

**SPECIFICATION
FOR
MOWERS, LAWN, POWER**

THIS SPECIFICATION IS RELEASED FOR PROCUREMENT PURPOSES UNTIL REVISED OR RESCINDED.

SCOPE

THIS SPECIFICATION COVERS VARIOUS TYPES OF SELF-PROPELLED, RIDING-TYPE GASOLINE, DIESEL OR COMPRESSED GAS POWERED, VERTICAL OR HORIZONTAL SHAFT ENGINE, LAWN MOWERS. THIS SPECIFICATION IS NOT INTENDED TO INCLUDE ALL VARIETIES OF THE COMMODITY, OR WHICH MAY BE COMMERCIALY AVAILABLE, BUT IS INTENDED TO COVER ONLY THOSE GENERALLY USED BY STATE AGENCIES AND PUBLIC SCHOOLS.

I. CLASSIFICATION

THE LAWN MOWERS INCLUDED IN THIS SPECIFICATION ARE CLASSIFIED AS FOLLOWS:

GROUP I. - RIDING TYPE, SELF-PROPELLED, BELLY MOUNTED MOWER

TYPE 1 - COMMERCIAL CATEGORY, MINIMUM 8 HP, REAR MOUNTED, IC ENGINE, ELECTRIC START, MINIMUM CUT WIDTH: 30"

SIZE 1, MINIMUM CUT WIDTH: 30"

TYPE 2 - COMMERCIAL CATEGORY, MINIMUM 11 HP, IC ENGINE, ELECTRIC START, MINIMUM CUT WIDTH: 30"

SIZE 1, MINIMUM CUT WIDTH: 30"

SIZE 2, MINIMUM CUT WIDTH: 36"

GROUP II. - RIDING TYPE, SELF-PROPELLED, FRONT MOUNTED MOWER

TYPE 1 - COMMERCIAL, GASOLINE ENGINE, HYDROSTATIC DRIVE, V-BELT DRIVE TO MOWER DECK, MINIMUM HP: 16

SIZE 1, MINIMUM CUT WIDTH: 48"

SIZE 2, MINIMUM CUT WIDTH: 52"

SIZE 3, MINIMUM CUT WIDTH: 60"

SIZE 4, MINIMUM CUT WIDTH: 72"

TYPE 2 - COMMERCIAL, AIR-COOLED GASOLINE ENGINE, HYDROSTATIC DRIVE, PTO DRIVE TO MOWER DECK, MINIMUM HP: 16

CLASS 1, MINIMUM WEIGHT: 800 LBS

SIZE 1, MINIMUM CUT WIDTH: 48"

SIZE 2, MINIMUM CUT WIDTH: 52"

SIZE 3, MINIMUM CUT WIDTH: 60"

CLASS 2, MINIMUM WEIGHT: 1,200 LBS
SIZE 1, MINIMUM CUT WIDTH: 50"

SIZE 2, MINIMUM CUT WIDTH: 60"

SIZE 3, MINIMUM CUT WIDTH: 72"

TYPE 3 - COMMERCIAL, LIQUID-COOLED GASOLINE ENGINE, HYDROSTATIC DRIVE, PTO OR HYDRAULIC DRIVE TO MOWER DECK, MINIMUM HP: 20

CLASS 1, MINIMUM WEIGHT: 1,000 LBS

SIZE 1, MINIMUM CUT WIDTH: 48"

SIZE 2, MINIMUM CUT WIDTH: 52"

SIZE 3, MINIMUM CUT WIDTH: 60"

SIZE 4, MINIMUM CUT WIDTH: 72"

CLASS 2, MINIMUM WEIGHT: 1,500 LBS

SIZE 1, MINIMUM CUT WIDTH: 72"

CLASS 3, MINIMUM WEIGHT: 1,700 LBS

SIZE 1, MINIMUM CUT WIDTH: 72"

TYPE 4 - COMMERCIAL, LIQUID-COOLED DIESEL ENGINE, HYDROSTATIC DRIVE, PTO OR HYDRAULIC DRIVE TO MOWER DECK, MINIMUM HP: 20

CLASS 1, MINIMUM WEIGHT: 1,100 LBS

SIZE 1, MINIMUM CUT WIDTH: 48"

SIZE 2, MINIMUM CUT WIDTH: 52"

SIZE 3, MINIMUM CUT WIDTH: 60"

SIZE 4, MINIMUM CUT WIDTH: 72"

CLASS 2, MINIMUM WEIGHT: 1,600 LBS

SIZE 1, MINIMUM CUT WIDTH: 60"

SIZE 2, MINIMUM CUT WIDTH: 72"

CLASS 3, MINIMUM WEIGHT: 1,800 LBS

SIZE 1, MINIMUM CUT WIDTH: 60"

SIZE 2, MINIMUM CUT WIDTH: 72"

TYPE 5 - COMMERCIAL LIQUID-COOLED, GASOLINE ENGINE, HYDROSTATIC DRIVE, PTO OR HYDRAULIC DRIVE TO MOWER DECK, EXTRA HEAVY DUTY (MINIMUM 7 GAUGE) MOWER DECK, MINIMUM 35 HP, FOR FINISH CUTTING

SIZE 1, MINIMUM CUT WIDTH: 60"

SIZE 2, MINIMUM CUT WIDTH: 72"

TYPE 6 - COMMERCIAL LIQUID-COOLED DIESEL ENGINE, HYDROSTATIC DRIVE, PTO OR HYDRAULIC DRIVE TO MOWER DECK, EXTRA HEAVY DUTY (MINIMUM 7 GAUGE) MOWER DECK, FOR FINISH CUTTING, MINIMUM 30 HP:

SIZE 1, MINIMUM CUT WIDTH: 60"

SIZE 2, MINIMUM CUT WIDTH: 72"

TYPE 7 - COMMERCIAL GASOLINE ENGINE, HYDROSTATIC DRIVE, PTO OR HYDRAULIC DRIVE TO MOWER DECK, EXTRA HEAVY DUTY (MINIMUM 7 GAUGE) MOWER DECK, MINIMUM 20 HP, FOR FINISH AND ROUGH CUTTING

SIZE 1, MINIMUM CUT WIDTH: 50"

SIZE 2, MINIMUM CUT WIDTH: 60"

SIZE 3, MINIMUM CUT WIDTH: 72"

TYPE 8 - COMMERCIAL, LIQUID-COOLED DIESEL ENGINE, HYDROSTATIC DRIVE, WIDE AREA CUTTING, MINIMUM 40HP

SIZE 1, MINIMUM CUT WIDTH: 126"

GROUP III. - RIDING TYPE, SELF-PROPELLED, SLOPE CUTTING

TYPE 1 - COMMERCIAL, AIR-COOLED GASOLINE OR DIESEL ENGINE, HYDROSTATIC TRACTION DRIVE, HEAVY DUTY (MINIMUM 8 GAUGE) CUTTING DECK, V-BELT OR PTO DRIVE TO CUTTING DECK. DESIGNED FOR HEAVY SLOPE CUTTING UP TO 30 DEGREE GRADE.

SIZE 1, MINIMUM CUT WIDTH: 70"

SIZE 2, MINIMUM CUT WIDTH: 72"

TYPE 2 - COMMERCIAL GASOLINE OR DIESEL ENGINE, HYDROSTATIC TRACTION DRIVE, EXTRA HEAVY DUTY (MINIMUM 3 GAUGE) CUTTING DECK, PTO OR HYDRAULIC DRIVE TO CUTTING DECK. DESIGNED FOR HEAVY DUTY ROUGH AND FINISH CUT SLOPE CUTTING UP TO 40 DEGREE GRADE. MUST HAVE A PIVOTING OPERATORS SEAT TO MAINTAIN VERTICAL POSITION ON STEEP SLOPES.

SIZE 1, MINIMUM CUT WIDTH: 60"

SIZE 2, MINIMUM CUT WIDTH: 72"

TYPE 3 - COMMERCIAL LIQUID-COOLED DIESEL ENGINE, HYDROSTATIC TRACTION DRIVE, EXTRA HEAVY DUTY (MINIMUM 3 GAUGE) CUTTING DECK, PTO OR HYDRAULIC DRIVE TO CUTTING DECK. DESIGNED FOR HEAVY DUTY WIDE AREA FINISH CUT SLOPE CUTTING UP TO 30 DEGREE GRADE.

SIZE 1, MINIMUM CUT WIDTH: 144"

TYPE 4 - COMMERCIAL LIQUID-COOLED DIESEL ENGINE, HYDROSTATIC TRACTION DRIVE, EXTRA HEAVY DUTY (MINIMUM 3 GAUGE) CUTTING DECK, PTO OR HYDRAULIC DRIVE TO CUTTING DECK. DESIGNED FOR HEAVY DUTY ROUGH AND FINISH WIDE AREA SLOPE CUTTING UP TO 30 DEGREE GRADE.

SIZE 1, MINIMUM CUT WIDTH: 88"

SIZE 2, MINIMUM CUT WIDTH: 187"

GROUP IV. – ZTR (ZERO TURN RADIUS) FRONT OR BELLY MOUNT

TYPE 1 - GASOLINE ENGINE, COMMERCIAL DUTY (MINIMUM 11 GAUGE) V-BELT DRIVEN CUTTING DECK, MINIMUM HP: 15

SIZE 1, MINIMUM CUT WIDTH: 36"

SIZE 2, MINIMUM CUT WIDTH: 48"

TYPE 2 - GASOLINE, LIQUID-COOLED GASOLINE OR DIESEL ENGINE, COMMERCIAL DUTY (MINIMUM 7 GAUGE), PTO DRIVEN CUTTING DECK DESIGNED FOR CONTINUOUS WORK, MINIMUM HP: 20

SIZE 1, MINIMUM CUT WIDTH: 48"

SIZE 2, MINIMUM CUT WIDTH: 52"

SIZE 3, MINIMUM CUT WIDTH: 60"

SIZE 4, MINIMUM CUT WIDTH: 72"

TYPE 3 - LIQUID-COOLED DIESEL ENGINE OR COMPRESSED GAS, COMMERCIAL DUTY (MINIMUM 7 GAUGE) PTO SHAFT DRIVEN FRONT MOUNTED CUTTING DECK, DESIGNED FOR RUGGED CONTINUOUS CUTTING, MINIMUM HP: 22 DIESEL AND 27 FOR COMPRESSED GAS.

SIZE 1, MINIMUM CUT WIDTH: 60"

SIZE 2, MINIMUM CUT WIDTH: 72"

II. APPLICABLE STANDARDS

THE FOLLOWING DOCUMENTS OF ISSUE IN EFFECT ON THE DATE OF THE INVITATION FOR BIDS SHALL FORM A PART OF THIS SPECIFICATION.

B.71.1 - SAFETY SPECIFICATION FOR POWER LAWN MOWERS

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
1430 BROADWAY
NEW YORK, NY 10018

B.71.4 - SAFETY SPECIFICATIONS FOR COMMERCIAL TURF CARE EQUIPMENT

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
1430 BROADWAY
NEW YORK, NY 10018

SAE J1349 – ENGINE POWER TEST CODE FOR SPARK AND COMPRESSION IGNITION; NET POWER RATING.

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE), WWW.SAE.ORG
400 COMMONWEALTH DRIVE
WARRENDALE, PA 15096-0001

III. REQUIREMENTS

ALL MOWERS SHALL COMPLY WITH THE SPECIFICATIONS OF THE ANSI B.71.4- SAFETY SPECIFICATIONS FOR COMMERCIAL TURF CARE EQUIPMENT AND SHALL BEAR THE ANSI SEAL OF APPROVAL.

ALL MOWERS ARE TO HAVE THE ROTARY FLAT KNIFE BLADE, OPERATING IN THE HORIZONTAL PLANE.

A. PERFORMANCE

EXCEPT FOR REFUELING REQUIREMENTS, ALL COMMERCIAL TYPE LAWN MOWERS SHALL BE CAPABLE OF CONTINUOUS OPERATION FOR PERIODS OF EIGHT HOURS. ALL SELF-PROPELLED LAWN MOWERS SHALL BE CAPABLE OF A CONTINUOUS-CUTTING-SPEED OF THREE MILES PER HOUR WHILE ON FIRM AND FAIRLY LEVEL LAWNS. IF SULKIES ARE USED, THEY SHALL BE ATTACHED AND A RIDER SHALL BE IN PLACE WHEN THE ABOVE TEST IS MADE.

1. OPERATION ON GRADES

ALL LAWN MOWERS SHALL NOT TIP OVER WHEN PLACED IN EITHER DIRECTION OF TRAVEL ACROSS A 30 DEGREE SLOPE.

SELF-PROPELLED LAWN MOWERS SHALL BE CAPABLE OF A CONTINUOUS-CUTTING-SPEED OF 2 1/2 MPH WHILE TRAVELING UP A 20 PERCENT GRADE. IF SULKIES ARE USED, THEY SHALL BE ATTACHED AND A RIDER SHALL BE IN PLACE WHEN THE ABOVE TEST IS MADE.

2. ADJUSTABLE OPERATING SPEEDS

ALL LAWN MOWERS SHALL HAVE A MANUAL THROTTLE TO CONTROL THE ENGINE SPEED. THE RELATIONSHIP OF THE ENGINE SPEED TO THE CUTTER-BLADE SPEED SHALL BE CONSTANT FOR EACH LAWN MOWER. THE CUTTER-BLADE SPEED SHALL VARY ONLY WHEN THE ENGINE SPEED IS VARIED.

SELF-PROPELLED LAWN MOWERS SHALL HAVE A RANGE OF CUTTING SPEEDS CONTROLLED BY A MANUAL THROTTLE AND A GOVERNOR; OR A COMBINATION OF A MANUAL THROTTLE, GOVERNOR, AND TRANSMISSION.

B. CONSTRUCTION

FRAME AND STRUCTURAL SUPPORTING MEMBERS SHALL BE EITHER HEAVY DUTY OR REINFORCED CONSTRUCTION, AND CAPABLE OF WITHSTANDING LOADS ARISING FROM OPERATION ON ROUGH GROUND. COMPONENT AND RELATED PARTS SHALL BE ACCURATELY AND PERMANENTLY ALIGNED. TOLERANCES AND GAUGES FOR METAL FITS SHALL CONFORM TO THIS SPECIFICATION AND TO STANDARDS OF GOOD COMMERCIAL PRACTICE. FINISHED CONTACT BEARING SURFACES SHALL BE TRUE AND EXACT. ALL BEARING HOUSINGS SHALL PROTECT THE BEARING FROM FOREIGN MATERIALS (GRASS CLIPPINGS, DIRT, ETC.).

1. ENGINE

ENGINES SHALL BE FOUR-CYCLE (AS SPECIFIED IN THE BID INVITATION) VERTICLE OR HORIZONTAL SHAFT, GASOLINE, DIESEL OR COMPRESSED GAS POWERED, AIR-COOLED, WATER-COOLED, SINGLE OR MULTIPLE CYLINDER. THE ENGINE SHALL HAVE ADEQUATE RESERVE POWER TO OPERATE THE LAWN MOWER UNDER INTERMITTENT OVER-LOAD CONDITIONS, AND TO ASSURE LONG SERVICE LIFE. THE ENGINE SHALL NOT STALL, OVERHEAT, OR SMOKE UNDULY FROM THE EXHAUST OR CRANKCASE DURING THE MACHINE DUTY OR ENGINE COOLING TEST. ENGINES RATED ABOVE 6 HP MAY HAVE STELLITE OR POSITIVE VALVE ROTATORS FOR EXHAUST VALVES. ENGINES MUST MEET EPA EMISSION STANDARDS IN EFFECT AT THE TIME OF MANUFACTURE.

(a) CYLINDER BLOCK

UNLESS OTHERWISE SPECIFIED, THE CYLINDER BLOCK SHALL BE CAST IRON OR ALUMINUM ALLOY WITH A CAST IRON CYLINDER SLEEVE.

(b) CRANKSHAFT

THE CRANKSHAFT SHALL BE ENCLOSED IN AN OIL-TIGHT HOUSING AND SUPPORTED (TOP AND BOTTOM) ON METAL ALLOY BUSHINGS, BALL BEARINGS, OR ROLLER BEARINGS. IF METAL ALLOY BUSHINGS ARE USED, THEY SHALL BE REPLACEABLE WITH NEW INSERTS.

(c) LUBRICATION

PRESSURIZED (OIL PUMP) OR SPLASH LUBRICATION SYSTEM SHALL BE PROVIDED TO MAINTAIN ADEQUATE LUBRICATION OF THE INTERNAL ENGINE PARTS AT ALL TIMES; EVEN IF THE LAWN MOWER IS NOT ON LEVEL GROUND, OR CUTTING CROSSWISE ON INCLINES. PRESSURIZED ENGINES MUST HAVE AN EASY ACCESS, SCREW-ON OIL FILTER.

(d) COOLING SYSTEM

MOWERS SHALL BE DESIGNED SO THAT THE ENGINE'S COOLING SYSTEM AIR PASSAGES WILL NOT BECOME CLOGGED WITH GRASS CLIPPINGS THROWN BY THE CUTTING DEVICE. WATER COOLED ENGINES MUST BE FILLED WITH A 50/50 MIX OF ANTIFREEZE.

(e) FUEL SYSTEM

THE FUEL TANK SIZE SHALL CONFORM TO INDUSTRY STANDARDS FOR THE HORSEPOWER RATING OF THE ENGINE. UNLESS OTHERWISE SPECIFIED, THE ENGINE SHALL BE EQUIPPED WITH THE FOLLOWING:

-- FLOAT-TYPE OR AIR-MIX TYPE CARBURETOR OR FUEL INJECTION, PLUS A FUEL FILTER FOR NON-PRESSURIZED LIQUID FUELS. DIESELS MUST ALSO HAVE A WATER SEPARATOR.

-- AN OIL-BATH, OIL-WETTED FOAM, OR PHENOLIC RESIN TREATED PAPER AIR FILTER THAT CAN BE REMOVED FOR CLEANING OR REPLACEMENT PURPOSES.

(f) IGNITION

UNLESS OTHERWISE SPECIFIED, THE ENGINE SHALL BE EQUIPPED WITH A HIGH-TENSION MOISTURE-RESISTANT MAGNETO. THE MAGNETO POINTS SHALL BE PROTECTED FROM INTERFERENCE BY FOREIGN MATERIAL (GRASS CLIPPINGS, DIRT, OIL, ETC.).

(g) EXHAUST

THE ENGINE SHALL BE EQUIPPED WITH AN EFFICIENT MUFFLER OR SILENCER THAT SHALL DIRECT THE OUT-FLOW AWAY FROM THE OPERATOR (TO THE FRONT, LEFT, OR RIGHT). REAR DISCHARGE IN WALK-BEHIND TYPE MOWERS SHOULD NOT BE OFFERED.

(h) STARTER

STARTERS SHALL BE HEAVY DUTY RECOIL TYPE AND SHALL BE RELEASED AUTOMATICALLY WHEN THE ENGINE STARTS.

(i) GOVERNOR

ALL LAWN MOWERS SHALL BE EQUIPPED WITH A GOVERNOR TO CONTROL ENGINE SPEED. ENGINES LESS THAN EIGHT HORSEPOWER SHALL HAVE EITHER AN ADJUSTABLE AIR-VANE OR MECHANICAL TYPE GOVERNOR. ENGINES EIGHT HORSEPOWER OR LARGER SHALL HAVE AN ADJUSTABLE MECHANICAL TYPE GOVERNOR.

2. DRIVING METHODS

THE DRIVE METHOD SHALL BE POSITIVE IN ACTION USING ROLLER-CHAIN AND SPROCKET, GEARSHAFTS AND GEARS, V-BELTS AND PULLEYS, OR A COMBINATION THEREOF. ALL GEARS SHALL BE SUITABLE FOR CONTINUOUS HEAVY DUTY USE. THEY SHALL MESH FULLY AND SMOOTHLY, AND BE COMPLETELY HOUSED AND PROPERLY LUBRICATED.

WHERE A V-BELT DRIVE IS USED, A MOVABLE SHAFT AND PULLEY (OR EQUALLY SUITABLE DEVICE) MAY FUNCTION AS A CLUTCH TO ENGAGE AND DISENGAGE THE V-BELT DRIVE. A TAKE-UP PULLEY OR AN IDLER PULLEY SHALL BE USED TO ADJUST THE V-BELT SLACK.

ALL V-BELTS SHALL BE HEAVY DUTY BELTS AND MEET INDUSTRY REQUIREMENTS FOR THE AMOUNT OF ENGINE HORSEPOWER TRANSMITTED. UPON REQUEST, THE CONTRACTOR SHALL PROVIDE CERTIFICATION, FROM THE BELT MANUFACTURER, THAT ALL V-BELTS UTILIZED ON THE MOWER ARE APPROVED FOR THEIR SPECIFIC APPLICATION.

ALL PULLEYS SHALL BE CAST IRON, MACHINED STEEL, OR POWDERED METAL (P/M) STEEL. INSIDE IDLER PULLEYS SHALL BE AT LEAST AS LARGE AS THE SMALLEST LOADED PULLEY. OUTSIDE IDLER PULLEYS SHALL BE AT LEAST ONE-THIRD (1/3) LARGER THAN THE SMALLEST LOADED PULLEY. ALL PULLEYS SHALL BE SECURELY FASTENED.

3. WHEEL DRIVE (SELF-PROPELLED MOWERS)

POWER TO THE DRIVING WHEELS SHALL BE THROUGH DIFFERENTIAL GEARING OR DIFFERENTIAL ACTION. MOWERS WITH DIFFERENTIAL GEARING SHALL HAVE A FULL BEVEL GEAR OR A FULL SPUR-GEAR TYPE DIFFERENTIAL. DIFFERENTIAL GEARS SHALL MESH FULLY AND SMOOTHLY, BE COMPLETELY HOUSED IN GREASE OR OIL FILLED CASE, AND BE SUITABLE FOR HEAVY DUTY USE. MOWERS WITH DIFFERENTIAL ACTION SHALL HAVE INDEPENDENT DRIVE-CONTROL CLUTCHES OR A PAWL-AND-RATCHET TYPE OF DIFFERENTIAL ACTION. WHEN INDEPENDENT DRIVE CONTROL CLUTCHES ARE USED, THERE SHALL BE AN INDEPENDENTLY OPERATED CLUTCH IN EACH WHEEL.

4. WHEELS

WHEELS SHALL BE OF (A) METAL CONSTRUCTION OF EITHER CAST OR DISK TYPE (WITH DISKS WELDED, BOLTED, OR RIVETED TO EACH OTHER) OR (B) HIGH DENSITY POLYETHYLENE PLASTIC ONE PIECE CONSTRUCTION WITH RIB REINFORCEMENT. THE MINIMUM DISTANCE BETWEEN WHEEL CENTERS (OR PAIRS OF WHEELS) SHALL BE 18". METAL WHEELS WITH BALL, SLEEVE AND ROLLER TYPE BEARINGS SHALL BE USED IN COMMERCIAL TYPE MOWERS.

DRIVE AXLES OR WHEELS SHALL HAVE SLEEVE, BALL, OR ROLLER TYPE WHEEL BEARINGS. SLEEVE BEARINGS SHALL BE CONSTRUCTED OF (1) A HIGH-GRADE BEARING METAL, AND EITHER: (A) BE THE SELF-LUBRICATING TYPE; OR (B) HAVE A SUITABLE MEANS OF LUBRICATION OR (2) IN THE CASE OF PLASTIC WHEEL THE SLEEVE MUST BE AT LEAST 9/16" MINIMUM I.D. AND MAY BE PART OF THE PLASTIC WHEEL ITSELF. BALL AND ROLLER TYPE BEARINGS SHALL BE PACKED WITH GREASE,

AND BE EITHER: (A) PERMANENTLY SEALED TO PREVENT ENTRY OF DIRT AND MOISTURE; OR (B) EQUIPPED WITH GREASE FITTINGS FOR LUBRICATION AND THE FLUSHING OUT OF DIRT AND MOISTURE.

WHEELS SHALL BE FITTED WITH PNEUMATIC, SEMI-PNEUMATIC, OR SOLID RUBBER TIRES. PNEUMATIC TIRES SHALL HAVE SUFFICIENT TRACTION TO OPERATE THE LAWN MOWER WITHIN THE SPECIFIED REQUIREMENTS, AND SHALL NOT MAR THE TURF IN NORMAL OPERATION.

5. CUTTER-BLADE DRIVE

CUTTER-BLADE DRIVING METHODS EMPLOYING SLIPPING CLUTCHES OR OTHER FRICTIONAL DEVICES (OTHER THAN BELT DRIVE) SHALL NOT BE ACCEPTABLE. SET SCREWS SHALL NOT BE USED, EITHER WHOLLY OR IN PART, TO TRANSMIT TORQUE LOADS.

6. CLUTCHES

CLUTCHES SHALL BE SUBSTANTIALLY CONSTRUCTED, DURABLE, AND HAVE A LOAD CAPACITY THAT PERMITS OPERATION OF THE MOWER IN ACCORDANCE WITH THE SERVICE AND CUTTING REQUIREMENTS SPECIFIED HEREIN. THE CLUTCH SHALL BE ENGAGED AND DISENGAGED BY A CONTROL LEVER ON THE HANDLE (OR A FOOT CONTROL FOR RIDING MOWERS). CLUTCHES SHALL BE PROVIDED WITH AN ADJUSTMENT TO COMPENSATE FOR SLIGHT SLIPPAGE. WHEN CLUTCHES WITH LINED FACES ARE USED, THE LINING MATERIAL SHALL BE REPLACEABLE.

7. LUBRICATION

GEARS AND BEARINGS SHALL BE ACCESSIBLE FOR LUBRICATION, EXCEPT BALL BEARINGS AND ROLLER BEARINGS THAT ARE PACKED IN GREASE AND PERMANENTLY SEALED. LUBRICATING POINTS SHALL HAVE GREASE FITTINGS OF THE GREASE GUN INJECTION TYPE. ALL MOWERS SHALL BE LUBRICATED BEFORE DELIVERY.

8. CONTROLS

MOWERS SHALL HAVE CONTROLS OF DURABLE CONSTRUCTION FOR REGULATING ENGINE SPEED, ENGAGING AND DISENGAGING CLUTCHES (WHERE APPLICABLE), AND STOPPING THE ENGINE. THESE CONTROLS SHALL BE LOCATED WITHIN CONVENIENT REACH OF THE OPERATOR. THE CONTROLS SHALL BE POSITIVE IN ACTION AND REMAIN FIXED IN ANY DESIRED POSITION.

A SHUT-OFF DEVICE SHALL BE PROVIDED TO STOP OPERATION OF THE ENGINE. THIS DEVICE SHALL REQUIRE MANUAL AND INTENTIONAL REACTIVATION TO RESTART THE ENGINE. SELF-PROPELLED MOWERS SHALL HAVE A CONTROL TO ENGAGE AND DISENGAGE THE DRIVE SYSTEM.

9. STEERING CONTROLS

THE STEERING CONTROLS SHALL BE STEERING WHEEL, "JOY STICK" OR MULTIPLE LEVERS (ZTR MOWERS). BICYCLE-TYPE HANDLEBARS ARE UNACCEPTABLE.

10. FINISH

LAWN MOWERS AND ALL ATTACHMENT UNITS SHALL BE FINISHED WITH A DURABLE WEATHERPROOF PAINT OR LACQUER.

C. OTHER REQUIREMENTS

RIDING MOWERS SHALL HAVE THE ADDITIONAL FEATURES LISTED BELOW:

- A MEANS TO DISENGAGE AND STOP BLADE ROTATION WHILE TRANSPORTING.
- PNEUMATIC REAR TIRES, AND PNEUMATIC OR SEMI-PNEUMATIC FRONT TIRES.
- INTERLOCKED TRACTION CLUTCH AND WHEEL BRAKES, OR SEPARATE WHEEL BRAKES.
- MOWERS 30" CUT OR SMALLER SHALL HAVE A SINGLE CUTTER-BLADE.
- THE STEERING MECHANISM SHALL BE DESIGNED FOR HEAVY DUTY USE.
- ALL MOWERS FURNISHED UNDER THIS SPECIFICATION SHALL BE OF THE HYDROSTATIC DRIVE TYPE.

1. ENGINE SIZE

THE FOLLOWING CHART SHOWS THE MINIMUM HORSEPOWER REQUIREMENTS FOR EACH MOWER SIZE.

SIZE CUT	MINIMUM HP
27" - 31"	8.00
32" - 36"	12.00
37" - 48"	12.00
49" - 59"	16.00
60" - 69"	18.00
70" - 72"	20.00
74" - 80"	22.00
82" - 88"	22.00

2. CUTTER BLADE

THE CUTTER BLADE SHALL BE ONE PIECE, MADE OF STEEL, BALANCED, AND HAVE THE LAST 4" OF EACH CUTTING EDGE HARDENED TO A DEGREE WITHIN THE RANGE OF ROCKWELL C35 TO C48. THE MINIMUM BLADE WIDTH SHALL BE 2 1/2", AND THE MINIMUM THICKNESS SHALL BE 1/4" (EXCEPT AT THE SHARPENED CUTTING EDGES). THE CUTTER BLADE SHALL BE SECURELY FASTENED TO THE CUTTER-SHAFT WITH A BOLT OR A THREADED-SHAFT LOCK NUT. LOCK NUTS SHALL BE SAE-5 OR EQUAL (SEE: SAE-J429), AND BOLTS SHALL HAVE A MIN. DIAMETER OF 7/16".

a) DIRECT DRIVE

THE CRANKSHAFT SHALL BE OF THE RIGID SHORT SHANK TYPE AND SHALL BE NOT LESS THAN .875" IN DIAMETER. THE END OF THE CRANKSHAFT TO WHICH THE CUTTING BLADE IS FASTENED SHALL HAVE A BEARING SUPPORT WITHIN 2" OF THE END TO PROVIDE FOR ADDITIONAL CRANKSHAFT RIGIDITY AND LONG LIFE.

b) SPINDLE DRIVE

THE CUTTER BLADE SHALL BE SECURELY ATTACHED TO, OR MOUNTED ON, THE VERTICAL SPINDLE SHAFT LOCATED FORWARD OF THE ENGINE AND DRIVEN BY ONE OR MORE BELTS AND PULLEYS POWERED BY THE ENGINE. THIS VERTICAL SHAFT SHALL BE OF STEEL, NOT LESS THAN 1" IN DIAMETER (OR THE EQUIVALENT STRENGTH THEREOF) AND SUPPORTED AT THE TOP AND AT THE BOTTOM WITH REPLACEABLE BALL OR ROLLER BEARINGS.

3. BLADE ENCLOSURE

THE BLADE ENCLOSURE SHALL BE MADE OF HEAVY GAUGE STEEL AND HAVE THE NECESSARY EMBOSSEMENTS OR BRACING TO PROVIDE CONTINUOUS SERVICE WITHOUT BENDING, CRACKING, OR DEFORMING. ADEQUATE GUARDS SHALL BE PROVIDED TO PROTECT PERSONNEL FROM THE BLADES AND OBJECTS THROWN BY THE BLADES (FOR EXAMPLE: ROCKS, STICKS, ETC.).

IV. WARRANTY

LAWN MOWERS FURNISHED UNDER THIS SPECIFICATION SHALL BE NEW AND SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIALS, WORKMANSHIP, AND PERFORMANCE IN ACCORDANCE WITH THE MANUFACTURER'S STANDARD WARRANTY, EXCEPT THAT IN NO EVENT SHALL SUCH COVERAGE BE FOR LESS THAN ONE (1) YEAR. WARRANTY COVERAGE SHALL BEGIN ON THE DATE OF DELIVERY TO THE ORDERING AGENCY. WARRANTY SERVICE SHALL BE AVAILABLE ON-SITE AT ANY LOCATION WITHIN THE STATE OF NORTH CAROLINA. DEFECTIVE UNITS SHALL BE REPAIRED OR REPLACED DURING THE WARRANTY PERIOD AT NO COST TO THE OWNER OR HIS REPRESENTATIVE.

V. SERVICE AND MANUALS

A. INSTRUCTION BOOK

THE CONTRACTOR SHALL FURNISH WITH EACH LAWN MOWER A BOOKLET OR PAMPHLET GIVING COMPLETE INSTRUCTIONS FOR THE OPERATION, LUBRICATION, ADJUSTMENT, AND CARE OF THE ENGINE; MOWER; AND ATTACHMENT UNITS.

B. TOOLS

MANUFACTURER'S STANDARD TOOL KIT, IF OFFERED OR REQUESTED BY INVITATION FOR BIDS SHALL BE PROVIDED.

VI. ACCEPTANCE EVALUATION AND QUALITY ASSURANCE

POWER LAWN MOWERS AND ATTACHMENTS MAY BE INSPECTED AND TESTED AS FOLLOWS TO DETERMINE COMPLIANCE WITH THIS SPECIFICATION.

A. CUTTING REQUIREMENT TESTS

CUTTING REQUIREMENT TESTS CHECK THE PERFORMANCE OF A LAWN MOWER WHILE OPERATING UNDER ACTUAL CONDITIONS. THE EVALUATED FACTORS ARE THE SPEED AND QUALITY OF CUT.

1. CONDITIONS

THE TESTS SHALL BE CONDUCTED ON STRAIGHT COURSES. THE GROWTH SHALL BE REPRESENTATIVE OF THE TYPE AND HEIGHT SPECIFIED IN THE CUTTING REQUIREMENTS FOR EACH LAWN MOWER. THE OPERATOR SHALL GUIDE THE MOWER FROM A STARTING POINT TOWARD A MARKER A SPECIFIED DISTANCE AWAY.

a) LENGTH OF CUT

THE LENGTH OF CUT SHALL BE BETWEEN TWO PRESET MARKERS OR BETWEEN A PRESET MARKER AND THE STOPPING POINT OF THE LAWN MOWER. THE DISTANCE SHALL BE MEASURED WITH A TAPE MEASURE.

b) TIME INTERVAL

TIMING SHALL BEGIN WHEN A MARKED SPOT ON THE MOWER CROSSES THE STARTING POINT AND SHALL STOP WHEN: 1) THE SAME SPOT CROSSES THE ENDING POINT; OR 2) THE MOWER IS STOPPED. TIME SHALL BE MEASURED WITH A STOP WATCH OR AN ACCURATE WATCH WITH A SECOND HAND. IF A STOP WATCH IS NOT USED, TIME SHALL BE MEASURED IN INCREMENTS OF ONE MINUTE.

CALCULATION OF SPEED:

IF A STOP WATCH IS USED, SPEED SHALL BE CALCULATED AS FOLLOWS:

$$\text{SPEED (MILES PER HOUR)} = \frac{\text{DISTANCE (IN FEET)}}{1.46 \times \text{TIME (IN SECONDS)}}$$

IF A STOP WATCH IS NOT USED, SPEED IS CALCULATED AS FOLLOWS:

$$\text{SPEED (IN MILES PER HOUR)} = \frac{\text{DISTANCE (IN FEET)}}{88 \times \text{TIME (IN MINUTES)}}$$

B. MEASUREMENT OF GRADES

GRADES SHALL BE MEASURED WITH SUITABLE INSTRUMENTS, ORDINARILY EMPLOYED FOR THAT PURPOSE. WHEN THESE INSTRUMENTS ARE NOT AVAILABLE, THE GRADE SHALL BE DETERMINED BY THE USE OF YARDSTICK, BENCH LEVEL, AND PROTRACTOR. THE ANGLE BETWEEN THE SURFACE OF YARDSTICK (WHEN LYING FIRMLY ON THE GRADE) AND THE SURFACE OF THE BENCH LEVEL (WHEN HORIZONTALLY LEVEL), SHALL BE ACCURATELY MEASURED WITH THE PROTRACTOR. INCLINES OF 11-1/3 DEGREES AND 17 DEGREES WITH THE HORIZONTAL ARE EQUIVALENT TO GRADES OF 20 PERCENT AND 30 PERCENT RESPECTIVELY.

2. CONDUCTING TESTS

WITH THE LAWN MOWER OPERATING AT THE HIGHEST SPEED ATTAINABLE A CUT SHALL BE MADE FOR THE TIME PERIOD OR DISTANCE SPECIFIED. THE SPEED OF THE MOWER IS THEN CALCULATED.

IF THE CUT PRODUCED IS UNSATISFACTORY AND THE MOWER SPEED WAS GREATER THAN THE MINIMUM SPECIFIED, THE MOWER SHALL BE RETESTED. RETESTING IS DONE AT A REDUCED SPEED (NEVER LESS THAN THE SPECIFIED MINIMUM), AND ON A NEW COURSE. AS MANY ADDITIONAL CUTS AS NECESSARY SHALL BE MADE TO DETERMINE CUTTING REQUIREMENT COMPLIANCE.

a) TEST ON LEVEL GROUND

THIS TEST IS CONDUCTED ON A FAIRLY LEVEL COURSE. THE OPERATOR SHALL GUIDE THE MOWER TOWARD A LANDMARK (OR A SPECIAL MARKER) AT LEAST 500 FEET AWAY. A CUT SHALL BE MADE FOR A MINIMUM TIME INTERVAL OF TWO MINUTES. THEN THE LENGTH OF THE CUT SHALL BE MEASURED AND THE SPEED CALCULATED. THE MINIMUM SPEED SHALL BE THREE MILES PER HOUR.

b) TEST ON GRADES

THIS TEST IS CONDUCTED ON A 20 PERCENT OR 30 PERCENT GRADES, AS MOWER IS OPERATED FROM A STARTING POINT TO AN ENDING POINT, AT LEAST 55' APART. THE TIME TO TRAVERSE THE COURSE SHALL BE RECORDED AND THE SPEED CALCULATED. THE MINIMUM SPEED SHALL BE 2 1/2 MILES PER HOUR. THE ABILITY OF THE LAWN MOWER TO OPERATE CONTINUOUSLY, ON THE GRADE AT THIS SPEED, SHALL BE DETERMINED AS PART OF THE TEST FOR MACHINE DUTY.

c) LONG COURSE METHOD (OPTIONAL)

THIS TEST IS CONDUCTED ON A 20 PERCENT OR 30 PERCENT GRADES, AS SPECIFIED IN III.A.1. OPERATION ON GRADES. THE OPERATOR SHALL GUIDE THE MOWER TOWARD A LANDMARK (OR SPECIAL MARKER) AT LEAST 500' AWAY. THE INTERVAL OF TIME SHALL BE TWO, THREE, FOUR, OR FIVE MINUTES; DEPENDING ON THE LENGTH OF UNIFORM GRADE AVAILABLE THE DISTANCE TRAVERSED DURING THE TIME INTERVAL SHALL BE MEASURED, AND THE SPEED CALCULATED. THE MINIMUM SPEED IS 2 1/2 MILES PER HOUR AND, THE MINIMUM DISTANCE TRAVERSED FOR A TWO MINUTE PERIOD IS 440'.

3. MACHINE DUTY TEST

LAWN MOWERS (WITH SPECIFIED ATTACHMENTS) SHALL BE OPERATED CONTINUOUSLY OVER LAWNS OR GROUNDS FOR A PERIOD, WHICH, IN THE ESTIMATION OF THE INSPECTOR, SUFFICIENTLY DEMONSTRATES THE MOWER'S CAPABILITY OF CONTINUOUS AND SATISFACTORY OPERATION. FAILURE OR UNUSUAL WEAR OF COMPONENTS OR PARTS, OR FAILURE TO CUT THE GRASS UNIFORMLY AND SATISFACTORILY SHALL BE CAUSE FOR REJECTION.

THE GROWTH SHALL BE THICK-GROWTH GRASS AND WEEDS. OPERATING SPEEDS EQUAL TO THOSE SPECIFIED, BOTH ON LEVEL GROUND AND GRADES, SHALL BE MAINTAINED.

VII. DELIVERY AND PAYMENT

DELIVERY OF AND PAYMENT FOR LAWN MOWERS PURCHASED UNDER THIS SPECIFICATION SHALL BE IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF THE INVITATION FOR BIDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY PACKING, PACKAGING, OR PROTECTION REQUIRED TO INSURE SAFE DELIVERY IN AN UNDAMAGED CONDITION.

VIII. ORDERING DATA

PURCHASERS SHOULD EXERCISE ANY DESIRED OPTION OFFERED HEREIN AND SHOULD SPECIFY THE FOLLOWING IN THE REQUISITION AND INVITATION FOR BIDS:

1. TITLE, NUMBER, AND DATE OF THIS SPECIFICATION
2. LAWN MOWER GROUP, TYPE, CLASS AND SIZE (SEE CLASSIFICATION)
3. ENGINE REQUIREMENT: 4 CYCLE GASOLINE, DIESEL OR COMPRESSED GAS
4. TOOL KIT, IF REQUIRED
5. ENGINE HORSEPOWER
6. ZTR MOWERS: ROPS
7. ZTR MOWERS: FRONT MOUNTED OR BELLY MOUNTED MOWING DECK
8. CUTTING DECK MULCHING BLADES