

AQUA-PAK INDUSTRIES, LTD. PRODUCT EVALUATION

PRODUCT EVALUATED

QUAD-LOCK INSULATING CONCRETE FORMS (ICFS)

EVALUATION PROPERTY

ASTM E119, CAN/ULC-S101

REPORT NUMBER

103398714COQ-001

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02/12/18

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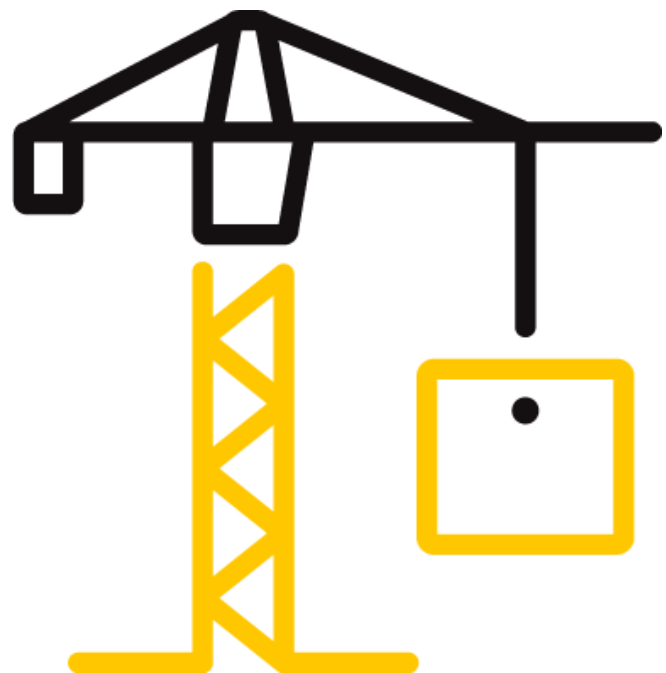
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8

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PRODUCT EVALUATION FOR AQUA-PAK INDUSTRIES, LTD.

Report No.: 103398714COQ-001

Date: 02/12/18

PRODUCT EVALUATION RENDERED TO:

Company Name:	Aqua-Pak Industries, Ltd., d.b.a. Quad-Lock Building Systems
Address:	7398 132 Street Surrey, BC, Canada V3W 4M7
Contact Person:	Douglas Bennion
Tel:	604-590-3111
Email:	douglas@quadlock.com

Table of Contents

Table of Contents	2
1 Introduction	3
2 Product and Assembly Description	3
2.1. Product Description:	3
2.2. Product Certification:	3
3 Reference Documents.....	3
4 Evaluation Method	4
5 Conclusion.....	5
6 APPENDIX	6
7 LAST PAGE & REVISION SUMMARY	8

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PRODUCT EVALUATION FOR AQUA-PAK INDUSTRIES, LTD.

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1 Introduction

Intertek Testing Services NA Ltd. (Intertek) is conducting a product evaluation for Aqua-Pak Industries, Ltd., d.b.a. Quad-Lock Building Systems, on the Quad-Lock Insulating Concrete Forms (ICFs), to evaluate fire resistance properties. The evaluation is being conducted to determine if the Quad-Lock Ultra and Plus Insulating Concrete Forms will maintain compliance with the fire-resistance requirements of ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, 2014; CAN/ULC-S101, *Standard Methods of Fire Endurance Tests of Building Construction and Materials*, 2007.

2 Product and Assembly Description

2.1. Product Description:

The Quad-Lock ICFs consist of two expanded polystyrene (EPS) foam plastic panels separated by injection-moulded high density polyethylene (HDPE) cross-ties, inserted into top and bottom edges of the EPS panels. The EPS panels have thicknesses of 2-1/4-inch, 3-1/8-inch and 4-1/4-inch, and are named as Regular, Ultra and Plus, respectively.

2.2. Product Certification:

This product is an Intertek certified product and is under Intertek ongoing surveillance through Intertek Follow-up inspections. The Intertek Listing Report Number for Quad-Lock Insulating Concrete Forms (ICFs) is 35720.

Authorities Having Jurisdiction (AHJ) should be consulted in all cases as to the particular requirements covering the installation and use of Intertek certified products, equipment, systems, devices and materials. The AHJ should be consulted before construction. Fire resistance assemblies and products are developed by the design submitter and have been investigated by Intertek for compliance with specific requirements. The published information (product and design listings) cannot always address every construction nuance encountered in the field. When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the test standard referenced for each Intertek certified product. The test standard includes specifics concerning alternate materials and alternate methods of construction. Only products which bear Intertek's Mark are considered as certified. The appearance of a company's name or product in Intertek Directory of Listed Building Products does not in itself assure that products so identified have been manufactured under Intertek's Follow-Up Service. Only those products bearing the Intertek Mark should be considered to be Listed and covered under Intertek's Follow-Up Service. Always verify the Mark on the product before using it.

3 Reference Documents

As part of this evaluation, Intertek has directly or indirectly used the following referenced documents:

- ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, 2014
- CAN/ULC-S101, *Standard Methods of Fire Endurance Tests of Building Construction and Materials*, 2007
- Spec ID No. 35720
- CCRR-1060
- UL File R25077, dated July 13, 2007

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Report No.: 103398714COQ-001

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4 Evaluation Method

The Quad-Lock Insulating Concrete Forms (ICFs) consist of two EPS panels separated by injection-moulded high density polyethylene (HDPE) cross-ties. The system has three different product categories named as Regular, Ultra and Plus. These products vary in EPS panel thickness: the Regular has a thickness of 2-1/4 inches, Ultra 3-1/8 inches and Plus 4-1/4 inches. The EPS panels are separated by the cross-ties to form the ICF core at thicknesses between 3-3/4 inches to 13-3/4 inches. Refer to Intertek CCRR-1060 for more product details.

The Quad-Lock Regular ICFs are listed by Intertek to the following fire-resistance ratings in Intertek CCRR-1060. The ratings below are applicable to both loadbearing of a maximum 29,800 lbf/lin.ft. wall types as well as non-loadbearing wall types.

Minimum Concrete Core Thickness (Inches)	Maximum Fire-Resistance Rating (Hours)
3-3/4	2
5-3/4	3
7-3/4	4

Table 1: Fire-resistance ratings of the Quad-Lock Regular ICFs.

Aqua-Pak now wishes to extend the fire-resistance ratings shown above to the Ultra and Plus ICFs.

The Quad-Lock Regular ICF was tested by Underwriter's Laboratories of Canada in July 2007 in accordance to ASTM E119; the test data was documented in UL File R25077. Intertek had previously reviewed the test data contained within and the test results were used as basis to grant the fire-resistance ratings to the Regular ICFs in CCRR-1060.

During the course of the test, the EPS panel on the exposed side was observed to have been completely consumed near the 16-minute 45-second mark. The concrete core was recorded to encounter the effects of spalling at the 21-minute 30-second mark. The forms remained in place without allowing any through flame penetration or temperature rise exceeding the limit in the remainder of the test.

In the event of a similar fire-resistance test on the Quad-Lock Ultra or Plus ICFs, the direct concrete exposure on the furnace side could be slightly delayed due to the thicker EPS form. As the EPS panel on the Regular ICF was consumed within 3 minutes, it would be expected that the Plus ICF to not last more than twice the duration on the furnace side. In this effect, similar to the original test, the majority of the fire-resistance would be endured by the concrete core directly, where the thickness of the EPS panel on the furnace side would have little effect on the system's fire-resistance performance. In effect, the Plus and Ultra ICFs should perform equally to the Regular ICF in terms of fire-resistance properties in a similar test.

This judgement is supported by Harmathy's Rule 2, where the fire resistance of a construction does not decrease with the addition of further layers.

Therefore, the fire-resistance ratings in Table 1 can be applied to the Quad-Lock Ultra and Plus ICFs.

PRODUCT EVALUATION FOR AQUA-PAK INDUSTRIES, LTD.

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5 Conclusion

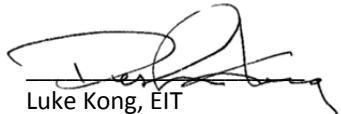
Intertek has conducted a product evaluation for Aqua-Pak Industries, Ltd., d.b.a. Quad-Lock Building Systems, on the Quad-Lock Insulating Concrete Forms (ICFs), to evaluate fire resistance properties. The evaluation was conducted to determine if the Quad-Lock Ultra and Plus Insulating Concrete Forms will maintain compliance with the fire-resistance requirements of ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, 2014; CAN/ULC-S101, *Standard Methods of Fire Endurance Tests of Building Construction and Materials*, 2007.

Based on the information contained and referenced herein, it is Intertek's professional judgment based on sound principles that the following is true:

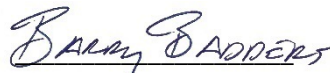
- The fire-resistance ratings of the Quad-Lock Regular Panels shown in Intertek CCRR-1060 can be applied to the Quad-Lock Ultra and Plus ICFs.
- Intertek CCRR-1060 will be revised to accommodate the judgement of this product evaluation for the Quad-Lock Ultra and Plus ICFs.

INTERTEK TESTING SERVICES NA LTD.

Reported by:


Luke Kong, EIT
Engineer, Evaluation Services

Reviewed by:


Barry L Badders, M.S., P.E.
Chief Engineer



Total Quality. Assured.

1500 Brigantine Drive
Coquitlam, BC, Canada V3K 7C1

Telephone: 604-520-3321

Facsimile: 604-524-9186

www.intertek.com/building

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Report No.: 103398714COQ-001

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6 APPENDIX



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1500 Brigantine Drive
Coquitlam, BC, Canada V3K 7C1

Telephone: 604-520-3321

Facsimile: 604-524-9186

www.intertek.com/building

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7 LAST PAGE & REVISION SUMMARY

DATE	SUMMARY	REPORTER	REVIEWER
February 12, 2018	Original	L. Kong	B. Badders