THERMAL RESISTANCE CALCULATIONS

CONDUCTED BY
EXOVA

FOR

NUDURA™ INTEGRATED BUILDING TECHNOLOGY
INSULATED CONCRETE FORMS

NOTE:

ON JAN 1st, 2017, THE COMPANY FORMERLY KNOWN AS “NUDURA CORPORATION” BECAME INCORPORATED UNDER THE COMPANY NAME OF “NUDURA INC.”

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THERMAL RESISTANCE CALCULATIONS OF NUDURA™ INSULATED CONCRETE FORM WALL SYSTEMS USING STANDARD ASHRAE THERMAL RESISTANCE VALUES

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Report No.:	10-06-M0083 B 3 Pages, 1 Appendix
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1.0 INTRODUCTION

At the request of NUDURA Corporation, Exova was retained to re-calculate the theoretical thermal resistance value of a wall system using standard theoretical values published in the *ASHRAE Fundamentals Handbook, 2009.*

The modified calculations are based on the client's intentions to change the 2.5 inch thick EPS foam density from 1.3 lb/ft^3 to 1.4 lb/ft^3 on the original "NUDURA^{TM} Insulated Concrete Form Wall System".

The initial calculations and assumptions are shown in the Appendix A: "Bodycote Materials testing Canada Inc., Report No. 01-06-M0379-3 Revision 1".

The wall system was assigned the following Exova Identification No.:

Client Wall-System Configuration	Exova Identification No.
NUDURA^{TM} Insulated Concrete Form Wall System".	10-06-M0083 B

2.0 PROCEDURE

ASHRAE Fundamentals handbook, 2009, Chapters 23, 25 and 26 were utilized to calculate the theoretical thermal resistance value of the wall systems. It should be noted that the values calculated in this report are the apparent value only and may change significantly when used as a system.

Reference Description	Reference No.
Annex 1: Bodycote Materials testing Canada Inc., Report No. 01-06-M0379-3 Revision 1 dated September 21, 2004 originated by Paul Chislom, P.Eng: *Thermal Resistance calculations of NUDURA TM Insulated Concrete Form.* Except inner and outer insulation thickness 65 mm instead of 63 mm and foam density 1.4 pcf (22.425 kg/m^3) instead of 1.3 pcf (21 kg/m^3); Assumptions: λ=0.035 instead of 0.036 W/m.K.	Annex 1

3.0 RESULTS

A summary of results is presented below in Table1. A detailed presentation of the values used in the total thermal resistance calculation is provided in Appendix B. In all cases, SI units are the primary units of measure.

Table 1 – Summary of Theoretical Thermal Transmission Values
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Configuration	Total Thermal Resistance		
	R-value $^oF.ft^2.h/Btu$	RSI-value m^2K/W	U-value W/m^2K
Outdoor Film (Winter Condition)	0.17	0.029	34.482
Siding (Hollow backed vinyl/steel)	0.61	0.107	9.345
Outer Insulation Panel	10.55	1.86	0.537
Concrete Core	0.58	0.102	9.804
Inner Insulation Panel	10.55	1.86	0.537
Gypsum Wallboard	0.45	0.080	12.5
Indoor Film	0.68	0.120	8.33
Total R-Value / RSI or U value	**23.59**	**4.158**	**0.2405**

4.0 CONCLUSION

The specified system configurations of NUDURA™ Insulated Concrete Form Wall Systems, as provided in this report, have theoretical thermal resistance values as shown in Table 1, calculated based on standard ASHRAE thermal resistance values.

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