

**U.S. ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C.**

_____)	
In the Matter of:)	
)	
41 Eastern Boulevard, Inc.)	ADMINISTRATIVE SETTLEMENT
Essex, Maryland,)	AGREEMENT
)	AED/MSEB: 7033
)	
Respondent.)	
_____)	

THIS SETTLEMENT AGREEMENT is made and entered into by and between the United States Environmental Protection Agency (EPA) and 41 Eastern Boulevard, Inc., 41 Eastern Boulevard, Essex, MD 21221 (Respondent).

Purpose:

The purpose of the Settlement Agreement (Agreement) is to resolve Respondent's alleged violations of Section 203(a) of the Clean Air Act (Act), 42 U.S.C. § 7522(a), and the regulations promulgated thereunder at 40 C.F.R. Part 86, Subpart E, regarding the emissions certification requirements for motorcycles (the Motorcycle Regulations).

Applicable Statutory and Regulatory Provisions

1. 40 C.F.R. § 86.401-97 provides that the Motorcycle Regulations apply to new gasoline-fueled motorcycles built after December 31, 1977, that have an engine displacement of at least 50 cubic centimeters (cc).
2. 40 C.F.R. § 86.402-98 defines a motorcycle as any motor vehicle with a headlight, taillight and stoplight, two or three wheels, and a curb mass less than or equal to 793 kilograms (1,749 pounds).
3. 40 C.F.R. § 86.407-78 prohibits a new motorcycle from being manufactured for sale, sold, offered for sale, introduced or delivered for introduction into commerce, or imported into the United States unless the motorcycle is covered by an EPA issued certificate of conformity (EPA certificate of conformity).
4. 40 C.F.R. § 86.410-90 provides that the emission standards for motorcycles are 5.0 grams per kilometer (g/km) of hydrocarbons, 12 g/km of carbon monoxide, and zero crankcase emissions (EPA motorcycle emissions standards).
5. 40 C.F.R. § 86.413-78 requires the manufacturer who has been issued the certificate of conformity for the motorcycle to affix at the time of manufacture a permanent and legible emissions label (EPA emissions label).

6. Section 207(a) of the Act, 42 U.S.C. § 7541(a), requires the manufacturer of each new motor vehicle and new motor vehicle engine to warrant to the ultimate purchaser and each subsequent purchaser that the vehicle or engine is designed, built, and equipped to comply with the federal emissions standards, and is free of any material defects which would cause the vehicle or engine to fail to comply with the federal emissions standards during its useful life (EPA emissions warranty).
7. Section 216 of the Act, 42 U.S.C. § 7550, defines a manufacturer as any person engaged in the manufacturing or assembling of new motor vehicles, or importing such motor vehicles for resale.
8. Section 203(a)(1) of the Act, 42 U.S.C. § 7522(a)(1) prohibits the importation into the United States of any new motor vehicle manufactured after the effective date of the regulations unless the motor vehicle is covered by an EPA certificate of conformity.
9. Section 205(a) of the Act, 42 U.S.C. § 7524(a), provides that any person who violates Section 7522(a), shall be subject to a civil penalty of not more than \$25,000 for each motor vehicle or nonroad engine. The Debt Collections Improvements Act of 1996, 31 U.S.C. § 3701, and 40 C.F.R. Part 19, increase the statutory maximum penalty to \$27,500 for each violation that occurred on or after January 31, 1997, and to \$32,500 for each violation that occurred on or after March 14, 2004.

Other Definitions:

10. For purposes of this Agreement the term “market” means to manufacture for sale, sell, offer for sale, introduce or deliver for introduction into commerce, or import into the United States.
11. For purposes of this Agreement the term “export” means to transport to a location outside of the United States and its territories, Canada, and Mexico.
12. For purposes of this Agreement the term “destroy” means the complete destruction of the motorcycle engine and the complete disassembly of the motorcycle. The engine shall be crushed or broken in such a manner that the engine or its parts can never be used to power anything, and the motorcycle shall be disassembled and broken down in such a manner that it can never be reassembled.

Alleged Violations:

13. EPA alleges that in December 2003 and May 2004, Respondent imported into the United States twenty-six motorcycles that are described in the Table below (the subject motorcycles). The subject motorcycles were not covered by an EPA-issued certificate of conformity and did not bear an EPA emissions label. EPA further alleges that each of the subject motorcycles was equipped with an engine having a displacement greater than 50 cc, and, as a consequence, was required to be covered by an EPA-issued certificate of conformity.

Table

Port 1303, Baltimore

Arrival Date	Make	Model Nos.	Quantity	Engine Displacement	Manufacturer	Status
12/03	E-Quality	LT50QT-31	2	124.07 cc	Zhejiang TiSong	Sold to Ultimate Purchaser
4/25/04	E-Quality	LT50QT-31	24	124.07 cc	Zhejiang TiSong	Under Seizure

14. Based on the forgoing, EPA alleges that Respondent committed twenty-six separate violations of Section 203(a)(1) of the Act, 42 U.S.C. § 7522(a)(1), and the Motorcycle Regulations.
15. Respondent disputes EPA's allegations, and asserts that each of the subject motorcycles was equipped with an engine having a displacement that is less than 50 cc, and as a consequence, is exempt from the EPA certification requirements.

Terms of Agreement:

16. EPA has determined to reduce the civil penalty for the twenty-six violations alleged in Paragraph 14 of this Agreement to \$5,466, provided Respondent successfully completes the terms of this Agreement. Respondent shall pay \$5,466 to the United States of America in four consecutive quarterly payments of \$1,366.50 each. The first payment shall be due within thirty days from the date that this Agreement is executed by EPA (the due date). Late payment of the civil penalty is subject to interest and fees as specified in 31 U.S.C. § 3717. Respondent agrees to pay the amount by certified check or cashier's check payable to the United States of America, and to mail the payment to:

U.S. Environmental Protection Agency
Washington Accounting Operations
P.O. Box 360277M
Pittsburgh, Pennsylvania 15251
Attn: AED/MSEB-7033

17. Within thirty days of this Agreement, or a longer period of time if required by the United States Customs and Border Protection (Customs), Respondent shall export or destroy the twenty-four subject motorcycles that are currently under Customs's seizure. This exportation or destruction shall be carried out under the supervision of Customs. Respondent shall certify to EPA and provide supporting documents that the twenty-four subject motorcycles were either exported or destroyed.
18. Within thirty days of this Agreement, Respondent shall implement a program to ensure its compliance with the Act and the Motorcycle Regulations, which shall remain in effect until December 31, 2007. In order to meet this requirement, Respondent shall:
- A. Create and maintain a complete list of all the motorcycles that it markets, by manufacturer, make, model number, vehicle identification number, engine serial number, engine type (i.e., 2 Stroke or 4 stroke), engine displacement, and maximum speed;
 - B. Examine a representative sample of the motorcycles marketed by Respondent by completing the following procedures:
 1. A separate sample must be examined for each make, model and production year of motorcycles that are marketed (motorcycle category);
 2. If motorcycles within a particular motorcycle category contain engines that are manufactured by different manufacturers, that motorcycle category shall be subdivided into separate categories for each engine manufacturer represented;
 3. The number of motorcycles to be examined in each motorcycle category (the motorcycle category sample size) shall be determined as follows:

Number of motorcycles in the category	Number of motorcycles from the category to be examined
1 through 10	1
11 through 50	3
51 through 250	10
251 and greater	20

4. The motorcycles in each motorcycle category sample shall:
 - (a) Be selected randomly from the motorcycles in each motorcycle category;
 - (b) Be examined as required in this Agreement before any motorcycles in the category are sold or transferred by Respondent; and
 - (c) If the number of motorcycles in a motorcycle category increases because of subsequent marketing of additional motorcycles in the category, and, if as a consequence the motorcycle category sample size increases, the additional motorcycles shall be examined before any of the additional motorcycles in the category are sold or transferred by Respondent;
5. For each motorcycle category that Respondent markets as being excluded from the certification requirements because of an engine displacement that is less than 50 cc, Respondent's examination of the motorcycle category sample shall consist of measurement of the engine cylinder size using the EPA procedures described in the Attachment;
6. For each motorcycle category that Respondent markets as being excluded from the certification requirements because the maximum speed is less than twenty-five miles per hour, Respondent's examination of the motorcycle category sample shall consist of test driving the motorcycles to determine their maximum speed;
7. For each motorcycle category that Respondent markets as being excluded from the certification requirements because the motorcycles are not equipped with a headlight, tail light and stop light, Respondent shall examine the motorcycles in the sample to determine that they are not equipped with these lights and cannot be readily fitted with these lights;
8. For each motorcycle category that Respondent markets as being covered by an EPA certificate of conformity, Respondent's examination of the motorcycle category sample shall consist of:
 - (a) Verifying the presence of the required EPA emissions label;
 - (b) Verifying that the EPA emissions warranty statement is included in the motorcycle owner's manual; and

- (c) Confirming with that the motorcycle manufacturer obtained an EPA certificate of conformity for the motorcycle category, by contacting the EPA Certification Division at (734) 214-4100.
- C. Where, for a category of motorcycles that Respondent markets as being excluded under Paragraphs 18(B)(5), (6) and (7), Respondent determines from its examination that one or more motorcycles does not meet the exclusion criteria, Respondent shall:
 1. Treat all the motorcycles in that motorcycle category as failing to meet the exclusion criteria;
 2. Not market any additional motorcycles in that category;
 3. Within ninety days of the examination, export all motorcycles in that category that are in Respondent's possession; and
 4. Within ninety days of the examination, recall and export all motorcycles in that category that previously were marketed;
- D. Where, for a category of motorcycles that Respondent marketed as being covered by an EPA certificate of conformity, Respondent determines from its examination that one or more motorcycles does not meet the criteria specified under Paragraphs 18(B)(8), Respondent shall:
 1. Treat all the motorcycles in that motorcycle category as failing to meet the criteria;
 2. Not market any additional motorcycles in that category unless and until the criteria deficiency has been corrected; and
 3. Within ninety days, recall and correct the deficiency for each motorcycle in that category that previously was marketed;
- E. For a period of three years from the date of this Agreement, Respondent shall submit annual reports to EPA that describe the activities taken under this compliance assurance program. Each annual report shall be submitted no later than March 1 each year, for activities performed during the previous calendar year, and shall include the following information:
 1. A description of each motorcycle category, the number of motorcycles in the category, and the dates and ports of entry for the motorcycles; and

2. A description of the examinations that were performed on the motorcycle category sample, and the results of the examinations.
19. Respondent shall maintain all reports, documents and records related to this Agreement for five years from the date of this Agreement, and upon request by EPA shall make these records available to EPA in the manner requested by EPA, either by sending copies to EPA or making the records available to EPA at Respondent's place of business;
20. All correspondence to EPA concerning this Agreement shall be sent to:

Jocelyn Adair
Mail Code 2242A
Room 1109A
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Stipulated Penalties:

21. Time is of the essence to this Agreement. Upon the failure to comply or timely perform pursuant to Paragraphs 16 through 19 of this Agreement, Respondent agrees to the following stipulated penalties:
 - (a) For the failure to timely pay the penalty, or provide proof of such payment, pursuant to Paragraph 16, Respondent shall pay a stipulated penalty of \$200 per day.
 - (b) For the failure to examine motorcycles, pursuant to Paragraph 18(B), Respondent shall pay a stipulated penalty of \$2,500 for each motorcycle not examined.
 - (c) For the failure to export or destroy the motorcycles as required by Paragraph 17 of this Agreement, or for the failure to export motorcycles that fail to meet a criteria specified in Paragraph 18(C)(3) or (4) of this Agreement, or for marketing additional motorcycles in a category found to not meet a criteria under Paragraph 18(C)(2) and 18(D)(2) of this Agreement, Respondent shall pay for each motorcycle a stipulated penalty of \$2,500 plus the difference between Respondent's purchase price and the retail value of the motorcycle.
 - (d) For failure to timely submit the reports required under Paragraph 18(E) of this Agreement, Respondent shall pay a stipulated penalty of \$200 for each day a report is not filed.
22. If Respondent's actions or inactions result in stipulated penalties under Paragraph 21, the stipulated penalties shall automatically begin to accrue on the day performance is due or

the non-compliance occurred, and shall continue to accrue through the following day that performance is completed or the non-compliance ceases. Nothing herein shall be construed to prevent the simultaneous accrual of separate stipulated penalties for separate violations of this Agreement. Payment of stipulated penalties as set forth above is in addition to the penalties required under Paragraph 16, and the United States specifically reserves all other rights or remedies which may be available to the United States by reason of Respondent's failure to comply with the requirements of this Agreement, or any federal, state or local law or regulation applicable to Respondent.

23. All stipulated penalties shall be paid in the manner specified in Paragraph 16. In addition, a copy of the transmittal letter(s) and check(s) shall be sent to Jocelyn Adair at the address specified in Paragraph 20.
24. Respondent further agrees that upon default or failure of Respondent to comply with the terms of this Agreement, EPA may refer this matter to the United States Attorney General for collection pursuant to Section 205(d) of the Act, 42 U.S.C. § 7524(d), commence an action to enforce this Agreement or to recover the civil penalty pursuant to Section 205 of the Act; or pursue any other remedies available to it. Respondent expressly waives its right to assert that such engines are certified or exempt from the certification requirements, or that such action is barred by 28 U.S.C. § 2462, other statutes of limitation, or other provisions limiting actions as a result of passage of time.
25. This Agreement becomes effective upon the date executed by EPA, at which time a copy will be returned to Respondent.
26. Respondent hereby represents that the individual or individuals executing this Agreement on behalf of Respondent are authorized to do so and that such execution is intended and is sufficient to bind Respondent.
27. Respondent waives its rights, if any, to a hearing, trial or any other proceeding on any issue of fact or law relating to the matters consented to herein.
28. The terms of this Agreement are contractual and not a mere recital. If any provision or provisions of this Agreement are held to be invalid, illegal or unenforceable, the remaining provisions shall not in any way be affected or impaired thereby.
29. The validity, enforceability, and construction of all matters pertaining to this Agreement shall be determined in accordance with applicable federal law.
30. The effect of settlement described in Paragraph 31 below is conditional upon the truthfulness, accuracy and completeness of Respondent's disclosures and representations to EPA as memorialized in its letters to EPA dated August 12 and 17, 2004, and in reports and documents submitted by Respondent in this matter.

31. Upon completion of the terms of this Agreement, this civil matter shall be deemed terminated and resolved. Nothing herein shall limit the right of EPA to proceed against Respondent in the event of default or noncompliance with this Agreement; for violations of § 203 of the Clean Air Act, 42 U.S.C. § 7522, which are not the subject matter of this Agreement; or for other violations of law; or with respect to other matters not within the scope of the Agreement. This Agreement in no way affects, or relieves Respondent of responsibility to comply with other state, federal or local law or regulations.

The following agree to the terms of this Agreement:

41 Eastern Boulevard, Inc

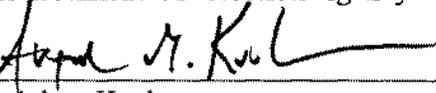
By: 
Robert Sander President

Date: MARCH 29, 2005

Administrative Settlement Agreement *In the Matter of: 41 Eastern Boulevard, Inc.;*
AED/MSEB: 7033

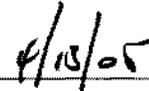
U.S. Environmental Protection Agency

By: _____



Adam Kushner
Acting Director
Air Enforcement Division

Date: _____



Attachment

WORKING DRAFT

REVISION: 0

DATE: 03/10/05

Page 1 of 6

**CUSTOMS AND BORDER PROTECTION
SAVANNAH LABORATORY**

and

**U.S. ENVIRONMENTAL PROTECTION AGENCY
AIR ENFORCEMENT DIVISION
WASHINGTON, DC**

**DETERMINATION OF DISPLACEMENT OF
RECIPROCATING INTERNAL COMBUSTION
ENGINES**

APPROVED BY:

SIGNATURE:

DATE:

SAFETY PRECAUTIONS

This method does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to its use.

0 METHOD UNCERTAINTY

The uncertainty of measurement for this method is specific to each laboratory.

1 INTRODUCTION

This method describes the procedure for determining the engine displacement in cubic centimeters (cm³) of reciprocating internal combustion engines. It covers dimensional measurement, calculation, and reporting of the piston swept volume of such engines.

Engine displacement is an important physical property that affects the power output, size and weight of an engine and its suitability for use in various equipment or vehicles.

Government agencies regulate equipment based on engine displacement. For example, US EPA regulations at 40 CFR 86.419-78, divide motorcycles into separate classes based on engine displacement.

2 SCOPE AND FIELD OF APPLICATION

This method is utilized for determining the engine displacement of reciprocating internal combustion engines, such as motorcycle and scooter engines

classified in HTSUS headings 8711.10 through 8711.50.

3 APPARATUS

3.1 Calipers, bore gages, and/or telescoping gages having a range of at least 0-150 mm or other device suitable for measuring the diameter (bore) of a reciprocating internal combustion engine cylinder.

3.2 Calipers, depth gages and/or telescoping gages or other suitable devices for measuring the stroke of reciprocating internal combustion engines.

3.3 A set of gage blocks or end gages suitable for verifying the accuracy of the calipers, bore gages, and/or depth gages.

3.4 Various hand tools required to gain access to the engine cylinder and flywheel. Typically, a 1/4" and 3/8" socket set, phillips and flathead screwdrivers, combination wrenches, and allen wrenches. Both standard and metric tools may be required.

3.5 Camera for recording the appearance, model numbers, VIN, serial numbers of the engine, and any other pertinent information.

4 DEFINITIONS

4.1 *Reciprocating Internal Combustion Engine:* Two-stroke, four-stroke, and diesel engines that run on a hydrocarbon fuel.

4.2 *Engine Displacement:* The piston swept volume of an internal combustion engine calculated using the bore and

stroke values determined according to this method. For regulatory compliance purposes, EPA will round the calculated displacement to the nearest whole cubic centimeter, in accordance with ASTM E29, "Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications."

4.3 Cylinder Bore: The Bore Value or average diameter of the cylinder within the area traveled by the piston.

4.4 Cylinder Stroke: The Stroke Value or average length of travel of a piston in a cylinder from the point closest to the crankshaft (bottom dead center or BDC) to the point farthest from the crankshaft (top dead center or TDC) in the engine cylinder.

5 PRELIMINARY DOCUMENTATION

5.1 EPA staff and contract inspectors, as well as independent contractors, are to use the Engine Displacement Data Sheet, Appendix A, to record documentary and generated data.

5.2 Examine measurement instruments for visible damage and note the date on the calibration label affixed to the instrument or case. Damaged instruments or instruments that have not been calibrated by an accredited calibration laboratory should not be used.

5.3 Prior to use, verify the accuracy of all measuring devices using certified gage blocks. EPA staff and contract inspectors, as well as independent contractors, are to use the currently calibrated standards (gauging blocks or end measuring rods) to determine that

the test instruments measure within 0.05mm of the standards.

PROCEDURE

The cylinder volume swept by the piston is calculated from the measured bore and stroke values using the standard mensuration formula for cylinders. The volume of each cylinder on multi-cylinder engines is measured and added together for a total volume. Engine displacement is equivalent to the total displacement volume calculated when rounded to the nearest whole cubic centimeter, in accordance with ASTM E 29.

6 PREPARATION

6.1 Dimensional measurements are to be performed using certified measurement tools and recorded in SI units, unless otherwise noted.

6.2 This method requires some disassembly of the engine, and some engines may require drilling a hole through the head to facilitate measuring the stroke of the engine.

6.3 Photograph the pertinent markings on the shipping carton (e.g. model number, VIN, engine number, frame engine, engine displacement, etc).

6.4 Remove the carton and photograph the motor scooter or motorcycle, its engine, and any pertinent markings.

7 ENGINE DISASSEMBLY

7.1 Perform disassembly necessary to gain clear access to the cylinder of the engine and the engine flywheel. This may involve removal of various pieces of

shrouding or flaring, covers, brackets, and other components.

7.2 Determine if the engine cylinder has a head that can be separated from the cylinder. If it does not, remove the spark plug and determine if the measurement instrument can be inserted through the spark plug hole in order to measure the stroke in an axis parallel to the motion of the piston. If this is possible, the stroke will be measured through the spark plug hole. If it is not possible to measure the stroke of the engine through the spark plug hole, it may be necessary to drill a hole through the cylinder head so that a measuring device can be used to measure the stroke of the engine.

7.3 For engines in which the head can be separated from the cylinder, remove the engine head and gasket from the cylinder. If the engine has an overhead camshaft, the camshaft assembly must be removed. It is useful to secure the camshaft chain above the engine block with a twist tie or wire so that it does not fall into the crankcase and interfere with the rotation of the crankshaft.

7.4 Remove the flywheel cover. This will allow the engine crankshaft to be turned by hand and facilitate making accurate stroke measurement.

8 STROKE MEASUREMENT - ENGINE WITH REMOVABLE HEAD

8.1 Measure the stroke of the engine using the slide of a caliper, a depth gage, or other suitable measuring device. To measure the stroke, rotate the engine crankshaft by hand until the piston is at the lowest point of travel in the cylinder.

8.2 Insert the measuring device into the cylinder until it just touches the piston. Slightly rotate the crankshaft in both directions to ensure the piston is at the bottom of its travel in the cylinder. The measuring device should be flat against the wall of the cylinder and perpendicular to the face of the piston. Measure the distance from the piston to the top of the cylinder wall. Record the measurement to the resolution allowed by the device.

8.3 Rotate the crankshaft until the piston reaches the highest point of travel. Slightly rotate the crankshaft back and forth to ensure the piston is at the top of its travel in the cylinder. Measure the distance from the face of the piston to the top of the cylinder wall ensuring that the measuring device is flat against the cylinder wall and perpendicular to the crankshaft. Record the measurement. The stroke is the difference between the bottom measurement and the top measurement. Make four stroke measurements at 90° intervals around the cylinder wall. NOTE: In order to minimize measurement error, ensure that the orientation of the measurement device and the position of the device on the top of the piston remain identical at the BDC and TDC measurement points.

9 STROKE MEASUREMENT - ENGINE WITH ONE PIECE CYLINDER/HEAD ASSEMBLY

9.1 If the measurement instrument can be inserted through the spark plug hole in order to measure the stroke in an axis parallel to the motion of the piston, insert the measuring device into the spark plug hole and if necessary expand the device until it touches the piston top.

9.2 Rotate the crankshaft back and forth to ensure the cylinder is at its lowest point of travel. The measuring device should be flat against the edge of the spark plug hole and perpendicular to the face of the piston. Measure the distance from the piston to the top of the spark plug hole. Record the measurement to the resolution allowed by the measuring device.

9.3 Rotate the crankshaft until the piston reaches the highest point of travel. Slightly rotate the crankshaft back and forth to ensure the piston is at the top of its travel in the cylinder. Measure the distance from the piston to the top of the spark plug hole. Record the measurement. The stroke is the difference between the bottom measurement and the top measurement. Make four stroke measurements in this manner with the purpose of assuring an accurate and precise measurement of the piston travel in the cylinder.

10 STROKE MEASUREMENT - ENGINE WITH ONE-PIECE CYLINDER HEAD ASSEMBLY AND WITH OFFSET SPARK PLUG HOLE

If the spark plug hole is at an angle such that it is not possible to insert a measuring device through the spark plug hole in order to measure the stroke in an axis parallel to the motion of the piston, it may be necessary to drill a hole in the top of the cylinder head to provide access for measuring the engine stroke. If necessary, remove the head/cylinder assembly prior to drilling the access hole. Drill a hole through the top of the head/cylinder assembly. The hole must be of sufficient diameter to

accommodate the depth gage probe or other measuring device. If it was necessary to remove the head/cylinder assembly in order to drill the hole, reassemble the engine by attaching the head/cylinder unit back onto the engine block. Measure the stroke as described in Section 8 using the drilled hole instead of the spark plug hole.

11 BORE MEASUREMENT

11.1 Measure the bore of the cylinder using a caliper, bore gage, telescoping gage or other device suitable for measuring the diameter of the cylinder. If there is clear access to the cylinder for measuring, the bore measurements may be made without removing the cylinder from the engine. If clear access for measuring is not available the cylinder may be removed from the engine to make bore measurements. If the engine head is an integral part of the cylinder measurement of the bore must be done from the bottom or crankcase side of the cylinder.

11.2 Rotate the crankshaft until the piston is at the lowest point of travel in the cylinder. Make four measurements at 45° intervals around the cylinder. If using calipers directly to measure the bore, care must be taken to ensure that measurements are directly across the center of the cylinder and that the inside measuring knife-edges of the caliper are parallel to the axis of the cylinder. If using a bore gage or a telescoping gage to measure the bore insert the device approximately 0.5 inch into the cylinder from the top edge of the cylinder. Allow the measuring device to "center" in the cylinder. If using a bore gage, record measurement to the resolution allowed by the device. If using a telescoping

gage, lock the gage, extract it from the cylinder and measure the distance between the spherical ground points of the gage with a caliper or other suitable device. Record the measurement to the resolution allowed by the device. Make four measurements at 45° intervals. If the cylinder has an integral head and the bore must be measured from the bottom of the cylinder it may not be possible to make measurements at 90-degree intervals if a caliper is used. In this case make four measurements at appropriate intervals.

12 Engines with Multiple Cylinders

For multiple cylinder engines, repeat steps described in Sections 7 through 11 for each individual cylinder.

13 DISASSEMBLED PARTS

Disassembled parts should be placed in a plastic bag and placed in the shipping container. Unless otherwise directed by EPA management, there should be no attempt to reassemble the sample (e.g., motorcycle, scooter, etc).

14 CALCULATIONS

14.1 Calculate the bore value of each cylinder by averaging the individual bore measurements obtained within each cylinder. Record the average bore value to the same level of precision as the individual bore measurements.

14.2 Calculate the stroke value of each cylinder by averaging the individual stroke measurements obtained within each cylinder. Record the average stroke value to the same level of precision as the individual stroke measurements.

14.3 Calculate engine displacement in cubic centimeters using the formula:

$$D = \frac{\pi (B/2)^2 (S) \times N}{1000}$$

This formula can be expressed more simply as:

$$D = B^2 \times S \times 0.0007854 \times N$$

Where:

D = Engine Displacement (cm³)
B = Average Bore Value (mm)
S = Average Stroke Value (mm)
N = Number of Cylinders

15 REPORTING

15.1 Report calculated engine displacement to two decimal places in the appropriate worksheet.

16 REFERENCES

40 CFR 86.419-78: Engine Displacement, Motorcycle Classes

ASTM E29: Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

For questions or comments on this method, please contact:

Mario Jorquera (EPA): 202-564-1079 or jorquera.mario@epa.gov

Ross Ruske (EPA): 202-564-1033 or ruske.ross@epa.gov

Carson Watts (CBP): 912-447-6500 or carson.watts@dhs.gov

(END OF METHOD)