

ANSI/ASHRAE Standard 199-2016

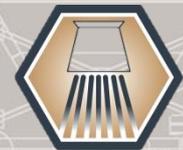
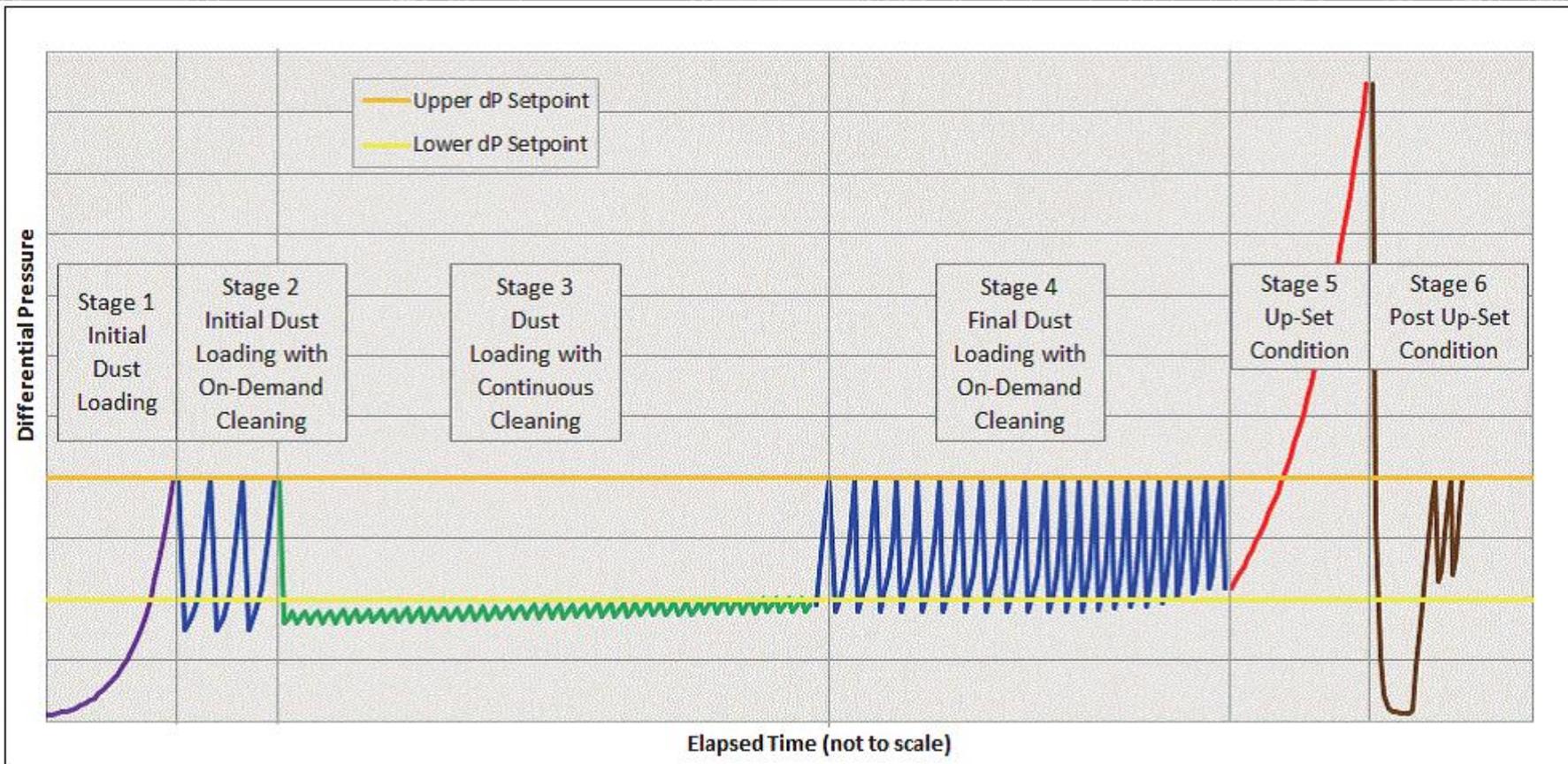
The dust collection industry now has its first standard to provide a quantitative laboratory test method for determining the performance of industrial pulse cleaned dust collectors. The ANSI/ASHRAE Standard 199-2016 was jointly published on June 1, 2016, by the American Society of Heating and Air Conditioning Engineers (ASHRAE) and the American Standards Testing Institute (ANSI). ANSI/ASHRAE Standard 199-2016 specifies test methods to measure emissions, differential pressure, and compressed air consumption in pulse cleaned dust collectors under realistic operating conditions.

For years, the dust collection industry was limited to stating the filter elements Minimum Efficiency Reporting Value, or MERV rating. The MERV rating as specified by ASHRAE 52.2-1999 exclusively focuses on the filtration efficiency of a filter element under controlled laboratory testing that mimics industrial HVAC systems. While the MERV rating is useful for HVAC systems, does not adequately address performance characteristics for dust collector operation. The approach developed in ANSI/ASHRAE 199-2016 is intended to be a “black box” concept where the dust collection system being evaluated is operated per the instructions in the standard without modification. The test procedure is not concerned with internal operation of the dust collector, rather the actual performance of each physical part of the dust collector itself.

The ANSI/ASHRAE Standard 199-2016 test procedure includes six stages as outlined in Figure 1 below



Figure 1. Schematic showing sequence of test stages



Stage 1: Initial Dust Loading

This stage loads dust collector to a predetermined differential pressure (dP) with no pulse cleaning.

Stage 2: Initial Dust Loading with On-Demand Cleaning

This stage starts the pulse cleaning system in the “On-Demand” interval where the cleaning frequency is determined by a High dP and Low dP and this stage lasts for 4 hours.

Stage 3: Initial Dust Loading with Continuous Cleaning

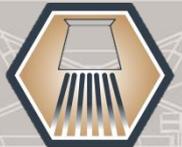
This stage changes the pulse cleaning frequency to a continuous operation and lasts for 24 hours or until a predetermined maximum differential pressure is reached.

Stage 4: Final Dust Loading with On-Demand Cleaning

This second, longer On-Demand cleaning stage lasts for 20 hours.

Stage 5: Up-Set Condition

This stage turns the cleaning system off and continues to feed the dust until the differential pressure reaches 10 inches of water gage (inWG).



Stage 6: Post Up-Set Condition

This final stage reduces the airflow to 25% specified airflow, pulses each filter 10 times and then returns the air flow to 100% specified airflow.

While the testing process and stages are defined by the standard, many testing parameters are specified by the test requestor and can influence the performance results. The parameters specified by the test requestor include:

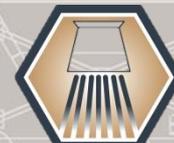
- ❖ Specified Airflow – Actual Cubic Feet per Minute (ACFM)
- ❖ Filter Media – Square Feet (ft²) and resulting Air-to-Cloth Ratio
- ❖ Pulse Cleaning System High & Low Differential Pressure Set Points – inches of Water Gage (inWG)
- ❖ Off Time delay between pulses – seconds (s)
- ❖ On Time pulse duration – milliseconds (ms)
- ❖ Pulse cleaning system pressure – pounds per square inch (psi)
- ❖ Pulse cleaning system air consumption – Cubic Feet (ft³)

Once the testing has been completed per the standard, the parameters and data are presented in table and graphical form in a format prescribed by ANSI/ASHRA 199-2016 and an example report is shown in Figures 2 through Figure 4.



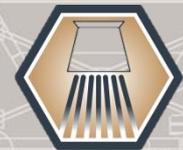
Company Logo		Report No.	
		Review 12-16-2014	
Company Address		Date:	Page:
Company Address		12/14/2014	1 of 3
Requestor Information			
Requestor	ASHRAE 199 Review Committee		
Device Under Test - Test Conditions			
Pulse Cleaned Dust Collector Information		Filter Information	
Manufacturer	Equipment Manufacturer	Manufacturer	Sample
Product Name	Equipment Product Name	Product Name	Canister
Tested Airflow (CFM)	1760	Part Number	Sample PN
Performance Summary (Last 4 hours of Stage 4)			
Emissions¹ (mg/m³)	Differential Pressure Average² ("wg)	Air Consumption³ (ft³/1000ft³)	
Not Available	3.14	0.078	
¹ Average PM ₁₀ emissions			
² Average of tubesheet differential pressure			
³ Compressed air usage rate (cubic feet of compressed air per 1000 cubic feet of cleaned air)			
Full Test Summary			
Differential Pressure and Photometric Emissions			
Disclaimer: Actual dust collector performance may vary depending upon multiple factors. See page three for full details.			

Figure 2. Example of Completed Test Report Page 1



Company Logo		Report No.				
		Review 12-16-2014				
Company Address		Date:		Page:		
Company Address		12/14/2014		2 of 3		
Requestor Information						
Company		Your Company Name				
Address		Your Address				
Phone Number		Your Phone Number				
Contact & Email		ASHRAE 199 Review Committee / Your e-mail				
Device Under Test						
Collector Information			Filter Information			
Manufacturer		Equipment Manufacturer		Manufacturer		
Serial Number		146577-001-1		Part Number		
Product Name		Equipment Product Name		Product Name		
Pulse Clean System (PCS) Information			Media Type			
No. Pulse Valves		Valves Pulse/cycle		Synthetic		
PCS Volume (ft ³)		Stated Interval (min)		Media Area (ft ²)		
0.18		1		256		
Initial PCS Pressure (PSI)		Actual Interval (min)		No. of Filters		
100		1		4		
Post Pulse PCS Pressure (PSI)		Stated Duration (ms)		Additional Info		
40		150				
Compressed Air/Pulse (ft ³)		Actual Duration (ms)				
0.73		100		ASHRAE 199 Test run #2		
Compressed Air/cycle (ft ³)		2.92				
Test Conditions						
Ambient Lab Conditions			Requestor Variables - Set by Customer			
Temperature (min max avg) (°F)		70.0 90.0 86.9		Tested Airflow (CFM)		
Rel. Humidity (min max avg) (%RH)		39.0 52.0 42.5		High / Low Set Points ("wg)		
Baro. Pressure (min max avg) ("Hg)		2.53 29.74 29.56		Up-Set Max ΔP ("wg)		
				10		
Test Dust						
Calcium Carbonate			Concentration (grain/ft ³)		1	
Test Results						
	Initial Dust Loading	Initial On-Demand Cleaning	Continuous Cleaning	Final On-Demand Cleaning	Up-Set Condition	Post Up-Set Condition
Stage	1	2	3	4	5	6
Duration (hrs)	3.08	4.00	24.00	20.73	1.02	1.30
Dust Fed (lbs)	46.50	60.32	361.91	312.65	15.33	17.59
No. of Pulses	-	8	86400	149	-	41
Total Air Usage (ft ³)	-	6	63032	109	-	30
Gravimetric Eff. (%)	88.27%		98.83%	99.41%	99.41%	-
PM _{2.5} Avg (mg/m ³)	0.122	0.070	0.151	0.003	0.001	0.010
PM _{2.5} Avg (mg/m ³)	0.122	0.070	0.151	0.003	0.001	0.010
PM ₁₀ Avg (mg/m ³)	0.122	0.070	0.151	0.003	0.001	0.010
Cumulative Data			Filter ΔP Data			
Total Test Duration (hrs)		54.1		Initial Filter ΔP ("wg)		
Total Dust Fed (lbs)		814.3		Avg. Pressure ("wg) Stage 3		
Total Number of Pulses		86598		0.29		
				0.91		

Figure 3. Example of Completed Test Report Page 2.



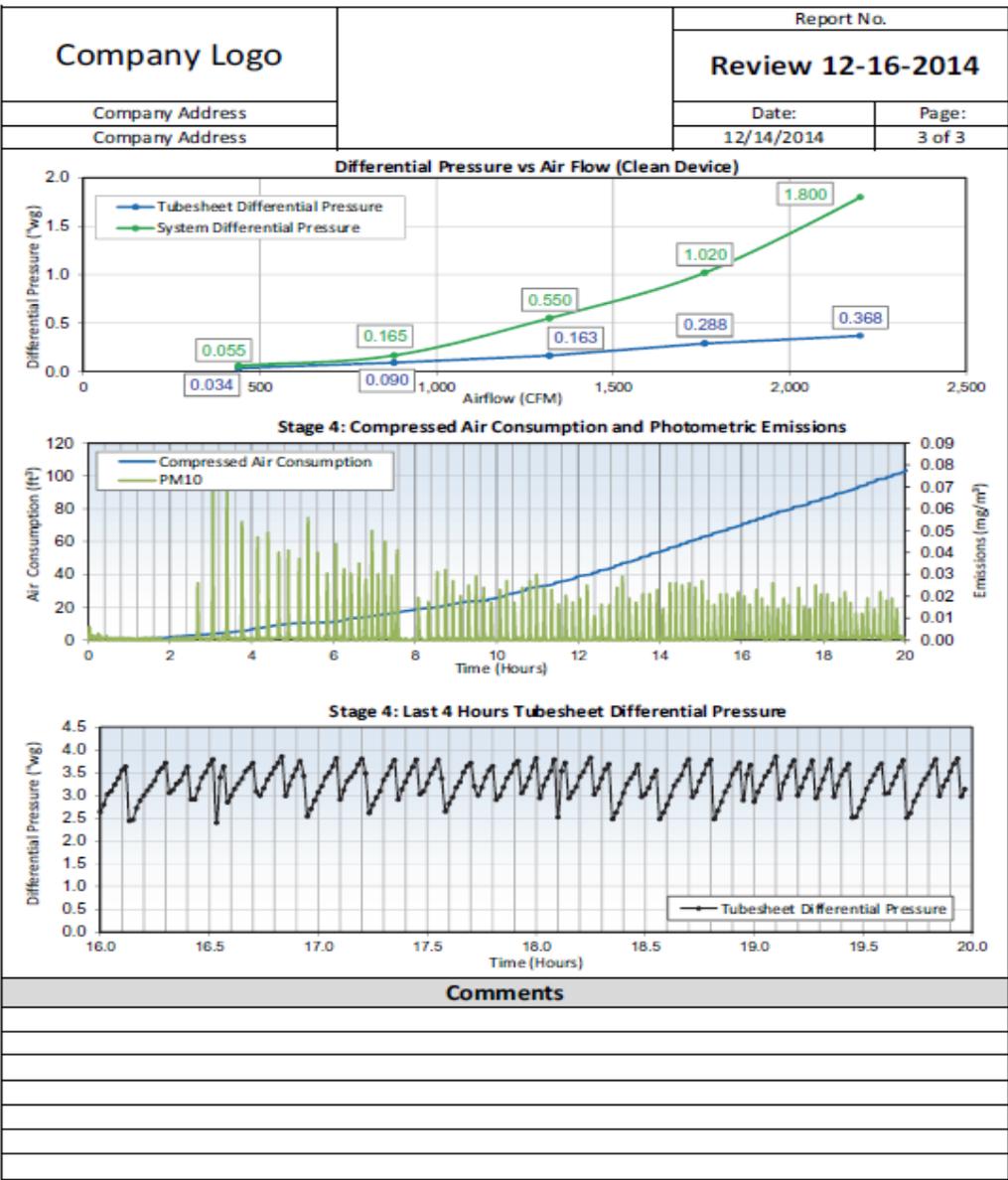


Figure 4. Example of Completed Test Report Page 3.

