

Sealant Compatibility Testing - Saflex® 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.

Results are reported from testing, but we do not make sealant recommendations as we cannot and do not control variations and modifications in the sealants which may occur from time to time. Our tests are performed under a strict protocol allowing comparisons to be made between products tested. The test results may not reflect in-situ performance.

We have not found a commercially available sealant that is consistently compatible with the laminated glass as tested following the prescribed protocol. Based on market trends, silicone sealants as a family seem to be most commonly used with laminated glass. Our experience with testing several silicone based sealants indicate acetoxycure silicone sealants tend to have the largest edge effects out of the silicone family, when the sealant is in intimate contact with the interlayer..

Sealants and other adhesives that can maintain intimate contact with the laminate edge throughout testing are evaluated for edge effects that may occur in laminated glass made with Saflex and Vanceva interlayers. The procedure used for testing is documented and published both by Eastman and also by the Glass Association of North America. 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.

Edge effects are normally seen as clear, very small, 2 mm – 3 mm (0.08 inch – 0.12 inch), edge bubbles, sometimes continuously occurring along an edge, other times very distinct and isolated. The extent of edge effects differs depending upon the sealant or adhesive. Edge effects from sealants and adhesives as seen in this testing are typically maximized in depth at approximately 10 mm (0.39 inch) from the edge. Although a slight discoloration can occur with sulfide containing sealants and adhesives, normally the edge effect is clear and does not cause a color change in the interlayer.

Sealants may contain solvents that can be harmful to the interlayer. In most cases investigated, the sealants considered neutral in curing are routinely better performers in this 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 laminated glass and the sealant or adhesive. This does not guarantee the same results in field as application, environmental and material deviations can affect the reactions..

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

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being a consideration after a performance class or family has been established. Although gaskets and setting blocks can and do come in contact with the laminate edge, the data acquired using this test method is only valid when intimate contact with the laminated glass edge has been maintained for the full duration of the test.

The data reported in the following tables have been rated and defined as follows (Figure 1):

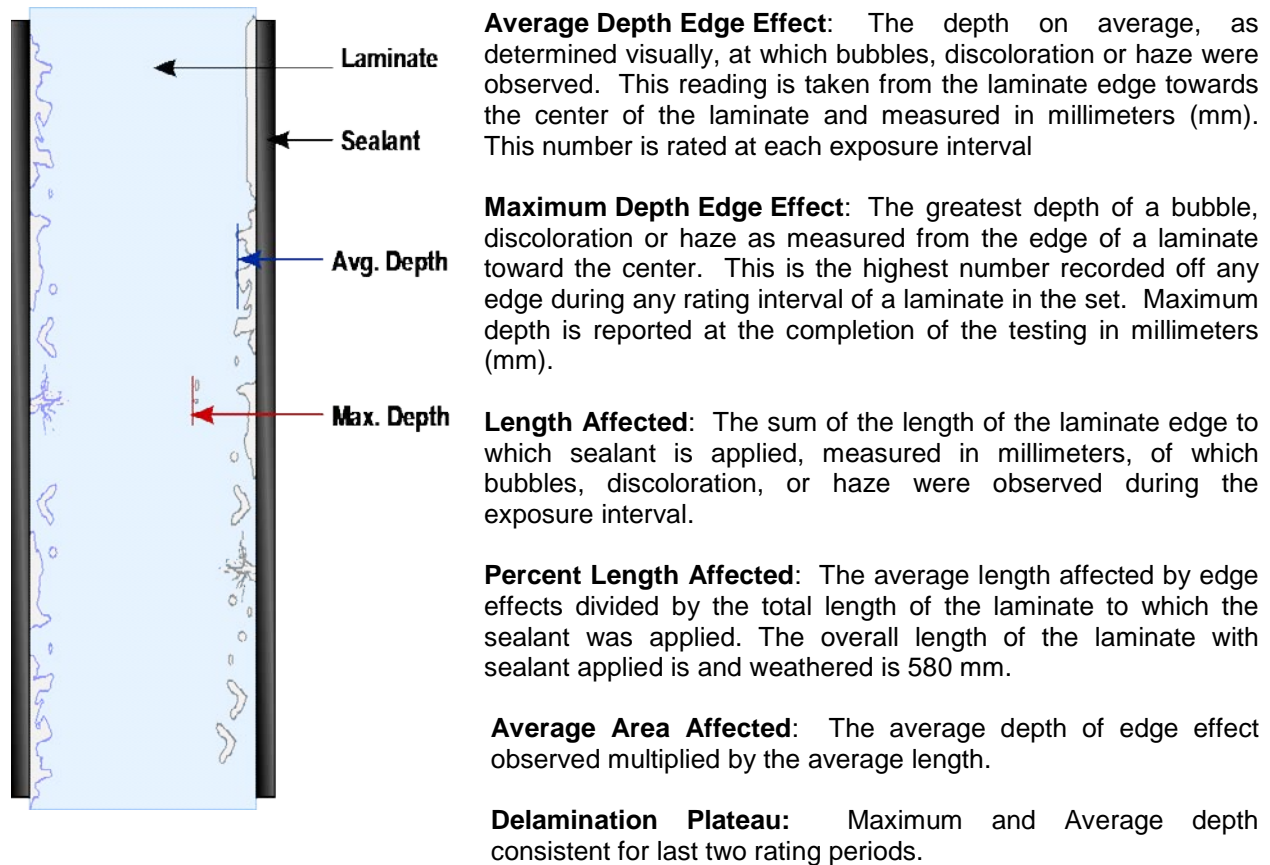


Figure 1: Rating Diagram for Sealant Compatibility Reporting

Evaluation Program Parameters

Interlayer Type:	Saflex® R series PVB interlayer
Interlayer Thickness:	0.76mm (0.030 in)
Exposure Type:	QUV; UV313 bulbs: Irradiance 0.71 W/m ²
Exposure Cycle:	16 hours UV at 66°C, 8 hours of condensation at 60°C
Total Exposure (Hours):	3500
Total Edge (mm):	580

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.

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The tables on the following pages are a summary of sealant and laminated glass compatibility testing conducted at Eastman in accordance with the procedure put forth by the Glass Association of North America (GANA) *Standard Test Method for Laminated Glass Edges when in Contact with Sealants and Glazing Tapes*. The data shown should be used as a reference and guide for sealant selection but should not be deemed as a guarantee of performance.

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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	159	**	3	4												
Sonolastic NP1	BASF	28	641	**	4	5												
BOSS 315 RTV	BOSS	33	383	**	2	3												
DAP Butyl Flex	DAP	2	41	**	3	3												
Hybri-seal 2PS	Den Braven	58	336	**	1	3												
Parasilico monument	DL Chemicals	64	1114	Yes	3	7												
DC Instant Glaze 18578 (MAS*)	Dow Corning	11	128	Yes	2	4												
DC TradeMate	Dow Corning	15	345	**	4	6												
DC-1199	Dow Corning	52	1508	No	5	8												
DC-2001	Dow Corning	15	277	**	3	5												
DC-3362	Dow Corning	78	1810	**	4	6												
DC-3793	Dow Corning	93	1618	**	3	6												
DC-399	Dow Corning	92	3457	**	7	12												
DC-688	Dow Corning	69	1201	Yes	3	11												
DC-756	Dow Corning	91	1583	Yes	3	5												
DC-785	Dow Corning	78	452	**	1	3												
DC-790	Dow Corning	42	1345	**	6	6												
DC-791	Dow Corning	93	3088	Yes	6	10												
DC-794	Dow Corning	81	1409	**	3	4												
DC-795	Dow Corning	90	2621	Yes	5	8												

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DC-797	Dow Corning	49	853	**	3	5												
DC-813	Dow Corning	68	1578	Yes	4	9												
DC-895	Dow Corning	8	131	**	3	4												
DC-899	Dow Corning	92	2655	**	5	7												
DC-983 (MAS*)	Dow Corning	27	626	Yes	4	6												
DC-991	Dow Corning	46	800	Yes	3	5												
DC-993	Dow Corning	68	1578	Yes	4	6												
DC-995	Dow Corning	91	2647	Yes	5	6												
DC-999A	Dow Corning	57	1322	Yes	4	6												
Egosilicon151	Ego	71	824	**	2	4												
THIOVER F	Fenzi	64	742	**	2	3												
Betaseal HV 3	Gurit-Essex	19	110	**	1	3												
Betaseal U-400 HV	Gurit-Essex	48	139	**	1	1												
T-998 R	Henkel	25	145	**	1	1												
T-998 RS	Henkel	0	0	**	0	0												
Terostat 8590	Henkel	36	418	**	2	4												
Terostat 8593	Henkel	51	296	**	1	3												
Terostat 998R	Henkel	45	261	**	1	1												
Terostat MS 930	Henkel	0	0	Yes	0	1												
Terostat MS 931	Henkel	0	3	No	2	4												

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Terostat MS 939	Henkel	1	3	**	1	1												
Terostat MS 9399	Henkel	6	35	Yes	1	1												
IGK 111	IGK	0	0	**	0	0												
IGK 130	IGK	0	0	**	0	0												
IGK 311	IGK	18	104	**	1	1												
IGK 330	IGK	18	104	**	1	1												
Safe Seal	Innotec	2	6	**	1	1												
Ködiglaze P LV	Kommerling	0	0	**	0	0												
Ködiglaze S	Kommerling	79	1375	**	3	5												
RGS 7700 (RapidStrength) (MAS*)	Momentive	25	435	Yes	3	4												
SCS 1000	Momentive	1	30	**	4	4												
SCS 1200	Momentive	96	2922	Yes	5	6												
SCS 1800 (Contractor)	Momentive	35	1015	Yes	5	6												
SCS 2000 (Silpruf)	Momentive	93	2158	Yes	4	7												
SCS 2350	Momentive	72	1462	Yes	4	6												
SCS 2700 (SilPruf LM)	Momentive	50	1160	Yes	4	6												
SCS 2800 (Silglaze II)	Momentive	8	240	Yes	5	6												
SCS 9000 (SilPruf NB)	Momentive	93	2158	**	4	5												
SSG 4000 (Ultraglaze)	Momentive	82	1903	Yes	4	5												
SSG 4000-AC (Ultraglaze)	Momentive	92	2260	Yes	4	7												
SSG 4400 (Ultraglaze) (*MAS)	Momentive	17	296	Yes	3	5												

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C 22	Olivé Quimica	90	1566	**	3	6												
Pecora 860	Pecora	24	416	**	3	4												
Pecora 863	Pecora	98	3053	**	5	9												
Pecora 864	Pecora	49	995	**	4	7												
Pecora 890	Pecora	43	1242	**	5	7												
Pecora 895	Pecora	8	177	**	4	5												
Pecora 896	Pecora	97	2821	**	5	8												
Pecora 985	Pecora	93	2954	**	6	8												
Permabond140	Permapack	71	824	**	2	5												
Permabond145	Permapack	44	510	**	2	5												
Permabond145S	Permapack	36	209	**	1	2												
PR469	Product Research	5	145	**	5	10												
PTI-707	PTI	1	19	**	4	4												
PTI-757	PTI	0	2	**	2	2												
Rhodor Therm 542	Rhone Poulenc	90	2883	**	6	7												
Rhodorsil 5C	Rhone Poulenc	63	1103	**	3	5												
Rhodosil Aquarium	Rhone Poulenc	29	421	**	3	5												
Lexel	Sashco	0	0	**	0	0												
SM-71000	Schnee Moorhead	19	483	**	4	6												
MASTER 300LS	Shin Etsu	64	1299	Yes	4	11												

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SG-18	Sika	71	1235	**	3	5												
Sikafast	Sika	6	35	**	1	2												
Sikafast 5211	Sika	57	331	**	1	3												
Sikaflex 265	Sika	59	1027	**	3	6												
Sikaflex 295 UV	Sika	2	12	**	1	1												
Sikaflex 296	Sika	75	870	**	2	4												
Sikaflex 552	Sika	79	1375	Yes	3	5												
Sikaflex Ultraf	Sika	68	789	**	2	5												
Sikasil 300 N	Sika	80	1392	**	3	5												
Sikasil 305 N	Sika	83	963	**	2	5												
Sikasil 600	Sika	92	2134	**	4	6												
Sikasil 605	Sika	40	464	**	2	4												
Sikasil 605 S	Sika	84	1462	**	3	5												
Sikasil 621	Sika	43	249	**	1	2												
Sikasil 650	Sika	60	1044	**	3	5												
Sikasil I	Sika	17	99	**	1	1												
Sikasil IG 16	Sika	95	1102	**	2	4												
Sikasil IG 25	Sika	79	916	**	2	5												
Sikasil IG 25 N	Sika	87	1009	**	2	4												
Sikasil IG 25 HM Plus	Sika	63	1206	No	3	6												

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Sikasil SG 20	Sika	N/A	N/A	**	4	6												
Sikasil SG 500	Sika	82	951	**	2	4												
Sikasil SG 550	Sika	68	1933	Yes	5	9												
Sikasil WS 680 SC	Sika	0	0	Yes	0	0												
Sikasil WT 485	Sika	94	1636	**	3	5												
Simson ASR-9101	Simson	0	0	**	0	0												
Simson Hybrid Plus	Simson	0	4	**	3	3												
Simson Silicone 60	Simson	27	711	**	5	5												
Silirub AL	Soudal	60	1740	**	5	7												
Silirub MA	Soudal	71	1235	**	3	7												
Proglaze II (*MAS)	Tremco	44	1021	Yes	4	11												
Proglaze HM	Tremco	38	220	Yes	1	3												
Proglaze SSG	Tremco	80	1856	**	4	5												
Tremco Mono 555	Tremco	2	29	**	3	3												
Tremco Spectrem 1	Tremco	54	948	**	3	4												
Tremco Spectrem 2	Tremco	80	1856	**	4	5												
Tremcil 200	Tremco	89	1032	**	2	3												
Tremcil -300	Tremco	71	1442	**	4	6												
Tremcil -600	Tremco	22	349	**	3	4												

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Vulkem 116	Vulkem	82	1663	**	4	5												
MF 881	Zhengzhou	88	1021	**	2	5												
MF 889	Zhengzhou	90	1044	**	2	5												
MF 889A	Zhengzhou	92	1067	**	2	5												
MF 889F	Zhengzhou	89	1032	**	2	5												
MF 899	Zhengzhou	89	1032	**	2	4												
MF 899A	Zhengzhou	89	1032	**	2	5												

(MAS*) = Manufacturer applied sealant.

** = Trend data not available

Testing performed on glass laminates composed of 3mm clear annealed glass / 0.76mm Saflex® R series PVB interlayer / 3mm clear annealed glass.

Data presented is most severe measurement seen during testing for each category.

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