



**PRIEST & ASSOCIATES
CONSULTING, LLC**

September 13, 2022

Ron Factor
Geolam, Inc.
9 Shorncliffe Ave
Toronto, ONT M4V 1S9

Re: Project No. 11017B
Geolam compliance with IBC 2018 (703.5.2) and ASTM E136 (Appendix)

Dear Mr. Factor:

This Engineering Letter addresses the subject of Geolam Architectural Elements (various Soleo, Planeo, Diameo, Rondo, Careo), and Cladding and Soffit products (Vertigo 5010) compliance with IBC 2018 (703.5.2) and ASTM E136 (Appendix). This only applies to products with a WPC (veneer ID PP or PPA or PVC) thickness of 0.7 mm or less.

The products' profiles are shown below.

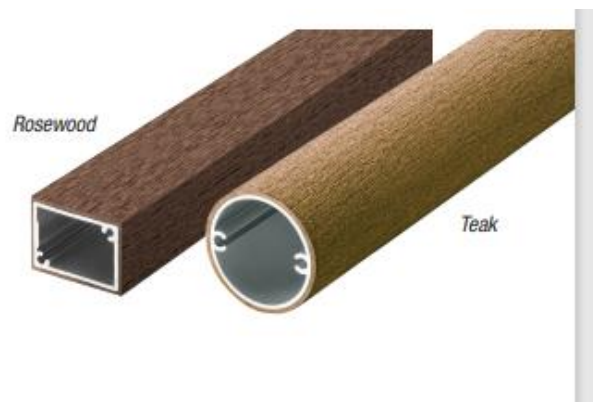
(Ref. https://usa.geolam.com/wp-content/uploads/2022/08/Geolam_Catalog_Aug2022-1.pdf)

This document provides an expert opinion on the properties of the materials, products, or assemblies identified in this report related to meeting a specific code or standard. Suitability to use is to be determined by the end-user.

Architectural Elements

HYBRID ALUMINUM/WPC

Available in Teak, Moleskin, Rosewood and Ebony




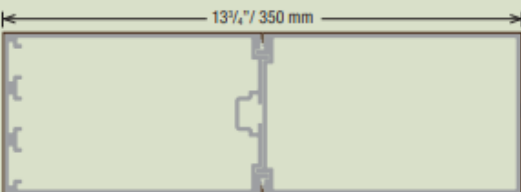
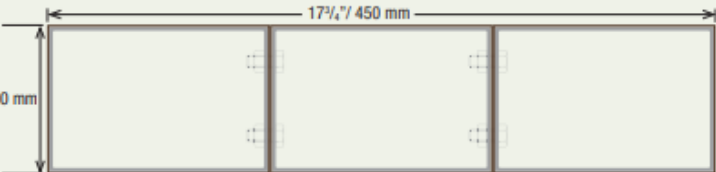
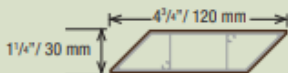
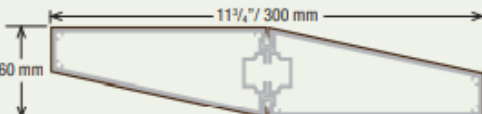
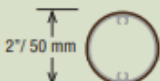


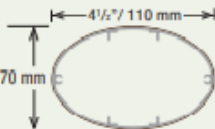
	Dimensions	Weight	End caps		Connectors	
			Plastic	WPC	Straight	Corner
Soleo 6027 <i>Minimum 1,000 lineal ft for all colors. Standard Length - 9 ft 10 in.</i>		0.74 kg/lm 0.50 lb/ft	✓			
Soleo 6005 <i>Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.</i>		0.60 kg/lm 0.40 lb/ft				
Soleo 6008 <i>Teak and Rosewood stocked in the US; no minimum. Minimum 1,000 lineal ft for Moleskin and Ebony. Standard Length - 9 ft 10 in.</i>		0.77 kg/lm 0.52 lb/ft		✓	✓	✓
Soleo 6029 <i>Minimum 1,000 lineal ft for all colors. Standard Length - 9 ft 10 in.</i>		1.00 kg/lm 0.67 lb/ft		✓		
Soleo 6026 <i>Minimum 1,000 lineal ft for all colors. Standard Length - 9 ft 10 in.</i>		1.05 kg/lm 0.71 lb/ft	✓			
Soleo 6011 <i>Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.</i>		1.12 kg/lm 0.75 lb/ft				
Soleo 6030 <i>Minimum 1,000 lineal ft for all colors. Standard Length - 9 ft 10 in.</i>		1.20 kg/lm 0.81 lb/ft		✓	✓	✓
Soleo 6017 <i>Minimum 1,000 lineal ft for all colors. Standard Length - 9 ft 10 in.</i>		1.60 kg/lm 1.08 lb/ft	✓			
Soleo 6036 <i>Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.</i>		1.00 kg/lm 0.67 lb/ft				
Soleo 6009 <i>Minimum 1,000 lineal ft for all colors. Standard Length - 9 ft 10 in.</i>		1.40 kg/lm 0.94 lb/ft		✓	✓	✓



	Dimensions	Weight	End caps		Connectors	
			Plastic	WPC	Straight	Corner
Soleo 6034 Minimum 1,000 lineal ft for all colors. Standard Length - 9 ft 10 in.		1.94 kg/lm 1.30 lb/ft	✓			
Soleo 6031 Teak and Rosewood stocked in the US; no minimum. Minimum 1,000 lineal ft for Moleskin and Ebony. Standard Length - 9 ft 10 in.		1.60 kg/lm 1.08 lb/ft		✓	✓	
Soleo 6010 Teak and Rosewood stocked in the US; no minimum. Minimum 1,000 lineal ft for Moleskin and Ebony. Standard Length - 9 ft 10 in.		2.30 kg/lm 1.55 lb/ft		✓	✓	✓
Soleo 6038 Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		2.00 kg/lm 1.34 lb/ft				
Soleo 6024 Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		2.06 kg/lm 1.38 lb/ft				
Soleo 6040 Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		2.40 kg/lm 1.61 lb/ft				
Soleo 6050 Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		3.90 kg/lm 2.62 lb/ft				
Soleo 6033 Teak and Rosewood stocked in the US; no minimum. Minimum 1,000 lineal ft for Moleskin and Ebony. Standard Length - 9 ft 10 in.		3.30 kg/lm 2.22 lb/ft	✓		✓	
Planeo 4010 Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		2.21 kg/lm 1.49 lb/ft				
Planeo 4044* Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		4.52 kg/lm 3.04 lb/ft				
Planeo 4123* Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		3.74 kg/lm 2.51 lb/ft				
Planeo 4048* Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		4.80 kg/lm 3.23 lb/ft				

* Planeo boards cannot be cut within the bolts at either board end. Refer to Architectural Elements Installation Guide for more details.



		Dimensions	Weight	End caps Plastic	WPC	Connectors Straight	Connectors Corner
Planeo 4061*	Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		9.50 kg/lm 6.38 lb/ft				
Planeo 4046*	Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		9.90 kg/lm 6.65 lb/ft				
Planeo 4062*	Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		14.25 kg/lm 9.58 lb/ft				
Diameo 2018	Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		1.42 kg/lm 0.95 lb/ft	✓		✓	
Diameo 2023	Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		7.43 kg/lm 4.99 lb/ft				
Rondo 3002	Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		0.95 kg/lm 0.64 lb/ft				
Rondo 3003	Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		1.14 kg/lm 0.77 lb/ft				
Rondo 3004	Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		2.47 kg/lm 1.66 lb/ft				
Rondo 3006	Minimum 1,600 lineal ft for all colors. Standard Length - 9 ft 10 in.		1.72 kg/lm 1.16 lb/ft				

* Planeo boards cannot be cut within the bolts at either board end. Refer to Architectural Elements Installation Guide for more details.



		Dimensions	Weight	End caps		Connectors	
				Plastic	WPC	Straight	Corner
Careo 7010	Minimum 1,000 lineal ft. for all colors. Standard Length - 9 ft 10 in.		0.74 kg/lm 0.50 lb/ft				
Careo 7031	Minimum 1,600 lineal ft. for all colors. Standard Length - 9 ft 10 in.		0.82 kg/lm 0.55 lb/ft				
Careo 7011	Minimum 1,000 lineal ft. for all colors. Standard Length - 9 ft 10 in.		1.34 kg/lm 0.90 lb/ft			✓	
Careo 7035	Minimum 1,000 lineal ft. for all colors. Standard Length - 9 ft 10 in.		2.28 kg/lm 1.53 lb/ft				
Careo 7014	Minimum 1,000 lineal ft. for all colors. Standard Length - 9 ft 10 in.		2.80 kg/lm 1.88 lb/ft		✓		
Careo 7016	Minimum 1,600 lineal ft. for all colors. Standard Length - 9 ft 10 in.		4.00 kg/lm 2.69 lb/ft				



Cladding & Soffit

HYBRID ALUMINUM/WPC

Available in Teak, Moleskin, Rosewood and Ebony



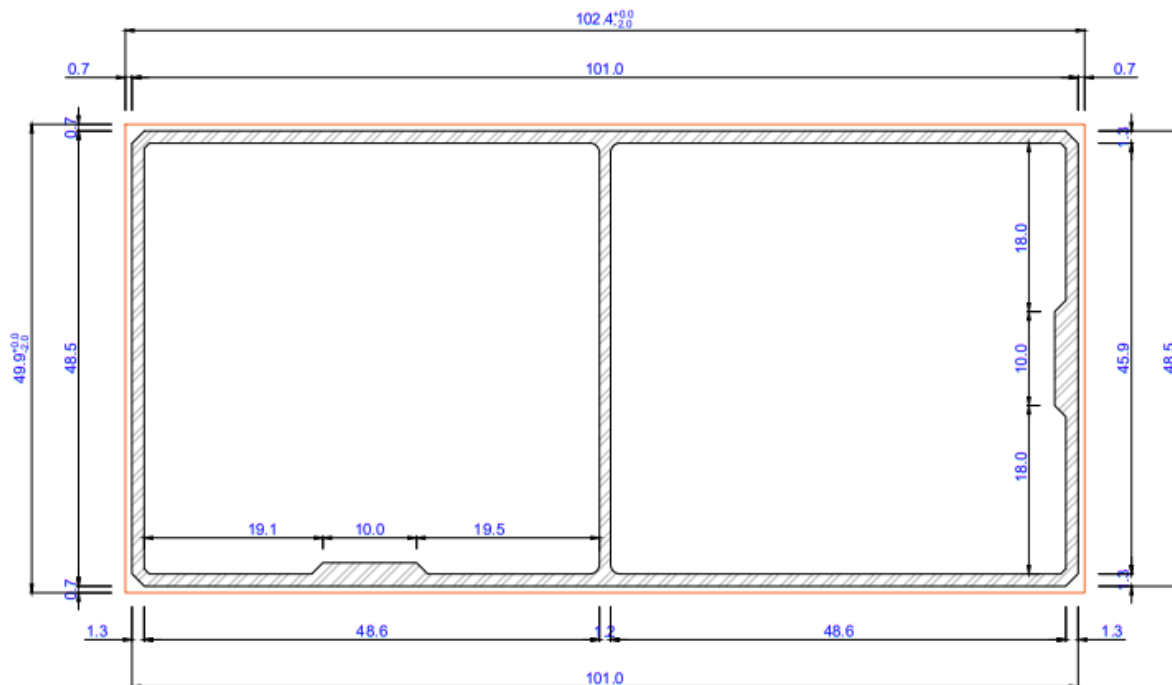
Outside Corner
9322

2-piece Starter
(J-trim) 9321

		Dimensions	Weight
Vertigo 5010	Minimum 5000 lineal ft or 2500 sq ft for all colors. Standard Length - 12 ft.		1.19 kg/lm 0.80 lb/ft
Vertigo 5010	All colors stocked in the US; no minimum. Standard Length - 12 ft.		1.19 kg/lm 0.80 lb/ft

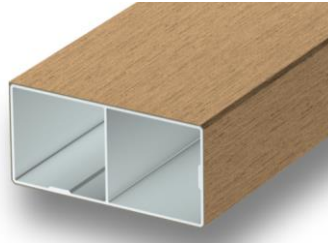
Scope

This analysis only applies to Geolam products (various Soleo, Planeo, Diameo, Rondo, Careo) and Cladding and Soffit products (Vertigo 5010)) with a WPC (veneer ID PP, PPA, or PVC) thickness of 0.7 mm or less. See the example below.



Tested Products

Three different Geolam Soleo 6020 products were tested per ASTM E84 as a representative of the profiles listed above with three different chemistries.



All three of these had a veneer thickness of 0.7mm. The materials and test results are listed below:

Specimen I.D.: Soleo 6020 PVC by Geolam, Inc.

ASTM E84 Test Results

FLAME SPREAD INDEX	SMOKE DEVELOPED INDEX
15	300

Ref. Intertek Report p1619.01-121-24-r0

Specimen I.D.: Soleo 6020 PPA by Geolam, Inc.

ASTM E84 Test Results

FLAME SPREAD INDEX	SMOKE DEVELOPED INDEX
25	250

Ref. Intertek Report p1619.02-121-24-r0

Specimen I.D.: Soleo 6020 PP by Geolam, Inc.

ASTM E84 Test Results

FLAME SPREAD INDEX	SMOKE DEVELOPED INDEX
35	125

Ref. Intertek Report p1619.03-121-24-r0

Codes and Standards

The following codes and standards delineate an interpretation for noncombustible composite finished products.

IBC 2018 (703.5.2)

703.5 Noncombustibility tests.

The tests indicated in Sections 703.5.1 and 703.5.2 shall serve as criteria for acceptance of building materials as set forth in Sections 602.2, 602.3 and 602.4 in Types I, II, III and IV construction. The term “noncombustible” does not apply to the flame spread characteristics of interior finish or trim materials. A material shall not be classified as a noncombustible building



construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

703.5.1 Elementary materials.

Materials required to be noncombustible shall be tested in accordance with ASTM E136.

703.5.2 Composite materials.

Materials having a structural base of noncombustible materials as determined in accordance with Section 703.5.1 with a surfacing not more than 0.125 inch (3.18 mm) thick that has a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible materials.

ASTM E136-16a Appendix, Exception B

Noncombustible as applied to a building construction material means a material that, in the form in which it is used, falls in one of the following groups (a) through (c). It does not apply to surface finish materials nor to the determination of whether a material is noncombustible from the standpoint of clearances to heating appliances, flues or other sources of high temperature. No material shall be classed as noncombustible which is subject to increase in combustibility or flame spread rating beyond the limits herein established, through the effects of age, moisture or other atmospheric condition. Flame spread rating as used herein refers to ratings obtained in accordance with Test Method E84.

a) Materials no part of which will ignite and burn when subjected to fire. Any material that liberates flammable gas when heated to a temperature of 750°C (1382°F), for 5 min shall not be considered noncombustible within the meaning of this paragraph.

b) Materials having a structural base of noncombustible material, as defined in (a), with a surfacing not over 1/8-in. thick that has a flame spread rating not higher than 50.

c) Materials, other than as described in (a) or (b), having a surface flame spread rating not higher than 25 without evidence of continued progressive combustion and of such composition that surfaces that would be exposed by cutting through the material in any way would not have a flame spread rating higher than 25 without evidence of continued progressive combustion.



X1.2.4 In adopting this definition, NBFU stated that it was based on a determination of which materials “could be properly classed as noncombustible and then fixing the qualifying conditions in the definition to include these materials.” The definition was considered to apply to materials used for the walls, roofs, or other structural parts of buildings, but not to surface finish materials and not to the determination of whether a material is noncombustible from the standpoint of clearances to heating appliances, flues, or other sources of high temperature.

Analysis

- 1) The products that are similarly constructed to Soleo 6020 (PVC, PPA, PP) with a base of aluminum and a veneer thickness of 0.7 mm or less are expected to perform similarly to the three tested systems as referenced in the ASTM E84 reports submitted.
- 2) All the products listed herein are expected to produce an FSI < 50 per E84 when Item 1 is met.
- 3) The products named herein meet IBC 2018 code section 703.5.2 (definition of composite noncombustible) and ASTM E136 Appendix Section X1.2 Criteria B).
- 4) It is unknown if aging, weathering, etc., will adversely affect the products' ability to meet 2018 IBC 703.5.
- 5) 2018 IBC Code Commentary is included in Appendix A (see attached commentary in the 2018 code).
- 6) This evaluation makes it clear that these products can ignite and burn (hence FSI > 0) but meet specific noncombustible definitions as applicable in the code or standard referenced herein.
- 7) Use limitations per code are discussed in Appendix A (2018 IBC Code Commentary).

Conclusion

The following is a summary of the discussion above:


As stated in Comments 1 - 7 above, Geolam boards listed herein meet the definition of 'composite noncombustible' according to IBC 2018 (703.5.2) and ASTM E136 (Appendix).

Submitted by,


Javier Trevino
Associate Engineer
210-601-0655

September 13, 2022

Reviewed and approved,


Deg Priest
President

September 13, 2022



APPENDIX A

IBC 2018 Code Commentary

703.5 Noncombustibility tests. The tests indicated in Sections 703.5.1 and 703.5.2 shall serve as criteria for acceptance of building materials as set forth in Sections 602.2, 602.3 and 602.4 in Types I, II, III and IV construction. The term “noncombustible” does not apply to the flame spread characteristics of *interior finish* or *trim* materials. A material shall not be classified as a noncombustible building construction material if it is subject to an increase in combustibility or flame spread beyond the limitations herein established through the effects of age, moisture or other atmospheric conditions.

- ❖ Restrictions on the use of combustible materials are primarily found in Chapter 6. However, certain sections of Chapter 7 (such as use of combustibles in Section 703.2.2 and fire walls in Section 706.3) contain restrictions on the use of combustible materials and separate provisions, depending on whether the material is combustible or noncombustible. Sections 703.5.1 and 703.5.2 contain the appropriate test criteria by which a material is to be evaluated to ascertain whether it is combustible or noncombustible.

Materials that are considered noncombustible must be capable of maintaining the required performance characteristics (noncombustibility and flame spread ratings) regardless of age, moisture or other atmospheric conditions. If exposure to atmospheric conditions results in an increase in combustibility or flame spread rating beyond the limitations specified, the material is considered combustible.

The criteria established by this section are primarily based on the National Board of Fire Underwriters' (NBFU) *National Building Code*, 1955 edition, which permitted a noncombustible material to contain a limited amount of combustible material, provided that it did not contribute to fire propagation. The requirement for noncombustibility is considered to apply to certain materials used for walls, roofs and other structural elements, but not to surface finish materials. The determination of whether a material is noncombustible from the standpoint of minimum required clearances to heating appliances, flues or other sources of high temperature is based on the ASTM E136 definition of “Noncombustibility,” not the prescriptive definition in Section 703.5.2. Note that the *International Mechanical Code*® (IMC®) contains a definition of “Noncombustible materials,” which does not contain provisions for the use of composite materials (defined in Section 703.5.2) as acceptable noncombustible materials.



703.5.2 Composite materials. Materials having a structural base of noncombustible material as determined in accordance with Section 703.5.1 with a surfacing not more than 0.125 inch (3.18 mm) thick that has a *flame spread index* not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible materials.

❖ In recognition that an essentially noncombustible material with a thin combustible coating will not contribute appreciably to an ambient fire, this section provides criteria by which a composite material may be determined acceptable as a noncombustible material. The structural base of the composite material must meet the criteria for elementary materials (see Section 703.5.1). The material may have a surface not more than $\frac{1}{8}$ inch (3.2 mm) thick applied to the noncombustible base. This surface is required to have a flame spread rating no greater than 50 when tested in accordance with ASTM E84 or UL 723. For a discussion of both the ASTM E84 and UL 723 test methods, refer to the commentary to Section 803.1.

In accordance with this section, material such as gypsum board—which consists of a noncombustible base and a combustible (paper) surface—is considered to be a composite material. As noted in the commentary to Section 703.5, a composite material is considered a noncombustible material in the context of the code. The IMC, however, intentionally includes only limited applications of the criteria of this section in the definition of a noncombustible material. Therefore, composite materials are not considered acceptable noncombustible materials from the standpoint of clearances to heating appliances, flues or other sources of high temperature because of their potentially poor response to radiant heat exposure.

End of Report 11017B

