



# Code Compliance Research Report CCRR-1080

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Issue Date: 01-20-2017  
Revision Date: 01-01-2018  
Renewal Date: 01-01-2019

## DIVISION: 07 00 00 – THERMAL AND MOISTURE PROTECTION

Section: 07 21 00 – Thermal Insulation

### REPORT HOLDER:

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### REPORT SUBJECT:

Starex SF Grade H and Grade L Polystyrene Beads

## 1.0 SCOPE OF EVALUATION

1.1 This Research Report addresses compliance with the following Codes:

- 2015, 2012, and 2009 *International Building Code*® (IBC)
- 2015, 2012, and 2009 *International Residential Code*® (IRC)
- 2015 and 2010 *National Building Code of Canada* (NBC) – See Section 9.1

NOTE: This report references 2015 Code sections with [2012], [2010], and [2009] Code sections shown in brackets where they differ.

1.2 Starex SF Grade H and Grade L polystyrene beads have been evaluated for the following properties (see Table 1A):

- Surface burning characteristics
- Physical properties

1.3 Starex SF Grade H and Grade L polystyrene beads have been evaluated for the following uses (see Table 1A):

- Use by independent expanded polystyrene (EPS) molders to manufacture EPS insulation products.
- Use in attic and crawl space applications without a Code-prescribed ignition barrier.

## 2.0 STATEMENT OF COMPLIANCE

Starex SF Grade H and Grade L polystyrene beads comply with the Codes listed in Section 1.1, for the properties stated in Section 1.2, and uses stated in Section 1.3, when installed as described in this report, including the Conditions of Use stated in Section 6.0.

## 3.0 DESCRIPTION

### 3.1 Starex SF Grade H and Grade L Polystyrene Beads:

Starex SF Grade H and L polystyrene beads are used by independent manufacturers (molders) in manufacturing expanded polystyrene (EPS) insulation boards intended to meet the requirements of ASTM C578.

3.2 The scope of this report does not cover the manufacturing or the use of the EPS boards, which must be shown to the satisfaction of the building official, to comply with the applicable requirements of the Code, and must include qualification under ICC-ES AC12 (Foam Plastic Insulation), Section 4.4.15.1.2.

## 4.0 PERFORMANCE CHARACTERISTICS

4.1 **Physical Properties:** The Starex SF Grade H and Grade L polystyrene beads have been qualified in accordance with ICC-ES AC12, Section 4.4.15.1.1, and thereby providing supporting documentation for EPS molders using the beads. ICC-ES AC12 permits reduced testing for molders using qualified beads. Densities qualified under this Research Report are described in Table 2A.

4.2 **Surface Burning Characteristics:** EPS insulation products manufactured with the Starex beads have a flame-spread index of 25 or less and a smoke-developed index of 450 or less, when tested in accordance with ASTM E84 or UL 723.

4.3 **Attics and Crawl Spaces:** EPS insulation products manufactured with the Starex beads may be used in attic and crawl space applications without the Code-prescribed ignition barrier, as described in Section 5.2.

## 5.0 INSTALLATION

### 5.1 General:

EPS insulation products manufactured from the Starex SF polystyrene beads must be installed in accordance with the insulation manufacturer's published installation instructions, the applicable Code and as prescribed in the corresponding Code report of the finished EPS insulation product, or as otherwise permitted by the Authority Having Jurisdiction under IBC Section 2603 and IRC Section R316. The manufacturer's published installation instructions must be strictly adhered to and a copy of the instructions must be available on the jobsite during installation.



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## 5.2 Attics and Crawl Spaces:

EPS insulation products manufactured from Starex SF beads of the resin type, density, and thickness shown in Table 3 of this report may be used on walls in attics and crawl spaces without a Code-prescribed ignition barrier required by IBC Section 2603.4.1.6 or IRC Sections R316.5.3 or R316.5.4, when all of the following conditions are met:

- Entry to the attic or crawl space is only to service utilities, and no storage is permitted. Utilities include, but are not limited to, mechanical equipment, electrical wiring, fans, plumbing, gas or electric hot water heaters, and gas or electric furnaces.
- There are no interconnected attic or crawl-space areas.
- Air in the attic or crawl space is not circulated to other parts of the building.
- Attic ventilation is provided when required by IBC Section 1203.2 or IRC Section R806.
- Under-floor (crawl space) ventilation is provided and complies with IBC Sections 1203.4 [1203.3] or IRC Section R408.1, as applicable.
- Combustion air is provided in accordance with IMC (International Mechanical Code) Section 701.
- The EPS insulation is limited to the EPS Types, densities and thicknesses specified in Table 2A.

## 6.0 CONDITIONS OF USE

**6.1** Installation must comply with this Research Report, the manufacturer's published installation instructions, and the applicable Code. In the event of a conflict between the manufacturer's instructions and this report, this report governs.

**6.2** The end use of EPS insulation manufactured from the Starex SF polystyrene beads must be recognized in a current Research Report or as permitted by the building official.

**6.3** The Starex polystyrene beads are manufactured by Lotte Advanced Materials Co., Ltd. in Yeosu-Si, Jellanam-Do, 59616, Korea, under a quality control program with inspections by Intertek Testing Services NA Inc. (AA-647).

## 7.0 SUPPORTING EVIDENCE

**7.1** Reports of tests in accordance with: ASTM C578, ASTM

E84 (UL 723), NFPA 286, CAN/ULC-S701, and CAN/ULC-S102.2.

**7.2** Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2015 (editorially revised May 2016).

**7.3** Intertek Listing Report "Lotte Advanced Materials - Starex SF Grade H and Grade L Polystyrene Beads", on the [Intertek Directory of Building Products](#).

## 8.0 IDENTIFICATION

The Starex SF Grade H and Grade L polystyrene beads described in this Research Report are identified by a marking bearing the report holder's name (Lotte Advanced Materials Co., Ltd.), the product name, the Intertek Mark, the Code Compliance Research Report number (CCRR-1080), the manufacturing location, and the bead grade.

## 9.0 OTHER CODES

### 9.1 National Building Code of Canada:

EPS insulation products manufactured from Starex SF Grade H and Grade L polystyrene beads, with properties described in Sections 3.0, 4.0, 6.0, 7.0, and 8.0 of this Research Report, comply with CAN/ULC-S701 as Types 1 and 2 EPS; the products have a flame spread classification of 115 and a smoke developed classification of 435 when tested in accordance with CAN/ULC-S102.2. Therefore, the insulation products comply with the requirements of the following NBC articles: 3.1.4.2, 3.1.5.14 [3.1.5.12], 3.1.5.15, 3.1.12.1, 5.10.1.1 [5.11.1.1], 9.10.3.2, 9.10.17.10, 9.23.17.2, and 9.25.2.2.

## 10.0 CODE COMPLIANCE RESEARCH REPORT USE

**10.1** Approval of building products and/or materials can only be granted by a building official having legal authority in the specific jurisdiction where approval is sought.

**10.2** Code Compliance Research Reports shall not be used in any manner that implies an endorsement of the product by Intertek.

**10.3** Reference to <https://bpdirectory.intertek.com> is recommended to ascertain the current version and status of this report.

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**TABLE 1A – PROPERTIES EVALUATED – INTERNATIONAL CODES**

PROPERTY	IBC SECTION <sup>1</sup>	IRC SECTION <sup>1</sup>
Surface burning characteristics	2603.3	R316.3
Physical properties	N/A	R404.1.3.3.6.1
Attics and crawl spaces	2603.4.1.6	R316.5.3
	2603.9	R316.5.4

<sup>1</sup>Section numbers in parentheses refer to the 2012 and 2009 Codes

**TABLE 1B – PROPERTIES EVALUATED – NATIONAL BUILDING CODE OF CANADA**

PROPERTY	NBC ARTICLES <sup>1</sup>
Physical properties	5.10.1.1 [5.11.1.1], 9.25.2.2
Combustible insulation	3.1.5.14 [3.1.5.12.]
Foamed plastic insulation	3.1.5.15
Surface burning characteristics	3.1.12.1, 9.10.3.2
Thermal resistance	9.25.2.1, 9.36.2
Thermal barrier	3.1.4.2, 9.10.17.10

<sup>1</sup>Section numbers in parentheses refer to the 2010 NBC

**TABLE 2A – ALLOWABLE EPS PRODUCT DENSITY AND THICKNESS – ASTM C578**

EPS TYPE <sup>1</sup>	MINIMUM DENSITY (pcf)
I	0.90
II	1.35
VIII	1.15
IX	1.80

<sup>1</sup>Type as designated in ASTM C578

**TABLE 2B – ALLOWABLE EPS PRODUCT DENSITY – CAN/ULC-S701**

EPS TYPE <sup>1</sup>	MINIMUM DENSITY (kg/m <sup>3</sup> )
1	15
2	22

<sup>1</sup>Type as designated in CAN/ULC-S701

**TABLE 3 – MAXIMUM INSULATION THICKNESS FOR USE IN ATTICS OR CRAWL SPACES**

ASTM C578 TYPE	MAXIMUM THICKNESS (inches)
I	6.67
II	4.44
VIII	5.22
IX	3.00