

File - Walk-behind Mowers  
Test Manual

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ENGINEERING TEST MANUAL  
REQUIREMENTS FOR WALK-BEHIND  
POWER LAWN MOWERS

16 CFR Part 1205

ESDOC 541110

Directorate for Engineering Sciences  
Engineering Laboratory

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CONSUMER PRODUCT SAFETY COMMISSION  
WASHINGTON, D.C.

WALK-BEHIND POWER LAWN MOWER TESTING MANUAL APPROVAL RECORD

7/1/82  
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7/1/82  
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## I. INTRODUCTION

### A. BACKGROUND

The Consumer Product Safety Commission (CPSC) promulgated a safety regulation for power lawn mowers with an effective date of June 30, 1982. The regulation provides performance criteria and test procedures. In order to provide a uniform system of testing and specific details of how each test is to be conducted and reported within CPSC, this Engineering Test Manual has been developed. Additional guidelines, with regard to potential problems which might be encountered in performing the compliance tests, have also been incorporated into this document. Procedures to test innovative mowers that may be available in the future will be incorporated as amendments to this document as these mowers become commercially available.

### B. SCOPE

This Engineering Test Manual sets forth the detailed test procedures, test equipment, test sequence, and report format certification to be utilized within the Commission in the compliance testing of power lawn mowers.

### C. APPLICABLE DOCUMENTS

1. Power Lawn Mower Regulation 16 CFR Part 1205 (see appendix).

2. Blade Stopping Time (BST) Instrumentation Design Report (ESDOC 542490) dated October 17, 1980.

## II. GENERAL PROCEDURES

### A. SAFETY PRECAUTIONS

1. The test engineer shall be responsible for the safety, competence, and training of all test personnel. All tests shall be conducted in such a manner as to provide the maximum protection to those individuals conducting the test.

2. Special care should be exercised in handling the lawn mower whenever it is running. The following applies to gasoline or electric mowers where appropriate.

(a) Read the operating and/or service instruction manual carefully and be thoroughly familiar with the control and proper use of the mower.

(b) Never run mower indoors in enclosed, poorly ventilated area. Engine exhaust fumes contain carbon monoxide, an odorless poisonous gas.

(c) Never fill the fuel tank indoors, while the engine is running, or while the engine is hot. Wipe off any spilled gasoline before starting the engine.

(d) When starting mower, pay attention to where feet should be placed so that they will not come in contact with the blade.

(e) Be sure all wheel drive and blade control equipment is in neutral; i.e., with clutch, belts, chains, etc. disengaged when starting mower.

(f) Never operate the mower without guards, plates, or other safety protective devices in place.

(g) Do not put your hands near the cutting blade when it is rotating and the engine is running. When adjustments are to be made, disconnect or remove spark plug. Maintain a proper distance from the mower at all times.

(h) When a helper or associate is near the mower, be careful that he is aware when the blade is energized (rotating) or is about to be energized.

(i) Never attempt to make a wheel height adjustment while the engine is running.

(j) Always stop engine if abnormal vibration is encountered. Check immediately for cause. Vibration is generally a warning of trouble.

(k) Always disconnect spark plug wire after use and secure it so it cannot accidentally contact spark plug.

(l) Allow engine to cool before storing.

(m) Never store mower with fuel in tank in poorly ventilated enclosures or where fuel fumes may reach an open flame or spark. Drain fuel into approved container, outdoors, away from open flame. Store gasoline in a well ventilated area, away from possible ignition sources.

(n) Electric mowers shall be adequately grounded.

(o) Do not operate electric mower in a wet test area.

## B. EQUIPMENT CALIBRATION AND ACCURACY

All equipment used in the performance of the tests shall be maintained in conformance with the Headquarters Laboratory Calibration and Maintenance Program. The selection of specific equipment to be used for each test shall be the responsibility of the test engineer, but in all cases the equipment utilized will provide the accuracy and precision necessary to withstand the scrutiny of possible legal actions.

## C. EQUIPMENT

The following list prescribes the equipment to be used in the performance of the test as well as any equipment or apparatus specified in the Standard.

### 1. General Equipment

(a) Spring force gauge capable of applying compressive force up to 10 pounds and measuring force accurate to within ± 0.1 pound.



(b) Spring force gauge capable of applying static tensile force up to 50 pounds and measuring force accurate to within 0.5 pound.

(c) Assorted clamps.

(d) Stop watch accurate to 0.2 seconds.

(e) Blade stopping time test stand (see Figure 3).

(f) Blade stopping time measurement instrumentation (see Figure 3).

(g) Meter scale.

(h) "C" clamps.

(i) Vernier caliper.

(j) Flexible spline.

## 2. Specified Equipment

(a) UK foot probe (see Figure 6).

(b) Obstruction test fixture (see Figure 11).

## D. SAMPLE IDENTIFICATION

A "sample" includes all items received under one sample number and may consist of several submissions (sub) and numbered accordingly. Upon receipt of a sample, each sub shall be permanently marked so that the identification will remain throughout the tests. Such markings shall be in a prominent location and not affect the results of the tests.

## E. TEST SEQUENCE

The tests shall be performed in the order they appear in this manual.

## F. DATA ACQUISITION AND REPORT FORMAT

The CPSC Test Report for Power Lawn Mowers shall be used for reporting of all results. Use photos for clarification as needed.

## G. PERSONNEL AND TEST REPORT CERTIFICATION

All reports shall be prepared on the form specified herein and shall be certified as to the accuracy and conformance to all the requirements of this test manual by the test engineer. Prior to the tests, the test engineer shall insure that all test operators are familiar with the procedure of this manual especially the safety precautions.

### III. PROCEDURES FOR TESTING MOWERS WITH POWER RESTART

The following test procedures are to be used with all walk-behind lawn mowers that have power start and restart. This includes electric start mowers. The results of the tests on the mowers with power start shall be reported in the CPSC Test Report for Power Lawn Mowers with Power Restart.

Prior to use of this section, determine that the mower has power start and restart capability as its normal starting means. Record determination.

A. LABELING TESTS

1. Mower Certification Label Test

a. Determine that the mower has a certification label that clearly and legibly contains the following information:

- (1) The statement "Meets CPSC Blade Safety Requirements."
- (2) An identification of the production lot (may be in code).
- (3) The name of the person or firm issuing the certificate.
- (4) The location where the product was principally assembled (may be in code).
- (5) The month and year the product was manufactured (may be in code).

If information is in code, consult Compliance Officer to obtain code. Record observations on report form.

b. Through visual observation, determine that the certification label can reasonably be expected to remain on the mower during the period the mower is capable of being used.

c. Visually determine that this label is visible and legible on the assembled mower. Record observations on report form.

2. Supplemental Certification Label or Notice

a. Determine that the mower was manufactured before January 1, 1984. (Parts III.A.2.b and c below apply to mowers manufactured after June 30, 1982 and before January 1, 1984.)

b. Visually determine whether or not any container provided as part of the sample contains a temporary or permanent label or notice stating "Meets CPSC blade safety requirements."

c. Visually determine whether or not any promotional material provided as part of the sample contains a temporary or permanent label or notice stating "Meets CPSC blade safety requirements."

Record observations on report form.

### 3. Warning Label Test

a. Visually determine that mowers have at least one label as shown in Figure 1 on the blade housing. Using a Vernier caliper, measure the height and width of the warning label and record results.

b. For rotary mowers, visually determine that the label is located as close as possible to any discharge opening or if there is no discharge opening in a position that is conspicuous to an operator in the normal operating position. For mowers with no discharge opening, place an operator who is 65 to 76 inches in height directly behind the mower with both hands on the handle(s) and feet on the ground and determine if at least one label is visible to the operator. Record observations.

c. For nonrotary mowers (reel-type) determine that the label is located as close to the center of the cutting width of the blade as possible or in the absence of a suitable mounting surface near the center of the cutting width, the label shall be placed on the nearest suitable mounting surface to the center of the cutting width. Record observations.

### B. MOWER BLADE CONTROL TESTS

#### 1. Control Actuation Test

Determine that the mower has a blade control system that prevents the blade from operating unless the operator actuates the blade control. Record observation on report form.

#### 2. Control Continuous Contact Test

Determine that the mower has a blade control system that prevents the blade from operating unless the operator continuously contacts the blade control. Record observation on report form.

#### 3. Two Distinct Actions Test

Release the blade control and observe that the blade has stopped; now restart the blade operation and determine that another means must be manually actuated to restart the blade. This additional means may be either a control which is separate from the control required in 1 above or may be incorporated into the control required in 1 above as a double-action device requiring two distinct actions to restart the blade. Record observation on report form.

#### 4. Starting Controls Location Test

Determine that the starting means is located within the operating control zone (see Figure 2 for illustration of operating control zone). This is done by using a meter stick or tape measure to measure the distance of the starting means from the rearmost part of the mower handle to determine if the starting means is within the 15 inch radius cylinder of Figure 2. Record distance on report form. See 1205.3(a) (11) and (18).

#### 5. Blade Stopping Time Test Procedure

a. Spray bottom of lawn mower blade with aluminum paint and allow to dry. If mower has circular blade, spray circular blade flat black, then spray with aluminum paint a 1-inch wide radial strip across its diameter to represent a blade to the BST test instrumentation.

b. Put lawn mower on blade stopping time (BST) test stand (see Figure 3).

c. Move timing disk vertically to approximately 1-inch from blade. If mower blade is tilted, tilt the timing disk approximately to same angle and secure adjustment screws.

d. Move lawn mower until center of blade is aligned with centering pin of timing disk.

e. Firmly clamp mower in aligned position using one clamp on the right front wheel and the other clamp on the left rear wheel (some mowers may require special fixtures to be held securely).

f. Fasten a microswitch on the lawn mower handle such that the switch actuates when the blade control device moves 1/4 inch or less from the position of maximum travel. For mowers that have electrical contact for blade control, the BST instrumentation may be connected or wired into this switch.

g. Start mower according to the manufacturer's instructions.

h. Operate mower at maximum operating speed for a minimum of six minutes with the blade fully engaged. Set blade at maximum operating speed before the blade control is released (record time).

i. Actuate reset buttons on BST instrumentation and BST timer.

j. Release blade control (device) in a rapid manner, start visicorder to record blade stop, and read BST on the

timer after the blade has stopped. Examine visicorder record to obtain applicable time component.

k. Repeat timing measurements until a total of 10 measurements of BST have been made (repeat BST measurements with mower at operating temperature). Record on the report form.

## C. MOWER PROTECTIVE SHIELD TESTS

### 1. Moveable Shield Test

a. Test moveable shields that are in any of the areas to be probed (see Section III.C.2.(b)) which are intended to be moveable for attaching auxiliary equipment. Test for automatic return of a moveable shield by manually deflecting the shield to its extreme open position, then release the shield and visually observe that it immediately returns to the closed position with the attached equipment not present.

b. If the shield does not automatically return to the closed position with the attached equipment not present, determine if operation of the blade(s) is prevented. To accomplish this, first manually deflect the shield to its extreme open position and then follow the manufacturer's instructions and complete the procedures necessary to operate the blade. Observe, using a mirror or any other safe method, that the blade(s) has or has not been prevented from operating. Record observations on the data sheet.

3 c. If the shield is in the area to be probed and also subject to the requirements of the Shield Foot-Probe Test, then the shield when opened must return to its closed position automatically or prevent operation of the blade. If the moveable shield does not automatically return to the fully closed position, the mower should be subjected to the Shield Foot-Probe Test (see Section III, C.2.) with the shield in the position it reaches after being released in the open position, unless operation of the blade is prevented.

3 d. If a moveable shield and/or discharge chute door is in the area to be probed, it must also be subjected to the Shield Structural Integrity Test (see Section III, C.4.).

### 2. Shield Foot-Probe Test

a. When performing this test, determine whether the foot probe (see Figure 6) contacts the blade or causes any part of the mower to contact the blade and observe the following test conditions:

- (1) Perform test on a smooth level surface.

(2) Inflate pneumatic tires to the mower manufacturer's recommended cold pressure.

(3) Adjust mower housing to highest setting relative to ground.

(4) On applicable mowers, adjust blade to lowest setting relative to mower housing (not necessary if not adjustable).

(5) Secure mower from horizontal movements, but allow free vertical movement.

(6) Remove grass catcher.

(7) Mark a template with  $+ 60^\circ$  lines on it and place it under the mower to determine the limits of the vertical plane areas.

b. The minimum area to be probed shall include an area both 60 degrees to the right and 60 degrees to the left of the rear of the fore-aft centerline of the cutting width. For single-blade mowers, these angles shall be measured from a point on this fore-aft centerline which is at the center of the blade tip circle (see Figure 7). For multi-blade mowers, these angles shall be measured from a point on the fore-aft centerline of the cutting width which is one-half of the cutting width forward of the rearmost point of the composite of all the blade tip circles (see Figure 8). For a swing over handle, the area to be probed shall be determined as above from both possible rear positions (see Figure 9).

c. Remove spark plug from engine and slowly rotate blade and observe blade contact while doing the following: Insert foot probe in any direction under all points of bottom edge of housing and shields within specified areas such that no part of the foot probe shall extend outside the specified vertical plane area. The shields shall be attached to the mower in a manner in which they are intended to be used. During each insertion of the foot probe, the "sole" of the probe shall be kept in contact with the supporting surface. A specific insertion shall stop when the mower housing lifts or the horizontal insertion force between the mower and foot probe reaches four lbs., (17, 8N), whichever occurs first. To achieve this horizontal insertion force between the mower and the foot probe, first determine the sliding frictional force required to move the probe and add four lbs. to this value. The resultant horizontal force applied to the foot probe produces the horizontal insertion force of four lbs. between the mower and the foot probe. Use a 0 to 10 lb. force gauge to determine the frictional force and to apply the resultant horizontal force. Withdraw the foot probe after each insertion, pivoting the "toe" upward around the "heel" as much as possible

without lifting the mower. Note the area where any contact of the probe with the blade occurs or any part of the mower enters the path of the blade. Measure the depth of penetration of the foot probe or mower part into the plane of the blade and record on report form.

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NOTE: For Air Cushion Mowers, the following test procedure will be used for the Shield Foot-Probe Test:

- (1) Perform the test on a smooth level surface.
- (2) Adjust blade to the lowest setting relative to mower housing (not necessary if not adjustable).
- (3) Start mower following manufacturer's instructions.
- (4) Determine that the mower is operating at manufacturer's recommended maximum operating speed.
- (5) With the mower operating and restrained from horizontal movement but with no vertical force applied measure the height of the mower housing above the flat level surface.
- (6) Turn off power and mount the mower at height measured in Step 5 above. Secure mower so the horizontal movement is prevented but free upward vertical movement is allowed.
- (7) Remove grass catcher (if present).
- (8) Mark a template with plus or minus 60 degree lines on it and place it under the mower to determine the limits of the vertical plane areas.
- (9) Conduct Shield Foot-Probe Test per paragraph III.C.2. b and c.

### 3. Shield Obstruction Test

a. Determine that during the obstruction test the mower shields do not stop the mower as a result of contact with the raised obstacle in Figure 11. Also determine that as a result of contact with the depression and the raised obstacle, the mower shields do not enter the path of the blade or cause more than one wheel to lift from the fixture surface. The distance between the depression and the raised obstacle should be such that the mower contacts only one at a time.

b. Observe the following test conditions:

1. Inflate pneumatic tires to the cold pressure recommended by the mower manufacturer.

2. Adjust the mower housing to its highest setting relative to the ground.



c. Push mower forward and pull rearward perpendicularly to and across the depression (when applicable) and the raised obstacle on the obstruction test fixture of Figure 11 without lifting the mower. Move at a speed not to exceed 2.2 ft/sec (0.7 m/sec.) Initially, the tester should move at a very slow speed, then to no greater than maximum speed in order to observe mower characteristics within the test speed. The tester should practice with a stop watch in an attempt to maximize the speed without exceeding the limit. The test fixture may be relieved only to the extent necessary to prevent interference with any blade retaining device. Observe if the shield stopped the mower as a result of contact with the raised obstacle while traversing the raised obstacle. Also observe as a result of contact with the depression and the raised obstacle whether the shields entered the blade path and whether more than one wheel at a time raised from the test surface while traversing the depression and the raised obstacle. The above are visibly determined with the aid of an observer. Record observations on the report form.

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NOTE: For Air Cushion Mowers, the following test procedure will be used for the Shield Obstruction Test:

- (1) Start the mower following the manufacturer's instructions.
- (2) Determine that the mower is operating at the manufacturer's recommended maximum operating speed.
- (3) Conduct shield obstruction test per paragraph III.C.3. a and c, except that the observation of wheel behavior during the test does not apply.

The mower must successfully traverse, without stopping, the raised obstacle and the trough, both in a forward and reverse direction. For Air Cushion Mowers, there is no requirement to determine blade accessibility during the Obstruction Test.

#### 4. Shield Structural Integrity Test

a. Determine that the shields on the mower do not permanently deform, separate, or crack when subjected to the required force. (This requirement does not apply to the housing.)

b. Secure the mower from horizontal or vertical movement with "C" clamps and/or hold down clamps at each wheel attached to a secure fixture.

c. Using a 50 lb or larger force gauge, apply a static tensile force of up to, but not to exceed, 50.0 lb (222N) uniformly distributed over not less than 50 percent of the length or more than 60 percent. Any shield located totally or partially in the area designated for the foot probe test is subject to this test. The force shall be applied within 5 seconds and maintained for at least 10 seconds in the direction which produces the maximum stress on the shield. Use templates or adjustable spline to determine deformation from the original shape. There shall be no visible evidence of cracks and or separation. Record, describe, and photograph location and amount of any permanent deformation, separation, or crack.

#### IV. PROCEDURES FOR TESTING MOWERS WITH MANUAL START

The following test procedures are to be used with all walk-behind lawn mowers that have solely manual start and restart. The results of the tests on the mowers with manual start shall be reported in the CPSC Test Report for Power Lawn Mowers with Manual Start.

Prior to use of this section, determine that the mower has manual start and restart capability as its normal starting means. Record determination.

A. LABELING TESTS

1. Mower Certification Label Test

a. Determine that the mower has a certification label that clearly and legibly contains the following information:

- (1) The statement "Meets CPSC Blade Safety Requirements."
- (2) An identification of the production lot (may be in code).
- (3) The name of the person or firm issuing the certificate.
- (4) The location where the product was principally assembled (may be in code).
- (5) The month and year the product was manufactured (may be in code).

If information is in code, consult Compliance Officer to obtain code. Record observations on report form.

b. Through visual observation, determine that the certification label can reasonably be expected to remain on the mower during the period the mower is capable of being used.

c. Visually determine that this label is visible and legible on the assembled mower. Record observations on report form.

2. Supplemental Certification Label or Notice

a. Determine that the mower was manufactured before January 1, 1984 (Part IV.A.2.b and c below apply to mowers manufactured after June 30, 1982 and before January 1, 1984).

b. Visually determine whether or not any container provided as part of the sample contains a temporary or permanent label or notice stating "Meets CPSC blade safety requirements."

c. Visually determine whether or not any promotional material provided as part of the sample contains a temporary or permanent label or notice stating "Meets CPSC blade safety requirements."

Record observations on report form.

### 3. Warning Label Test

a. Visually determine that mowers have at least one label as shown in Figure 1 on the blade housing. Using a Vernier caliper, measure the height and width of the warning label and record results.

b. For rotary mowers, visually determine that the label is located as close as possible to any discharge opening or if there is no discharge opening in a position that is conspicuous to an operator in the normal operating position. For mowers with no discharge opening, place an operator who is 65 to 76 inches in height directly behind the mower with both hands on the handle(s) and feet on the ground and determine if at least one label is visible to the operator. Record observations.

c. For nonrotary mowers (reel-type) determine that the label is located as close to the center of the cutting width of the blade as possible or in the absence of a suitable mounting surface near the center of the cutting width, the label shall be placed on the nearest suitable mounting surface to the center of the cutting width. Record observations.

### B. MOWER BLADE CONTROL TESTS

#### 1. Control Actuation Test

Determine that the mower has a blade control system that prevents the blade from operating unless the operator actuates the blade control. Record observation on report form.

#### 2. Control Continuous Contact Test

Determine that the mower has a blade control system that prevents the blade from operating unless the operator continuously contacts the blade control. Record observation on report form.

#### 3. Two Distinct Actions Test

Release the blade control and observe that the blade has stopped; now restart the blade operation and determine that another means must be manually actuated to restart the blade. This additional means may be either a control which is separate from the control required in 1 above or may be incorporated into the control required in 1 above as a double-action device requiring two distinct actions to restart the blade. Record observation on report form.

#### 4. Blade Stopping Time Test Procedure

- a. Spray bottom of lawn mower blade with aluminum paint and allow to dry. If mower has circular blade, spray circular blade flat black, then spray with aluminum paint a 1-inch wide radial strip across its diameter to represent a blade to the BST test instrumentation.
- b. Put lawn mower on blade stopping time (BST) test stand (see Figure 3).
- c. Move timing disk vertically to approximately 1-inch from blade. If mower blade is tilted, tilt the timing disk approximately to same angle and secure adjustment screws.
- d. Move lawn mower until center of blade is aligned with centering pin of timing disk.
- e. Firmly clamp mower in aligned position using one clamp on the right front wheel and the other clamp on the left rear wheel (some mowers may require special fixtures to be held securely).
- f. Fasten a microswitch on the lawn mower handle such that the switch actuates when the blade control device moves 1/4 inch or less from the position of maximum travel.

For mowers that have electrical contact for blade control, the BST instrumentation may be connected or wired into this switch.

- g. Start mower according to the manufacturer's instructions.
- h. Operate mower at maximum operating speed for a minimum of six minutes; then engage blade control (if applicable) to bring blade up to speed.
- i. Actuate reset buttons on BST instrumentation and BST timer.
- j. Release blade control (device) in a rapid manner, start visicorder, and read BST on the timer after the blade has stopped. Examine visicorder record to obtain applicable time component.
- k. Repeat timing measurements until a total of 10 measurements of BST have been made. Record on the report form.

#### 5. Blade Stop Engine Run Control Test and Starting Control Location Test

a. Determine whether or not the blade control stops the blade without stopping the engine. If the blade control stops the blade without stopping the engine, record result on report form. If not, go to IV.B.5.b.

b. Determine if the engine starting controls are located within 24 inches from top of the mower handle (Figures 4 and 5). This is done by using a meter stick or tape measure and measuring the distance from the uppermost portion(s) of the handle that would be gripped by an operator in the normal operating position to the top of the engine starting control. Record results on report form. If the distance is greater than 24 inches go to IV.B.5.c.

c. Determine if the mower has a protective foot shield which extends 360 degrees around the mower housing. This is accomplished by performing part IV.C.2. of this test manual "Shield Foot-Probe Test" around the entire 360° periphery of the mower housing (see Figure 10). Record results on report form.

#### C. MOWER PROTECTIVE SHIELD TESTS

##### 1. Moveable Shield Test

a. Test moveable shields that are in any of the areas to be probed (see Section IV.C.2.(b)) which are intended to be moveable for attaching auxiliary equipment. Test for automatic return of a moveable shield by manually deflecting the shield to its extreme open position, then release the shield and visually observe that it immediately returns to the closed position with the attached equipment not present.

b. If the shield does not automatically return to the closed position with the attached equipment not present, determine if operation of the blade(s) is prevented. To accomplish this, first manually deflect the shield to its extreme open position and then follow the manufacturer's instructions and complete the procedures necessary to operate the blade. Observe, using a mirror or any other safe method, that the blade(s) has or has not been prevented from operating. Record observations on the data sheet.

6 c. If the shield is in the area to be probed and also subject to the requirements of the Shield Foot-Probe Test, then the shield when opened must return to its closed position automatically or prevent operation of the blade. If the moveable shield does not automatically return to the fully closed position, the mower should be subjected to the Shield Foot-Probe Test (see Section IV, C.2.) with the shield in the position it reaches after being released in the open position, unless operation of the blade is prevented.

6

d. If a moveable shield and/or discharge chute door is in the area to be probed, it must also be subjected to the Shield Structural Integrity Test (see Section IV, C.4.).

## 2. Shield Foot-Probe Test

a. When performing this test, determine whether the foot probe (see Figure 6) contacts the blade or causes any part of the mower to contact the blade and observe the following test conditions:

- (1) Perform test on a smooth level surface.
- (2) Inflate pneumatic tires to the mower manufacturer's recommended cold pressure.
- (3) Adjust mower housing to highest setting relative to ground.
- (4) On applicable mowers, adjust blade to lowest setting relative to mower housing (not necessary if not adjustable).
- (5) Secure mower from horizontal movements, but allow free vertical movement.
- (6) Remove grass catcher.
- (7) Mark a template with  $\pm 60^\circ$  lines on it and place it under the mower to determine the limits of the vertical plane areas.

b. The minimum area to be probed shall include an area both 60 degrees to the right and 60 degrees to the left of the rear of the fore-aft centerline of the cutting width. For single-blade mowers, these angles shall be measured from a point on this fore-aft centerline which is at the center of the blade tip circle (see Figure 7). For multi-blade mowers, these angles shall be measured from a point on the fore-aft centerline of the cutting width which is one-half of the cutting width forward of the rearmost point of the composite of all the blade tip circles (see Figure 8). For a swing over handle, the area to be probed shall be determined as above from both possible rear positions (see Figure 9). For mowers subject to IV.B.5.(c), the area to be probed is the entire periphery of the mower including any discharge chute (see Figure 10).

c. Remove spark plug from engine and slowly rotate blade and observe blade contact while doing the following: Insert foot probe in any direction under all points of bottom edge of housing and shields within specified areas such that



no part of the foot probe shall extend outside the specified vertical plane area. The shields shall be attached to the mower in a manner in which they are intended to be used. During each insertion of the foot probe, the "sole" of the probe shall be kept in contact with the supporting surface. A specific insertion shall stop when the mower housing lifts or the horizontal force between the mower and foot probe reaches four pounds, (17, 8N), whichever occurs first. To achieve this horizontal insertion force between the mower and the foot probe, first determine the sliding frictional force required to move the probe and add four pounds to this value. The resultant horizontal force applied to the foot probe produces the horizontal insertion force of four pounds between the mower and the foot probe. Use 0 to 10 pound force gauge to determine the frictional force and to apply the resultant horizontal force. Withdraw the foot probe after each insertion, pivoting the "toe" upward around the "heel" as much as possible without lifting the mower. Note the area where any contact of the probe with the blade occurs or any part of the mower enters the path of the blade. Measure the depth of penetration of the foot probe or mower part into the plane of the blade and record on report form.

7

NOTE: For Air Cushion Mowers, the following test procedure will be used for the Shield Foot-Probe Test:

- (1) Perform the test on a smooth level surface.
- (2) Adjust blade to the lowest setting relative to mower housing (not necessary if not adjustable).
- (3) Start mower following manufacturer's instructions.
- (4) Determine that the mower is operating at manufacturer's recommended maximum operating speed.
- (5) With the mower operating and restrained from horizontal movement but with no vertical force applied measure the height of the mower housing above the flat level surface.
- (6) Turn off power and mount the mower at height measured in Step 5 above. Secure mower so the horizontal movement is prevented but free upward movement is allowed.
- (7) Remove grass catcher (if present).
- (8) Mark a template with plus or minus 60 degree lines on it and place it under the mower to determine the limits of the vertical plane areas.
- (9) Conduct Shield Foot-Probe Test per paragraph IV.C.2. b and c.

3. Shield Obstruction Test

a. Determine that during the obstruction test the mower shields do not stop the mower as a result of contact with the raised obstacle in Figure 11. Also determine that as a result of contact with the depression and the raised obstacle, the mower shields do not enter the path of the blade or cause more than one wheel to lift from the fixture surface. The distance between the depression and the raised obstacle should be such that the mower contacts only one at a time.

b. Observe the following test conditions:

1. Inflate pneumatic tires to the cold pressure recommended by the mower manufacturer.

2. Adjust the mower housing to its highest setting relative to the ground.

c. Push mower forward and pull rearward perpendicularly to and across the depression (when applicable) and the raised obstacle on the obstruction test fixture of Figure 11 without lifting the mower. Move at a speed not to exceed 2.2 ft/sec (0.7 m/sec.) Initially, the tester should move at a very slow speed, then to no greater than maximum speed in order to observe mower characteristics within the test speed. The tester should practice with a stop watch in an attempt to maximize the speed without exceeding the limit. The test fixture may be relieved only to the extent necessary to prevent interference with any blade retaining device. Observe if the shield stopped the mower as a result of contact with the raised obstacle while traversing the raised obstacle. Also observe as a result of contact with the depression and the raised obstacle whether the shields entered the blade path and whether more than one wheel at a time raised from the test surface while traversing the depression and the raised obstacle. The above are visibly determined with the aid of an observer. Record observations on the report form.

8

NOTE: For Air Cushion Mowers, the following test procedure will be used for the Shield Obstruction Test:

- (1) Start the mower following the manufacturer's instructions.
- (2) Determine that the mower is operating at the manufacturer's recommended maximum operating speed.
- (3) Conduct Shield Obstruction Test per paragraph IV.C.3 a and c except that the observation of wheel behavior during the test does not apply.

The mower must successfully traverse, without stopping, the raised obstacle and the trough, both in a forward and reverse direction. For Air Cushion Mowers, there is no requirement to determine the blade accessibility during the Obstruction Test.

4. Shield Structural Integrity Test

a. Determine that the shields on the mower do not permanently deform, separate, or crack when subjected to the required force. (This requirement does not apply to the housing.)

b. Secure the mower from horizontal or vertical movement with "C" clamps and/or hold down clamps at each wheel attached to a secure fixture.

c. Using a 50 lb. or larger force gauge, apply a static tensile force of up to, but not to exceed, 50.0 lb (222N) uniformly distributed over not less than 50 percent or more than 60 percent of the length. Any shield located totally or partially in the area designated for the foot probe test is subject to this test. The force shall be applied within 5 seconds and maintained for at least 10 seconds in the direction which produces the maximum stress on the shield. Use templates or adjustable spline to determine deformation from the original shape. There shall be no visible evidence of cracks and or separation. Record, describe, and photograph location and amount of any permanent deformation, separation, or crack.

## V. REQUIREMENTS FOR CPSC TEST REPORT FOR POWER LAWN MOWERS

The Power Lawn Mower Report Form used to report the results shall be per Appendix A or B as appropriate. The names of the test personnel involved shall be inserted and final approval and responsibility shall rest with the Test Engineer.

## VI. FIGURES

- Figure 1 - Warning Label
- Figure 2 - Operating Control Zone
- Figure 3 - Blade Stopping Time Test Instrumentation
- Figure 4 - Engine Starting Control Location
- Figure 5 - Engine Starting Control Location
- Figure 6 - Foot Probe
- Figure 7 - Area To Be Probed
- Figure 8 - Area To Be Probed, Multi-Blade Mowers
- Figure 9 - Area To Be Probed, Swingover Handle
- Figure 10 - Area To Be Probed, 360° Foot Shield
- Figure 11 - Obstruction Test Figure



FIG 1 — WARNING LABEL

LABEL COLORS

- |        |   |   |
|--------|---|---|
| BLACK  | { | BORDER (1/8 wide)<br>Outline of word DANGER<br>All fine LINES<br>Small LETTERING<br>HAND symbol |
| RED    | { | The word DANGER<br>KNIFE POINT and circular panel OUTLINE                                       |
| YELLOW |   | 5-sided PANEL <u>except</u> circular area   |
| WHITE  |   | REMAINING AREAS   |

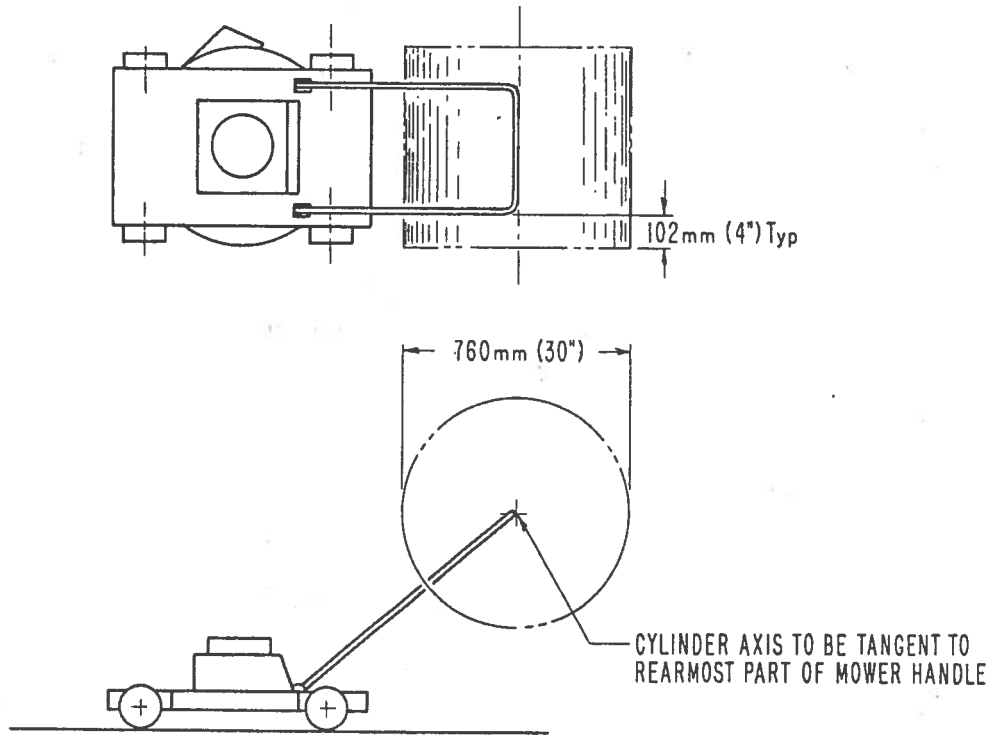


FIG 2—OPERATING CONTROL ZONE

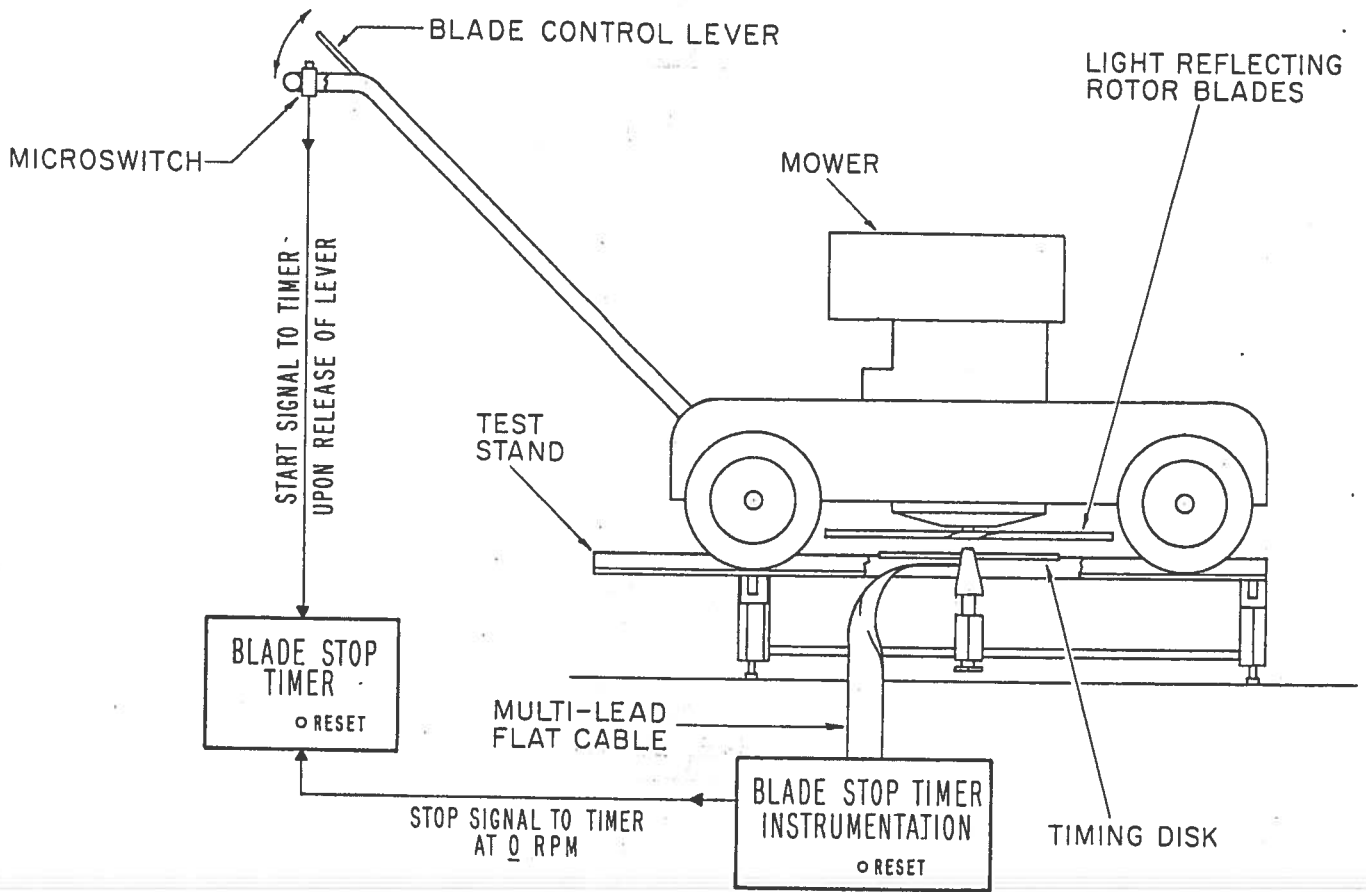
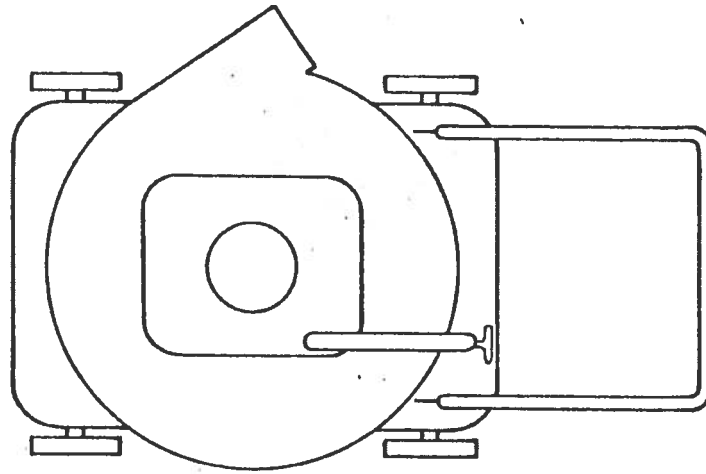
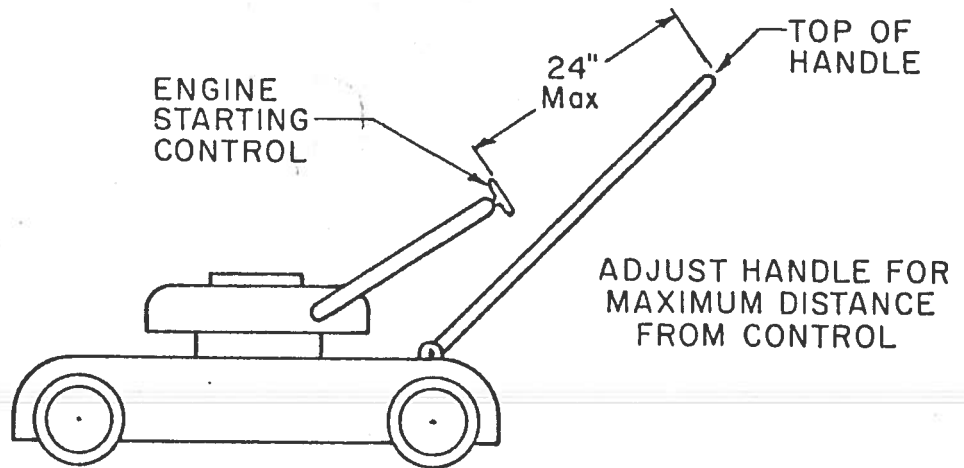


FIG 3—BLADE STOPPING TIME TEST INSTRUMENTATION





TOP VIEW



SIDE VIEW

FIG 4—ENGINE STARTING CONTROL LOCATION



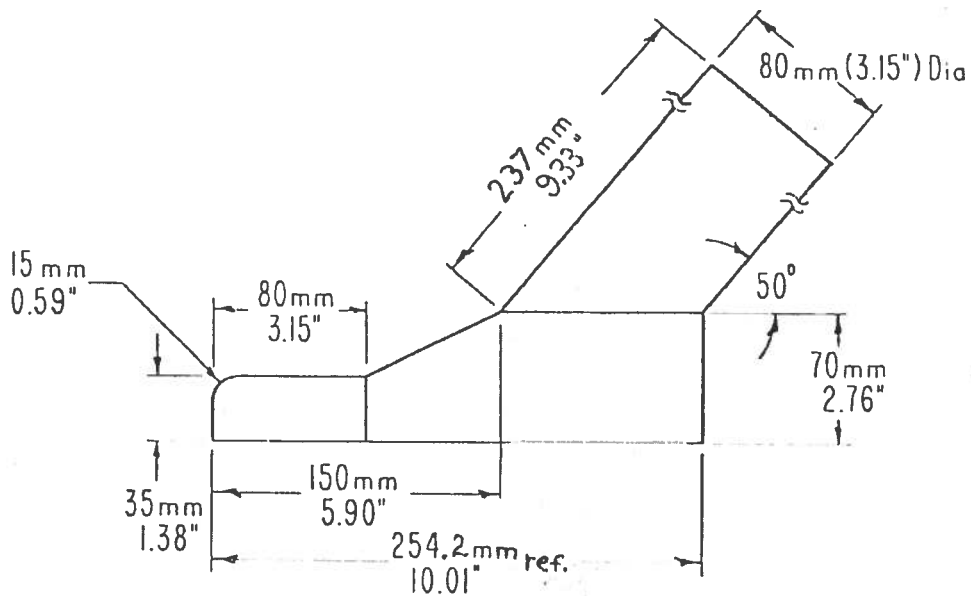
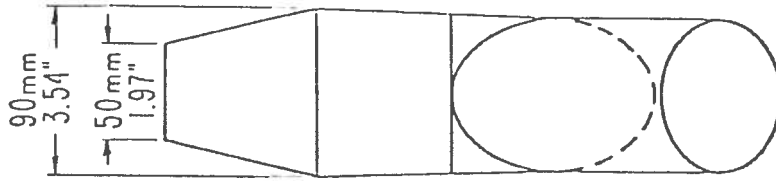


FIG 6—FOOT PROBE

Note: The foot probe diagram in 16 CFR Part 1205 does not fully depict the intersection of the "leg" and the "instep." This figure, which depicts the foot probe used at the CPSC Engineering Laboratory, indicates a hard intersection between these two parts of the foot probe. As shown, smoothing or fairing is not required between the two parts.

This diagram also depicts the foot probe dimensions in a clarified manner. The overall length of the "foot" is given as is the dimension for the length of the "leg" portion of the probe. A cutoff angle for the cylindrical "leg" section is also shown. These clarifications are in full agreement with the foot probe diagram in 16 CFR Part 1205.

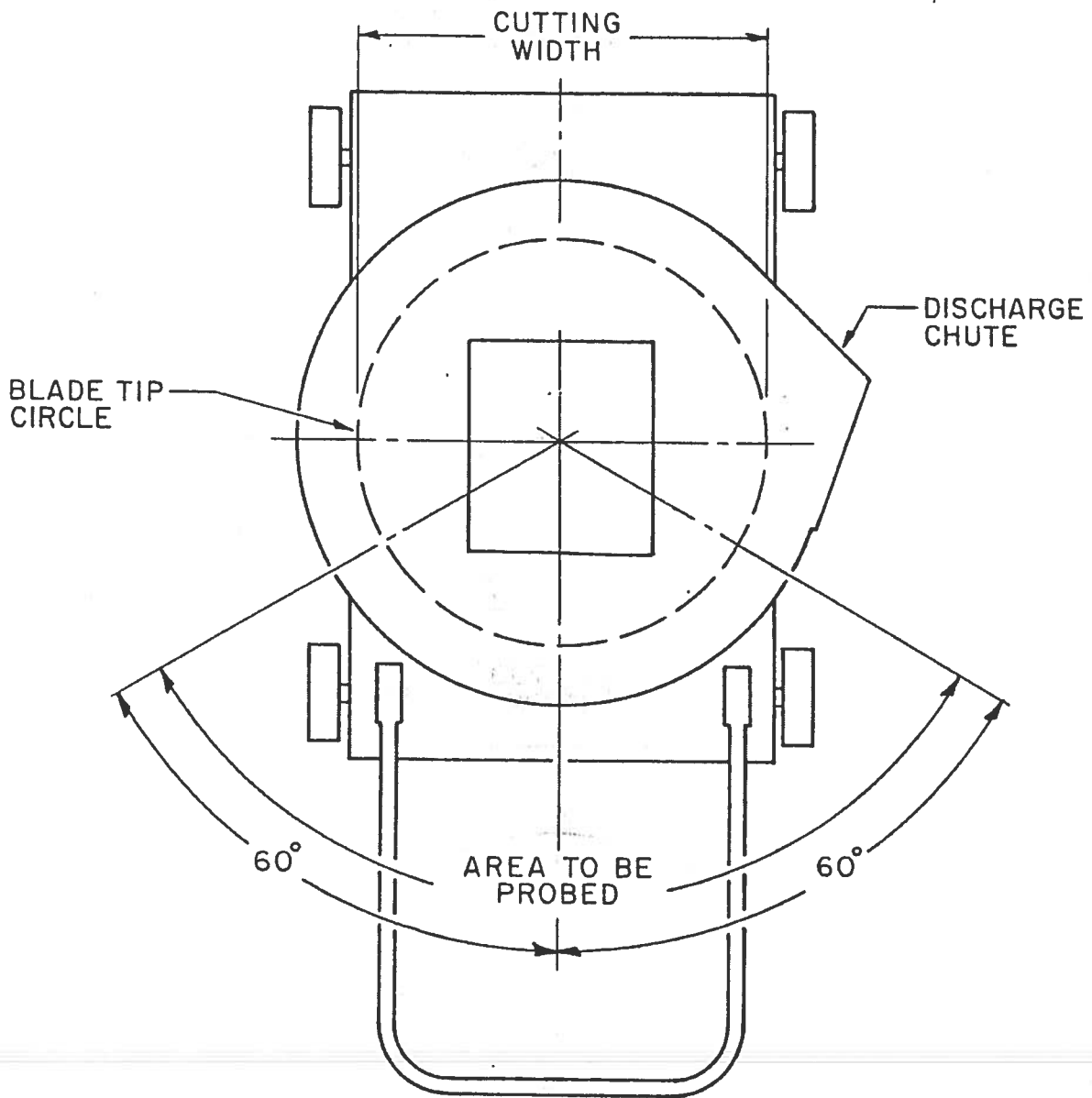


FIG 7—AREA TO BE PROBED

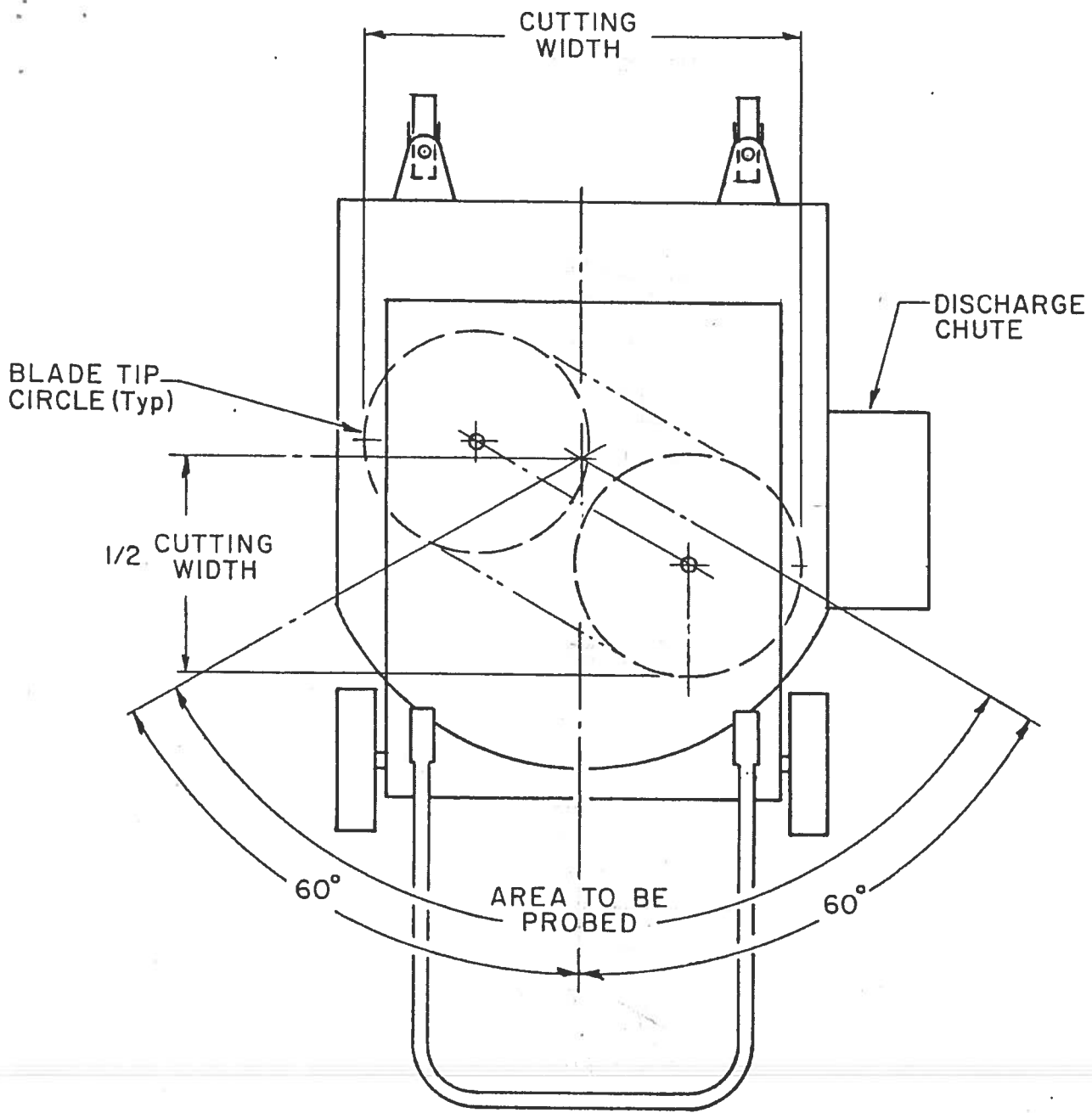


FIG 8 — AREA TO BE PROBED  
MULTI-BLADE MOWERS

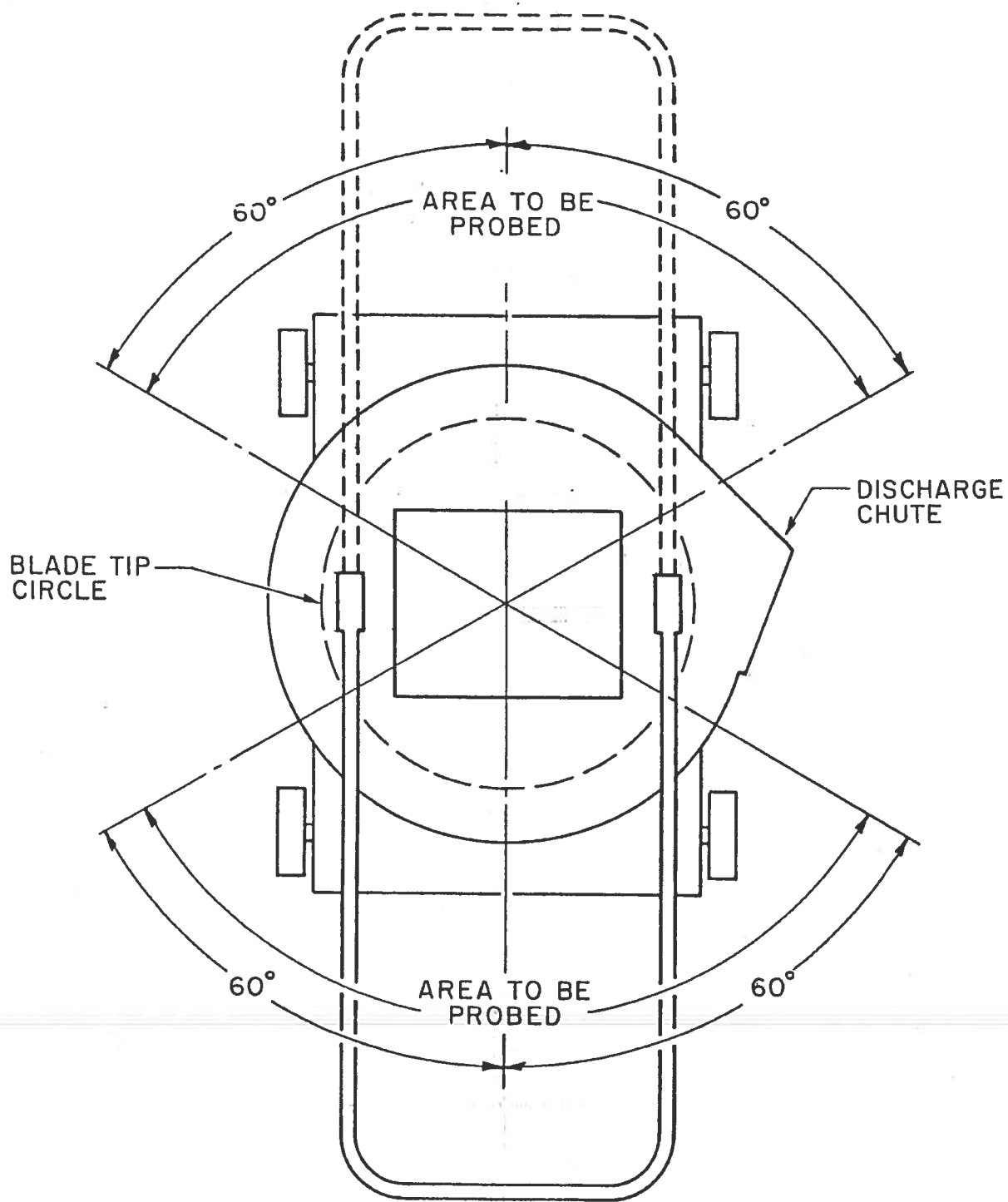


FIG 9 — AREA TO BE PROBED.  
SWINGOVER HANDLE

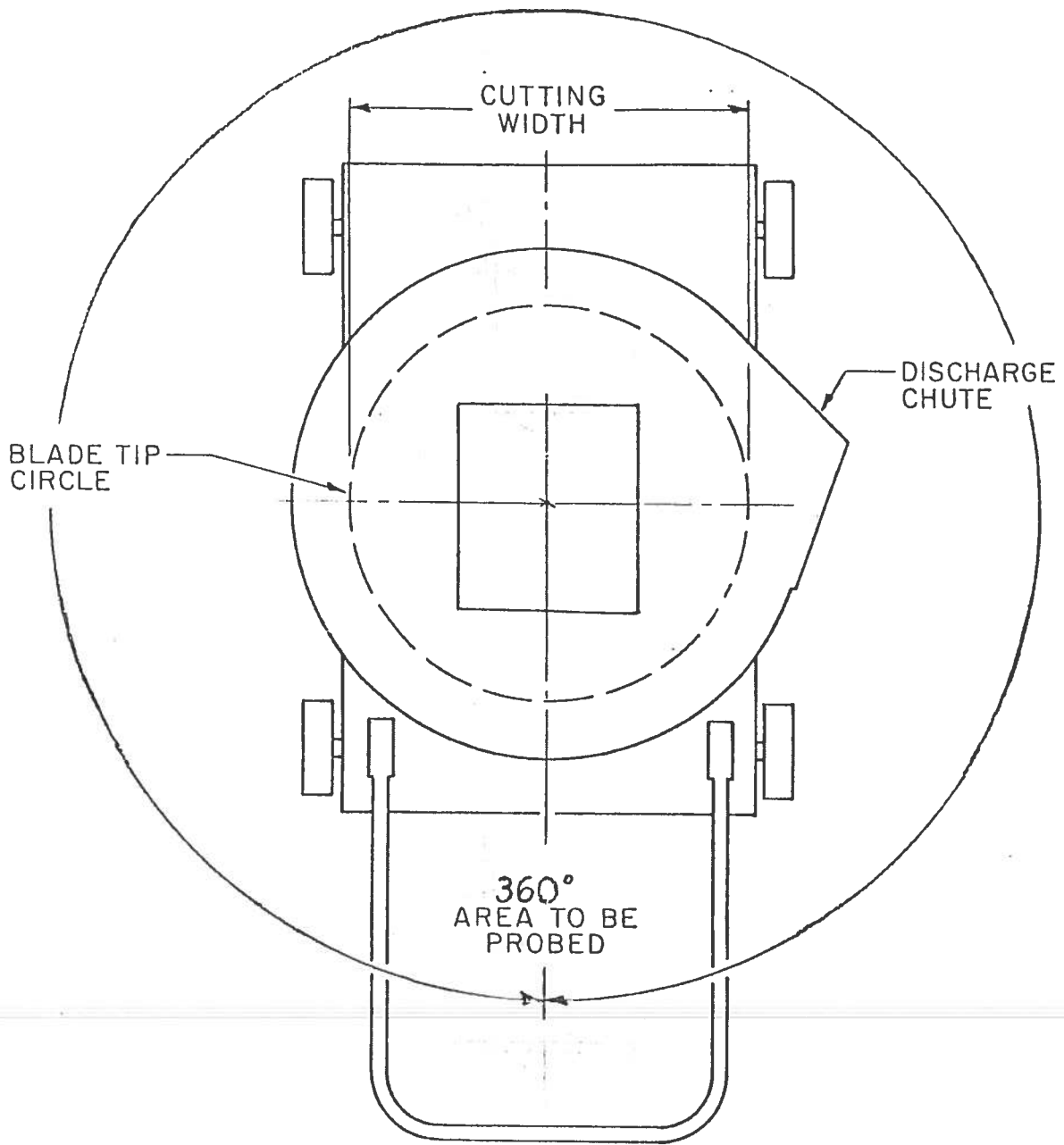


FIG 10 AREA TO BE PROBED,  
360° FOOT SHIELD

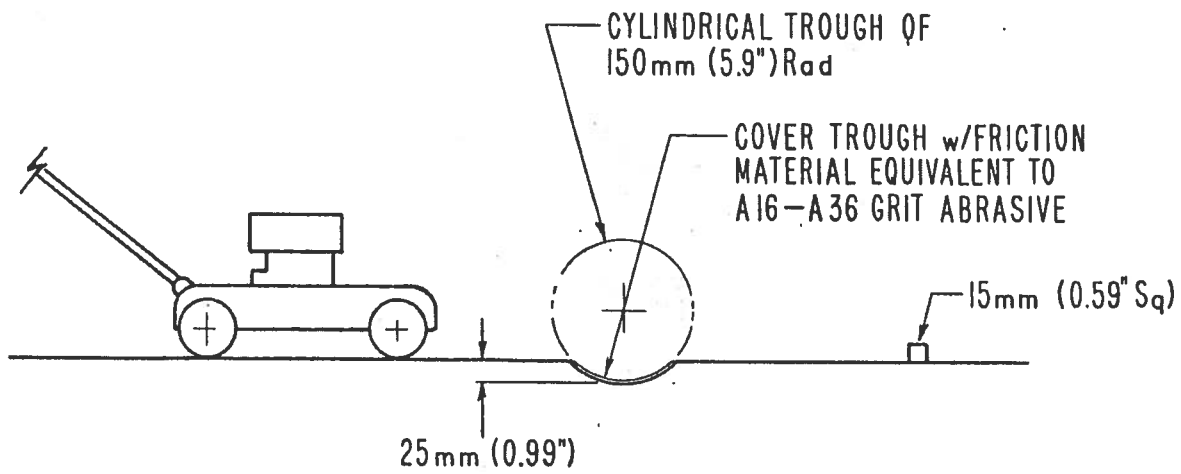


FIG II—OBSTRUCTION TEST FIXTURE



## VII. APPENDIX

- A. CPSC Test Report for Power Lawn Mowers with Power Restart
- B. CPSC Test Report for Power Lawn Mowers with Manual Start
- C. 16 CFR Part 1205 Requirements for Power Lawn Mowers

CPSC TEST REPORT FOR POWER LAWN  
MOWERS WITH POWER RESTART

DATE: \_\_\_\_\_  
SAMPLE NUMBER: \_\_\_\_\_ SUB NUMBER: \_\_\_\_\_  
MANUFACTURER: \_\_\_\_\_  
MODEL: \_\_\_\_\_  
POWER START/RESTART CAPABILITY (describe) \_\_\_\_\_

APPROVAL RECORD

_____	_____
Test Technician	Date
_____	_____
Test Engineer	Date
_____	_____
Supervisory Mechanical Engineer	Date

\*Additional pages for photographs and comments are as follows  
(none or list):

CPSC TEST REPORT FOR POWER LAWN  
MOWERS WITH POWER RESTART  
Sample Number \_\_\_\_\_

REFERENCE PARAGRAPH		REQUIREMENT	OBSERVATION OR MEASUREMENT
TEST MANUAL	REGULATION		
III.A.1.(a)	1205.35(b)	<p>The mower has a certification label containing the following:</p> <ol style="list-style-type: none"> <li>1. A statement "Meets CPSC Blade Safety Requirements" (yes or no).</li> <li>2. Identification of production lot (may be in code; if yes, record decoded information).</li> <li>3. Name of person or firm issuing the certificate (if yes, record).</li> <li>4. Location where product was assembled (may be in code; if yes, record decoded information).</li> <li>5. Month and year the product was manufactured (may be in code; if yes, record decoded information).</li> </ol>	
III.A.1.(b)	1205.35(a)	Certification label can reasonably be expected to remain on mower (describe if no).	
III.A.1.(c)	1205.35(d)	Certification label visible and legible on assembled mower (describe if no).	
III.A.2.(a)	1205.35(d)	Mower manufactured prior to January 1, 1984 (yes or no).	
III.A.2.(b)	1205.35(d)	Container has label or notice stating, "Meets CPSC blade safety requirements." **	

\*\*Applies only to mowers manufactured after June 30, 1982 and before January 1, 1984.)

CPSC TEST REPORT FOR POWER LAWN  
MOWERS WITH POWER RESTART  
Sample Number \_\_\_\_\_

REFERENCE PARAGRAPH		REQUIREMENT	OBSERVATION OR MEASUREMENT
TEST MANUAL	REGULATION		
III.A.2.(c)	1205.35(d)	Promotional material has label or notice stating, "Meets CPSC blade safety requirements." **	
III.A.3.(a)	1205.6(a)	Mowers shall have at least one warning label as shown in Figure 1 on the blade housing (if no, record deviations).	
III.A.3.(b)	1205.6(b)	(1) For rotary mowers with a discharge opening, the warning label shall be located as close as possible to any discharge opening (if no, describe).  (2) For mowers with no discharge opening, the warning label shall be in a position that is conspicuous to an operator in the normal operating position (if no, describe).	
III.A.2.(c)	1205.6(c)	For reel-type mowers, the warning label shall be located as close to the center of the cutting width of the blade as possible or the nearest suitable mounting surface to the center of the cutting width (if no, describe).	
III.B.1	1205.5(a)(1)(i)	Blade operates only when blade control is actuated (yes or no).	
III.B.2	1205.5(a)(1)(ii)	Continuous contact with blade control required for blade to be continuously driven (yes or no).	

\*\*Applies only to mowers manufactured after June 30, 1982 and before January 1, 1984.)

CPSC TEST REPORT FOR POWER LAWN  
MOWERS WITH POWER RESTART  
Sample Number \_\_\_\_\_

REFERENCE PARAGRAPH		REQUIREMENT	OBSERVATION OR MEASUREMENT
TEST MANUAL	REGULATION		
III.B.3	1205.5(a)(2)	Additional manual means to be actuated before stopped blade is restarted.  1. Separate control from blade control means (yes, no, or n/a) or  2. Blade control with two distinct motions or double-action device (yes, no, or n/a)	
III.B.4	1205.5(c)	Power restart mowers with blades that begin operating when the power source starts shall have their normal starting means located within the operating control zone (if no, describe position).	
III.B.5	1205.5(a)(1)(iii) 1205.5(b)	Blade motion in the normal direction of travel shall come to a complete stop within 3.0 seconds after release of the blade control.	

III.B.5.k

\*Stopping Time Data

Run time prior to test \_\_\_\_\_ min.

Comments:

Run No.	Timer Reading (sec)	Visicorder Time Component (sec)	Total BST (sec)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

CPSC TEST REPORT FOR POWER LAWN  
MOWERS WITH POWER RESTART  
Sample Number \_\_\_\_\_

REFERENCE PARAGRAPH		REQUIREMENT	OBSERVATION OR MEASUREMENT
TEST MANUAL	REGULATION		
III.C.1	1205.4(c)(1)(i)	Shields when deflected to their extreme open position shall return automatically to a position that meets the requirements of III.C.2, 3, & 4 (yes, no, or n/a) or	
	1205.4(c)(1)(ii)	Shields when deflected to their extreme open position shall prevent operation of the blade(s) unless the attached equipment is present or the moveable shield is returned to a position that meets the requirements of III.C.2, 3, & 4 (yes, no, or n/a).	
III.C.2.	1205.4(a)(1)	Shields shall prevent foot probe in Figure 6 from entering the path of the blade or causing any part of the mower to enter the path of the blade (if no, describe).  1. Location of contact.  2. Depth of penetration into the plane of the blade.	Sliding Friction Force _____ (lbs)
III.C.3.	1205.4(a)(3)	1. Shields shall not stop mower as a result of contact with the raised obstacle during the obstruction test. Does shield stop mower (yes or no).  2. As a result of contact with the depression and the raised obstacle, the shields shall not enter the path of the blade or cause more than one wheel to lift.	

CPSC TEST REPORT FOR POWER LAWN  
MOWERS WITH POWER RESTART  
Sample Number \_\_\_\_\_

REFERENCE PARAGRAPH		REQUIREMENT	OBSERVATION OR MEASUREMENT
TEST MANUAL	REGULATION		
III.C.4.	1205.4(a)(2)	<p>(a) Does shield enter path of blade (yes or no).</p> <p>(b) Does more than one wheel lift (yes or no).</p> <p>Shields shall not permanently deform, separate, or crack when subjected to 50 lbs (222N) static tensile force.</p> <p>1. Location of deformation, separation, or crack (describe and photograph any failures).</p>	

CPSC TEST REPORT FOR POWER LAWN  
MOWERS WITH MANUAL START

DATE: \_\_\_\_\_

SAMPLE NUMBER: \_\_\_\_\_

SUB NUMBER: \_\_\_\_\_

MANUFACTURER: \_\_\_\_\_

MODEL: \_\_\_\_\_

MANUAL START/RESTART CAPABILITY (describe) \_\_\_\_\_

APPROVAL RECORD

\_\_\_\_\_  
Test Technician Date

\_\_\_\_\_  
Test Engineer Date

\_\_\_\_\_  
Supervisory Mechanical Engineer Date

\*Additional pages for photographs and comments are as follows  
(none or list):



CPSC TEST REPORT FOR POWER LAWN  
MOWERS WITH MANUAL START  
Sample Number \_\_\_\_\_

REFERENCE PARAGRAPH		REQUIREMENT	OBSERVATION OR MEASUREMENT
TEST MANUAL	REGULATION		
IV.A.1.(a)	1205.35(d)	<p>The mower has a certification label containing the following:</p> <ol style="list-style-type: none"> <li>1. A statement "Meets CPSC blade safety requirements" (yes or no).</li> <li>2. Identification of production lot (may be in code; if yes, record decoded information).</li> <li>3. Name of person or firm issuing the certificate (if yes, record).</li> <li>4. Location where product was assembled (may be in code; if yes, record decoded information).</li> <li>5. Month and year the product was manufactured (may be in code; if yes, record decoded information).</li> </ol>	
IV.A.1(b)	1205.35(a)	Certification label can reasonably be expected to remain on mower (describe if no).	
IV.A.1.(c)	1205.35(d)	Certification label visible and legible on assembled mower. (describe if no).	
IV.A.2.(a)	1205.35(d)	Mower manufactured prior to January 1, 1984 (yes or no).	
IV.A.2.(b)	1205.35(d)	Container has label or notice stating, "Meets CPSC blade safety requirements." **	

\*\*Applies only to mowers manufactured after June 30, 1982 and before January 1, 1984).

CPSC TEST REPORT FOR POWER LAWN  
MOWERS WITH MANUAL START  
Sample Number \_\_\_\_\_

REFERENCE PARAGRAPH		REQUIREMENT	OBSERVATION OR MEASUREMENT
TEST MANUAL	REGULATION		
IV.A.2.(c)	1205.35(d)	Promotional material has label or notice stating, "Meets CPSC blade safety requirements." **	
IV.A.3.(a)	1205.6(a)	Mowers shall have at least one warning label as shown in Figure 1 on the blade housing (if no, record deviations).	
IV.A.3.(b)	1205.6(b)	(1) For rotary mowers with a discharge opening, the warning label shall be located as close as possible to any discharge opening (if no, describe).  (2) For mowers with no discharge opening, the warning label shall be in a position that is conspicuous to an operator in the normal operating position (if no, describe).	
IV.A.2.(c)	1205.6(c)	For reel-type mowers, the warning label shall be located as close to the center of the cutting width of the blade as possible or the nearest suitable mounting surface to the center of the cutting width (if no, describe).	
IV.B.1	1205.5(a)(1)(i)	Blade operates only when blade control is actuated (yes or no).	
IV.B.2	1205.5(a)(1)(ii)	Continuous contact with blade control required for blade to be continuously driven (yes or no).	

\*\*Applies only to mowers manufactured after June 30, 1982 and before January 1, 1984).

CPSC TEST REPORT FOR POWER LAWN  
MOWERS WITH MANUAL START  
Sample Number \_\_\_\_\_

REFERENCE PARAGRAPH		REQUIREMENT	OBSERVATION OR MEASUREMENT
TEST MANUAL	REGULATION		
IV.B.3	1205.5(a)(2)	Additional manual means to be actuated before stopped blade is restarted.  1. Separate control from blade control means (yes, no, or n/a) or  2. Blade control with two distinct motions or double-action device (yes, no, or n/a).	
VI.B.4	1205.5(a)(1)(iii) 1205.5(b)	Blade motion in the normal direction of travel shall come to a complete stop within 3.0 seconds after release of the blade control.	

\*Stopping Time Data  
Run time prior to test \_\_\_\_\_ min.

Comments:

Run No.	Timer Reading (sec)	Visicorder Time Component (sec)	Total BST (sec)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

CPSC TEST REPORT FOR POWER LAWN  
MOWERS WITH MANUAL START  
Sample Number \_\_\_\_\_

REFERENCE PARAGRAPH		REQUIREMENT	OBSERVATION OR MEASUREMENT
TEST MANUAL	REGULATION		
IV.B.5.(a)	1205.5(a)(1)(iv)	Mowers with an engine and manual starting controls shall have a blade control that stops blade without stopping engine (yes, no, or n/a) or	
IV.B.5.(b)	1205.5(a)(1)(iv)(A) and 1205.5(c)	Engine starting controls are located within 24 inches from the top of the mower's handles (if no record, distance and photograph) or	
IV.B.5.(c)	1205.5(a)(1)(iv)(B) and 1205.5(c)	Mower has a protective foot shield which extends 360 degrees around the mower housing (yes, no, or n/a). See IV.C.2.	
IV.C.1	1205.4(c)(1)(i)	Shields when deflected to their extreme open position shall return automatically to a position that meets the requirements of IV.C.2, 3, & 4 (yes, no, or n/a) or	
	1205.4(c)(1)(ii)	Shields when deflected to their extreme open position shall prevent operation of the blade(s) unless the attached equipment is present or the moveable shield is returned to a position that meets the requirements of IV.C.2, 3, & 4 (yes, no, or n/a).	
IV.C.2	1205.4(a)(1)	Shields shall prevent foot probe in Figure 1 from entering the path of the blade or causing any part of the mower to enter the path of the blade (if no, described).	Sliding Friction Force _____ (lbs)

CPSC TEST REPORT FOR POWER LAWN  
MOWERS WITH MANUAL START  
Sample Number \_\_\_\_\_

REFERENCE PARAGRAPH		REQUIREMENT	OBSERVATION OR MEASUREMENT
TEST MANUAL	REGULATION		
IV.C.3.	1205.4(a)(3)	<p>1. Location of contact.</p> <p>2. Depth of penetration into the plane of the blade.</p>	
IV.C.4	1205.4(a)(2)	<p>1. Shields shall not stop mower as a result of contact with the raised obstacle during the obstruction test (yes or no).</p> <p>2. As a result of contact with the depression and the raised obstacle, the shield shall not enter the path of the blade or cause more than one wheel to lift.</p> <p>(a) Does shield enter path of blade (yes or no).</p> <p>(b) Does more than one wheel lift (yes or no).</p> <p>Shields shall not permanently deform, separate, or crack when subjected to 50 lbs (222N) static tensile force.</p> <p>1. Location of deformation, separation, or crack (describe and photograph any failures).</p>	