COR-TUF UHPC
the future of concrete

GSA Contract Holder
Contract # 47QSMA23D08NM

THE ONLY LICENSED PRODUCER OF COR-TUF UHPC IN THE UNITED STATES AND THE WORLD.

MEETING ALL OF YOUR UHPC NEEDS

PRODUCT DATA SHEET
CT25

DESCRIPTION:

Cor-Tuf CT25 UHPC is a class of concrete that is exceptionally strong and durable. Originally developed by the U.S. Army Corps of Engineers, it combines form and function with strength and resiliency.

Cor-Tuf CT25 has 10 times the compressive strength of traditional concrete and an estimated longevity of more than 100 years, versus 15-25 years for traditional concrete. It has been shown to withstand more than 1,000 freeze/thaw cycles with no damage whatsoever, while traditional concrete starts to deteriorate after only 28 cycles. Cor-Tuf UHPC is also impervious to water and resistant to other harsh environmental conditions. These qualities make Cor-Tuf ideal for traditional uses of concrete, such as bridge construction and repair, as well as new applications of concrete, such as contemporary designs that require thinner components or complex shapes. The exceptional durability of Cor-Tuf UHPC delivers a total life-cycle cost that is lower than traditional concrete, while delivering added benefits of safety, resiliency, and energy efficiency.

APPLICATIONS:

Cor-Tuf CT25 is our standard material formulation and can used in a wide range of applications including pre and post tensioned structural component construction, precast panels, field-cast structural connections, wear surface overlays, marine installations, injection and extrusion techniques, tilt-up construction, blast and corrosion resistance, cast in place joints and many others. CT25 is a highly versatile mix that can be used as a direct replacement for standard concrete and is compatible with all industry standard production techniques ranging from large scale pre-cast facilities down to small cast in place applications.

CTL Group Material Testing Results*

Concrete Performance	Test Method	Curing Conditions at CTL Group	Age	Test Result
Compressive Strength	ASTM C 39	73°F/100% RH	at 1 day	9,050 psi
Compressive Strength	ASTM C 39	73°F/100% RH	at 3 days	11,140 psi
Compressive Strength	ASTM C 39	73°F/100% RH	at 14 days	16,000 psi
Compressive Strength	ASTM C 39	73°F/100% RH	at 28 days	21,000 psi
Compressive Strength	ASTM C 39	73°F/100% RH	at 56 days	23,000 psi
Compressive Strength	ASTM C 1856	Controlled Curing	at 28 days	25,500 psi
Length Change of HHC	ASTM C 157	73°F/50% RH	28 days (26 days Dry)	-0.033%
Chloride Penetrability	ASTM C 1202 AASHTO T277	73°F Limewater 190°F water 5 days; 190°F air 2 days; 73°F water until testing	28 days 28 days	≤100 (Negligible) ≤100 (Negligible)
**Flexural Strength	ASTM C 1609	73°F/Limewater	28 days	L/600 = 2800 psi or better
**Flexural Strength	ASTM C 1609	73°F/Limewater	28 days	L/150 = 1500 psi or better
Direct Tensile Strength	AASHTO T397	73°F/Limewater	28 days	1000 psi or better
Modulus of Elasticity	ASTM C 469	73°F/Limewater	28 days	6800 ksi
Abrasion Resistance, Ave Loss	ASTM C 944	73°F/Limewater	58 days	0.016 oz
Freeze Thaw Resistance RDM	ASTM A 666	73°F/Limewater	28 days	600 cycles, 96%

Notes:

*Testing results confirmed by independent laboratory CTL Group. Results are based on laboratory mixes.

Client: Cor-Tuf UHPC CTL Project No: 059330
Date: 1/20/2020

**Data per UCF Material Study 5/10/2022

PRODUCT DATA SHEET
CT25

Constituents, Packaging and Yield:

1. Premix: proprietary pre-blended constituents, local masonry sand and portland cement per QC manual.
- 40 lb (18 kg) bags; 54 bags per pallet.
  1 pallet yields approx. 1 cubic yard
- 1080 lb (489 kg) super sack; 2 bags per pallet.
  1 pallet yields approx 2 cubic yards
- Sand and cement, bagged separately, available upon request or use your own.

2. Liquid Admixture: high range water reducer, corrosion inhibitor
- 1 gal (3.78 L) pails
- 5 gal (19 L) pails
- 264 gal (1,000 L) totes

3. Steel Fibers: 0.008in (0.20 mm) dia x 0.5 in (13 mm) long
Tensile strength ≥295ksi (200MPa) (not included w/ pre-mix)

4. Water: to be provided by contractor in accordance with QC manual

Storage:
All materials should be stored in a dry environment, under cover to prevent moisture accumulation and climactic exposure. Ideal storage temperature is between 40 - 100°F. Materials may be stored for up to six months in the original unopened packaging.

Preparation:
Surfaces to be in contact with CT25 should not be over prepared aside from being free of excess dirt, greases, oils, or other bond-inhibiting agents. All forms should be prepared in a watertight manner to prevent leaking.

Batching:
Batching of CT25 or any other Cor-Tuf UHPC product shall be done in accordance with Cor-Tuf's published QC and batching protocols. Cor-Tuf requires all batching of CT25 be done only by trained and certified persons unless directed otherwise by Cor-Tuf. All mixing constituents shall be portioned, weighed, and sequenced in accordance with Cor-Tuf batching protocols per field conditions. Moisture management is a key factor in the batching of CT25 and is based on values measured at the time of mixing. Follow all procedures for discerning and recording batch moisture content prior to mixing per batching protocols.

Initial friction (friction from particles in the matrix) / mixing temperatures up to 100 degrees F are acceptable. Mixed material should be no more than 95 degress F at the time of placement. Dispatched materials will cool due to very limited "Heat from Hydration".

Consult Cor-Tuf UHPC prior to batching to evaluate any proposed batching equipment. While not required a high shear mixer is recommended.

Placing:
CT25 can be poured using a variety of industry standard means and methods. Cor-Tuf UHPC has seen great success pouring CT25 in ready mix trucks, Tuckerbuilt dispensers, skid-steer augur buckets and all manner of conventional wheelbarrows, buckets and buggies. CT25 can also be dispensed via standardized concrete pumps like the TK 50 common to many contractors. CT25 is self leveling and self consolidating and should never be vibrated as it may segregate the internal fibers. All exposed surfaces should be covered with plastic vapor barriers immediately after placing to prevent material dehydration. Refer to Cor-Tuf's QC and batching protocols when placing in temperatures below 40°F.

Finishing:
Due to the versatility of CT25, please consult with Cor-Tuf's technical division when finishing is required.

Disclaimer:
All values indicated above depend on multiple factors including but not limited to equipment used, formula and mix design, raw materials, manufacturing processes and environmental conditions. This data sheet provides no guarantee that the values described herein will be achieved in any particular application of CT25. The ultra high performace constituents that comprise Cor-Tuf UHPC and its varients are protected by numerous patents and may not be used unless pursuant to the terms and conditions of a license agreement with Cor-Tuf UHPC.

COR-TUF UHPC
the future of concrete

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CONTROLS GROUP

Test type **ASTM C1609**

ASTM C1609 - Flexural Performance of Fiber-Reinforced Concrete (Using Beam With Third-Point Loading)

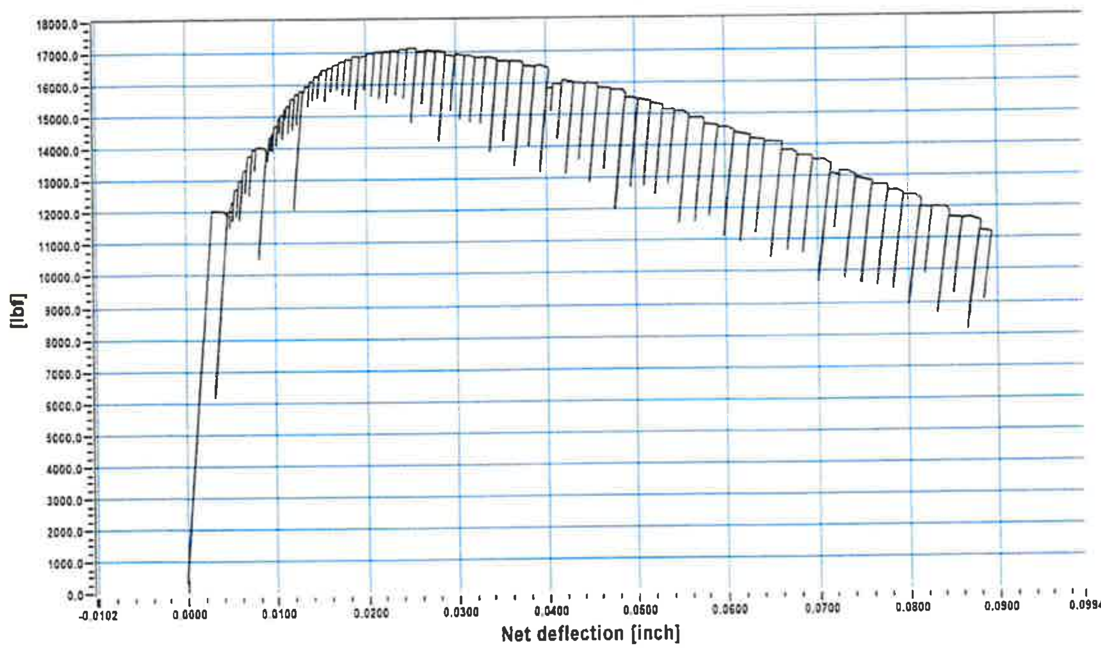
Test Organization	Cortuf of Florida	Testing machine	Controls Automax

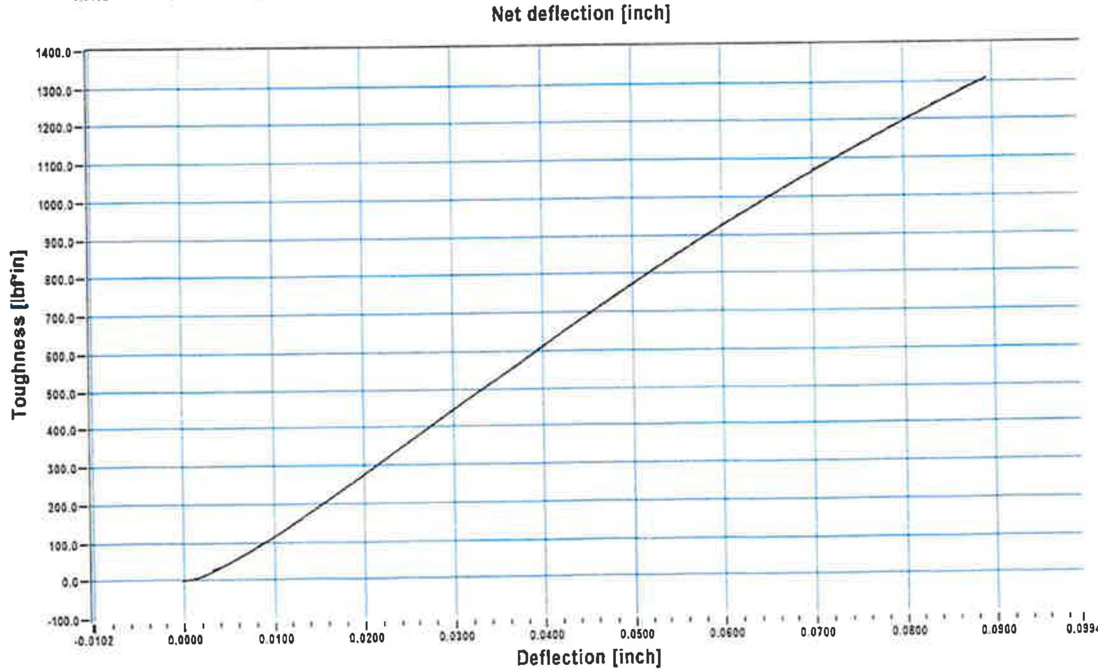
SPECIMEN DATA

Specimen ID	UCF	Specimen type	Beam 4x4x14
Specimen age [dd]	28	Preparation date	6/7/2022
		Surface humidity	
Area [inch2]	5 33333		
l [inch]	14	b [inch]	4
		d [inch]	4
Surface preparation	as per C1609	L [inch]	12
Upper rollers number	2	Upper rollers distance [inch]	4
Preload [lbf]	45	Concrete type	UHPC
Fiber type	steel fibers	Fiber content	2%
Sampling date	5/10/2022	Sampling details	ASTM C1856
Test date	6/7/2022	Test Location	Cortuf of Florida
Operator	Justin Knight		
Certificate number	1	Certificate date	6/7/2022
Customer	UCF Civil Eng	Reference	ASTM C 1609
Notes	Cured according to ASTMC1856		
Start speed [inch/min]	0 002	End Speed [inch/min]	0 006
Speed change Thres. [inch]	0 013		
		Target [inch]	0 1

TEST RESULT

f1	1755.37 psi	f1	9361.99 lbf
fp	3213.33 psi	fp	17137.74 lbf
Fd 600	3045.81 psi	Fd 600	16244.33 lbf
Fd 150	1670.53 psi	Fd 150	8909.5 lbf
Td 150	1200.1 lbf*in	f1 deflection	0.0022 inch
fp deflection	0.0247 inch	RT 150	160.2 %





BALLISTIC RESISTANCE TEST

Element U.S. Space & Defense
4603B Compass Point Road
Belcamp, MD 21017

Client: R&M International
Project No.: PH00013270-3
Test Date: 10/16/2024
Page 1 of 1

Test Panel

Description: Rigid armor

Manufacturer: R&M International

Sample No.: 4 inch

Size: 12.00 x 12.00 in
Avg. Thickness: 4.020 in
Thicknesses: 4.030 in, 4.046 in, 4.001 in, 4.004 in

Weight: 49.140 lbs
Plies/Laminates: N/A

Date Received: 10/16/2024
Received Via: Hand Carried
Returned Via: Hand Carried

Setup

Shot Spacing: UL 752 Level 8
Witness Panel: .001 in Aluminum foil
Backing Material: N/A
Condition: Ambient

Primary Vel. Screens (ft): 5.000, 5.333, 9.666, 10.000
Primary Vel. Location (ft): 7.500
Range to Target (ft): 15.000
Target to Witness (in): 6.000

Range No.: Range 1
Temp: 69.3 °F
BP: 30.2 inHg
RH: 45 %
Barrel/Gun: WC078634
Gunner: Adam Beach
Recorder: Isaiah Lookingbill

Ammunition

Projectile	Lot No.	Manufacturer	Powder
(1) 7.62 x 51-mm, 149-grain M80 FMJ	NA	Military	N133

Applicable Standards or Procedures

(1) UL 752 Level 8 (Modified)

Shot No.	Ammo	Powder/ Seating	Weight (gr)	Time 1 (µs)	Vel. 1 (ft/s)	Time 2 (µs)	Vel.2 (ft/s)	Avg. Vel. (ft/s)	Penetration	Obliq. (°)	Footnotes
1	1	40.0	147.7	1780	2809	1546	2803	2806	None	0	
2	1	40.0	147.3	1793	2789	1550	2795	2792	None	0	
3	1	40.0	148.0	1793	2789	1550	2795	2792	None	0	
4	1	40.0	147.9	1789	2795	1550	2795	2795	None	0	
5	1	40.0	147.2	1793	2789	1550	2795	2792	None	0	

Remarks:
Required Velocity: 2750-2810 ft/s.
Projectile Yaw Check: 0° Yaw on All Impacts.

Footnotes:
N/A

BALLISTIC RESISTANCE TEST

Element U.S. Space & Defense-Belcamp
4603B Compass Point Road
Belcamp, MD 21017

Client: Cor-Tuf UHPC
Project No.: PH00014550
Test Date: 03/06/2025
Page 1 of 1

Test Panel

Description: Concrete

Manufacturer: Cor-Tuf UHPC

Sample No.: (.50 M33 Ball, V0) Sample 2

Size: 27.50 x 27.50 in
Avg. Thickness: 7.781 in
Thicknesses: 7.875 in, 7.875 in, 7.875 in, 7.500 in

Weight: 506.550 lbs
Plies/Laminates: N/A

Date Received: 02/27/2025
Received Via: Freight, LTL
Returned Via: Freight, LTL

Setup

Shot Spacing: UL 752 Level 10
Witness Panel: 0.02 in 2024-T3 Al
Backing Material: N/A
Condition: Ambient

Primary Vel. Screens (ft): 5.000, 5.333, 19.666, 20.000
Primary Vel. Location (ft): 12.500
Range to Target (ft): 25.000
Target to Witness (in): 6.000

Range No.: Range 2
Temp: 68.8 °F
BP: 30.4 inHg
RH: 44 %
Barrel/Gun: WC060680
Gunner: Timothy Mackie
Recorder: Justin Long

Ammunition

Projectile	Lot No.	Manufacturer	Powder
(1) .50-cal., 662-grain M33 Ball	NA	Military	IMR 4831

Applicable Standards or Procedures

(1) UL 752 Level 10 (Modified)
(2) Customer Request

Shot No.	Ammo	Powder/ Seating	Weight (gr)	Time 1 (µs)	Vel. 1 (ft/s)	Time 2 (µs)	Vel.2 (ft/s)	Avg. Vel. (ft/s)	Penetration	Obliq. (°)	Footnotes
1	1	240.0	649.5	5117.0	2931	4896.0	2927	2929	None	0	

Remarks:
Required velocity: 2880-2940 ft/s
Projectile yaw check: 0° yaw on all Impacts.

Footnotes:
N/A

BALLISTIC RESISTANCE TEST

Element U.S. Space & Defense-Belcamp
4603B Compass Point Road
Belcamp, MD 21017

Client: Cor-Tuf UHPC
Project No.: PH00014550
Test Date: 03/06/2025
Page 1 of 1

Test Panel

Description: Concrete

Manufacturer: Cor-Tuf UHPC

Sample No.: (.50 M33 Ball, V0) Sample 1 (2nd shot)

Size: 27.50 x 27.50 in
Avg. Thickness: 5.853 in
Thicknesses: 5.875 in, 5.785 in, 5.875 in, 5.875 in

Weight: 383.480 lbs
Plies/Laminates: N/A

Date Received: 02/27/2025
Received Via: Freight, LTL
Returned Via: Freight, LTL

Setup

Shot Spacing: UL 752 Level 10
Witness Panel: 0.02 in 2024-T3 Al
Backing Material: N/A
Condition: Ambient

Primary Vel. Screens (ft): 5.000, 5.333, 19.666, 20.000
Primary Vel. Location (ft): 12.500
Range to Target (ft): 25.000
Target to Witness (in): 6.000

Range No.: Range 2
Temp: 68.8 °F
BP: 30 inHg
RH: 44 %
Barrel/Gun: WC060680
Gunner: Timothy Mackie
Recorder: Justin Long

Ammunition

Projectile	Lot No.	Manufacturer	Powder
(1) .50-cal., 662-grain M33 Ball	NA	Military	IMR 4831

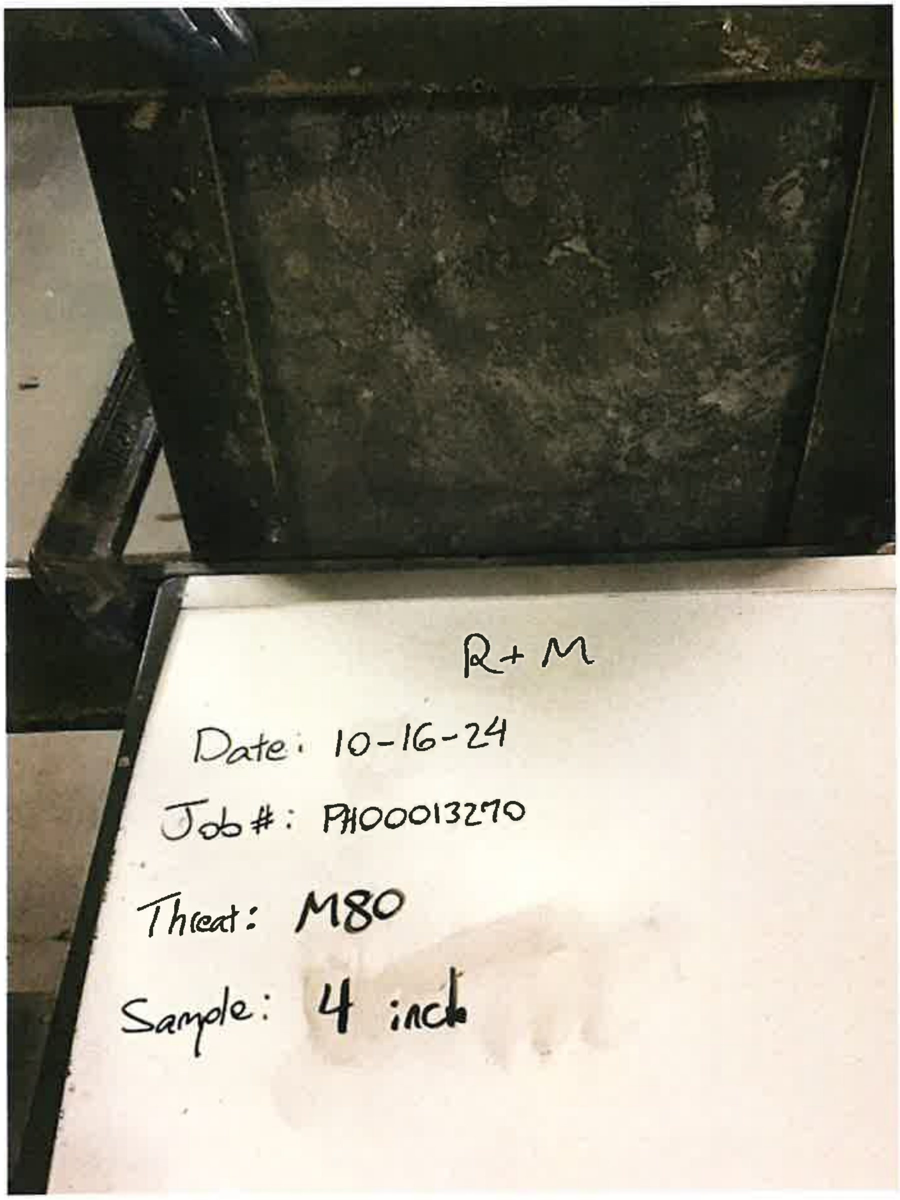
Applicable Standards or Procedures

(1) UL 752 Level 10 (Modified)

Shot No.	Ammo	Powder/ Seating	Weight (gr)	Time 1 (µs)	Vel. 1 (ft/s)	Time 2 (µs)	Vel.2 (ft/s)	Avg. Vel. (ft/s)	Penetration	Obliq. (°)	Footnotes
1	1	240.0	649.2	5148.0	2914	4922.0	2912	2913	None	0	

Remarks:
Required velocity: 2880-2940 ft/s
Projectile yaw check: 0° yaw on all Impacts.

Footnotes:
N/A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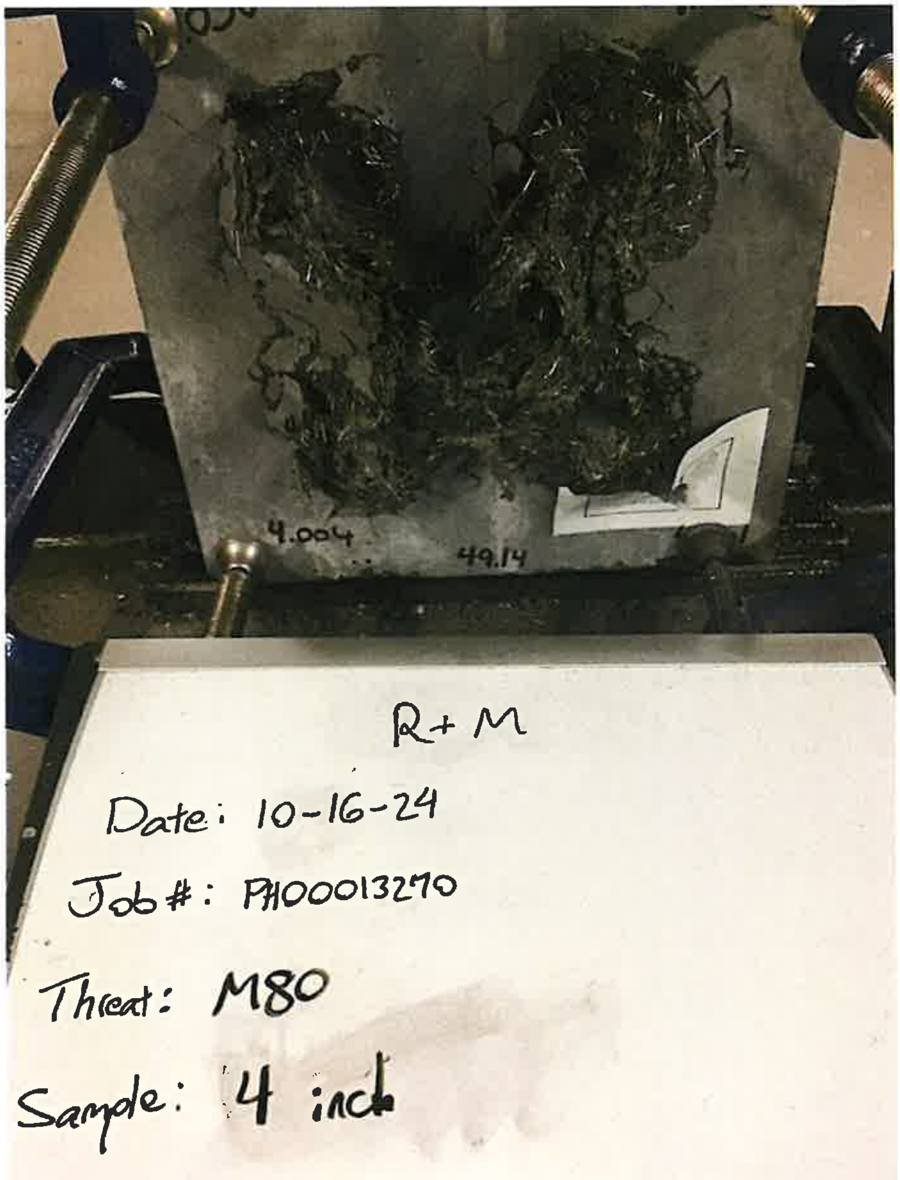
Date: 10-16-24
Job #: PH00013270
Threat: M80
Sample: 4 inch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49.14
R+M
Date: 10-16-24
Job #: PH00013270
Threat: M80
Sample: 4 inch