Weathered OSB air and water leakage testing

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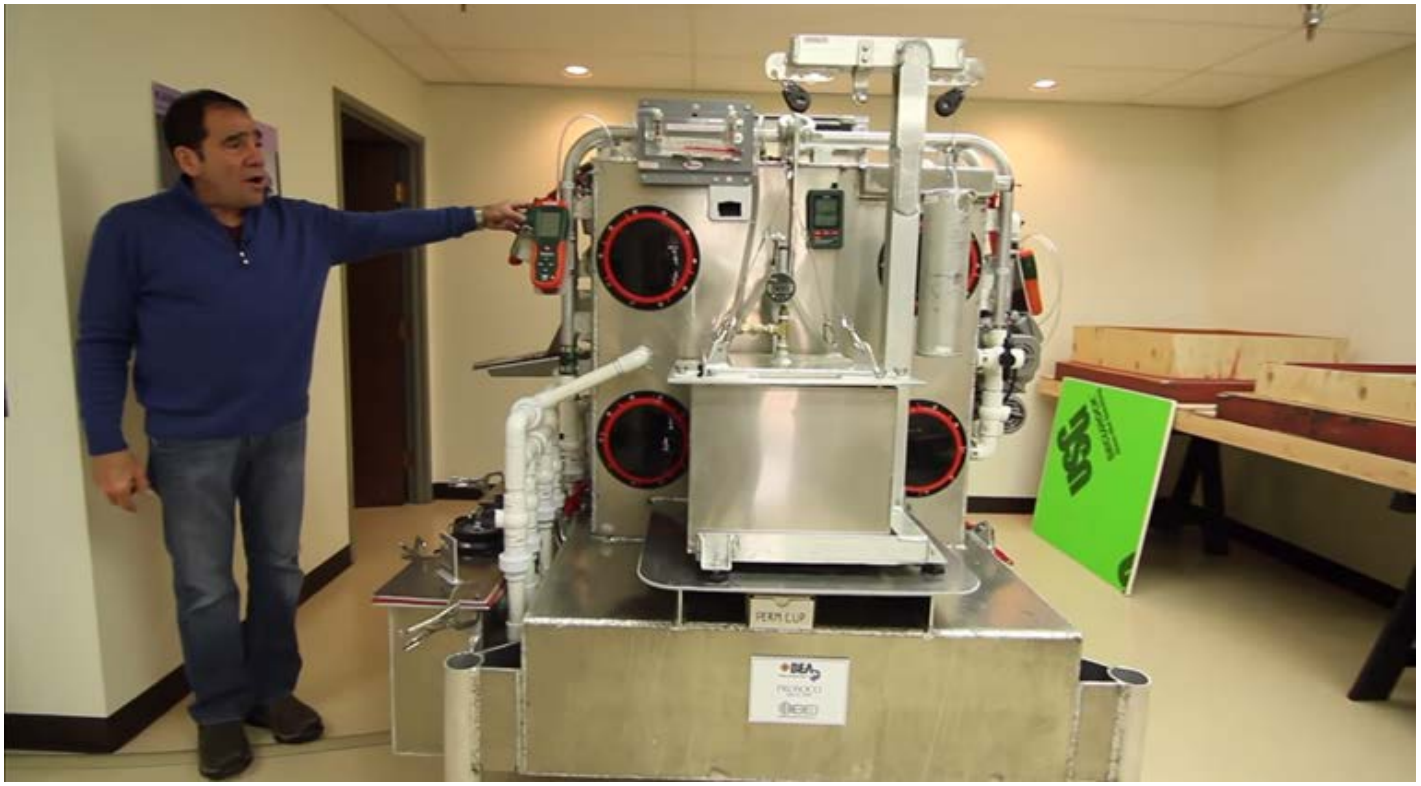
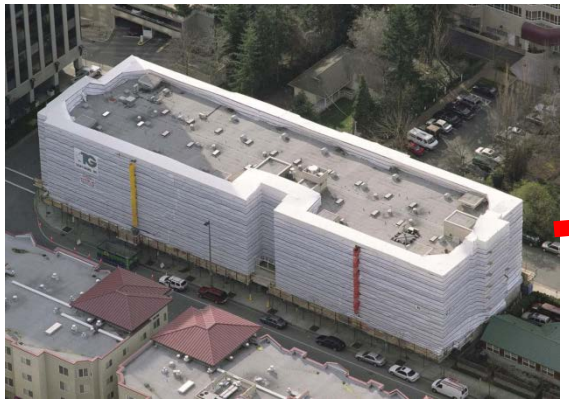


Rosetta Stone Dynamic Vapor Permeability & Diffusive Air Movement Measurement Chamber

Weathered OSB air and water leakage testing

Hurricane test chamber

Weathered OSB air and water leakage testing



Tatley-Grund Construction Repair Specialists

BEI Building Envelope Innovations, LLC

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BEA Building Envelope Analysis LLC

- Hurricane test chambers
- Storm surge chamber
- Rosetta Stone Dynamic Vapor Permeability & Diffusive Air Movement Measurement Chamber

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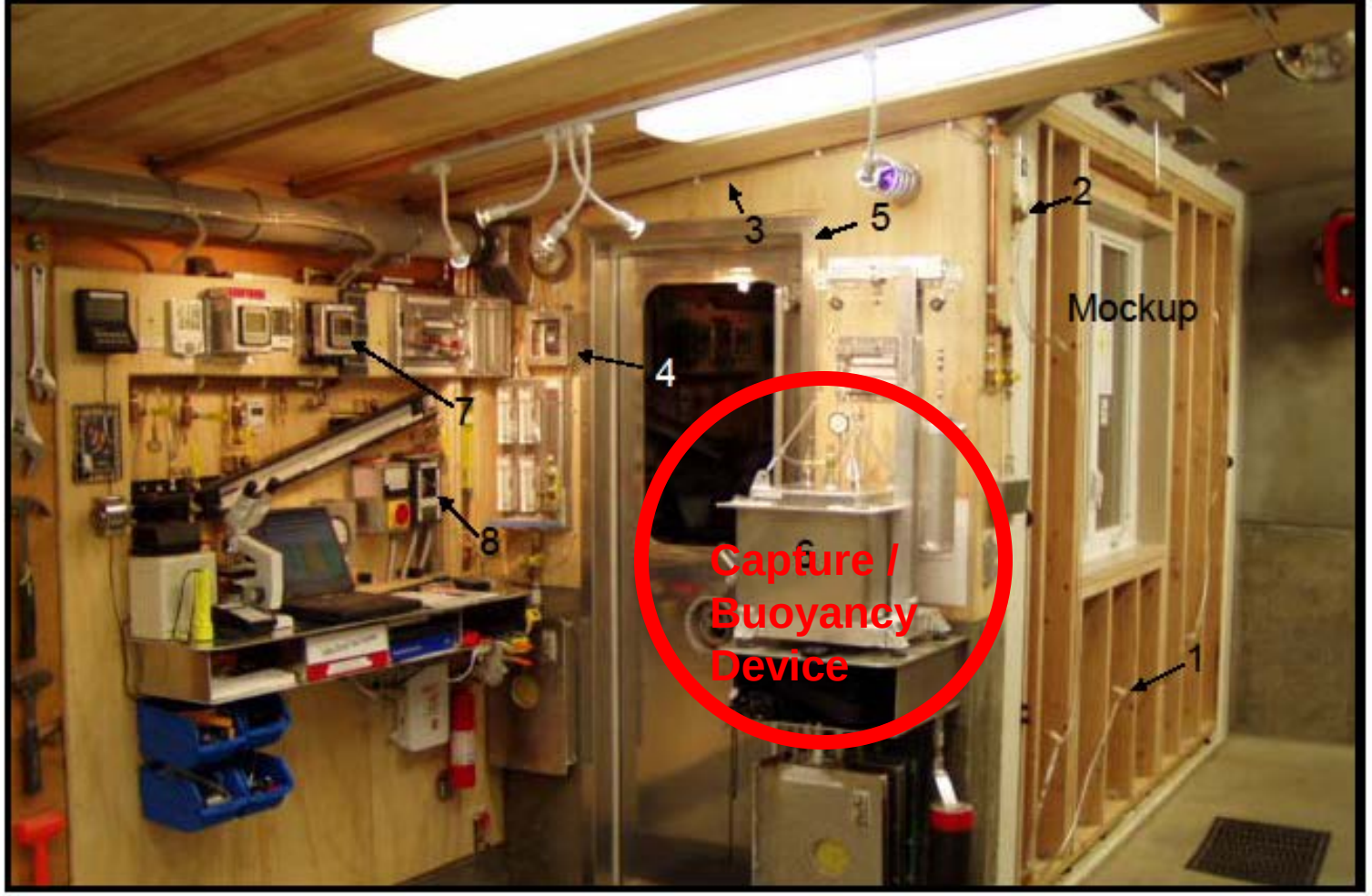
Prototype for exploded view



1. Collection System 2. Activation Valve 3. Line to RH and Temp Sensor 4. RH and Temp Sensor 5. Line from RH and Temp Sensor 6. Air Flow Measuring Equipment 7. Smart Gauge 8. Speed Controller

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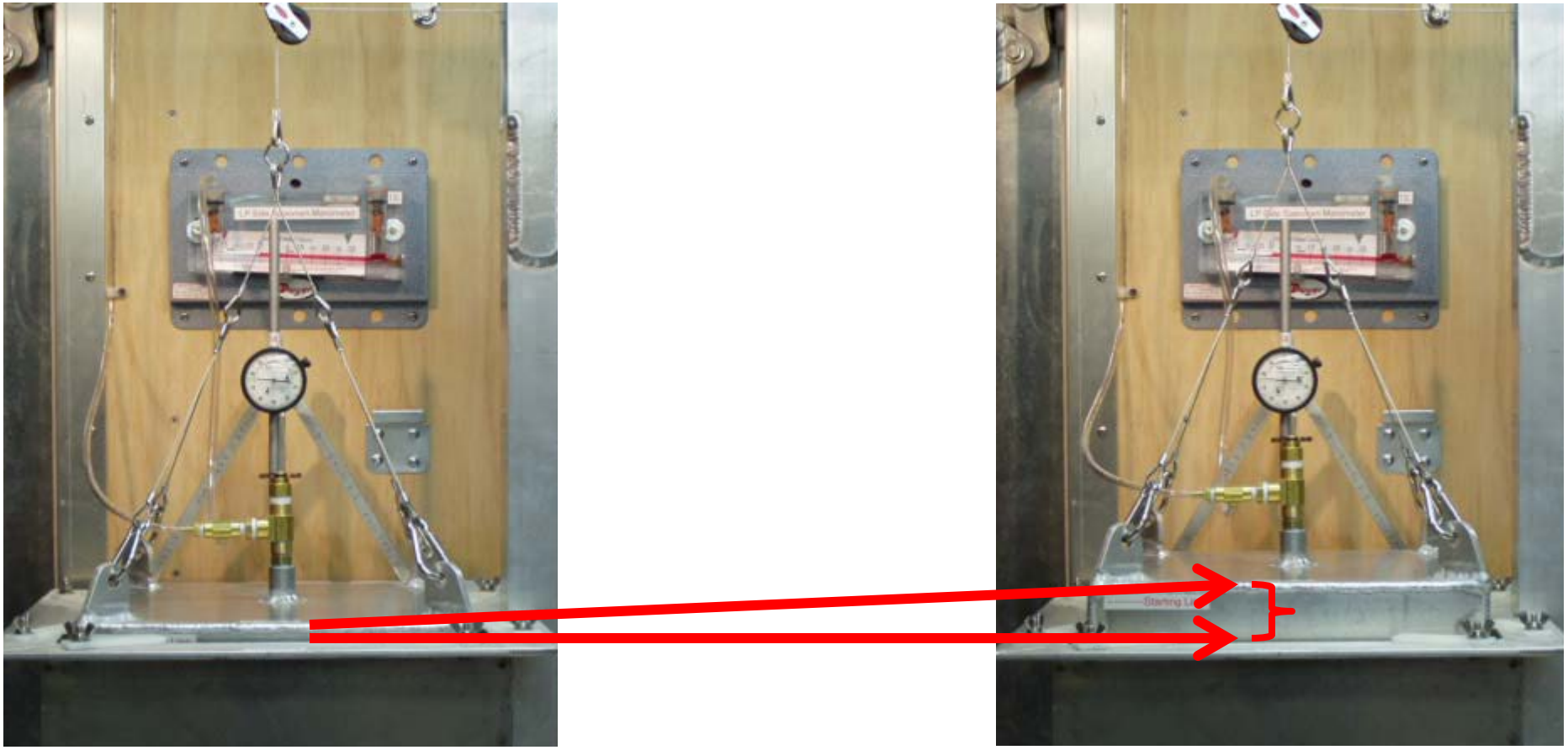
Capture / Buoyancy Device



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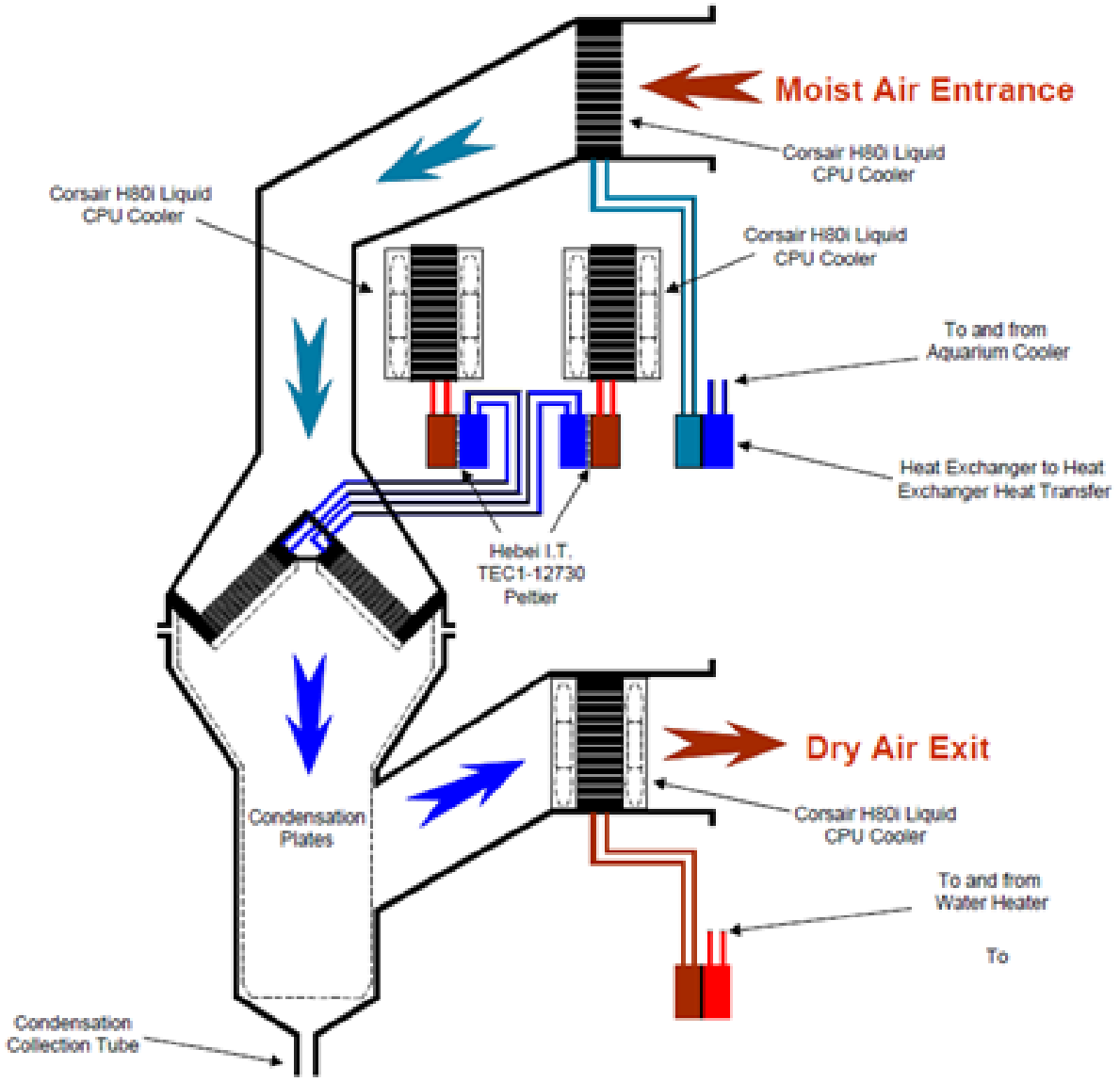

-- Cooling, Dehumidification and Re-Heating System.

-- The temperature and dehumidification process precisely controlled by a laptop.

-- Specimen water removal rate data logged and recorded in real time.

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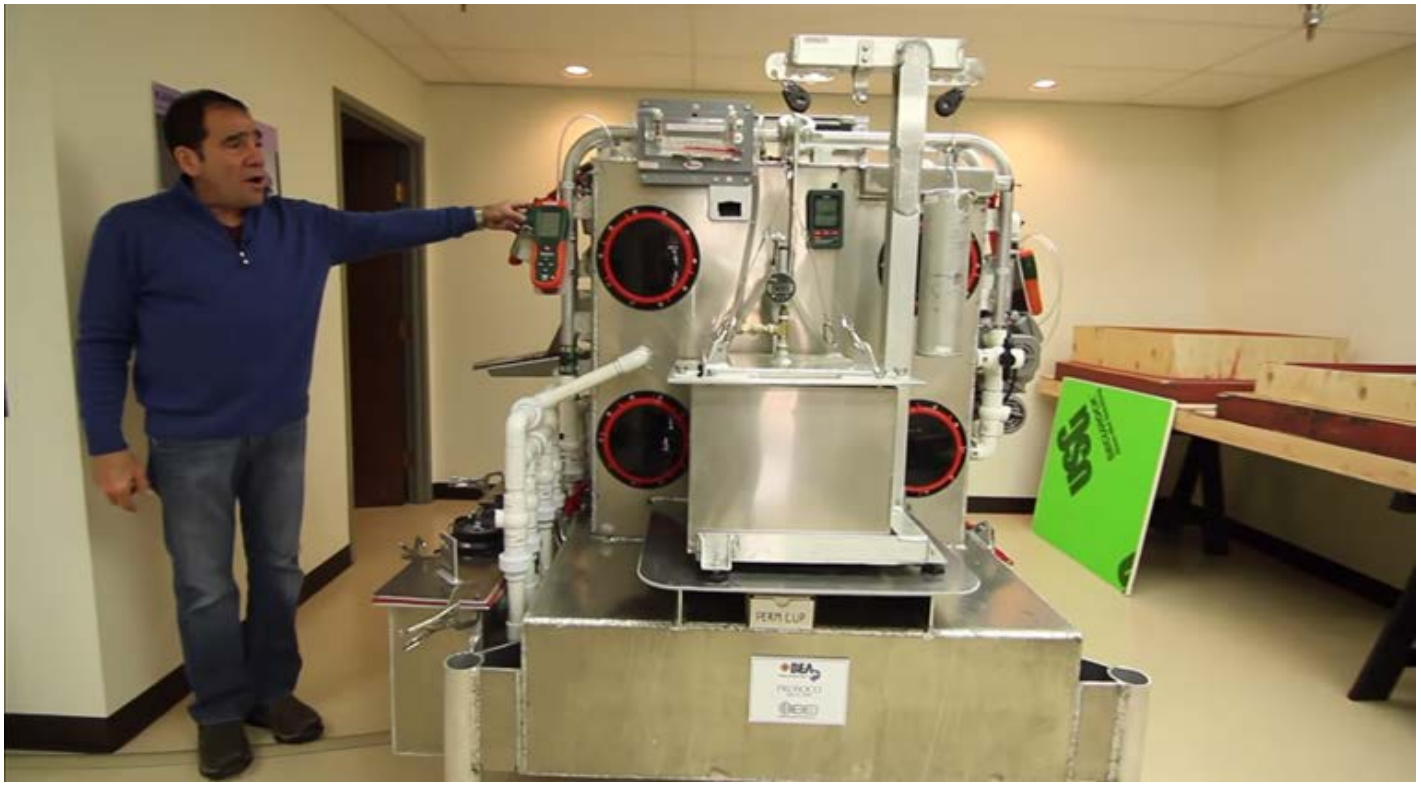
Rosetta Stone Dynamic Vapor Permeability & Diffusive Air Movement Measurement Chamber



www.youtube.com/watch?v=E914JxndUIA&feature=youtu.be

Weathered OSB air and water leakage testing

www.greenbuildingadvisor.com/blogs/dept/musings/osb-airtight

“Is OSB Airtight?”

“Builders and researchers in North America and Europe report that air can leak right through oriented strand board.”

“Recommendations to builders”

“North American OSB is not marketed as an air barrier material, and current manufacturing standards for OSB do not require OSB to resist air leakage.”

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OSB Test data from Rosetta Stone Dynamic Vapor Permeability & Diffusive Air Movement Measurement Chamber

Date	Specimen	Amb Temp	Amb RH	Par Temp	Par RH	Neg temp	Neg RH	Minuter	CD Incher	Airflow	Par DP	Neg DP	
12/21/2014	AVG	67.33	59.57	67.00	59.67	63.67	61.33	0.16	1.31	0.00	0.30	0.19	
12/22/2014	AVG	66.80	57.67	68.33	59.00	67.33	58.33	0.16	1.31	0.00	0.30	0.19	
12/23/2014	AVG	70.50	45.33	71.67	54.67	69.67	56.33	0.16	1.30	0.00	0.30	0.20	
12/24/2014 (a)	AVG	68.60	43.50	65.33	53.00	65.67	51.67	0.16	1.31	0.00	0.30	0.21	
12/29/2014	AVG	69.33	32.73	64.33	41.00	65.00	41.67	1.15	1.30	0.00	0.30	5.79	
12/30/2014 (b, c)	AVG	63.73	26.80	69.00	96.00	66.67	62.33	0.13	1.30	0.00	0.30	0.17	
12/31/2014	AVG	66.10	22.73	64.67	97.00	63.67	65.67	0.12	1.30	0.00	0.30	0.18	
1/5/2015 (d, e, f)	AVG	70.10	43.25	70.25	77.25	69.00	50.25	0.09	1.30	0.01	0.30	0.27	
1/7/2015 (g, h)	AVG	68.88	43.03	69.75	96.75	68.75	75.25	0.10	1.30	0.01	0.30	0.28	
Note:													
a	Adjust capturing device buoyancy w/ 1/2 weight of above water ballast												
b	Open humidity chamber and turn on device Open 1.5" valve on grids												
c	Chamber run overnight with open no grids valve .3 IWC Humidity chamber on												
d	Specimen removed, sealant removed, wt. 12.48, Moisture content read X 3 meters, Installed into 3X3 buck in TVC, spray rack 1 hour leaks recorded, Wt. 14.4, .3 IWC 24 hours, Wt 15.28												
e	Specimen reinstalled into Rametta												
f	Specimen thickness originally at .44" now at .58", Moisture content originally 17%, after humidity: 23%, after TVC water spray: 80% (depending on instrument used) discuss later.												
g	After fan/heat 48 hours, moisture content: 25%, specimen reinstalled into Rametta												
h	Specimen allowed to dry further in front of fan/heater												
Date	Specimen	Amb Temp	Amb RH	Par Temp	Par RH	Neg temp	Neg RH	Barometer	Humid Box	Minuter	CD Incher	Airflow	Par DP	Neg DP
12/29/2014(b)	1 hour	67.8	22	66	83	64	55		On				0.3	0.
	2 hour	64	28	68	90	65	56		On				0.3	0.
	6 hour	64	28	69	96	67	62		On				0.3	0.
	AVG	65.266667	26	67.66666667	89.66666667	65.333333	57.666667		On				0.3	0.

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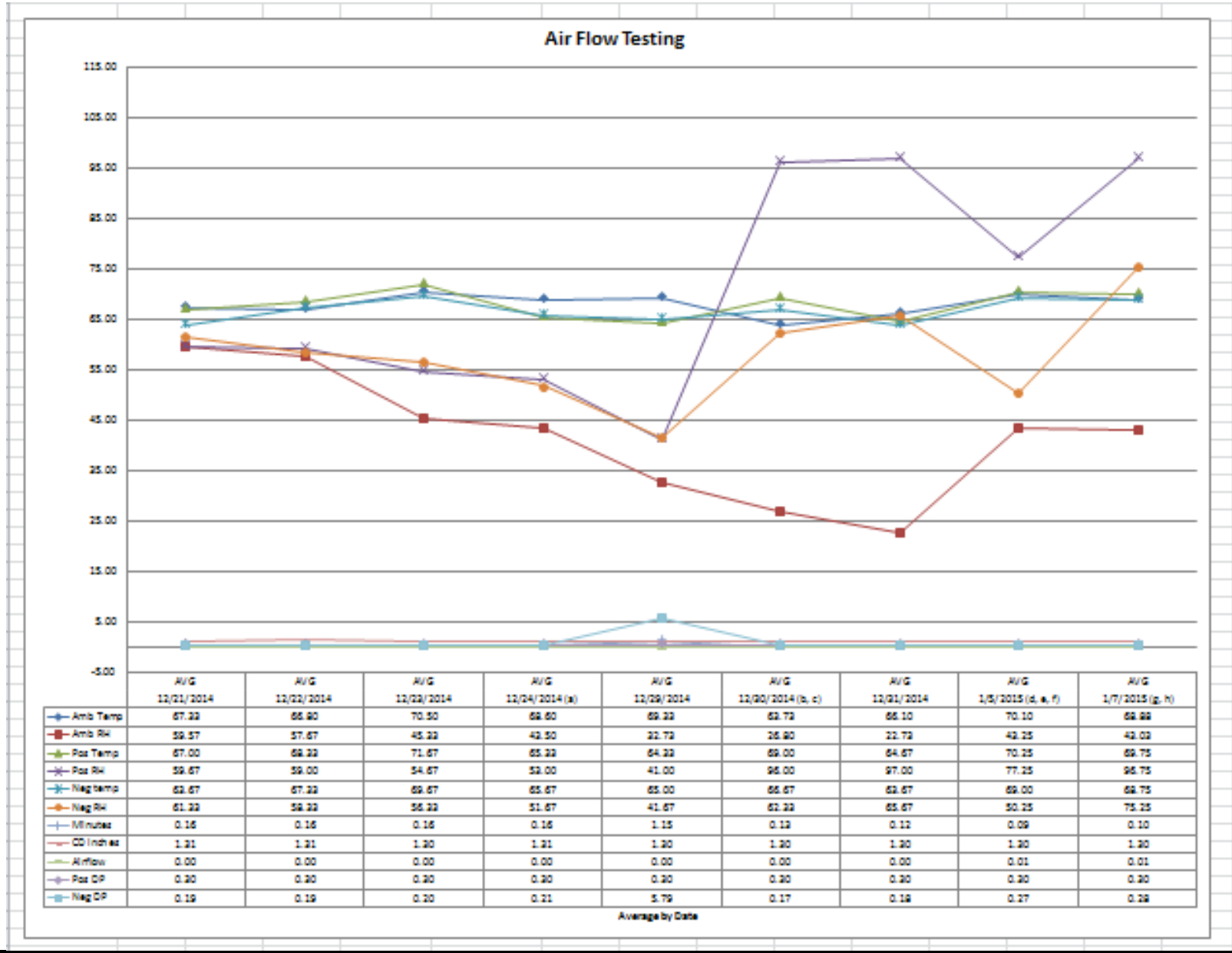

	AVG 12/21/2014	AVG 12/22/2014	AVG 12/23/2014	AVG 12/24/2014 (a)	AVG 12/29/2014	AVG 12/30/2014 (b, c)	AVG 12/31/2014	AVG 1/5/2015 (d, e, f)	AVG 1/7/2015 (g, h)
Amb Temp	67.33	66.80	70.50	69.60	69.33	63.73	66.10	70.10	69.88
Amb RH	59.67	57.67	45.33	43.50	23.73	26.80	23.73	43.25	43.03
Pos Temp	67.00	69.33	71.67	69.33	64.33	69.00	64.67	70.25	69.75
Pos RH	59.67	59.00	54.67	53.00	41.00	96.00	97.00	77.25	96.75
Neg temp	63.67	67.33	69.67	69.67	65.00	66.67	63.67	69.00	69.75
Neg RH	61.33	59.33	56.33	51.67	41.67	63.33	65.67	50.25	75.25
Minutes	0.16	0.16	0.16	0.16	1.15	0.13	0.12	0.09	0.10
CD Inches	1.21	1.21	1.20	1.21	1.20	1.20	1.20	1.20	1.20
Airflow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Pos DP	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Neg DP	0.19	0.19	0.20	0.21	5.79	0.17	0.18	0.27	0.28

Average by Date

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Tested OSB prior to and after wetting

- Prior to wetting, met ABAA standard 0.004 cfm/ft^2 at 1.57 psf (0.3 IWC) -- but just barely
- Wetted with simulated one-hour heavy rain
- Followed with simulated 25mph wind for 24 hours
- After wetting and drying: 0.0055 cfm/ft^2 at 1.57 psf (0.3 IWC)
- Fails the ABAA standard
- 37.5 % increase in air leakage
- Significant water transmission

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Ongoing & Future Work

Drying Quotient Ratings (DQRs)

- For structural building materials and air- and water-barrier membranes.
- A function of the drying of materials over time under varying wetting and humidity circumstances.
- DQR = % water content reduction / minutes.

Ongoing & Future Work

Engineered Drying

- Maintain dryness and respond to catastrophic weather events

    -- Wall assembly design

    -- Building operation

        -- Increased HVAC fan pressure v heating

            -- cost
            -- comfort

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The End

Presented by

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