

**SPECIFICATION  
FOR  
LOADER, BACKHOE, INTEGRAL**

(THIS SPECIFICATION IS RELEASED FOR PROCUREMENT PURPOSES UNTIL REVISED OR RESCINDED.)

**SCOPE**

THIS SPECIFICATION COVERS DIESEL ENGINE-DRIVEN, FRONT-WHEEL STEER, REAR-WHEEL DRIVE (AND FOUR-WHEEL DRIVE), INTEGRAL (AS DEFINED IN SAE J326 TYPE C), BACKHOE LOADERS. IT DOES NOT INCLUDE ALL TYPES AND SIZES OF COMMERCIALY AVAILABLE BACKHOE LOADERS, BUT ONLY THE SIZES GENERALLY USED BY THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS, AND OTHER STATE AGENCIES.

**I. CLASSIFICATION**

THIS SPECIFICATION COVERS THREE SIZES OF BACKHOE LOADERS.

**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 TO THE EXTENT DESCRIBED IN REQUIREMENTS.

SAE J31	-HYDRAULIC BACKHOE LIFT CAPACITY
SAE J43	-AXLE RATING FOR INDUSTRIAL WHEEL LOADERS AND LOADER BACKHOES
SAE J49	-SPECIFICATION DEFINITIONS-- HYDRAULIC BACKHOES
SAE J99	-LIGHTING AND MARKING OF INDUSTRIAL EQUIPMENT ON HIGHWAYS
SAE J185	-ACCESS SYSTEMS FOR OFF-ROAD MACHINES
SAE J326	-NOMENCLATURE-- HYDRAULIC BACKHOES
SAE J386	-OPERATOR RESTRAINT SYSTEMS FOR OFF-ROAD WORK MACHINES
SAE J732	-SPECIFICATION DEFINITIONS-- LOADERS
SAE J742	-CAPACITY RATING-- LOADER BUCKET
SAE J818	-OPERATING LOAD FOR LOADERS
SAE J930	-STORAGE BATTERIES FOR OFF-ROAD WORK MACHINES
SAE J994	-ALARM--BACKUP--ELECTRIC--PERFORMANCE, TEST, AND APPLICATION
SAE J1040	-ROLL OVER PROTECTIVE STRUCTURES (ROPS)
SAE J1105	-HORN--FORWARD WARNING--ELECTRIC--PERFORMANCE, TEST, AND APPLICATION
SAE J1166	-SOUND MEASUREMENT-- EARTHMOVING MACHINERY-OPERATOR- WORK CYCLE
SAE J1349	-ENGINE TEST CODE
SAE J1446	-ON-MACHINE ALARM TEST AND EVALUATION PROCEDURE FOR CONSTRUCTION AND GENERAL PURPOSE INDUSTRIAL MACHINERY
SAE J1473	-BRAKING PERFORMANCE RUBBER-TIRED EARTHMOVING MACHINES
SAE J1511	-STEERING FOR OFF-ROAD, RUBBER-TIRED MACHINES

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SOCIETY OF AUTOMOTIVE ENGINEERS, INC. (SAE)  
400 COMMONWEALTH DRIVE  
WARRENDALE, PA 15096

FEDERAL OCCUPATIONAL SAFETY AND HEALTH ACT CODES  
U. S. DEPARTMENT OF LABOR  
200 CONSTITUTIONAL AVE., NW  
WASHINGTON, DC 20210

STATE OCCUPATIONAL SAFETY AND HEALTH ACT CODES (OSHA)  
N. C. DEPARTMENT OF LABOR  
OSHA DIVISION  
4 WEST EDENTON STREET  
RALEIGH, NC 27601

### III. REQUIREMENTS

#### A. GENERAL

THIS SPECIFICATION COVERS DIESEL POWERED BACKHOE LOADERS AND ATTACHMENTS OF CONVENTIONAL DESIGN AND HEAVY DUTY CONSTRUCTION. THE BACKHOE LOADER IS TO BE FURNISHED COMPLETE WITH ALL NECESSARY OPERATING ACCESSORIES CUSTOMARILY FURNISHED BY THE MANUFACTURER WITH LOADERS OF THIS TYPE WHETHER STIPULATED HEREIN OR NOT, INCLUDING BUT NOT LIMITED TO ALL EQUIPMENT SHOWN AS STANDARD IN THE MANUFACTURER'S CURRENT PUBLISHED LITERATURE INTENDED FOR THE GENERAL PUBLIC. THIS LITERATURE IS TO BE INCLUDED WITH THE BID.

##### 1. STANDARD PRODUCT

THE MACHINE OFFERED SHALL BE NEW AND THE LATEST PRODUCTION MODEL AS REPRESENTED IN THE MANUFACTURER'S CURRENT PUBLISHED LITERATURE INTENDED FOR THE GENERAL PUBLIC. THE SPECIFIC CONFIGURATION OFFERED MUST BE REPRESENTED IN SUCH LITERATURE. MACHINES WHICH ARE OFFERED OTHERWISE MAY BE REJECTED.

##### 2. USE CONDITIONS

DESIGN AND CONSTRUCTION SHALL BE SUCH THAT THE BACKHOE LOADER WILL WITHSTAND EXTREMELY HARD USAGE IN SERVICE, SUCH AS DIGGING, LIFTING, TRANSPORTING, DUMPING OF MATERIALS, OPERATION OVER ROUGH TERRAIN AND STORAGE AND OPERATION IN THE OPEN AIR UNDER ALL WEATHER CONDITIONS FOR EXTENDED PERIODS OF TIME. COMPONENTS, PARTICULARLY OF THE ELECTRICAL, FUEL, AND EXHAUST SYSTEMS, SHALL BE SO DESIGNED AS TO RESIST ANY HARMFUL EFFECTS OF DUST OR WATER.

##### 3. EASE OF MAINTENANCE

THE DESIGN OF THE BACKHOE LOADER SHALL PERMIT READY ACCESSIBILITY FOR SERVICING, REPLACEMENT, AND ADJUSTMENT OF COMPONENT PARTS AND ACCESSORIES WITH MINIMUM DISTURBANCE OF OTHER ELEMENTS.

##### 4. FRAME

THE FRAME SHALL BE DESIGNED TO WITHSTAND MAXIMUM STRESSES UNDER NORMAL OPERATING CONDITIONS AND IN ADDITION, PROVIDE ADEQUATE SUPPORT FOR ATTACHING ANY DEVICE APPROVED BY THE BACKHOE LOADER MANUFACTURER FOR USE IN COMBINATION WITH THE BACKHOE LOADER. FRAME SHALL PROVIDE FOR FRONT AXLE OSCILLATION IN EACH DIRECTION FROM HORIZONTAL.

5. BACKHOE LOADER OPERATING WEIGHT

OPERATING WEIGHT SHALL INCLUDE THE BACKHOE AND LOADER BUCKETS AND TIRES SPECIFIED IN THE OPERATING WEIGHT EQUIPMENT LIST IN THE MANUFACTURER'S CURRENT PUBLISHED LITERATURE, ROPS CAB, 175 LB. OPERATOR, FUEL, OIL, COOLANT, LUBRICANTS, STANDARD ADVERTISED EQUIPMENT, STANDARD BOOM AND STANDARD DIPPERSTICK, AND TWO-WHEEL DRIVE (OPERATING WEIGHT COMPUTATION MAY INCLUDE FOUR-WHEEL DRIVE IF TWO-WHEEL DRIVE IS NOT AVAILABLE). THE BACKHOE LOADER OPERATING WEIGHT SHALL NOT INCLUDE ANY OPTIONAL COUNTERWEIGHTS, OR TIRE HYDROINFLATION. NOTE THAT THE ABOVE LISTED EQUIPMENT IS FOR DEFINITION OF OPERATING WEIGHT ONLY, AND MAY BE DIFFERENT FROM THE EQUIPMENT SPECIFICALLY REQUIRED HEREIN.

6. LOADER OPERATING LOAD

THE LOADER RATED OPERATING LOAD SHALL BE IN ACCORDANCE WITH SAE-J818. THIS RATED LOAD SHALL BE ATTAINABLE WITH THE MANUFACTURER'S STANDARD GENERAL PURPOSE BUCKET, EXCEPT THAT THE MINIMUM CAPACITY OF THE BUCKET SHALL BE AS CALLED FOR HEREIN UNDER PARAGRAPH III.P, BUCKET.

7. OCCUPATIONAL SAFETY AND HEALTH ACT

THE BACKHOE LOADER SHALL BE FURNISHED WITH ALL APPLICABLE EQUIPMENT AND ACCESSORIES AS REQUIRED BY THE OCCUPATIONAL SAFETY AND HEALTH ACT (U.S. DEPT. OF LABOR AND N. C. DEPT. OF LABOR), INCLUDING THE FOLLOWING:

29 CFR 1926.52 - OCCUPATIONAL NOISE EXPOSURE

THE BACKHOE LOADER SHALL BE CONSTRUCTED AND ASSEMBLED SO THAT THE NOISE AT EAR LEVEL OF THE SEATED OPERATOR, WITH ALL DOORS, WINDOWS AND VENTS OPEN; WHEN MEASURED IN ACCORDANCE WITH SAE-J1166-- WORK CYCLE TEST, SHALL NOT EXCEED THE PERMISSIBLE NOISE EXPOSURE LIMITS OF THIS REGULATION FOR 8-HOUR OPERATOR EXPOSURE.

29 CFR 1926.600 - EQUIPMENT

SAFETY GLASS FOR ENCLOSED CAB.

29 CFR 1926.602 - MATERIAL HANDLING EQUIPMENT

SEAT BELTS, BRAKES, FENDERS, AND HORN.

29 CFR 1926.1000 - ROLLOVER PROTECTIVE STRUCTURES (ROPS)

CAB WITH INTEGRAL ROPS.

29 CFR 1910.145 - SPECIFICATIONS FOR ACCIDENT PREVENTION SIGNS AND TAGS

SLOW MOVING VEHICLE EMBLEM.

**B. OPERATING AND DIMENSIONAL REQUIREMENTS**

THE REQUIREMENTS GIVEN BELOW ARE MINIMUM, EXCEPT AS NOTED, AND IN ACCORDANCE WITH APPLICABLE SAE STANDARDS. BACKHOE SPECIFICATIONS OF MODEL OFFERED MUST BE THOSE OBTAINED WHEN THE MACHINE IS EQUIPPED WITH THE 24" TRENCHING BUCKET REFERENCED FOR THIS PURPOSE IN THE MANUFACTURER'S PUBLISHED LITERATURE. ALL BACKHOE REQUIREMENTS MUST BE MET WITHOUT THE NEED TO SWITCH BUCKETS:

SIZE (CLASS)	1	2	3
NET HP	60	65	82
OPERATING WEIGHT	12500	13200	14700
TRAVEL SPEED FORWARD (MPH)	18	19	19
FRONT TIRE SIZE	MFR'S STD	MFR'S STD	MFR'S STD
REAR TIRE SIZE	MFR'S STD	MFR'S STD	MFR'S STD
WHEEL BASE (IN)	82	81	83
NUMBER OF TRAVEL SPEEDS, FORWARD/REVERSE	4/4	4/4	4/4
LOADER:			
LIFT CAPACITY, FULL HEIGHT (LB)	4600	5200	6900
BREAKOUT FORCE (LB)	6700	7,900	8900
DUMP CLEARANCE, FULL HGT, 45-DEG DUMP (IN)	106	102	104
BUCKET CAPACITY, HEAPED (CU. YD.)	1	1	1
RAISING TIME, FULL HEIGHT, MAXIMUM (SECS)	5	6	6
BACKHOE:			
DIGGING DEPTH, 2-FT FLAT BOTTOM	13' 10"	14' 0"	15' 5"
SWING ARC (DEGREES)	180	180	180
DIGGING FORCE, BUCKET CYLINDER (LB)	9900	9900	10700
LOADING HEIGHT (IN)	119	126	137
RATED BOOM LIFT CAPACITY (LB)*	1400	2050	2700
OVERALL REACH FROM SWING POINT	17'	17' 6"	18' 6"
*FULL SWING ARC, FULL REACH, GROUND LEVEL			

### C. ENGINE

#### 1. DIESEL ENGINE

THE ENGINE SHALL BE OF THE COMPRESSION IGNITION TYPE, FOUR-STROKE CYCLE, LIQUID COOLED, AND DESIGNED FOR OPERATION ON COMMERCIAL DIESEL FUEL. THE ENGINE SHALL BE EQUIPPED WITH AN ADEQUATE AND EFFICIENT FUEL INJECTION MECHANISM, HEAVY DUTY FUEL FILTER SYSTEM, AND MAXIMUM AVAILABLE CAPACITY FULL FLOW TYPE LUBRICATING OIL FILTER. ENGINES ON CLASS 3 MACHINES SHALL BE TURBOCHARGED.

AIR FILTER SHALL BE HEAVY DUTY DRY TYPE, DUAL STAGE (PRIMARY AND SAFETY ELEMENTS). AIR CLEANER HOSE SHALL BE OF METAL OR HEAVY DUTY FLEXIBLE, NON-COLLAPSIBLE TYPE (WIRE REINFORCED HOSE NOT ACCEPTABLE), AND WITH METAL OR MOLDED RUBBER ELBOWS. ALL AIR CLEANER HOSE CONNECTIONS MUST BE BANDED. EXHAUST PIPE SHALL BE OF THE DEFLECTOR TYPE AND RIGIDLY MOUNTED TO PREVENT VIBRATION.

#### 2. ENGINE GOVERNOR

THE ENGINE GOVERNOR SHALL BE OF THE MECHANICAL OR HYDRAULIC TYPE AND SHALL BE DRIVEN FROM THE ENGINE. PROVISIONS SHALL BE MADE FOR PERMITTING REGULATION OF THE GOVERNED SPEED-SETTING THROUGHOUT THE ENGINE LOAD RANGE WHILE THE UNIT IS IN OPERATION.

3. ENGINE STARTING SYSTEM

THE MANUFACTURER'S STANDARD ELECTRIC STARTING SYSTEM WITH HEAVY DUTY BATTERY (IN ACCORDANCE WITH SAE J930) SHALL BE ACCEPTABLE FOR CRANKING THE BACKHOE LOADER ENGINE. THE MANUFACTURER'S STANDARD NUMBER OF HEAVY DUTY BATTERIES (SINGLE OR DUAL) IS ACCEPTABLE. THE ENGINE STARTING SYSTEM SHALL BE CAPABLE OF CRANKING THE ENGINE FOR STARTING IN AN AMBIENT TEMPERATURE OF -20 DEGREES FAHRENHEIT. THE BATTERY SHALL BE SPECIFICALLY DESIGNED TO WITHSTAND THE SHOCK, VIBRATION, AND DUSTY ENVIRONMENT ENCOUNTERED IN OFF-ROAD WORK MACHINES. A SHOCK RESISTANT BATTERY MOUNT IS NOT AN ACCEPTABLE SUBSTITUTE FOR THE TYPE OF BATTERY REQUIRED, THOUGH SUCH MOUNT MAY BE FURNISHED IN ADDITION TO THE PROPER BATTERY.

4. ENGINE COOLING SYSTEM

a) LIQUID COOLED - THE UNIT SHALL HAVE HEAVY DUTY RADIATOR AND BLADE TYPE FAN. THE COOLING SYSTEM SHALL BE PROTECTED TO A MINIMUM OF -20 DEGREES FAHRENHEIT.

b) AIR COOLED - NOT APPLICABLE

5. ENGINE LUBRICATING SYSTEM

THE MANUFACTURER'S CURRENT STANDARD PRODUCTION LUBRICATING SYSTEM IS ACCEPTABLE.

**D. FUEL TANK**

THE MANUFACTURER'S STANDARD FUEL TANK(S) IS (ARE) ACCEPTABLE, EXCEPT THAT MACHINE IS TO BE ABLE TO OPERATE IN NORMAL USAGE CONTINUOUSLY FOR EIGHT (8) HOURS WITHOUT REFUELING. FUEL TANKS SHALL BE LOCATED SO AS NOT TO BE AFFECTED BY HEAT FROM THE ENGINE EXHAUST PIPE OR MUFFLER.

**E. POWER TRAIN**

1. TRANSMISSION

THE BACKHOE LOADER SHALL HAVE A TORQUE CONVERTER AND HYDRAULIC POWER REVERSING, WITH THE MINIMUM NUMBER OF FORWARD AND REVERSE TRAVEL SPEEDS SPECIFIED IN PARAGRAPH III.B.

2. AXLES

FRONT AXLE SHALL BE SOLID ONE PIECE CONSTRUCTION (TWO-WHEEL DRIVE ONLY).

REAR AXLE SHALL BE EQUIPPED WITH DIFFERENTIAL LOCK OR OTHERWISE DESIGNED TO TRANSMIT POWER FROM ONE WHEEL TO THE OTHER WHEN NEEDED.

FRONT AND REAR AXLES SHALL BE RATED IN ACCORDANCE WITH SAE J43.

**F. STEERING**

THE BACKHOE LOADER SHALL HAVE POWER STEERING. SECONDARY STEERING ABILITY SHALL BE FURNISHED IN THE EVENT OF ENGINE FAILURE. THE SECONDARY STEERING SHALL MEET THE REQUIREMENTS OF SAE-J1511.

**G. BRAKING SYSTEMS**

THE SERVICE BRAKES SHALL BE FOOT CONTROLLED AND OF THE WET DISC TYPE. AN SECONDARY BRAKING SYSTEM AND A PARKING BRAKE SYSTEM SHALL BE PROVIDED.

IN ADDITION TO THE ABOVE REQUIREMENTS, THE SERVICE BRAKING, SECONDARY BRAKING AND PARKING BRAKE SYSTEMS SHALL CONFORM TO THE REQUIREMENTS OF SAE-J1473.

**H. TIRES**

TIRE SIZES SHALL BE AS STATED IN PARAGRAPH III.B UNLESS OTHERWISE SPECIFIED IN THE IFB AND SHALL BE OF A PREMIUM QUALITY.

**I. HYDRAULIC SYSTEM**

THE LIFT AND BUCKET MECHANISMS SHALL BE OPERATED BY HYDRAULIC CYLINDERS. HYDRAULIC PUMP SHALL BE ON A LIVE DRIVE FROM THE ENGINE OR TORQUE CONVERTER AND SHALL PROVIDE ADEQUATE PRESSURE FOR ALL BUCKET OPERATIONS. AMPLE PUMP AND RESERVOIR CAPACITY SHALL BE FURNISHED FOR CONTINUOUS DUTY OPERATING CYCLES WITHOUT OVERHEATING. A SYSTEM RELIEF VALVE AND SPIN-ON REPLACEABLE OIL FILTER SHALL BE PROVIDED.

FOR SIZES 2 AND 3 ONLY, THE HYDRAULIC SYSTEM SHALL BE CAPABLE OF OPERATING A BREAKER-IMPACTOR SPECIFIED TO REQUIRE 21 GPM. HOWEVER, THE VALVE AND ANY OTHER HYDRAULIC COMPONENTS DEDICATED TO BREAKER-IMPACTOR ARE NOT REQUIRED.

**J. ROPS CAB**

UNLESS OTHERWISE SPECIFIED, A ROPS CAB SHALL BE FURNISHED. THE ROPS CAB SHALL CONFORM TO SAE-J1040, AND BE COMPLETELY ENCLOSED. DOOR(S) WITH FASTENERS TO SECURE IN THE OPEN POSITION AND KEYED LOCKS TO SECURE IN THE CLOSED POSITION SHALL BE FURNISHED. TINTED SAFETY GLASS WINDOWS SHALL BE FURNISHED, AND ARE TO BE MOUNTED TO WITHSTAND THE EFFECT OF SHOCK AND VIBRATION ENCOUNTERED DURING USE. THE OPERATOR'S SEAT SHALL BE LOCATED WITHIN EASY REACH OF ALL OPERATING CONTROLS, AND ALLOW A GOOD VIEW OF THE WORK AREAS. THE SEAT SHALL BE ADJUSTABLE BUCKET TYPE, FOAM RUBBER CUSHIONED, UPHOLSTERED, WITH ARM RESTS, BACK REST, AND SEAT BELT. SEAT BELT SHALL BE IN ACCORDANCE WITH SAE J386.

A HEAVY DUTY HEATER, DEFROSTER, AND WINDSHIELD WIPERS (FRONT AND REAR) SHALL BE INCLUDED.

WHERE NECESSARY FOR SAFE AND CONVENIENT INGRESS AND EGRESS OF THE OPERATOR TO AND FROM THE ROPS CAB (OR ROPS CANOPY WHERE ALLOWED IN THE INVITATION FOR BIDS), HANDHOLDS, HANDRAILS, AND/OR STEPS SHALL BE PROVIDED. WHERE SUCH ARE PROVIDED THEY SHALL BE IN ACCORDANCE WITH SAE J185.

**K. BUCKET CONTROLS**

THE CONTROLS SHALL CONSIST OF SINGLE LEVER LOADER, TWO LEVER BACKHOE, AND TWO LEVER STABILIZER, UNLESS OTHERWISE SPECIFIED.

**L. OUTRIGGERS**

OUTRIGGERS SHALL BE "A" TYPE (INCLINED FROM THE VERTICAL, SUCH THAT THE TWO OUTRIGGERS APPEAR TO FORM THE LEGS OF AN "A" WHEN VIEWED FROM THE REAR OF THE MACHINE) WITH FLIP-OVER PADS FOR DIRT AND STREET OPERATION. OUTRIGGERS SHALL BE HYDRAULICALLY AND INDEPENDENTLY CONTROLLED. PADS SHALL HAVE SUFFICIENT GROUND CONTACT AREA FOR ALL TYPICAL WORKING ENVIRONMENTS.

**M. PAINTING**

ALL EXPOSED METAL PARTS OF THE BACKHOE LOADER SHALL BE CLEANED OF ALL MILL SCALE, RUST, GREASE, ETC, THEN PRIMED AND UNDERCOATED WITH A RUST RESISTANT PAINT IN ACCORDANCE WITH ACCEPTABLE SHOP PRACTICE.

SIZE 1 AND SIZE 2 MACHINES: THE FINISH COAT SHALL BE THE MANUFACTURER'S STANDARD COLOR(S). INTERIOR OF THE CAB SHALL BE A NON-GLARE COLOR.

SIZE 3 MACHINES: FOR ALL PURCHASES FOR NC DOT, THE FINISH COAT SHALL BE "NC DOT SAFETY YELLOW," WHICH SHALL BE VISUALLY INSPECTED FOR SUITABLE MATCH IN THE FOLLOWING MANNER: PRIOR TO THE FINISH PAINTING OF EQUIPMENT, THE SUCCESSFUL BIDDER WILL BE PROVIDED A PAINT CHIP BY THE NORTH CAROLINA DEPT OF TRANSPORTATION WHICH HAS BEEN PREPARED UTILIZING A MINIMUM OF ONE (1) MIL THICKNESS OF GREY PRIMER AND A MINIMUM OF TWO (2) MIL THICKNESS OF DUPONT #93-54701A LEAD FREE. THE SUCCESSFUL BIDDER SHALL BE REQUIRED TO RETURN THE DOT PAINT CHIP AND FURNISH TWO (2) 3-1/2" x 8" PAINTED PANELS REPRESENTING THE FINISHED COLOR FOR APPROVAL. IF APPROVED, ONE PANEL WILL BE RETURNED TO CONTRACTOR AND OTHER WILL BE RETAINED BY THE STATE FOR COLOR COMPARISON; COLOR OF EQUIPMENT THEN MUST MATCH COLOR OF APPROVED PANEL. NC DOT SAFETY YELLOW FINISH COAT SHALL BE DUPONT #93-54701A LEAD FREE, MOLINE MPM 11Y169-A LEAD FREE, OR AN ACCEPTABLE EQUIVALENT. INTERIOR OF THE CAB SHALL BE A NON-GLARE COLOR. THE BACKHOE BUCKETS AND ATTACHMENTS, OTHER THAN SWIVEL, SHALL BE MANUFACTURER'S STANDARD COLOR. CAB WINDOW FRAMING, AND FENDERS AND BUMPERS EITHER OF WHICH ARE MADE OF COMPOSITE OR PLASTIC MATERIAL, DO NOT HAVE TO BE PAINTED WITH THE ABOVE SAFETY YELLOW FINISH. IF A BACKHOE BUCKET SWIVEL DEVICE IS REQUIRED, IT IS TO BE PAINTED WITH THE ABOVE SAFETY YELLOW FINISH .

FOR ALL OTHER PURCHASES (FOR OTHER THAN NC DOT), THE FINISH COAT ON SIZE 3 MACHINES SHALL BE THE MANUFACTURER'S STANDARD COLOR(S). INTERIOR OF THE CAB SHALL BE A NON-GLARE COLOR.

**N. INSTRUMENTS AND GAUGES**

THE INSTRUMENT PANEL SHALL BE LOCATED IN VIEW OF THE SEATED OPERATOR. THE MANUFACTURER'S STANDARD INSTRUMENTATION SHALL BE FURNISHED UNLESS OTHERWISE SPECIFIED IN THE INVITATION FOR BIDS.

**O. EQUIPMENT**

THE FOLLOWING EQUIPMENT SHALL BE FURNISHED WITH THE BACKHOE LOADER UNLESS OTHERWISE SPECIFIED IN THE INVITATION FOR BIDS:

1. AIR CLEANER RESTRICTION INDICATOR OF THE PROPER SIZE AND SETTING, VISIBLE FROM THE OPERATOR'S STATION.

2. RADIATOR GUARD.
3. SLOW MOVING VEHICLE EMBLEM
4. HORN, PER SAE J1105
5. VANDALISM PROTECTION KIT. THE KIT SHALL INCLUDE LOCKING TYPE DOOR(S) AND LOCK TYPE CAPS FOR EXPOSED FILLER CAPS AND OIL DIPSTICK PIPE (LESS PADLOCKS).
6. ENGINE HOOD AND SIDE DOORS OR SHIELDS.
7. FRONT AND REAR WORK LIGHTS, STOP LIGHT, INSTRUMENT LIGHTS, AND FRONT AND REAR TURN SIGNALS WITH HAZARD FLASHER. LIGHTING IS TO BE IN ACCORDANCE WITH SAE J99.
8. SIZE 3 MACHINES ONLY: FRONT AND REAR TIE DOWN HOOKS FOR TRANSPORTING THE BACKHOE LOADER.
9. REAR FENDERS.
10. COLD STARTING AID.
11. BACKUP ALARM, PER SAE J994 AND SAE J1446.

**P. BUCKETS**

LOADER

A GENERAL PURPOSE BUCKET OF THE SIZE SPECIFIED IN PARAGRAPH III.B SHALL BE FURNISHED WITH THE BACKHOE LOADER UNLESS OTHERWISE SPECIFIED IN THE INVITATION FOR BIDS. THE BUCKET SHALL BE EQUIPPED WITH A SPILL GUARD AND REPLACEABLE (WELD-ON) CUTTING EDGE UNLESS OTHERWISE SPECIFIED IN THE INVITATION FOR BIDS.

IF A MULTI-PURPOSE BUCKET HAS BEEN SPECIFIED, THEN IT SHALL BE EQUIPPED WITH A SPILL GUARD AND REPLACEABLE (WELD-ON) CUTTING EDGES ON ALL APPLICABLE EDGES OF THE BUCKET UNLESS OTHERWISE SPECIFIED IN THE INVITATION FOR BIDS.

BACKHOE

BACKHOE BUCKET SHALL BE HEAVY DUTY, TRENCH TYPE, 24" WIDE WITH MANUFACTURER'S RECOMMENDED BUCKET TEETH AND REPLACEABLE TEETH POINTS UNLESS OTHERWISE SPECIFIED IN THE INVITATION FOR BIDS.

**IV. WARRANTY**

THE CONTRACTOR WARRANTS TO THE OWNER THAT ALL EQUIPMENT FURNISHED UNDER THIS SPECIFICATION WILL BE NEW AND OF GOOD MATERIAL AND WORKMANSHIP AND AGREES TO REPLACE PROMPTLY ANY PART OR PARTS WHICH BY REASON OF DEFECTIVE MATERIAL OR WORKMANSHIP SHALL FAIL UNDER NORMAL USE, FREE OF NEGLIGENCE OR ACCIDENT, FOR A MINIMUM PERIOD OF 12 MONTHS FROM DATE PUT IN OPERATION. SUCH REPLACEMENT SHALL INCLUDE ALL PARTS, LABOR, AND TRANSPORTATION COSTS TO THE LOCATION WHERE EQUIPMENT IS DOWN, FREE OF ANY CHARGE TO THE OWNER OR HIS REPRESENTATIVE.

UNDER SAME AND ALL CONDITIONS AS ABOVE, THE POWER TRAIN (ENGINE, TRANSMISSION, TORQUE CONVERTER, AND FINAL DRIVE) AND STRUCTURAL MEMBERS SHALL BE SO WARRANTED FOR AN ADDITIONAL PERIOD OF AT LEAST 24 MONTHS (36 MONTHS TOTAL). ANY PERIODIC INSPECTIONS WHICH MAY BE PERFORMED BY THE CONTRACTOR OR HIS REPRESENTATIVE SHALL BE WITHOUT CHARGE TO THE OWNER.

## **V. INSTRUCTION, MANUALS, AND LINE SETTING SHEET**

THE CONTRACTOR SHALL FURNISH A QUALIFIED REPRESENTATIVE TO INSTRUCT THE OWNER'S OPERATOR(S) IN THE OPERATION AND MAINTENANCE OF THE EQUIPMENT FOR A MINIMUM PERIOD OF EIGHT HOURS AT USER'S SITE OR AS OTHERWISE SPECIFIED IN THE INVITATION FOR BIDS.

AN OPERATOR'S MANUAL, SHOP MANUAL, COMPLETE PARTS BOOK, AND LINE SETTING SHEET SHALL BE FURNISHED WITH EACH UNIT. ADDITIONAL MANUALS AND PARTS BOOKS AND LINE SETTING SHEETS SHALL BE FURNISHED WHEN SPECIFIED IN THE INVITATION FOR BIDS.

## **VI. ACCEPTANCE EVALUATION AND QUALITY ASSURANCE**

UPON RECEIPT OF EACH BACKHOE LOADER AT THE RECEIVING POINT, THE PURCHASER OR HIS AUTHORIZED REPRESENTATIVE SHALL ARRANGE FOR AN ACCEPTANCE INSPECTION FOR COMPLIANCE WITH THE PROVISIONS OF THIS SPECIFICATION.

ANY DEVIATION FROM THE VERSION OF A SPECIFICATION REFERENCED HEREIN (E.G. SAE, OSHA) WHICH IS IN EFFECT ON DATE OF OPENING OF THE INVITATION FOR BIDS MUST BE RECTIFIED BY THE CONTRACTOR AT NO COST TO THE USER, REGARDLESS OF WHEN DURING THE PERIOD OF OWNERSHIP BY THE ORIGINAL PURCHASER THE DEVIATION IS DISCOVERED.

FOR CLASS 3 MACHINES, UNLESS OTHERWISE SPECIFIED THE CONTRACTOR SHALL FURNISH A PILOT MODEL FOR EXAMINATION, TESTS, AND POSSIBLE MODIFICATION AND/OR ADJUSTMENT OF ATTACHMENTS IN ACCORDANCE WITH THIS SPECIFICATION.

## **VII. DELIVERY AND PAYMENT**

DELIVERY OF AND PAYMENT FOR BACKHOE LOADERS 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 DELIVERY IN AN UNDAMAGED CONDITION.

BACKHOE LOADERS SHALL BE COMPLETELY SERVICED AND READY FOR OPERATION WHEN DELIVERED.

## **VIII. ORDERING DATA (FOR PURCHASER'S USE ONLY)**

PURCHASERS SHOULD EXERCISE ANY DESIRED OPTION OFFERED HEREIN AND SHOULD SPECIFY THE FOLLOWING:

1. TITLE, NUMBER, AND DATE OF THIS SPECIFICATION.
2. SIZE (CLASS) OF MACHINE: 1, 2, OR 3.
3. WHETHER THE MACHINE IS TO BE FURNISHED WITH TWO-WHEEL DRIVE OR FOUR-WHEEL DRIVE.
4. IF BACKHOE LOADER IS TO BE PAINTED OTHER THAN AS CALLED FOR HEREIN.
5. IF MULTI-PURPOSE LOADER BUCKET IS REQUIRED, IN LIEU OF GENERAL PURPOSE BUCKET. SPECIFY SIZE.
6. ON LOADER BUCKET, IF OTHER THAN WELD-ON CUTTING EDGE IS REQUIRED.
7. IF ADDITIONAL MANUALS, PARTS BOOKS, AND LINE SETTING SHEETS ARE REQUIRED.
8. IF ON-THE-JOB-SITE TRAINING BY A TECHNICIAN IN THE OPERATION AND MAINTENANCE OF THE LOADER IS REQUIRED TO EXCEED 8 HOURS AT A SINGLE LOCATION.
9. IF A PILOT MODEL IS NOT TO BE FURNISHED ON AN ORDER FOR SIZE 3 MACHINES.
10. IF DIFFERENT OR ADDITIONAL BACKHOE BUCKETS ARE REQUIRED.
11. IF ADDITIONAL ATTACHMENTS ARE REQUIRED.
12. IF SPECIAL INSTRUMENTS AND GAUGES ARE REQUIRED.

13. IF TIRES OTHER THAN AS SPECIFIED IN PARAGRAPH III.B ARE REQUIRED.
14. IF A ROPS CANOPY (IN CONFORMANCE WITH SAE J1040) IS REQUIRED, IN LIEU OF ROPS CAB.
15. IF OTHER THAN SINGLE-LEVER LOADER CONTROL AND/OR TWO-LEVER BACKHOE CONTROL ARE REQUIRED.
16. ON SIZE 2 AND SIZE 3 MACHINES ONLY: IF IT IS NOT NECESSARY THAT THE HYDRAULIC SYSTEM BE CAPABLE OF OPERATING A BREAKER-IMPACTOR REQUIRING 21 GPM (UNLESS SUCH CAPABILITY IS STANDARD).
17. IF ADDITIONS, DELETIONS, OR CHANGES ARE REQUIRED TO THE LIST OF EQUIPMENT IN PARAGRAPH III.O.

**--- END OF SPECIFICATION ---**