QAI LABORATORIES
CERTIFICATION TESTING INSPECTION

8385 White Oak Avenue
Rancho Cucamonga, CA 91730
909.483.0250 ph. | 909.483.0336 fx.

CLIENT: **DASSO USA**
6060 Boat Rock BLVD. SW Suite 800
Atlanta, GA 30336

Test Report No: RJ7637P-1rev2	Revision Date: May 17, 2022

SUBJECT: dassoXTR Epic Cognac and dassoXTR Classic Espresso bamboo composite deckboards of nominal 1'' and 2'' thickness.

SAMPLING DETAIL: Test samples were witnessed at the location of manufacture in Xiandai Zhuchanye Yuanqu, Gaobu Town, Zixi Country, Fuzhou City, Jiangxi Province China by QAI personnel Fey Han on July 31, 2020. QAI confirmed the products sampled for testing were representative of normally manufactured product in accordance with ICC-ES AC85 Section 3.1.

DATE OF RECEIPT: Sample was received at QAI Rancho Cucamonga, CA facility on September 20, 2020 in good condition.

TESTING PERIOD: September 27, 2020 – June 28, 2021.

AUTHORIZATION: QAI Proposal 20JL05211r3 dated May 29, 2020 signed by Avery Chua, CEO on May 29, 2020.

TEST PROCEDURE: Testing in accordance with ICC-ES AC174 *Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails)* approved January 2012 (editorially revised December 2014) referencing ASTM D7032-17 *Standard Specification for Establishing Performance Ratings for Wood Plastic Composite and Plastic Lumber Deck Boards, Stair Treads, Guards and Handrails*.

TEST RESULTS: Based on evaluation by QAI of Dasso USA dassoXTR bamboo boards Classic Espresso and Epic Cognac of 1'' and 2'' thickness, were found to have maximum span ratings outlined below:

PRODUCT	SPAN RATING		WIND UPLIFT	INSTALLATION
	DECKING	STAIR TREAD		
1'' (0.8'') Classic Espresso	100 psf @ 24''	100 psf @ 16''	-78 psf @ 24''	One Panda Claw 2 hidden clip at each joist with #7 1-3/4'' length screw.
1'' (0.8'') Epic Cognac	100 psf @ 24''	100 psf @ 16''	-77 psf @ 24''	
2'' Classic Espresso	100 psf @ 24''	Not Evaluated	-75 psf @ 24''	Two #10 x 3.5'' screws at each joist location, 2'' from deck ends.
2'' Epic Cognac	100 psf @ 24''	Not Evaluated	-75 psf @ 24''	

Prepared By

Larry Burmer
Lab Manager Physical Testing

Signed for and on behalf of QAI Laboratories Inc.

Matt Lansdowne
Director of Engineering

SUMMARY OF REQUIREMENTS AND RESULTS

Property	*Test Method*	*Number of Specimens*	*Test Requirement*	*Test Results*	*Section*
Flexural Strength Modulus (MOR)	ASTM D6109	10 Each Formulation	Report	Classic Espresso: MOR 10,175 psi Epic Cognac MOR: 14,466 psi	**1.1**
Flexural Stiffness (EI)	ASTM D6109	10 Each Formulation	Report	Classic Espresso: EI: 2,553 psi Epic Cognac EI: 2,542 psi	**1.1**
Temperature Effect, Low -20°F Flexural	ASTM D7032 / ASTM D6109	10 Each Formulation	Report Change	Classic Espresso: MOR 12,509 psi (0% change) EI: 2,811 psi (0% change) Epic Cognac MOR 14,830 psi (0% change) EI: 2,788 psi (0% change)	**1.2**
Temperature Effect, High 125°F Flexural	ASTM D7032 / ASTM D6109	10 Each Formulation	Report Change	Classic Espresso: MOR 9,433 psi (-7% change) EI: 2,501 psi (-2% change) Epic Cognac MOR 12,397psi (-14% change) EI: 2,366 psi (-8% change)	**1.3**
Moisture Effect, Submerged Flexural	ASTM D7032 / ASTM D6109	10 Each Formulation	Report Change	Classic Espresso: MOR 10,806 psi (0% change) EI: 2,416 psi (-5% change) Epic Cognac MOR 15,893 psi (0% change) EI: 2,442 psi (-4% change)	**1.4**
Ultraviolet Resistance (2000 hours) Flexural	ASTM G155 / ASTM D6109	5 Each Formulation	Report Change	Classic Espresso Control: MOR 11,327 psi EI: 1,667 psi Classic Espresso Exposed: MOR 14,488 psi (0% change) EI: 1,841 psi (0% change) Epic Cognac Control: MOR 14,596 psi EI: 1,791 psi Epic Cognac Exposed: MOR 14,892 psi (0% change) EI: 1,851 psi (0% change)	**2.1**
Freeze-Thaw Flexural	ASTM D7032 / ASTM D6109	5 Each Formulation	Report Change	Classic Espresso: MOR 10,423 psi (0% change) EI: 2,654 psi (0% change) Epic Cognac MOR 13,645 psi (-6% < 10% no change) EI 2,357 psi (-7% < 10% no change)	**2.2**

Biodeterioration (Fungi)	AWPA E10	5 Each Formulation	Must Exceed Control	Classic Espresso: Complies Epic Cognac: Complies	**3.1**
Biodeterioration (Termite)	ASTM D3345	5 Each Formulation	Must Exceed Control	Classic Espresso: Complies Epic Cognac: Complies	**3.2**
Surface Burning Characteristics	ASTM E84	Each Formulation, Thickest	FSI ≤ 200	2'' Classic Espresso: FSI 25 2'' Epic Cognac: FSI 25	**4.0**
Duration of Load	ASTM D7031	15 of Each Formulation Thinnest	No Failures or Tertiary Creep	1'' Classic Espresso: Complies 1'' Epic Cognac: Complies	**5.0**
Determination of Unadjusted Allowable Load Deck Board	ASTM D7032 / ASTM D6109	28 Each Product Thinnest	≥ 2.5 psf x Adjustments	Classic Espresso: 414 psf @ 24'' Epic Cognac: 357 psf @ 24''	**6.1**
Determination of Unadjusted Allowable Load Stair Tread	ASTM D7032	28 Each Product Thinnest	Classic Espresso: ≥ 809 lbs Failure ≤0.125'' @323 lbs Epic Cognac: ≥ 875 lbs Failure ≤0.125'' @340 lbs	Classic Espresso: Ultimate: 1,587 lbs 0.084'' @ 323 lbs Epic Cognac Classic Espresso: Ultimate: 2,209 lbs 0.088'' @ 340 lbs	**6.2**
Mechanical Holding Tests	ASTM D330	Each Product Installation	Ultimate Load / FS 3.0	Classic Espresso 1' Thick Panda Claw 2 Hidden Clip: Allowable: -80 lbs negative Classic Espresso 2'' Thick Face Screws: Allowable: 75 lbs negative Epic Cognac 1'' Thick Panda Claw 2 Hidden Clip: : Allowable: -80 lbs negative Epic Cognac 2'' Thick Face Screws: Allowable: 76 lbs negative	**6.3**

1. DECK BOARD FLEXURAL TESTS ADJUSTMENT FACTORS

Test Procedure: Testing was conducted in accordance with Section 4.4 of ASTM D7032 referencing ASTM D6109. This testing was conducted to evaluate temperature and moisture effects by comparing exposed materials to control samples.

All test samples were cut to 25'' length for testing client requested 24'' span rating. After sample cutting, samples were conditioned at standard conditioning of 75°F ± 3°F and 50% ± 5% relative humidity for a minimum of 48 hours prior to exposure and testing detailed below.

As dassoXTR Classic Espresso 1'' and 2'' thickness profiles are of the same product formulation and testing for flexural tests of adjustment factors are based on product formulation response to environmental conditions, testing was done on 1'' thickness products to evaluate response for both profile thickness types.
See Appendix E for product details.

As dassoXTR Epic Cognac 1'' and 2'' thickness profiles are of the same product formulation and testing for flexural tests of adjustment factors are based on product formulation response to environmental conditions, testing was done on 1'' thickness products to evaluate response for both profile thickness types. See Appendix E for product details.

All deck board products were measured to have thickness of 5.4 inches width.

All loading was conducted at 1% strain/min with a cross head speed of 1.332 in./min ($R = 0.00185 \times L^2/t$ or $R = 0.00185 \times 24^2/0.8$) where 0.8 was the measured thickness of the dassoXTR bamboo decking products.

3% strain was taken from the non-simplified method of ASTM D7032 at 4.5 inches.

Adjustment Factors were determined from the exposures outlined below as the decrease in flexural strength and flexural stiffness values after exposures detailed in this report from control specimens for the 1'' dassoXTR Classic Espresso and Epic Cognac deck boards.

1.1 FLEXURAL STRENGTH (MOR) AND FLEXURAL STIFFNESS (EI) CONTROL

After conditioning, 10 samples of each Classic Espresso and Epic Cognac were tested for flexural strength (MOR) and flexural stiffness (EI) following ASTM D6109 on a 24-inch support span.

Test Requirements:

Report Values

Test Results:

MOR and EI Flexural Strength Values for dassoXTR Classic Espresso

Sample ID	Thickness	Max Load (lbs)	Max Stress (psi)	Max Deflection (in.)	Stiffness (EI) (psi)	3% Strain Load
1	0.799	1,483	10295	0.911	2,286	-
2	0.800	1,424	9886	0.687	2,792	-
3	0.801	1,369	9504	0.791	2,360	-
4	0.800	1,163	8074	0.682	2,312	-
5	0.800	1,748	12135	0.950	2,606	-
6	0.799	1,544	10719	0.783	2,730	-
7	0.799	1,693	11753	0.801	2,982	-
8	0.801	1,356	9413	0.730	2,447	-
9	0.801	1,666	11565	0.798	2,771	-
10	0.801	1,211	8407	0.711	2,247	-
AVERAGE	**0.80**	**1466**	**10175**	**0.784**	**2,553**	**-**
ST DEV	**0.0**	**199**	**1384**	**0.1**	**257.0**	**-**
COV	**0.1**	**14**	**14**	**11.4**	**10.1**	**-**

-Not achieved.

CONTROL CLASSIC ESPRESSO MOR: 10175 psi CONTROL CLASSIC ESPRESSO EI: 2553 psi

MOR and EI Flexural Strength Values for dassoXTR Epic Cognac

Sample ID	Thickness	Max Load (lbs)	Max Stress (psi)	Max Deflection (in.)	Stiffness (EI) (psi)	3% Strain Load
1	0.800	2,034	14135	1.122	2,547	-
2	0.800	2,243	15588	1.422	2,433	-
3	0.800	1,828	12704	0.996	2,543	-
4	0.801	1,945	13517	1.013	2,699	-
5	0.801	2,000	13899	1.132	2,574	-
6	0.799	2,427	16866	1.359	2,769	-
7	0.799	2,142	14886	1.325	2,378	-
8	0.798	2,129	14795	1.243	2,517	-
9	0.799	1,931	13419	1.204	2,335	-
10	0.800	2,137	14851	1.190	2,621	-
AVERAGE	**0.80**	**2082**	**14466**	**1.201**	**2,542**	-
ST DEV	**0.0**	**173**	**1201**	**0.1**	**135.7**	-
COV	**0.1**	**8**	**8**	**11.8**	**5.3**	-

-Not achieved.

CONTROL EPIC COGNAC MOR: 14466 psi CONTROL EPIC COGNAC EI: 2542 psi

1.2 FLEXURAL STRENGTH (MOR) AND FLEXURAL STIFFNESS (EI) LOW TEMPERATURE

10 samples of each Classic Espresso and Epic Cognac were tested for low temperature effects on flexural strength (MOR) and flexural stiffness (EI) following Section 4.5.1 of ASTM D7032. Samples were conditioned at -20°F ± 4°F for a minimum of 48 hours until samples were at temperature saturation. Samples were removed and immediately tested for flexural strength (MOR) and flexural stiffness (EI) at 24-inch support span following ASTM D6109.

Test Requirements:

Compare Values to Control Flexural Strength (MOR) and Flexural Stiffness (EI).

Test Results:

Low Temperature MOR and EI Flexural Strength Values for dassoXTR Classic Espresso

Sample ID	Thickness	Max Load (lbs)	Max Stress (psi)	Max Deflection (in.)	Stiffness (EI) (psi)	3% Strain Load
1	0.801	1560	10825	0.769	2,708	-
2	0.801	1952	13546	0.919	2,866	-
3	0.802	2013	13969	0.950	2,847	-
4	0.799	1854	12866	0.889	2,827	-
5	0.799	2212	15350	1.023	3,025	-
6	0.800	1478	10256	0.752	2,584	-
7	0.800	1562	10839	0.764	2,700	-
8	0.799	1646	11422	0.788	2,797	-
9	0.801	1759	12206	0.834	2,820	-
10	0.801	1990	13809	0.916	2,938	-
AVERAGE	**0.80**	**1803**	**12509**	**0.860**	**2,811**	**-**
ST DEV	**0.0**	**240**	**1669**	**0.1**	**125.3**	**-**
COV	**0.1**	**13**	**13**	**10.8**	**4.5**	**-**

-Not achieved.

LOW TEMP CLASSIC ESPRESSO MOR: 12509 psi CHANGE: 0% EI: 2811 psi CHANGE: 0%

Low Temperature MOR and EI Flexural Strength Values for dassoXTR Epic Cognac

Sample ID	Thickness	Max Load (lbs)	Max Stress (psi)	Max Deflection (in.)	Stiffness (EI) (psi)	3% Strain Load
1	0.800	1,993	13850	0.986	2,710	-
2	0.800	2,263	15726	1.093	2,802	-
3	0.800	2,147	14920	1.090	2,718	-
4	0.800	2,356	16372	1.064	2,996	-
5	0.800	2,323	16143	1.044	2,997	-
6	0.798	1,979	13753	1.025	2,611	-
7	0.798	1,709	11876	0.895	2,541	-
8	0.800	2,299	15976	1.045	2,918	-
9	0.800	1,960	13621	0.999	2,656	-
10	0.801	2,311	16060	1.057	2,929	-
AVERAGE	**0.80**	**2134**	**14830**	**1.030**	**2,788**	**-**
ST DEV	**0.0**	**215**	**1493**	**0.1**	**164.9**	**-**
COV	**0.1**	**10**	**10**	**5.7**	**5.9**	**-**

-Not achieved.

LOW TEMP CLASSIC ESPRESSO MOR: 14830 psi CHANGE: EI: 2788 psi CHANGE: 0%

1.3 FLEXURAL STRENGTH (MOR) AND FLEXURAL STIFFNESS (EI) HIGH TEMPERATURE

10 samples of each Classic Espresso and Epic Cognac were tested for high temperature effects on flexural strength (MOR) and flexural stiffness (EI) following Section 4.5.1 of ASTM D7032. Samples were conditioned at 125°F ± 4°F for a minimum of 48 hours until samples were at temperature saturation. Samples were removed and immediately tested for flexural strength (MOR) and flexural stiffness (EI) at 24-inch support span following ASTM D6109.

Test Requirements:

Compare Values to Control Flexural Strength (MOR) and Flexural Stiffness (EI).

Test Results:

High Temperature MOR and EI Flexural Strength Values for dassoXTR Classic Espresso

Sample ID	Thickness	Max Load (lbs)	Max Stress (psi)	Max Deflection (in.)	Stiffness (EI) (psi)	3% Strain Load
1	0.802	1,274	8847	0.708	2,427	-
2	0.801	1,156	8028	0.672	2,322	-
3	0.798	1,221	8479	0.687	2,411	-
4	0.800	1,209	8396	0.696	2,386	-
5	0.801	1,598	11097	0.878	2,586	-
6	0.799	1,522	10569	0.759	2,799	-
7	0.798	1,207	8382	0.740	2,276	-
8	0.801	1,439	9993	0.759	2,575	-
9	0.800	1,427	9910	0.811	2,459	-
10	0.800	1,531	10632	0.759	2,772	-
AVERAGE	**0.80**	**1358**	**9433**	**0.747**	**2,501**	**-**
ST DEV	**0.0**	**162**	**1128**	**0.1**	**178.3**	**-**
COV	**0.2**	**12**	**12**	**8.4**	**7.1**	**-**

-Not achieved.

HIGH TEMP CLASSIC ESPRESSO MOR: 9433 psi CHANGE: -7% EI: 2501 psi CHANGE: -2%

High Temperature MOR and EI Flexural Strength Values for dassoXTR Epic Cognac

Sample ID	Thickness	Max Load (lbs)	Max Stress (psi)	Max Deflection (in.)	Stiffness (EI) (psi)	3% Strain Load
1	0.798	1,836	12,814	1.149	2,421	-
2	0.799	1,899	13,220	1.277	2,301	-
3	0.802	1,955	13,506	1.289	2,310	-
4	0.800	1,699	11,797	1.100	2,173	-
5	0.800	1,625	11,283	1.016	2,238	-
6	0.801	1,844	12,770	1.156	2,396	-
7	0.800	1,894	13,151	1.303	2,270	-
8	0.800	1,891	13,136	1.224	2,307	-
9	0.801	1,611	11,159	0.933	2,432	-
10	0.798	1,593	11,120	0.895	2,516	-
AVERAGE	**0.80**	**1785**	**12396**	**1.134**	**2,336**	-
ST DEV	**0.0**	**138**	**949**	**0.1**	**103.1**	-
COV	**0.2**	**8**	**8**	**13.0**	**4.4**	**-**

-Not achieved.

HIGH TEMP CLASSIC ESPRESSO MOR: 12396 psi CHANGE: -14% EI: 2336 psi CHANGE: -8%

1.4 FLEXURAL STRENGTH (MOR) AND FLEXURAL STIFFNESS (EI) MOISTURE EFFECTS

10 samples of each Classic Espresso and Epic Cognac were tested for moisture effects on flexural strength (MOR) and flexural stiffness (EI) following Section 4.5.1 of ASTM D7032. Samples were submerged in a water bath maintained at standard conditioning for a minimum of 48 hours until samples were considered to be saturated. Samples were removed and immediately tested for flexural strength (MOR) and flexural stiffness (EI) at 24-inch support span following ASTM D6109.

Test Requirements:

Compare Values to Control Flexural Strength (MOR) and Flexural Stiffness (EI).

Test Results:

Moisture Effects MOR and EI Flexural Strength Values for dassoXTR Classic Espresso

Sample ID	Thickness	Max Load (lbs)	Max Stress (psi)	Max Deflection (in.)	Stiffness (EI) (psi)	3% Strain Load
1	0.802	1,732	12019	0.916	2,654	-
2	0.801	1,667	11568	0.921	2,534	-
3	0.799	1,729	11998	1.083	2,362	-
4	0.798	1,582	10978	0.989	2,339	-
5	0.800	1,538	10673	0.902	2,389	-
6	0.800	1,827	12678	1.066	2,503	-
7	0.801	1,454	10090	0.890	2,298	-
8	0.800	1,415	9819	0.917	2,153	-
9	0.802	1,248	8660	0.687	2,430	-
10	0.800	1,381	9583	0.759	2,496	-
AVERAGE	**0.80**	**1557**	**10806**	**0.913**	**2,416**	**-**
ST DEV	**0.0**	**184**	**1274**	**0.1**	**140.4**	**-**
COV	**0.2**	**12**	**12**	**13.3**	**5.8**	**-**

-Not achieved.

MOISTURE CLASSIC ESPRESSO MOR: 10806 psi CHANGE: 0% EI: 2416 psi CHANGE: -5%

Moisture Effects MOR and EI Flexural Strength Values for dassoXTR Epic Cognac

Sample ID	Thickness	Max Load (lbs)	Max Stress (psi)	Max Deflection (in.)	Stiffness (EI) (psi)	3% Strain Load
1	0.800	2,333	16246	1.521	2,416	-
2	0.800	2,208	15376	1.422	2,369	-
3	0.801	2,316	16128	1.521	2,445	-
4	0.800	2,360	16434	1.620	2,414	-
5	0.789	2,090	14554	1.335	2,435	-
6	0.800	2,064	14373	1.378	2,357	-
7	0.799	2,589	18029	1.714	2,568	-
8	0.800	2,509	17472	1.686	2,535	-
9	0.800	2,207	15369	1.485	2,452	-
10	0.800	2,147	14951	1.388	2,426	-
AVERAGE	**0.80**	**2282**	**15893**	**1.507**	**2,442**	**-**
ST DEV	**0.0**	**173**	**1205**	**0.1**	**65.8**	**-**
COV	**0.4**	**8**	**8**	**8.7**	**2.7**	**-**

-Not achieved.

MOISTURE EPIC COGNAC MOR: 15893 psi CHANGE: 0% EI: 2442 psi CHANGE: -4%

2. DECK BOARD FLEXURAL TESTS END USE ADJUSTMENT FACTORS

Test Procedure: Testing was conducted in accordance with Section 4.4 of ASTM D7032 referencing ASTM D6109. This testing was conducted to ultraviolet (UV) resistance and freeze-thaw resistance by comparing exposed materials to control samples.

UV samples were cut to 9'' length, 1.75 inch width from 1'' products to accommodate placement in ASTM G155 compliant UV test equipment. Control samples for comparison where cut to 9'' length, 1.75'' width at 1'' thickness.

Freeze-thaw test samples were cut to 24'' length per the requested span.

After sample cutting, samples were conditioned at standard conditioning of 75°F ± 3°F and 50% ± 5% relative humidity for a minimum of 48 hours prior to exposure and testing detailed below.

As dassoXTR Classic Espresso 1'' and 2'' thickness profiles are of the same product formulation, and testing for flexural tests of adjustment factors are based on product formulation response to environmental conditions, testing was done on 1'' thickness products to evaluate response for both profile thickness types, as the thicker geometry is considered to be of stronger cross section.

As dassoXTR Epic Cognac 1'' and 2'' thickness profiles are of the same product formulation, and testing for flexural tests of adjustment factors are based on product formulation response to environmental conditions, testing was done on 1'' thickness products to evaluate response for both profile thickness types.

All loading was conducted at 1% strain/min with a cross head speed of 1.332 in./min ($R = 0.00185 \times L^2/t$ or $R = 0.00185 \times 24^2/0.8$) where 0.8 was the measured thickness of the dassoXTR bamboo deck board products.

3% strain was taken from the non-simplified method of ASTM D7032 at 4.5 inches.

End Use Adjustment Factors were determined from the exposures outlined below as the decrease in flexural strength and stiffness values in excess of 10% after exposures noted from control specimens for the 1'' dassoXTR Classic Espresso and Epic Cognac deck boards.

2.1 ULTRAVIOLET (UV) RESISTANCE

10 test samples of dassoXTR Classic Espresso and Epic Cognac were removed from standard conditioning cut to dimensions of 5.4 inches width x 10 inches length x 0.80 inches product thickness to fit into the ASTM G155 UV exposure apparatus. Following sample preparation, 5 specimens were exposed for UV resistance following ASTM G155 Cycle 1, with 0.35 W/(m^2-nm) at 340 nm wavelength, with an exposure of 102 minutes of light at 63ºC black panel temperature with 18 minutes of light and water spray at air temperature for 2,000 hours in accordance with ASTM D7032. 5 control specimens were placed back into conditioning for match testing for flexural strength.

Following UV exposure, UV exposed samples and 5 control samples were tested following ASTM D6109, with the UV exposed face located in tension during flexural testing.

The control and after UV weathered samples were tested at a span of 8 inches.

Test Requirements:

Compare UV Values to Control Flexural Strength (MOR) and Flexural Stiffness (EI).

Test Results:

Control Samples MOR and EI Flexural Strength Values for dassoXTR Classic Espresso

Sample ID	Thickness	Max Load (lbs)	Max Stress (psi)	Max Deflection (in.)	Stiffness (EI) (psi)	3% Strain Load
1	0.787	1,419	10,973	0.185	1,599	-
2	0.788	1,488	11,016	0.171	1,727	-
3	0.786	1,406	10,902	0.170	1,711	-
4	0.786	1,660	12,369	0.188	1,707	-
5	0.787	1,530	11,373	0.184	1,592	-
AVERAGE	**0.79**	**1501**	**11327**	**0.18**	**1667**	**-**
ST DEV	**0.00**	**103**	**610**	**0.01**	**66**	**-**
COV	**0%**	**7%**	**5%**	**5%**	**4%**	**-**

-Not achieved.

CONTROL CLASSIC ESPRESSO MOR: 11327 psi EI: 1667 psi

UV Exposed MOR and EI Flexural Strength Values for dassoXTR Classic Espresso

Sample ID	Thickness	Max Load (lbs)	Max Stress (psi)	Max Deflection (in.)	Stiffness (EI) (psi)	3% Strain Load
1	0.776	1,974	15,679	0.218	1,817	-
2	0.781	1,858	14,510	0.203	1,973	-
3	0.780	2,007	15,734	0.216	1,857	-
4	0.783	1,688	13,072	0.205	1,650	-
5	0.775	1,689	13,444	0.195	1,906	-
AVERAGE	**0.78**	**1843**	**14488**	**0.21**	**1841**	**-**
ST DEV	**0.00**	**152**	**1232**	**0.01**	**121**	**-**
COV	**0%**	**8%**	**9%**	**5%**	**7%**	**-**

-Not achieved.

UV EXPOSED CLASSIC ESPRESSO MOR: 14488 psi CHANGE: 0% EI: 1841 psi CHANGE: 0%

Control Samples MOR and EI Flexural Strength Values for dassoXTR Epic Cognac

Sample ID	Thickness	Max Load (lbs)	Max Stress (psi)	Max Deflection (in.)	Stiffness (EI) (psi)	3% Strain Load
1	0.789	1,570	12,080	0.164	1,746	-
2	0.788	1,871	14,524	0.200	1,829	-
3	0.785	1,889	14,686	0.202	1,804	-
4	0.789	1,634	12,575	0.176	1,741	-
5	0.788	2,478	19,115	0.275	1,836	-
AVERAGE	**0.79**	**1888**	**14596**	**0.20**	**1791**	**-**
ST DEV	**0.0**	**358**	**2777**	**0.04**	**45.2**	**-**
COV	**0**	**19**	**19**	**21**	**3**	**-**

-Not achieved.

CONTROL EPIC COGNAC MOR: 14596 psi EI: 1791 psi

UV Exposed MOR and EI Flexural Strength Values for dassoXTR Epic Cognac

Sample ID	Thickness	Max Load (lbs)	Max Stress (psi)	Max Deflection (in.)	Stiffness (EI) (psi)	3% Strain Load
1	0.781	1,822	14,307	0.241	1,902	-
2	0.783	2,033	15,887	0.207	1,946	-
3	0.792	1,842	13,903	0.220	1,726	-
4	0.783	2,001	15,634	0.199	1,869	-
5	0.781	1,875	14,729	0.215	1,813	-
AVERAGE	**0.78**	**1915**	**14892**	**0.22**	**1851**	**-**
ST DEV	**0.0**	**96**	**850**	**0.02**	**85.2**	**-**
COV	**1**	**5**	**6**	**7**	**5**	**-**

UV EXPOSED EPIC COGNAC MOR: 14892 psi CHANGE: 0% EI: 1851 psi CHANGE: 0%

2.2 FREEZE-THAW RESISTANCE

5 test samples of dassoXTR Classic Espresso and Epic Cognac were removed from standard conditioning and exposed to freeze-thaw resistance. Sampesl were submerged underwater for a period of 24 hours, following which the specimens were placed in a freezer maintained at -20ºF ± 4ºF for 24 hours. Following, specimens were placed in room temperature for 24 hours.

This process was followed for a total of 3 cycles. Following exposure, the samples were tested at 24 inch span following ASTM D6109.

Test Requirements:

Compare Freeze-Thaw Values to Control Flexural Strength (MOR) and Flexural Stiffness (EI).

Test Results:

Freeze-Thaw MOR and EI Flexural Strength Values for dassoXTR Classic Espresso

Sample ID	Thickness	Max Load (lbs)	Max Stress (psi)	Max Deflection (in.)	Stiffness (EI) (psi)	3% Strain Load
1	0.801	1,549	10756	0.767	2,770	-
2	0.801	1,532	10638	0.767	2,699	-
3	0.799	1,173	8145	0.597	2,664	-
4	0.799	1,629	11312	0.854	2,623	-
5	0.800	1,622	11263	0.890	2,514	-
AVERAGE	**0.80**	**1501**	**10423**	**0.775**	**2,654**	**-**
ST DEV	**0.0**	**188**	**1308**	**0.1**	**95.1**	**-**
COV	**0**	**13**	**13**	**15**	**4**	**-**

FREEZE-THAW CLASSIC ESPRESSO MOR: 10423 psi CHANGE: 0% EI: 2654 psi CHANGE: 0%

Freeze-Thaw MOR and EI Flexural Strength Values for dassoXTR Epic Cognac

Sample ID	Thickness	Max Load (lbs)	Max Stress (psi)	Max Deflection (in.)	Stiffness (EI) (psi)	3% Strain Load
1	0.800	1,731	12038	1.011	2,440	-
2	0.799	2,037	14166	1.316	2,366	-
3	0.799	2,090	14534	1.393	2,343	-
4	0.798	2,054	14284	1.291	2,417	-
5	0.801	1,899	13206	1.262	2,220	-
AVERAGE	**0.80**	**1962**	**13645**	**1.255**	**2,357**	**-**
ST DEV	**0.0**	**148**	**1030**	**0.1**	**85.9**	**-**
COV	**0**	**8**	**8**	**12**	**4**	**-**

FREEZE-THAW EPIC COGNAC MOR: 13645 psi CHANGE: -6% EI: 2357 psi CHANGE: -7%
MOR % Change < 10%, EI % Change < 10% no end use adjustment factor required.

3.0 BIODETERIORATION TESTING

Test Procedure: Testing was conducted in accordance with Section 4.8 of ASTM D7032 for fungal and termite resistance.

3.1 FUNGAL DECAY RESISTANCE

dassoXTR Classic Espresso and Epic Cognac were evaluated for fungal decay resistance following method AWPA Standard E10 by Louisiana Forest Products Development Center (International Accreditation Services, Inc. TL-350).

Test Requirements

Test samples are to show decay resistance to equivalent to that of preservative-treated or the heartwood of naturally durable wood used in identical applications, as measured by visual inspection and average weight loss

Test Results

Findings by Louisiana Forest Products Development Center found dassoXTR Classic Espresso and Epic Cognac products exhibited good resistance ot the decay fungi compared with the untreated pine and sweetgum controls and comply with ICC-ES AC174.

See Louisiana Forest Products Development Center test report WDL-2020-12b dated 4/16/2021 found in Appendix A.

3.2 TERMITE RESISTANCE

dassoXTR Classic Espresso and Epic Cognac were evaluated for termite resistance following method ASTM D3345-17 by Louisiana Forest Products Development Center (International Accreditation Services, Inc. TL-350).

Test Requirements

Visual inspection of the test specimens shall demonstrate resistance to termite attack equivalent to that of preservative treated or the heartwood of naturally durable wood used in identical applications.

Test Results

Findings by Louisiana Forest Products Development Center found dassoXTR Classic Espresso and Epic Cognac products exhibited strong resistance to termite attack with the termites exhibiting light attack on the machined surfaces of the test samples and comply with ICC-ES AC174.

See Louisiana Forest Products Development Center test report WDL-2020-12a dated 14/1/2021 found in Appendix B.

4.0 SURFACE BURNING CHARACTERISTICS

dassoXTR Classic Espresso and Epic Cognac products of 2'' thickness were evaluated to ASTM E84-18 to determine surface burning characteristics. Testing was conducted on the noted 2'' product thickness option, as this was considered of higher fuel load with results to apply to the thinner 1'' product thickness options of dassoXTR.

Test Requirements

Products evaluated are to have a flame spread index of < 200 evaluated to ASTM E84.

Test Results

dassoXTR Classic Espresso and Epic Cognac products surface burning characteristics are outlined below.

PRODUCT	FLAME SPREAD INDEX	SMOKE DEVELOPED INDEX
Classic Espresso	25	25
Epic Cognac	25	10

For further details, see QAI test report RJ7637F-1brev1 revised 05/11/2022 (Classic Espresso) and RJ7637F-1arev1 revised 05/11/2022 (Epic Cognac) found in Appendix C and D of this report.

dassoXTR Classic Espresso and Epic Cognac when evaluated to ASTM E84-18b were found to have a flame spread < 200.

5.0 DURATION OF LOAD

dassoXTR Classic Espresso and Epic Cognac of 1 inches thickness were evaluated to ASTM D7021 Section 5.10.2 for duration of load, with 15 samples tested.

Specimens were loaded to two times the expected span load, increased by the applicable adjustment factors determined in Sections 1 and 2 of this report, determined based on the target of 100 psf design load at 24 inch span. The intended load for application was calculated based on simply supported beam theory, by determining the appropriate center point load for producing equivalent stress in a simply supported beam of the same geometric properties (ie, shape of the profile) as follows:

Required pressure resistance = 2 x 100 psf x worst case between strength and stiffness adjustment.

Classic Expresso = 2 x 100 psf * (1 + (1-0.927) = 215 psf
Epic Cognac = 2 x 100 psf * (1 + (1-0.857) = 229 psf

Based on the above 230 pounds was applied as center point load to the dassoXTR deck board samples for duration of load.

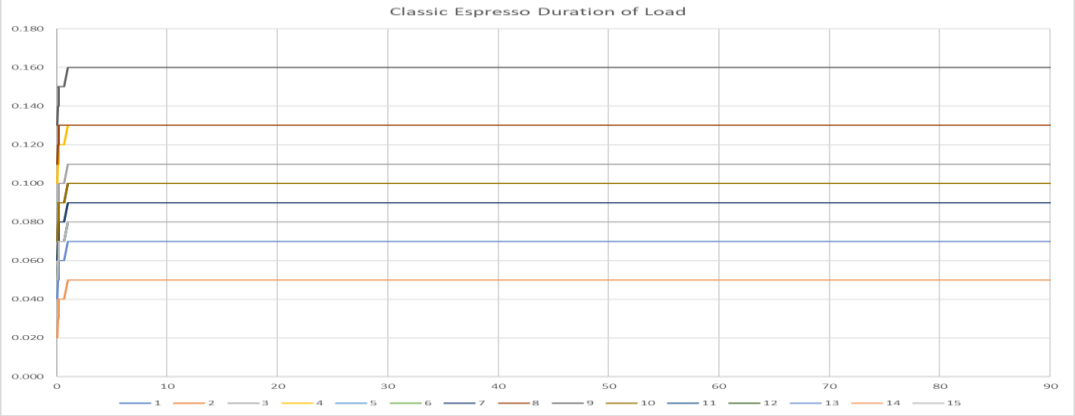
Test Requirements

No failures, and no evidence of tertiary creep.

Test Results

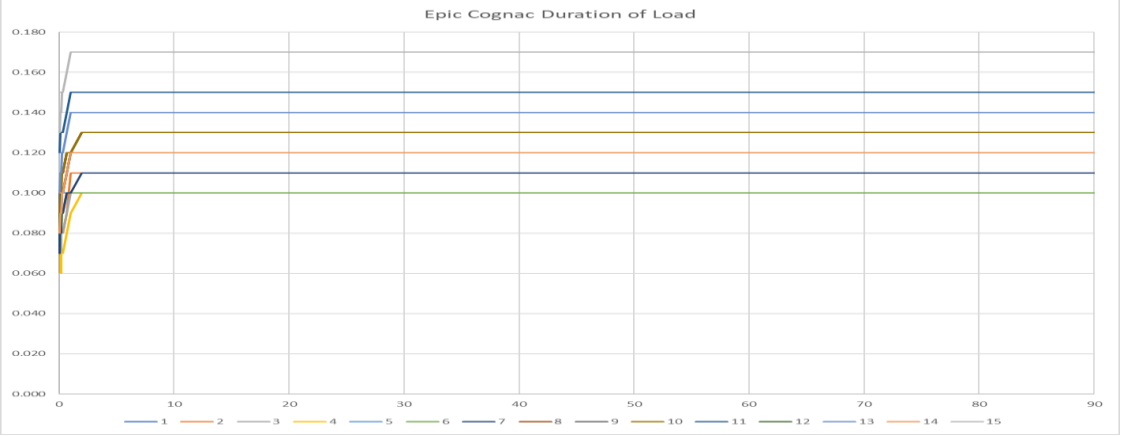
dassoXTR Classic Espresso Duration of Load Test Summary

Specimen No.	Net Deflection After 1 Hour (in)	Net Deflection After 2 Hours (in)	Net Deflection After 3 Hours (in)	Net Deflection After 4 Hours (in)	Net Deflection After 5 Hours (in)	Net Deflection After 6 Hours (in)	Net Deflection After 7 Hours (in)	Net Deflection After 8 Hours (in)	Net Deflection After 16 Hours (in)	Net Deflection After 24 Hours (in)	Net Deflection After 2 days (in)	Net Deflection After 3 days (in)	Net Deflection After 4 days (in)	Net Deflection After 5 days (in)	Net Deflection After 6 days (in)	Net Deflection After 7 days (in)	Net Deflection After 2 weeks (in)	Net Deflection After 3 weeks (in)	Net Deflection After 4 weeks (in)	Net Deflection After 5 weeks (in)	Net Deflection After 6 weeks (in)	Net Deflection After 7 weeks (in)	Net Deflection After 8 weeks (in)	Net Deflection After 9 weeks (in)	Net Deflection After 10 weeks (in)	Net Deflection After 11 weeks (in)	Net Deflection After 12 weeks (in)	Net Deflection After 90 days (in)
	0.041666667	0.08333333	0.125	0.166666667	0.208333333	0.25	0.142857143	0.333333333	0.666666667	1	2	3	4	5	6	7	14	21	28	35	42	49	56	63	70	77	84	90
1	0.070	0.070	0.080	0.080	0.090	0.090	0.090	0.090	0.090	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
2	0.070	0.070	0.080	0.080	0.090	0.090	0.090	0.090	0.090	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
3	0.080	0.080	0.090	0.090	0.100	0.100	0.100	0.100	0.100	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
4	0.100	0.100	0.110	0.110	0.120	0.120	0.120	0.120	0.120	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130
5	0.070	0.070	0.080	0.080	0.090	0.090	0.090	0.090	0.090	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
6	0.060	0.060	0.070	0.070	0.080	0.080	0.080	0.080	0.080	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
7	0.060	0.060	0.070	0.070	0.080	0.080	0.080	0.080	0.080	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
8	0.110	0.110	0.120	0.120	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130
9	0.130	0.130	0.140	0.140	0.150	0.150	0.150	0.150	0.150	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160
10	0.070	0.070	0.080	0.080	0.090	0.090	0.090	0.090	0.090	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
11	0.050	0.050	0.060	0.060	0.070	0.070	0.070	0.070	0.070	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080
12	0.050	0.050	0.060	0.060	0.070	0.070	0.070	0.070	0.070	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080
13	0.040	0.040	0.050	0.050	0.060	0.060	0.060	0.060	0.060	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070
14	0.020	0.020	0.030	0.030	0.040	0.040	0.040	0.040	0.040	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
15	0.050	0.050	0.060	0.060	0.070	0.070	0.070	0.070	0.070	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080



dassoXTR Epic Cognac Duration of Load Test Summary

Specimen No.	Net Deflection After 1 Hour (in)	Net Deflection After 2 Hours (in)	Net Deflection After 3 Hours (in)	Net Deflection After 4 Hours (in)	Net Deflection After 5 Hours (in)	Net Deflection After 6 Hours (in)	Net Deflection After 7 Hours (in)	Net Deflection After 8 Hours (in)	Net Deflection After 16 Hours (in)	Net Deflection After 24 Hours (in)	Net Deflection After 2 days (in)	Net Deflection After 3 days (in)	Net Deflection After 4 days (in)	Net Deflection After 5 days (in)	Net Deflection After 6 days (in)	Net Deflection After 7 days (in)	Net Deflection After 2 weeks (in)	Net Deflection After 3 weeks (in)	Net Deflection After 4 weeks (in)	Net Deflection After 5 weeks (in)	Net Deflection After 6 weeks (in)	Net Deflection After 7 weeks (in)	Net Deflection After 8 weeks (in)	Net Deflection After 9 weeks (in)	Net Deflection After 10 weeks (in)	Net Deflection After 11 weeks (in)	Net Deflection After 12 weeks (in)	Net Deflection After 90 days (in)
	0.041666667	0.08333333	0.125	0.166666667	0.208333333	0.25	0.142857143	0.333333333	0.666666667	1	2	3	4	5	6	7	14	21	28	35	42	49	56	63	70	77	84	90
1	0.080	0.090	0.090	0.090	0.100	0.100	0.100	0.100	0.110	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120
2	0.070	0.070	0.070	0.070	0.080	0.080	0.080	0.080	0.090	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
3	0.060	0.070	0.070	0.070	0.080	0.080	0.080	0.080	0.090	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
4	0.060	0.060	0.060	0.060	0.070	0.070	0.070	0.070	0.080	0.090	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
5	0.080	0.080	0.090	0.090	0.090	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
6	0.070	0.070	0.080	0.080	0.080	0.090	0.090	0.090	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
7	0.070	0.080	0.080	0.080	0.090	0.090	0.090	0.090	0.100	0.100	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
8	0.090	0.100	0.100	0.100	0.110	0.110	0.110	0.110	0.120	0.120	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130
9	0.090	0.100	0.100	0.100	0.110	0.110	0.110	0.110	0.120	0.120	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130
10	0.090	0.090	0.100	0.100	0.100	0.110	0.110	0.110	0.120	0.120	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130
11	0.120	0.120	0.130	0.130	0.130	0.130	0.130	0.130	0.140	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150
12	0.080	0.090	0.090	0.090	0.100	0.100	0.100	0.100	0.110	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120
13	0.100	0.100	0.110	0.110	0.110	0.120	0.120	0.120	0.130	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140
14	0.080	0.080	0.090	0.090	0.090	0.100	0.100	0.100	0.110	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120
15	0.130	0.130	0.140	0.140	0.140	0.150	0.150	0.150	0.160	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170



dassoXTR Classic Espresso was found to have no tertiary creep and no failures were found during duration of load evaluation to ASTM D7031.

dassoXTR Epic Cognac was found to have no tertiary creep and no failures were found during duration of load evaluation to ASTM D7031.

6.0 DECKBOARD PERFORMANCE RATINGS

Deck board performance ratings were determined for dassoXTR Classic Espresso and Epic Cognac products to determine unadjusted allowable load including use as stair tread, and mechanical holding capacity.

As dassoXTR Classic Espresso 1'' and 2'' thickness profiles are of the same product formulation, evaluation for allowable load including use as stair treat and duration of load was conducted on 1 inches thickness Classic Espresso products of weaker geometrical properties, with results considered to apply to 2'' thickness Classic Espresso products.

As Classic Espresso 1 inch thickness products and Classic Espresso 2-inch thickness products are of different installations using proprietary fasteners provided by Dasso USA, each product was evaluated for mechanical holding capacity following ASTM E330, with a factor of safety of 3 applied.

As dassoXTR Epic Cognac 1'' and 2'' thickness profiles are of the same product formulation, evaluation for allowable load including use as stair treat and duration of load was conducted on 1 inches thickness Epic Cognac products of weaker geometrical properties, with results considered to apply to 2'' thickness Epic Cognac products.

As Epic Cognac 1 inch thickness products and Epic Cognac 2-inch thickness products are of different installations using proprietary fasteners provided by Dasso USA, each product was evaluated for mechanical holding capacity following ASTM E330, with a factor of safety of 3 applied.

6.1 Adjusted Allowable Load Determination Deckboards

28 samples each of dassoXTR Classic Espresso and Epic Cognac products were cut to 26'' length and placed at standard conditioning.

Following, the samples were tested following ASTM D6109 at 24'' span, and ultimate load, MOR, EI, and load at 1/180 span recorded.

From the determined loads noted above, the equivalent applied pressure (psf) was determined following general engineering principles for stress determination in simply supported beams, converting the stress induced through third point loading to equivalent pressure (psf) based on the formulas:

$Stress_{THIRD\ POINT} = Stress_{UNIFORM}$

$Stress = M*y/I$

Where M = Maximum moment due to loading type (lbs*ft).
y = distance perpendicular from neutral axis to outer edge (ft).
I = moment of inertia of section about the neutral axis (ft^4).

Following

$Stress_{THIRD\ POINT} = Stress_{\omega}$

Where Maximum Moment Third Point Bending Stress = PL / 6
Where P = Max Test Load (lbs)
L = Test Span (ft =)

Maximum Uniform Load = $\omega L^2 / 8$
Where ω = Uniform Load (lbs /ft)

Thus: $((PL / 6) * y) / I = ((\omega L^2 / 8) * y) / I$

Solving for $\omega = (P*8) / (L * 6)$ = lbs/ft

Converting to psf = (ω * 12 inches / 1 ft) / Width (ft) = Allowable Pressure (psf)

Test Requirements

Unadjusted Allowable Load Based is Lesser between Flexural Strength / 2.5 and Load @ 1/180 Deflection
Adjusted Allowable Load = Unadjusted Allowable Load x Factors from Sections 1 and 2 of this report outlined below.

PRODUCT	STRENGTH ADJUSTMENT	STIFFNESS ADJUSTMENT
Classic Espresso	0.927	0,927
Epic Cognac	0.857	0.883

Adjusted Allowable Load > 100 psf @ 24 inches Span Deckboard

Test Results:

Classic Espresso Deckboard Flexural Performance Results

SAMPLE	THICKNESS (inches)	ULT. LOAD (lbs)	MOR (psi)	LOAD 1/180 (lbs)	STIFFNESS (EI) lbs*in^2	LOAD 3% STRAIN
1	0.801	1303	11311	192	2,375	-
2	0.800	1605	13932	168	2,423	-
3	0.799	1206	10469	199	2,377	-
4	0.800	1463	12700	214	2,640	-
5	0.800	1745	15148	224	2,775	-
6	0.798	1314	11406	191	2,395	-
7	0.799	1501	13030	206	2,500	-
8	0.800	1374	11927	187	2,253	-
9	0.802	1375	11936	183	2,328	-
10	0.799	1300	11285	194	2,394	-
11	0.798	1318	11441	173	2,163	-
12	0.799	1222	10608	203	2,361	-
13	0.801	1264	10972	189	2,432	-
14	0.800	1464	12708	202	2,615	-
15	0.799	1665	14453	214	2,637	-
16	0.798	1637	14210	197	2,500	-
17	0.799	1571	13637	216	2,628	-
18	0.800	1502	13038	206	2,478	-
19	0.800	1601	13898	206	2,588	-
20	0.800	1442	12517	219	2,517	-
21	0.798	1528	13264	232	2,682	-
22	0.798	1596	13854	166	2,414	-
23	0.799	1683	14609	164	2,470	-
24	0.799	1407	12214	189	2,554	-
25	0.800	1800	15625	218	2,623	-
26	0.801	1707	14818	226	2,750	-
27	0.802	1615	14019	242	2,593	-
28	0.800	1501	13030	205	2,478	-
AVERAGE	**0.80**	**1490**	**12931**	**201**	**2498**	
ST DEV	**0.00**	**165**	**1428**	**20**	**145**	
COV	**0.14**	**11**	**11**	**10**	**6**	

Unadjusted MOR: 596 lbs Unadjusted Load @ 1/180: 201 lbs
Adjusted MOR based on Strength Reductions: 552 lbs
Adjusted Load @ 1/180 based on Stiffness Reductions: 186 lbs

(186 lbs third point x 8) / (2 ft Span x 6) = 124 lbs/ft = ω
124 lbs/ft / Width (5.4 inches / 12 inches/ ft) = 276 psf allowable load.

186 lbs third point loading = 276 psf pressure for equivalent stress > 100 psf target at 24'' on center spacing.

Epic Cognac Deckboard Flexural Performance Results

SAMPLE	THICKNESS (inches)	ULT. LOAD (lbs)	MOR (psi)	LOAD 1/180 (lbs)	STIFFNESS (EI) lbs*in^2	LOAD 3% STRAIN
1	0.801	1,875	16276	149	2,567	-
2	0.798	1,595	13845	133	2,300	-
3	0.799	1,757	15252	121	2,189	-
4	0.802	1,974	17135	185	2,620	-
5	0.800	1,657	14384	159	2,363	-
6	0.798	1,433	12439	139	2,053	-
7	0.801	1,727	14991	163	2,151	-
8	0.800	1,808	15694	191	2,243	-
9	0.799	1,787	15512	206	2,587	-
10	0.798	1,817	15773	189	2,747	-
11	0.800	2,097	18203	192	2,659	-
12	0.801	2,088	18125	182	2,321	-
13	0.802	2,079	18047	195	2,445	-
14	0.802	2,050	17795	190	2,511	-
15	0.800	2,285	19835	190	2,358	-
16	0.799	1,743	15130	184	2,260	-
17	0.798	2,147	18637	209	2,394	-
18	0.798	2,088	18125	192	2,215	-
19	0.800	1,821	15807	209	2,306	-
20	0.798	2,255	19575	196	2,452	-
21	0.800	1,788	15521	179	2,308	-
22	0.799	2,007	17422	198	2,454	-
23	0.801	2,171	18845	203	2,404	-
24	0.800	2,196	19063	224	2,522	-
25	0.798	1,960	17014	195	2,438	-
26	0.798	1,768	15347	206	2,313	-
27	0.802	1,881	16328	179	2,206	-
28	0.800	1,879	16311	140	2,415	-
AVERAGE	**0.80**	**1919**	**16658**	**182**	**2386**	
ST DEV	**0.00**	**209**	**1816**	**26**	**163**	
COV	**0.18**	**11**	**11**	**14**	**7**	

Unadjusted MOR: 768 lbs Unadjusted Load @ 1/180: 182 lbs
Adjusted MOR based on Strength Reductions: 658 lbs
Adjusted Load @ 1/180 based on Stiffness Reductions: 161 lbs

(161 lbs third point x 8) / (2 ft Span x 6) = 107 lbs/ft = ω
107 lbs/ft / Width (5.4 inches / 12 inches/ ft) = 238 psf allowable load.

161 lbs third point loading = 238 psf pressure for equivalent stress > 100 psf target at 24'' on center spacing.

6.2 Adjusted Allowable Load Determination Stair Treads

28 samples each of dassoXTR Classic Espresso and Epic Cognac 1'' products were cut to 17'' length and placed at standard conditioning.

Following, the samples were supported at 16 inches span, and a concentrated load applied at the edge of the stair tread sample over a 4 $inch^2$ circular area at midspan. The load required to achieve 0.125 inch deflections were recorded.

Test Requirements

Deck board products used as stair tread, are to resist an applied load of 750 lbs, with adjustments based on strength determined in Sections 1 and 2 of this report applied.

Deck board products used as stair treads are to have a minimum load capacity of 300 lbs at 0.125'' deflection, with adjustments based on stiffness determined in Sections 1 and 2 of this report applied.

dassoXTR Adjustment Factors determined in Sections 1 and 2 of this report are outlined below:

PRODUCT	STRENGTH ADJUSTMENT	STIFFNESS ADJUSTMENT
Classic Espresso	0.927	0,927
Epic Cognac	0.857	0.883

The minimum adjusted load requirements for dassoXTR products are outlined below:

PRODUCT	MINIMUM STAIR TREAD LOAD CAPACITY (lbs)	MINIMUM LOAD REQUIRED @ 0.125'' DEFLECTION (lbs)
Classic Espresso	809	323
Epic Cognac	875	340

Test Results:

dassoXTR Classic Espresso Stair Tread Performance Results

SAMPLE	THICKNESS (inches)	ULT. LOAD (lbs)	DEFLECTION @ 323 lbs (inches)
1	0.798	1,830	0.075
2	0.800	1,491	0.080
3	0.798	1,823	0.080
4	0.797	1,579	0.080
5	0.797	1,426	0.092
6	0.799	1,225	0.085
7	0.797	1,521	0.085
8	0.799	1,731	0.083
9	0.800	1,430	0.094
10	0.800	1,388	0.094
11	0.798	1,836	0.085
12	0.800	1,742	0.077
13	0.796	1,346	0.086
14	0.797	1,541	0.085
15	0.796	1,693	0.078
16	0.800	1,466	0.089
17	0.800	1,599	0.082
18	0.799	1,454	0.082
19	0.798	1,308	0.080
20	0.798	1,918	0.070
21	0.799	1,475	0.094
22	0.800	1,431	0.099
23	0.800	1,411	0.095
24	0.798	1,756	0.082
25	0.799	1,859	0.077
26	0.799	1,618	0.082
27	0.798	1,665	0.087
28	0.800	1,872	0.077
AVERAGE	0.799	1,587	0.084
ST DEV	0.001	193.059	0.007
COV	0.161	12.166	8.227

Ultimate Load = 1587 lbs > 805 lbs minimum load based on strength.
Deflection at 323 lbs = 0.084 inches < 0.125'' based on stiffness.

Classic Expresso has met requirements for use as stair treads at 16'' span.

dassoXTR Epic Cognac Stair Tread Performance Results

SAMPLE	THICKNESS (inches)	ULT. LOAD (lbs)	DEFLECTION @ 340 lbs (inches)
1	0.798	2,021	0.084
2	0.798	2,556	0.094
3	0.798	2,302	0.092
4	0.797	2,596	0.084
5	0.798	2,089	0.089
6	0.799	2,351	0.086
7	0.797	2,569	0.082
8	0.796	2,465	0.087
9	0.799	2,242	0.081
10	0.799	2,634	0.081
11	0.800	2,118	0.086
12	0.798	1,952	0.081
13	0.799	2,001	0.086
14	0.799	2,104	0.076
15	0.798	2,007	0.085
16	0.798	1,833	0.089
17	0.800	2,037	0.081
18	0.800	2,408	0.086
19	0.800	2,436	0.086
20	0.800	2,274	0.085
21	0.799	2,038	0.092
22	0.797	2,210	0.101
23	0.800	2,181	0.099
24	0.800	2,207	0.092
25	0.799	2,201	0.092
26	0.798	2,016	0.097
27	0.799	2,176	0.092
28	0.798	1,826	0.092
AVERAGE	**0.799**	**2,209**	**0.088**
ST DEV	**0.001**	**225.786**	**0.006**
COV	**0.138**	**10**	**7**

Ultimate Load = 2209 lbs > 875 lbs minimum load based on strength.
Deflection at 340 lbs = 0.088 inches < 0.125'' based on stiffness.

Classic Expresso has met requirements for use as stair treads at 16'' span.

6.3 Mechanical Fastener Tests

dassoXTR products outlined in this report are supplied with fasteners provided with fastener systems as outlined below:

PRODUCT	FASTENER TYPE	INSTALLATION DESCRIPTION
1'' Classic Espresso 1'' Epic Cognac	Panda Claw 2 Hidden Clip System with #7 1-3/4'' length screw	Panda Claw 2 hidden clip is attached at each joist location with 1 #7 1-3/4'' length screw.
2'' Classic Espresso 2'' Epic Cognac	Face fastening system with #10 3-1/2'' length.	2 fasteners at each joist location, 2'' from each deck board end.

Decks of minimum 4' x 8' size were constructed, with 2 x 6 Southern Yellow Pine joists spaced at 24'' on center used as supports for installation of the deck board samples.

Test assemblies were constructed and tested for fastener capacity in accordance with ASTM E330-14 by QAI Laboratories Inc., Medley, FL facility (formerly Fenestration Testing Laboratory (FTL), IAS TL-948 including ASTM E330).

Drawings of the fasteners, Panda Clip 2, and test decks can be found in Appendix E of this test report.

Installation Instructions can be found in Appendix E of this test report.

Test Requirements:

Uplift resistance = ultimate load with a factor of safety of 3.0 applied.

Test Results:

Results of testing dassoXTR deck board products are outlined below.

TEST#	1'' CLASSIC ESPRESSO[1]	2'' CLASSIC ESPRESSO[2]	1'' EPIC COGNAC[1]	2'' EPIC COGNAC[2]
Assembly 1 (psf)	232	221	231	226
Assembly 2 (psf)	238	228	238	229
Assembly 3 (psf)	236	230	223	229
Average (psf)	235	226	231	228
Allowable Uplift (psf)	**78 psf**	**75 psf**	**77 psf**	**76 psf**

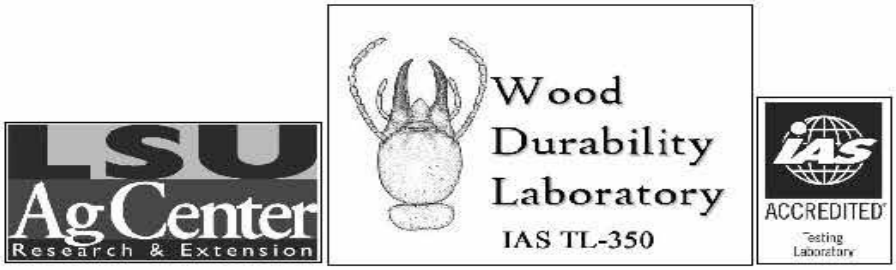
1: Additional details can be found in Fenestration Testing Laboratory (FTL), A Division of QAI test report 12765 dated 1/31/2022.

2: Additional details can be found in Fenestration Testing Laboratory (FTL), A Division of QAI test report 12529 dated May 7, 2021.

APPENDIX A – Termite Resistance Report WDL-2020-12a dated 14/1/2021 by Louisiana Fore Products Development Center

Report: WDL-2020-12a

Formosan Subterranean termite resistance study of dassoXTR epic cognac deckboards, dassoXTR classic expresso deckboards, untreated pine control, and reference pine control



Report #: WDL-2020-12a

Dasso USA
6060 Boat Rock Blvd. SW Suite 800
Atlanta, GA 30336

Submitted By:

Wood Durability Lab
Louisiana Forest Products Development Center
School of Renewable Natural Resources
LSU Agricultural Center
Baton Rouge, LA 70803
Tel. (225) 578-4131
Fax (225) 578-4251

January 14, 2021

We kindly request that all public references to the contents of this report be attributed to "LSU AgCenter's Wood Durability Lab"

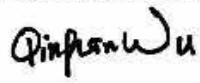
Page **1** of **14**

Report: WDL-2020-12a

TABLE OF CONTENTS

Report: WDL-2020-12a

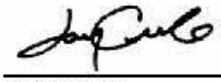
Report approved by:



Date: 1/14/2021

Q.Wu, Ph.D.
Professor, Wood Science
Wood Durability Laboratory, Quality Manager
Phone: (225) 578-8369
Fax: (225) 578-4251
E-mail: qwu@agcenter.lsu.edu

Report prepared by:



Date: 1/14/2021

J.P. Curole
Research Associate
Phone: (225) 578-4157
Fax: (225) 578-4251
E-mail: jcurole@agcenter.lsu.edu

Report: WDL-2020-12a

Background

The Wood Durability Laboratory (WDL) at the LSU AgCenter became an ISO 17025 accredited laboratory through the International Accreditation Services (IAS) accreditation system on March 1, 2008. Additional test standards were added by IAS to the WDL approved scope of services on July 24, 2008, November 20, 2009, May 31, 2012, January 24, 2014, March 31, 2016, July 26th, 2016, and June 6th, 2018 (Table 1). The lab has been operating under ISO 17025 Guidelines for over ten years. This report is compliant with ICC-ES AC85. This report has not been reviewed by a licensed professional engineer nor a third party skilled in the art. Samples and information sheets on traceability of samples were provided by the sponsor and verified at the time of sample creation. The results from this test only relate to the items tested.

Table 1. Current scope and WDL test methods accredited by IAS.

IAS Accreditation Number:	**TL-350**
Accredited Entity:	Wood Durability Laboratory
Address:	227 Renewable Natural Resources Louisiana State University Baton Rouge, Louisiana 70803
Contact Name:	Dr. Qinglin Wu, Director
Telephone:	(225) 578-8369
Effective Date of Scope of Accreditation:	April 28th, 2020
Accreditation Standard:	ISO/IEC Standard 17025:2017

Fields of Testing	**Accredited Test Methods**
Wood testing	ASTM Standards D143[2], D1037[2] (Compression Parallel to surface, section 12 excluded), D2395[8], D3043[5] (Methods A & D only), D4442[8], and D5456[5] (Test methods referenced in Annex A3 & A4); AC257[3] test methods referenced in Section 4.0, excluding 4.3.1.1, 4.3.1.2, 4.3.1.4, & 4.3.2.2)
Wood preservatives	ASTM Standards D2481[3], D3273[5], D3345[1], D4442[8], D4445[3], & D5516[4] AWPA Standards E1[1], E5[3], E7[1], E9[3], E10[1], E11[1], E12[1], E16[3], E18[3], E20[6], E21[4], E22[2], E23[2], E24[1], E26[4] and E29[5] WDMA Standards TM-1[1] and TM-2[1] WDL-SOP-25[6] – Field Evaluation of Termiticide against Subterranean Termites AC380[7] test methods referenced in Sections 3, 4.1, 4.2 and 4.3, excluding 4.4.1 through 4.4.9)

Approved: [1]March 1, 2008, [2]July 24, 2008, [3]November 20, 2009, [4]May 31, 2012, [5]January 24, 2014, [6]March 31, 2016, [7]July 26, 2016, [8]June 6, 2018, & [9]April 28, 2020

Report: WDL-2020-12a

OBJECTIVES

The objective of this study was to evaluate dassoXTR Epic Expresso deckboards and dassoXTR Classic Cognac deckboards **(Figure 1)** for prevention of Formosan subterranean termite (*Coptotermes formosanus*) feeding in an ASTM D3345-17 no-choice test. The deckboards were compared to untreated southern pine and treated pine reference controls.

Table 2. Identification of the WPC groups plus controls.

WDL-2020-12a D3345 QAI 20 Jar Test		
Treatment	**Sample ID**	**MC ID**
Untreated Pine Controls	1-5	1-5mc
dassoXTR Epic Cognac deckboards	6-10	6-10mc
dassoXTR Classic Expresso deckboards	11-15	11-15mc
Treated Pine Reference Controls	16-20	16-20mc

MATERIALS AND METHODS

Procedure

The test was performed in accordance with ASTM International D3345-17 Standard Test Method for Laboratory Evaluation of Solid Wood for Resistance to Termites (ASTM 2017). The no-choice method was used. The tested product was sampled by QAI Laboratories on July 31, 2020 at the location of manufacture in Fuzhou City, Jiangxi Province, China. QAI confirmed the products to be representative of normally manufactured products. The test was started on 12/10/20 and was completed on 1/7/21. The experiment consisted of 5 dassoXTR Epic Expresso deckboards, 5 dassoXTR Classic Cognac deckboards, 5 southern pine sapwood untreated controls, and 5 treated pine reference controls. All samples were precisely machined into 1 x 1 x ¼ in. test specimens. The controls were in the correct grain orientation and contained 4-6 rings per inch.

Each test jar contained 200 grams of autoclaved sand and 40 milliliters of distilled water. A sample was placed in each jar and sand was added. Termites were obtained from Brechtel State Park (Algiers, LA) on 12/3/20 and added to the D3345-17 test on 12/10/20. One gram of Formosan subterranean termites were weighted out and added to each jar.

After 28 days of exposure, the samples were removed and cleaned with distilled water and rated using the scale below.

10 Surface nibbles permitted
9 Light attack
7 Moderate attack, penetration
4 Heavy
0 Failure

Results

The data obtained were analyzed for termite resistance with means and standard deviations (SPSS 25). The Least Significant Difference (LSD) mean separation test procedure was used (Steel and Torrie 1980). Different capital letters following each data value within columns indicate that significant differences were found at the significance level $\alpha = 0.05$. Significant differences were not found among treatments when means shared the same letters within columns. All data and records collected during the tests are maintained and are available upon request per ISO 17025 Lab Guidelines.

Table 3 provides a summary of the means (Avg.) for the primary data of interest (i.e., percent mortality, percent weight loss, and treatment ratings). Table 4 provides the statistical data for termite mortality, sample weight loss, and sample rating in a descending order using the Least Significant Difference (LSD) mean separation test procedure.

Percent Termite Mortality. All live termites were counted after the 28-day exposure period. Percent mortality was obtained with this calculation: ((initial termites – live termites) / initial termites)*100. As shown in Table 4, mean percent termite mortality for the untreated pine controls resulted in the lowest mortality at 8.45%. The dassoXTR Epic Cognac deckboards had 15.70%, dassoXTR Classic Expresso deckboards 16.75%, followed by the treated pine reference control at 16.75% termite mortality. The untreated control group was significantly different from all other groups the $\alpha=0.05$ significance level.

Percent Sample Weight Loss. Percent weight loss was based on the original oven dry weight using this formula: ((calculated ODWt – final ODWt)/calculated ODWt)*100. The test sample oven dry weight is determined by measuring the moisture content of the matched sample and using it to calculate the sample oven dry weight. The final oven dry weight was determined by oven drying the sample after the test. As shown in Table 4, weight loss for the untreated pine controls resulted in the highest weight loss at 28%. The dassoXTR Epic Cognac deckboards had 7.42%, dassoXTR Classic Expresso deckboards 8.35%, followed by the treated pine reference control at 3.99% sample weight loss. The untreated pine control group and the treated pine reference controls were significantly different from each other and the deckboard groups the $\alpha=0.05$ significance level.

Sample Rating. Trained and experienced scientist estimated the extent of damage by visually sample rating each sample **(Figure 2)**. The rating scale used was 0 to 10. The mean rating value of the untreated pine control was 1, indicating heavy attack/failure. The dassoXTR Epic Cognac deckboards and the dassoXTR Classic Expresso deckboards had an average rating of 9 indicating light attack. The treated reference pine control had an average rating of 9.5 indicating surface nibbles/light attack. The untreated pine control group was significantly different from all other groups the $\alpha=0.05$ significance level. It is noted that termites caused nibbling on both front and back surface of the test samples (**Figure 3**). It seems that more damage (nibbling) for the dassoXTR Epic Cognac deckboards and the dassoXTR Classic Expresso deckboards occurred on machined surfaces. The original board surface had higher density and termites caused less nibbling on these surfaces (**Figure 3**).

CONCLUSIONS

The dassoXTR Epic Cognac deckboards and the dassoXTR Classic Expresso deckboards had strong resistance to termite attack, with the termites exhibiting light attack on the machined surfaces of the test samples. The treated pine controls had signs of light termite attack (nibbling) as well. The untreated pine control mortality, sample weight loss, and sample ratings were consistent with previous test results. The results from the untreated control samples indicate strong termite vigor and performance, and hence the test data are valid.

REFERENCES CITED

The American Society for Testing and Materials (ASTM). 2020. Standard test method for laboratory evaluation of solid wood for resistance to termites (D3345-17).

American Wood Protection Association (AWPA). 2020. Standard method for laboratory evaluation to determine resistance to subterranean termites (E1-17). 2020 book of standards. Birmingham, AL.

SPSS 25 for Windows. 2020. Chicago, IL.

Steel, R.G.D. and J.H. Torrie. 1980. Principle and procedures of statistics – A biometrical approach. 2nd edition. McGraw Hill. New York. 633 p.

Report: WDL-2020-12a

Table 3. Individual data for termite mortality, sample weight loss, and sample rating.

WDL-2020-12a D3345 QAI 20 Jar Test - Summary Table						
Treatment	**Mortality**	**LSD**	**Wt. Loss**	**LSD**	**Rating**	**LSD**
Untreated Pine Control	8.45%	A	28.00%	A	1	A
dassoXTR Epic Cognac deckboards	15.70%	B	7.42%	B	9	B
dassoXTR Classic Expresso deckboards	16.65%	B	8.35%	B	9	B
Treated Pine Reference	16.75%	B	3.99%	C	9.5	B

Table 4. Statistical data for termite mortality, sample weight loss, and sample rating.

WDL-2020-12a D3345 QAI 20 Jar Test Summary Table		
Treatment	**Mortality**	**LSD Group**
Untreated Pine Control	8.45%	A
dassoXTR Epic Cognac deckboards	15.70%	B
dassoXTR Classic Expresso deckboards	16.65%	B
Treated Pine Reference	16.75%	B

Treatment	**Weight Loss**	**LSD Group**
Untreated Pine Control	28.00%	A
dassoXTR Epic Cognac deckboards	7.42%	B
dassoXTR Classic Expresso deckboards	8.35%	B
Treated Pine Reference	3.99%	C

Treatment	**Ratings**	**LSD Group**
Untreated Pine Control	1	A
dassoXTR Epic Cognac deckboards	9	B
dassoXTR Classic Expresso deckboards	9	B
Treated Pine Reference	9.5	B

*Groups containing the same capital letter are not significantly different at α=0.05.

Report: WDL-2020-12a

dassoXTR Classic Expresso deckboards dassoXTR Epic Cognac deckboards

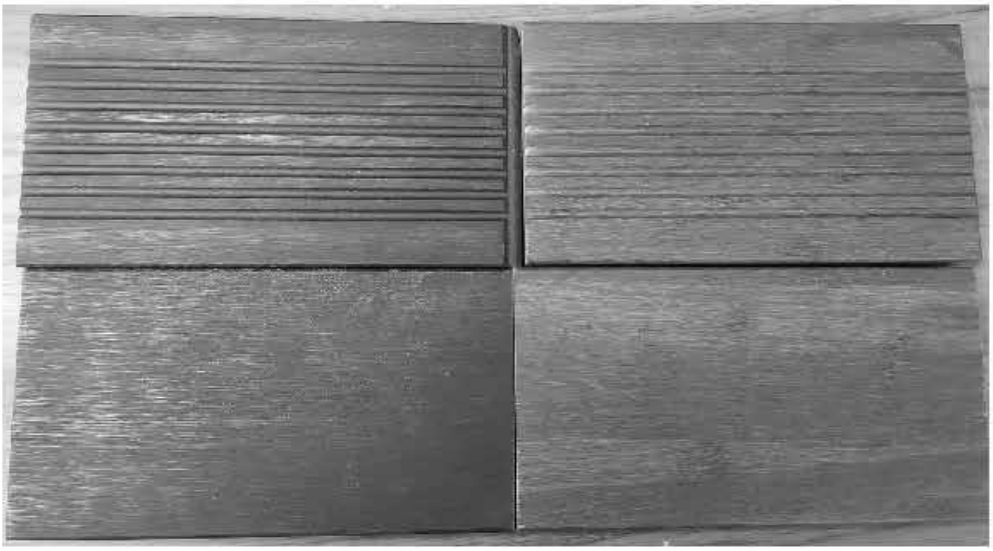


Figure 1. Original deck boards for testing

Report: WDL-2020-12a

Figure 2. Test samples including controls and deckboards

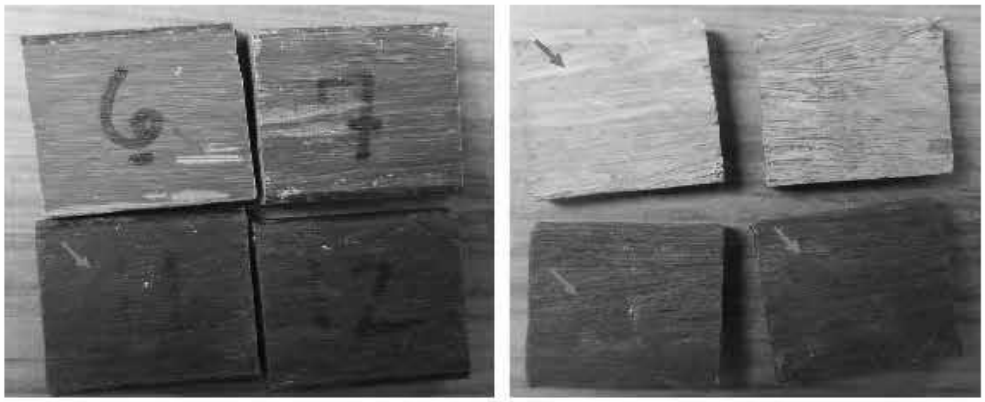
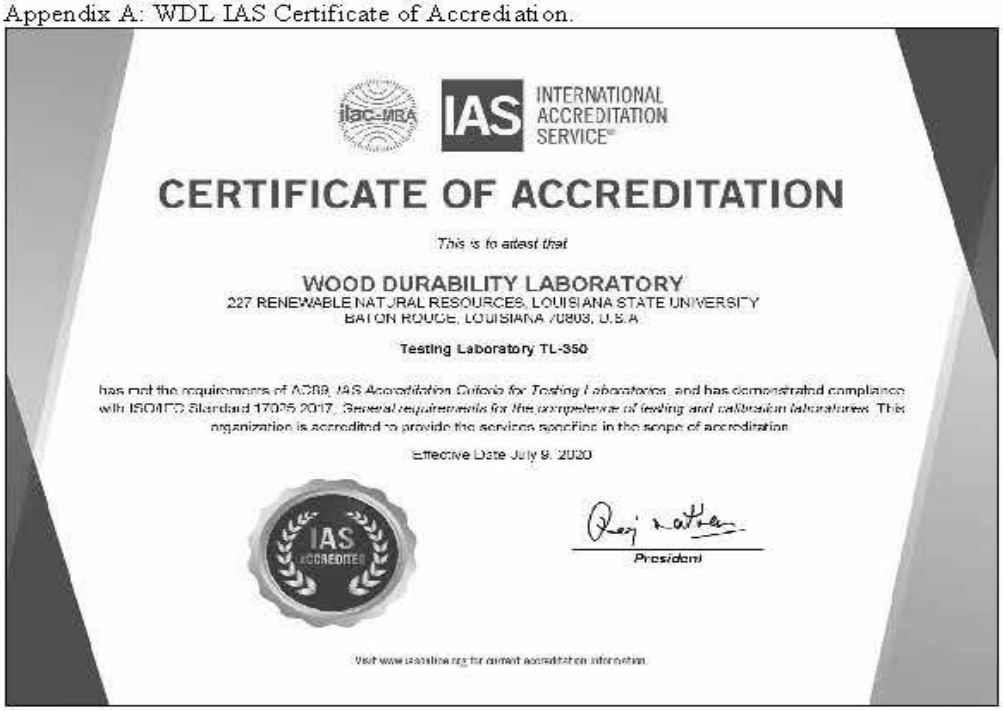


Figure 3. Areas of Termite Nibbling on the deckboards

Report: WDL-2020-12a

Appendix A: WDL IAS Certificate of Accreditation.



INTERNATIONAL ACCREDITATION SERVICE

CERTIFICATE OF ACCREDITATION

This is to attest that

WOOD DURABILITY LABORATORY
227 RENEWABLE NATURAL RESOURCES, LOUISIANA STATE UNIVERSITY
BATON ROUGE, LOUISIANA 70803, U.S.A.

Testing Laboratory TL-350

has met the requirements of ACLASS *IAS Accreditation Criteria for Testing Laboratories*, and has demonstrated compliance with ISO/IEC Standard 17025:2017, *General requirements for the competence of testing and calibration laboratories*. This organization is accredited to provide the services specified in the scope of accreditation.

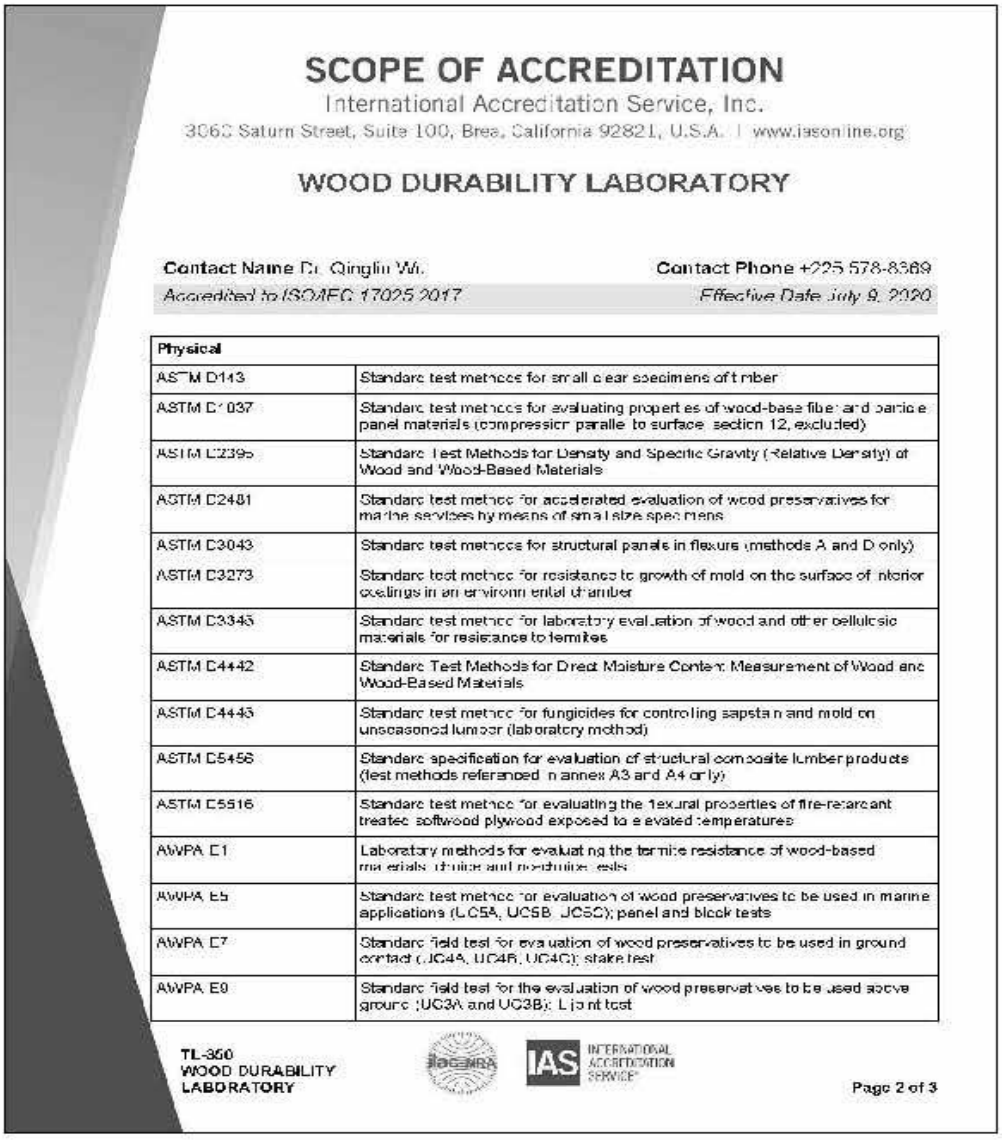
Effective Date July 9, 2020

IAS ACCREDITED

President

Visit www.iasonline.org for current accreditation information

Report: WDL-2020-12a



SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | www.iasonline.org

WOOD DURABILITY LABORATORY

Contact Name Dr. Qinglin Wu **Contact Phone** +225 578-8389

Accredited to ISO/IEC 17025:2017 *Effective Date July 9, 2020*

Physical	
ASTM D143	Standard test methods for small clear specimens of timber
ASTM D1037	Standard test methods for evaluating properties of wood-base fiber and particle panel materials (compression parallel to surface, section 12, excluded)
ASTM D2395	Standard Test Methods for Density and Specific Gravity (Relative Density) of Wood and Wood-Based Materials
ASTM D2481	Standard test method for accelerated evaluation of wood preservatives for marine services by means of small size specimens
ASTM D3043	Standard test methods for structural panels in flexure (methods A and D only)
ASTM D3273	Standard test method for resistance to growth of mold on the surface of interior coatings in an environmental chamber
ASTM D3345	Standard test method for laboratory evaluation of wood and other cellulosic materials for resistance to termites
ASTM D4442	Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials
ASTM D4445	Standard test method for fungicides for controlling sapstain and mold on unseasoned lumber (laboratory method)
ASTM D5456	Standard specification for evaluation of structural composite lumber products (test methods referenced in annex A3 and A4 only)
ASTM D5516	Standard test method for evaluating the flexural properties of fire-retardant treated softwood plywood exposed to elevated temperatures
AWPA E1	Laboratory methods for evaluating the termite resistance of wood-based materials (choice and no-choice tests)
AWPA E5	Standard test method for evaluation of wood preservatives to be used in marine applications (UC5A, UC5B, UC5C); panel and block tests
AWPA E7	Standard field test for evaluation of wood preservatives to be used in ground contact (UC4A, UC4B, UC4C); stake test
AWPA E9	Standard field test for the evaluation of wood preservatives to be used above ground (UC3A and UC3B); Lap joint test

TL-350
WOOD DURABILITY
LABORATORY

Page 2 of 3

Page **12** of **14**

Report: WDL-2020-12a

SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | www.iasonline.org

AWPA E10	Laboratory method for evaluating the decay resistance of wood-based materials against pure basidiomycete cultures: soil/block test
AWPA E11	Standard method for accelerated evaluation of preservative leaching
AWPA E12	Standard method of determining corrosion of metal in contact with treated wood
AWPA E16	Standard field test for evaluation of wood preservatives to be used above ground (UC3B): horizontal lap-joint test
AWPA E18	Standard field test for evaluation of wood preservatives to be used above ground (UC3B): ground proximity decay test
AWPA E20	Standard method of determining the depletion of wood preservatives in soil contact
AWPA E21	Standard field test method for the evaluation of wood preservatives to be used for interior applications (UC1 and UC2): full-size commodity termite test
AWPA E22	Laboratory method for rapidly evaluating the decay resistance of wood-based materials against pure basidiomycete cultures using compression strength: soil/water test
AWPA E23	Laboratory method for rapidly evaluating the decay resistance of wood-based materials in ground contact using static bending: soil jar test
AWPA E24	Laboratory method for evaluating the mold resistance of wood-based materials: mold chamber test
AWPA E26	Standard field test for evaluation of wood preservatives intended for interior applications (UC1 and UC2): ground proximity termite test
AWPA E29	Antisapstain field test: method for green lumber
ICC ES AC257	Corrosion-resistant fasteners and evaluation of corrosion effects of wood treatment chemicals (test methods referenced in section 4.3, excluding sections 4.3.1.1, 4.3.1.2, 4.3.1.4 and 4.3.2.2)
ICC ES AC380	Termite physical barrier systems (test methods referenced in sections 3, 4.1, 4.2 and 4.3, excluding 4.4.1 through 4.4.9)
WDL-SOP-95	Field evaluation of fenbutatin oxide against subterranean termites
WDMA TM. 1	Soil block test method
WDMA TM. 2	Swellometer test method

AWPA: American Wood Preservers' Association

WDMA: Window and Door Manufacturer Association

TL-350
WOOD DURABILITY
LABORATORY

ilac-MRA IAS INTERNATIONAL ACCREDITATION SERVICE

Page 3 of 3

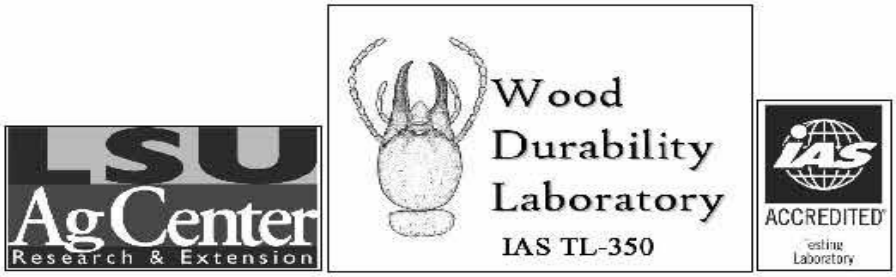
Report: WDL-2020-12a

End of report

APPENDIX B – Fungal Resistance Report WDL-2020-12b dated 4/16/2021 by Louisiana Fore Products Development Center

Report: WDL-2020-12b

Decay resistance study of dassoXTR epic cognac deckboards, dassoXTR classic expresso deckboards, untreated pine control, and reference pine control



Report #: WDL-2020-12b

Dasso USA
6060 Boat Rock Blvd. SW Suite 800
Atlanta, GA 30336

Submitted By:

Wood Durability Lab
Louisiana Forest Products Development Center
School of Renewable Natural Resources
LSU Agricultural Center
Baton Rouge, LA 70803
Tel. (225) 578-4131
Fax (225) 578-4251

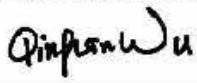
4/16/2021

Report: WDL-2020-12b

TABLE OF CONTENTS

Report: WDL-2020-12b

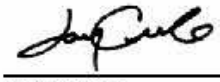
Report approved by:



Date: 4/16/21

Q.Wu, Ph.D.
Professor, Wood Science
Wood Durability Laboratory Director
Phone: (225) 578-8369
Fax: (225) 578-4251
E-mail: qwu@agcenter.lsu.edu

Report prepared by:



Date: 4/16/21

J.P. Curole
Research Associate
Wood Durability Technical Manager
Phone: (225) 578-4157
Fax: (225) 578-4251
E-mail: jcurole@agcenter.lsu.edu

Report: WDL-2020-12b

BACKGROUND

The Wood Durability Laboratory (WDL) at the LSU AgCenter became an ISO 17025 accredited laboratory through the International Accreditation Services (IAS) accreditation system on March 1, 2008. Additional test standards were added by IAS to the WDL approved scope of services on July 24, 2008, November 20, 2009, May 31, 2012, January 24, 2014, March 31, 2016, July 26th, 2016, and June 6th, 2018 (Table 1). The lab has been operating under ISO 17025 Guidelines for over ten years. This report is compliant with ICC-ES AC85. This report has not been reviewed by a licensed professional engineer nor a third party skilled in the art. Samples and information sheets on traceability of samples were provided by the sponsor and verified at the time of sample creation. The results from this test only relate to the items tested.

Table 1. Current scope and WDL test methods accredited by IAS.

IAS Accreditation Number:	**TL-350**
Accredited Entity:	Wood Durability Laboratory
Address:	227 Renewable Natural Resources Louisiana State University Baton Rouge, Louisiana 70803
Contact Name:	Dr. Qinglin Wu, Director
Telephone:	(225) 578-8369
Effective Date of Scope of Accreditation:	April 28th, 2020
Accreditation Standard:	ISO/IEC Standard 17025:2017

Fields of Testing	**Accredited Test Methods**
Wood testing	ASTM Standards D143[2], D1037[2] (Compression Parallel to surface, section 12 excluded), D2395[8], D3043[5] (Methods A & D only), D4442[8], and D5456[5] (Test methods referenced in Annex A3 & A4); AC257[3] test methods referenced in Section 4.0, excluding 4.3.1.1, 4.3.1.2, 4.3.1.4, & 4.3.2.2)
Wood preservatives	ASTM Standards D2481[3], D3273[5], D3345[1], D4442[8], D4445[3], & D5516[4] AWPA Standards E1[1], E5[3], E7[1], E9[3], E10[1], E11[1], E12[1], E16[3], E18[3], E20[6], E21[4], E22[2], E23[2], E24[1], E26[4] and E29[5] WDMA Standards TM-1[1] and TM-2[1] WDL-SOP-25[6] – Field Evaluation of Termiticide against Subterranean Termites AC380[7] test methods referenced in Sections 3, 4.1, 4.2 and 4.3, excluding 4.4.1 through 4.4.9)

Approved: [1]March 1, 2008, [2]July 24, 2008, [3]November 20, 2009, [4]May 31, 2012, [5]January 24, 2014, [6]March 31, 2016, [7]July 26, 2016, [8]June 6, 2018, & [9]April 28, 2020

Report: WDL-2020-12b

OBJECTIVES

The objective of this study was to evaluate dassoXTR Epic Expresso deckboards and dassoXTR Classic Cognac deckboards, untreated southern pine control, sweetgum control, and treated reference control for prevention of decay attack in an AWPA E10 soil-block culture test.

MATERIALS

Representative material was sampled by QAI Laboratories on July 31, 2020 at the location of manufacture in Fuzhou City, Jiangxi Province, China (Table 2). QAI confirmed the products to be representative of normally manufactured products.

Table 2. Identification of test sample groups

WDL-2020-12b E10 decay test		
Treatment Groups	**Brown Rot Fungus**	**White Rot Fungus**
dassoXTR Epic Cognac deckboards	*Gloeophyllum trabeum* (GT) & *Postia placenta* (PP)	*Trametes versicolor* (TV) & *Irpex lacteus* (IL)
dassoXTR Classic Expresso deckboards		
Untreated pine		
Untreated Sweetgum		
ACQ Treated Pine		

WDL-2020-12b E10 decay test					
ID	**Controls**	**Fungus**	**ID**	**Controls**	**Fungus**
1-5	dassoXTR Epic Cognac deckboards	GT	11-15	dassoXTR Epic Cognac deckboards	TV
6-10		PP	16-20		IL
21-25	dassoXTR Classic Expresso deckboards	GT	31-35	dassoXTR Classic Expresso deckboards	TV
26-30		PP	36-40		IL
41-45	Untreated Pine	GT	51-55	Untreated Sweetgum	TV
46-50		PP	56-60		IL
61-65	ACQ Treated Pine	GT	71-75	ACQ Treated Pine	TV
66-70		PP	76-80		IL

METHODS

Testing procedures used were based on the AWPA E10-16 "Standard Method of Wood Preservatives by Laboratory Soil-Block Cultures" (AWPA 2019). Decay fungi were obtained from the USDA FPL, Madison, Wisconsin, consisting of *Gloeophyllum trabeum*, *Postia placenta*, *Trametes versicolor*, and *Irpex lacteus*. The decay fungi were grown on agar media for two weeks prior to being placed into the testing bottles (on the top of each feeder strip). After a two-week growing period in the testing bottles (allowing the fungi to grow on the feeder strip); test samples were placed on top of the feeder strips. Substrates used were southern pine for brown rot decay and sweetgum for white rot decay. Five samples were tested per group.

Report: WDL-2020-12b

RESULTS

Table 3 summarizes the brown rot fungi data and Table 4 summarizes the white rot fungi data for weight loss. Figure 1 shows plots of the individual groups against the brown rot decay fungi. Figure 2 shows plots of the individual groups against the white rot decay fungi.

1. *Gloeophyllum trabeum* – The pine controls had the largest weight loss at 40.07%. The dassoXTR Epic Cognac deckboards and dassoXTR Classic Expresso deckboards had 9.3 and 8.71% weight loss. The ACQ groups had the lowest sample weight loss at 5.82 %.

2. *Postia placenta* – The pine controls had the largest weight loss at 38.67%. The dassoXTR Epic Cognac deckboards and dassoXTR Classic Expresso deckboards had 9.45 and 9.25% weight loss. The ACQ groups had the lowest sample weight loss at 6.2%.

3. *Trametes versicolor* – The sweetgum controls had the largest weight loss at 44.67%. The dassoXTR Epic Cognac deckboards and dassoXTR Classic Expresso deckboards had 8.87 and 8.46% weight loss. The ACQ groups had the lowest sample weight loss at 6.89%.

4. *Irpex lacteus* - The sweetgum controls had the largest weight loss at 24.36%. The dassoXTR Epic Cognac deckboards and dassoXTR Classic Expresso deckboards had 9.39 and 9.37% weight loss. The ACQ groups had the lowest sample weight loss at 7.48%.

Thus, untreated control wood (pine and sweetgum) showed high sample weight loss; therefore, the fungi were considered to be of high vigor to yield valid data. The decay fungi caused similar wood damage to the dassoXTR Epic Cognac deckboards and dassoXTR Classic Expresso deckboards for each fungus. When tested against all four fungi, the dassoXTR Classic Expresso deckboards had lightly less sample weight loss; however, the weight loss values were not significantly different from the dassoXTR Epic Cognac deckboards. The ACQ treated wood had similar results for all four fungi types and also had the lowest percentage weight loss of all groups.

CONCLUSIONS

This test demonstrated that the dassoXTR deckboards had good resistance to the decay fungi compared with the untreated pine and sweetgum controls. When compared with ACQ treated wood, the dassoXTR deckboards had slightly more weight losses. The ACQ samples performed as expected and had similar weight losses as in previous tests. The untreated control wood showed high sample weight loss; therefore, the fungi were considered to be of high vigor and the data are valid.

REFERENCES CITED

American Wood Protection Association (AWPA). 2020. Standard Method of Testing Wood Preservatives by Laboratory Soil-Block Cultures (E10-16). 2020 book of standards. Birmingham, AL.

American Society for Testing and Materials Standard Test Method for Wood Preservatives by Laboratory Soil-block Cultures (ASTM D1413).

SPSS 25 for Windows. 2021. Chicago, IL.

Steel, R.G.D. and J.H. Torrie. 1980. Principle and procedures of statistics – A biometrical approach. 2nd edition. McGraw Hill. New York. 633 p.

Report: WDL-2020-12b

Table 3. Summary data for weight loss % for brown rot fungi.

WDL-2020-12b E10 decay test - Brown Rot Weight Loss Stats			
Group ID	**BR Decay**	**Weight Loss %**	**LSD Group**
ACQ treated Pine	GT	5.82	A
dassoXTR Classic Expresso deckboards		8.71	AB
dassoXTR Epic Cognac deckboards		9.30	B
Untreated Pine		40.07	C
Group ID	**BR Decay**	**Weight Loss %**	**LSD Group**
ACQ treated Pine	PP	6.20	A
dassoXTR Classic Expresso deckboards		9.25	B
dassoXTR Epic Cognac deckboards		9.45	B
Untreated Pine		38.67	C

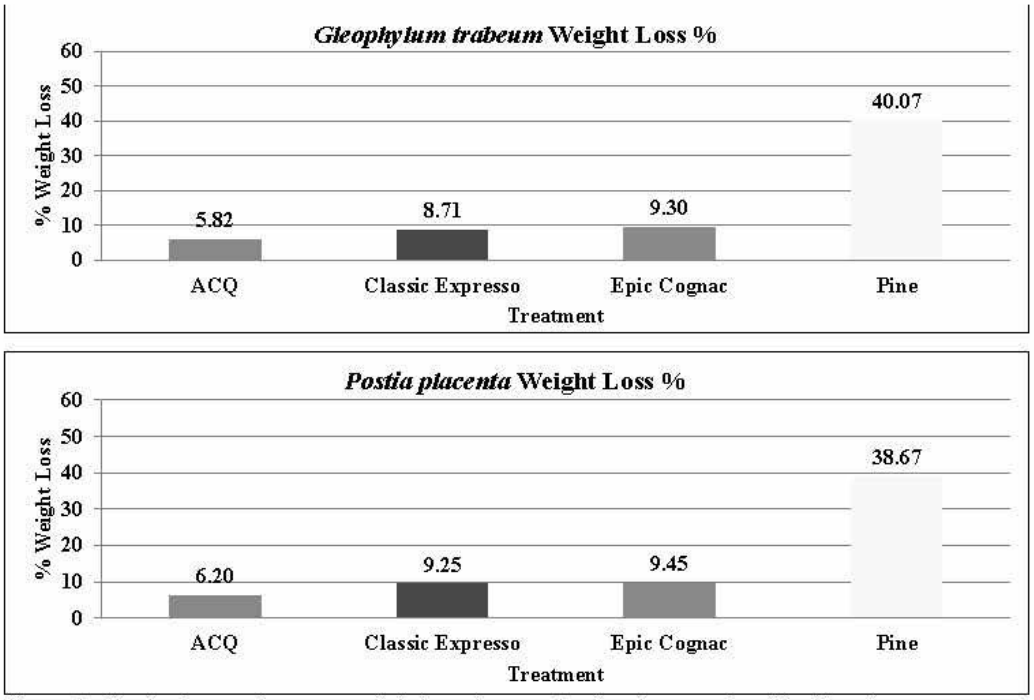
*Weight loss values sharing a capitol LSD letter are not significantly different at α=0.05.

Table 4. Summary data for weight loss % for white rot fungi.

WDL-2020-12b E10 decay test - White Rot Weight Loss Stats			
Group ID	**BR Decay**	**Weight Loss %**	**LSD Group**
ACQ treated Pine	TV	6.89	A
dassoXTR Classic Expresso deckboards		8.46	A
dassoXTR Epic Cognac deckboards		8.87	A
Untreated Sweetgum		44.67	B
Group ID	**BR Decay**	**Weight Loss %**	**LSD Group**
ACQ treated Pine	IL	7.48	A
dassoXTR Classic Expresso deckboards		9.37	B
dassoXTR Epic Cognac deckboards		9.39	B
Untreated Sweetgum		24.36	C

*Weight loss values sharing a capitol LSD letter are not significantly different at α=0.05.

Report: WDL-2020-12b



Figures 1. Graphs of means for percent weight loss when tested against brown rot fungi for 16 weeks.

Page **9** of **15**

Report: WDL-2020-12b

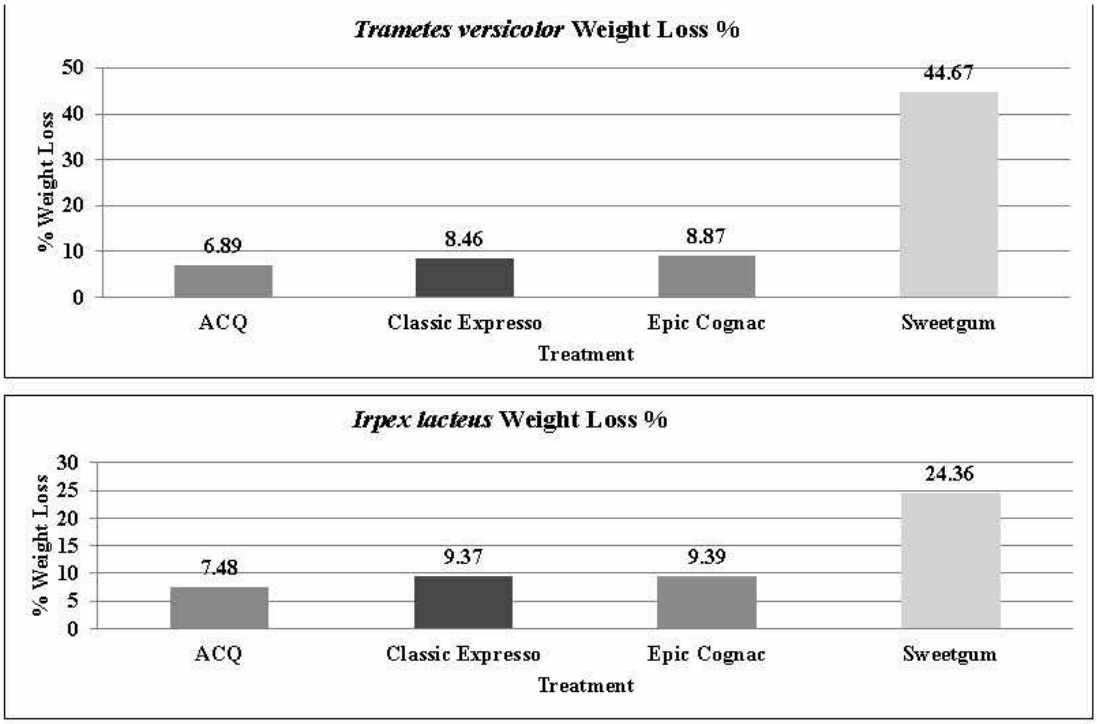


Figure 2. Graph of means for percent weight loss when tested against white rot fungi for 16 weeks.

Page **10** of **15**

Report: WDL-2020-12b

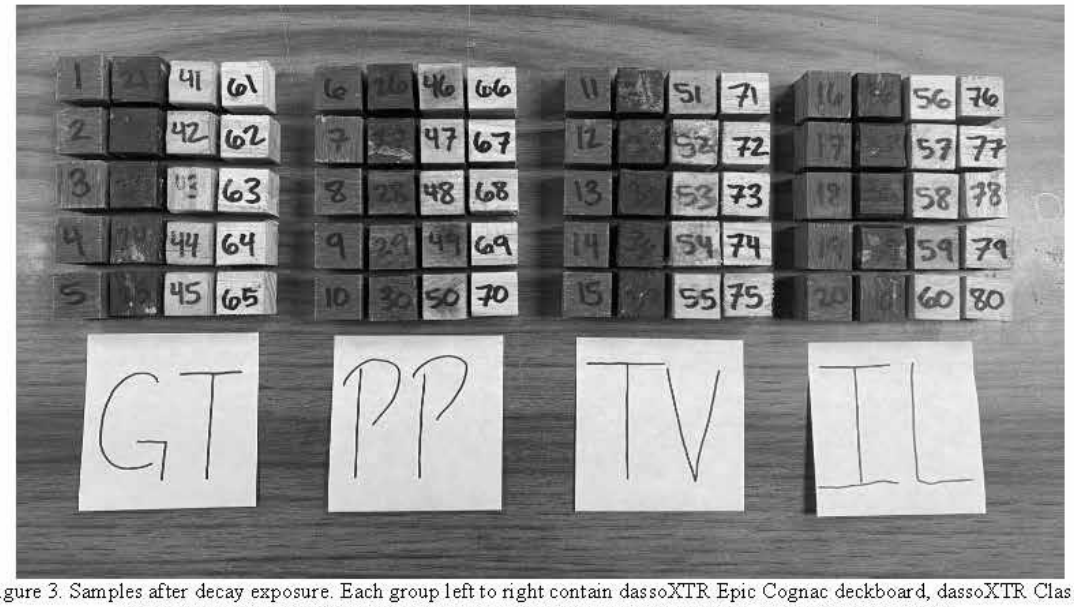
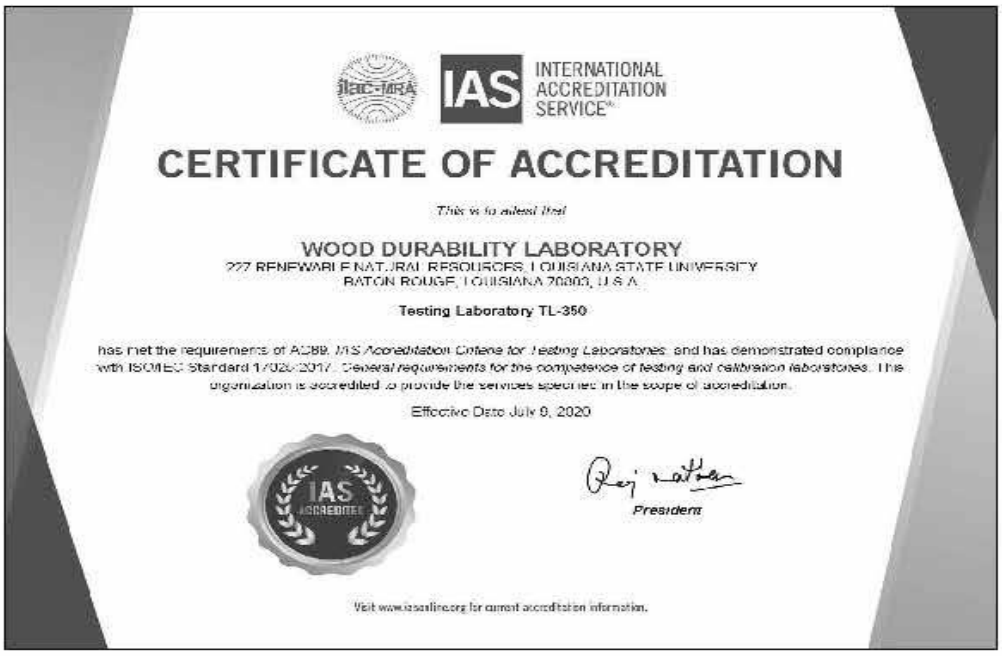


Figure 3. Samples after decay exposure. Each group left to right contain dassoXTR Epic Cognac deckboard, dassoXTR Classic Expresso deckboard, untreated controls or untreated sweetgum controls, and reference controls.

Report: WDL-2020-12b



IAS INTERNATIONAL ACCREDITATION SERVICE

CERTIFICATE OF ACCREDITATION

This is to attest that

WOOD DURABILITY LABORATORY
227 RENEWABLE NATURAL RESOURCES, LOUISIANA STATE UNIVERSITY
BATON ROUGE, LOUISIANA 70803, U.S.A.

Testing Laboratory TL-350

has met the requirements of ACLASS *Accreditation Criteria for Testing Laboratories*, and has demonstrated compliance with ISO/IEC Standard 17025:2017, *General requirements for the competence of testing and calibration laboratories*. This organization is accredited to provide the services specified in the scope of accreditation.

Effective Date July 9, 2020

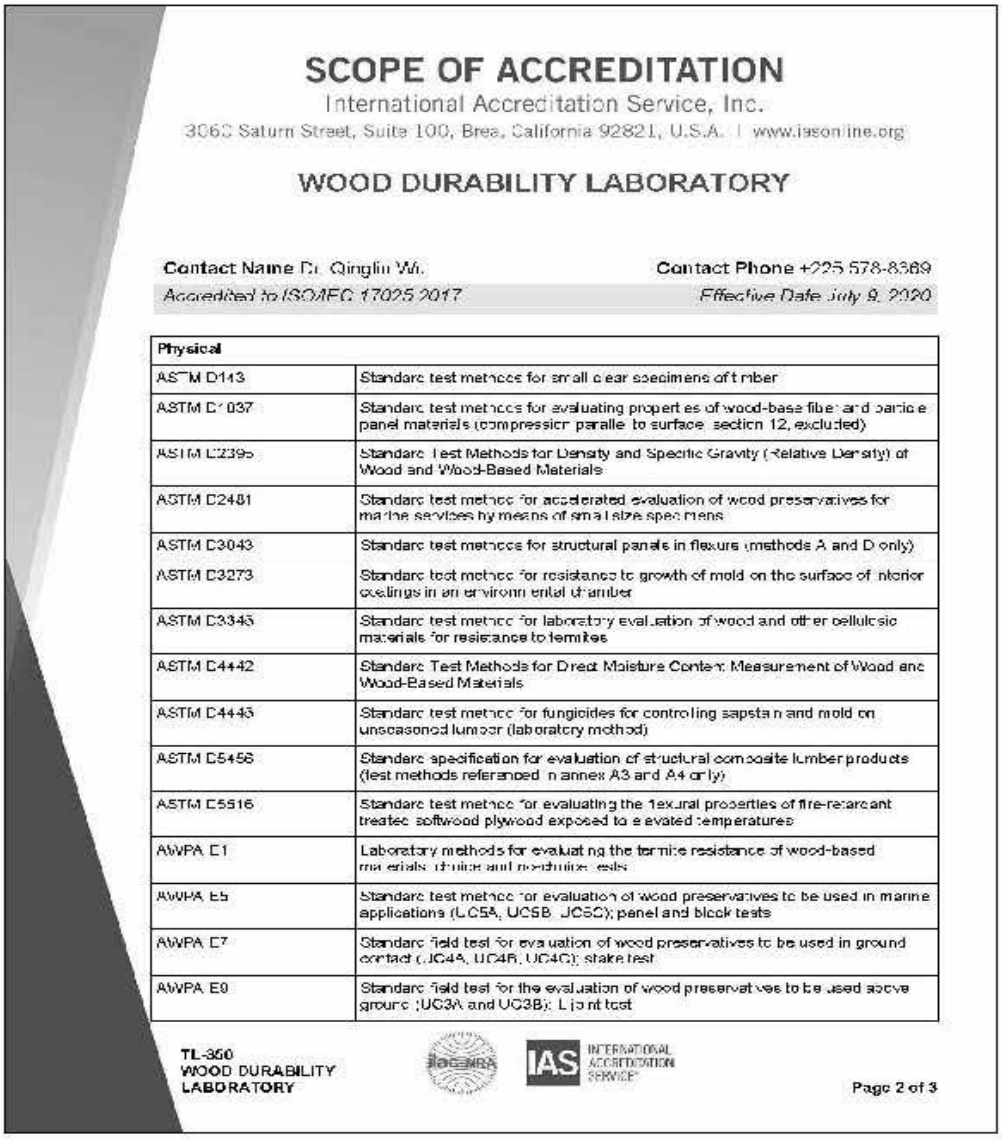
IAS ACCREDITED

President

Visit www.iasonline.org for current accreditation information.

Page **12** of **15**

Report: WDL-2020-12b



SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | www.iasonline.org

WOOD DURABILITY LABORATORY

Contact Name Dr. Qinglin Wu **Contact Phone** +225 578-8389

Accredited to ISO/IEC 17025:2017 *Effective Date July 9, 2020*

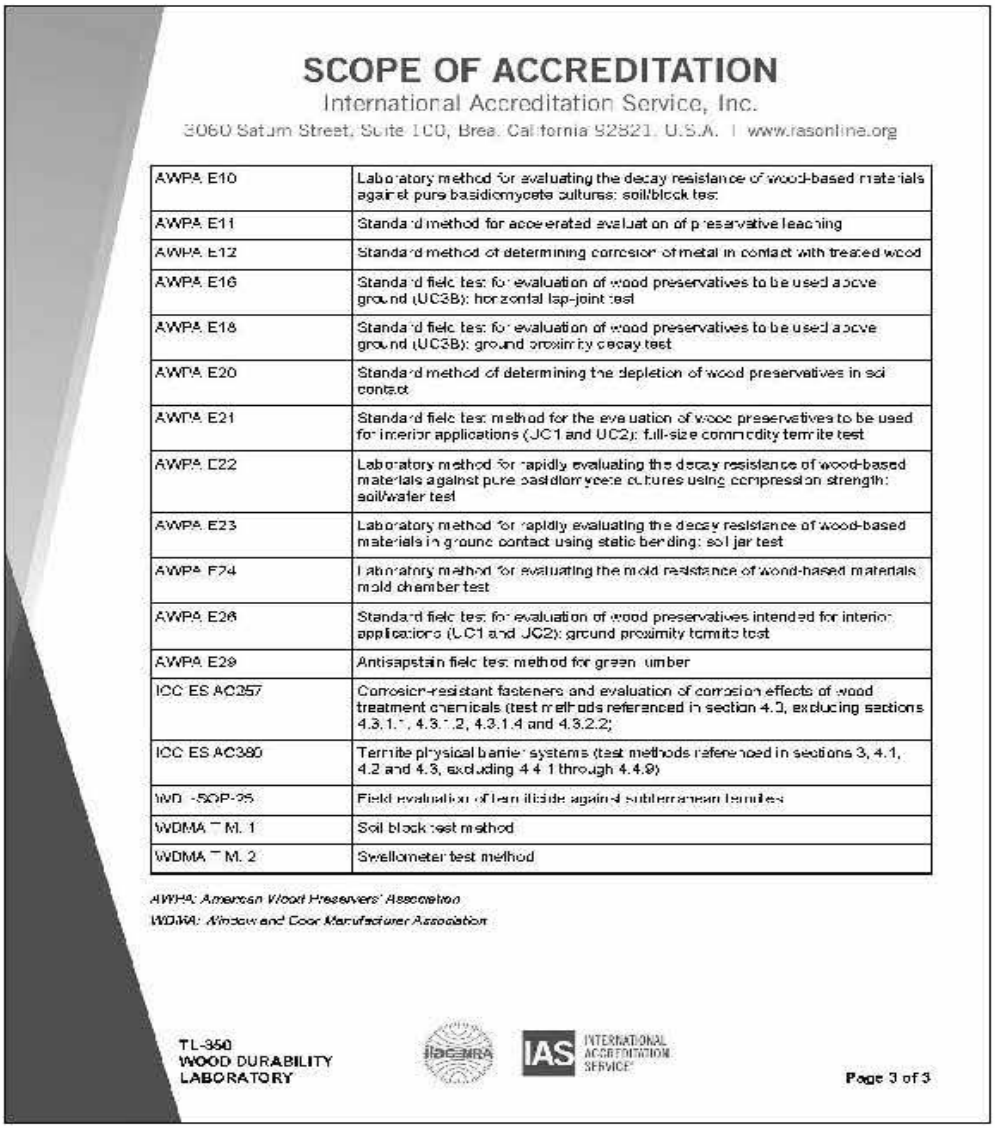
Physical	
ASTM D143	Standard test methods for small clear specimens of timber
ASTM D1037	Standard test methods for evaluating properties of wood-base fiber and particle panel materials (compression parallel to surface, section 12, excluded)
ASTM D2395	Standard Test Methods for Density and Specific Gravity (Relative Density) of Wood and Wood-Based Materials
ASTM D2481	Standard test method for accelerated evaluation of wood preservatives for marine services by means of small size specimens
ASTM D3043	Standard test methods for structural panels in flexure (methods A and D only)
ASTM D3273	Standard test method for resistance to growth of mold on the surface of interior coatings in an environmental chamber
ASTM D3345	Standard test method for laboratory evaluation of wood and other cellulosic materials for resistance to termites
ASTM D4442	Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials
ASTM D4445	Standard test method for fungicides for controlling sapstain and mold on unseasoned lumber (laboratory method)
ASTM D5456	Standard specification for evaluation of structural composite lumber products (test methods referenced in annex A3 and A4 only)
ASTM D5516	Standard test method for evaluating the flexural properties of fire-retardant treated softwood plywood exposed to elevated temperatures
AWPA E1	Laboratory methods for evaluating the termite resistance of wood-based materials (choice and no-choice tests
AWPA E5	Standard test method for evaluation of wood preservatives to be used in marine applications (UC5A, UC5B, UC5C); panel and block tests
AWPA E7	Standard field test for evaluation of wood preservatives to be used in ground contact (UC4A, UC4B, UC4C); stake test
AWPA E9	Standard field test for the evaluation of wood preservatives to be used above ground (UC3A and UC3B); L joint test

TL-350
WOOD DURABILITY
LABORATORY

Page 2 of 3

Page **13** of **15**

Report: WDL-2020-12b



SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | www.iasonline.org

AWPA E10	Laboratory method for evaluating the decay resistance of wood-based materials against pure basidiomycete cultures: soil/block test
AWPA E11	Standard method for accelerated evaluation of preservative leaching
AWPA E12	Standard method of determining corrosion of metal in contact with treated wood
AWPA E16	Standard field test for evaluation of wood preservatives to be used above ground (UC3B): horizontal lap-joint test
AWPA E18	Standard field test for evaluation of wood preservatives to be used above ground (UC3B): ground proximity decay test
AWPA E20	Standard method of determining the depletion of wood preservatives in soil contact
AWPA E21	Standard field test method for the evaluation of wood preservatives to be used for interior applications (UC1 and UC2): full-size commodity termite test
AWPA E22	Laboratory method for rapidly evaluating the decay resistance of wood-based materials against pure basidiomycete cultures using compression strength: soil/water test
AWPA E23	Laboratory method for rapidly evaluating the decay resistance of wood-based materials in ground contact using static bending: soil jar test
AWPA E24	Laboratory method for evaluating the mold resistance of wood-based materials: mold chamber test
AWPA E26	Standard field test for evaluation of wood preservatives intended for interior applications (UC1 and UC2): ground proximity termite test
AWPA E29	Antisapstain field test: method for green lumber
ICC ES AC257	Corrosion-resistant fasteners and evaluation of corrosion effects of wood treatment chemicals (test methods referenced in section 4.3, excluding sections 4.3.1.1, 4.3.1.2, 4.3.1.4 and 4.3.2.2)
ICC ES AC380	Termite physical barrier systems (test methods referenced in sections 3, 4.1, 4.2 and 4.3, excluding 4.4.1 through 4.4.9)
WDI -SOP-25	Field evaluation of termiticide against subterranean termites
WDMA T.M. 1	Soil block test method
WDMA T.M. 2	Swellometer test method

AWPA: American Wood Preservers' Association

WDMA: Window and Door Manufacturer Association

TL-350
WOOD DURABILITY
LABORATORY

IAS INTERNATIONAL ACCREDITATION SERVICE

Page 3 of 3

Report: WDL-2020-12b

End of report

APPENDIX C – Surface Burning Characteristics Report RJ7637F-1arev1 dated 05/11/2022 for Epic Cognac by QAI Laboratories

QAI LABORATORIES
CERTIFICATION TESTING INSPECTION

8385 White Oak Avenue
Rancho Cucamonga, CA 91730
909.483.0250 ph. | 909.483.0336 fx.

CLIENT: **DASSO USA**
6060 Boat Rock Blvd. SW, Suite 800
Atlanta, GA 30336

Test Report Number :	RJ7637F-1a rev1	Revision Date:	May 11, 2022

SAMPLE ID: The client identified the following test material as:
dassoXTR Epic Cognac composite bamboo decking material of 2" (51 mm) thickness.

SAMPLING DETAIL: Test Samples were witnessed at the location of manufacture in Xiandal Z huchanye Yuanqu, Gaobu Town, Zixi Country, Fuzhou City, Jianxi Province China by QAI personnel FEY Han on July 31, 2020. Samples were comfirmed to be representative of normally manufactured product.

DATE OF RECEIPT: Samples were received at QAI facilities on: 9/12/2020.

TESTING PERIOD: November 2, 2020.

AUTHORIZATION: Testing was authorized by DASSO USA for proposal 20JL05211R3 dated May 29, 2020. signed May 29, 2020.

TEST REQUESTED: Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM E84 - 18b "Standard Method of Test for Surface Burning Characteristics of Building Materials". The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1..

TEST RESULTS:

Flame Spread	Smoke Developed
25	10

CONCLUSION: When tested in accordance to ASTM E84-18b the tested material resulted in a Class 'A'. Detailed test results are presented in the subsequent pages of this report

Prepared By

Brian Ortega
Fire Lab Manager

Signed for and on behalf of QAI Laboratories, Inc.

Jason Friedrich
Engineering Manager

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

SCOPE: This fire-test-response standard is used for the comparative surface burning behavior of building materials is applicable to exposed surfaces such as walls, ceilings and others. The test is conducted with the specimen in the ceiling position with the surface to be evaluated exposed face down to the ignition source. The material, product, or assembly shall be capable of being mounted in the test position during the test. Thus, the specimen shall either be self-supporting by its own structural quality, held in place by added supports along the test surface, or secured from the back side. The purpose of this test method is to determine the relative burning behavior of the material by observing the flame spread along the specimen. Flame spread and smoke developed index are reported. However, there is not necessarily a relationship between these two measurements.

USE: The use of supporting materials on the underside of the test specimen has the ability to lower the flame spread index from those which might be obtained if the specimen could be tested without such support. These test results do not necessarily relate to indices obtained by testing materials without such support.

Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place.

This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire-hazard or fire-risk assessment of the materials, products, or assemblies under actual fire conditions.

PROCEDURE: A brief overview of the method is as follows: The test specimen, a material between 20 and 24 inches in width by 24 feet +/- 12 inches in length is loaded onto the water cooled ledge of the fire test chamber when tested to ASTM E84 or CAN/ULC-S102. If tested to CAN/ULC-S102.2 the specimen is tested on the chamber floor. The inside dimensions are 17 3/4 inches +/- 1/4" wide by 12 inches +/- 1/2" deep by 25 feet long. The fire test chamber is a rectangular horizontal duct with a removable lid. The sides and base of the chamber are lined with an insulated firebrick with pressure tight observation windows down one side for a technician to observe flame progression during the duration of the 10-minute test period. The chamber lid is lowered into test position with non combustible concrete board placed between the specimen and chamber lid. A draft of 240 feet per minute which is maintained inside the test chamber throughout the test period by the means of an electronic fan afterburner and an electronically controlled damper door system located downstream of the test chamber in the exhaust ducting. The test is started when the test flame is ignited at the front of the test chamber. An electronic photocell system located in the exhaust system downstream from the test chamber is used to plot the smoke developed for use in calculating the smoke developed index while a technician plots the flame spread distance used in determining the flame spread index. The test is run for the 10 minute duration in accordance to the method.

(See Diagrams in the Appendix of this report.)

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

PREPARATION AND CONDITIONING:
#N/A

MOUNTING METHOD:
#N/A

ASTM E84 TEST RESULTS:

CLIENT NAME:	**DASSO USA**	**TEST DATE:** November 2, 2020.	
SAMPLE ID:	dassoXTR Epic Cognac composite bamboo decking material of 2" (51 mm) thickness.		
SAMPLE IGNITION:		**01:07**	Minutes / Seconds
MAX FLAME FRONT:		**8.1**	Feet
TIME TO MAXIMUM SPREAD:		**09:25**	Minutes / Seconds
TEST DURATION:		**10:00**	Minutes / Seconds
SUMMARY:	FLAME SPREAD:	**25**	*27 Unrounded*
	SMOKE DEVELOPED:	**10**	*12 Unrounded*

OBSERVATIONS:

A Maximum Flamefront of 8.1 feet was observed at 09:25. The Test was terminated at 10:00.

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

SUMMARY OF ASTM E84 / UL 723 RESULTS:

Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5.
Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

NFPA CLASS[1]	IBC CLASS[2]	FLAME SPREAD	SMOKE DEVELOPED
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

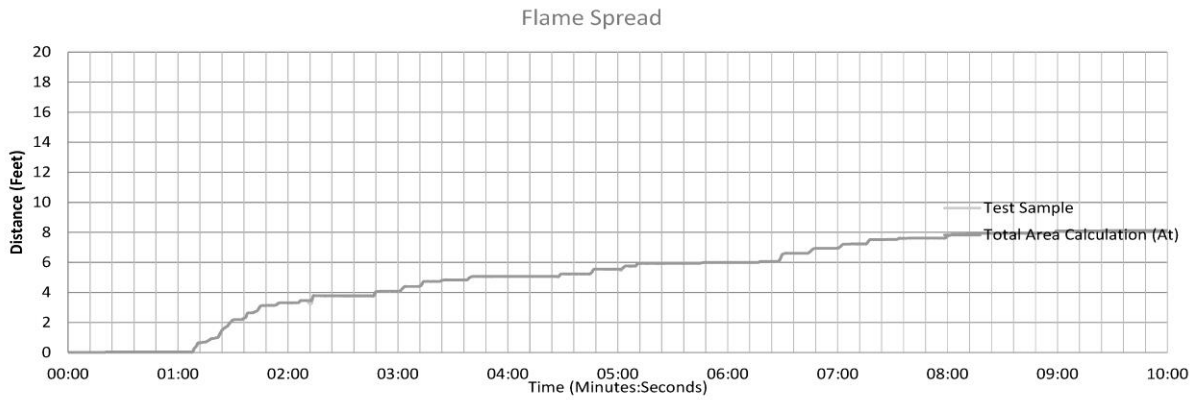
BUILDING CODES CITED:

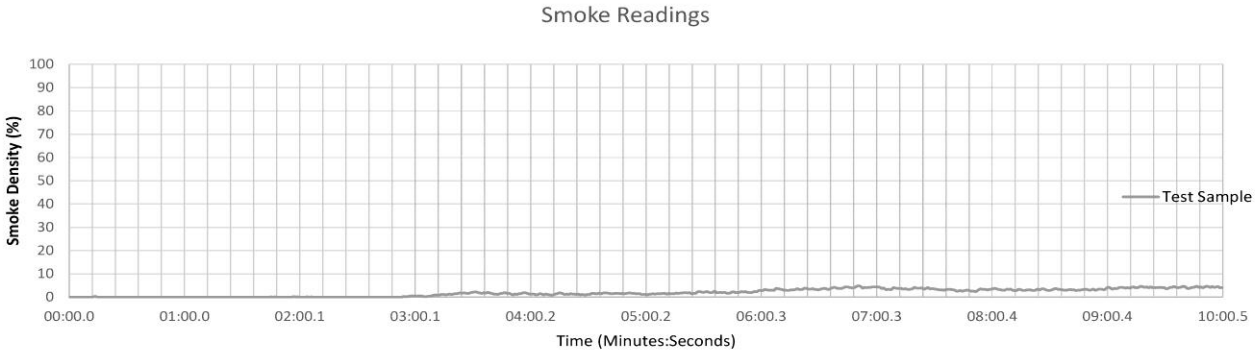
1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code"

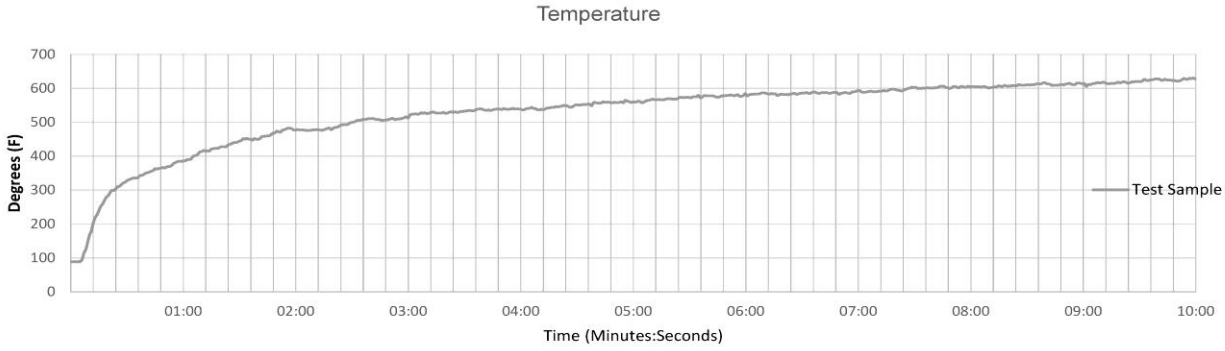
2. International Building Code, Chapter 8, Interior Finishes, Section 803.

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

RESULTS CONTINUED:







APPENDIX

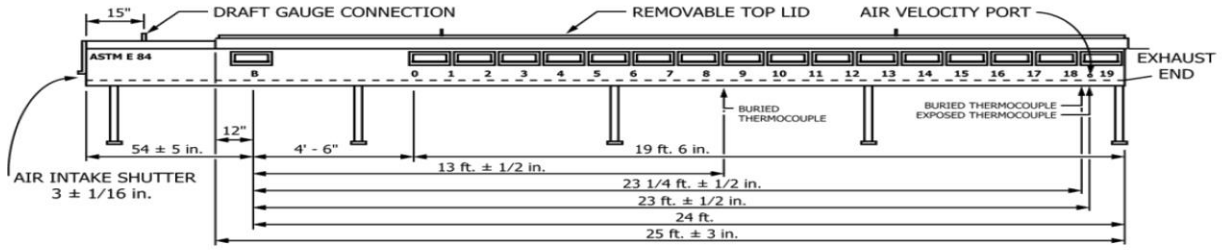


Diagram 1. Test Chamber side view showing critical dimensions.

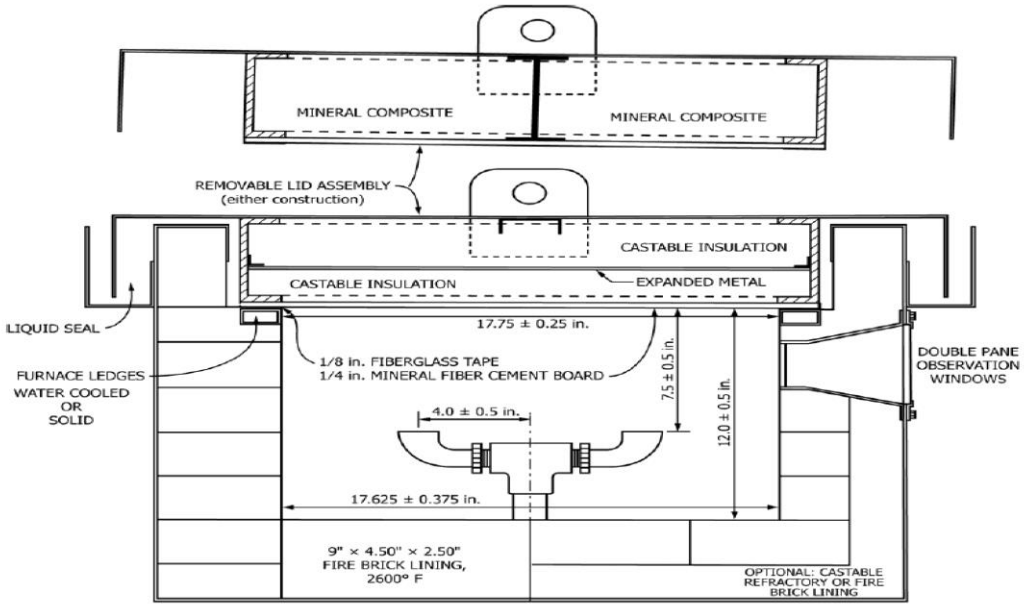


Diagram 2. Test Chamber looking down chamber showing critical dimensions.

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

REVISION HISTORY

07/15/2021:	Report published.
05/02/2022:	Update to include sample thickness, correct report client sample name (dassoXTR) on report.

This page intentionally left blank.

*****<<<END OF TEST REPORT>>>*****

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

APPENDIX D – Surface Burning Characteristics Report RJ7637F-1brev1 dated 05/11/2022 for Classic Espresso by QAI Laboratories

QAI LABORATORIES
CERTIFICATION TESTING INSPECTION

8385 White Oak Avenue
Rancho Cucamonga, CA 91730
909.483.0250 ph. | 909.483.0336 fx.

CLIENT: **Dasso USA**
6060 Boat Rock Blvd. SW, Suite 800
Atlanta, GA 30336

Test Report Number :	RJ7637F-1b rev1	Date:	May 11, 2022

SAMPLE ID: The client identified the following test material as:
dassoXTR Classic Espresso composite bamboo decking material of 2" (51 mm) thickness.

SAMPLING DETAIL: Test Samples were witnessed at the location of manufacture in Xiandal Z huchanye Yuanqu, Gaobu Town, Zixi Country, Fuzhou City, Jianxi Province China by QAI personnel FEY Han on July 31, 2020. Samples were comfirmed to be representative of normally manufactured product.

DATE OF RECEIPT: Samples were received at QAI facilities on: 9/12/2020.

TESTING PERIOD: November 2, 2020.

AUTHORIZATION: Testing was authorized by DASSO USA for proposal 20JL05211R3 dated May 29, 2020. signed May 29, 2020.

TEST REQUESTED: Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM E84 - 18b "Standard Method of Test for Surface Burning Characteristics of Building Materials". The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1..

TEST RESULTS:

Flame Spread	Smoke Developed
25	25

CONCLUSION: When tested in accordance to ASTM E84-18b the tested material resulted in a Class 'A'. Detailed test results are presented in the subsequent pages of this report

Prepared By

Brian Ortega
Fire Lab Manager

Signed for and on behalf of QAI Laboratories, Inc.

Jason Friedrich
Engineering Manager

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

SCOPE: This fire-test-response standard is used for the comparative surface burning behavior of building materials is applicable to exposed surfaces such as walls, ceilings and others. The test is conducted with the specimen in the ceiling position with the surface to be evaluated exposed face down to the ignition source. The material, product, or assembly shall be capable of being mounted in the test position during the test. Thus, the specimen shall either be self-supporting by its own structural quality, held in place by added supports along the test surface, or secured from the back side. The purpose of this test method is to determine the relative burning behavior of the material by observing the flame spread along the specimen. Flame spread and smoke developed index are reported. However, there is not necessarily a relationship between these two measurements.

USE: The use of supporting materials on the underside of the test specimen has the ability to lower the flame spread index from those which might be obtained if the specimen could be tested without such support. These test results do not necessarily relate to indices obtained by testing materials without such support.

Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place.

This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire-hazard or fire-risk assessment of the materials, products, or assemblies under actual fire conditions.

PROCEDURE: A brief overview of the method is as follows: The test specimen, a material between 20 and 24 inches in width by 24 feet +/- 12 inches in length is loaded onto the water cooled ledge of the fire test chamber when tested to ASTM E84 or CAN/ULC-S102. If tested to CAN/ULC-S102.2 the specimen is tested on the chamber floor. The inside dimensions are 17 3/4 inches +/- 1/4" wide by 12 inches +/- 1/2" deep by 25 feet long. The fire test chamber is a rectangular horizontal duct with a removable lid. The sides and base of the chamber are lined with an insulated firebrick with pressure tight observation windows down one side for a technician to observe flame progression during the duration of the 10-minute test period. The chamber lid is lowered into test position with non combustible concrete board placed between the specimen and chamber lid. A draft of 240 feet per minute which is maintained inside the test chamber throughout the test period by the means of an electronic fan afterburner and an electronically controlled damper door system located downstream of the test chamber in the exhaust ducting. The test is started when the test flame is ignited at the front of the test chamber. An electronic photocell system located in the exhaust system downstream from the test chamber is used to plot the smoke developed for use in calculating the smoke developed index while a technician plots the flame spread distance used in determining the flame spread index. The test is run for the 10 minute duration in accordance to the method.

(See Diagrams in the Appendix of this report.)

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

PREPARATION AND CONDITIONING:
#N/A

MOUNTING METHOD:
#N/A

ASTM E84 TEST RESULTS:

CLIENT NAME:	**Dasso USA**	**TEST DATE:** November 2, 2020.	
SAMPLE ID:	dassoXTR Classic Espresso composite bamboo decking material of 2" (51 mm) thickness.		
SAMPLE IGNITION:		**00:00**	Minutes / Seconds
MAX FLAME FRONT:		**9.1**	Feet
TIME TO MAXIMUM SPREAD:		**08:56**	Minutes / Seconds
TEST DURATION:		**10:00**	Minutes / Seconds
SUMMARY:	FLAME SPREAD:	**25**	*26 Unrounded*
	SMOKE DEVELOPED:	**25**	*23 Unrounded*

OBSERVATIONS:

A Maximum Flamefront of 9.1 feet was observed at 08:56. The Test was terminated at 10:00.

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

SUMMARY OF ASTM E84 / UL 723 RESULTS:

Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5.
Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

NFPA CLASS[1]	IBC CLASS[2]	FLAME SPREAD	SMOKE DEVELOPED
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

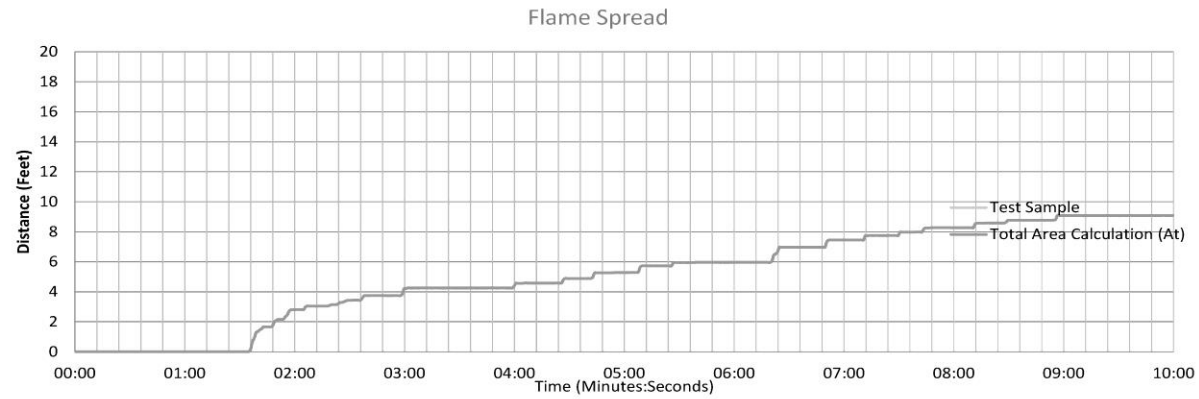
BUILDING CODES CITED:

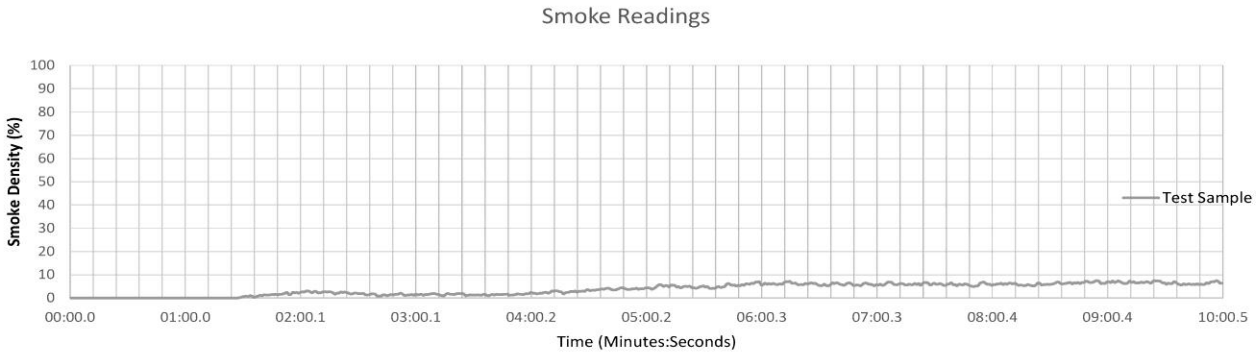
1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code"

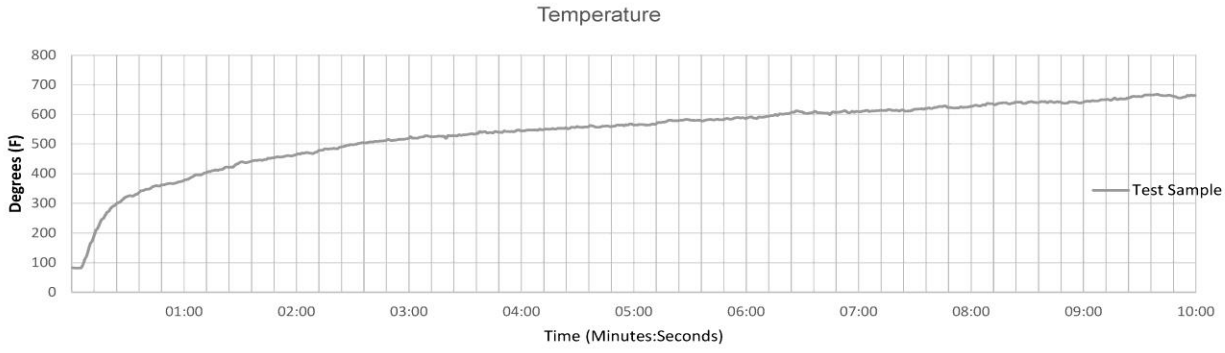
2. International Building Code, Chapter 8, Interior Finishes, Section 803.

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

RESULTS CONTINUED:







THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

APPENDIX

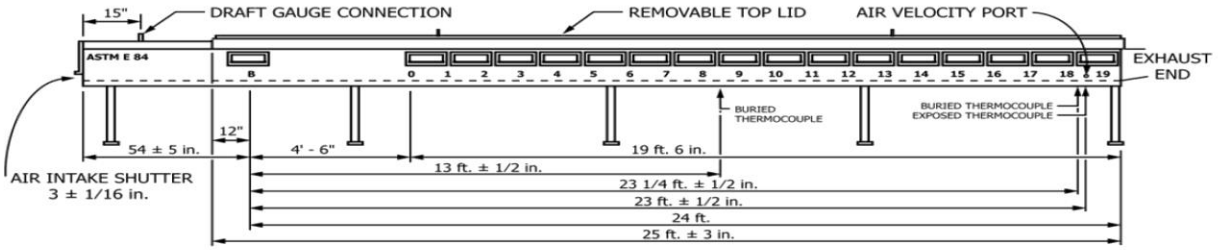


Diagram 1. Test Chamber side view showing critical dimensions.

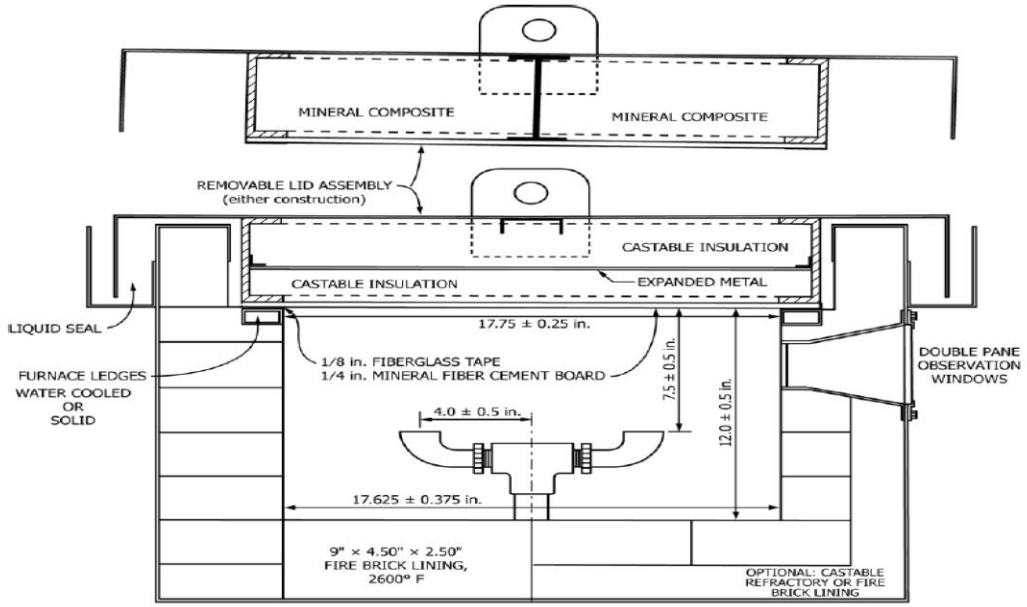


Diagram 2. Test Chamber looking down chamber showing critical dimensions.

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

REVISION HISTORY

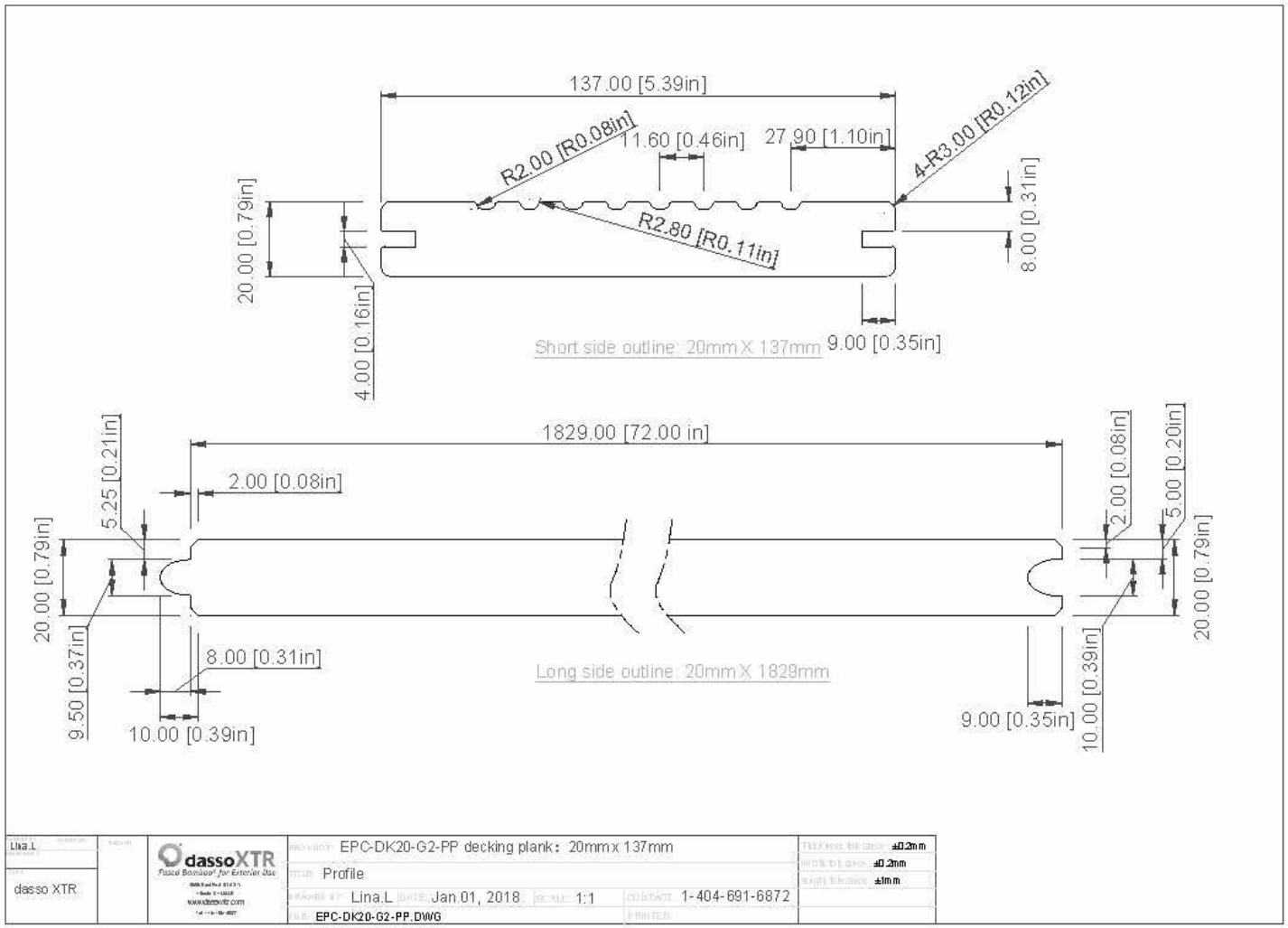
07/15/2021:	Report published.
05/02/2022:	Update to include sample thickness, correct report client sample name (dassoXTR) on report, update to project / report number to corret to RJ7637F-1b

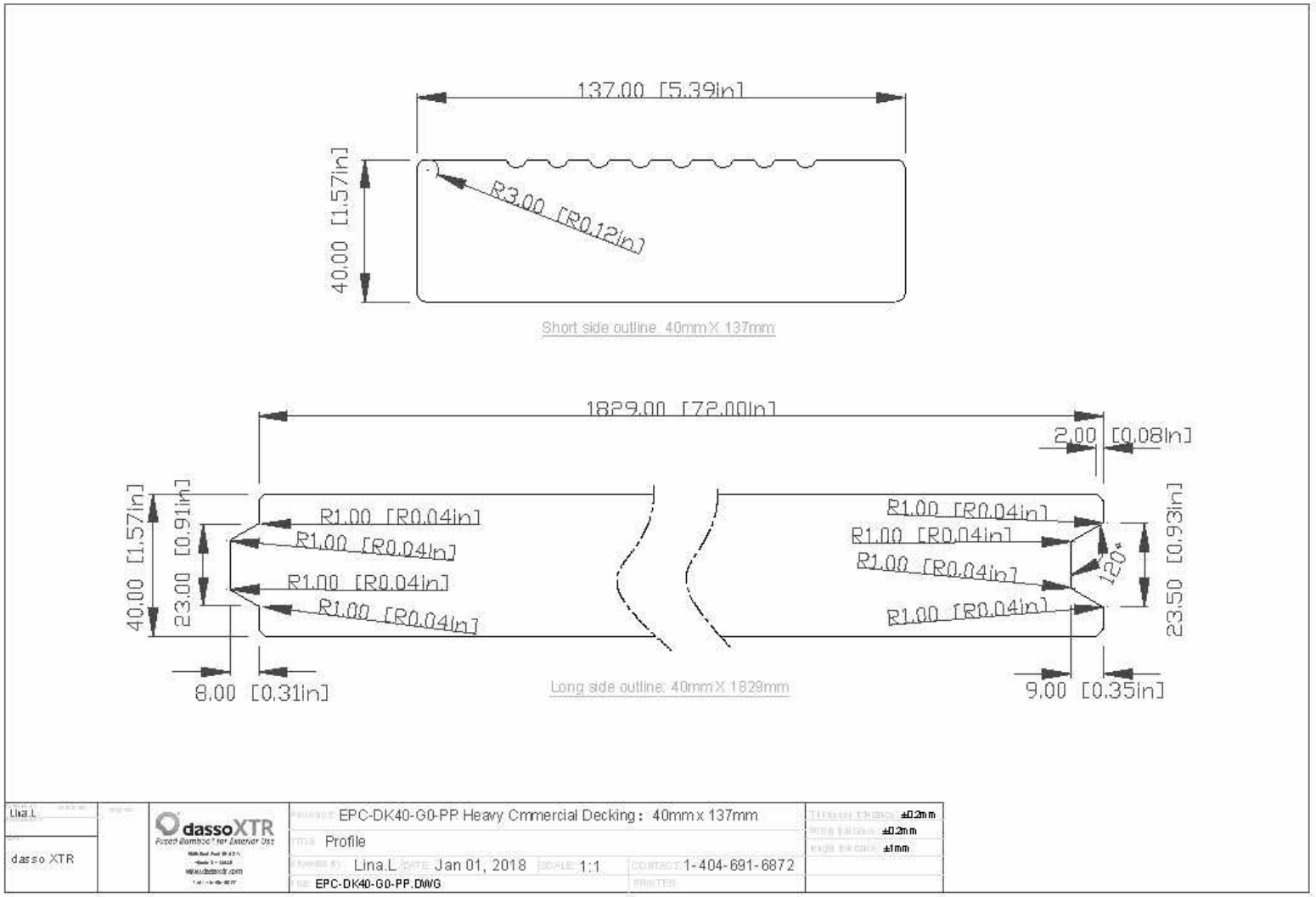
This page intentionally left blank.

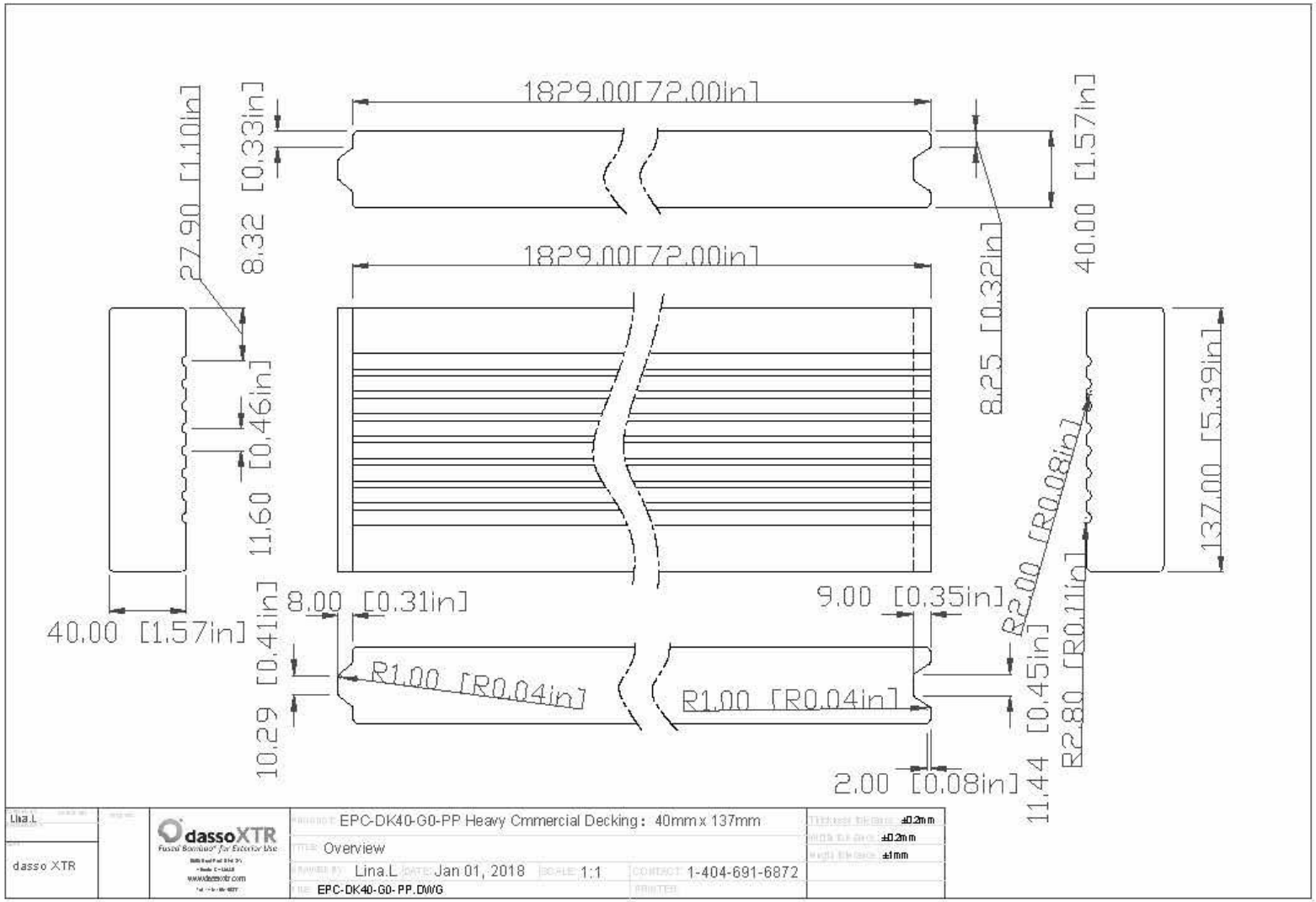
*****<<<END OF TEST REPORT>>>*****

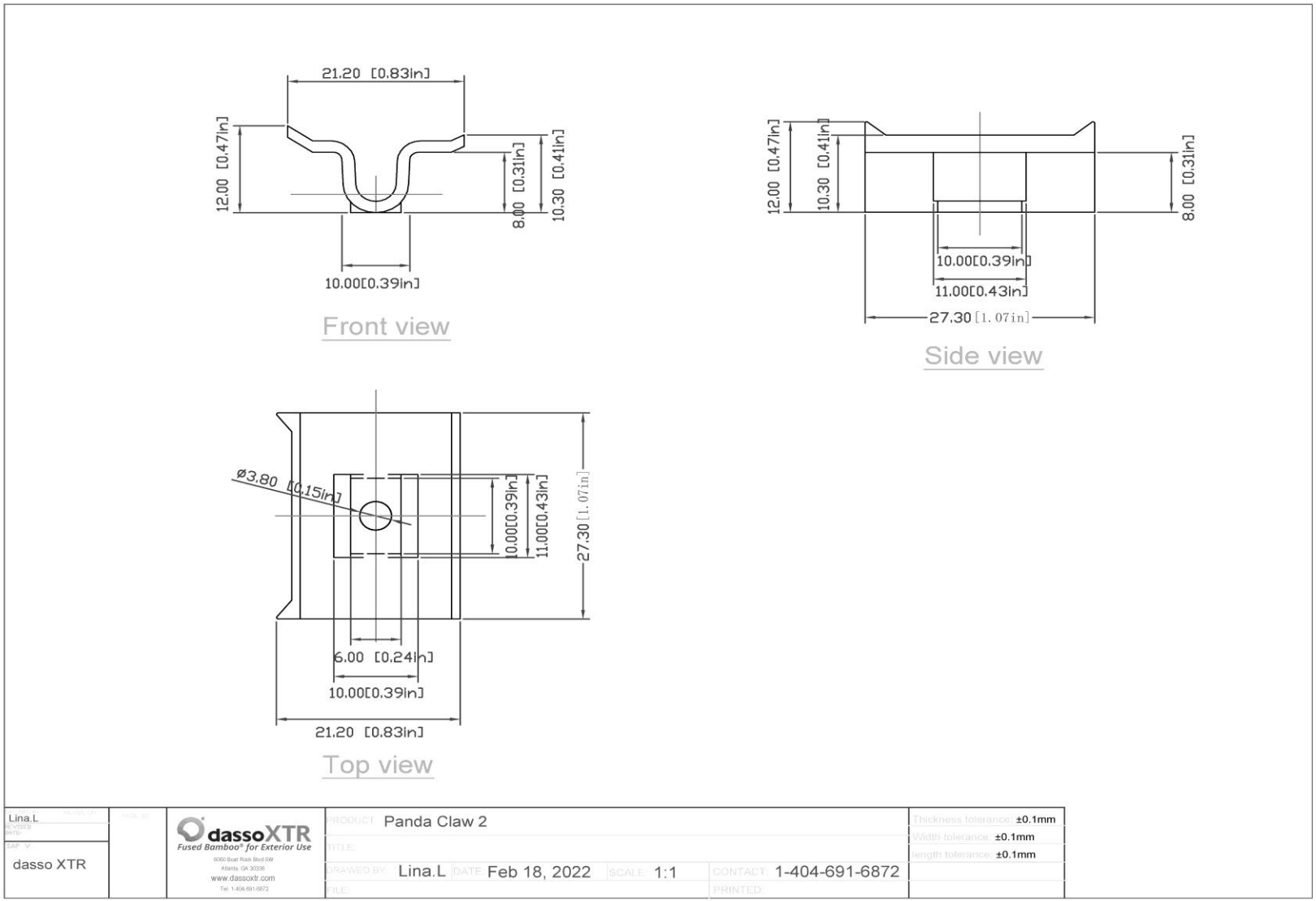
THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

APPENDIX E – Product Drawings

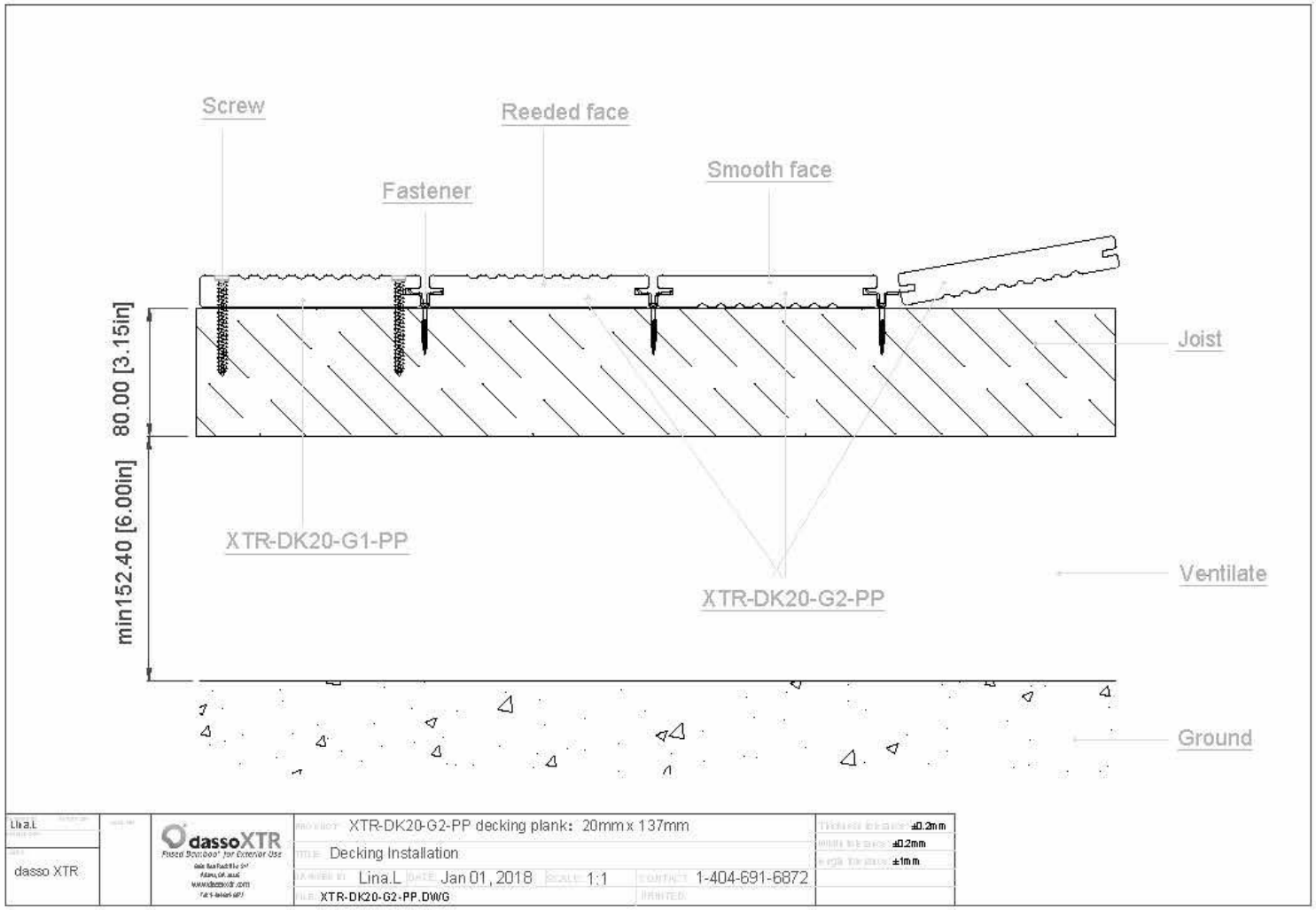


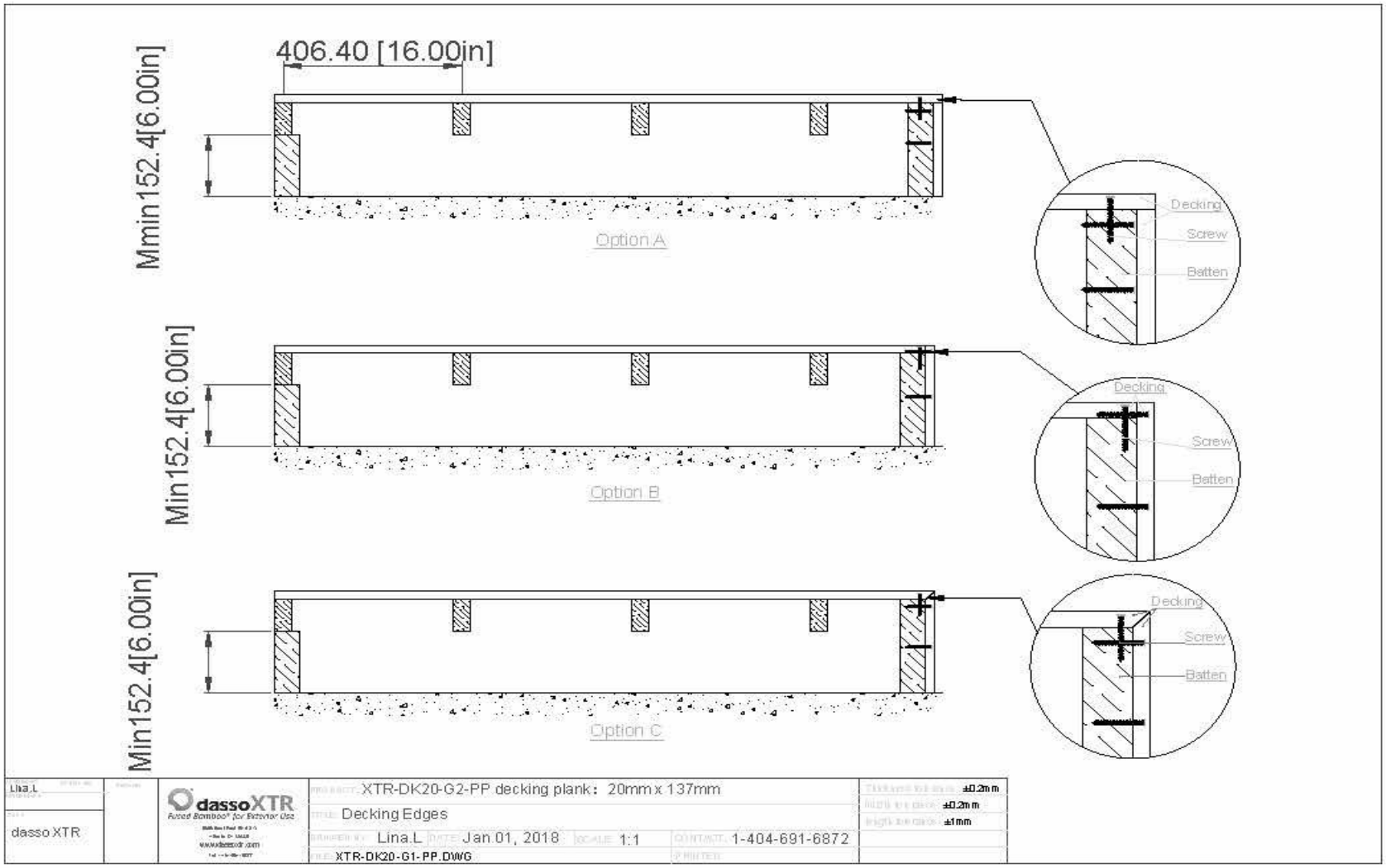


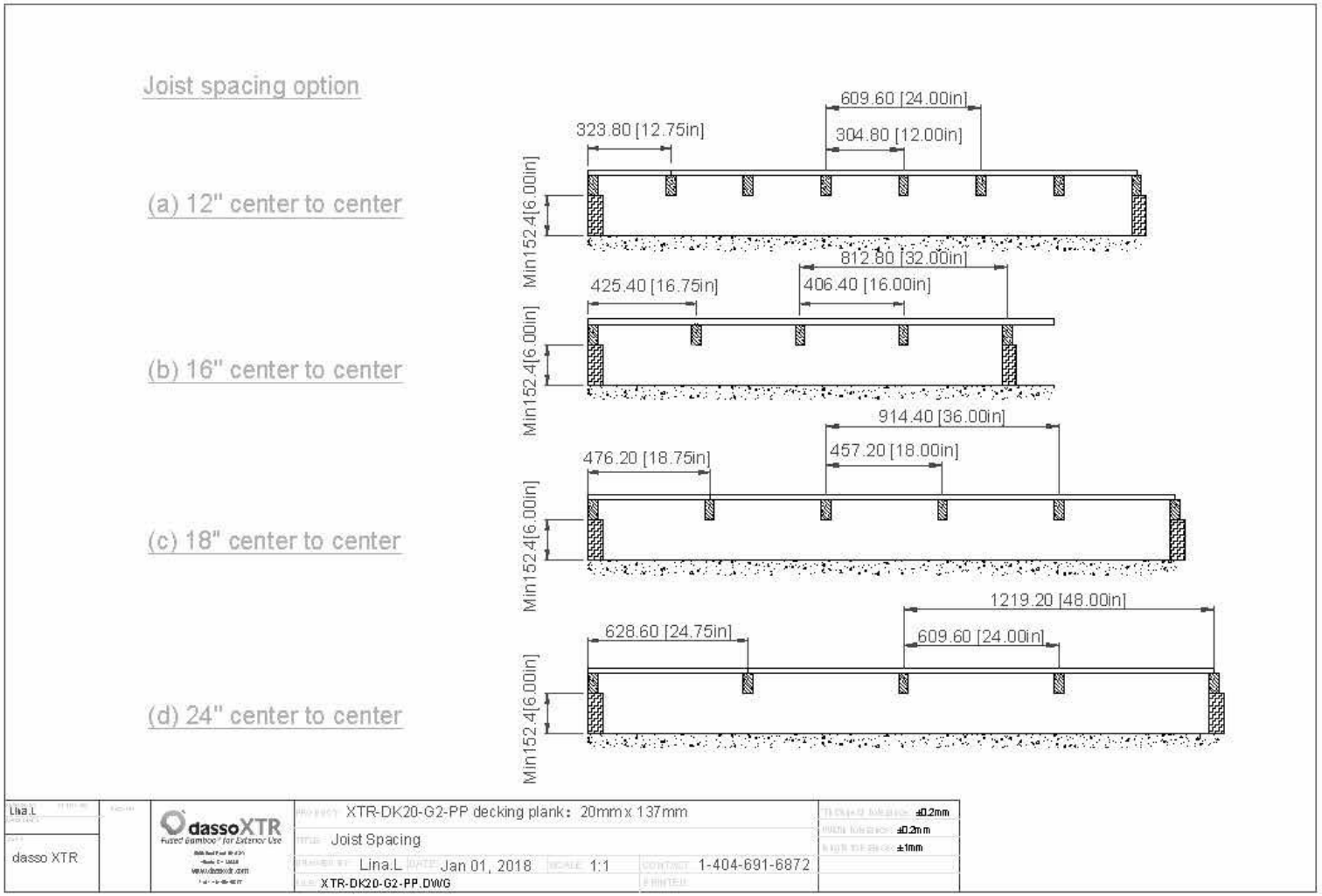


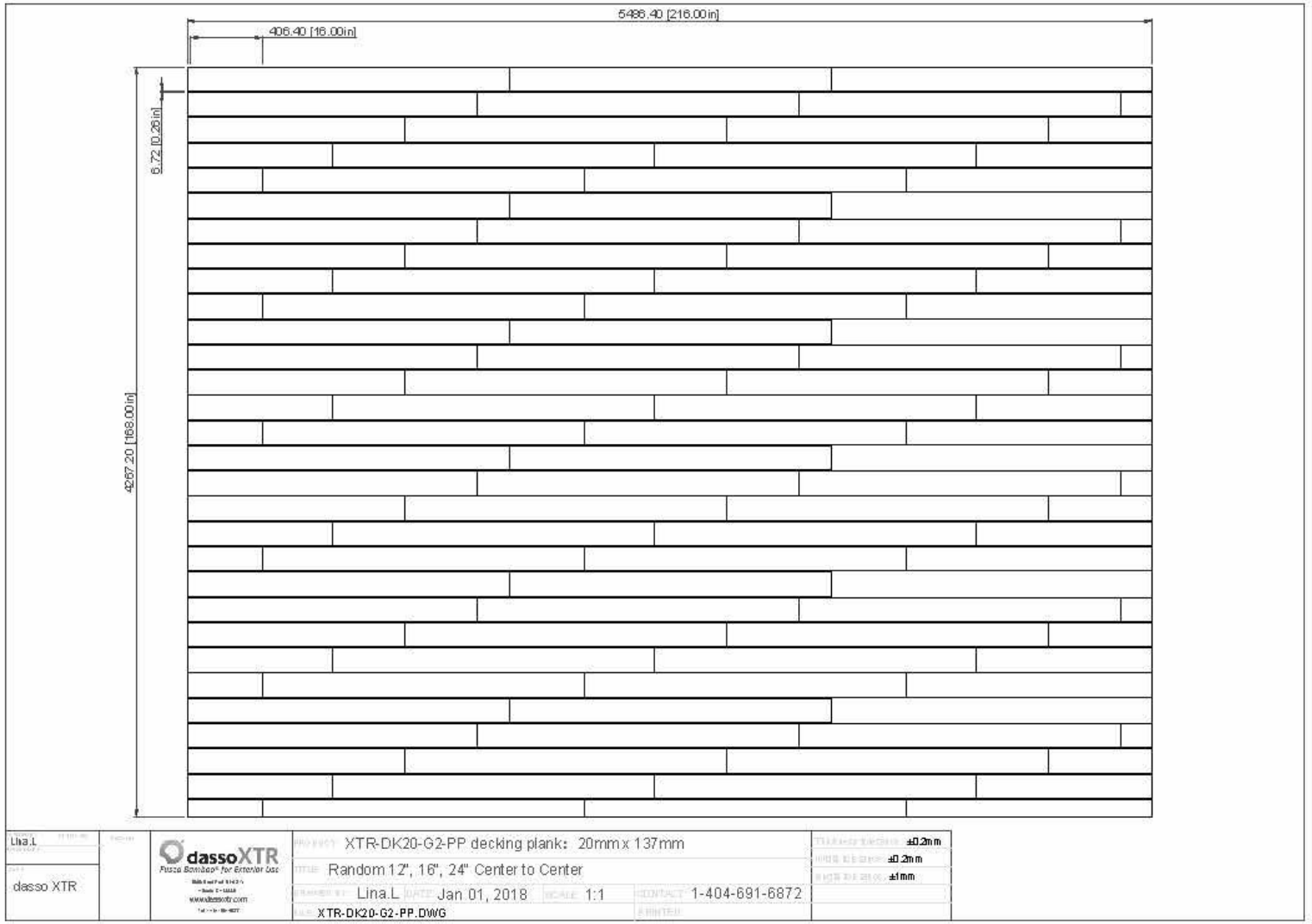


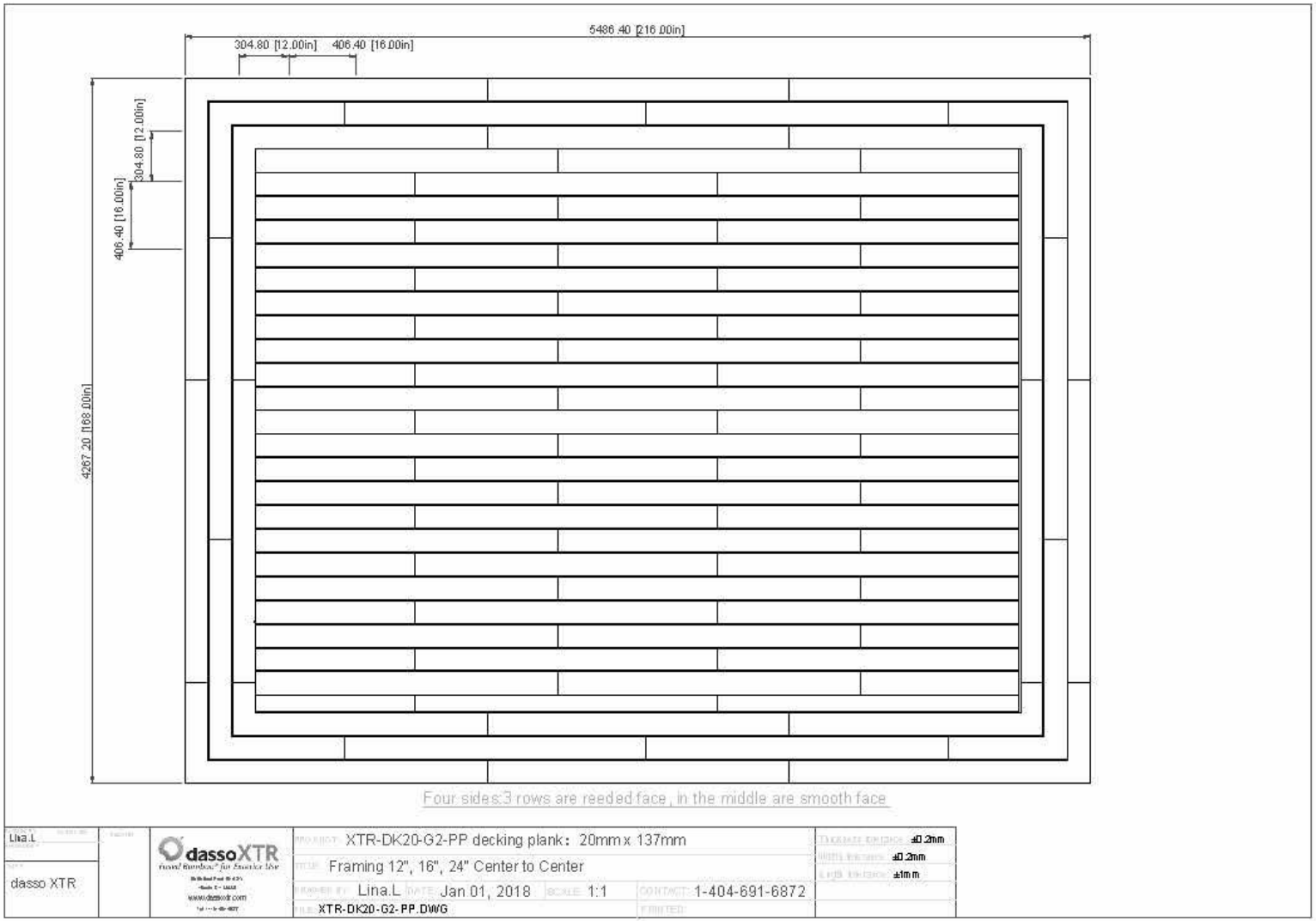
Appendix G - Installation Instructions

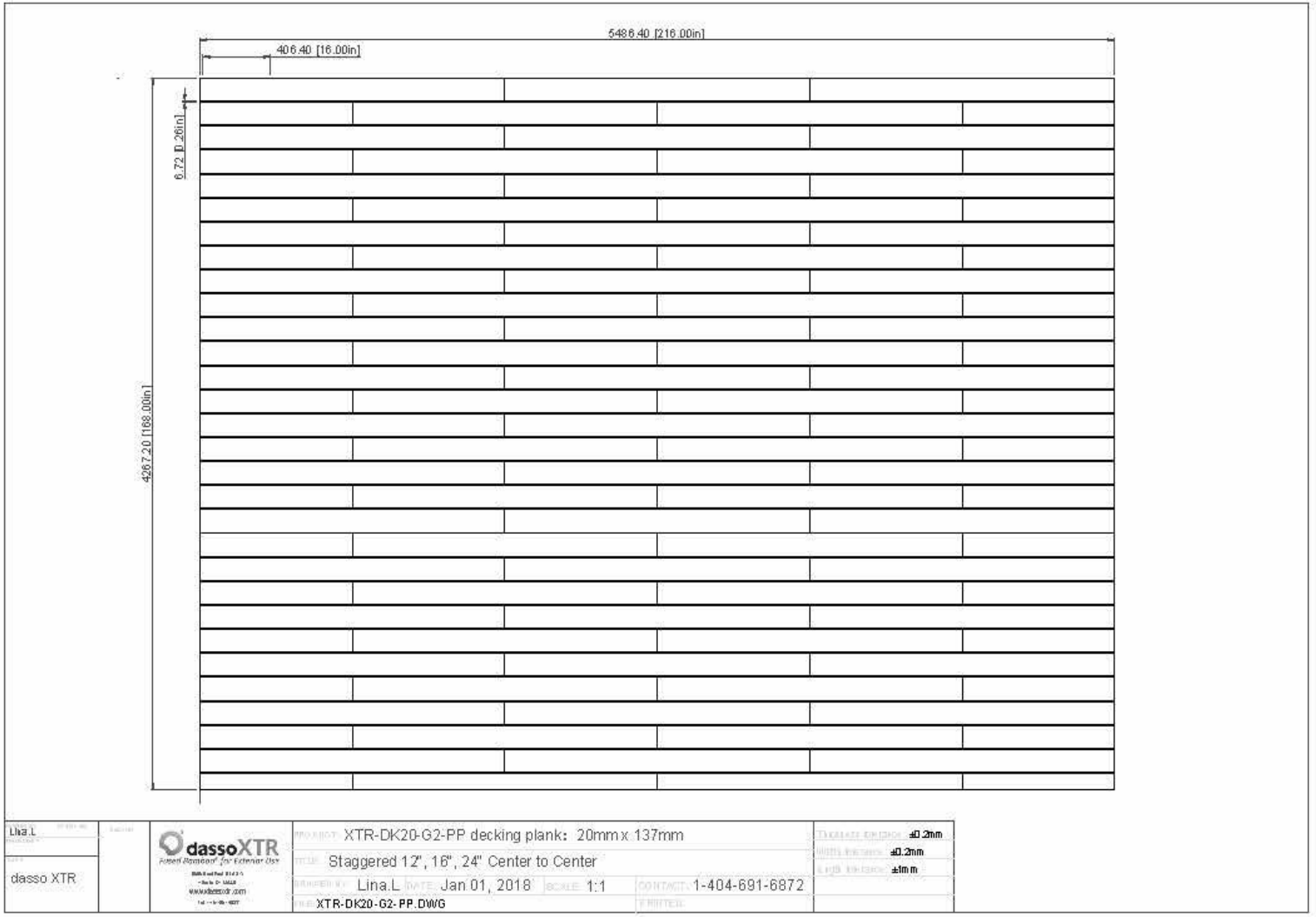


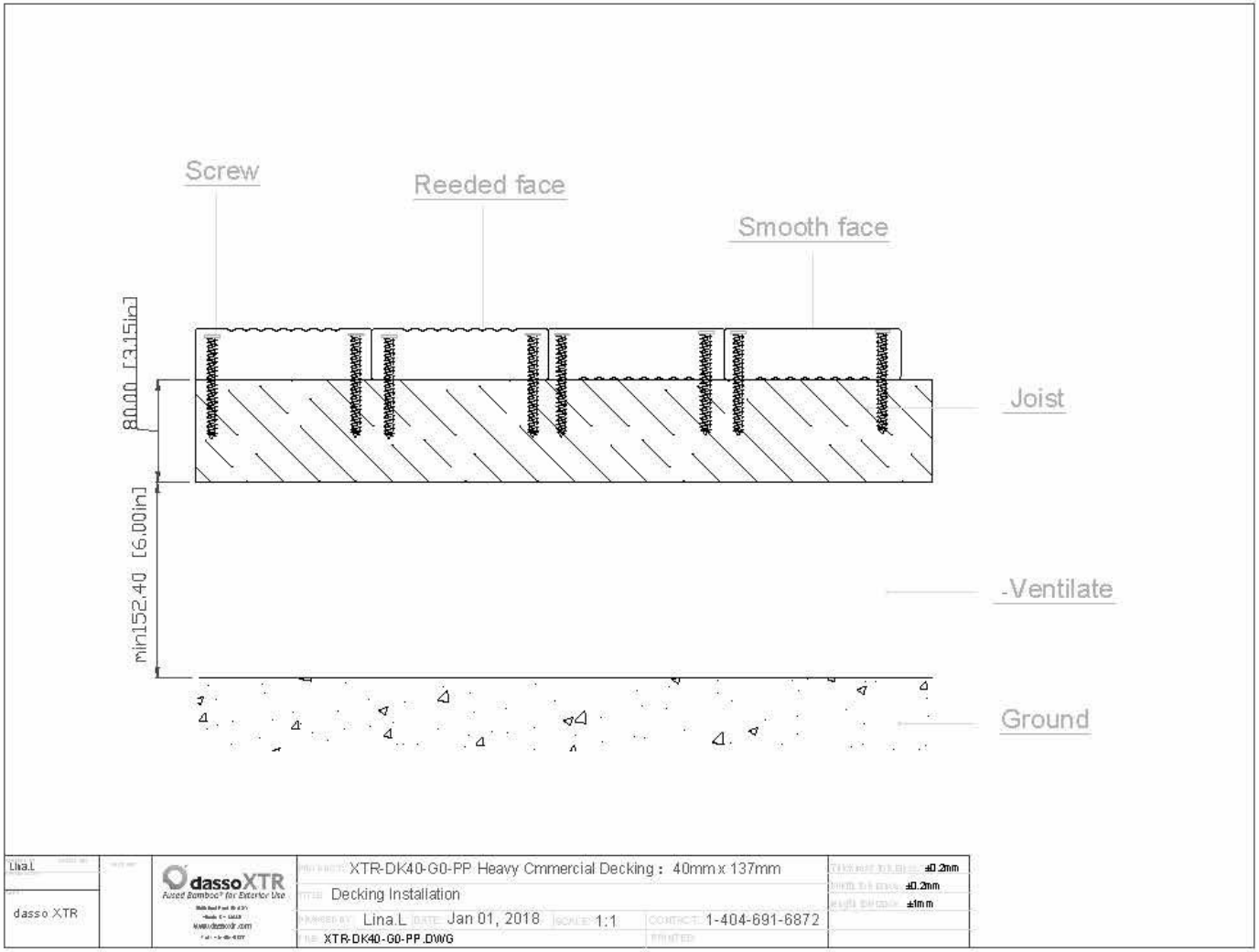


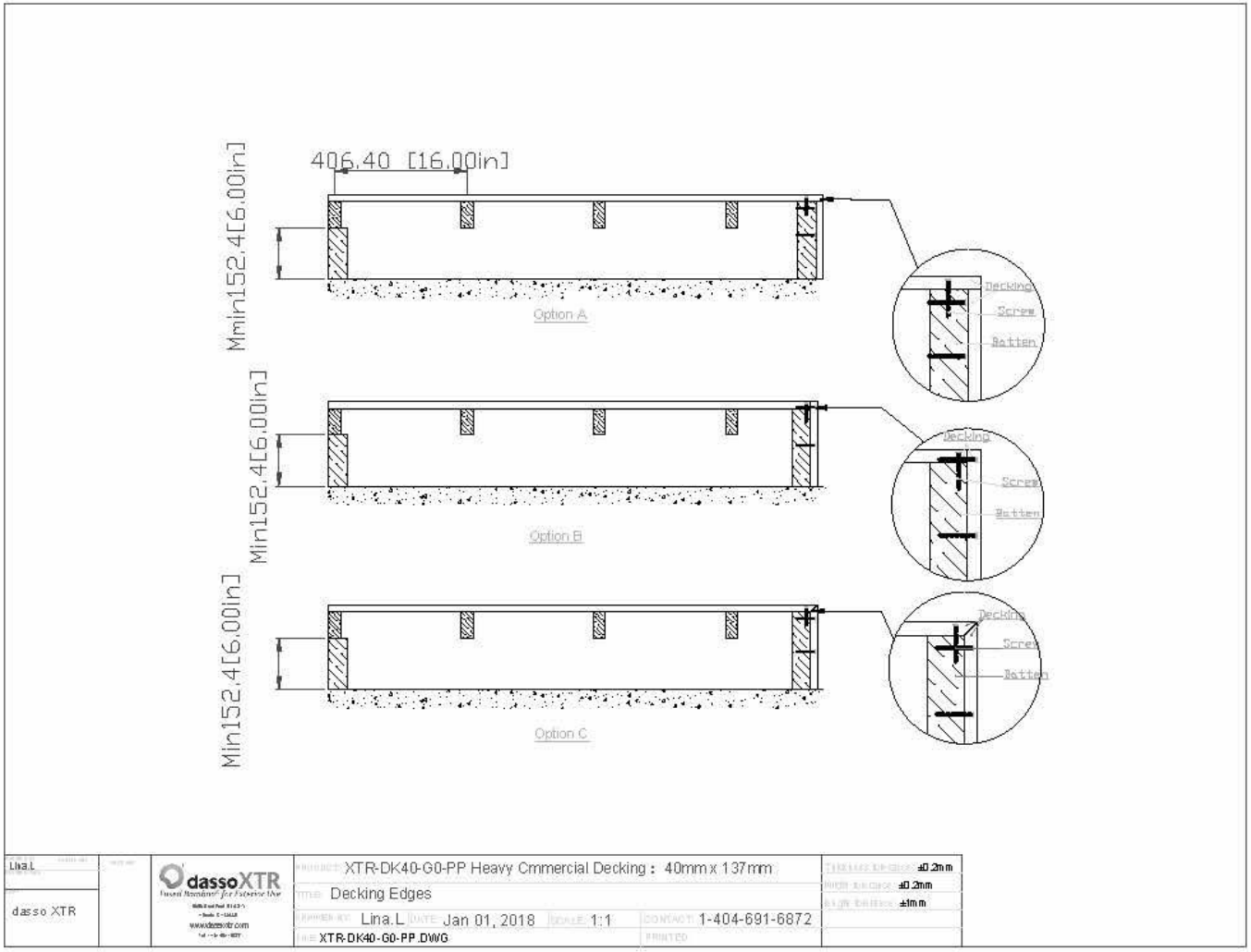


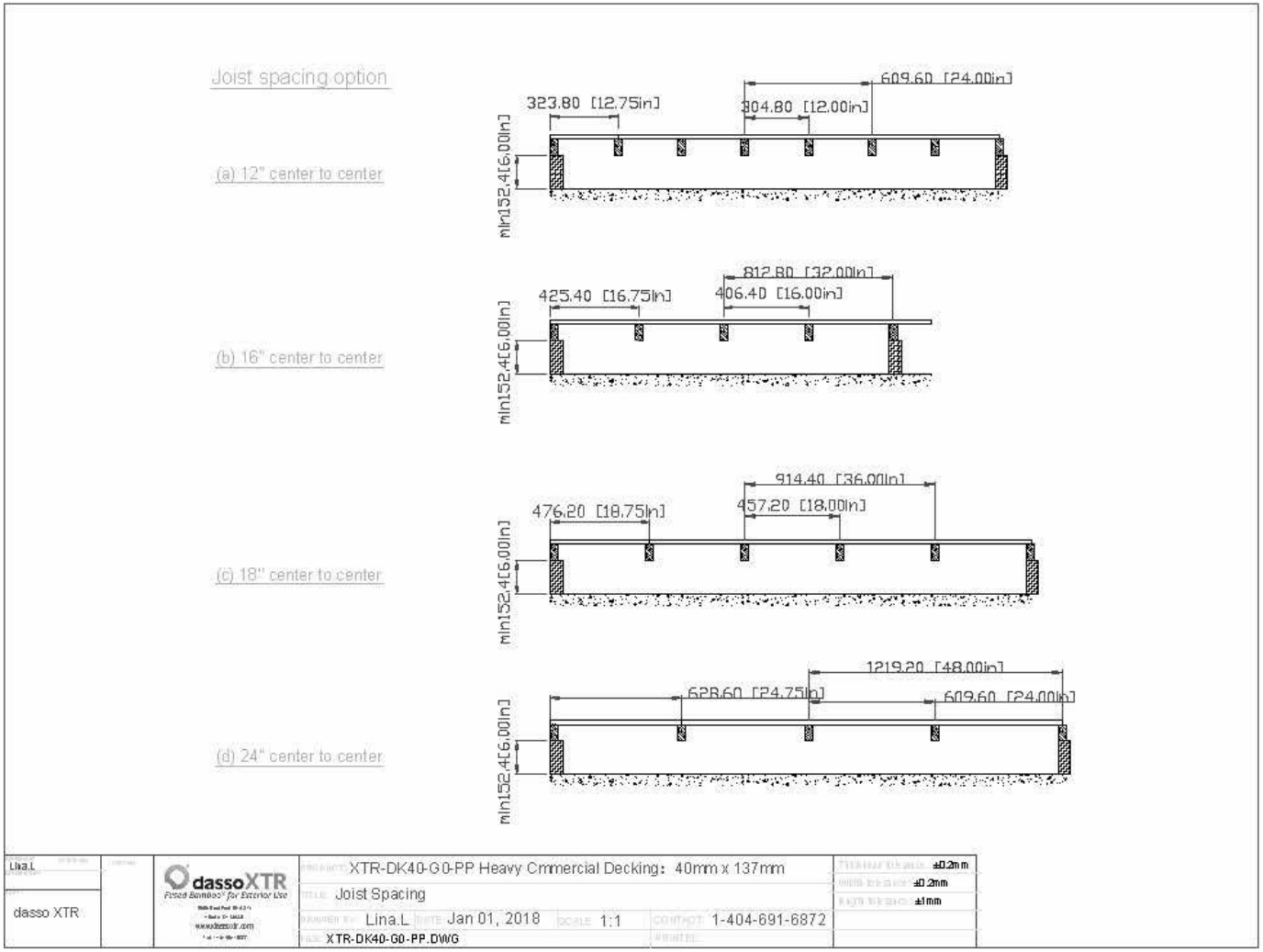


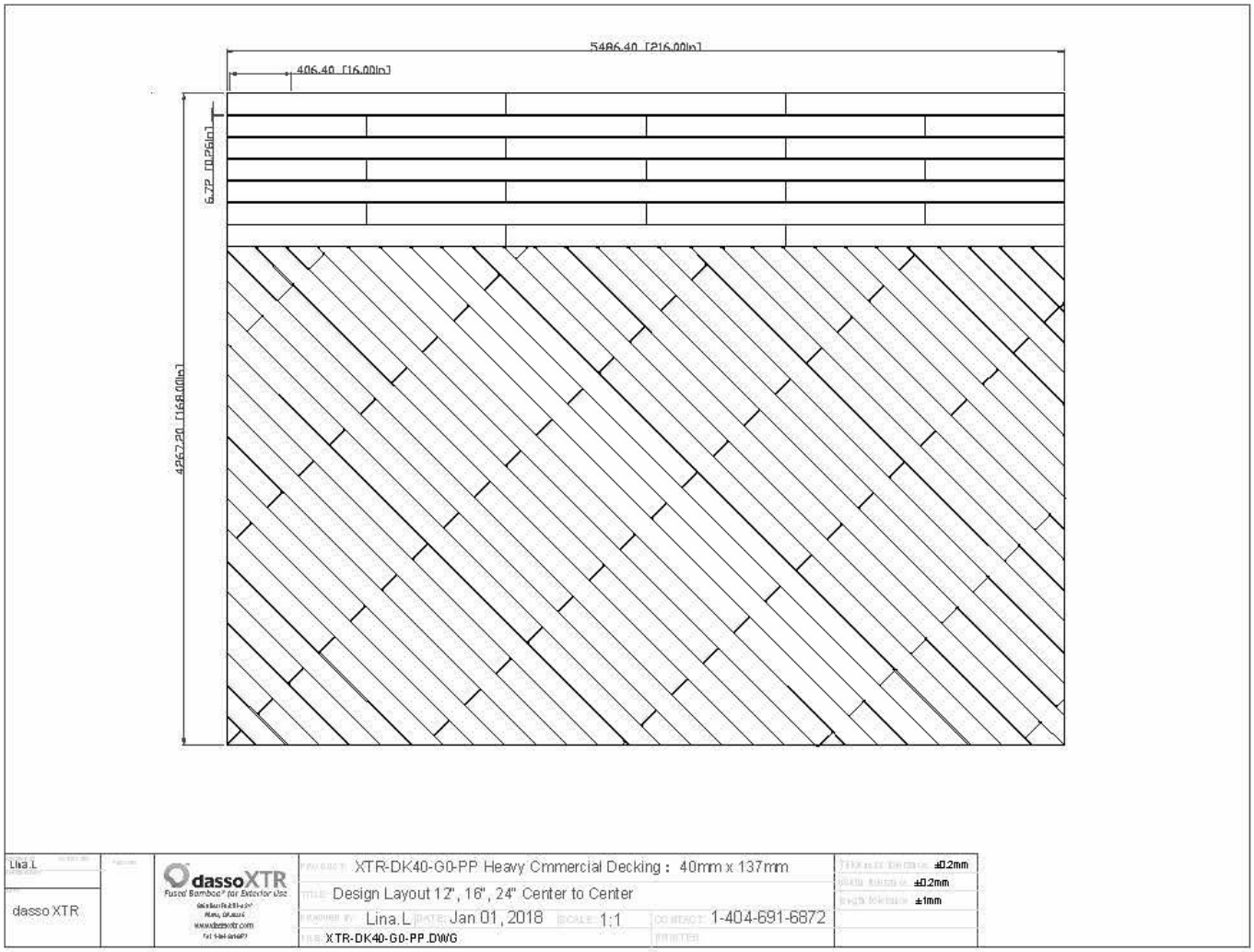


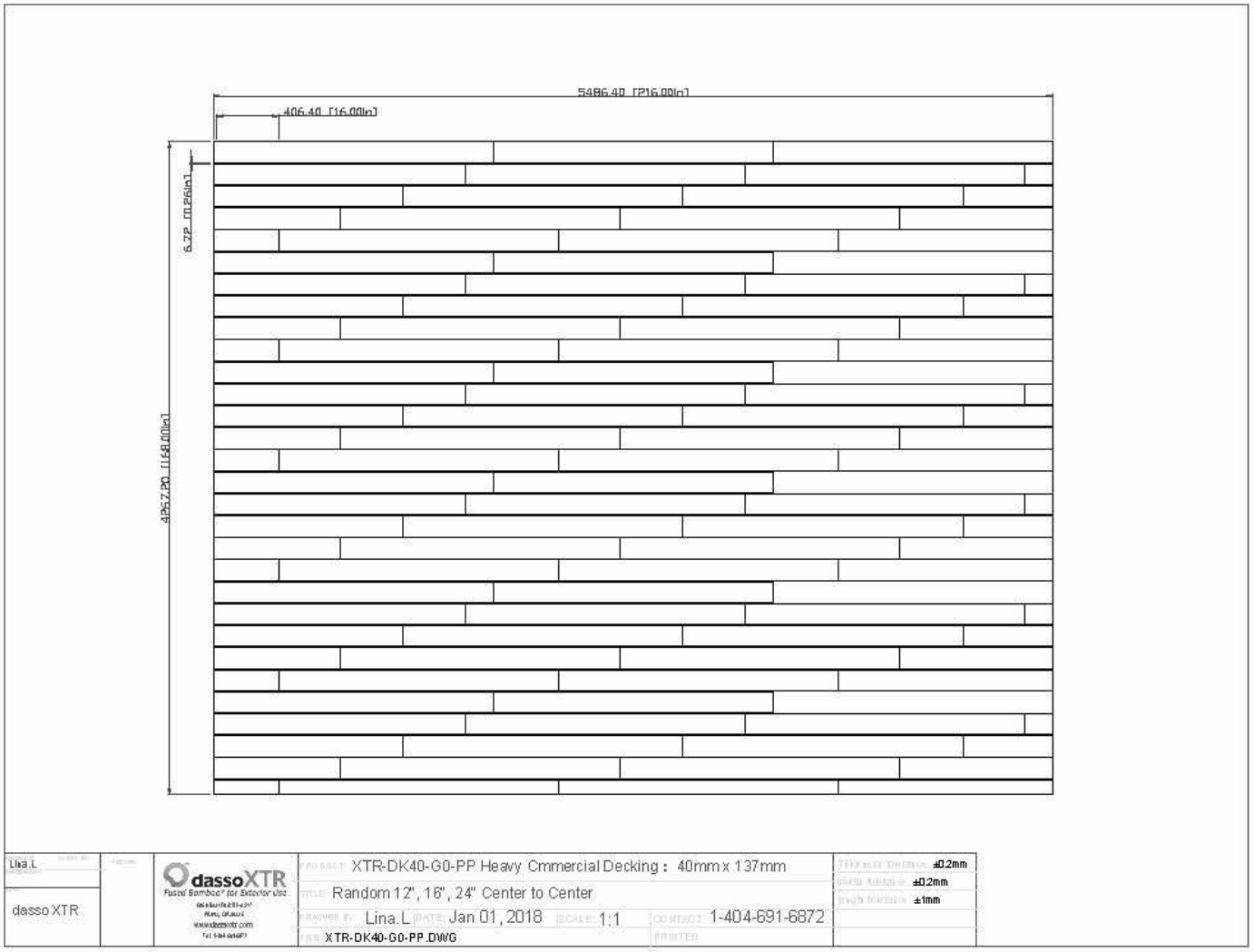


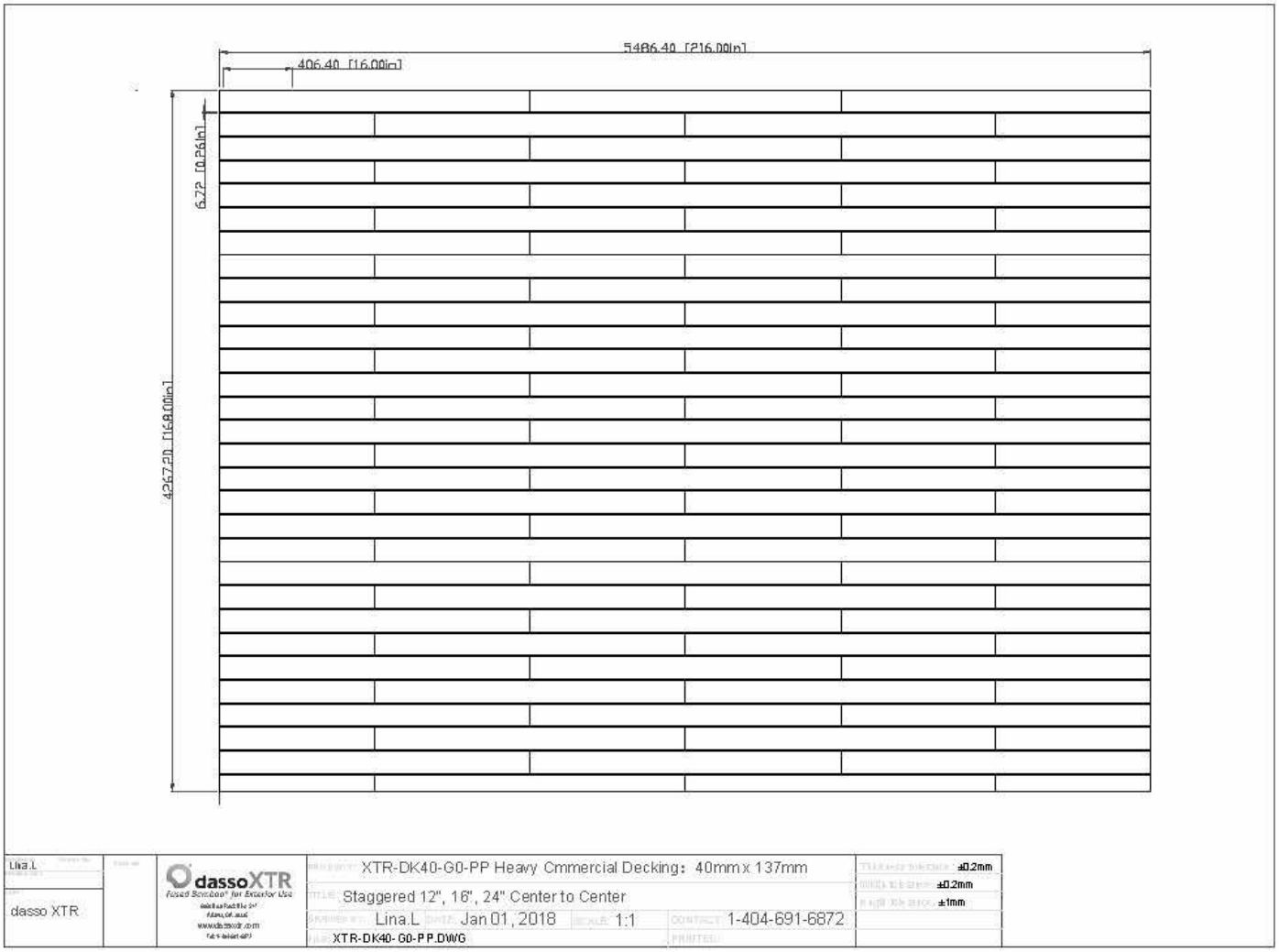












REVISION HISTORY:

DATE	PAGE	DESCRIPTION	QAI STAFF
10/02/2022	All	Report Issued	QAI
05/11/2022	7	Correction to Epic Cognac temperature max deflection values. Correction to COV for Epic Cognac values.	ML
	8	Correction to Epic Cognac Moisture Effects test result values.	
	10	Update to UV Resistance to note 2000 hours of ASTM G155 Cycle 1 followed. Update to UV Resistance to note test span used on coupons. Update to correct Standard Deviation and COV errors both products.	
	12	Correction of Epic Cognac average stiffness in conclusions and table for agreement.	
	13	Update to fungal and termite testing to outline test samples used as control for exposure to biological test agents.	
	14	Update to correct Smoke Developed value for Classic Espresso to 10 to match test report.	
	19, 20	Update to outline method for determining allowable load in pressure (psf) from applied third point loading. Correction to data to convert load based on equivalent stress to correct calculation that changed load to pressure based on area.	
	24	Update to Fenestration Test Laboratory test report number to correct report numbering conflict. Update to uplift values to remove rounding to 10 psf.	
	Appendices C, D	Update to ASTM E84 test reports to correct product name dassoXTR, include product thickness, and correct report naming convention issue.	
17/05/2022	2, 12	Correction of page 2 Epic Cognac EI values to match page 12 values for strength loss.	ML
	10	Correction of ST. DEV and COV values for Classic Espresso.	

********<<<END OF REPORT>>>*******