



ATDS Emission Lab Test Report

for Exhaust Emission Test Procedures according

Date:	2/24/2023	Start Time:	9:05:09
Test Number:	ONT3_004932	End Time:	10:49:04
Test Vehicle:	3225_GCRXT03.05PV_75		
Test Legislation:	EPA1066		
Test Cycle:	FTP75		
Test Purpose:	Certification		
Test Cell:	iGEM-V-TC1		
Order Number:	3225		
Remark:	Consent Decree		



QUALITY ASSURANCE

INSPECTED BY: ^{REDACTED} _____

DATE: 2/28/2023 _____

COMMENTS: OK _____

General Data

Test Number	ONT3_004932		
Test Name	FTP75		
Test Cell	iGEM-V-TC1		
Test Type	FTP75		
Legislation	EPA1066		
Requirements (Bag)	CERTIFICATION		
Requirements (Modal)	CERTIFICATION		
Date	2/24/2023	CH ₄ Response Factor	
Test Start	9:05:09	Odometer Position ^[mi]	93094
Start Time Cycle	2023-02-24 09:25-28-(000)	Delay Time Method	
Test End	10:49:04		
Operator	REDACTED	Air Condition	OFF
Driver	REDACTED	Particle Measurement	USUAL
Shiftable	Auto		
Flow Stream	ModalDirty		
Calibrated Ranges	autorange		
Remark	Consent Decree		

Vehicle Data **3225_GCRXT03.05PV_75**

Manufacturer	CHEROKEE	Displacement	
Vehicle Model	REDACTED	Engine Family	GCRXT03.05PV
Order Number	3225	Manufacturer	JEEP
Test Group	3225_GCRXT03.05PV_75	Transmission	Automatic
Evaporative Family		Engine Code	

Dyno Data **3225**

Dyno Type	SVOR	Inertia ^[lb]	5500.00
	A ^[lb]	B ^[lb/mph]	C ^[lb/mph²]
Street Load	73.250	-0.29150	0.036730
Road Load	30.300	-0.10700	0.032700

Fuel Data **Diesel-S-000266**

Fuel Type	DIESEL	Fuel Temperature ^[°C]	15.00
Fuel Analyze Date		Fuel Density ^[kg/l]	0.8540
Fuel Manufacturer		Net Heat. Val. ^[BTU/lb]	18382
Fuel Tank Number		Carb. Weight Frac.	0.8700
Fuel Charge		HC Ratio	1.7945
Remarks:		OC Ratio	-1.0000

Weather Limit Data

Temp Min ^[deg F]	68.00	Dew Point Max ^[deg F]	100.00
Temp Max ^[deg F]	86.00	Pressure Min ^[mbar]	800.0
Dew Point Min ^[deg F]	15.01	Pressure Max ^[mbar]	1100.0

Fan Speed Data **RoadSpeed**

F1 ^[%]	F2 ^[%/mph]	F3 ^[%/mph²]
5	0.745999992	0.0031

Test Data FTP75 Operator **REDACTED** Speed Table Date: 2/24/2023
Test Number ONT3_004832 Driver Shift Table Auto Cold Start

Vehicle	REDACTED	Dyno	Fuel	Test Timing
Vehicle #	REDACTED	Inertia ^(lb) 5500.00	Diesel-S-000266	Start Time 9:05:09
Model	CHEROKEE	A ^(lb) 30.300	Fuel type DIESEL	End Time 10:49:04
Year	2016	B ^(lb/mph) -0.10700	Density 0.8540	
Displacement:		C ^(lb/mph²) 0.032700	NHV 16362	Soak Time 575.1
Engine Family	GCRXT03.05PV		CWF 0.8700	
Trans	Automatic	Flow Stream ModalDirty		
Odometer ^(mile)	93094	Remark Consent Decrease		

Bag Analysis

PHASE 1	THC ^(ppmC)	CO ^(ppm)	CO ₂ ^(%)	NO _x ^(ppm)	N ₂ O ^(ppm)	CH ₄ ^(ppm)	NMHC ^(ppm)	Temp. ^(°F)	Volume ^(scf)
Range	100	50	4	30		30		80.33	3178
Zero Read	0.00	0.0	0.0	0.0		0.0		Press. ^(inHg) 29.02	D.F. 12.09
Span Read	93.11	46.53	3.721	28.010		27.600		RH ^(%) 24.84	Ph. Start ^(s) 0.1
Sample	9.56	37.25	1.025	4.288		2.599	9.564	AH ^(%/hr) 5.606	Ph. End ^(s) 505.7
Mass.	0.500	3.932	1700.317	0.637		0.157	0.497	Dist. ^(m) 3.60	Ph. Length ^(s) 505.6
Mass per Dist.	0.1391	1.0936	472.852	0.1770		0.0437	0.1381	NO _x Corr. 0.8562	Bag An. Del 2610
PSS Massflow Particles [g/h]	0.0291							Dr. Viola 0	Vio. Durat ^(s) 0.0
			PSS Mass per Dist. [g/mile]				0.0011	Crank ^(s) 0.70	FE ^(miles/gal) 21.4
PHASE 2	THC ^(ppmC)	CO ^(ppm)	CO ₂ ^(%)	NO _x ^(ppm)	N ₂ O ^(ppm)	CH ₄ ^(ppm)	NMHC ^(ppm)	Temp. ^(°F)	Volume ^(scf)
Range	100	50	1	30		30		80.18	4454
Zero Value	0.00	0.0	0.0	0.0		0.0		Press. ^(inHg) 29.02	D.F. 19.12
Span Value	93.11	46.54	0.931	27.970		27.600		RH ^(%) 27.93	Ph. Start ^(s) 505.9
Sample	4.45	0.19	0.666	0.023		3.899	4.450	AH ^(%/hr) 6.279	Ph. End ^(s) 1375.8
Mass.	0.326	0.028	1550.268	0.005		0.331	0.324	Dist. ^(m) 3.89	Ph. Length ^(s) 869.3
Mass per Dist.	0.0838	0.0072	398.040	0.0012		0.0849	0.0831	NO _x Corr. 0.8728	Bag An. Del 2339
PSS Massflow Particles [g/h]	0.0046							Dr. Viola 0	Vio. Durat ^(s) 0.0
			PSS Mass per Dist. [g/mile]				0.0003	Crank ^(s) 0.70	FE ^(miles/gal) 25.5
PHASE 3	THC ^(ppmC)	CO ^(ppm)	CO ₂ ^(%)	NO _x ^(ppm)	N ₂ O ^(ppm)	CH ₄ ^(ppm)	NMHC ^(ppm)	Temp. ^(°F)	Volume ^(scf)
Range	100	50	1	30		30		79.00	3161
Zero Value	0	0.0	0.0	0.0		0.0		Press. ^(inHg) 29.01	D.F. 16.57
Span Value	93.11	46.53	0.931	27.970		27.600		RH ^(%) 31.32	Ph. Start ^(s) 1948.9
Sample	5	2.07	0.828	0.697		3.983	4.892	AH ^(%/hr) 6.782	Ph. End ^(s) 2454.1
Mass.	0.254	0.217	1355.519	0.106		0.239	0.253	Dist. ^(m) 3.60	Ph. Length ^(s) 505.4
Mass per Dist.	0.0706	0.0603	378.988	0.0295		0.0665	0.0701	NO _x Corr. 0.8256	Bag An. Del 1859
PSS Massflow Particles [g/h]	0.0208							Dr. Viola 0	Vio. Durat ^(s) 0.0
			PSS Mass per Dist. [g/mile]				0.0008	Crank ^(s) 0.30	FE ^(miles/gal) 26.8

Total Result (weighted)

Weighted	THC ^(g/mile)	CO ^(g/mile)	CO ₂ ^(g/mile)	NO _x ^(g/mile)	N ₂ O ^(g/mile)	CH ₄ ^(g/mile)	NMHC ^(g/mile)	HC+NO _x ^(g/mile)	Fuel Economy
Mass per Dist.	0.0916	0.2460	408.26	0.0453		0.0713	0.0909	0.13697	mile/gal 24.88
Mass per Dist. (rounded)	0.0916	0.2460	408.3	0.0453		0.0713	0.0909	0.1369	
Mass per Dist. - Particulate PSS	0.0005								

Test Data: FTP75
Test Number: ONT3_004932

Operator: **REDACTED**
Driver:

Date: 2/24/2023

Driver Violations

	<u>Phase1</u>	<u>Phase2</u>	<u>Phase3</u>
Number of Violations	0	0	0
Duration of Violations	0.0	0.0	0.0

Number	Phase	Violation Begin (s)	Violation End (s)	Violation Duration (s)	Scheduled Speed (mph)	Max Speed Deviation (mph)
No Violations In This Test						



Phase 1

Analyzer Adjust

	Range Number	Range ppm	Zero Value ppm	Zero Set Value ppm	Zero Offset %	Span Value ppm	Span Set Value ppm	Span Offset %	ReZero Value ppm
CO ₂ (%)	2	4	0.00	0.00	0.01	3.72	3.72	0.00	0.00
CO	1	50	0.04	0.00	0.09	46.53	46.56	-0.06	0.01
NO _x	1	30	0.00	0.00	0.01	28.01	27.97	0.13	0.01
THC (ppmC1)	2	100	0.00	0.00	0.00	93.11	93.11	0.00	0.11
CH ₄	1	30	0.00	0.00	0.00	27.60	27.60	0.00	0.00

Analyzer Check

	Range Number	Range ppm	Zero Value ppm	Zero Set Value ppm	Zero Drift %	Span Value ppm	Span Set Value ppm	Span Drift %
CO ₂ (%)	2	4	0.00	0.00	-0.01	3.72	3.72	-0.01
CO	1	50	0.01	0.00	0.00	46.48	46.56	-0.10
NO _x	1	30	0.01	0.00	-0.01	28.05	27.97	0.12
THC (ppmC1)	2	100						
CH ₄	1	30	0.00	0.00	0.00	27.58	27.60	-0.07

Phase 2

Analyzer Adjust

	Range Number	Range ppm	Zero Value ppm	Zero Set Value ppm	Zero Offset %	Span Value ppm	Span Set Value ppm	Span Offset %	ReZero Value ppm
CO ₂ (%)	1	1	0.00	0.00	0.01	0.93	0.93	0.00	0.00
CO	1	50	-0.02	0.00	-0.04	46.54	46.56	-0.04	0.00
NO _x	1	30	-0.03	0.00	-0.10	27.97	27.97	0.00	0.00
THC (ppmC1)	2	100	0.00	0.00	0.00	93.11	93.11	0.00	0.03
CH ₄	1	30	0.00	0.00	0.00	27.60	27.60	0.00	0.00

Analyzer Check

	Range Number	Range ppm	Zero Value ppm	Zero Set Value ppm	Zero Drift %	Span Value ppm	Span Set Value ppm	Span Drift %
CO ₂ (%)	1	1	0.00	0.00	0.00	0.93	0.93	-0.46
CO	1	50	0.00	0.00	0.05	46.50	46.56	-0.09
NO _x	1	30	0.00	0.00	0.00	27.97	27.97	0.00
THC (ppmC1)	2	100						
CH ₄	1	30	0.00	0.00	0.00	27.59	27.60	-0.03

Phase 3

Analyzer Adjust

	Range Number	Range ppm	Zero Value ppm	Zero Set Value ppm	Zero Offset %	Span Value ppm	Span Set Value ppm	Span Offset %	ReZero Value ppm
CO ₂ (%)	1	1	0.00	0.00	0.02	0.93	0.93	0.01	0.00
CO	1	50	0.05	0.00	0.10	46.53	46.56	-0.06	0.03
NO _x	1	30	-0.01	0.00	-0.05	27.97	27.97	0.00	0.00
THC (ppmC1)	2	100	0.00	0.00	0.00	93.11	93.11	0.00	0.03
CH ₄	1	30	0.00	0.00	0.00	27.60	27.60	0.00	0.00

Analyzer Check

	Range Number	Range ppm	Zero Value ppm	Zero Set Value ppm	Zero Drift %	Span Value ppm	Span Set Value ppm	Span Drift %
CO ₂ (%)	1	1	0.00	0.00	-0.01	0.93	0.93	-0.29
CO	1	50	0.07	0.00	0.07	46.52	46.56	-0.02
NO _x	1	30	0.00	0.00	-0.01	27.99	27.97	0.07
THC (ppmC1)	2	100	0.03	0.00	0.02	93.15	93.11	0.05
CH ₄	1	30	0.00	0.00	0.00	27.57	27.60	-0.10

Operator **REDACTED** Driver **REDACTED** Customer : 3225
 Test Purpose: Certification Legislation: EPA1066 Requirements (Req) CERTIFICATION
 Conditioning: Emission Standards Default
 Test Intent: Consent Decree

VIN **REDACTED**

DYNO Data

	Road Load	Street Load				
Inertia [lb]	5500.00					
A [N]	134.781	325.832				
B [N/km/h]	-0.29575	-0.80571				
C [N/km2/h2]	0.056161	0.063083				
			Phase1	Phase2	Phase3	Phase4
Distance (m)						Weighted
Target			5779.15	6210.96	5779.14	17769.25
Driven			5786.54	6267.54	5798.52	17852.60
Distance Rating (%)			0.1278	0.9110	0.3353	0.4690
Cycle Energy (MJ)						
Target			4.74	4.38	4.74	9.12
Driven			4.74	4.59	4.80	9.36
Distance per Energy Cycle (m/MJ)						
Target			4.74	4.38	4.74	1314.79
Driven			4.74	4.59	4.80	1288.47
Road Load Work Fraction						
Target			0.4745	0.3655	0.4745	0.4221
Driven			0.4775	0.3493	0.4876	0.4176
Inertial Work (MJ)						
Target			2.49	2.78	2.49	5.27
Driven			2.48	2.99	2.46	5.45
Inertial Work Fraction						
Target			0.5255	0.6345	0.5255	0.5779
Driven			0.5225	0.6507	0.5124	0.5824
Inertial Work Rating (%)			-0.5696	7.4410	-1.3013	3.4597
Absolute Speed Change (m/s)						
Target			204.88	340.91	204.88	545.78
Driven			204.34	356.27	203.35	560.04
Absolute Speed Change Rating (%)			-0.2634	4.5057	-0.7468	2.6121
Energy Rating (%)			-0.0096	4.7614	1.2147	1.9177
Energy Economy Rating (%)			-0.1374	3.6754	0.8689	2.0018

Operator **REDACTED** Driver **REDACTED** Customer : 3225
 Test Purpose: Certification Legislation **EPA1066** Requirements (Bag) **CERTIFICATION**
 Conditioning: Emission : Default

Overall Status **Passed**

Phase 1

Test Record #: ONT3_004932

Vehicle ID: **REDACTED**

	<u>Average</u>	<u>Min</u>	<u>Max</u>	<u>Low Limit</u>	<u>Upper Limit</u>	<u>Status</u>
General						
Cell Temperature (°C)	26.85	26.70	27.00	20.00	30.00	Passed
Barometer (mbar)	982.68	982.60	982.80	800.00	1100.00	Passed
Dew Point Temperature (°C)	5.08	5.00	5.20	-9.44	37.78	Passed
Specific Humidity Test Cell (gr/lb)	39.24	38.99	39.61	38.50	87.50	Passed
Dilution Air Temperature (°C)	34.41	33.75	35.15	15.00	52.00	Passed
Weighted Test Dilution Factor (-)	15.97			7.00	20.00	Passed
Dilution Factor (-)	12.69			7.00	20.00	Passed
Fuel Economy (mpg)	21.42			10.00	50.00	Passed
Zero Offset (%)	-	0.00	0.09	-2.00	2.00	Passed
Span Offset (%)	-	-0.06	0.13	-2.00	2.00	Passed
Zero Check Drift (%)	-	-0.01	0.00	-2.00	2.00	Passed
Span Check Drift (%)	-	-0.10	0.12	-2.00	2.00	Passed
Bag vs. Modal Validation (CO2) (%)	n.a.	-	-	-10.00	10.00	Passed
Ambient Concentrations						
HC (ppm)	3.93			2.00	10.00	Passed
NO _x (ppm)	0.05			-0.10	10.00	Passed
CO (ppm)	0.81			0.00	15.00	Passed
CO ₂ (ppm)	465.26			300.00	650.00	Passed
CH ₄ (ppm)	2.09			1.30	10.00	Passed
N ₂ O (ppm)				0.20	0.50	Passed
PM Filter Parameters						
Particulate Filter Temperature (°C)	50.07	48.15	51.65	42.00	60.00	Passed
Filter Face Velocity (cm/s)	90.33			0.00	100.00	Passed
Particulate Result Validation (ug)	21.00			1.00	600.00	Passed
Test-Cycle Specific Validations						
Phase Distance (miles)	3.60			3.52	3.66	Passed
Sample Phase Time (s)	506.6			503.6	507.6	Passed
Duration Phase 1 (s)	505.60					NA
Crank Time Phase1 (s)	0.70			0	5	Passed
Crank Time Phase3 (s)	0.30			0	5	Passed
Crank Counts	1			0	1	Passed
Shutdown Time Phase 1				0	5	Passed
Shutdown Time Phase 3				0	5	Passed
Hot Soak Time (s)	575.10			540.00	660.00	Passed
Test Hold Counts	0					Passed
Duration Test Hold (s)	0.00			0	60	Passed

Operator **REDACTED** Driver **REDACTED** Customer :
 Test Purpose: Certification Legislation **EPA1066** Requirements (Bag)
 Conditioning: Emission : Default

3225
 CERTIFICATION

Phase 2

Overall Status **Passed**

	<u>Average</u>	<u>Min</u>	<u>Max</u>	<u>Low Limit</u>	<u>Upper Limit</u>	<u>Status</u>
General						
Cell Temperature (°C)	26.77	26.10	27.30	20.00	30.00	Passed
Barometer (mbar)	982.57	982.40	982.70	800.00	1100.00	Passed
Dew Point Temperature (°C)	6.60	5.00	9.40	-9.44	37.78	Passed
Specific Humidity Test Cell (gr/lb)	43.95	39.02	52.93	38.50	87.50	Passed
Dilution Air Temperature (°C)	35.55	34.55	36.05	15.00	52.00	Passed
Dilution Factor (-)	19.12			7.00	20.00	Passed
Fuel Economy (mpg)	25.55			10.00	50.00	Passed
Zero Offset (%)	-	-0.10	0.01	-2.00	2.00	Passed
Span Offset (%)	-	-0.04	0.00	-2.00	2.00	Passed
Zero Check Drift (%)	-	0.00	0.05	-2.00	2.00	Passed
Span Check Drift (%)	-	-0.46	0.00	-2.00	2.00	Passed
Bag vs. Modal Validation (CO2) (%)	n.a.			-10.00	10.00	Passed
Ambient Concentrations						
HC (ppm)	3.94			2.00	10.00	Passed
NO _x (ppm)	0.01			-0.10	10.00	Passed
CO (ppm)	0.71			0.00	15.00	Passed
CO ₂ (ppm)	471.87			300.00	650.00	Passed
CH ₄ (ppm)	2.09			1.30	10.00	Passed
N ₂ O (ppm)				0.20	0.50	Passed
PM Filter Parameters						
Particulate Filter Temperature (°C)	49.25	48.15	51.65	42.00	60.00	Passed
Filter Face Velocity (cm/s)	90.19			0.00	100.00	Passed
Particulate Result Validation (ug)	7.00			2.00	600.00	Passed
Test-Cycle Specific Validations						
Phase Distance (miles)	3.89			3.78	3.94	Passed
Sample Phase Time (s)	869.3			868.1	872.1	Passed
Duration Phase 2 (s)	870.10					NA
Crank Time Phase1 (s)	0.7000			0	5	Passed
Crank Time Phase3 (s)	0.30			0	5	Passed
Crank Counts	1			0	1	Passed
Shutdown Time Phase 1				0	5	Passed
Shutdown Time Phase 2				0	5	Passed
Hot Soak Time (s)	575.10			540.00	660.00	Passed
Test Hold Counts	0					Passed
Duration Test Hold (s)	0.00			0	60	Passed

Operator
 Test Purpose:
 Conditioning:

REDACTED
 Certification

Driver **REDACTED**
 Legislation: EPA1066
 Emission : Default

Customer :
 Requirements (Bag)

3225
 CERTIFICATION

		Phase 3					Overall Status
		<u>Average</u>	<u>Min</u>	<u>Max</u>	<u>Low Limit</u>	<u>Upper Limit</u>	<u>Status</u>
General							
Cell Temperature	(°C)	26.11	25.60	26.80	20.00	30.00	Passed
Barometer	(mbar)	982.36	982.20	982.50	800.00	1100.00	Passed
Dew Point Temperature	(°C)	7.79	6.60	9.20	-9.44	37.78	Passed
Specific Humidity Test Cell	(gr/lb)	47.47	43.74	52.43	38.50	87.50	Passed
Dilution Air Temperature	(°C)	34.60	33.55	35.65	15.00	52.00	Passed
Dilution Factor	(-)	15.57			7.00	20.00	Passed
Fuel Economy	(mpg)	26.83			10.00	50.00	Passed
Zero Offset	(%)	-	-0.05	0.10	-2.00	2.00	Passed
Span Offset	(%)	-	-0.06	0.01	-2.00	2.00	Passed
Zero Check Drift	(%)	-	-0.01	0.07	-2.00	2.00	Passed
Span Check Drift	(%)	-	-0.29	0.07	-2.00	2.00	Passed
Bag vs. Modal Validation (CO2)	(%)	n.a.	-	-	-10.00	10.00	Passed
Ambient Concentrations							
HC	(ppm)	3.83			2.00	10.00	Passed
NO _x	(ppm)	0.02			-0.10	10.00	Passed
CO	(ppm)	0.59			0.00	15.00	Passed
CO ₂	(ppm)	485.14			300.00	650.00	Passed
CH ₄	(ppm)	2.10			1.30	10.00	Passed
N2O	(ppm)				0.20	0.50	
PM Filter Parameters							
Particulate Filter Temperature	(°C)	49.62	48.15	51.65	42.00	60.00	Passed
Filter Face Velocity	(cm/s)	90.08			0.00	100.00	Passed
Particulate Result Validation	(ug)	15.00			2.00	600.00	Passed
Test-Cycle Specific Validations							
Phase Distance	(miles)	3.60			3.52	3.66	Passed
Sample Phase Time	(s)	505.4			503.2	507.2	Passed
Duration Phase 3	(s)	505.20					NA
Crank Time Phase1	(s)	0.7000			0	5	Passed
Crank Time Phase3	(s)	0.30			0	5	Passed
Crank Counts		1			0	1	Passed
Shutdown Time Phase 1					0	5	
Shutdown Time Phase 3					0	5	
Hot Soak Time	(s)	575.10			540.00	660.00	Passed
Test Hold Counts		0					Passed
Duration Test Hold	(s)	0.00			0	60	Passed