
QSiil550	Quantum Silicones	66	764	Yes	2.0	4.0												
DRY SEAL™ MP	Repair Care	73	424		1.0	3.0												
Rhodor Therm 542	Rhone Poulenc	90	3145	**	6.0	7.0												
Rhodosil 5C	Rhone Poulenc	63	1103	**	3.0	5.0												
Rhodosil Aquarium	Rhone Poulenc	29	505	**	3.0	5.0												
Lexel	Sashco	0	0	**	0.0	0.0												
SM-71000	Schnee Moorhead	19	441	**	4.0	6.0												
MASTER 300LS	Shin Etsu	64	1485	Yes	4.0	11.0												
SG-18	Sika	71	1235	**	3.0	5.0												
SIKA WS 200	Sika	73	847	Yes	2.0	6.0												
SIKA WS 300	Sika	80	1392	Yes	3.0	6.0												
SIKA WS 305	Sika	84	974	Yes	2.0	4.0												
SIKA WS 605	Sika	82	951	No	2.0	7.0												
SIKA IG25 HM Plus	Sika	56	650	Yes	2.0	4.0												
SIKA SG 500	Sika	59	1027	Yes	3.0	5.0												
SIKA SG 500 CN	Sika	49	568	Yes	2.0	4.0												
Sikafast	Sika	6	35	**	1.0	2.0												
Sikafast 5211	Sika	57	331	**	1.0	3.0												
Sikaflex 221	Sika	90	1048	No	2.0	6.0												
Sikaflex 246E	Sika	41	238	**	1.0	3.0												
Sikaflex 265	Sika	59	1027	**	3.0	6.0												
Sikaflex 295 UV	Sika	2	12	**	1.0	1.0												
Sikaflex 296	Sika	75	870	**	2.0	4.0												
Sikaflex 552	Sika	79	1375	Yes	3.0	5.0												

Table continued on next page.

Sealant	Manufacturer	Percent of Edge Affected (%)	Area Affected (mm²)*	Delamination Plateau	Average Depth Total (mm)	Maximum Depth for Laminate (mm)	1	2	3	4	5	6	7	8	9	10	11	12
Sikaflex Ultraflex	Sika	68	789	**	2.0	5.0												
Sikasil 300 N	Sika	80	1392	**	3.0	5.0												
Sikasil 305 N	Sika	83	963	**	2.0	5.0												
Sikasil 600	Sika	92	2134	**	4.0	6.0												
Sikasil 605	Sika	40	464	**	2.0	4.0												
Sikasil 605 S	Sika	84	1462	**	3.0	5.0												
Sikasil 621	Sika	43	249	**	1.0	2.0												
Sikasil 650	Sika	60	1044	**	3.0	5.0												
Sikasil I	Sika	17	99	**	1.0	1.0												
Sikasil IG 16	Sika	95	1102	**	2.0	4.0												
Sikasil IG 25	Sika	79	916	**	2.0	5.0												
Sikasil IG 25 N	Sika	87	1009	**	2.0	4.0												
Sikasil SG 20	Sika	1	12	**	4.0	6.0												
Sikasil SG 550	Sika	68	1972	Yes	5.0	9.0												
Sikasil SG 500	Sika	59	1018	Yes	3.0	5.0												
Sikasil SG 500 CN	Sika	49	565	Yes	2.0	4.0												
Sikasil WS 200	Sika	73	842	Yes	2.0	6.0												
Sikasil WS 300 EU	Sika	80	1383	Yes	3.0	6.0												
Sikasil WS 305 EU	Sika	84	973	Yes	2.0	4.0												
Sikasil WS 605 S	Sika	82	954	Yes	2.0	7.0												
Sikasil WS 680 SC	Sika	0	0	Yes	0.0	0.0												
Sikasil WT 485	Sika	94	1636	**	3.0	5.0												
Simson ASR-9101	Simson	0	0	**	0.0	0.0												
Simson Hybrid Plus	Simson	0	4	**	3.0	3.0												
Simson Silicone 60	Simson	27	790	**	5.0	5.0												
Silirub AL	Soudal	60	1740	**	5.0	7.0												
Silirub MA	Soudal	71	1235	**	3.0	7.0												
Mastic	Thixoflex	14	81	**	1.0	1.0												
Proglaze HM	Tremco	38	220	Yes	1.0	3.0												
Proglaze II (*MAS)	Tremco	44	1021	Yes	4.0	11.0												
Proglaze SSG	Tremco	80	1856	**	4.0	5.0												
Tremco 830	Tremco	1	18	**	4.0	4.0												
Tremco Spectrem 1	Tremco	54	948	**	3.0	4.0												
Tremco Spectrem 2	Tremco	80	1856	**	4.0	5.0												
Tremsil 200	Tremco	89	1032	**	2.0	3.0												
Tremsil 600	Tremco	22	381	**	3.0	4.0												
Vulkem 116	Vulkem	82	1901	**	4.0	5.0												
Wacker CS	Wacker	22	127	Yes	1.0	3.0												
MF 881	Zhengzhou	88	1021	**	2.0	5.0												
MF 889	Zhengzhou	90	1044	**	2.0	5.0												
MF 889A	Zhengzhou	92	1067	**	2.0	5.0												
MF 889F	Zhengzhou	89	1032	**	2.0	5.0												
MF 899	Zhengzhou	89	1032	**	2.0	4.0												
MF 899A	Zhengzhou	89	1032	**	2.0	5.0												
Notes:	Average depth		Maximum depth			Average and Maximum depth the same												
** = trend data not available		*MAS = manufacturer applied sealant																

Keywords: Architectural, Saflex, Saflex Clear, Saflex Solar, Saflex UV, Sealant, Vanceva

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