

# ICC-ES Evaluation Report

ESR-4770

Reissued September 2024


This report also contains:

- CBC and CRC Supplement

Subject to renewal September 2026

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<p><b>DIVISION: 07 00 00—</b>  <b>THERMAL AND MOISTURE PROTECTION</b></p> <p><b>Section: 07 21 00—</b>  <b>Thermal Insulation</b></p>	<p><b>REPORT HOLDER:</b></p> <p><b>SH ENERGY &amp; CHEMICAL CO., LTD.</b></p>	<p><b>EVALUATION SUBJECT:</b></p> <p><b>ZEROPOL EXPANDABLE POLYSTYRENE BEADS, ZP GRADE</b></p>	
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## 1.0 EVALUATION SCOPE

**Compliance with the following codes:**

- 2021, 2018, 2015, 2012, 2009 and 2006 [International Building Code® \(IBC\)](#)
- 2021, 2018, 2015, 2012, 2009 and 2006 [International Residential Code® \(IRC\)](#)
- 2013 *Abu Dhabi International Building Code (ADIBC)*<sup>†</sup>

<sup>†</sup>The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

- 1997 *Uniform Building Code™ (UBC)*

**Properties evaluated:**

- Surface-burning characteristics
- Physical properties

## 2.0 USES

The ZEROPOL expandable polystyrene beads, ZP Grade, are used by independent manufacturers to produce expanded polystyrene (EPS) insulation boards.

## 3.0 DESCRIPTION

ZEROPOL expandable polystyrene ZP grade beads are designated as ZP-1600, ZP-2000, ZP-2500, and ZP-3000, and are used by independent manufacturers to produce expanded polystyrene (EPS) insulation boards. Boards manufactured with the ZEROPOL beads are produced solely through the introduction of heat, without other additives. This process expands the beads, which are then molded into insulation boards in minimum densities and maximum thicknesses no greater than those specified in [Table 1](#). The end use of the polystyrene beads, including the manufacture of boards, is beyond the scope of this report. At minimum densities and maximum thicknesses specified in [Table 1](#), insulation boards produced from the ZEROPOL beads have a flame-spread rating of 25 or less and a smoke-developed rating not exceeding 450 when tested in accordance with the ASTM E84 / UL 723.

ZEROPOL expandable polystyrene ZP grade beads have been qualified in accordance with Section 4.5.15.1.1 of the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12).

The expandable beads can be used to produce expanded polystyrene products that comply with ASTM C578, for the types specified in [Table 1](#), provided the final product is recognized in a current ICC-ES evaluation report and has been qualified in accordance with Section 4.5.15.1.2 of AC12.

## 4.0 DESIGN AND INSTALLATION

Installation is as noted in the corresponding ICC-ES evaluation reports on foam plastic assemblies, or as otherwise permitted in applicable codes noted in Section 1.0 of this report.

## 5.0 CONDITIONS OF USE:

The ZEROPOL ZP Grade Expandable Polystyrene Beads evaluated 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 maximum density and thickness of the insulation boards produced from expanded beads are noted in [Table 1](#) of this report.
- 5.2 Products manufactured from the polystyrene beads described in this report must be recognized in a current ICC-ES evaluation report.
- 5.3 Insulation boards produced from ZEROPOL ZP grade beads must be separated from the building interior by a thermal barrier complying with IBC Section 2603.4, IRC Section R316.4, and UBC Section 2602.4, as applicable.
- 5.4 The beads are produced by SH Energy & Chemical Co., Ltd., in Gunsan-Si, Korea, under a quality control program with inspections by ICC-ES.

## 6.0 EVIDENCE SUBMITTED

Data in accordance with the [ICC-ES Acceptance Criteria for Foam Plastic Insulation \(AC12\)](#), dated June 2015 (editorially revised December 2020).

## 7.0 IDENTIFICATION

- 7.1 Containers of ZEROPOL beads bear a label noting the component designation; the name and address of SH Energy & Chemical Co., Ltd.; the evaluation report number (ESR-4770); and the lot number.
- 7.2 The report holder's contact information is the following:

**SH ENERGY & CHEMICAL CO.**  
**LTD. 20, OEHANG 7-GIL,**  
**GUNSAN-SI, JEOLLABUK-DO**  
**SOUTH KOREA**  
**82-63-469-1547**  
[www.sh-enerchem.com](http://www.sh-enerchem.com)

TABLE 1—MAXIMUM INSULATION BOARD DENSITY AND THICKNESS

ASTM C578 TYPE	MINIMUM DENSITY (pcf)	MAXIMUM THICKNESS (inches)
I	0.90	6
VIII	1.15	6
II	1.35	6
IX	1.80	6

For SI: 1 pcf = 16.018 kg/m<sup>3</sup>, 1 inch = 25.4 mm.

**DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION**

**Section: 07 21 00—Thermal Insulation**

**REPORT HOLDER:**

SH ENERGY & CHEMICAL CO., LTD.

**EVALUATION SUBJECT:**

ZEROPOL EXPANDABLE POLYSTYRENE BEADS, ZP GRADE

**1.0 REPORT PURPOSE AND SCOPE**

**Purpose:**

The purpose of this evaluation report supplement is to indicate that Zeropol Expandable Polystyrene Beads, ZP Grade, described in ICC-ES evaluation report ESR-4770, have also been evaluated for compliance with the code(s) noted below.

**Applicable code edition(s):**

- 2022 and 2019 *California Building Code* (CBC)

For evaluation of applicable Chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2022 and 2019 *California Residential Code* (CRC)

**2.0 CONCLUSIONS**

**2.1 CBC:**

The Zeropol Expandable Polystyrene Beads, ZP Grade, described in Sections 2.0 through 7.0 of the evaluation report ESR-4770, comply with CBC Chapter 26, and the insulation boards produced from these beads also comply with CBC Chapter 26, provided the insulation boards are described in an ICC-ES evaluation report with a CBC Supplement and installation is in accordance with the 2021 and 2018 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapter 26, as applicable.

**2.2 OSHPD:**

The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

**2.3 DSA:**

The applicable DSA Sections and Chapters of the CBC are beyond the scope of this supplement.

**2.4 CRC:**

The Zeropol Expandable Polystyrene Beads, ZP Grade, described in Sections 2.0 through 7.0 of the evaluation report ESR-4770, comply with CRC Chapter 3, and the insulation boards produced from these beads also comply with CRC Chapter 3, provided the insulation boards are described in an ICC-ES evaluation report with a CRC Supplement and installation is in accordance with the 2021 and 2018 *International Residential Code*® (IRC) provisions noted in the evaluation report and the additional requirements of CRC Chapter 3, as applicable.

This supplement expires concurrently with the evaluation report, reissued September 2024.