PRIEST & ASSOCIATES CONSULTING, LLC

April 12, 2018

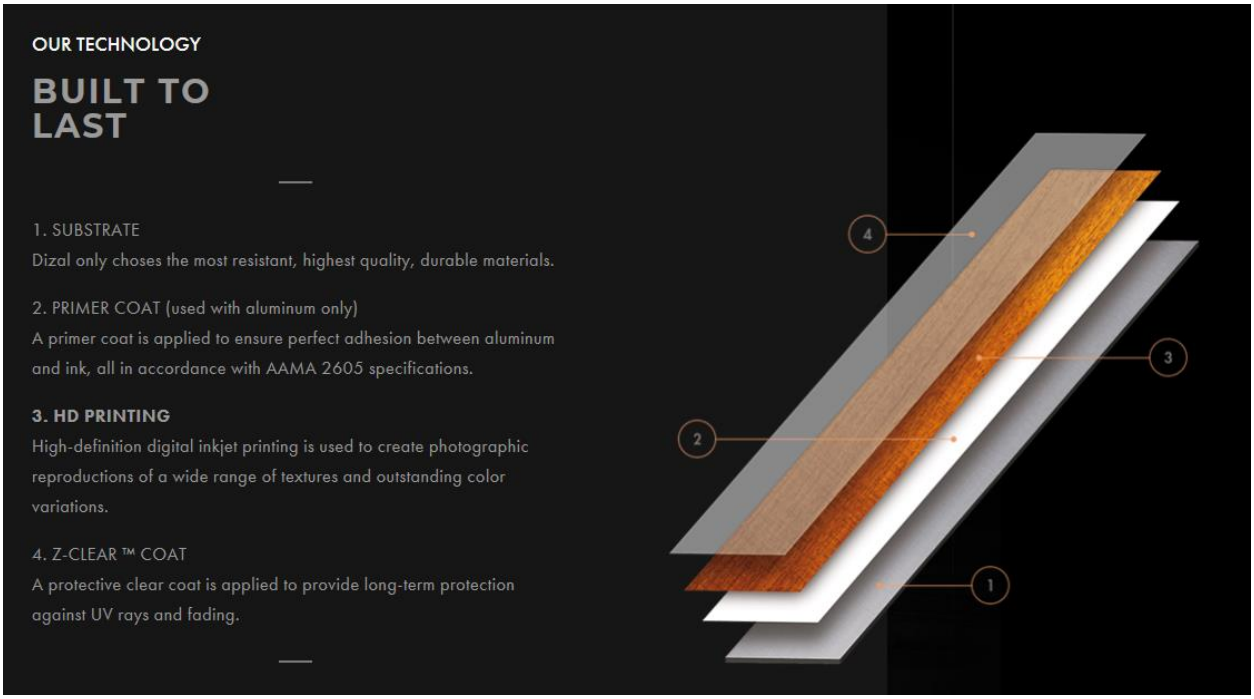
Joël Côté-Cright
Dizal
4000 rue Jean-Marchand, Local 108
Quebec, QC G2C 1Y6

Re: Project 10603, Revision 1
Use of Dizal Aluminum Siding/Cladding in NFPA 285 Assemblies

Dear Mr. Côté-Cright:

The purpose of this letter is to demonstrate equivalence and compliance for the use of the Dizal Aluminum Siding/Cladding in NFPA 285 assemblies. The system consists of an aluminum sheet with a primer layer, an HD printing layer, and a Z-clear coat layer.

The illustration below shows the product.



The product meets noncombustibility requirements (Ref. Exova Report 18-002-123 Can ULC S114) when tested at 750°C. This test is similar to ASTM E136 for use in the United States.

TEST RESULTS

CAN/ULC-S114-05
Standard Method of Test for Determination
of Non-Combustibility in Building Materials

Trial	Maximum Temperature Rise (C°)	Flaming During Last 14.5 min.?	Specimen Initial Weight(g)	Specimen Final Weight (g)	**Percent Weight Loss**
1	**	No	189.20	189.19	**0.01**
2	**	No	186.48	186.47	**0.01**
3	**	No	186.90	186.89	**0.01**
Mean:	**				
Maxima Specified by CAN/ULC-S114:	36 (mean)	No			**20.0** (individual)

** The temperature never exceeded the initial stabilized furnace temperature.

OBSERVATIONS

In all cases, no ignition was observed.

The products meets Class A (0/0) FSI/SDI requirements (Ref. Exova Report 16-002-517A, ASTM E84).

TEST RESULTS

SAMPLE	Flame Spread Index (FSI)	Smoke Developed Index (SDI)
"Digitally Printed Aluminum Siding"	0	0

Engineering Extensions

There are many NFPA 285 approvals which allow sheet aluminum as a cladding material where the underlying materials may consist of various types of insulation, WRB, sheathings, wall framing, and interior sheathing. The allowance of sheet aluminum in NFPA 285 approvals is almost always based on test results with a cladding of Aluminum Composite Panels (ACM/MCM/ACP, etc.). These products not only melt but also ignite and spread flames in NFPA 285 fire tests if the core is exposed. For this reason, this cladding is considered worst case when tested with combustible underlying components. Testing with ACM allows the use of sheet aluminum cladding because the sheet aluminum can only melt (no ignition or flame spread of the cladding).

The fire test results above (no ignition, no flame spread) indicate that Dizal Aluminum Siding/Cladding will behave like sheet aluminum in NFPA 285 fire tests. For this reason, this product can replace ACM cladding in NFPA 285 approved assemblies.

A large list of approved NFPA 285 approved assemblies can be found in DRJ Engineering DRR 1202-04 (table page 3-4). This document lists most of the known NFPA 285 approvals for various brands of polyiso insulation.

http://www.drjengineering.org/system/files/drj/ter/node/56/drr120204foamintypeiivconstruction.pdf

To see the NFPA 285 approval for each insulation, go to the website above and click on each foam approval (in Code Evaluation Report Column – see table below) to download the TER or ESR or NFPA 285 approval report for each manufacturer (i.e., NFPA 285 table).

Research Report

Foam Plastic Insulating Sheathing Products in Exterior Walls of Type I, II, III or IV Construction

DRR No. 1202-04

Issue Date: May 7, 2012
Updated: January 8, 2016

Foam Sheathing Committee (FSC) Members

Atlas Roofing Corporation – atlasroofing.com, atlaswallci.com, atlaseps.com
Dow Building Solutions – building.dow.com
GAF – gaf.com
Hunter Panels – hpanels.com
Johns Manville – jm.com
Kingspan Insulation, LLC – kingspan.com
Owens Corning – owenscorning.com
Rmax Operating, LLC – rmax.com

DIVISION: 07 00 00 – THERMAL AND MOISTURE PROTECTION
Section: 07 21 00 – Thermal Insulation

Product Code Compliance									
Manufacturer	Product	Code Evaluation Reports	2603.5.1 ASTM E 119[1]	2603.5.2 Thermal Barrier Req'd	2603.5.3 *NFPA 259*	2603.5.4 FSI / SDI[2]	2603.5.5 *NFPA 285*	2603.5.6 Label Req'd	2603.5.7 *NFPA 268*
Atlas Roofing	Energy Shield®	ESR 1375[3]	N	Y	N	Y	N	Y	N
	Energy Shield® Pro	TER No. 1306-03 ESR 1375 Intertek Warnock Hersey Directory	Y	N	Y	Y	Y	Y	N
	Energy Shield® Pro 2								
	Rboard® Pro	TER No 1306-03	Y	Y	Y	Y	Y	Y	N
	ThermalStar® Chrome	BRYX.R16529	Y	Y	Y	Y	Y	Y	N
	ThermalStar® CVT		Y	N	Y	Y	N	Y	N
	ThermalStar® LCi		Y	N	Y	Y	Y	Y	N
Dow	THERMAX™	ESR 1659	Y	N[4]	Y	Y	Y	Y	N
	THERMAX™ ci Exterior Insulation	ESR 1659 TER No. 1105-01	N	N	Y	Y	Y	Y	N
	Thermax™ Total Wall System	ESR 1659	N	Y	Y	Y	Y	Y	N
	STYROFOAM™	ESR 2142	N	N[4]	Y	Y	Y	Y	N
Hunter Panels	Xci Class A	TER No. 1402-01	N	Y	Y	Y	Y	Y	N
	Xci 286								
	Xci Foil	TER No. 1402-02	N	Y	Y	N[5]	Y	Y	N
	Xci CG								
	Xci Ply		N	N	Y	N[5]	Y	Y	N
Johns Manville	JM AP™ Foil-Faced	ESR 3398	N	Y	Y	Y	Y	Y	N
	JM CI Max®		N	Y	N	Y	N	Y	N
Kingspan	GreenGuard® CM	TER No. 1407-05	N	Y[7]	N	Y	Y	Y	N
	GreenGuard® SL								
	GreenGuard® SB								

DrJ Research Report

Product Code Compliance									
Manufacturer	Product	Code Evaluation Reports	2603.5.1 ASTM E 119[1]	2603.5.2 Thermal Barrier Req'd	2603.5.3 *NFPA 259*	2603.5.4 FSI / SDI[2]	2603.5.5 *NFPA 285*	2603.5.6 Label Req'd	2603.5.7 *NFPA 268*
Owens Corning	FOAMULAR® 150, 250, 400, 600 & 1000	UL ER 8811-01	Y	Y	Y	Y	Y	Y	N
Rmax	ECOMAXci™ Wall Solution	TER No. 1212-03	N	Y	Y	Y	Y	Y	N
	Durasheath®-3	ROL/BI 30-03 TER No. 1309-03	N	Y	N	N	N	Y	N
	Thermasheath®-3								
	Thermasheath®-XP	TER No. 1309-03	N	N[5]	N	N	Y	Y	N
	TSX 8500	TER No. 1309-03	N	N[5]	Y	Y	Y	Y	Y
	TSX-8510								
	TSX-8520								
	ECOBASEci™	TER No. 1504-04	N	N[8]	N	N[6]	Y	Y	N

1. For products indicating that *ASTM E119* testing has been done, contact manufacturer for testing details. To contact a manufacturer, see company websites listed on Page 1.
2. Flame Spread Index / Smoke Developed Index.
3. This product has been tested in accordance with *IBC* Section 2603.10 and is approved for use without a thermal barrier for thicknesses up to 4¼" thick.
4. Depends on type and thickness.
5. This product has been tested in accordance with *IBC* Section 2603.10 and is approved for use without a thermal barrier for thicknesses up to 4½" thick in walls and 12" thick in ceilings.
6. This is a Class B product with a flame spread index less than 75, but it is approved for use in this application based on full scale fire tests. See code evaluation report for details.
7. Thermal or ignition barrier not required in attics and crawl spaces in accordance with *IBC* Section 2603.4.1.6.
8. Barrier required when installed with FRT plywood facing exterior

Table 1: Product Code Compliance

If an NFPA approval table lists ACM or MCM or ACP or Aluminum Composite Cladding tested per NFPA 285 (or similar language), then Dizal Aluminum Siding/Cladding can replace the ACM.

Below is one example (Ref. TER 1402-01 item 7):

Technical Evaluation Report (TER)

Items 8, 9, or 12 may use any standard installation technique.	5. Cast Artificial Stone – Minimum 1½" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. 6. Terra Cotta Cladding – Minimum 1¼" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Any MCM that has passed *NFPA 285.* 8. Uninsulated sheet metal building panels including steel, copper, aluminum or zinc. 9. ¼" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 10. Stone, porcelain, ceramic/aluminum honeycomb composite building panels that have successfully passed *NFPA 285* criteria. 11. Autoclaved-aerated-concrete (AAC) panels that have successfully passed *NFPA 285* criteria. 12. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. ½" thick) with ventilated shiplap. 13. ½" Stucco – Any one coat stucco (½" min.) that meets AC11 acceptance criteria or is approved for use in Type I-IV construction or has been tested per *NFPA 285* or stays in place when tested per *ASTM E119* (stucco exposed to fire) for at least 30 minutes. 14. Thin brick/cultured stone set in thin set adhesive and metal lath that has been tested to *ASTM E119* (brick exposed to furnace) and remains in place for a minimum of 30 minutes, or has passed a *NFPA 285* test. Minimum ¾". For these systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #9 in WRB Over Exterior Insulation (Table 9) can be used as a slip sheet between the WRB/AVP and the lath. 15. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with ½"-thick bricks using TABS Wall Adhesive. 16. Natural Stone Veneer – minimum 1¼" thick using any standard installation technique. 17. FunderMax M.Look Grey Core – minimum ¼" thick using any standard installation technique

All allowances in each NFPA 285 approval are only to be used within that NFPA 285 approval. It is not permissible to use components from one NFPA 285 approval in a different NFPA 285 approval. Each approval is unique. These components include (examples from TER 1402-01):

Base Wall Types and floor line firestop

NFPA 285 **Approved Wall Assemblies with Xci Foil (Class A) or Xci 286 as Exterior Insulation[1,4]**	
Wall Component	**Materials**
Base Wall System Use either 1, 2, 3 or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge min. 3⅝" (min.) steel studs spaced 24" o.c. (max.) a. ⅝" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW (fire-retardant-treated wood) studs: min. nominal 2x4 dimension, spaced 24" o.c. (max.) a. ⅝" Type X gypsum wallboard interior b. Bracing as required by code
Fire-Stopping at Floor Lines	1. Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. 2. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.

Interior sheathing (see above)
Studs (see above)

Cavity Insulation

Cavity Insulation Use either 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or 11. Note: For items 2, 3, 8, 9, 10 and 11 spray foam may not be used in constructions that utilize a foil faced exterior insulation and do not utilize an exterior sheathing. Items 2, 3, 8, 9, 10 and 11 may only be used with exterior sheathing 2.	1. None 2. 1½" (min.) of Bayer EcoBay CC SPF (up to full cavity thickness) 3. 1½" (min.) of BASF Walltite SPF (up to full cavity thickness) 4. Any noncombustible insulation per *ASTM E136* 5. Any mineral fiber (Board type Class A *ASTM E84* faced or unfaced) 6. Any fiberglass (Batt type Class A *ASTM E84* faced or unfaced) 7. Any foam plastic insulation (SPF or board type) that has been tested per *ASTM E1354* (at a min. of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{ign}, PK. HRR) than Bayer EcoBay CC or BASF Walltite 8. NCFI InsulBloc SPF (up to full cavity thickness) 9. Icynene MD-C-200v3 (Proseal) up to 5½ inches (only with ½ in. [min.] exterior gypsum sheathing) 10. SWD Urethane Quik-Shiled 112 up to 6 inch (max.) stud cavities with an air gap not exceeding 2½" 11. 1½" (min.) Thermoseal 2000 (up to full cavity thickness)

Exterior sheathing

Exterior Sheathing Use either 1, 2 or 3	1. None (only with cavity insulation 1, 4, 5 or 6) 2. ½" or thicker exterior gypsum sheathing 3. ½" (min.) FRTW structural panels in Type III construction

WRB on Base Wall, Insulation, WRB on Insulation

WRB Over Base Wall Surface	1. See Table 9
Exterior Insulation Use either 1 or 2 depending on cladding. Note: A construction which utilizes no exterior sheathing may not use spray foam cavity insulation	1. 3½"-thick (max.) Xci Foil (Class A) or Xci-286 for all claddings. 2. 4" thick Xci Foil (Class A) or Xci-286 for claddings 1-6
WRB Over Exterior Insulation	1. See Table 9

Cladding - Where ACM or MCM or similar is listed, the cladding may be Dizal Aluminum Siding/Cladding as referenced in this report. (See example page 4).

Limitations

It is important to note that certain details must be followed:

1) The attachment system must be a simple metallic system (or NFPA 285 approved systems that are not metallic) that meets wind load requirements.
2) The air gap created between the cladding and combustible insulation or WRB (when insulation is used) should not exceed that which was tested. This is typically in the 1 to 2.25 inch range.
3) When 1 inch 4 pcf mineral wool non-combustible insulation is used on the exterior (over a combustible WRB), the air gap between the cladding and insulation can exceed 2.25 inches since nothing can ignite (cladding, insulation, WRB). This is based on testing we have seen where a highly combustible WRB was tested under 1 inch 4 pcf mineral wool at heating conditions exceeding the NFPA 285 fire test and ignition did not occur
4) It is permissible to replace the combustible exterior insulation with mineral wool (1 inch 4 pcf) since it is non-combustible compared to the combustible insulation and protects the WRB from ignition.
5) It is permissible to use no insulation – but the wall exterior must have a WRB. The WRB must be one listed for use over polyiso (under the cladding). Removing the insulation reduces the combustible fuel and improves the fire design – bit only when exposed WRB's are allowed under the cladding.
    a. At the client's request, we list Cosella-Dörken Delta Fassade S since it is allowed over Hunter insulation in TER 1402-01 which is listed in DRR 1202-04.
    b. Below are other examples from TER 1402-01

WRB Over Exterior Insulation Use either 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17 or 18 Note: Some WRB's are only allowed with specific systems	1. None 2. Carlisle Fire Resist 705 VP (with 702 WB, Cav-Grip, or Low VOC Travel-Tack adhesives), Fire Resist 705 FR-A (with CCW 702, 702LV, 702 WB, CAV-Grip, and Low VOC Travel Adhesives), Fire Resist Barritech VP (or VP LT), Fire Resist Barritech NP 3. GE Momentive SEC 2500 SilShield 4. Vaproshield Wrapshield SA, RevealShield SA 5. Grace Perm-A-Barrier® NPL (AKA: PAB NP20), Perm-A-Barrier® VPL, Perm-A-Barrier® Aluminum Wall Membrane (AWM), Perm-A-Barrier® VPL LT, Perm-A-Barrier® VPS. 6. Henry Air-Bloc 17MR, 21S, 31MR, Blueskin VP160 (only with Xci Ply [Class A]), 33MR and 16MR. 7. Tyvek CommercialWrap. 8. PolyGuard Air Lok Flex VP, FlexGuard, Air Lok Flex (only with claddings 1-6) (Table 3) 9. Prosoco R-Guard Cat 5, R-Guard Cat 5 Rainscreen, R-Guard VB or R-Guard Spray Wrap MVP 10. Sto Gold coat or Emerald Coat (only with Xci-Ply [ClassA]) 11. Dryvit Backstop NT 12. Any WRB that has been tested per *ASTM E1354* (at a minimum of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{ign}, Pk. HRR) than those listed above 13. 3" Aluma-GRIP 701 or 4" FG-1402 joint tape may be interchanged. (Hardcast AFT is a rebrand of Aluma-GRIP 701). 14. WR Meadows Air Shield LMP (Gray), Air Shield LMP (Black), Air Shield TMP, Air Shield LSR 15. Cosella-Dörken Products, Inc., Delta-Vent SA, Delta-Vent S, Delta-Fassade S, Delta Maxx. 16. Soprema Sopraseal Stick VP, Soprasolin HD 17. Pecora XL Perm Ultra VP 18. Siga Majvest
2. CCW LM 800 XL adhesive applied discontinuously at a rate of 3/8" x 3" dabs, 16" o.c. may be used to adhere exterior insulation to WRB over sheathing, concrete or CMU for those applications requiring this adhesive to be used.	

Conclusion

Based on the information above,

1) The fire test results above (no ignition, no flame spread) indicate that Dizal Aluminum Siding/Cladding will behave like sheet aluminum in NFPA 285 fire tests. For this reason, this product can replace ACM cladding in NFPA 285 approved assemblies.

2) If an NFPA approval table lists ACM or MCM or ACP or Aluminum Composite Cladding tested per NFPA 285 (or similar language), then Dizal Aluminum Siding/Cladding can replace the ACM.

If you have any comments or questions, please contact us at your convenience.

Written by,

Javier Trevino
Associate Engineer
210-601-0655

April 12, 2018

Reviewed and Approved,

Deg Priest
President

April 12, 2018