CCMC CANADIAN CODE COMPLIANCE EVALUATION

CCMC EVALUATION

CCMC 14230-R

CCMC Canadian code compliance evaluation

CCMC number:	14230-R
Status:	Active
Issue date:	2021-05-11
Modified date:	2023-11-08
Evaluation holder:	**BASF Canada Inc.** 10 Constellation Court Toronto ON M9W 1K1 Canada Website: www.basf.com Telephone: 289-360-1300
Product name:	WALLTITE® XL01
Compliance:	NBC 2015, NBC 2020, OBC
Criteria:	CCMC-TG-072119.06-15, "CCMC Technical Guide for Spray-Applied Rigid Polyurethane Foam Insulation – Single Pass Medium Density" CCMC-TG-072119.06-20, "CCMC Technical Guide for Spray-Applied Rigid Polyurethane Foam Insulation – Single Pass Medium Density"

In most jurisdictions this document is sufficient evidence for approval by Canadian authorities.

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Compliance opinion

It is the opinion of the Canadian Construction Materials Centre that the evaluated product, when used as thermal insulation in accordance with the conditions and limitations stated in this evaluation, complies with the following codes:

National Building Code of Canada 2015

Code provision	Solution type
5.9.1.1. Compliance with Applicable Standards	Alternative
9.25.2.2.(1)(h) Insulation Materials	Alternative
9.25.2.5. Installation of Spray-Applied Polyurethane	Alternative

National Building Code of Canada 2020

Code provision	Solution type
5.9.1.1. Compliance with Applicable Standards	Alternative
9.25.2.5. Installation of Spray-Applied Polyurethane	Alternative

Ontario Building Code

Ruling No. 21-06-369 (14230-R) authorizing the use of this product in Ontario, subject to the terms and conditions contained in the Ruling, was made by the Minister of Municipal Affairs and Housing on 2021-12-13 pursuant to s.29 of the Building Code Act, 1992 (see Ruling for terms and conditions). This Ruling is subject to periodic revisions and updates.

The above opinion(s) is/are based on the evaluation by the CCMC of technical evidence provided by the evaluation holder, and is bound by the stated conditions and limitations. For the benefit of the user, a summary of the technical information that forms the basis of this evaluation has been included.

Product information

Product name

WALLTITE® XL01

Product description

“WALLTITE® XL01” is a spray-applied, rigid polyurethane foam of medium density that has a closed-cell structure. The foaming system consists of two components that must be labelled with “CCMC 14230-R” and the following information:

- Isocyanate (Component A): “Elastospray® 8000A”; and
- Resin (Component B): “WALLTITE® XL01.”

The two components are mixed on-site by a BASF Canada Inc.-qualified installer (see Section 3.2) with fixed-ratio positive displacement equipment.

This product is referred to as a ‘high-lift’ spray polyurethane foam whereby a thick layer of “WALLTITE® XL01” can be applied in a single pass. The product is installed at a maximum nominal thickness of 127 mm and a minimum nominal thickness of 50 mm. This installation method differs from the method described in CAN/ULC-S705.2-05, “Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Application,” which specifies a 50-mm maximum nominal thickness for spray foam installed in a single pass.

The final cured product has a density of 32.25 kg/m^3 and is available in the following colour:

- Dark purple

At 50-mm thick, the design long-term thermal resistance (LTTR) value is 1.87 (m^2·K)/W. See physical properties of the product for estimated LTTR values at higher thicknesses.

The product is available in winter grade and regular grade formulations.

Site-manufactured product

This is a site-manufactured product; it is finished on-site following the spray-application of raw materials produced at the manufacturing plant(s) below.

Manufacturing plants

This evaluation is limited to products produced at the following plants:

Product name	Manufacturing plants	
	Blackie, AB, CA	Toronto, ON, CA
WALLTITE® XL01	⊘	⊘

⊘ Indicates that the product from this manufacturing facility has been evaluated by the CCMC

Conditions and limitations

The CCMC's compliance opinion is bound by this product being used in accordance with the conditions and limitations set out below.

CCMC's compliance opinion is bound by "WALLTITE® XL01" being used in accordance with the conditions and limitations set out below.

- The cured polyurethane foam must have a minimum nominal thickness of 50 mm and a maximum nominal thickness of 127 mm. Any product sprayed to a thickness greater than 140 mm (maximum nominal thickness plus a field safety margin of 13 mm) must be removed from the substrate immediately after application and the substrates sprayed again. IMPORTANT: spraying to a thickness greater than 140 mm may result in spontaneous combustion or poor foam quality.
- The application of the foam in multiple passes is beyond the scope of this evaluation.
- The polyurethane foam can be applied on the substrates listed under physical properties of the product. Substrates must be clean, dry, and free of grease, frost, dust, rust and other contaminants that may affect the adhesion performance of the foam to the substrate.
- Below-grade (exterior side of foundation wall) and attic applications are beyond the scope of this evaluation.
- As required in Article 9.25.2.3., Installation of Thermal Insulation, of Division B of the NBC 2010 and NBC 2015, the insulation shall have a reasonably uniform insulation value over the entire face of the insulated area.
- The assessment of the fire hazard-peak temperature reached during foam application is only valid for the tested substrates under material temperature requirements due to exothermic reaction and for foam applied in a single pass with a maximum nominal thickness of 127 mm.
- The peak temperatures of the thick single pass may affect the performance and durability of materials and equipment in contact with the foam (such as ducts and pipes). The performance of such components is beyond the scope of this evaluation. The measured maximum temperature of the foam while curing is specified under material temperature requirements due to exothermic reaction.
- The interior side of the polyurethane foam insulation must be covered with an approved thermal barrier as per:
  - Article 3.1.4.2., Protection of Foamed Plastics, of Division B of the NBC 2010 or NBC 2015;
  - Article 3.1.5.12., Combustible Insulation and its Protection, of Division B of the NBC 2010;
  - Article 3.1.5.15., Foamed Plastic Insulation, of Division B of the NBC 2015; or
  - Article 9.10.17.10., Protection of Foamed Plastics, of Division B of the NBC 2010 or NBC 2015.
- When applicable, the exterior surface of an exterior wall containing this insulation shall be designed in accordance with Section 9.10, Fire Protection, of Division B of the NBC 2010 or NBC 2015, or Section 3.2, Building Fire Safety, of Division B of the NBC 2010 or NBC 2015. The product shall not be used in exposed interior or exterior locations.
- The insulation must be kept away at least 75 mm (or as required by building regulations and safety codes) from heat-emitting devices (such as recessed lighting fixtures and chimneys). The insulation shall not be used inside electrical outlets or junction boxes.
- For retrofit construction, the time to occupancy is 25 hours when installed with the requisite ventilation of the segregated retrofit area as per CAN/ULC-S705.2. Additional details are provided in Note 3 in physical properties of the product.
- When the product is installed in an exterior insulation sheathing-type application, the low air and water vapour-permeance value of the product requires that the wall assembly conform to Table 9.25.5.2., Ratio of Outboard to Inboard Thermal Resistance, of Division B of the NBC 2010 or NBC 2015.

- The product must not be installed after the expiry date printed on the label of each container. The product has a shelf life of four (4) months from the date of manufacture.
- The substrate temperatures are −15°C to 5°C for the winter grade formulation and 0°C to 40°C for the regular grade formulation. The appropriate formulation shall be chosen for the specific temperature conditions of application in consultation with BASF Canada Inc.
- The installation of the product must:
  - conform to the general requirements of CAN/ULC-S705.2-05,
  - comply with the manufacturer's specific installation instructions for their proprietary high-lift product
  - be performed by a qualified installer, and
  - meet all conditions and limitations in this evaluation.
- The continuous in-service temperature of the insulation must not exceed the range of −60°C to 80°C. The building envelope in which this product is installed must conform to the requirements of Division B of the NBC 2010 or NBC 2015 for vapour barrier, air barrier and dampproofing (interior below-grade walls).
- The product must be protected from ultraviolet radiation within 90 days of installation.
- The installation must be carried out by certified installers in accordance with the manufacturer's instruction manual, which must be available at the job site at all times during the installation for review by the building official.
- The components, “Elastospray® 8000A” isocyanate and “WALLTITE® XL01” resin, must have their respective containers (i.e., drums) identified by the phrase “CCMC 14230-R.”

Qualified Installers

This is a site-manufactured product whereby BASF Canada Inc. requires that only specific qualified installers be authorized to install their proprietary spray-applied polyurethane insulation in buildings. In accordance with BASF Canada Inc.’s site quality assurance program (SQAP), the certification organization (CO) Caliber Quality Solutions Inc. (Caliber) has been commissioned to license the specified installers and issue them the requisite Caliber identification card. All specified installers must have a Caliber identification card.

Third-Party Site Auditing of Qualified Installers

As part of their SQAP, BASF Canada Inc. also stipulates that site audit inspections be conducted by site inspectors licensed by Caliber. Upon completion of the site audit, Caliber will report the product’s conformity results and any corrective action required, if necessary, to BASF Canada Inc. Building officials who would like site-audit inspections to be conducted on specific building sites can contact Caliber at:

Caliber Quality Solutions Inc. (Caliber)
120 Eglington Avenue East,
Suite 1000 Toronto, ON M4P 1E2
Tel.: 888-572-7435
Web site: www.caliberqa.com

Technical information

This evaluation is based on demonstrated conformance with the following criteria:

Criteria number	Criteria name
CCMC-TG-072119.06-15	CCMC Technical Guide for Spray-Applied Rigid Polyurethane Foam Insulation – Single Pass Medium Density
CCMC-TG-072119.06-20	CCMC Technical Guide for Spray-Applied Rigid Polyurethane Foam Insulation – Single Pass Medium Density

The Report Holder has submitted technical documentation for CCMC's evaluation. Testing was conducted at laboratories recognized by CCMC. The corresponding technical evidence for this product is summarized below.

The following were the key performance requirements for the evaluation:

- **Material qualification:**
  - Foam basic properties per CAN/ULC-S705.1 requirements except for the sample preparation. Samples were sprayed at the maximum nominal thickness of 127 mm using a single pass instead of two passes of 30-mm each nominal thickness as specified in CAN/ULC-S705.1. Foam application of regular formulation at 23°C was used for testing as required in CAN/ULC-S705.1.
  - Key physical properties in high- and low-temperature applications.
- **Adhesion performance:** Foam adhesion strength to different substrates (the manufacturer-selected substrates were wood, gypsum, and concrete). Foam application of regular formulation at high surface temperature was considered a worst-case scenario.
- **Foam uniformity:** Foam cells uniformity when sprayed in different wall cavity dimensions. Foam application of regular formulation at high surface temperature and at maximum nominal thickness was considered a worst-case scenario.
- **Fire hazard:** Maximum temperature achieved in the foam due to exothermic reaction (high internal temperature generated while curing). Foam application of winter grade formulation at lowest surface temperature was considered a worst-case scenario by the manufacturer.

Material requirements

Physical properties from ambient temperature application

The basic properties of the product's regular formulation, when sprayed over polyethylene board having a surface temperature of 23°C, are presented below. Test specimens used were extracted from the central area of foam samples sprayed at a nominal 127-mm thickness.

Table 1. Physical properties of the product

Property	Unit	Requirement	Result
Air permeance for a 25-mm-thick specimen	$L/(s \cdot m^2)$	≤ 0.020	0.0022
Apparent core density	kg/m^3	≥ 28.0	32.25
Compressive strength	kPa	≥ 170	232

Property		Unit	Requirement	Result
Dimensional stability, without substrate volume change at	**−20°C**	%	−1	0.6
	80°C		+8	1.3
	70°C, 97 ± 3% RH		+14	1.6
Surface burning characteristics for a 100- mm-thick specimen	**Flame-spread rating** [(1)]	--	≤ 500	240
Open-cell content volume		%	≤ 10	1.2
Initial thermal resistance for a 50-mm-thick specimen (after 13 days at 23°C)		$(m^2 \cdot K)/W$	Declare	2.46
Long-term thermal resistance (LTTR) [(2)]	**125 mm**	$(m^2 \cdot K)/W$	Declare	4.84
	100 mm			3.77
	75 mm			2.81
	50 mm			1.87
Tensile strength		kPa	≥ 200	425
Volatile organic emissions (VOC) [(3)]		hrs	≤ 30 days	25
Water absorption by volume		%	≤ 4.0	0.73
Water vapour permeance (WVP) for a 50-mm-thick specimen	**Specimen with bottom skin intact (top skin removed)**	$ng/(Pa \cdot s \cdot m^2)$	≤ 60	40
Fungi resistance		--	No growth	None

Notes:

1 The published value is based on average results from three (3) specimens tested with the skin intact for comparison purposes. For compliance with Part 9, Housing and Small Buildings, of Division B of the NBC 2010 and NBC 2015, flame-spread rating is not required. When the product is installed in other than Part 9 buildings, the flame-spread rating must be determined in compliance with the requirements of Part 3 of Division B of the NBC 2010 or NBC 2015.

2 Testing was conducted in compliance with CAN/ULC-S770-09, “Standard Test Method for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams.”

3 For retrofit construction (e.g., occupied buildings), the time to occupancy is one (1) day when installed with the requisite ventilation of the segregated retrofit area as per CAN/ULC-S705.2. CAN/ULC-S705.2 requires that the ventilation rate be no less than 0.3 air changes per hour within the working area during the application of the product and that the working area be isolated during spraying. The same ventilation rate is required after the product has been sprayed and for the time period of 25 hours shown above.

Physical properties in high-temperature application

The air permeance and water vapour permeance of the product's regular formulation, when sprayed over polyethylene board having a surface temperature of 40°C, are presented below. Test specimens used were extracted from foam samples sprayed at a nominal 127-mm thickness.

Table 2. Physical properties of the product in high-temperature application

Property		Unit	Requirement	Result
Air permeance for a 26.2-mm-thick specimen		L/(s·m^2)	≤ 0.020	0.0018
Water vapour permeance (WVP) for a 50-mm-thick specimen	**specimen with bottom skin intact (top skin removed)**	ng/(Pa·s·m^2)	≤ 60	59

Physical properties in low-temperature application

The initial and long-term thermal resistance of the product's winter grade formulation, when sprayed over concrete tiles having a surface temperature of −15°C, are presented below. Test specimens used were extracted from foam samples sprayed at a nominal 60-mm thickness.

Table 3. Physical properties of the product in low-temperature application

Property		Unit	Requirement	Result
Initial thermal resistance for a 50-mm-thick specimen (after 13 days at 23°C)		(m^2·K)/W	Report value	2.42
Long-term thermal resistance (LTTR) (1)	**125 mm**	(m^2·K)/W	Report value	5.16
	100 mm			3.99
	75 mm			2.87
	50 mm			1.85

Notes:

1 Testing was conducted in compliance with CAN/ULC-S770-09.

Adhesion requirements

The adhesion strength of the product's regular formulation, when sprayed over wood, gypsum and concrete substrates having a surface temperature of 40°C, is presented in below. Foam samples were sprayed at a nominal 127-mm thickness.

Table 4. Adhesion strength to substrate

Property		Unit	Requirement	Result
Adhesion strength [(1)]	**Exterior gypsum board**	kPa	≥ 2.6	214
	OSB			207
	Plywood			116
	Concrete slab			207
	Wood			275

Notes:

1 Testing was conducted in compliance with ASTM D1623.

Foam uniformity

The average cell size of the product's regular formulation, when sprayed in wood frame cavities made of oriented strandboard (OSB) sheathing and 89-mm × 140-mm wood studs spaced at 600 mm on centre (o.c.), 400 mm o.c. and 300 mm o.c., are presented below. The substrate surface temperature was 40°C. Foam sample thicknesses were 125 mm to 135 mm.

Table 5. Foam uniformity – summary of cell sizes

Property		Unit	Requirement	Result
Average cell size	**Panel with two cavities of 600 mm o.c.**	mm	< 0.5	Pass [(1)]
	Panel with two cavities of 400 mm o.c.	mm	< 0.5	Pass [(2)]
	Panel with two cavities of 300 mm o.c.	mm	< 0.5	Pass [(3)]

Notes:

1 Tiny cells of less than 0.5 mm wide were mostly observed with some occasional isolated cells of 8-mm wide.

2 Tiny cells of less than 0.5 mm wide were mostly observed with some occasional isolated cells of 6-mm wide.

3 Tiny cells of less than 0.5 mm wide were mostly observed with some occasional isolated cells of 12-mm wide

Material temperature requirements due to exothermic reaction

The maximum temperature and amount of time required for the product's winter grade formulation to cool down when sprayed over wood and gypsum substrate with a surface temperature of 5.3°C are presented below. Spraying over concrete substrate was not part of the testing protocol since this type of substrate is a non-combustible material. Foam sample thicknesses were 125 mm to 127 mm.

Table 6. Material temperature requirements due to exothermic reaction

Property			Unit	Requirement	Result
Maximum recorded temperature at any place in the foam	**OSB substrate**		°C	< 200	176.5
	Gypsum substrate				178.5
Temperatures in the foam vs. time			°C	Temperature vs. time must be decreasing after the peak (1)	Pass
Maximum recorded temperature at wood frame–foam interface	**OSB substrate**		°C	< 170	42.9
	Gypsum substrate				62.7
Maximum recorded temperature at substrate–foam interface:	**Wood material and gypsum bord**	**OSB substrate**	°C	< 170	135.1
		Gypsum substrate		< 170	102.2
	Melting material		°C	Foam temperature must be less than melting temperature of the material (2)	n/a
	Non-combustible materials			Not required	n/a
Timeframe for the foam temperature to cool down to 21°C -		**OSB substrate**	hr:min	Report value	06:16 (3)
		Gypsum substrate	hr:min	Report value	06:46
Effect of maximum recorded temperature on electrical wires		**OSB substrate (4)**	--	No damage to the electrical wire jacket where maximum foam temperature is reached	159°C (4) was recorded near the wire, and no visual effect was observed on the wire jacket

Notes:

1 Any subsequent temperature peak must be lower than the initial peak.

2 Any material such as ABS, polypropylene and polyethylene over which the foam will be sprayed must have a softening temperature reasonably higher than 178.5°C. Softening temperature of such materials must be determined using a recognized test method.

3 Construction material such as a polyethylene vapour barrier sheet may be affected by the foam temperature if installed too early following the foam installation. The timeframe for the foam to reach ambient temperature must be considered to lower the risk of damaging any materials that may melt, being installed against the foam afterwards

4	A minimum of 140-mm-thick foam was sprayed in a wood frame cavity made of OSB sheathing and 38-mm × 140-mm wood studs. Two electrical wires (12 AWG and 14 AWG) were installed in the cavity at different depths before the foam application. The maximum recorded temperatures near the wires were 159°C and 140°C.

Administrative information

Use of Canadian Construction Materials Centre (CCMC) assessments

This assessment must be read in the context of the entire CCMC Registry of Product Assessments, any applicable building code or by-law requirements, and/or any other regulatory requirements (for example, the Canada Consumer Product Safety Act, the Canadian Environmental Protection Act, etc.).

It is the responsibility of the user to confirm that the assessment they are using is current and has not been withdrawn or superseded by a later version on the CCMC Registry of Product Assessments.

Disclaimer

The National Research Council of Canada (NRC) has evaluated only the characteristics of the specific product described herein. The information and opinions in this evaluation are directed to those who have the appropriate degree of experience to use and apply its contents (such as authorities having jurisdiction, design professionals and specifiers). This evaluation is valid when the product is used as part of permitted construction, respecting all conditions and limitations stated in the evaluation, and in accordance with applicable building codes and by-laws.

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Language

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In the case of any discrepancy between the English and French version of this document, the English version shall prevail.

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CCMC recognition

The Canadian Construction Materials Centre (CCMC) assesses compliance with Canadian building, energy and safety codes. We are the only construction code compliance service supported and operated by the Government of Canada. Trusted by over 6,000 regulators across Canada.

> Most Canadian authorities having jurisdiction (AHJs) consider CCMC product assessments acceptable as evidence for product approval.

CCMC assessments are recognized by construction authorities across Canada:

Alliance of Canadian Building Official Associations (ACBOA)	(Alliance of Canadian Building Official Associations (ACBOA))
First Nations National Building Officers Association (FNNBOA)	(First Nations National Building Officers Association (FNNBOA))
Canadian Home Builders' Association (CHBA)	(Canadian Home Builders' Association (CHBA))
Alberta Building Officials Association (ABOA)	(Alberta Building Officials Associations (ABOA))
Saskatchewan Building Officials Association (SBOA)	(Saskatchewan Building Officials Association (SBOA))
Manitoba Building Officials Association (MBOA)	(Manitoba Building Officials Association (MBOA))
Ontario Building Officials Association (OBOA)	(Ontario Building Officials Association (OBOA))
New Brunswick Building Officials Association (NBBOA)	(New Brunswick Building Officials Association (NBBOA))
Nova Scotia Building Officials Association (NSBOA)	(Nova Scotia Building Officials Association (NSBOA))

> The CCMC provides code compliance assessments to Canadian code requirements, consulting nationwide with construction regulators to elicit regional variations in code requirements as well as provincial and local interpretations. Users are advised to review the technical information presented in CCMC assessments when making approval decisions. Learn more about how the CCMC provides a unique service for Canada.

For more information, contact the CCMC by phone at (613) 993-6189 or by email at ccmc@nrc-cnrc.gc.ca

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- it represents the information as it was available at the time of downloading, and
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Code compliance as an acceptable solution

Code Compliance via Acceptable Solutions

> If a building design (e.g. material, component, assembly or system) can be shown to meet all provisions of the applicable **acceptable solutions** in Division B (e.g. it complies with the applicable provisions of a referenced standard), it is deemed to have satisfied the objectives and functional statements linked to those provisions and thus to have complied with that part of the Code.
>
> — **National Building Code of Canada, Sentence A-1.2.1.1.(1)(a)**

The CCMC has determined that compliance with this provision of the Code has been demonstrated as an **Acceptable Solution**. The evaluation report provides a summary of the basis of CCMC's compliance opinion.

CCMC's code compliance opinions

All CCMC evaluation reports are opinions of code compliance established in accordance with the National Building Code of Canada, Subsection 1.2.1. "Compliance with this Code," which requires compliance to be achieved by:

- complying with the applicable acceptable solutions in Division B, or
- using an alternative solution that will achieve at least the minimum level of performance required by Division B in the areas defined by the objective and functional statements attributed to the applicable acceptable solutions.

The CCMC assesses compliance with Canadian building, energy and safety codes, and is trusted by over 6,000 regulators across Canada.

Code compliance as an alternative solution

Code Compliance via Alternative Solutions

> Where a design differs from the acceptable solutions in Division B, then it should be treated as an "**alternative solution**." A proponent of an alternative solution must demonstrate that the alternative solution addresses the same issues as the applicable acceptable solutions in Division B and their attributed objectives and functional statements. However, because the objectives and functional statements are entirely qualitative, demonstrating compliance with them in isolation is not possible. Therefore, Clause 1.2.1.1.(1)(b) identifies the principle that Division B establishes the quantitative performance targets that alternative solutions must meet. In many cases, these targets are not defined very precisely by the acceptable solutions [...] Nevertheless, Clause 1.2.1.1.(1)(b) makes it clear that an effort must be made to demonstrate that an alternative solution will perform as well as a design that would satisfy the applicable acceptable solutions in Division B—not “well enough” but “as well as.”
>
> — **National Building Code of Canada, Sentence A-1.2.1.1.(1)(b)**

The CCMC has determined that compliance with this provision of the Code has been demonstrated as an **Alternative Solution**. The evaluation report provides a summary of the basis of CCMC's compliance opinion.

CCMC's code compliance opinions

All CCMC evaluation reports are opinions of code compliance established in accordance with the National Building Code of Canada, Subsection 1.2.1. "Compliance with this Code," which requires compliance to be achieved by:

- complying with the applicable acceptable solutions in Division B, or
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