

Part 2b of a Review
of
ASSESSMENT OF EPA's RESIDENTIAL WOOD HEATER CERTIFICATION PROGRAM
Test Report Review: Stoves & Central Heaters
Written by NESCAUM, March 2021
and
ALT-140
and
Valid vs. Invalid Test Sequences

Reviewed by:
Thomas Morrissey
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July 2, 2021

Part 2b of a Review

of "ASSESSMENT OF EPA's RESIDENTIAL WOOD HEATER CERTIFICATION PROGRAM"

and IDCTM (now ALT-140)

and Valid vs. Invalid Test Sequences

Part 2a of this review focused on the low burn rate and low burn rate differences between the ASTM E-3053 method and the IDCTM. Before moving on to other issues, I would like to revisit the low burn rates again, this time in the context of valid and invalid runs due to load density variation.

Both ASTM E-3053 and the IDCTM require identical load densities for low burn rates: 12 pounds per cubic foot of firebox area. For both methods, the 12 lbs refers to wood "as fired." The IDCTM allows for variance in the total weight of the load of +/- 5%, and also stipulates that the moisture content of the *load* be between 19% and 25% dry basis, although *individual pieces* may be between 18% and 27% dry basis. Any load not meeting these requirements of load density and moisture content is classified as an "invalid test run."

The IDCTM further states that the data from all test runs must be reported, but any invalid runs must be repeated. It is ambiguous as to whether one or two additional test runs are required to complete a series after an invalid run.¹

When ADEC asked EPA to approve the IDCTM as an Alternative Test Method, it supplied EPA with a spreadsheet to document "that at least one appliance had been tested with that methodology and ...met the emissions standard in the rule." (email from Steffan Johnson to me dated 6/7/21, emphasis added). The spreadsheet supplied to EPA by ADEC

¹ The IDCTM states: "Once three valid runs have been completed, the testing is complete. No additional runs may be completed."

It further states: "If there is an invalid run, two additional runs may be attempted to complete the test series... If more than three test runs are conducted, the results from all valid test runs shall be used in calculating the average emissions rate."

It is ambiguous as to whether two runs are required to replace an invalid run (as is the current practice with other EPA test methods (M28R and ASTM E-3053), or whether a test candidate can conduct *as many as* two more runs to get a good run.

contained summary test results for “Stove 7” and “Stove 17,” along with test fuel data and a single spreadsheet to summarize the actual testing. This spreadsheet was alleged to show that the tests on it successfully used the IDCTM Methodology and met the emissions standard in the rule. It doesn’t show this.

Data from “Stove 7” (a catalytic stove with a 1.9 cu ft. firebox) is included in NESCAUM’s “Interim Report.” Approximately 75% of the IDCTM low burn test runs described in NESCAUM’s “Interim Report” were invalid based on failures to adhere to the IDCTM density standard.² “Stove 7” fails to meet the density standard on 2 of 4 runs, and no successful 3 run sequence has been documented.

To determine whether a stove in the “Interim Report” meets the density requirement, I calculate the absolute minimum load needed to achieve a density of 12 lbs. per cubic foot based on the firebox size, and then compare this with the load reported by NESCAUM. I make adjustments for 1) moisture content, 2) the expected 10% coal-bed at the end of the load, and 3) the +/- 5% allowance for the size of the fuel load, always calculating the lowest load possible.

I compare the lowest load possible with NESCAUM’s actual load, which I calculate by simply multiplying its stated dry burn rate times the length of the burn. The actual load (dry basis) has to exceed the calculated minimum for the load to comply with the 12 lbs per cu. ft. requirement.

So, for a 1.9 cu. ft. firebox, we can expect the total load to be 22.8 lbs ($1.9 \times 12 = 22.8$). Next, I apply the maximum possible moisture content to this load, in order to generate the lowest possible fuel weight “dry basis” (highest allowable moisture content will yield the lowest possible “dry weight” of wood available for testing). This is expressed in the formula $22.8 / (1 + 25/100) = 18.24$. If I remove 10% for the anticipated coal-bed, I have 16.416 lbs as the minimum load (dry basis) for the low burn (+/- 5%, as allowed). Just to be safe, I deduct the 5%, and then divide by 2.204 to

² By contrast, when I review the data that NESCAUM has compiled about ASTM tests, there is 100% accuracy in adhering to the load density standards.

get kilograms of fuel available. So $(16.416 \times .95)/2.204 = 7.076$ kg “dry basis.” This is the minimum weight (dry basis) required to meet the low burn density standard.

I compare this minimum amount of fuel required for “Stove 7” to comply with the IDCTM standard to the amount reported consumed in the “Interim Report.” Here is a set of sample set of calculations for “Stove 7:”

Low Burn Density	12				
STOVE 7: EXPECTED LOW BURN CONSUMPTION IN KG DRY BASIS					
Assume Moisture		19%	25%		
cu ft firebox		1.90	1.90		
Load (3.1 x 12):		22.80	22.80		
Convert Load to dry ba	$22.8/(1+25/100)$	19.16	18.24	$22.80/(1+25/100)$	
Less 10% Coalbed	$22.8 \times 0.1 = 3.126$	1.916	1.824		
Expected lb burned		17.244	16.416		
Expected kg burned	Exp lb/2.204	7.824	7.448		
Absolute Load Range	Exp kg x 0.95	7.433	7.076	kg minimum	
ACTUAL NESCAUM REPORTED RESULTS					
Dry Burn Rate	Minutes	Test #	Dry KG Burner	Valid/Invalid	
1.42	314	S7-18-07-25	7.431	VALID	maple
1.37	283	S-18-07-26	6.462	INVALID	maple
1.23	315	S-18-07-27	6.458	INVALID	maple
1.54	307	S7-4-29-20	7.880	VALID	maple
			1.22023487		

Two of the four runs here are invalid by looking at just the density requirement (much less the complete test results). The heaviest load (7.880kg) is 22% heavier than the lightest load (6.458 kg). The first series of three tests contains two failures and is an invalid test series.³ The “second” sequence is just a single test; were two other tests performed? Did they pass or fail? There are other anomalies in the “Stove 7” data, like the absence of catalytic temperature data and variances in measurement of stack gasses, but we need not examine them since the runs are invalid.

Why does NESCAUM’s failure to meet its stated density requirement matter?
There are two reasons, both important.

³ The point is that based on the load density alone, these are invalid runs and do not constitute a successful series of 3 tests as required by IDCTM. There are other problems with these results, such as irregularities in measurements of combustion gasses, and the continued measurement of stove efficiency using CSA B415, which was not developed for measuring efficiency based on partial loads. But once the test has been deemed invalid, we need look no further.

First, NESCAUM presents a variety of charts, graphs, and narrative comparisons in its “Interim Report” but does not disclose that the basic load weights from one run to another vary by as much as 40%. Only 2 of 7 stoves discussed in the “Interim Report” have consistent load density over three runs. The other 5 fail on the density metric. When NESCAUM presents data in the “Interim Report” and proceeds to claim that its method is repeatable and reproducible, and that results are comparable, *without disclosing variable load densities from one run to the next, and from stove to stove*, it is making claims that cannot be supported by its own data.

Second, in order for EPA to adopt NESCAUM’s method, the IDCTM has to pass a two pronged test: A) it has to prove that the IDCTM can be successfully used in the field to test stoves (i.e., that stoves with different firebox sizes can be tested using the method, that its calculations will survive scrutiny, that implementing the method will not be excessively burdensome, and so on) and B) it has to prove that stoves can be successfully tested to current EPA emissions standards and pass the test. (In other words, if all stoves tested with IDCTM failed, then the IDCTM method likely fails as well.) So far, NESCAUM has not proved that it can meet either requirement, and after extensively promoting its method, has provided virtually no valid data to support its claims.

Further, I would suggest that the only way that NESCAUM can prove the utility of its test method is to do a complete certification test that conforms to all of its test requirements. This means that there is a 30-day notice, a test stove gets conditioned at a willing manufacturer’s facility and shipped to a test lab, there is witnessing of the test implementation via video, there is no communication between the lab and any third party prior to or during the test, that the test results, including all raw data, calculations, and analysis are publicly available, and the test is reviewed by a legitimate third party reviewer. The idea of locked spreadsheets hiding calculations or data from scrutiny is a complete non-starter.

The stove that originally piqued my interest in the density calculation was “Stove 1.” The “Interim Report” tried to compare “Stove 1” “results” from the IDCTM to

“results” from ASTM E-3053 and M28 methods. Here is a review of “Stove 1” IDCTM test runs:

Low Burn Density	12				
STOVE 1: EXPECTED LOW BURN CONSUMPTION IN KG DRY BASIS					
Assume Moisture		19%	25%		
cu ft firebox		3.10	3.10		
Load (3.1 x 12):		37.20	37.20		
Convert Load to dry ba	$37.2/(1+25/100)$	31.26	29.76	$37.2/(1+25/100)$	
Less 10% Coalbed	$31.26 \times 0.1 = 3.126$	3.126	2.976		
Expected lb burned		28.134	26.784		
Expected kg burned	Exp lb/2.204	12.765	12.152		
Absolute Load Range	Exp kg x 0.95	12.127	11.545	kg minimum	
ACTUAL NESCAUM REPORTED RESULTS					
Dry Burn Rate	Minutes	Test #	Dry KG Burner	Valid/Invalid	
2.72	222	S1-18-08-08	10.064	INVALID	maple
2.82	193	S1-18-08-09	9.071	INVALID	maple
2.46	248	S1-18-08-10	10.168	INVALID	maple
			1.12093485		

Here, all three runs were invalid. The difference between the three invalid loads was 12%. The difference between the smallest load in this sequence (9.071 kg) and the absolute minimum load density (11.545 kg, after deducting the 5% allowance) is 27%, or 2.47 kg (almost 5 ½ pounds).

NESCAUM tries to compare IDCTM “results” for “Stove 1” with “results” it claims to have generated from testing the same stove using M28R and ASTM E-3053. But no comparison is possible because M28R and ASTM E-3053 methods were both altered for this testing⁴ and the runs had different densities.

Below are load density results from “Stove 2” in NESCAUM’s “Interim Report.” For “Stove 2,” the heaviest load was 40% heavier than the lightest load. Only one load met the minimum load density requirement for IDCTM.

⁴ For example, emissions were measured with a TEOM; the number of runs for M28R was reduced from 4 to 3, load densities varied from IDCTM to ASTM E-3053 to M28R, and so on. In other words, the tests NESCAUM sought to compare were not comparable to begin with, other than that the appliance was the same.

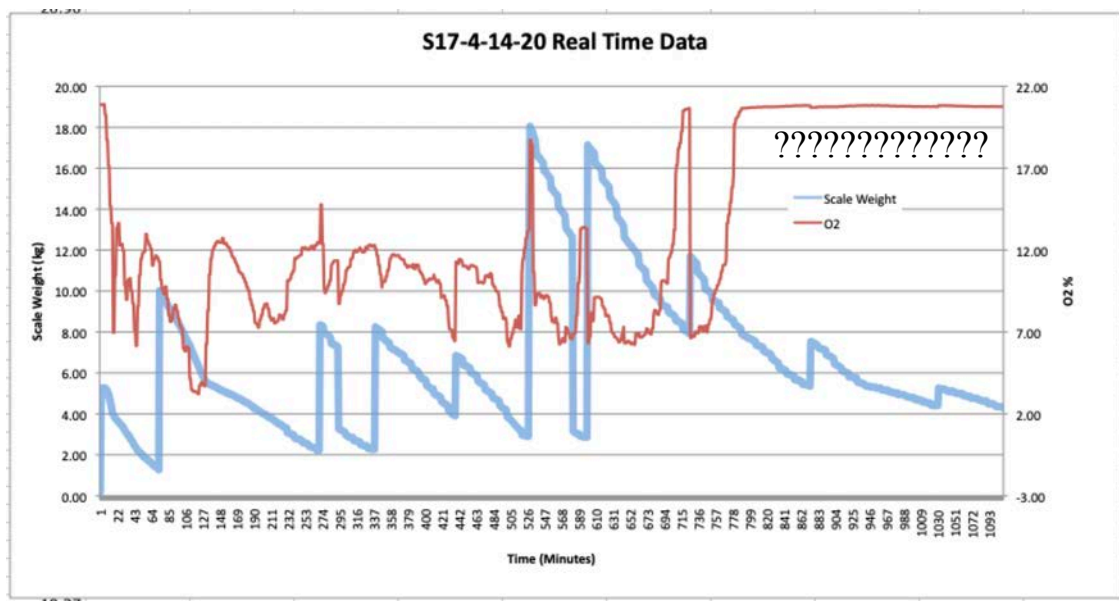
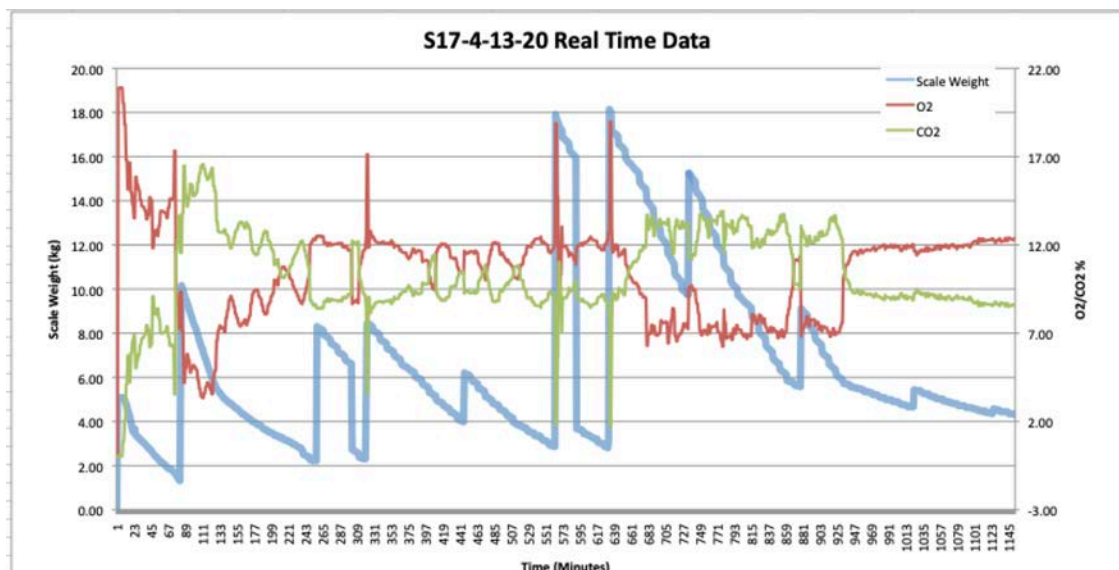
STOVE 2: EXPECTED LOW BURN CONSUMPTION IN KG DRY BASIS					
Assume Moisture		19%	25%		
cu ft firebox		1.30	1.30		
Load (1.3 x 12):		15.60	15.60		
Convert Load to dry ba	$15.6/(1+25/100)$	13.11	12.48	$15.6/(1+25/100)$	
Less 10% Coalbed	$13.11 \times 0.1 = 1.311$	1.311	1.248		
Expected lb burned		11.798	11.232		
Expected kg burned	Exp lb/2.204	5.353	5.096		
Absolute Load Range	Exp kg x 0.95	5.085	4.841 kg minimum		
ACTUAL NESCAUM REPORTED RESULTS					
Dry Burn Rate	Minutes	Test #	Dry KG Burner	Valid/Invalid	
1.53	172	S2-18-10-23	4.386	INVALID	maple
1.56	138	S2-18-10-24	3.588	INVALID	maple
1.5	175	S2-18-10-25	4.375	INVALID	maple
1.41	165	S2-19-01-07	3.878	INVALID	maple
1.25	220	S2-19-01-08	4.583	INVALID	maple
1.24	224	S2-19-01-09	5.043	VALID	maple
			1.40542549		

Here is another sample ("Stove 6") with 2019 tests dates and different fuels. One run appears to have an incorrect Dry Burn Rate in the "Interim Report" (highlighted in pink).

STOVE 6: EXPECTED LOW BURN CONSUMPTION IN KG DRY BASIS					
Assume Moisture		19%	25%		
cu ft firebox		2.20	2.20		
Load (2.2 x 12):		26.40	26.40		
Convert Load to c	$26.40/(1+25/100)$	22.18	21.12	$26.40/(1+25/100)$	
Less 10% Coalbe	$22.18 \times 0.1 = 2.218$	2.218	2.112		
Expected lb burned		19.966	19.008		
Expected kg burn	Exp lb/2.204	9.059	8.624		
Absolute Load Ra	Exp kg x 0.95	8.606	8.193 kg minimum		
ACTUAL NESCAUM REPORTED RESULTS					
Dry Burn Rate	Minutes	Test #	Dry KG Burner	Valid/Invalid	
1.43	260	S6-18-07-18	6.197	INVALID	maple
1.64	250	S6-18-07-19	6.833	INVALID	maple
1.61	263	S6-18-07-20	7.057	INVALID	maple
1.51	328	S6-19-03-13	8.255	VALID	oak
1.65	299	S6-19-03-18	8.223	VALID	oak
1.6	308	S6-19-03-19	8.213	VALID	oak
2.65	251	S6-19-02-18	11.086	???	WET Oak
1.72	277	S6-19-03-21	7.941	INVALID	WET Oak
1.65	284	S6-19-03-22	7.810	INVALID	WET Oak

In order to get approval for ALT-140, ADEC also sent EPA some results for "Stove 17." When I first charted the reported results for "Stove 17" the results were

truly bizarre. Here are the initial plots for tests S17-4-13-20 and S17-4-14-20, which appeared to include multiple loading events and did not conform to the protocol.



Through an exchange of emails with EPA (in the interest of transparency, reproduced as an appendix to this Review), we were able to ascertain that the spreadsheet data ADEC submitted to EPA was disorganized, and rows of results were out of sequence. We are still missing an explanation for the anomalous recordings of

oxygen (as well as CO and CO₂) over the last 5.5 hours of the 4/14/20 test. Normally these test failures would render a run invalid, but we have no back-up data to determine what actually happened.

This is why EPA has third party certifiers. They would normally catch these errors long before submission to EPA. In this case, there was no review at all, and EPA accepted the NESCAUM results without uncovering the obvious anomalies.

Also of interest with “Stove 17” is that the test fuel is less than 5/6 the length of the firebox. The 5/6 criteria appears to be of interest to some State Attorney Generals, and has been repeatedly referenced by NESCAUM as a way that test labs “cheat.” Before accepting these test results, a determination should be made about the importance of the 5/6 metric, which NESCAUM itself violates here.

The “locked fuel calculator” may or may not provide the direction that NESCAUM/ADEC/NYSERDA thinks it does. Fuel measurements for “Stove 17” indicate that it either does not provide such direction, or that NESCAUM’s previous claims about the importance of fuel length not being less than 5/6 firebox length are frivolous. They can’t have it both ways.

Certainly no manufacturer or test lab could get away with submitting these results for certification of a stove, much less certification of a test method.

NESCAUM/ADEC has been highly critical of test labs, third party certifiers, and EPA, yet when it comes to actually producing verifiable data using IDCTM, it is inexplicably silent. As of just over a year ago (April 2020) NESCAUM/ADEC was still using CSA B415 to calculate efficiency, but it was applying the CSA B415 calculation to partial loads, which was not its intended use. We have never seen a sample of the “new” efficiency calculation applied to an actual test. There have obviously been issues with IDCTM loading densities, with big coal beds, and with producing representative runs.

I am not sure that developing a new test method in isolation, and without aggressive peer review, was a formula for success.

EPA has two approved test labs beaver away, trying to run test batteries on 3 sample test stoves in 2 locations (Portland, OR and Connecticut). Since NESCAUM has been unable to produce reliable results itself, as evidenced by the numerous failed test runs in its "Interim Report", these official lab results are likely the only remaining possibility for a valid "proof of concept." NESCAUM's dubious data does not appear up to the "proof of concept" task.

There are still a lot of questions about the test design that remain unanswered, or are papered-over. I am looking forward to getting some valid data on a successful battery of tests from a qualified lab.

Meanwhile, there is still a lot to unpack beyond what I have already covered, while waiting for actual lab results using the IDCTM.

The attached exchange of emails between EPA and myself is intended mainly to display the quality of data available from testing the IDCTM.



Subject: FW: S17 4/15/20 Data
From: "Johnson, Steffan" <johnson.steffan@epa.gov>
Date: 6/28/21, 12:46 PM
To: Tom Morrissey <tomm@woodstove.com>

Dear Tom,

As a follow up to our call this morning, we've been reviewing the spreadsheet data and have picked up an issue that causes us sufficient concern to withdraw ATM-140 until we see a complete data set.

As you can see in the graphs below, behind the issues you pointed out regarding the stove weight and O2/CO2 swings are missing data points from the data acquisition system. It seems that on a regular basis ten minutes of data are simply absent (the time-line should be a straight line, not jagged).

We'll be following up on this with Alaska and asking for a complete test report. ATM-140 will remain in suspended status until we receive that and review the data.

Again, thanks for the phone call.

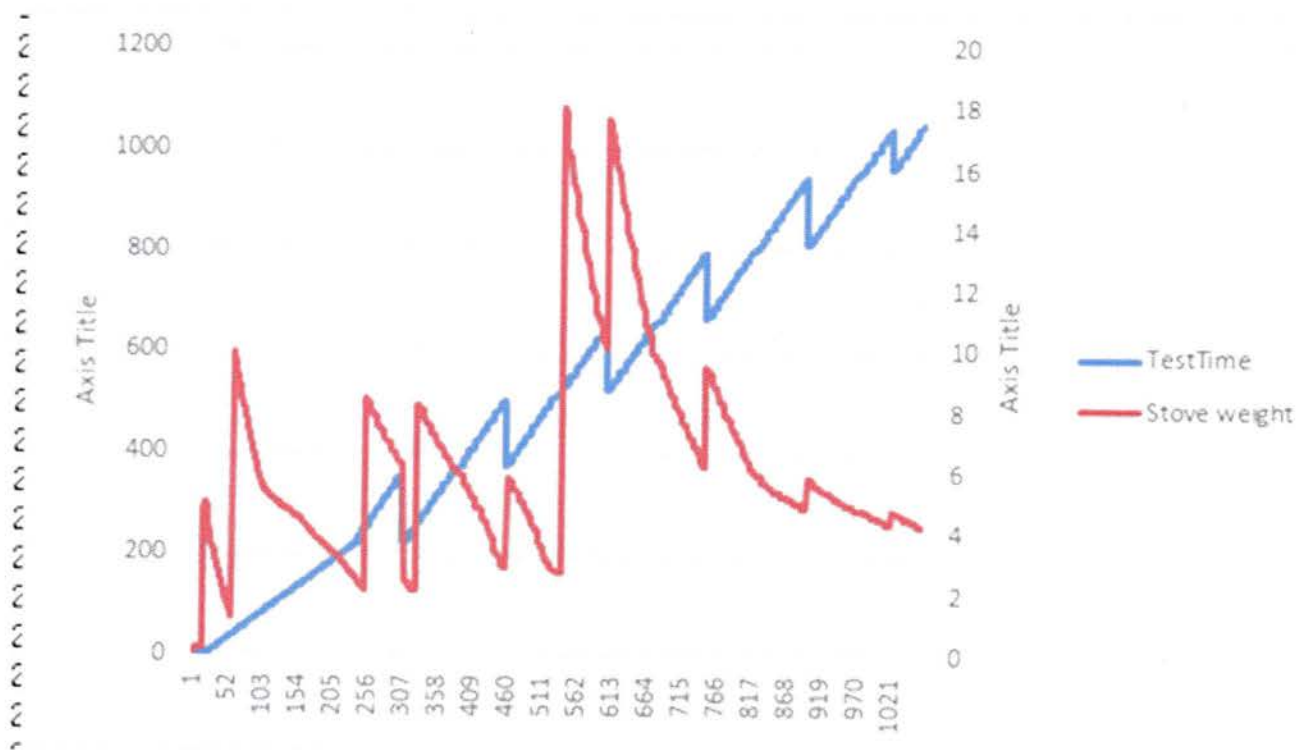
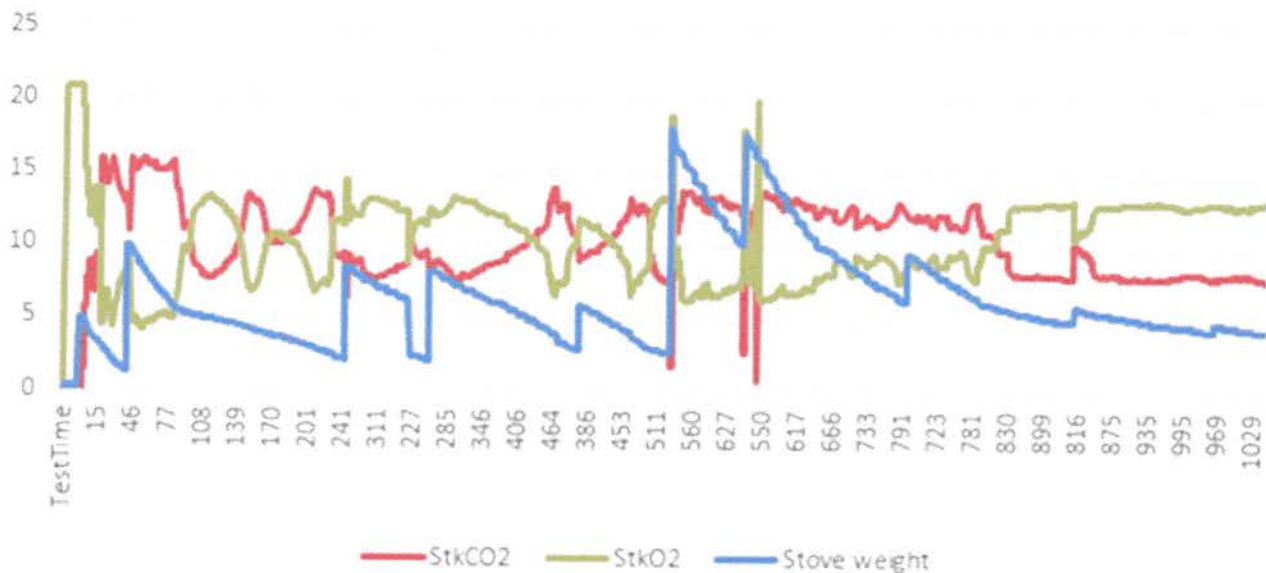
Stef

From: Brashear, Angelina <Brashear.Angelina@epa.gov>
Sent: Monday, June 28, 2021 12:28 PM
To: Johnson, Steffan <johnson.steffan@epa.gov>
Subject: S17 4/15/20 Data

What I am seeing so far:

See the second chart. Looks like DAQ jumps in the data. Time varies but it is usually ~10 min of data missing from the spreadsheet. This is consistent for stove 17 test days. They seem to have fixed the problem by the time they did a 4th test on 4/29/20 on stove 7.

S17 4/15/20



Angelina Brashear
 U.S. Environmental Protection Agency
 OAQPS-AQAD-MTG
 109 T.W. Alexander Drive (E143-02)
 Research Triangle Park, NC 27711
brashear.angelina@epa.gov
 919-541-4746

3

Subject: Re: FW: S17 4/15/20 Data
From: Tom Morrissey <tomm@woodstove.com>
Date: 6/29/21, 11:29 AM
To: "Johnson, Steffan" <johnson.steffan@epa.gov>, "Brashear, Angelina" <Brashear.Angelina@epa.gov>

Angelina-

On Stove 17, if you sort up under "test time" (Column B), then the data falls back into place, and the loading assumes a normal curve. I'm not sure how it got so muddled.

We still have a middle run with no O2 measurements for 5.5 hours.

The stated CO measurements also seem extremely high *to me*, relative to stated emissions. It would be helpful to see those calcs. It's a lot of work to weed through this data jumble.

Tom

On 6/28/21 12:46 PM, Johnson, Steffan wrote:

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Again, thanks for the phone call.

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From: Brashear, Angelina <Brashear.Angelina@epa.gov>
Sent: Monday, June 28, 2021 12:28 PM
To: Johnson, Steffan <johnson.steffan@epa.gov>
Subject: S17 4/15/20 Data

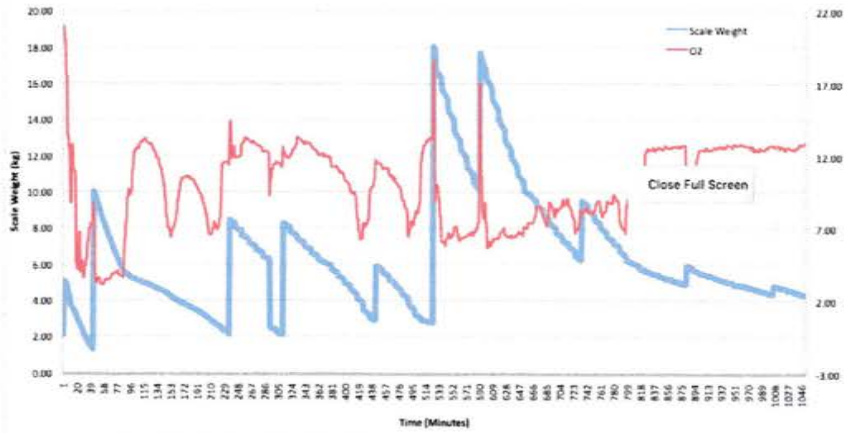
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4/15/20 Stove 17

2.09	0.00
4.81	20.87
5.03	20.87
5.03	20.89
4.99	20.89

S17-4-15-20 Real Time Data

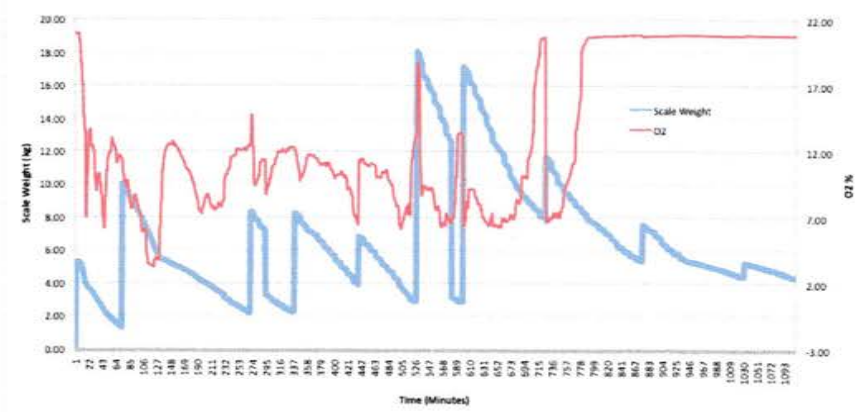


1.50	3.94
1.45	4.69
1.41	4.69
1.36	3.55
1.27	3.55
10.02	4.34
9.93	4.34
9.80	4.81
9.71	4.81
9.57	6.03
9.43	6.03
9.34	6.92
9.21	6.92
9.07	7.28
8.98	7.28
8.84	7.22
8.71	7.22
8.62	8.66
8.48	8.66
8.34	3.81
8.30	3.81
8.16	3.22
8.07	3.22
7.94	3.53
7.85	3.53
7.71	3.55
7.62	3.55
7.53	3.13
7.44	3.13
7.30	3.05
7.21	3.05
7.12	3.07
6.98	3.07
6.89	3.31
6.80	3.31
6.71	3.45
6.62	3.45

4/14/20 Stove 17

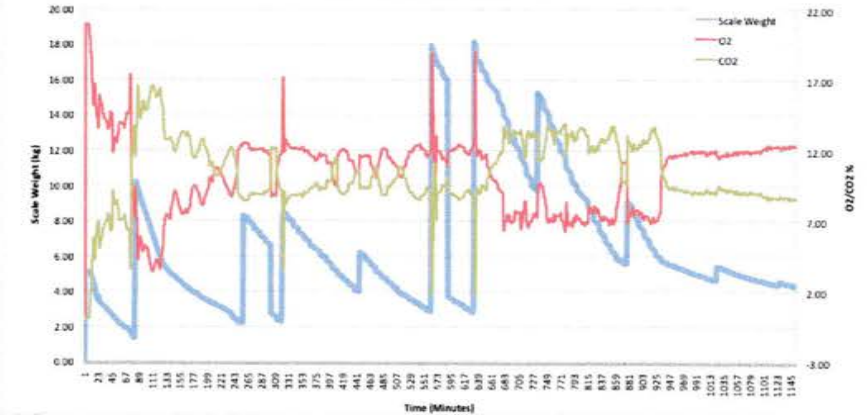
0.18	20.89
4.49	20.89
5.26	20.88
5.26	20.88
5.26	20.90
5.22	
5.26	
5.17	
5.08	
4.99	
4.85	
4.67	
4.49	
4.26	
4.04	
3.95	
3.90	
3.81	
3.76	
3.72	
3.67	
3.63	
3.58	
3.54	
3.49	
3.45	
3.40	
3.36	
3.27	
3.22	
3.13	
3.08	
3.04	
2.95	
2.95	
2.90	
2.77	
2.72	
2.68	
2.63	
2.54	
2.45	
2.40	
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2.22	
2.18	
2.13	
2.13	
2.04	
2.04	
2.00	
1.90	
1.86	
1.81	
1.81	
1.77	
1.72	
1.68	
1.68	
1.63	
1.59	
1.54	
1.50	
1.45	
1.45	
1.41	
1.41	
1.36	
1.32	
1.27	
1.27	
10.02	
9.98	

S17-4-14-20 Real Time Data



10.27
9.51
9.51

S17-4-13-20 Real Time Data



11.54
11.30
11.30
10.02
9.98

4/13/20 Stove 17

0.00
5.08
5.08
5.08
5.08
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5.08
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5.08
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5.08
5.03
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3.63
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3.67
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3.36
3.31
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2.13
2.09
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2.04
2.00
1.95
1.90
1.86
1.86
1.86
1.81
1.77
1.77
1.72
1.68
1.63



5

Subject: FW: Question about spreadsheet information
From: "Johnson, Steffan" <johnson.steffan@epa.gov>
Date: 6/29/21, 11:09 AM
To: Tom Morrissey <tomm@woodstove.com>
CC: "Toney, Mike" <Toney.Mike@epa.gov>, "Brashear, Angelina" <Brashear.Angelina@epa.gov>

Tom,

In reviewing the spreadsheet we spoke about yesterday, Angelina Brashear of my staff reminded me of the added data sets provided to us by NESCAUM, after we raised a concern with the State of Alaska.

These will also be included in your FOIA request so I have no trouble sharing them with you here, and I abjectly apologize for not sending them to you sooner, but I had forgotten that we had received additional data.

You will note that these files have TEOM emissions data, and the results included in the previous spreadsheet are not based on these data but on filterable data included in that spreadsheet.

You will also note that these spreadsheets include efficiency calculations based on CSA B415.1, but that one startup test suffers from negative efficiency due to low CO2 after light off.

I believe these will help you make more sense of the data set, overall.

Even so, we have suspended the use of ALT-140 until we see a full report documenting the collection of these data.

Best regards,

Stef

Steffan M Johnson | Leader – Measurement Technology Group | US EPA Office of Air Quality Planning and Standards | Air Quality Assessment Division | 109 T.W. Alexander Drive, RTP, NC 27710 | Mail Drop: E-143-02 | Phone: (919) 541-4790 | Cell: (919) 698-5096

From: Brashear, Angelina <Brashear.Angelina@epa.gov>
Sent: Tuesday, June 29, 2021 8:00 AM
To: Johnson, Steffan <johnson.steffan@epa.gov>
Subject: FW: Question about spreadsheet information

From: Lisa Rector <lrector@nescaum.org>
Sent: Tuesday, February 23, 2021 9:58 AM
To: Johnson, Steffan <johnson.steffan@epa.gov>; cindy.heil@alaska.gov; Alice.Edwards@alaska.gov

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Subject: ATM 140**From:** "Johnson, Steffan" <johnson.steffan@epa.gov>**Date:** 6/30/21, 2:21 PM**To:** Tom Morrissey <tomm@woodstove.com>**CC:** "Sanchez, Rafael" <Sanchez.Rafael@epa.gov>, "Toney, Mike" <Toney.Mike@epa.gov>, "Brashear, Angelina" <Brashear.Angelina@epa.gov>

Dear Tom,

After review of the excel sheets supporting the emissions values for Stove 7 that were submitted by NESCAUM in support of the Alaska ATM request, we have reinstated ATM-140. We spoke with NESCAUM who will be providing a more complete data set to further support the spreadsheets we already have. Note that Stove 17 does not show compliance with the standard and data supporting that is not relevant to our request to Alaska.

Best regards,

Stef Johnson

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Subject: Re: ATM 140
From: Tom Morrissey <tomm@woodstove.com>
Date: 7/1/21, 10:08 AM
To: "Johnson, Steffan" <johnson.steffan@epa.gov>
CC: "Sanchez, Rafael" <Sanchez.Rafael@epa.gov>, "Toney, Mike" <Toney.Mike@epa.gov>, "Brashear, Angelina" <Brashear.Angelina@epa.gov>

Hello Stef/Others,

The excel sheets for the 4 runs for Stove 7 clearly show that the low burn loads on 2 runs (7/26/18 and 7/27/18) do not meet the minimum load density required by the standard, and are thus invalid runs. There is no set of three consecutive runs that meets the criteria in the standard. This is one of the absolute minimum standards – i.e. that each load meets the density standard $\pm 5\%$.

I have reviewed the "data" in the "Interim Report," and 75% of the IDC test runs there do not meet minimum density standards. I understand that they were trying to develop a "method", but data from those runs was subsequently presented as comparable, without disclosing that there was enormous variation from load to load.

You and/or EPA can do whatever you want. However, after NESCAUM's endless and unsupported claims of data manipulation, the very least that I would expect is a set of three consecutive tests that meets their own minimum standards for complying with the ATM-140 standard. So far, they haven't been able to do this, at least from the data that I have reviewed.

Attached is my calculation from the Interim Report. Their actual data just confirms it. I would expect a little better evidence than "Stove 7". Let me know if you have any questions, and thanks,

Tom

On 6/30/21 2:21 PM, Johnson, Steffan wrote:

Dear Tom,

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Best regards,

Stef Johnson

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Low Burn Density 12

STOVE 7: EXPECTED LOW BURN CONSUMPTION IN KG DRY BASIS

Assume Moisture	19%	25%
cu ft firebox	1.90	1.90
Load (3.1 x 12):	22.80	22.80
Convert Load to dry ba $22.8/(1+25/100)$	19.16	18.24 $22.80/(1+25/100)$
Less 10% Coalbed $22.8 \times 0.1 = 3.126$	1.916	1.824
Expected lb burned	17.244	16.416
Expected kg burned Exp lb/2.204	7.824	7.448
Absolute Load Range Exp kg x 0.95	7.433	7.076 kg minimum

ACTUAL NESCAUM REPORTED RESULTS

Dry Burn Rate	Minutes	Test #	Dry KG Burner	Valid/Invalid	
1.42	314	S7-18-07-25	7.431	VALID	maple
1.37	283	S-18-07-26	6.462	INVALID	maple
1.23	315	S-18-07-27	6.458	INVALID	maple
1.54	307	S7-4-29-20	7.880	VALID	maple
			1.22023487		

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167 KB

Subject: RE: ATM 140

From: "Johnson, Steffan" <johnson.steffan@epa.gov>

Date: 7/1/21, 3:07 PM

To: Tom Morrissey <tomm@woodstove.com>

CC: "Brashear, Angelina" <Brashear.Angelina@epa.gov>, "Toney, Mike" <Toney.Mike@epa.gov>, "Sanchez, Rafael" <Sanchez.Rafael@epa.gov>, "Scinta, Robert" <scinta.robert@epa.gov>

Tom,

Thank you for this feedback. I have reached out to Alaska to get their input on these findings and to see if they have concerns with the supporting data set.

I'll keep you posted on what we hear back. As you mention, and as the dates of testing suggest, there may have been a previous version of the IDC involved in earlier tests than the one supporting ALT 140 right now, but the questions you raise are of a concern to us as well.

Again, my thanks for the information and exchange, we will be in touch.

Stef

From: Tom Morrissey <tomm@woodstove.com>

Sent: Thursday, July 1, 2021 10:08 AM

To: Johnson, Steffan <johnson.steffan@epa.gov>

Cc: Sanchez, Rafael <Sanchez.Rafael@epa.gov>; Toney, Mike <Toney.Mike@epa.gov>; Brashear, Angelina <Brashear.Angelina@epa.gov>

Subject: Re: ATM 140

Hello Stef/Others,

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Subject: RE: ATM 140
From: "Johnson, Steffan" <johnson.steffan@epa.gov>
Date: 7/1/21, 4:38 PM
To: Tom Morrissey <tomm@woodstove.com>
CC: "Brashear, Angelina" <Brashear.Angelina@epa.gov>, "Toney, Mike" <Toney.Mike@epa.gov>, "Sanchez, Rafael" <Sanchez.Rafael@epa.gov>, "Scinta, Robert" <scinta.robert@epa.gov>

Tom,

I have asked Alaska for explanation, and for additional data should they have those available that show three test runs meeting the method requirements and emissions limits.

As you pointed out, it seems likely that the load did not fit and one fuel piece was left out. While that may have been allowed via the IDC at the time (I don't have a copy dating from 2018 so I cannot say) what is clear is that such a practice is not allowed in the current version.

As far as the speed of data, the process must flow through the data owner, NYSEDA, so it isn't as simple as it appears on its face. Even so, we await a reply from Alaska and expect their response to be forthcoming soon.

Speaking as a lifelong Twins fan, I'm happy to see anyone out in front of the Yankees. And, as I usually say by the end of June, there's always next season.

More when I hear more.

Stef

From: Tom Morrissey <tomm@woodstove.com>
Sent: Thursday, July 1, 2021 4:04 PM
To: Johnson, Steffan <johnson.steffan@epa.gov>
Cc: Brashear, Angelina <Brashear.Angelina@epa.gov>; Toney, Mike <Toney.Mike@epa.gov>; Sanchez, Rafael <Sanchez.Rafael@epa.gov>; Scinta, Robert <scinta.robert@epa.gov>
Subject: Re: ATM 140

Stef-

The 2018 data is one good run and 2 failed runs. Then we have a stray run in 2020 for Stove 7. No one would set up a test stand in 2020 for one run (out of 3). So where's the data for the other 2 runs? Or maybe they have three runs with some other stove?

They have been so slow in producing data, that I suspect that they may not have it.

Meanwhile, I turned 72 this week, the Red Sox have the best record in baseball (ahead of KC 15-0 right now), and the Yankees are about 7-8 games back, where they deserve to be. Life is good.

Tom