

	<b>Manufacturer:</b>		<b>Date:</b>		
	<b>Laboratory Name:</b>		<b>Inspected By:</b>		
	<b>Laboratory Address:</b>		<b>Type of tests performed:</b>		
	<b>Manufacturer's Contacts Associated with this Checklist:</b>				
		<b>Information &amp; Comments</b>	<b>Regulations</b>	<b>Audit Observations</b>	<b>Manufacturer's Follow-up Action</b>
<b>1</b>	<b>Laboratory Equipment Description</b>				
1.1	Dynamometer - make & model		§1065.110		
1.2	Exhaust Analyzers make, model		§1065 subpart C		
1.3	Gas Divider make & model				
1.4	Sample collection				
	Batch sampling containers	Material, number			
	Heated sample lines		§1065.145(c)		
	Sample line path	Length kept to a minimum? 90° Bends avoided? Good engineering judgement exercised?	§1065.145(c)		
1.5	CVS Considerations				
	Make & model				
	Dilution ratio				
	Pressure control	Static pressure within ±1.2 kPa at initial dilution point?	§1065.140(c)(2)		
	Temperature control	Dilution air temp?	§1065.140(a)		
1.6	Mixing	Calculated Re of diluted exhaust stream >4000?	§1065.140(c)(3)		
	Flow measurement	Does flow measurement device meet §1065.240? How is aqueous condensation addressed upstream of flow measurement? Are there any preconditioning devices?	§§1065.140(c)(4)-(6)		
	Flow compensation method	How is a nominally constant flow maintained?	§1065.140(c)(7)		
1.7	Dilution Air				
	How is dilution air preconditioned?	Filters, etc			

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1.8	Dilution Air Particulate measurement	How is it controlled? What is HC background level?	§1065.140		
	Filter specifications	47mm OD? PTFE?	§1065.170(c)		
	Dilution ratio	Primary DR at least 2:1; overall 5:1 - 7:1? Proportionality check	§1065.140(e)(2)		
	Filter loading	What is the expected filter loading?	§1065.170(a)(2)		
	Sample temperature	Filter face temp 47±5°C?	§1065.140(e)(4)		
	Filter face velocity	Basis for expecting near 100 cm/s?	§1065.170(c)(1)(vi)		
	Is a pre-classifier used?	If so, what type?			
	PM Sample Handling	Filter holder specifications meeting 1065? Leak check method? Filter/sample storage?	§1065.170(c)		
	Filter conditioning	Min 30 minutes in env meeting §1065.190?	§1065.590(e)		
	Measurement specifications		§1065.190(f)		
	Measurement report	Report supplied including pre/post weights, reference filter weight, times, etc?	§1065.590		
<b>2</b>	<b>Gas Audit:</b>				
2.1	Analyze EPA-supplied gases:	As lab injects gas, observe the gas flow and pressures for zero, span and audit gas. All should flow at the same pressure and flow rate. Analyzers should read EPA gases within 2%.			
2.2	Engine Intake Air	How are humidity, temperature, HC, CO, Nox, etc. controlled?	§1065.125		
2.3	Zero gas for analyzers	Check pressure & expiration date; must have ≤ 1ppmC, ≤1ppm CO; ≤400ppm CO <sub>2</sub> , ≤0.1ppm Nox.	§1065.750		
2.4	Nitrogen for analyzers	Check pressure & expiration date; must have ≤ 1ppmC, ≤1ppm CO; ≤400ppm CO <sub>2</sub> , ≤0.1ppm Nox.	§1065.750		
2.5	Lab Calibration/Span Gases:	Check pressure & expiration date; 200 psi min	§1065.750		
<b>3</b>	<b>Calibration Equipment:</b>				
3.1	Gas Divider	Every 370 days; calib 15,30,45,60,75,90% on all ranges; rename all span gases initially & if monthly curve changes; recheck w/15-50% gas;	§1065.248; §1065.307 §1065.750		
<b>4</b>	<b>Exhaust Calibration Records:</b>				
4.1	HC analyzer methane response	185 Days: FID response to methane, ethanol	§1065.360		
4.2	HC analyzer linearity	35 Days: calibrate each range w/gas divider (±2% each point)	§1065.307		
4.3	CH <sub>4</sub> analyzer linearity	35 Days: calibrate each range w/gas divider (±2% each point)	§1065.307		
4.4	CO analyzer linearity	35 Day: calibrate each range w/gas divider (±2% each point)	§1065.307		
4.5	CO analyzer interference	After installation and major maintenance: water vapor & CO <sub>2</sub> interference (<1% or 3ppm);	§1065.355		

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4.6	CO <sub>2</sub> analyzer linearity	35 Day: calibrate each range w/gas divider ( $\pm 2\%$ each point)	§1065.307		
4.7	CO <sub>2</sub> analyzer interference	After installation and major maintenance: water vapor interference (<1% or 3ppm);	§1065.350		
4.8	NOx analyzer linearity	35 Day: calibrate each range w/gas divider ( $\pm 2\%$ each point)	§1065.307		
4.9	NOx analyzer conversion verification	35 Day; Efficiency > 95% .	§1065.378		
4.9.1	O2 analyzer linearity	35 Day: calibrate each range w/gas divider ( $\pm 2\%$ each point)	§1065.307		
4.10	CVS propane injections	35 Day: one range (e.g. 100ppm) all analyzers, all commonly used venturis (may rotate venturis thru successive weeks); (+2%); Calibration report available? CFO or Mass balance calibration records?	§1065.341		
4.11	Flow meters				
	Fuel Flow (if used)	Off-site cal or through carbon/oxygen balance	§1065.320		
	Intake Flow (if used)	Off-site cal or LFE, subsonic venturi, or ultrasonic flow meter	§1065.325		
	Exhaust Flow (if used)	Off-site cal, subsonic venturi, or ultrasonic flow meter	§1065.330		
	CVS Flow	On site reference flow meter or calibration certificate	§1065.340		
4.12	Dynamometer verifications	Annually: In-line torque sensor	§1065.310		
4.13	Ambient monitors	ambient temperature, humidity	§1065.315		
4.14	Maintenance Records:	Must calibrate analyzers after maintenance. Recommend keeping a separate maintenance log.	§1065.503		
<b>5</b>	<b>Engine Setup &amp; Test Observations:</b>				
5.1	Engine serial number	POGHG766AJ, Code 1 (cert engine)			
5.2	Service accumulation				
	Method/duty cycle				
	Maintenance	Unscheduled or scheduled?			
5.3	Fuel supply temperature/pressure	Representative of in-use operation?	§1065.120(c)		
5.4	Oil/engine block cooling provisions	Are engine oil and block temperatures representative of in-use conditions?	§1065.122(a)		
5.5	Engine intake air temperature	25 $\pm$ 5°C?	§1065.125		
5.6	Intake system	Is the intake system production representative?	§1065.125(d)		
5.7	Charge air cooler	Is the CAC production representative? If not does CAC simulator meet §1065.125(e)?	§1065.125(e)		
5.8	Exhaust system	Representative of production? Are A/T devices located in production representative locations?	§1065.130		
5.9	Laboratory tubing	Minimized length between exit of in-use exhaust system or last A/T device and first point of dilution?	§1065.130(c)		
5.10	Exhaust restriction	Typical of in-use operation?	§1065.130(h)		
5.11	Crankcase emissions	Self-contained or routed to dilution tunnel?	§1065.130(i)		
5.12	Simulated inputs	Are any simulated engine loads applied during testing?	§1065.110		
	Accessories	Are all accessories present? If not, how are loads simulated?			
	Vehicle speed input	Is a simulated vehicle speed supplied?			
	Other	Are other special inputs required to simulate vehicle functionality?			

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5.13	Ambient conditions	Approximate temperature, pressure, and RH during testing			
5.14	Regeneration identification	How are regeneration events identified during testing?			
5.15	Low idle speed & torque?				
5.16	Maximum test speed	Observed or declared?			
5.17	A, B, C Speeds				
<b>6</b>	<b>Test Validation</b>				
6.1	Transient cycle trace	Review a speed-load trace	§1065.514		
6.2	Cycle validation report	Does test meet cycle regression statistics? Is report available?	§1065.514		
6.3	Analyzer range, drift validation, and drift correction	±4% uncorrected vs corrected	§1065.550		
6.4	Proportional sampling validation	SEE <3.5% of mean sample flow rate or each flow rate within 2.5% of mean or target flow rate. Is report available?	§1065.545		
<b>7</b>	<b>Calculations</b>				
7.1	Emission Calculations:	Review calculations. Calcs should not use negative emission (bag) values.	§1065 subpart G		
7.2	Brake specific calculation method	Total mass divided by total work?	§1065.650		
7.3	NOx Correction Factor (K <sub>N</sub> )	$K_N = 1 / (9.953 \times X_{H_2O} + 0.832)$ ?	§1065.670		
<b>8</b>	<b>Test Results</b>				
8.1	QA/QC Documentation	How are tests reviewed for accuracy, completeness?			
8.2	Torque/power				
8.3	Maximum test speed	Is the maximum test speed calculated correctly?	§1065.610		
8.4	Speed vs torque map	Has report been supplied including a speed vs torque map?	§1065.510		
8.5	Test Report	Has a test report been supplied including emission results for each test cycle/test interval?			
8.6	Final calculated emissions	Do emissions results indicated compliance with standards (with DFs and IRAFs applied)? [EPA calculated]			
<b>9</b>	<b>Fuel Analysis</b>	monthly; Obtain copy of lab fuel analysis; Take fuel samples of test fuel.	§1065.710		
<b>10</b>	<b>DEF Analysis</b>				
10.1	AUS32	Commerical brand meeting ISO-22241?			
10.2	Urea concentration	31.8 < Urea Concentration < 33.2%	ISO22241-2 Annex C		
10.3	Sample drawn	1L sample taken for full chemical analysis?			
<b>11</b>	<b>Other/General Observations</b>				
	DEF Dosing				
	NTE Point Evaluation				