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DIVISION: 06—WOOD AND PLASTIC
Section: 06093—Adhesives

REPORT HOLDER:

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EVALUATION SUBJECT:

SIA 110 SERIES (SIA 110, 111, 113-119) STRUCTURAL URETHANE LAMINATING ADHESIVES

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2003 *International Building Code*® (IBC).
- 2003 *International Residential Code*® (IRC)
- BOCA® *National Building Code*/1999 (BNBC)
- 1999 *Standard Building Code*® (SBC)
- 1997 *Uniform Building Code*™ (UBC)

Property evaluated:

Structural

2.0 USES

The Henkel Corporation adhesives designated SIA 110, SIA 111, and SIA 113 through SIA 119 are structural urethane laminating adhesives used in the factory fabrication of sandwich panels used to support loads in addition to the panel weight. The SIA 110, SIA 111 and SIA 113 through SIA 119 adhesives are used to bond extruded polystyrene foam plastic (XPS) and expanded polystyrene foam plastic (EPS) sandwich panel core materials to facing components, such as plywood and oriented strand board (OSB). The adhesives are also used to laminate facing materials, such as Douglas fir lumber, plywood, OSB, and coated steel.

3.0 DESCRIPTION

The SIA 110, SIA 111 and SIA 113 through SIA 119 adhesives are one-part, moisture-cure, polyurethane adhesives. The SIA 119 adhesive is the fastest reacting adhesive, while SIA 110 adhesive is the slowest. See Table 2 for assembly and cure times.

The adhesives are available in 320-gallon (2800 lbs) totes, 275-gallon (2400 lbs) totes, 55-gallon (471 lbs) steel drums and 5-gallon (45 lbs) steel pails [1211 L (1271 kg), 1041 L (1090 kg), 208 L (214 kg) and 19 L (20 kg)]. Optimum storage

temperatures for an unopened container shall be 65°F to 95°F (18.3°C to 35°C). Containers shall be stored indoors, protected from any water contact and out of direct sunlight. The adhesives, when stored in unopened containers, have a shelf life of 90 days from date of shipment. The adhesives shall be used as soon as possible once the containers are opened.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The SIA 110, SIA 111, and SIA 113 through SIA 119 adhesives are Type II, Class 2, structural adhesives for use where high resistance to moisture is required in roof, wall and floor sandwich panels subjected to sustained loading. The allowable tensile stress is limited to a maximum 4 psi (27.6 kPa) when extruded polystyrene foam plastic is used, and a maximum 2 psi (13.8 kPa) when expanded polystyrene is used. The allowable shear stress based on creep is limited to a maximum of 80 psi (552 kPa). The allowable shear and tensile stresses for the adhesives between facing material laminations are given in Table 1.

4.2 Installation:

4.2.1 General: The manufacturer's published installation instructions shall be followed, subject to the conditions of this evaluation report. Copies of the instructions and this report shall be available at all times during adhesive application.

4.2.2 Preparation and Application: Surfaces being bonded shall be clean and dry. Dust, oil, grease, water, paint and other contaminants shall be removed before adhesive application. The adhesives shall be applied at ambient temperatures between 60°F and 95°F (15°C to 35°C).

All SIA adhesives shall be applied in accordance with the manufacturer's recommended installation instructions, using a bead applicator to apply 1/16-inch-diameter (1.6 mm) beads of adhesive spaced a maximum of 5/8 inch (15.9 mm) on center; except for the SIA 110 and SIA 111 adhesives, where application may be by roll coating the surface at a wet-spread rate of 12 grams per square foot (129 g/m²). An evenly distributed, fine distilled water fog/mist shall also be applied at the rate of 1 to 2 grams per square foot (11 to 22 g/m²) during adhesive application. Only one coat of adhesive and water shall be applied to one of the two contact surfaces, either the core or the facing of the sandwich panel. When the adhesive is applied in beads, the sandwich panel manufacturer shall ensure that complete coverage of the contact surfaces of the panel with the adhesive has occurred after the adhesive application and panel pressing are done. Assembly and cure times are found in Table 2. Panels shall be pressed at a minimum pressure of 3 psi (21 kPa).

5.0 CONDITIONS OF USE

The SIA 110, SIA 111 and SIA 113 through SIA 119 Structural Urethane Laminating Adhesives described in this

report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** The adhesives shall be used, applied and cured in accordance with this report and the manufacturer's instructions.
- 5.2** The adhesive application shall be limited to sandwich panels specifically recognized in an ICC-ES evaluation report. The allowable structural shear and tensile stresses of the adhesive are given in Section 4.1 of this report.
- 5.3** The adhesives shall be used only with the sandwich panel facings and cores described in Section 2.0 of this report.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Sandwich Panel Adhesives (AC05), dated June 2005.

7.0 IDENTIFICATION

Each container of adhesive shall bear markings and inscriptions showing the product name, the Henkel Corporation name, the batch code, the manufacturing date, storage requirements, and the evaluation report number (ESR-1002).

TABLE 1—ALLOWABLE SHEAR AND TENSILE STRESSES

FACING MATERIAL LAMINATIONS ¹	SIA 110, SIA 111 AND SIA 113 THROUGH SIA 119	
	Shear Stress (psi)	Tensile Stress (psi)
Douglas fir/Douglas fir	80	40
Plywood/plywood	50	10
OSB/OSB	28	4
Steel/steel ²	44	17

For SI: 1 psi = 6895 Pa.

¹The laminations describe two plies adhered to each other (e.g., OSB/OSB is OSB adhered to OSB).

²Steel shall be coated with an epoxy coated primer consisting of:

INGREDIENT	CAS#	APPROX. %
Xylene	1330-20-7	>23
Propylene glycol MEE	108-65-6	11
Isophorone	78-59-1	9
Strontium chromate	7789-06-02	5
Ethyl benzene	100-41-4	5
Methyl isobutyl ketone	108-65-6	3
Formaldehyde	50-00-0	0.5

TABLE 2—MAXIMUM ASSEMBLY TIME AND MINIMUM CURE TIME FOR SIA-110 SERIES STRUCTURAL ADHESIVES
(minutes, unless noted otherwise)

TEMPERATURE ^{1,2} (°F)	SIA-110	SIA-111	SIA-113	SIA-114	SIA-115	SIA-116	SIA-117	SIA-118	SIA-119
	Assembly (Cure)	Assembly (Cure)	Assembly (Cure)	Assembly (Cure)	Assembly (Cure)	Assembly (Cure)	Assembly (Cure)	Assembly (Cure)	Assembly (Cure) (minutes-seconds)
60	150 (180)	62 (104)	32 (63)	23 (48)	17 (26)	10 (22)	7 (8)	6 (7)	3-20 (7-0)
65	135 (170)	52 (95)	28 (56)	19 (40)	16 (25)	9 (19)	7 (8)	6 (7)	3-10 (6-40)
70	125 (150)	45 (88)	24 (51)	16 (33)	14 (25)	8 (16)	7 (8)	5 (7)	2-50 (5-50)
75	110 (140)	38 (82)	22 (46)	13 (27)	12 (24)	7 (14)	7 (8)	5 (7)	2-50 (5-0)
80	90 (130)	33 (76)	19 (42)	12 (25)	11 (23)	7 (12)	6 (7)	4 (6)	2-40 (4-10)
85	80 (120)	29 (71)	17 (39)	10 (23)	9 (22)	6 (10)	6 (7)	4 (6)	2-40 (3-40)
90	75 (105)	26 (67)	16 (36)	9 (23)	8 (22)	6 (9)	6 (7)	4 (5)	2-30 (3-10)
95	60 (90)	23 (63)	14 (33)	8 (23)	6 (22)	5 (9)	5 (6)	4 (5)	2-30 (2-30)

For SI: °C = (°F - 32)⁵/₉.

¹Glue line temperature.

²Water mist of 1 to 2 grams/square foot on the adhesive surface is required to ensure uniform cure rate.