HPRE-MD

High Performance Rail Encapsulator

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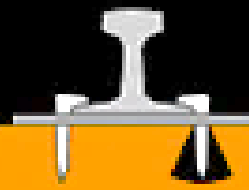
POLYQUIK®
PERFORMANCE PRODUCTS

WVCO

SPIKEFAST®

WILLAMETTE VALLEY COMPANY



FastPatch



HPRE-MD



2K PUR with integrated 'aggregate'

HPRE-MD

- *Electrically Isolating*
- *Absorbs Sound & Vibration*
- *Flexible and Tough*
- *Resists Chemicals and Salts*
- *COLTE and Adhesion to Concrete*
- *Meter Dispensed*
- *Fast Cure*

HPRE-MD

- ***Electrically Isolating***

X10^{14}

Two orders of magnitude better than current generation materials

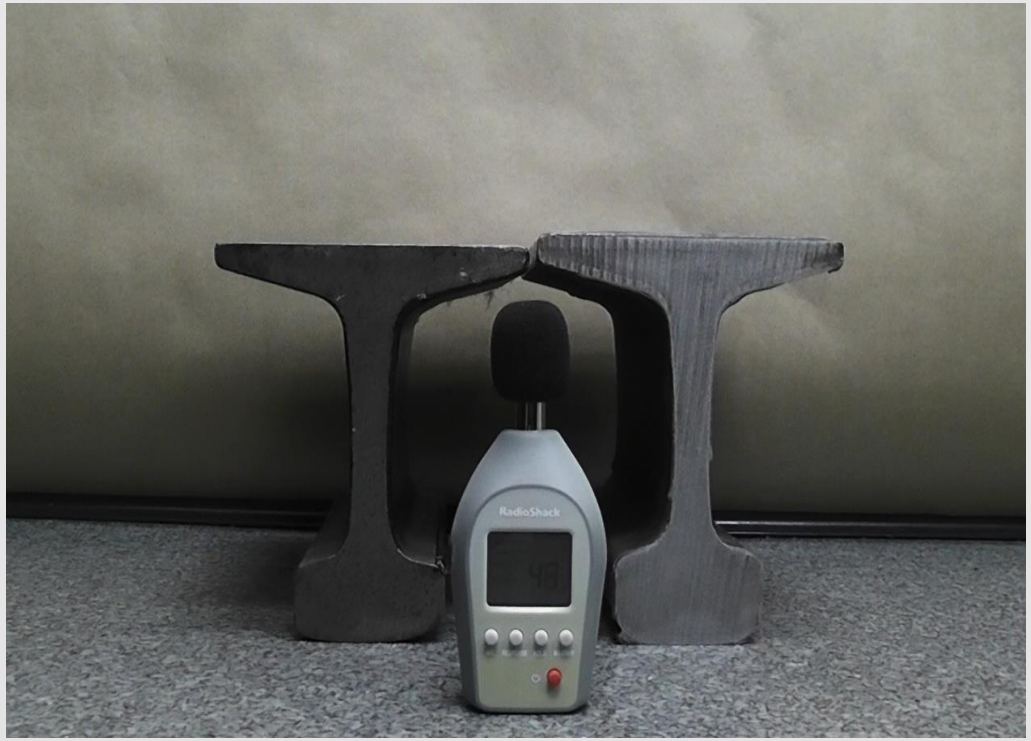
intertek
Total Quality. Assured.

ACCREDITED
Cert. No. 0619.01
TESTING LABORATORY

				Apparent Surface Resistivity (Ω/square)	Apparent Volume Resistivity (Ω•cm)
Material	: Cured Polyurethane				
Sample Dimensions	: 3.75" x 3.75"				
Electrode Type	: Guarded Parallel Plate				
Electrode Dimensions	: Measuring	:	1.9993 in. O.D. 0.25835 in. Thick		
		:	3.2340 in. O.D. 2.2545 in. I.D. 0.2		
	Guard	:	2.9790 in. O.D. 0.4904 in. Thick		
Measurement Method	: Three Terminal			4.30E+14	1.63E+14
Measurement Circuit	: Parallel			4.26E+14	1.66E+14
Applied Voltage	: 500 Volts			5.11E+14	1.69E+14
Electrode Area	: 22.92 cm^2				
Electrification Time	: 60 Seconds				
Sample Preparation	: Machined by Intertek PTL				
Sample Conditioning	: 40+ Hours at 23°C ± 2°C / 50% ± 10% RH			**4.56E+14**	**1.66E+14**
Test Conditions	: 23°C ± 2°C / 50% ± 10% RH				

HPRE-MD

- ***Absorbs Sound & Vibration***



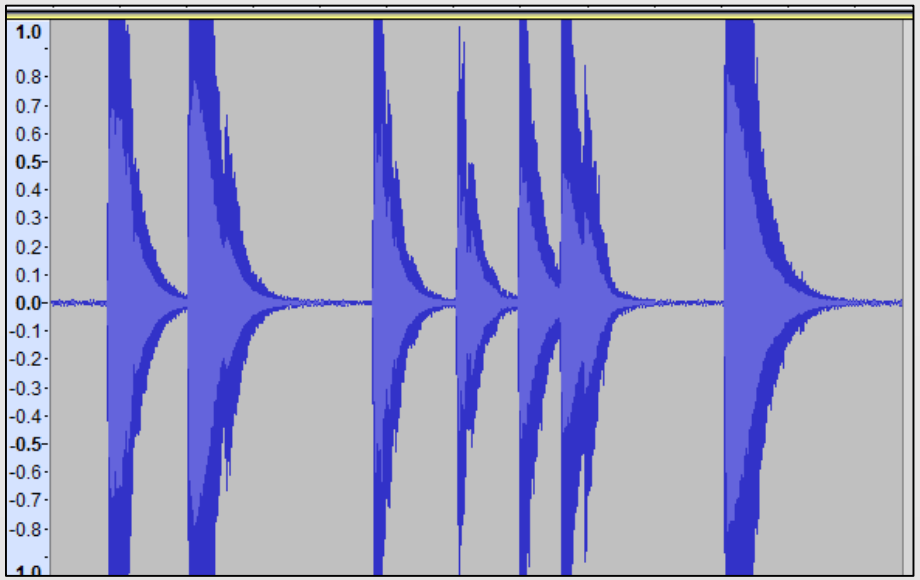
Uncoated rail (left)
With 1/8” layer of HPRE (right)

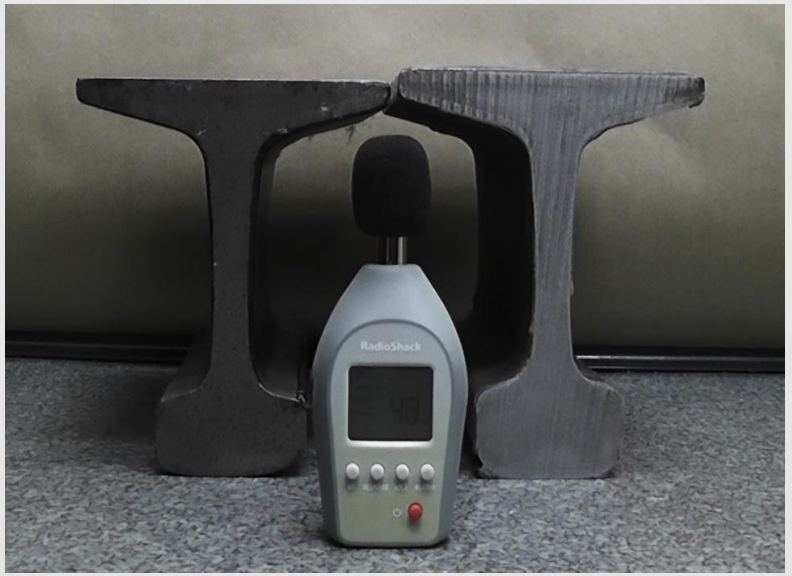
500g steel ball
3ft drop height

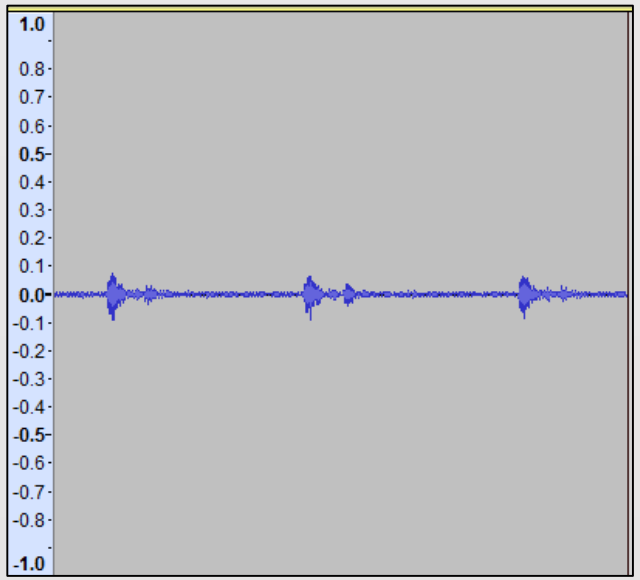
mic positioned
9ft from impact

HPRE-MD

- ***Absorbs Sound & Vibration***



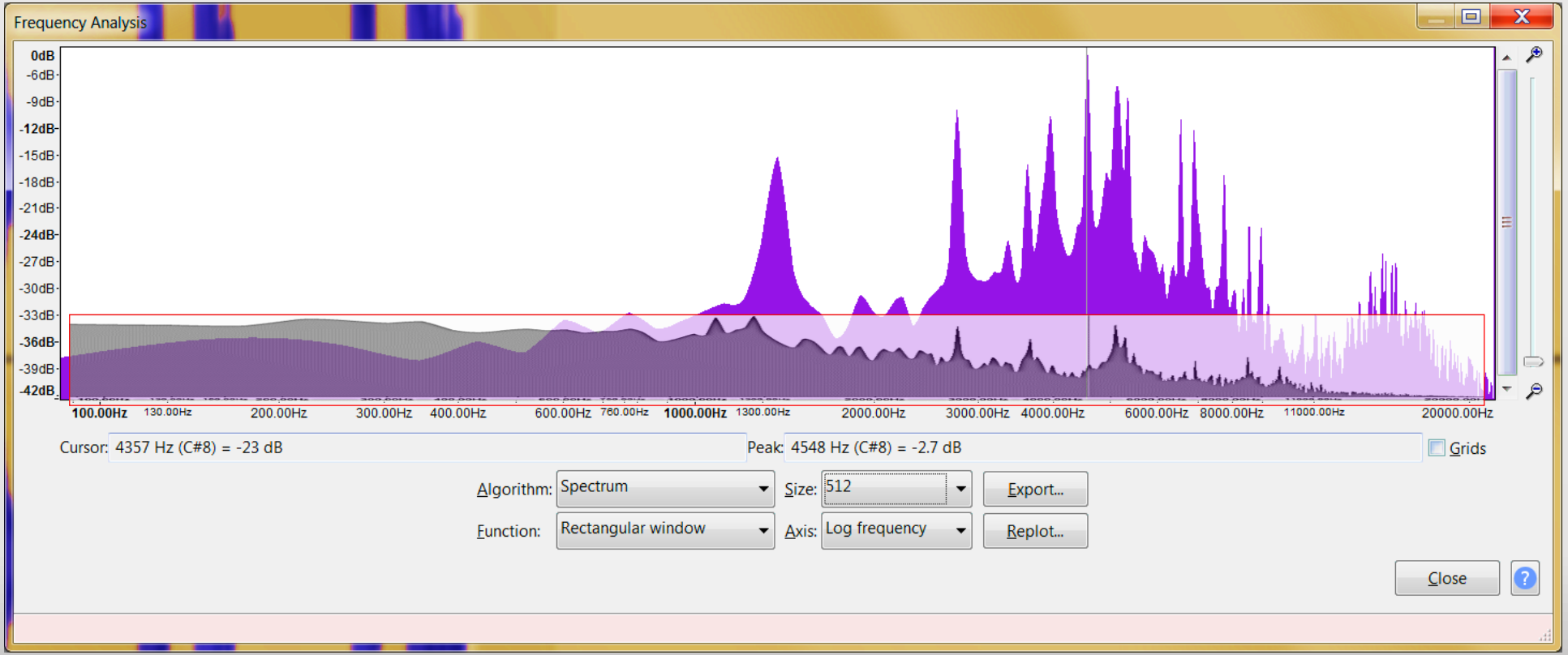




HPRE-MD

- ***Absorbs Sound & Vibration***

HPRE-MD (inlay) significantly reduces sound levels (60-70 dB reduction) particularly at higher frequencies (≥2 kHz)



HPRE-MD

- ***Absorbs Sound & Vibration***

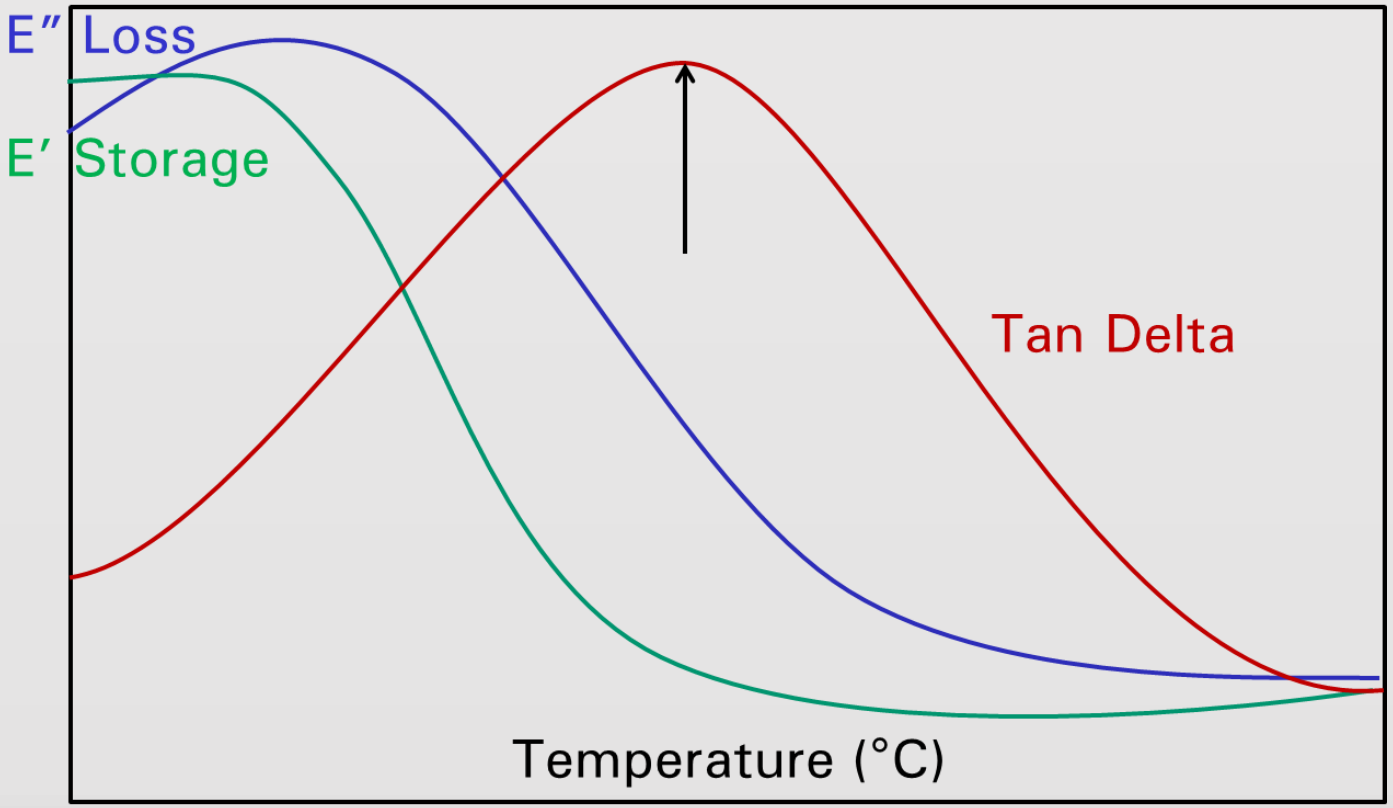
ASTM D2635
Vertical Rebound

HPRE-MD	Shore 70A competitor
12-13	44-45



HPRE-MD

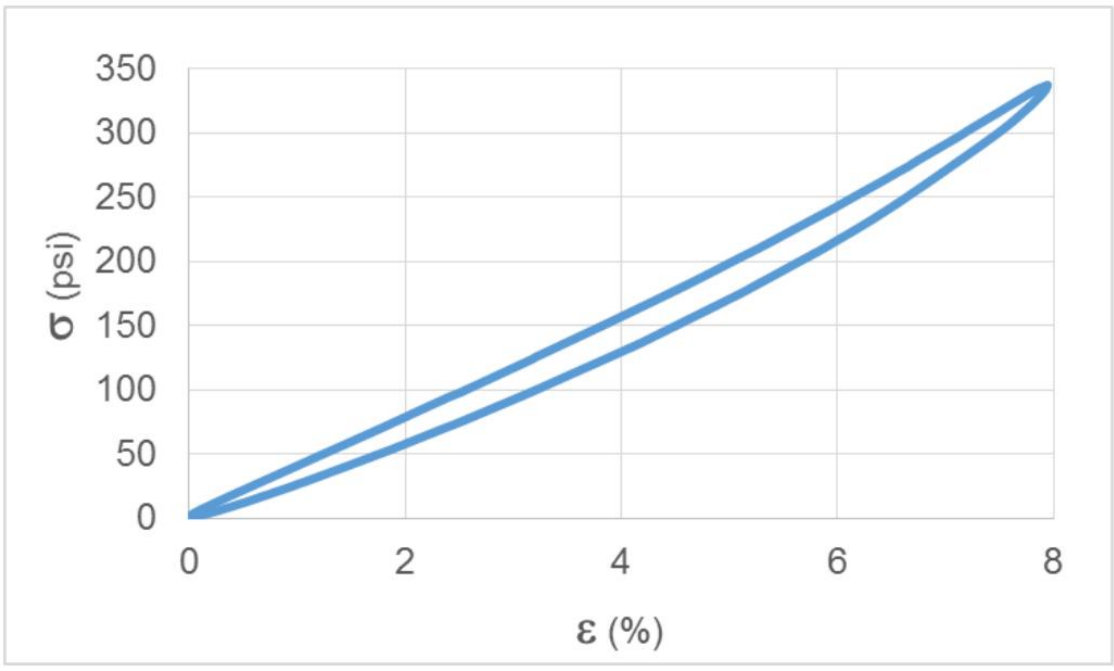
- ***Absorbs Sound & Vibration***



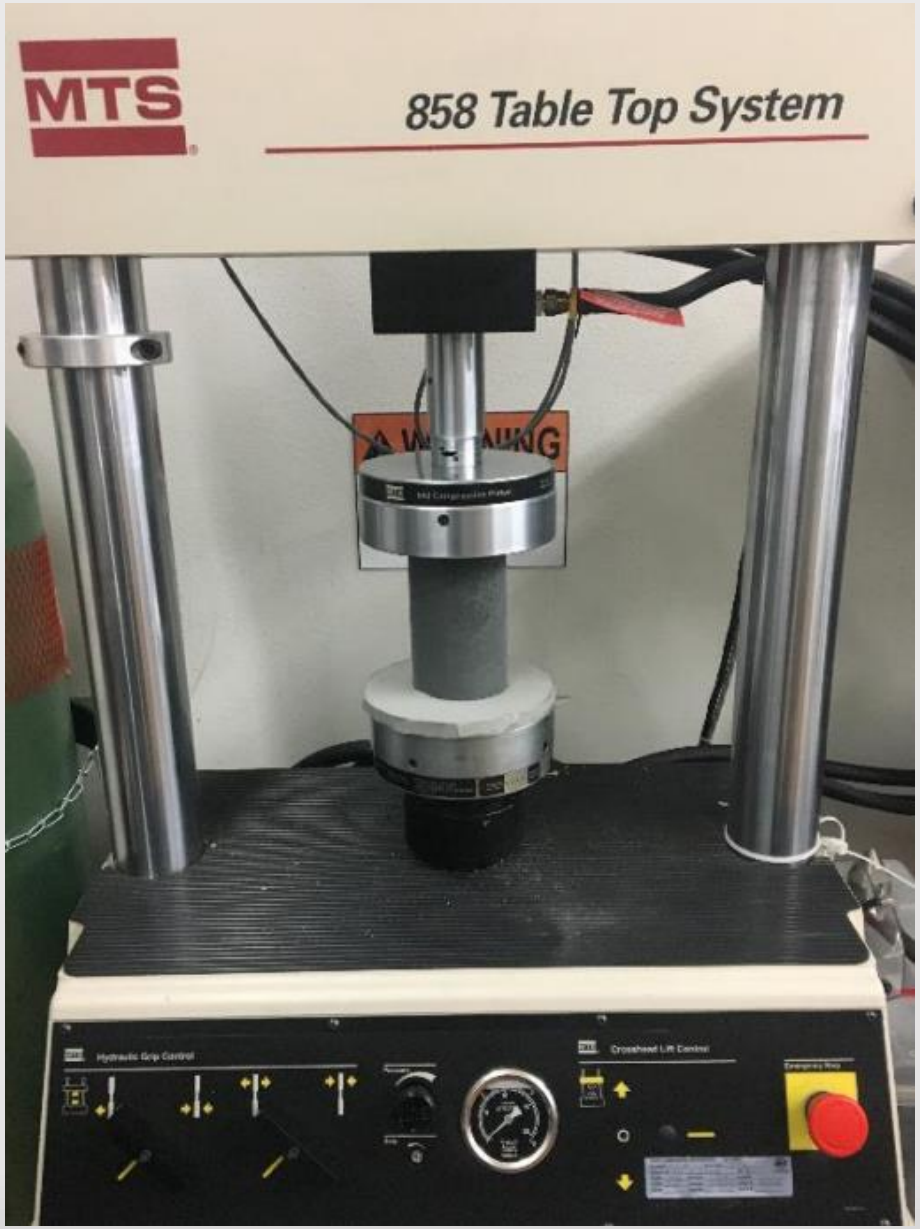
HPRE-MD

- ***Flexible and Tough***

≥10^7 cycles, 1Hz, 8% strain

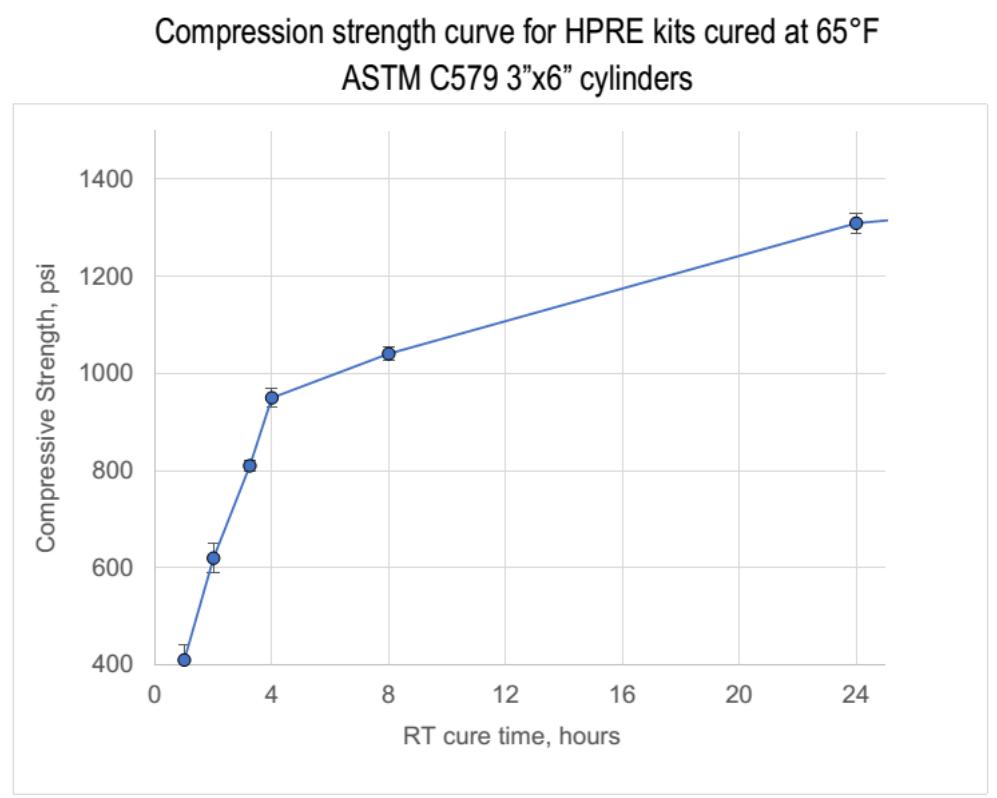


Linear best fit from 0-8% strain:
41.2 lbf/in^2 [284 kN/m^2]



HPRE-MD

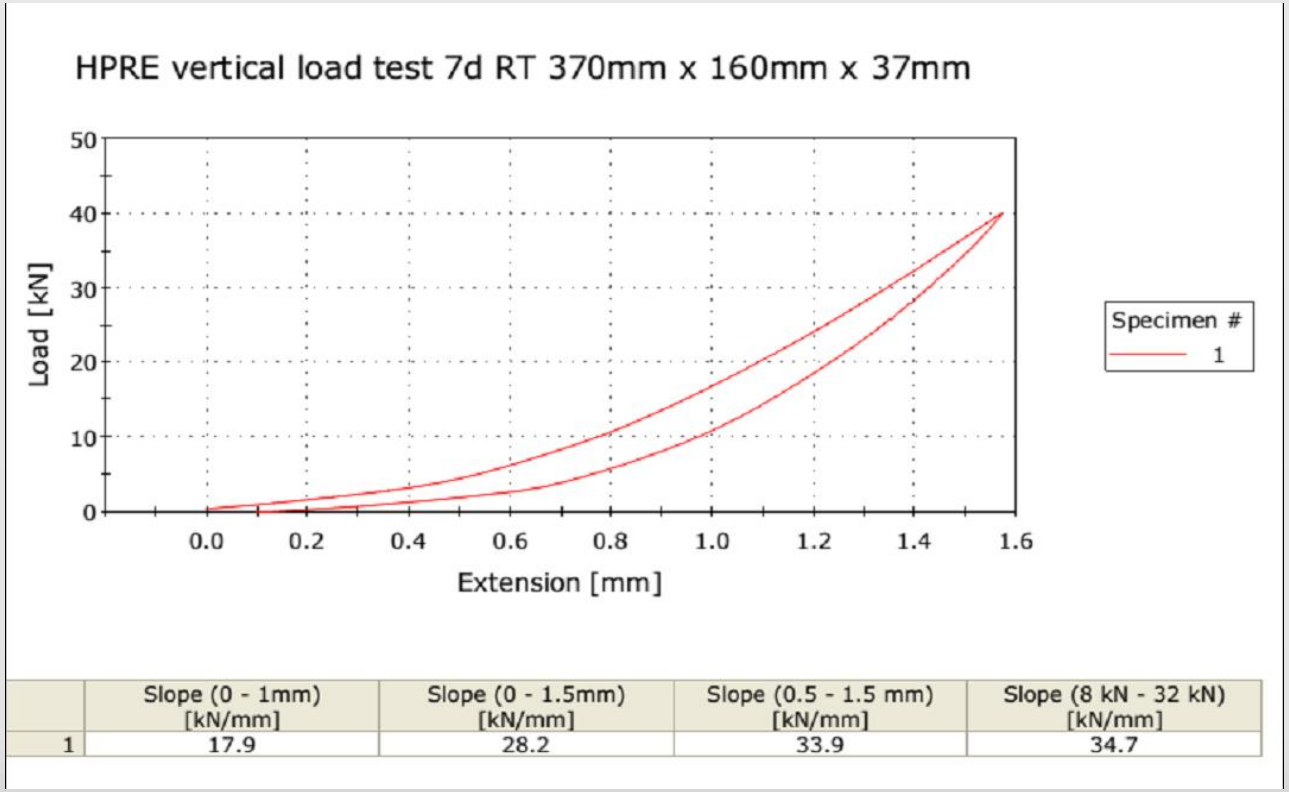
ASTM C579
3,000 psi Compression Strength
590 lbf-in/in³ Toughness





HPRE-MD

Vertical Load Test
Rail Seat/Grout Pad Geometry



	Slope (0 - 1mm) [kN/mm]	Slope (0 - 1.5mm) [kN/mm]	Slope (0.5 - 1.5 mm) [kN/mm]	Slope (8 kN - 32 kN) [kN/mm]
1	17.9	28.2	33.9	34.7



Figure 3: HPRE best fit linear slopes measured in [kN / mm]

	slope range			
cure time	0-1mm	0-1.5mm	0.5-1.5mm	8kN - 32kN
3.5 hours	1.6	6.6	9.6	21
3 days	15.8	27.2	31.6	35.5
7 days	**17.9**	**28.2**	**33.9**	**34.7**

HPRG II – Type 2 Flowable Grout

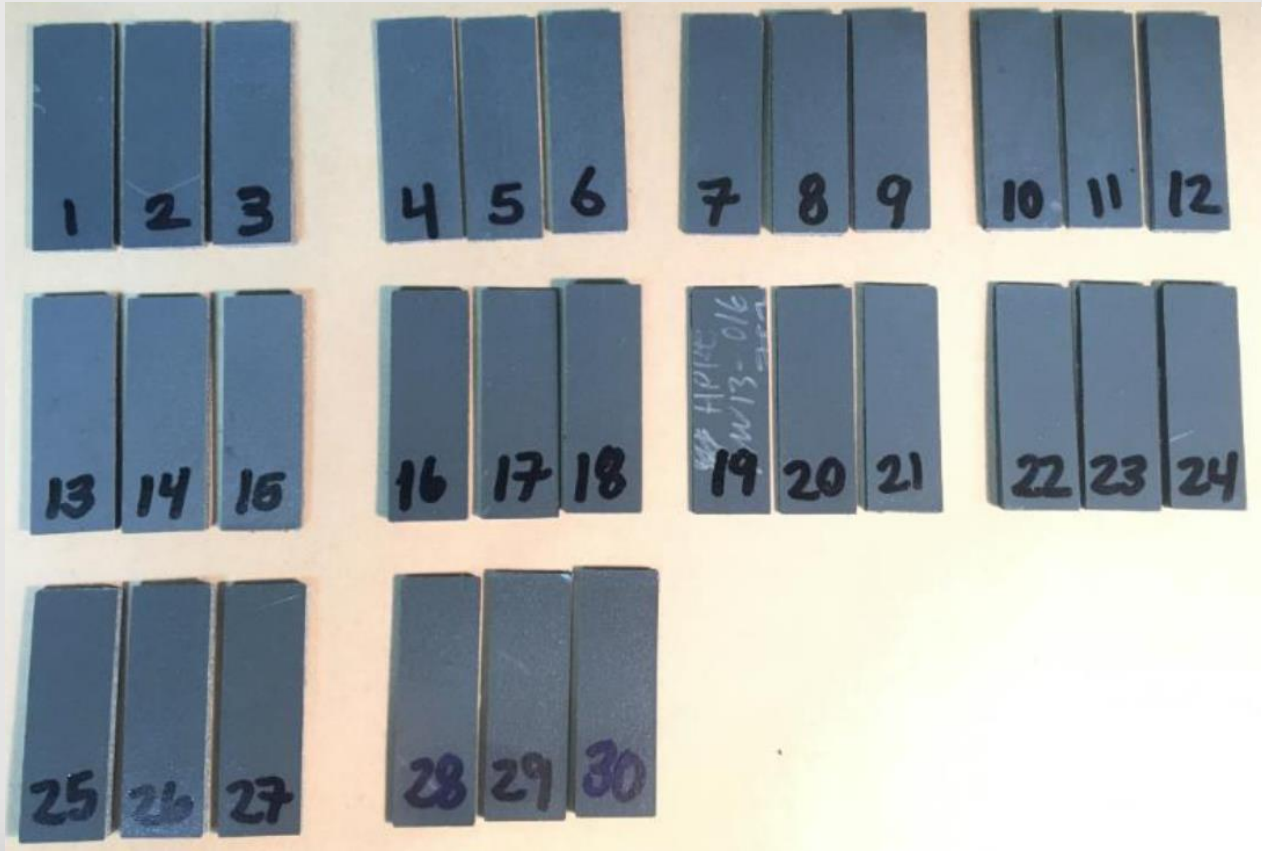


HPRG II – DF Application



HPRE-MD

- ***Resists Chemicals and Salts***



	1 week	
	% vol	% wt
water	no change	0.73 ±0.09
10% NaCl	no change	0.87 ±0.10
5% NaOH	no change	0.65 ±0.09
10% $CaCl_2$	no change	0.70 ±0.10
5% H_2SO_4	no change	0.635 ±0.019
IRM-901 (oil #1)	no change	0.024 ±0.05
IRM-902 (oil #2)	no change	0.32 ±0.02
IRM-903 (oil #3)	no change	0.443 ±0.012
Jet A	no change	0.59 ±0.03
JP-4	2.2 ±1.0	1.5 ±0.2

HPRE-MD

Adhesion to concrete is substrate limited, ≥350psi

COLTE: Passes ASTM C884 and 'Texas' mod.



5 cycles

RT to -25°C (-13°F)

<u>and</u>

9 cycles

60°C (140°F) to -25°C (-13°F)

HPRE-MD

1hr Return to Service

-MD Application rate: 30ft³/hr

0 VOC, 100% solids

Made in USA

DART, MTA, SFMTA,MN, LA METRO, CALTRANS, DOW, HDOT,



HPRE @ 4g per minute. 4,000gallons in 7 hours = 570cuft per shift





★ Manufacturing Locations

FastPatch Worldwide Use

Australia
Canada
Chile ★
China
Korea
New Zealand
UK
USA

FastPatch

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