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FY 2015 Insp

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Scheduled Inspection

N653729352

FACILITY: PROCAT TESTING LLC	SRN / ID: N6537
LOCATION: 30844 CENTURY DR, WIXOM	DISTRICT: Southeast Michigan
CITY: WIXOM	COUNTY: OAKLAND
CONTACT: Ashley Barrett, General Manager	ACTIVITY DATE: 05/05/2015
STAFF: Iranna Konanahalli	COMPLIANCE STATUS: Compliance
SUBJECT: FY 2015 scheduled annual inspection of ProCat Testing, LLC. ("ProCat")	SOURCE CLASS: SM OPT OUT
RESOLVED COMPLAINTS:	

N6537 - SAR - 2015 05 05

Procat Testing, LLC. (N6537)
F.K.A. Prodrive Engelhard, LLC.; Tickford Engelhard, LLC.
30844 Century Drive
Wixom, Michigan 48393-2064

Phone: 248-926-8200
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Web: www.procat-testing.com
E-mail: ashley.barrett.procat-testing.com

PTI Mod: PTI No. 327-98C → PTI No. 327-98D. AQD is considering this modification as of May 05, 2015, to include CNG and LPG testing for automotive engines

PTI No. 327-98C dated November 8, 2007 (ROP opt-out) – under revision to include CNG & LPG.

Voided on November 8, 2007: PTI No. 327-98B dated June 5, 2007(ROP opt-out)

Voided on June 5, 2007: PTI No. 327-98A dated February 25, 2002(ROP opt-out)

Voided on February 25, 2002: PTI No. 327-98 dated November 19, 1998

VNs: AQD issued violation notices: May 3, 2005 (for failure conduct destruction efficiency [DE] stack tests [gasoline engines] pursuant to PTI No. 327-98A, SC 1.4) and November 8, 2010 (for failure conduct NOx [diesel engines RE = minimum 75%] stack tests pursuant to PTI No. 327-98C, FG-TESTCELLS, SC 1.7).

Name Change: Tickford Engelhard, LLC. (Least recent) → Prodrive Engelhard, LLC → Procat Testing, LLC. (Most recent)

On May 05, 2015, I conducted a level-2 scheduled annual inspection of ProCat Testing, LLC. ("ProCat"), fka Prodrive Engelhard, LLC, Tickford Engelhard, LLC., located at 30844 Century Drive, Wixom, Michigan 48393-2064. The inspection was conducted to determine compliance with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451; Michigan Department of Environmental Quality, Air Quality Division (MDEQ-AQD) administrative rules; and the air use permit (PTI No. 327-98C) conditions.

During the inspection, Mr. Ashley Barrett (Phone: 248-926-8200; Fax: 248-926-8300; Mobile: 248-787-2880; e-mail: ashley.barrett.procat-testing.com), General Manager, assisted me.

Mr. John Briggs (Phone: 248-926-8200; Fax: 248-926-8300; Mobile: 734-945-3475; e-mail: john.briggs.procat-testing.com), Chassis Rolls Manager, a lead engineer for stack testing, retired about May 01, 2015.

Name change: ProCat Testing, LLC, mailed the name change announcement dated January 20, 2009, to all suppliers, customers and MDEQ-AQD. The announcement letter was returned to ProCat due to incorrect mail

box number for AQD (P.O. Box 30157). The announcement stated that the name change from Prodrive Engelhard, LLC, to ProCat Testing, LLC, was effective January 15, 2009. BASF owns ProCat Testing

ProCat Testing, LLC, is a supplier of total solutions for automotive emission system technologies (catalyst) which was established in 1997 as an independent joint venture between two world leaders in the automotive industry: Prodrive, the advanced technology and motor sports company, and Engelhard Corporation, the global supplier of automotive catalyst technologies. Hence, the company was then known as Prodrive Engelhard until January 15, 2009, name change to ProCat Testing, LLC. ProCat offers state-of-the-art, flexible emission testing equipment on a secure three-acre site with a 33, 000 sq. ft. facility housing 22 testing cells and SULEV 7 (Super Ultra Low Emission Vehicles, a California CARB standard) bench chassis rolls. ProCat offers its automotive customer project management and engineering services through catalyst development and refinement, component system testing and system application and calibration. BASF purchased then Prodrive Engelhard about 2007 and changed its name to ProCat Testing about 2009.

ProCat is involved in designing, developing, validating and certifying engines and related components for automotive OEM companies (e.g. Ford, Chrysler, GM, Toyota, Honda, etc.). Only 22 of the 23 permitted dyno test cells have been installed due to space constraints. In addition to 22 dyno cells, there is one chassis (fully assembled vehicle) dynamometer cell (No. 23 / 24; see below), where a fully-assembled, road-worthy, catalytic-converter-equipped vehicle is tested. A fully-assembled car is run on the chassis dyno, where an exhaust sample is collected, flow rate (cfm) is measured and analyzed for the specified parameters such as CO, HC, NOx, CO2, etc . Due to dire economic conditions in automotive industry less than half the dynos operated in CY 2009. By April 2010, the catalyst certification business picked up and most of dynos started operating. The automotive muffler catalyst testing is done on 24/7/360 basis (24 hours per day, 7 days per week 360 days per year).

Flexible Group ID	Emission Units Included in Flexible Group	Stack Identification
FG-TESTCELLS	23 dynamometer engine test cells with catalytic converters and burning lead-free gasoline or diesel fuel (EU-TESTCELL1 through EU-TESTCELL24)	SV-STACKA, SV-STACKB, SV-STACKC, SV-STACKD, SV-STACKE, and SV-STACKF
Changes to the equipment described in this table are subject to the requirements of R336.1201, except as allowed by R336.1278 through R336.1290.		

	Pollutant	Equipment	Limit	Time Period	Compliance Method	Applicable Requirement(s)
1.1a	CO	FG-TESTCELLS	88.7 tpy	12-month rolling time period as determined at the end of each calendar month.	See below* and SC 1.9	R336.1205(3)
1.1b	NOx	FG-TESTCELLS	22.7 tpy	12-month rolling time period as determined at the end of each calendar month.	See below* and SC 1.10	R336.1205(3), R336.2803, R336.2803,40 CFR 52.21 (c) & (d)

*The permittee shall calculate annual NOx and CO emissions from FG-TESTCELLS based on fuel usage data recorded per SC 1.11, the destruction efficiencies calculated in SC 1.4 and 1.5, and the worst-case emission factor from testing per SC 1.6 and SC 1.7

and the emission factors below:	
Diesel Emission Factor NOx = 0.604 lb/gallon diesel CO = 0.130 lb/gallon diesel	Gasoline Emission Factor NOx = 0.102 lb/gallon gasoline CO = 3.94 lb/gallon gasoline

Cell 23 Vs Cell 24

Chassis dynamometer No. 24 (fully assembled vehicle) is a part of the permit. Cell No. 23 does not exist and hence sometimes No. 24 is referred to as No. 23. Please refer to September 10, 2010, letter from G. Vinson Hellwig, AQD Chief, regarding engine chassis dynamometers and August 15, 2010, US EPA determination regarding Hyundai America Technical Center, Inc. ProCat is already in compliance with the US EPA's determination because Chassis Dynamometer is already a part of the permit.

Hundreds of engine catalysts are tested every year. From various customers, all engines and all catalyst types are tested. Hydrocarbons, carbon monoxide, carbon dioxide, nitrogen oxides are monitored at input and output of the catalyst being tested in order to determine destruction / conversion / reduction efficiencies. All data is logged into a computer system. The customers demand good records and data retention for several years owing to US EPA Mobile Source regulations.

A 1.5 million (PTI No. 327-98A → PTI No. 327-98B; revised upward from 900,000) gallon of gasoline usage per year together with a required minimum 97 carbon monoxide (CO) destruction efficiency is expected to limit carbon monoxide (CO) emissions below 89 tons per year (PTI No. 327-98C SC 1.2, 1.1a: 88.7 tpy). Gasoline usage revision is a direct result of destruction efficiency (DE) revision from 95 percent to 97 percent (PTI No. 327-98B SC 1.3 limit: 95% → PTI No. 327-98C SC 1.4 limit: 97%), which in turn is a result of October 2005 stack tests. However, ProCat uses actual destruction efficiencies of the catalytic converters being tested / certified to perform the emission calculations. The test conditions and CO destruction efficiency (DE) / NOx removal efficiency (RE) calculations are required by a customer such as Ford, GM, Chrysler, etc. (PTI No. 327-98B SC 1.3; PTI No. 327-98C SC 1.4 [CO DE > 97%] & 1.5 [NOx RE > 75%]).

Violation Notices

On May 3, 2005, AQD issued a letter of violation (LOV) for failure to conduct performance test to verify CO emission rates per PTI No. 327-98A (SC 1.4). As a result of the LOV, on October 13, 2005 ProCat (then Prodrive) conducted the required stack tests and the LOV was resolved. On January 9, 2006, Tom Maza reviewed the test results and determined that the methods, procedure and the calculations were acceptable. The results showed 98.4 percent DE for CO, 31.48 ppm CO, 0.03 pounds per hour, 0.11 tons per year. Per PTI No. 327-98C (SC 1.6 [CO] & 1.7 [NOx]), the tests must be conducted once every five years.

The revised PTI No. 327-98C (SC 1.6 [CO] & 1.7 [NOx]) requires first test on October 13, 2010, for CO destruction (> 97%) and NOx reduction (> 75%) efficiencies and every five years thereafter. NOx reduction efficiency is required as a result of addition of diesel fuel to the catalyst testing / certification with the PTI modification (PTI No. 327-98B → PTI No. 327-98C).

Again, ProcCat failed conduct a test in a timely manner for nitrogen oxides (NOx) emissions for the diesel engines (PTI No. 327-98C SC 1.6 [CO] & 1.7 [NOx]). AQD issued the Violation Notice dated November 8, 2010, for failure to conduct performance test to determine NOX reduction efficiency by October 13, 2010 (PTI No. 327-98C, SC 1.5 [Min. 75% RE] and SC 1.7 [NOx]). On December 1, AQD received the VN response letter dated November 19, 2010, from Mr. Barrett. The letter stated that diesel catalysts were not available for testing due to lack of diesel catalyst test business during the test period. However, NOx test for diesel engines was conducted on Friday, October 29, 2011, for 28 hours.

According to the destruction / reduction efficiency records for the catalysts being tested, the CY2013 / CY2014 calculations show that 5.22 / 8.076 (CY2014 gasoline usage 173,363 gallons) tons of carbon monoxide and 7.1 / 6.313 (CY2014 diesel usage 60,109 gallons) tons of nitrogen oxides are emitted per year (PTI No. 327-98C SC 1.1a limit: 88.7 tpy CO; SC 1.1b limit: 22.7 tpy NOx). ProCat has maintained a spreadsheet of carbon monoxide destruction efficiency (DE), which is about 98 percent (PTI No. 327-98C SCs 1.9, 1.10 & 1.12). ProCat uses actual destruction efficiencies (monthly averages) of the catalytic converters tested to perform emission calculations. Per the CY2006 fuel usage records, ProCat exceeded the 900,000 (0.9 million) gallons of gasoline usage per year limit (SC 1.2, PTI No. 327-98A). However, ProCat promptly revised the permit (PTI No. 327-98A

→PTI No. 327-98B) to increase the usage limit to 1.5 million gallons of gasoline per year and a letter violation was not issued. In addition, based upon actual DE (monthly average), carbon monoxide emissions were still below the limit (PTI No. 327-98C SC 1.1a limit: 89 tpy, the limit that remained unchanged during the PTI modifications although special condition numbers changed). Further, Procat plots monthly and 12-month rolling period carbon monoxide emissions versus the limit of 89 tons per year. PTI No. 327-98C (SC 1.3) limit of 300,000 gallons per 12-month period is expected to limit NOx emissions (PTI No. 327-98C, SC 1.1b limit: 22.7 tons/12-month)

In CY 2014, while 173,363 gallons of gasoline (PTI No. 327-98C SC 1.2 limit: 1.5 million gallons) were used, 60,109 gallons of diesel (PTI No. 327-98C SC 1.3 limit: 300,000 gallons) were used.

CY2014 CO destruction efficiencies: 97-98%

CY2014 NOX removal efficiencies: 75-77%

Catalysts

An automotive catalytic (a proprietary mixture of Platinum [Pt], Rhodium [Rh] and Palladium[Pd]) converter being tested itself is a control equipment and hence there no probability of malfunction of the control. The customers demand many requirements of the PTI. Procat is in the business of testing automotive catalytic converters and it is required to meet US EPA mobile source protocols. As a result of testing, Procat certifies the catalytic converters with respect destruction efficiency for hydrocarbons, carbon monoxide, nitrogen oxides, etc.

Fuel storage tanks

The gasoline storage tank (3 compartments: 6000 gallons, 6000 gallons, 8000 gallons) is exempt from Rule 201 (Permit-to-Install) pursuant to Rule 284(g), handling less than 20,000 gallons of gasoline per day. The tank is not subject to NSPS Kb (40 CFR, Part 60, Subpart Kb) because its capacity is less than 40 cubic meters (10, 567 gallons or 40, 000 liters).

Diesel engines

The latest PTI revision (PTI No. 327-98B → PTI No. 327-98C) allowed use of diesel. The permit limits diesel use to 300,000 gallons (PTI No. 327-98C SC 1.3), which corresponds to the NOx limit (PTI No. 327-98C SC 1.1b limit: 22.7 tpy NOx).

In the permit, FG-TESTCELLS identification should read: 22 dynamometer engine test cells plus one fully assembled vehicle test cell.

Froude Consine Test controller is used to control the engine conditions (speed, rpm; torque, lbf-ft; etc.). The Froude system takes readings of fuel pressure, temperature of catalyst, ambient temperature, air-to-fuel mixture, etc. Pt:Rh:Pd ratios are adjusted based upon precious metal costs to yield same or better performance.

PTI revisions:

PTI No. 327-98 → PTI No. 327-98A: The original PTI No. 327-98 was approved on September 23, 1998. The permit was revised on February 25, 2002, to add 12 more dynamometers.

PTI No. 327-98A → PTI No. 327-98B: Keeping carbon monoxide emission limit same (PTI No. 327-98B SC 1.1: remained unchanged at 89 tons of CO per year), fuel (gasoline) usage limit was upgraded to 1.5 million from 0.9 million gallons per year and minimum CO destruction efficacy required was increased from 95 percent to 97 percent (PTI No. 327-98B SC 1.3: CO DE 95% →97%). The revision was necessitated by Procat (then Prodrive) exceeding 0.90 million gasoline usage limit; ProCat exceeded the limit in CY2006.

PTI No. 327-98B → PTI No. 327-98C: The PTI revision allowed use of diesel fuel during the catalyst testing and certification. NOx limit (PTI No. 327-98C SC 1.1b: 22.7 tpy) and diesel usage limit (PTI No. 327-98C SC 1.3: 300,000 gallons per 12-months) were included in the revised permit.

PTI No. 327-98C → PTI No. 327-98D: As of May 05, 2015, AQD is considering the PTI revision to include CNG

and LPG.

The catalysts are tested at higher temperatures (850 °F) such that 200-hour test is equivalent to 100,000 miles of driving on public roads. Higher exhaust gas temperatures deteriorate the muffler catalysts faster.

October 2010 stack tests

On October 12, 2010, Tom Maza of TPU-AQD approved the test plans for carbon monoxide (CO) from gasoline engines and nitrogen oxides (NOx) from diesel engines. Maza and I observed CO tests on Oct 14 and 15, 2010. Diesel engines (NOx) tests were not observed.

AQD issued the Violation Notice dated November 8, 2010, for failure to conduct performance test to determine NOX reduction efficiency by October 13, 2010 (PTI No. 327-98C, SC 1.5 [Min. 75% RE] and SC 1.7 [NOx]). ProCat completed stack test for CO for gasoline engines on October 14 & 15 and for NOx for diesel engines on October 28, 2010. The NOx test was not conducted in a timely manner because diesel catalysts were not available due to lack of business.

During the tests exhaust flow, temperature, pressure were monitored. 3 runs of 24-hour period for carbon monoxide and 28-hour period for nitrogen oxide were performed.

October 14 & 15, 2010 CO tests: 4 catalysts in parallel (not in series) were used. Instruments continuously measured CO. Horiba instruments were used. Samples were collected in series of bags as well. Cell 11 was used for testing. Run #2 was cancelled due to 10-hour check by an operator. The tests showed over 99.95% control for CO. The catalysts were aged for 50k, 100k and 150k miles.

October 28, 2010 NOx tests: The tests were conducted for diesel engines at Cell # 19. NOx removal efficiency was 84.6 percent; minimum efficiency required by PTI No. 327-98C, SC 1.5 is 75%. Engine out NOx was 1.355 pounds per hour and tail pipe out NOx was 0.208 pounds per hour. GM Duramax 7.4 liter engine was used. Horiba 7000 analyzer was used.

Conclusion:

An automotive catalytic control being tested itself is a control equipment and hence there is no probability of malfunction. The customers demand many requirements of the PTI.

FYI: November 8, 2010, Violation Notice

November 8, 2010

Mr. Ashley Barrett
Procat Testing, LLC.
30844 Century Drive
Wixom, Michigan 48393-2064

SRN: N6537, Oakland (63) County

Dear Mr. Barrett:

VIOLATION NOTICE

On October 26, 2010, the Department of Natural Resources and Environment (DNRE), Air Quality Division (AQD), conducted a file review inspection of Procat Testing, LLC. ("Procat") located at 30844 Century Drive, Wixom, Michigan. The purpose of the inspection was to determine Procat's compliance with the requirements of the federal Clean Air Act; Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451,

as amended (Act 451); the administrative rules; and the conditions of Permit to Install (PTI) number 327-98C dated November 8, 2007.

During the inspection, staff observed the following:

Process Description	Rule/Permit Condition Violated	Comments
FG-TESTCELLS using diesel fuel	PTI No. 327-98C, Special Condition No. (SC) 1.7	Procat failed to conduct a performance test to determine NOx reduction efficiency (RE) by October 13, 2010. Minimum required RE is 75 percent (SC 1.5).

Please initiate actions necessary to correct the cited and submit a written response to this Violation Notice by November 29, 2010 (which coincides with 21 calendar days from the date of this letter). The written response should include: the dates the occurred; an explanation of the causes and duration of the ; whether the ongoing; a summary of the actions that have been taken and are proposed to be taken to correct the and the dates by which these actions will take place; and what steps are being taken to prevent a reoccurrence.

If Procat believes the above observations or statements are inaccurate or do not constitute violations of the applicable legal requirements cited, please provide appropriate factual information to explain your position.

Thank you for your attention to resolving the cited above. If you have any questions regarding the or the actions necessary to bring this facility into compliance, please contact me at the number listed below or the DNRE, AQD, SEMI (Warren), 27700 Donald Court, Warren, Michigan 48092-2793.

Sincerely,

Iranna Konanahalli

Air Quality Division
586-753-3741

ISK / VLL

cc: Mr. Gerald Avery, DNRE
Mr. Thomas Hess, DNRE
Ms. Teresa Seidel, DNRE
Mr. Christopher Ethridge, DNRE
Mr. Tom Maza, DNRE
Mr. Richard Taszreak, DNRE

NAME Deleannah:

DATE 05/11/2015

SUPERVISOR CJE