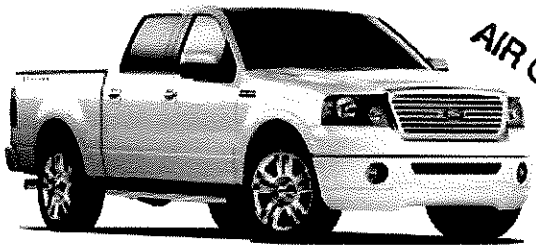
Ford Dearborn Assembly Plant
Dearborn, Michigan



Environmental Testing Program – January 2016

Clearcoat Booth and Oven Capture Efficiency

Prepared By:

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1.0 Executive Summary

JLB Industries, LLC completed a compliance environmental testing program on January 24, 2016 at the Ford Dearborn Assembly Plant (DAP) facility in Dearborn, Michigan. The testing program included Booth Capture Efficiency (BCE) testing of the Topcoat Booth (Clearcoat zone). Determination of CE was conducted in accordance with all applicable procedures contained in USEPA document *Protocol for Determining the Daily Volatile Organic Compound Emission Rate of Automobile and Light-Duty Truck Topcoat Operations*. The test results will be used to demonstrate compliance with Auto MACT requirements and in monthly emissions compliance calculations.

Capture Efficiency values were derived using the Ford F150 truck model, which currently accounts for the majority of production volume at the facility. Personnel from the paint shop, Ford environmental staff and JLB Industries, LLC conducted the testing. These groups worked together at each stage of testing to ensure that the results were representative of production conditions. JLB Industries used a highly accurate weighing system to determine the panel weights before and after coating application.

Material samples were collected from the paint circulation tanks directly after vehicle spray out. Determination of percent solids by weight and density was performed by Advanced Technologies of Michigan laboratories, located in Livonia, Michigan.

Table 1 – Testing Results Summary

Clearcoat Booth Capture Efficiency	**43.4%**
Clearcoat Oven Capture Efficiency	**37.3%**

2.0 Introduction

JLB Industries, LLC (JLBI) was contracted by Ford Dearborn Assembly Plant (DAP) to perform a Capture Efficiency (CE) testing program on the Topcoat Booth (Clearcoat zone) at the Dearborn Assembly Plant located in Dearborn, Michigan. This testing was conducted on Ford F150 truck model on January 24, 2016.

3.0 Sampling and Analytical Procedures

Capture Efficiency Tests

A panel weigh station (PWS) was assembled at the Clearcoat Spraybooth. A precision balance with measurement capability to 0.001 gram was placed on an isolation platform inside an enclosure to minimize vibration and air movement.

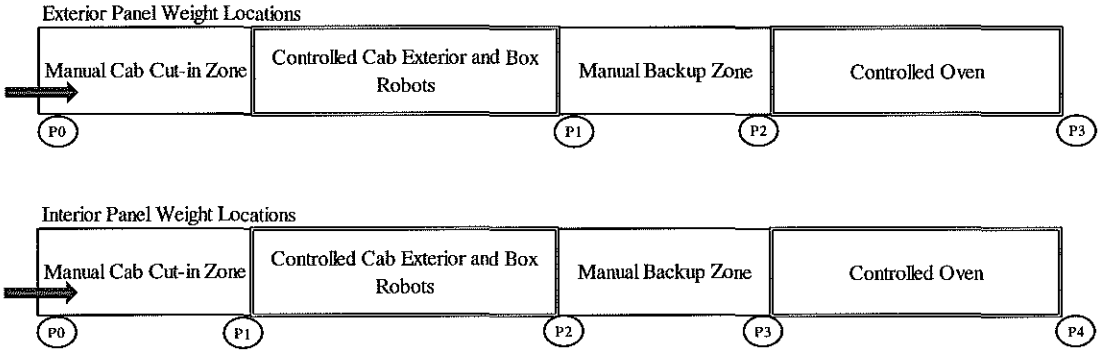
The testing conformed to the methods described in ASTM 5087-02 for solvent borne coatings. Capture Efficiency values for the controlled booth zones were calculated using the procedures outlined in the 40 CFR, Part 63.

Test panels were placed on a Ford F150 cab and box, and processed with normal production spray programming.

Four electrocoated panels were used for the manual test vehicle and five panels were used for the robotic test vehicle. Each group of test panels was weighed in four locations (see panel test diagram) to determine the relative distribution of VOC that is released in the controlled booth zones. The panels were attached to test vehicles by magnet, which allowed for removal of the wet panels with minimal disturbance to the coating during handling. Panel mounting locations were chosen to achieve a representative coating film based on the observation of normal vehicle production.

Before the panels were coated, they were marked (1, 2, 3, 4, blank) and weighed to establish the initial unpainted panel weights (P0). The panels were then attached to a test vehicle and routed through the Spraybooth. After coating, the panels were carefully removed from the test vehicle and brought to the balance for weighing immediately upon exit from the controlled booth zone (P1). Panels were weighed again before entering the controlled bake oven (P2). The panels were then placed on the test vehicle for travel through the curing oven. Upon exiting the oven, the panels were allowed to cool and then weighed a final time (P3).

Diagram 1 – Panel Testing Diagram



4.0 Test Equipment and Calibration

Panel Weigh Station

A panel weigh station (PWS) with measurement capability to 0.001 gram was used to measure panel weights. The balance was warmed up and then calibrated with a 300 gram test weight. The balance was tested with 200, 100, 50, 20, 10 and 5 gram weights before commencing weighing operations. A blank panel weight was measured at the beginning of the testing program and again at the time of each subsequent panel weight measurement. The balance was placed on an isolation platform and inside an enclosure to minimize vibration and airflow at the measurement point.

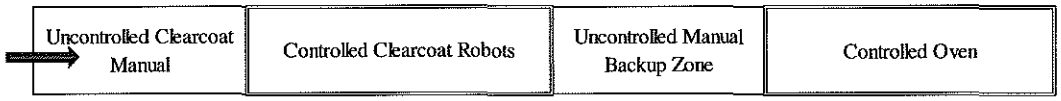
5.0 Discussion of Test Results

There were no significant disruptions to the testing program. Blank panels weighed to within 0.004 grams throughout the testing procedure.

6.0 Summary of Results

To accurately reflect the emissions being captured, separate panels were used to represent clearcoat manual cab cut-in and clearcoat cab exterior and box robots (See Diagram 2). To determine the amount of emissions captured from the clearcoat manual cab cut-in zone, panel weights were taken at the beginning & ending of the clearcoat cab exterior and box robots zone. To determine the amount of emissions captured from the clearcoat cab exterior and box robot zone, panel weights were taken at the exit of the clearcoat cab exterior and box robot zone.

Diagram 2 – Clearcoat Booth Controlled and Uncontrolled Zones



The panel testing is the procedure to measure the Section Capture Efficiency (CE) in a controlled zone from a specific spray zone. To convert to the Booth CE, the Section CE is multiplied by the ratio of paint sprayed in the spray zone. The results for each zone are then added to obtain the total Booth CE.

Paint Usage Ratio

Zone	Controlled Auto Exterior	Uncontrolled Manual
Paint Usage (cc)	3252	226
Percentage of Paint Usage	93.5%	6.5%

The results of multiplying the ratio of paint sprayed in the spray zone and the measured Section CE are shown the table below.

Overall Capture Efficiency Results

Booth Capture Efficiency

Spray Zone	Control Zone	Section CE (%)	Ratio of Paint Sprayed in Zone	Contribution to Booth CE (%)
Manual	to Auto Zone	8.2%	6.5%	0.53%
Automatic	in Auto Zone	45.9%	93.5%	42.91%
		Weighted Booth Capture Efficiency		**43.44%**

Oven Capture Efficiency

Spray Zone	Control Zone	Oven CE (%)	Ratio of Paint Sprayed in Zone	Contribution to Oven CE (%)
Manual	Oven	32.5%	6.5%	2.11%
Automatic	Oven	37.6%	93.5%	35.15%
		Weighted Oven Capture Efficiency		**37.26%**

Calculation Example:

8.2 % of the VOC applied in the manual cab cut-in zone was captured in the controlled cab exterior and box robot zone. The manual zone accounts for 6.5% of the coating application in the clearcoat booth. Thus the Manual Zone contribution to Booth CE is 0.53%.

8.2% * 6.5% = 0.53%

Table 2 -- Clearcoat Section VOC Capture Efficiency
Cab Exterior and Box Robots in Controlled Clearcoat Robot Zone

Sample	Blank Panel Weights (g)	Wet Panel Weights - Control Zone Exit (g)	Panel Weights - after bake (g)	Weight of Coating Solids Deposited (g)	Weight of VOC remaining after zone (g)	Weight of VOC remaining per Weight Solids Deposited (g)	Mass Fraction Solids	Mass Fraction VOC in Coating	Percent of VOC remaining on Panel after Zone	Booth Section Capture Efficiency (%)
Variable	P0	P1	P3	Wsdep	Wrem	Pm	Ws	Wvoc	Pvoc	CE
Formula				P3-P0	P1-P3	Wrem/Wsdep			(Pm)(Ws)/(Wvoc)	1-Pvoc
1	187.062	190.695	189.573	2.511	1.122	0.447				
2	186.189	188.838	188.081	1.892	0.757	0.400				
3	186.592	189.688	188.813	2.221	0.875	0.394				
4	186.862	189.402	188.686	1.824	0.716	0.393				
5	186.789	189.378	188.667	1.878	0.711	0.379				
Average	186.699	189.600	188.764	2.065	0.836	0.405	0.572	0.428	0.541	**45.9%**

Table 3 -- Clearcoat Section VOC Capture Efficiency
Manual Cab Cut-in in the Controlled Clearcoat Robot Zone

Solvent Loading

Sample	Blank Panel Weights (g)	Wet Panel Weights - Enter Zone (g)	Wet Panel Weights - Exit Zone (g)	Panel Weights - After Bake (g)	Weight of Coating Solids Deposited (g)	Weight of VOC available for abatement (g)	Weight of VOC available per volume of coating solids (lb/GACS)
Variable	P0	P3	P4	P5	Wcos	Wa	CL
Formula					P5-P0	P3-P4	$(W_a/W_{cos})*D_{cos}$
1	186.934	188.297	188.200	187.864	0.930	0.097	0.95
2	188.326	189.263	189.206	188.988	0.662	0.057	0.78
3	186.261	187.691	187.607	187.241	0.980	0.084	0.78
4	186.188	187.978	187.905	187.426	1.238	0.073	0.54
Average	186.927	188.307	188.230	187.880	0.953	0.078	**0.74**

Material Properties

Sample	Coating Density (lb/gal)	Mass Fraction Solids	Volume Fraction Solids	Average Film Build Thickness (mil)	VOC mass fraction	Solids Density (lb/gal)
Variable	W_c	W_s	V_s	mil	W_{voc}	D_{cos}
Formula						(Ws*Wc)/Vs
Prime	8.26	0.5720	0.5196	1.1	0.4280	9.09

Capture Efficiency

Mass Fraction VOC in Coating	Coating Density (lb/gal)	Mass VOC per Volume Coating (lb/gal)	Transfer Efficiency (%)	Volume Fraction Solids	Volume Solids Deposited per Volume Coating Sprayed	Panel Test Result (lb VOC/ gal Solids)	Booth Section VOC Capture Efficiency (%)
W_{voc}	D_c	VOC	TE	V_s	V_{sdep}	P	CE
		(Dc)(Wvoc)			$(V_s)(TE)$		$(P)(V_{sdep})(100)/(VOC)$
0.4280	8.26	3.535	75.0%	0.5196	0.390	0.74	**8.2%**

Table 4 -- Clearcoat Oven VOC Capture Efficiency

Exterior Cab and Box Robots to Oven

Oven Solvent Loading

Sample	Blank Panel Weights (g)	Wet Panel Weights - Before Bake (g)	Panel Weights - after bake (g)	Weight of Coating Solids Deposited (g)	Weight of VOC available for abatement (g)	Weight of VOC available per volume of coating solids (lb/gal)
Variable	P0	P2	P3	W_{cos}	W_a	CL
Formula				P3-P0	P2-P3	$(W_a/W_{cos})*D_{cos}$
1	187.062	190.604	189.573	2.511	1.031	3.73
2	186.189	188.783	188.081	1.892	0.702	3.37
3	186.592	189.624	188.813	2.221	0.811	3.32
4	186.862	189.350	188.686	1.824	0.664	3.31
5	186.789	189.332	188.667	1.878	0.665	3.22
Average	186.699	189.539	188.764	2.065	0.775	**3.41**

Material Properties

Sample	Coating Density (lb/gal)	Mass Fraction Solids	Volume Fraction Solids	Average Film Build Thickness (mil)	VOC mass fraction	Solids Density (lb/gal)
Variable	W_c	W_s	V_s	mil	W_{voc}	D_{cos}
Formula						$(W_s*W_c)/V_s$
Clearcoat	8.26	0.5720	0.5196	2.3	0.4280	9.09

Capture Efficiency

Mass Fraction VOC in Coating	Coating Density (lb/gal)	Mass VOC per Volume Coating (lb/gal)	Transfer Efficiency (%)	Volume Fraction Solids	Volume Solids Deposited per Volume Coating Sprayed	Panel Test Result (lb VOC/ gal Solids)	Oven VOC Capture Efficiency (%)
W_{voc}	D_c	VOC	TE	V_s	V_{sdep}	P	CE
		$(D_c)(W_{voc})$			$(V_s)(TE)$		$(P)(V_{sdep})(100)/(VOC)$
0.4280	8.26	3.535	75.0%	0.5196	0.390	3.41	**37.6%**

Table 5 -- Clearcoat Oven VOC Capture Efficiency
Manual Cab Cut-In to Oven

Oven Solvent Loading

Sample	Blank Panel Weights (g)	Wet Panel Weights - Before Bake (g)	Panel Weights - after bake (g)	Weight of Coating Solids Deposited (g)	Weight of VOC available for abatement (g)	Weight of VOC available per volume of coating solids (lb/gal)
Variable	P0	P2	P3	W_{cos}	W_a	CL
Formula				P3-P0	P2-P3	$(W_a/W_{cos})*D_{cos}$
1	186.934	188.151	187.864	0.930	0.287	2.81
2	188.326	189.182	188.988	0.662	0.194	2.66
3	186.261	187.563	187.241	0.980	0.322	2.99
4	186.188	187.857	187.426	1.238	0.431	3.17
Average	186.927	188.188	187.880	0.953	0.308	**2.95**

Material Properties

Sample	Coating Density (lb/gal)	Mass Fraction Solids	Volume Fraction Solids	Average Film Build Thickness (mil)	VOC mass fraction	Solids Density (lb/gal)
Variable	W_c	W_s	V_s	mil	W_{voc}	D_{cos}
Formula						$(W_s*W_c)/V_s$
Clearcoat	8.26	0.5720	0.5196	1.1	0.4280	9.09

Capture Efficiency

Mass Fraction VOC in Coating	Coating Density (lb/gal)	Mass VOC per Volume Coating (lb/gal)	Transfer Efficiency (%)	Volume Fraction Solids	Volume Solids Deposited per Volume Coating Sprayed	Panel Test Result (lb VOC/ gal Solids)	Oven VOC Capture Efficiency (%)
W_{voc}	D_c	VOC	TE	V_s	V_{sdep}	P	CE
		$(D_c)(W_{voc})$			$(V_s)(TE)$		$(P)(V_{sdep})(100)/(VOC)$
0.4280	8.26	3.535	75.0%	0.5196	0.390	2.95	**32.5%**

7.0 Data Sheets

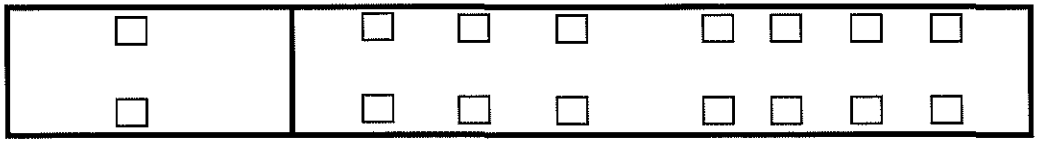
Table 6 - Applicator Parameter Summary
Ford DTP, January 2016

Operation	Manufacturer	Applicator	Fluid Tip	Air Cap	Gun Voltage	RPM	Target Distance	Remarks
CC Exterior Bells	Fanuc	Servo Bell 3	2.0 mm	N/A	60-80 kV	60,000	10"	Solventborne

Line Speed: 35 JPH

Process Diagram

Clearcoat Manual Int. Clearcoat Exterior



ATOM

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VOC OF _PAINT PRODUCTS
US-EPA's REFERENCE METHOD 24

Date:	01/25/2016
Product:	CC DTP 1/24/2016
Company:	JLB
% Nonvolatiles:	57.20
% Volatiles:	42.80
Density @ 77° F:	0.990 g/mL
Wght/Gal @ 77° F:	8.26 lbs/gallon
% Water:	0
VOCs (Grams):	423.7 g/L
VOCs (Pounds):	3.54 lbs/gallon

% Volatiles = Used ASTM Test Method D 2369
Density = Used ASTM Test Method D 1475
% Water = Used ASTM Test Method D 4017
Calculations = Used ASTM Test Method D 3960

Certificate of Analysis

Clearcoat Materials

Submitted to DEARBORN ASSEMBLY

Supplier	Mount Clemens	Date of MFG.	12/09/2015
Material Name	GEN 5W CLEARCOAT	Product Specification	WSSM 33J7 A2
Approved By:	BB	M Number	M7154
Color Standard	N/A	Supplier Batch Number	3178866
Alpha Code	N/A	Clearcoat Supplier Code	RKA01199
% Reduction (Target)	7% By Volume	Tox Number	173634
Reducing Solvent	H-883	Batch Size	5,000 GALS

Mix Room Reference Information	Test Method*	Range Min - Aim - Max	Calculated Valuess
VISCOSITY (RFU, CALCULATED, 4# FORD)	TM-0024F	40.0 - 42.5 - 45.0	N/A
WT PER GALLON (RFU, CALCULATED)	TM-0013E	REPORT	8.29
% NV BY WT (RFU, CALCULATED)	TM-0221Z	REPORT	54.00
% NV BY VOL (RFU, CALCULATED)	TM-0220A	REPORT	51.960
VOC (RFU, CALCULATED)	TM-0225A	REPORT	3.82
RESISTIVITY (MEGA OHMS) MIX TANK	TM-0174A	REPORT	N/A

Test items	Test Method*	Range Min - Aim - Max	Actual Results
VISCOSITY #4 FC	TM-0009G	58 - 66	58.8
WEIGHT PER GALLON	TM-0013E	8.13 - 8.33 - 8.53	8.32
% WEIGHT SOLIDS	TM-0221Z	57.50 - 59.50 - 61.50	57.60
% NV BY VOL (PKG THEORETICAL)	TM-0220A	54.000 - 56.000 - 58.000	55.600
VOC AS PACKAGED	TM-0225A	3.30 3.60 3.90 REPORT	3.53
VOC (AS PKGD) THEORETICAL	TM-0225A	REPORT	3.09
WEIGHT % REPORTABLE HAPS (AS PKGD, VOLATILE) THEORETICAL	TM-CALC	REPORT	0.308
RESISTIVITY (MEGA OHMS)	TM-0174A	0.08 - 0.50 - 0.80	0.60
UVA CONCENTRATION	TM-0665A	0.530 -	PASS
(QMS) WAVESCAN - HORIZONTAL	TM-0353A	REPORT	56.0
(QMS) WAVESCAN - VERTICAL	TM-0353A	REPORT	56.0
FMVSS	TM-0670A	PASS	PASS
ADHESION TEST	TM-0486A	2 MAX	0
INTERCOAT ADHESION (STD/STD)	TM-0486A	2 MAX	0
POP RESISTANCE	TM-0440I	2.0 MIN	2.9
SAG RESISTANCE	TM-0311J	2.0 MIN	2.2
CRATERS / DENTS	TM-0345A	0 . 4	0.000
DIRT RATING (GRIT)	TM-0044E	2 MAX	2
DIRT RATING (FIBERS)	TM-0044E	2 MAX	2

*Axalta-Ford Test Method Cross-reference:
TM-009M=ASTM D1200, TM-0013E=ASTM D1475,TM-221Z=ASTM D1353,TM-0225A=METHOD 24,TM-0174A=ASTM D5682,TM-243A=ISO 1148-69, TM-350B=SAEJ1545,TM-352I=FLTM B1 158-01,TM-486A=FLTM B1 106-01,TM-0440I=FLTM B1 122-02

* TS16949 - Due to the test cycle time requirements, the PASS result is based upon product history and formula design. The actual result is recorded once testing is completed and is rovided upon request.

ord Clearcoat.htm

Form Revised: 12/07/2015

Print Date: 12/10/2015 08:15:00 By user: VF0993

JLB Industries, LLC

Chain of Custody Form

Facility: **Ford Dearborn Truck Plant**

Material Name	Sampling Location	Date/Time	Label	Comment	Preservative
Gen V Clearcoat	Mix Room	1/24/2016	DTP CC	Solventborne	None

Relinquished by:	Date	Time	Received by:	Date	Time
[signature]	1/25/16	9:00 Am	SRamesh	01252016	9 AM

8.0 Appendix

Oven Data Record
Ford DTP, January 2016

Zone	Temperature (deg F)
Fresh Air	200
Zone 1	175
Zone 2	300
Zone 3	305
Zone 4A	305
Zone 4B	305
Zone 5	295
Zone 6	295

Panel Film Build Record

Booth	Panel	E-coat Build (mil)				Coated Build (mil)				Coating Thickness (mil)
		Reading 1	Reading 2	Reading 3	Average	Reading 1	Reading 2	Reading 3	Average	
Clearcoat Exterior	1	0.9	0.9	0.9	0.90	3.5	3.3	3.6	3.47	2.57
	2	0.8	0.8	0.8	0.80	2.8	3.0	3.0	2.93	2.13
	3	0.9	0.9	0.9	0.90	3.4	3.3	3.3	3.33	2.43
	4	0.8	0.8	0.8	0.80	2.7	2.8	3.1	2.87	2.07
	5	0.8	0.8	0.8	0.80	3.3	2.8	2.7	2.93	2.13

Booth	Panel	E-coat Build (mil)				Coated Build (mil)				Coating Thickness (mil)
		Reading 1	Reading 2	Reading 3	Average	Reading 1	Reading 2	Reading 3	Average	
Clearcoat Interior	1	0.9	0.8	0.9	0.87	2.0	1.9	2.0	1.97	1.10
	2	0.8	0.8	0.8	0.80	1.3	1.6	1.8	1.57	0.77
	3	0.9	0.9	0.9	0.90	2.1	2.1	2.2	2.13	1.23
	4	0.8	0.8	0.9	0.83	2.2	2.4	2.3	2.30	1.47

TRANSFER EFFICIENCY COMPLIANCE TEST REPORT

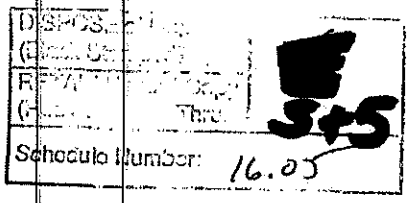
for

Environmental Quality Office

DEARBORN TRUCK

F-150

Topcoat System



By

PROCESS TECHNOLOGIES GROUP

39500 Fourteen Mile Road, Suite 316
Commerce Township, Michigan 48390
(248) 661-1400

Project 04-03 - October 2004

1. EXECUTIVE SUMMARY

A Transfer Efficiency Compliance Test performed on October 30, 2004, at the Dearborn Truck Plant, on the Topcoat System. The test was conducted in accordance with applicable procedures contained in Section 18, *"Transfer Efficiency Test Procedure – In Plant,"* contained in US EPA document EPA-450/3 ***Protocol for Determining the Daily Volatile Organic Compound Emission Rate of Automobile and Light-Duty Truck Topcoat Operations***.

The composite transfer efficiency of the Topcoat System for F-150 Super Cab with 6 ½' Box currently built at the Dearborn Truck Plant was determined to be as follows:

Coating	Transfer Efficiency
Silver Basecoat & Clearcoat	75 %

TABLE I - Summary of Test Results

The test team was comprised of personnel from the Ford Environmental Quality Office, Dearborn Truck Paint Shop and Process Technologies Group. The team worked together throughout the test to ensure results accurately represented production conditions.

Dearborn Truck produces various models of the F-150 Pick-up truck. The F-150 Super Cab with 6 ½' Box and Silver basecoat with Clearcoat was chosen for the test based on high production volume.

Panel Test Data Sheet

Date: 1/24/16 Operator: JB/JM/MF

Plant: FORD DTP Balance: Ohaus

Spraybooth: ENAMEL 1

EXTERIOR

Panel	Weight 0	Weight 1	Weight 2	Weight 3	Weight 4	Weight 5
1	187 062	190 695	190 604	189 573		
2	186 189	188. 838	188 783	188 081		
3	186 592	189 688	189 624	188 813		
4	186 862	189 402	189 350	188 686		
5	186 789	189 378	189 332	188 667		
6	188.628	188.626	188 629	188 628		

BLACK

* Reference testing diagram for weight locations.

Oven Data

Zone	1	2	3	4	5	6	7	8
Temp								

Oven Entry Time: _____ Oven Exit Time: _____

Calibration Procedure:

Calibration Record

Time	Weight Applied	Weight Displayed
10:50	300	300.000
	200	199.999
	100	100.000
	50	50.000
	20	20.000
	10	10.000
	5	5.000

Panel Test Data Sheet

Date: 1/24/16 Operator: JB/JM/MF

Plant: FORD DFP Balance: Ohaus

Spraybooth: ENAMEL 1

INTERIOR

Panel	Weight 0	Weight 1	Weight 2	Weight 3	Weight 4	Weight 5
1	186 934	189 297	188 200	188 151	187 864	
2	188 326	189 263	189 206	189 182	188 988	
3	186 261	187 691	187 607	187 563	187 241	
4	186 188	187 978	187 905	187 857	187 426	
5						
6	188 628	186 626	188 630	188 629	186 629	

BLANK

* Reference testing diagram for weight locations.

Oven Data

Zone	1	2	3	4	5	6	7	8
Temp								

Oven Entry Time: _____ Oven Exit Time: _____

Calibration Procedure:

Calibration Record See Previous Sheet

Time	Weight Applied	Weight Displayed

JLB Industries, LLC

Paint Metering Record

Test ID: FORD DTP
Test Location: CLEARCOAT

Date: 1/24/16
Staff: JB/JM/MF

Process	Applicator	Unit ID TEST 1	Unit ID TEST 2			Total cc	Total Gal.
CLEARCOAT	3P1	349	349				
CAB EXTERIOR	3P2	335	335				
& BOX ROBOTS	3P3	276	276				
	3P4	276	276				
	2P1	138	138				
	2P2	138	138				
	2P3	149	149				
	2P4	149	149				
	2P6	184	184				
	P1	350	350				
	P2	336	336				
	P3	286	286				
	P4	286	286				
TOTAL ROBOTS:		3,252	3,252				
MANUAL	DRIVER SI	115	101				
	PASSSIDE	111	124				
TOTAL MANUAL:		226	225				

Notes: PAINT USAGE IN THE ROBOT ZONE WAS COMPARED TO HISTORICAL DATA & VERIFIED.

Sterling Scale Co., Inc.
20950 Boening St.
Southfield, MI 48075

Test report for commercial device

accredited for calibration 1448.01

Customer: JLB ***Cert#*** 15-0669 ***Temp/Humidity:*** 70/40
Location of Calibration: 2181 Avon Industrial Dr. Rochester Hills mi
Calibration Date: 9/9/2015 ***Cal Due:*** Sep-16 ***Condition of Item:*** Fair
Equipment Make: Ohaus ***Model:*** PA313 ***Serial/ID:*** 8331170206 ***Capacity:*** 300g
NTEP ***Class*** ***COC*** x 0,001 g

Applied Test Wt g	*Before Adustment* g	*Tolerance* g	*In-Tolerance Y/N*	*After Adjustment* g	*In-Tolerance Y/N*	*Unc* mg	*Sec #*
0	0.000	0.001	Y	0.000	Y	0.63	
1	1.000	0.001	Y	1.000	Y	0.63	
150	150.009	0,002	N	149.999	Y	0.63	
300	300.011	0,003	N	299.999	Y	1.3	

shift test

Platform #1	***Platform #2***	***Platform #3***
☑ Pass	☐ Pass	☐ Pass
☐ Fail	☐ Fail	☐ Fail

Tests performed: ☑ Repeatability ☑ Linearity ☐ Sensitivit ☑ Discrimination

Technician comments: Scale passed all tests.

Traceable certificate for weights used: Kit # 28404

☑ Scale Certified ☐ Scale Rejected

Sterling Scale Service Rep: *Tyler C.* **1 of 1**

The above item has been calibrated using the relevant EPO or OEM procedures utilizing test weights
Traceable to International Systems of Units (SI), through the Michigan Department of Agriculture.
Expanded uncertainty(k=2) confidence level of 95% as reported.
Results relate only to items listed.
The reported uncertainty is valid only for the environment in which it is determined.
Any number of factors may cause the item to drift out of calibration before recommended interval has expired for this reason Sterling Scale does not warranty calibration.
This report shall not be reproduced, except in full without approval of the laboratory
Tolerances followed are maintenance/acceptance per HB 44 or customer specific.

Booth Capture Efficiency Calculations Summary

1. Mass of Solids Deposited

$$W_{sdep} = W_2 - W_0$$

where:

W_{sdep} = mass of coating solids deposited on panel, g
W_2 = mass of panel after baking, g
W_0 = mass of blank panel prior to spraying, g

2. Mass of VOC remaining on the panel after exiting the controlled zone

$$W_{rem} = W_1 - W_2$$

where:

W_{rem} = mass of VOC remaining on the panel when the panel leaves the controlled zone, g
W_2 = mass of panel after baking, g
W_1 = mass of VOC remaining on the wet panel when the panel leaves the controlled zone, g

3. Mass of VOC remaining on the panel after exiting the controlled zone per mass of coating solids deposited on the panel

$$P_m = (W_{rem}) / (W_{sdep})$$

where:

P_m = mass of VOC remaining on the panel when the panel leaves the controlled zone per mass of coating solids deposited on the panel, g
W_{rem} = mass of VOC remaining on the panel when the panel leaves the controlled zone, g
W_{sdep} = mass of coating solids deposited on panel, g

4. The percent of VOC for the coating associated with the solids deposited on the wet panel after exiting the controlled

$$P_{voc} = (P_m)(W_s)(100) / (W_{voc})$$

where:

P_{voc} = percent VOC for coating associated with the solids deposited on the wet panel when the panel leaves the controlled zone, percent
P_m = mass of VOC remaining on the panel when the panel leaves the controlled zone per mass of coating solids deposited on the panel, g
W_s = mass fraction of coating solids
W_{voc} = mass fraction of VOC in coating

5. Zone capture efficiency

$$CE = 100 - P_{voc}$$

where:

CE = capture efficiency for the coating in the controlled booth zone, percent
P_{voc} = percent VOC for coating associated with the solids deposited on the wet panel when the panel leaves the controlled zone, percent

Oven Capture Efficiency Calculations Summary

1. Weight of Solids applied

$$W_{cos} = W_2 - W_0$$

Where:

W_{cos} = Weight of Solids Applied, g

W_2 = Cured Panel Weight, g

W_0 = Initial Panel Weight. g

2. Weight of VOC available for control

$$W_A = W_1 - W_2$$

Where:

W_A = Weight of VOC Available for Control. g

W_1 = Wet Panel Weight Just Before Controlled Section, g

W_2 = Cured Panel Weight, g

3. Weighted coating solids density

$$D_{cos} = (W_S / W_C) / V_S$$

Where:

D_{cos} = Weighted Solids Density (lbs. Solids / gal. Solids)

WS = Mass Fraction Solids (Method 24)

WC = Coating Density, lb/gal (Method 24)

VS = Volume Fraction Solids (Certificate of Analysis)

4. Oven VOC loading

$$C_L = (W_A / W_{cos}) * D_{cos}$$

Where:

C_L = VOC Loading (lbs. VOC / gal. Solids Applied)

W_A = Weight of VOC's Available for Control, g

W_{cos} = Weight of Solids Applied, g

D_{cos} = Weighted Solids Density (lbs. Solids / gal. Solids)

The weight of water, corrected for the blank field sample, will be subtracted from the weight of VOC available for control (W_A) for waterborne coatings.