Michigan Fireline Plow Design

Roscommon Equipment Center
Northeast Forest Fire Supervisors
In Cooperation with
Michigan's Forest Fire Experiment Station
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Introduction

In the mid 1950’s the Michigan Forest Fire Experiment Station developed the first hydraulically operated fireline plow. Its use and successful history was documented in several sources, including REC Project #18. The original design called for many of the larger components to be cast. Later, as the cost of casting rose dramatically and the small production foundries began to disappear, the cast parts were redesigned as weldments. Additionally the plow bottom, whose mouldboards and shares first were commercial agricultural purchase parts, became obsolete. The solution, again, was to make the assembly a weldment, using abrasion resisting steel in the areas of greatest wear. This welded plow bottom has proved to be easier to maintain and stronger than its forerunner.

System Design And Fabrication

Plow Hitch Mounting:
The hitch mounting bracket attaches the plow’s hitch to the crawler-tractor. In Project #29, the design of a hitch mounting bracket (21-9800D) for the John Deere 400-G tractor is shown. Each tractor model of each manufacturer will have its own implement attachment hole pattern on the rear housing. Hence, the plow hitch mounting bracket shown in this project is just a sample and each tractor will need its own specific design. Several dimensional relationships are important to hold for the hitch mounting bracket. These include the distances between the link pin bosses and the height of the link pin locations. The depth adjuster discussion will further elaborate on this. Also, the distance from the rear of the tractor to the link pin bosses is important. If it is mounted too close, the plow in its upright stored position may not clear the rear of the tractor or its cab. Conversely, the farther back from the tractor that the pin is located, the greater the rearward shift of the center of gravity of the tractor-plow system. This may affect the rear stability of the tractor when it is not plowing. It is best to locate the plow so that it mounts as close to the rear of the tractor as possible. Also note that some modification to existing drawbars and cover plates may be necessary to mount the hitch.

Parallel Hitch Linkage:
The four links attach the depth adjuster to the hitch mounting bracket with 2-inch diameter pins. This forms the parallel linkage that allows the plow to maintain an optimum attack angle with the soil, despite changes in the angle of the terrain. The depth adjuster shown is designed for the JD-400G and JD-350 series tractors.
top plane of the lower pivot plate of the depth adjuster (0-711 det. DA-9) should be about 15-5/16 inches above the ground when the parallel linkage is 1/8 of the way up its vertical travel. Drawing (21-9800D) shows the dimensions of this relationship as designed for the John Deere 400G tractor. Adjustment of the depth adjuster design or the hitch mounting bracket can be made for other tractors in order to maintain this height.

Pivot (20-0004D):
The plow pivot allows the plow to swing from side to side. It is pinned to the depth adjuster and the plow beam is pinned to the pivot. In order for the hydraulic cylinder of the plow beam to operate properly, the dimensions shown on Drawing 20-0004D of the pivot are important to hold.

Plow Beam (20-0012D):
Likewise, the geometry of the plow beam is important: in particular, the 6" x 19½" rectangular dimension between the plow attachment hole and the trunion mounting holes, as shown on Drawing 00-0458D. This distance is critical in the performance of the plow, both when plowing and in the latch-up position.

The plow beam channels can be rough cut, tack welded together and then machined as one piece. After, the tack welds are cut apart and the bosses that make up the rest of the lower beam assembly welded, with the beam channels 1-9/16 inch apart. The upper beam assembly is welded together with the trunion bosses aligned and spaced 9 inches apart. Upper and lower beam weldments are welded to form a complete beam.

Plow Bottom Weldment (20-0007D):
The plow bottom fabrication is made difficult because of the curved structures that are involved. A 5' x 9' x 3/8" steel plate is rolled with the 17-3/8" inside diameter (your local steel supplier can do this). Using the flat mouldboard layouts of Drawings 00-0240D and 00-0241D draw a full size layout to mark the cutting lines for flame cutting the mouldboards out of the rolled steel. For larger productions, a steel template made of 1/4" stock, rolled at a 17-3/4" inside diameter, can be used as a burn-out template. Undersize the burn-out template to account for the torch tip clearance. Cut left and right halves, making sure that the bottom edge of the mouldboard is parallel to the rolling axis of the steel. A fixture is essential for assembling the plow bottom. It is important to fix the mouldboards at a 45 degree angle from the plow standard. The plow shares (00-0418B & 00-0419B) and the turf cutting knives (20-0008B & 20-0009B) are made from medium hard, abrasion resisting steel (200/250 Brinnell hardness). This material normally comes in plate, but can be sheared to needed widths. The bevel edges can best be produced by flame cutting at an angle.

Hydraulic Cylinders:
Drawings 22-0006 & 22-0018 show the minimum requirements for the plow and hitch hydraulic cylinder. Commercial cylinders may be available that can be adapted to the plow design. Inside the plow's trunion is a large spring that is compressed when the hydraulic cylinder is fully extended. The spring, in part, provides for force to keep the plow in the ground. Specifications for the spring are shown on Drawing 20-0011B. This can be made by a spring manufacturer.
Rolling Coulter Assembly (20-0019D):
The coulter cuts the sod mat and other debris prior to the mouldboard’s turning the furrow. The depth control flange attached to the coulter rides on top of the ground. When the plow’s hitch cylinder is in the float position, a rise in the ground will force the coulter flange up which, in turn, forces the depth adjuster up at the parallel linkage of the hitch. This keeps the plow beam parallel to the surface of the ground and provides the optimum attack angle of the plow bottom. When a depression in the ground is encountered, the coulter flange again follows the ground and the parallel linkage drops to again keep the plow beam parallel. If the hitch is "locked" into position by removing it from the float, the spring provides some adjustment for the terrain differences.

Tractor Hydraulic System:
The hydraulic system of the tractor needs to be adapted for a 2-spool hydraulic valve to operate the plow. The spool that actuates the plow beam cylinder must be 4-way and the spool that actuates the plow hitch cylinder must be 4-way with float detent position. It should be an open center valve with relief set at about 1100 psi. Disconnect points should be located at the rear of the tractor so that the plow can be easily removed during seasons that it is not in use. Drawing 27-9803B shows a schematic of the hydraulics.

Contact your tractor dealer for advice on ordering or adapting hydraulic systems to operate the plow.

Organization of Drawings
The following pages contain drawings for production of the plow. The drawings do not have page numbers. A list of the drawing order follows. The first drawing is 27-9803B; the schematics for hydraulics. The next is a flow chart of all drawings, 17-0003D. This chart groups the major assemblies in the plow construction. The drawings are generally ordered by these groups with the highest print in the hierarchy first followed by the drawings that complete that assembly.
## Final Assembly Drawing List

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## Plow Hitch Assembly Drawing List

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<td>20-0018 A</td>
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<td>Flange, 3/8” Square</td>
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<td>00-0385 C</td>
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<td>22-0006 D</td>
<td>4-1/2 Hyd. Cyl. Assembly</td>
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FROM POWER BEYOND PORT ON BLADE CONTROL VALVE

TO RESERVOIR VIA FILTER

PLow CYL.
4.1/2" BORE

HITCH CYL.
3" BORE

PLow VALVE
W/ 1100 P.S.I. RELIEF

PLOW FROM POWER BEYOND PORT ON BLADE CONTROL VALVE

TO RESERVOIR VIA FILTER

PLow CYL.
4.1/2" BORE

HITCH CYL.
3" BORE
NOTE!
BREAK ALL SHARP EDGES.
ITEM | PART NO | DWG | DESCRIPTION | QTY | EST WT
---|---|---|---|---|---
1 | 00-0088 B | PIN SHANK: BAR RD 1 1/2" OD | 1 | 5.61
2 | 00-0089 B | PIN HEAD: BAR, RND, 2" DIA. | 1 | 0.38

**NOTE:**
CASE HARDEN TO ROCKWELL 60 C X 0.03 DEEP.

PART NUMBER: 20-0003
EST. WT.: 6.13 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROYSCOMMON, MICHIGAN 48653

MICHIGAN DNR FOREST MANAGEMENT DIVISION

NOTE: CASE HARDEN TO ROCKWELL 60 C X 0.03 DEEP.

PART NUMBER: 20-0003
EST. WT.: 6.13 LBS.
PART NUMBER: 00-0088
MAT'L.: BAR: RND., 1 1/2" DIA.
RYCASE/LEAD
UNS 611170/Pb
F.F.E.S. SPEC.: AC-00150AF
EST. WT.: 5.61 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653
TITLE: PIN SHANK: BAR, RND., 1 1/2" DIA.
PART NUMBER: 00-0089
MAT'L.: BAR: ROUND, 2" DIA. C.D.
UNS G10180
F.F.E.S. SPEC. NO.: AC-00200AW
EST. WT.: .38 LBS.

C’SINK 0.25 DP. X 90°
Plow Hitch Assembly
ITEM | PART NO | QTY | DESCRIPTION
---|---|---|---
1 | 21-0017 B | 1 | DRAWBAR MODIFICATION: J.D. 400G
2 | 21-0009 B | 1 | SPACER: J.D. 400G HITCH
3 | 21-0006 D | 158 | HITCH MOUNTING BRACKET W/C: J.D. 400G
4 | WS10-BC | 0.03 | WASHER, SPRING LOCK, REG.: 1/8" PLATED
5 | TS-10G016 | 8 | SCREW, CAP, HEX. HD.: 2-3/4" LONG, REG.
6 | WS12-BC | 4.05 | WASHER, SPRING LOCK, REG.: 3/4" PLATED
7 | TS-12G024 | 0.47 | SCREW, CAP, HEX. HD.: 2-3/4" LONG, REG.
8 | WS10-BA | 0.09 | WASHER, FLAT U.S.S.: 1/8" PLATED
9 | TS-10G012 | 0.19 | SCREW, CAP, HEX. HD.: 2-1/4" LONG, REG.
10 | TS-10GP | 0.08 | NUT, HEX., DOUBLE CHAM.: 3/4" PLATED
11 | 21-0018 D | 1.24 | TRACTOR HITCH HYD. CYL. ASSEMBLY
12 | 21-0011 B | 1.95 | PIN, CYLINDER ANCHOR END
13 | RDB-8128AB | 0.01 | PIN, COTTER: 1/8" X 2" LONG PLATED
14 | 0-711 | 0.06 | DEPTH ADJUSTER W/C: J.D. 400G
15 | 0-431 | 2 | LINK, LOWER W/C
16 | 0-431 | 2 | LINK, UPPER W/C
17 | 21-0010 B | 14.5 | PIN, HITCH LINK
18 | R24-192A4 | 4.06 | PIN, ROLL: 3/8" DIA. X 3" LONG
19 | 21-0012 B | 1.32 | PIN, CYLINDER ROD END
20 | 15-060G22 | 0.11 | SCREW, CAP, HEX. HD.: 3/4" LONG, REG.
21 | WS06-8C | 2.02 | WASHER, SPRING LOCK, REG.: 3/8" PLATED
22 | TS-06GP | 0.09 | NUT, HEX., DOUBLE CHAM.: 3/4" PLATED
23 | 21-0016 C | 2.20 | FUEL TANK GD. MODIFICATION
24 | 33-0002 B | 5.98 | SHACKLE, ANCHOR FORGED W/ LOOSE PIN: 3/4"
NOTE
USE TEMPLATE
P/N 18-0027.

PART NUMBER: 21-0009
MAT'L.: BAR, FLAT, 3/8" X 2" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00608AA
EST. WT.: 2.39 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

TITLE: SPACER: JD 400G HITCH

SCALE: 1 = 2
DATE: SEP. 05, 1981

DRAWN: R. GREENLAW
CHECKED: KDE
APPROVED: 

FOREST MANAGEMENT DIVISION
PART NUMBER: 21-0010
MAT'L.: BAR, ROUND, 2" DIA. C.D.
UNS G10180
F.F.E.S. SPEC. NO.: AC-00200AW
EST. WT.: 14.5 LBS.

3/8" DIA.
TYP

15.50

0.06 X 45° CHAM.
TYP

16.50

0.50

2.00

REF

15.50

PART NUMBER: 21-0010
MAT'L.: BAR, ROUND, 2" DIA. C.D.
UNS G10180
F.F.E.S. SPEC. NO.: AC-00200AW
EST. WT.: 14.5 LBS.

3/8" DIA.
TYP

16.50

0.06 X 45° CHAM.
TYP

0.50

2.00

REF

15.50

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

SCALE: 1 = 2
DATE: NOV. 8, 1990
DRAWING: 21-0010B
PART NUMBER: 21-0012
MAT'L.: BAR, RND., 1.1/4" DIA. C.D.
UNS G10180
F.F.E.S. SPEC. NO.: AC-00125AW
EST. WT.: 2.32 LBS.

0.06 X 45° CHAM.
TYP

7.00

1.225

0.06 X 45° CHAM.
TYP

PART NUMBER: 21-0012
MAT'L.: BAR, RND., 1.1/4" DIA. C.D.
UNS G10180
F.F.E.S. SPEC. NO.: AC-00125AW
EST. WT.: 2.32 LBS.

0.06 X 45° CHAM.
TYP
SHACKLE W/ LOOSE PIN

NOMINAL SIZE: 3/4"
STYLE: ANCHOR (BOW STYLE) W/ LOOSE PIN
WORKING LOAD: 10,000 LBS.
MATERIAL: FORGED STEEL, GALV. FINISH
EST. WT.: 2.20 LBS.

APPROVED MANUFACTURERS
McMASTER-CARR SUPPLY CO.
P.O. BOX 4355
CHICAGO, ILLINOIS
60680-4355

PART NO.
3559T51

APPROVED MANUFACTURERS

MICHIGAN DNR
FOREST MANAGEMENT DIVISION

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN
48653

F.F.E.S. PART NO.: 33-0002

SCALE: 1 = 2
DATE: FEB. 7, 1991

EST. WT.: 2.20 LBS.
NOTE!
INSTALL ITEM 17
AT ASSEMBLY OF
HITCH WITH TRACTOR.

NOTE!
USE FIXTURE
P/N 18-0021.

ITEM | PART NO | SVG | DESCRIPTION | QTY |
---|---|---|---|---|
1 | 00-0205 | B | HITCH MOUNTING BAR: TOP | 2 |
2 | 00-0206 | A | GUSSET | 2 |
3 | 00-0207 | A | GUSSET | 2 |
4 | 00-0208 | B | HITCH MOUNTING BAR: BOTTOM | 2 |
5 | 00-0209 | A | BAR, FLAT, 1/2" X 3" H.R. | 1 |
6 | 00-0210 | A | BAR, FLAT, 1/2" X 4" H.R. | 1 |
7 | 00-0211 | B | GUSSET | 2 |
8 | 00-0212 | A | GUSSET | 2 |
9 | 00-0213 | B | FLANGE | 1 |
10 | 00-0214 | A | BAR, FLAT, 1/2" X 4.1/2" H.R. | 1 |
11 | 00-0216 | C | HYD. CYLINDER ANCHOR S/W | 1 |
12 | 00-0395 | B | DRAWBAR RETAINER BRKT. S/W | 1 |
13 | 00-0396 | B | ANGLE, 3" X 2" X 1/4" H.R. | 2 |
14 | 00-0397 | C | HITCH SIDE L.H. S/W | 1 |
15 | 00-0400 | C | HITCH SIDE R.H. S/W | 1 |
16 | 21-0008 | B | GREASE FING.: 1/4"-28 STR'T. | 1 |
17 | 21-0008 | B | GREASE FING.: 1/4"-28 STR'T. | 1 |

PART NUMBER: 21-0005
EST. WT.: 158 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 40
RESEARCH, MANAGEMENT, EDUCATION
MICHIGAN

HITCH MOUNTING BAR WITH TRACTOR.

HITCH MOUNTING BRACKET W/ C J.D. 4000
NOTE
USE FIXTURE
P/N 18-0023.

PART NUMBER: 00-0205
MAT'L.: BAR, FLAT, 1/2" X 6" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00824AA
EST. WT.: 11.2 LBS.

11/16" DIA.
4 - PLCS.
1/16" X 45° CHAMFER TYP

USE GAGE P/N 18-0026 TYPICAL

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO</th>
<th>DWG</th>
<th>DESCRIPTION</th>
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<tr>
<td>1</td>
<td>00-0401</td>
<td>B</td>
<td>BOSS: 3&quot; O.D. X 1.937&quot; I.D.</td>
<td>1</td>
<td>2.41</td>
</tr>
<tr>
<td>2</td>
<td>00-0402</td>
<td>B</td>
<td>BOSS: 3&quot; O.D. X 1.937&quot; I.D.</td>
<td>1</td>
<td>2.39</td>
</tr>
<tr>
<td>3</td>
<td>00-0403</td>
<td>B</td>
<td>ANCHOR CENTER PLATE</td>
<td>1</td>
<td>12.4</td>
</tr>
</tbody>
</table>

PART NUMBER: 00-0228
EST. WT.: 16.3 LBS.
PART NUMBER: 00-0401
MAT'L.: TUBE, RD. 3" OD X 9/16" WALL
COLD DRAWN SEAMLESS
UNS G10260
F.F.E.S. SPEC. NO.: AD-30015BB
EST. WT.: 2.41 LBS.

STANDARD TOLERANCES

<table>
<thead>
<tr>
<th>FRACTIONAL</th>
<th>DECIMAL</th>
<th>ANGULAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>±1/32&quot;</td>
<td>±0.003&quot;</td>
<td>±1/2°</td>
</tr>
</tbody>
</table>

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653
PROJECT NO.: 88-4
TITLE: BOSS: 3" O.D. X 1.937" I.D.
SCALE: FULL
DATE: AUG. 29, 1955
DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED: DNR

MICHIGAN DNR
FOREST MANAGEMENT DIVISION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653
PROJECT NO.: 88-4
TITLE: BOSS: 3" O.D. X 1.937" I.D.
SCALE: FULL
DATE: AUG. 29, 1955
DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED: DNR

3/32" X 45° CHAMFER.
PART NUMBER: 00-0402
MAT'L.: TUBE, RD. 3" OD X 9/16" WALL
COLD DRAWN SEAMLESS
UNS G10260
F.F.E.S. SPEC. NO.: AD-30015BB
EST. WT.: 2.39 LBS.

NO. 3 DRILL THRU, ONE WALL
1/4"-28 UN TAP 1/4" DEEP.

1.937"
3"

2.1/8"
1.1/2"

3/32" X 45° CHAMFER.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

TITLE: BOSS: 3" O.D. X 1.937" I.D.
SCALE: FULL
DATE: AUG. 29, 1988
DNR NO. 00-0402B
NOTE!
USE TEMPLATE, P/N 18-0041.

PART NUMBER: 00-0403
MAT'L: BAR, FLAT, 1" X 6" H.R.
UNS 610200
F.F.E.S. SPEC. NO.: AB-01624AA
EST. WT.: 12.4 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

TITLE: HYD. CYL. ANCHOR CENTER PLATE
SCALE: 1 = 2
DATE: AUG. 29, 1985
DMN. NO.: 00-0403B
PART NUMBER: 00-0206
MAT'L.: BAR, FLAT, 1/2" X 3" HR
UNS G10200
F.F.E.S. SPEC. NO.: AB-00812AA
EST. WT.: 1.59 LBS.

2.1/2"

3"

1/2"

5"

2.1/2"

5"

1/2"

3"
NOTE!

USE FIXTURE, P/N 18-0024.
PART NUMBER: 00-0396
MAT'L.: BAR, FLAT, 1/2" X 3" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00812AA
EST. WT.: 0.53 LBS.

STANDARD TOLERANCES

R. GREENLAN
DRAFTED: KDB
CHECKED: APPROVED:

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

MICHIGAN DNR
FOREST MANAGEMENT DIVISION

PROJECT NO.: 88-4

DATE: AUG. 10, 1990

DRAWN: R. GREENLAN
CHECKED: KDB
APPROVED:

SCALE: FULL

TITLE: BAR, FLAT, 1/2" X 3" H.R.
PART NUMBER: 00-0397
MAT'L.: BAR, FLAT, 1/2" X 3" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00812AA
EST. WT.: 1.38 LBS.

1/2"

3"

3 1/4"

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

PROJECT NO.: 88-4

TITLE: BAR, FLAT, 1/2" X 3" H.R.

DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED: MICHIGAN DNR
FOREST MANAGEMENT DIVISION

SCALE: 1 = 2
DATE: AUG. 10, 1988

DUR. NO.: 00-0397A
PART NUMBER: 00-0207
MAT' L.: BAR, FLAT, 1/2" X 3" HR
UNS G10200
F.F.E.S. SPEC. NO.: AB-00812AA
EST. WT.: 1.49 LBS.
NOTE!
MACHINE IN PAIRS
W/ P/N 00-0400.

SECTION A - A
TYPICAL

PART NUMBER: 00-0399
EST. WT.: 17.0 LBS.
<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO</th>
<th>QTY</th>
<th>EST WT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>00-0215</td>
<td>1</td>
<td>15.5</td>
</tr>
<tr>
<td>2</td>
<td>00-0216</td>
<td>2</td>
<td>1.12</td>
</tr>
</tbody>
</table>

**Description:**
- **Item 1:** B Bar, Hitch Side
- **Item 2:** Boss: 3" OD x 9/16" Wall

**NOTE:**
MACHINE IN PAIRS W/ P/N 00-0399.

**SECTION A - A**

**PART NUMBER:** 00-0400
**EST. WT.:** 17.0 LBS.

**FOREST FIRE EXPERIMENT STATION**
P.O. BOX 58
ROSCOMMON, MICHIGAN 48653

**TITLE:** HITCH SIDE, R.H. S/W
PART NUMBER: 00-0216
MAT.L.: TUBE, RD. 3" OD X 9/16" WALL
COLD DRAWN SEAMLESS
UNS G10260
F.F.E.S. SPEC. NO.: AD-30015BB
EST. WT.: 1.12 LBS.

PART NUMBER: 00-0216
MAT.L.: TUBE, RD. 3" OD X 9/16" WALL
COLD DRAWN SEAMLESS
UNS G10260
F.F.E.S. SPEC. NO.: AD-30015BB
EST. WT.: 1.12 LBS.
PART NUMBER: 00-0208
MAT'L.: BAR, FLAT, 1/2" X 2.1/2" HR
UNS G10200
F.F.E.S. SPEC. NO.: AB-00810AA
EST. WT.: 2.86 LBS.

NOTE
USE FIXTURE
P/N 18-0022.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

MICHIGAN DNR
FOREST MANAGEMENT DIVISION
PROJECT NO.: 88-4

TITLE: HITCH MTG. BAR: BOTTOM
SCALE: 1 = 2
DATE: AUG. 25, 1988
DRAWN: M. GREENLAW
CHECKED: KDB
APPROVED: PUCF

STD. TOLERANCES

FACTORIAL:

- FRACTIONAL: +/- 0.010
- DECEIAL: +/- 0.0001
- ANGULAR: +/- 0.005

DRAWN: M. GREENLAW
CHECKED: KDB
APPROVED: PUCF

SCALE = 1 = 2
PART NUMBER: 00-0209
MAT'L.: BAR, FLAT, 1/2" X 3" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00812AA
EST. WT.: 5.31 LBS.

STANDARD TOLERANCES

DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED: P. A. RICE

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653
TITLE: BAR, FLAT, 1/2" X 3" H.R.
SCALE: 1 = 4
DATE: AUG. 28, 1988
PROJECT NO.: 88-4
DUB. NO.: 00-0209A
PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.

PART NUMBER: 00-0210
MAT'L.: BAR, FLAT, 1/2" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00816AA
EST. WT.: 7.07 LBS.
PART NUMBER: 00-0212
MAT'L: BAR, FLAT, 1/2" X 4.1/2" HR
UNS G10200
F.F.E.S. SPEC. NO.: AB-00818AA
EST. WT.: 2.74 LBS.

PART NUMBER: 00-0212
MAT'L: BAR, FLAT, 1/2" X 4.1/2" HR
UNS G10200
F.F.E.S. SPEC. NO.: AB-00818AA
EST. WT.: 2.74 LBS.

STD. TOLERANCES
FRACTIONAL:
R. GREENLAW
DECIMAL:
KDB
ANGULAR:
APPROVED:

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

MICHIGAN
DNR
FOREST MANAGEMENT
DIVISION

PROJECT NO.: 88-4

TITLE: GUSSET
SCALE: 1 = 2
DATE: AUG. 17, 1990
DUE NO. 00-0212A
PART NUMBER: 00-0213
MAT'L.: BAR, FLAT, 1/2" X 5" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00820AA
EST. WT.: 18.5 LBS.

28.3/8"

2.1/2"

23.3/8"

1/2" REF

5" REF

2.3/8" TYP

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSSCOMMON, MICHIGAN 48653

TITLE: FLANGE
SCALE: 1 = 4
DATE: AUG 24, 1988
Dwg No: 00-0213B
PART NUMBER: 00-0214
MAT'L.: BAR, FLAT, 1/2" X 4.1/2" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00818AA
EST. WT.: 15.2 LBS.

<table>
<thead>
<tr>
<th>STD. TOLERANCES</th>
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<tr>
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MICHIGAN DNR
FOREST MANAGEMENT DIVISION

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653
PROJECT NO.: 88-4

TITLE: BAR, FLAT, 1/2" X 4.1/2" H.R.
SCALE: 1 = 4
DATE: AUG. 25, 1988
D.N.R. NO. 00-0214A
PART NUMBER: 00-0398
MAT'L.: ANGLE, 3" X 2" X 1/4" H.R.
UNS K02600
F.F.E.S. SPEC. NO.: AK-41208AG
EST. WT.: 0.83 LBS.

11/16" DIA.
2.1/2"
1 1/4" REF
1/4" REF
3" REF
2" REF
1"

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSEDALE, MICHIGAN 48653
PROJECT NO.: 88-4
TITLE: ANGLE, 3" X 2" X 1/4" H.R.
SCALE: FULL
DATE: AUG. 11, 1988
DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED: MICHIGAN DNR
FOREST MANAGEMENT DIVISION
F.F.E.S. SPEC. NO.: AK-41208AG FOREST FIRE EXPERIMENT STATION
EST. WT.: 0.83 LBS.
### Diagram Notes:

- **1.1/4" Dia REF**: Various references to a 1.1/4" diameter line in the diagram.
- **17.11/16" Extended Length**: This is the extended length of a component in the diagram.

### Table of Parts:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO</th>
<th>QTY</th>
<th>DESCRIPTION</th>
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<tr>
<td>1</td>
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<td>ROD W/C</td>
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<td>22-0024</td>
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<td>OIL SEAL</td>
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<tr>
<td>3</td>
<td>22-0002</td>
<td>B</td>
<td>CAP, BOLTED END</td>
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<td>4</td>
<td>22-0004</td>
<td>A</td>
<td>BUSHING, BRONZE</td>
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<tr>
<td>5</td>
<td>22-0023</td>
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<td>ROD SEAL: &quot;U-CUP&quot;</td>
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<tr>
<td>7</td>
<td>0232-AN70</td>
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<td>&quot;O&quot;-RING: 2.3/4&quot; I.D. x 3&quot; O.D. 0.002</td>
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<tr>
<td>8</td>
<td>0232-8T</td>
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<td>BACK-UP RING: 1.1/4&quot; I.D. x 1.1/4&quot; O.D. 0.064</td>
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<td>9</td>
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<td>PISTON</td>
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<td>13</td>
<td>0221-AN70</td>
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<td>0222-AN70</td>
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<td>22-0020</td>
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<td>16</td>
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<td>B</td>
<td>RETAINER RING</td>
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<tr>
<td>17</td>
<td>TS-04V10</td>
<td></td>
<td>SCREW, CAP HEX SOCKET HEAD: L-1/4&quot; X T-1/4&quot;</td>
</tr>
</tbody>
</table>

### Description:

- **NOTE FOR INTERNAL COMPONENT INSTALLATION, USE TOOL P/N'S 18-0072, 18-0073, 18-0074 & 18-0075. TO EXTRACT THE END GLAND, USE P/N 18-0071.**

- **NOTE**

  ROD DIA. = 1.1/4"
  STROKE = 3.15/16"
  BORE = 3"
  PORTS = 3/8" NPT FEMALE

- **FOR INTERNAL COMPONENT INSTALLATION, USE TOOL P/N'S**

- **18-0072, 18-0073, 18-0074 & 18-0075. TO EXTRACT THE END GLAND, USE P/N 18-0071.**

- **NOTE**

  ROD DIA. = 1.1/4"
  STROKE = 3.15/16"
  BORE = 3"
  PORTS = 3/8" NPT FEMALE

- **FOR INTERNAL COMPONENT INSTALLATION, USE TOOL P/N'S**

  - 18-0072
  - 18-0073
  - 18-0074
  - 18-0075

- **TO EXTRACT THE END GLAND, USE P/N 18-0071.**
J.D. 350 Tractor: Depth Adjuster Weldment

This depth adjuster is designed for use with the John Deere 350 Crawler Tractor. It is made of steel and is designed to work with the Deere 350 Crawler Tractor Hitch. See drawing No. 0-713.

Approx. finished weight = 95.4 lbs.

Michigan Forest Fire Experiment Station
Roscommon Equipment Center Project

J.D. 350 Tractor: Hydraulic Depth Adjuster Assy

Part No. | Description |
--- | --- |
DA-1 | 2 | 11.72 | Depth Adjuster Side Plate |
DA-2 | 1 | 11.00 | Top Horizontal Pin |
DA-3 | 1 | 11.12 | Lower Horizontal Pin |
DA-4 | 1 | 11.36 | Internal Vertical Spacerr Plate |
DA-5 | 1 | 3.47 | Flow Latch Retainer Plate |
DA-6 | 1 | 6.94 | Flow Latch Bumper Plate |
DA-7 | 1 | 9.99 | Flow Latch Guide Plate |
DA-8 | 1 | 6.62 | Upper Pivot Plate |
DA-9 | 1 | 13.54 | Lower Pivot Plate |
DA-10 | 2 | 1.61 | Lower Pivot Plate Gasket |
DA-11 | 2 | 1.36 | Upper Pivot Plate Gasket |

Bill of Material

<table>
<thead>
<tr>
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<td>5</td>
<td>133/16 in. OD x 1/8 in. FLAT STEEL</td>
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<td>133/16 in. OD x 1/8 in. FLAT STEEL</td>
<td>10</td>
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<td>11</td>
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Sheet 103 9-711
DEPTCH ADJUSTER SIDE PLATE : JOHN DEERE 350 TRACTOR

(2) REQUIRED / EA. DEPTH ADJUSTER ASSEMBLY (PRODUCE AS IDENTICAL PAIRS)

MATERIAL: 1/2" x 4/16" H.R. LOW-CARBON FLAT STEEL; UNI G 10200

SCALE: FULL

EST. WT / EA. = 13.711 lbs.

NOTE:
FOR COMPLETE ASSEMBLY OF THE JOHN DEERE 350 TRACTOR DEPTH ADJUSTER, SEE DRAWING #0-712.

MICHIGAN FOREST FIRE EXPERIMENT STATION
ROSCOMMON, EQUIPMENT CENTER PROJECT

DRAWN BY: APPROVED BY:
Plow Assembly
SECTION A - A
SCALE: 1 = 4

NOTE
TO INSTALL ITEM # 12,
USE SPRING COMPRESSION TOOL P/N 18-0077.

NOTE
FOR LATCH ADJUSTMENT INFO.: REFER TO DWG.
NO. 20-9801C.

SECTION B - B
SCALE: 1 = 4

PART NUMBER, 20-9800
EST. WT., 933 LBS.

PAINT SPECIFICATIONS
PAINT ITEM #6, COULTER ASSEMBLY, WITH BLACK GLOSS ENAMEL, F.F.E.S. SPEC. NO. 18-8000. ALL COMPONENTS, EXCEPT COULTER ARMS.
PAINT COULTER ARMS, AND ALL OTHER PLOW COMPONENTS WITH SPRINKLER RED GLOSS ENAMEL, F.F.E.S. SPEC. NO. 18-8001.

MICHIGAN
P.O. BOX 68
ROSCOE, MICHIGAN 49073

FOREST FIRE EXPERIMENT STATION
P.O. BOX 98
ROSCOE, MICHIGAN 49073

PLow, 52", ASSEMBLY: TRACTOR MOUNTED
NOTE!
USE BURNING TEMPLATE, P/N 18-0043.

PART NUMBER: 20-0013
MAT' L.: PLATE, 1" HOT ROLLED
UNS G10200
F.F.E.S. SPEC. NO.: AA-01648AA
EST. WT.: 3.60 LBS.

NOTE!
BREAK ALL SHARP EDGES.

STANDARD TOLERANCES
FRACTIONAL: 

DE CIMAL: ANGULAR:

DIA: 5.57

CHAMFER

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

MICHIGAN DNR
FOREST MANAGEMENT DIVISION

TITLE: SPACER, SPRING

DATE: DEC. 07, 1988
DRAWN: R. GREENLAW
CHECKED: KDR
APPROVED:

PROJECT NO.: 84-19
DWS NO.: 20-0013B
SPRING

TYPE: HELICAL COMPRESSION
MATERIAL: 5/8" O.D. STEEL WIRE
OUTSIDE DIAMETER: 6.7/8"
INSIDE DIAMETER: 5.5/8"
TOTAL COILS: 6
ACTIVE COILS: 4
FREE HEIGHT: 8"
SOLID HEIGHT: 3.1/2"
ENDS: SQUARED & GROUND
TESTING: SPRINGS TO BE MAGNAFLUXED
DOCUMENTATION OF TEST TO BE PROVIDED WITH SHIPMENT.
SPRING RATING: 225 LBS./IN.
EST. WT.: 9.1/2" LBS.

APPROVED MANUFACTURERS

PART NO. APPROVED MANUFACTURERS

SAGINAW SPRING COMPANY
P.O. BOX 328
11008 DIXIE HIGHWAY
BIRCH RUN, MICHIGAN
48415

F.F.E.S. PART NO.: 20-0017

SPRING, HELICAL COMPRESSION

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

TITLE:
SPRING, HELICAL COMPRESSION

SCALE: 1 = 2
DATE: DEC. 27, 1968
DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED: MICHIGAN DNR
FOREST MANAGEMENT DIVISION

PROJECT NO.: 84-19

F.F.E.S. PART NO.: 20-0017
PART NUMBER: 20-0015
MAT'L.: BAR, RD., 1.1/2" DIA.
RYCASE / LEAD
UNS G11170/Pb
F.F.E.S. SPEC. NO.: AC-00150AF
EST. WT.: 2.92 LBS.

0.03" X 45°
CHAMFER
4-PLCS.

6.63
5.50
0.56
0.31
17/64" DIA.
TYP

316
5.500
0.56

0.01
+.01
-.00
+.01
-.00

+0.00
-.03

-0.05
+0.00

1.485
1.00

MICHIGAN
DNR
FOREST MANAGEMENT DIVISION

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

PROJECT NO.: 84-19
TITLE: PIN, PLOW CYLINDER BASE
SCALE: FULL
DATE: DEC. 15, 1989
DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED: FOREST MANAGEMENT DIVISION

FRACTIONAL:

DECIMAL:

ANGULAR:

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

PROJECT NO.: 84-19
TITLE: PIN, PLOW CYLINDER BASE
SCALE: FULL
DATE: DEC. 15, 1989
DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED: FOREST MANAGEMENT DIVISION

FRACTIONAL:

DECIMAL:

ANGULAR:
Type: Swivel Adapter, 90°
Internal Thd.: 3/8" - 18 N.P.S.M.
Swivel Female
External Thd.: 3/8" - 18 N.P.T.
Material: Steel, Plated
Est. Wt.: 0.33 lbs.

Approved Manufacturers

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<th>Part No.</th>
<th>Approved Manufacturers</th>
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<td>60UA-06X06</td>
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<td>1440 North 24th St.</td>
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<td>Manitowac, Wisconsin 54220-0847</td>
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Standard Tolerances

- Fractional:
  - 8 1/2 to 8 1/8
  - 8 1/4 to 8 1/2
- Decimal:
  - 1/16
  - 1/32
- Angular:
  - ±1/16
  - ±1/32

Drawn: R. Greenlaw
Checked: KDB
Approved: MICHIGAN DNR

Forest Fire Experiment Station

F.F.E.S. Part No.: 27-0042

P.O. Box 68, Roscommon, Michigan 48633

Project No.: 84-19

Title: Elbow, 90° Std. W/ Fem. Swiv.: 3/8" NPT

Scale: Full

Date: Jan. 23, 1991

Design No.: 27-0042B
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<th>EST WT</th>
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**Title:** HOSE ASSY, HYDRAULIC

**Date:** JAN 16, 1991

**Est. WT.:** 1.49 LBS.

**Revised:** 27-0040

**Forest Fire Experiment Station**

**P.O. Box 68**

**Roscommon, Michigan 48653**

**Project No.:** 84-19

**Scale:** None

**Date:** Jan 16, 1991

**Dwg No.:** 27-0040B
NOTE
BREAK ALL SHARP EDGES.

PART NUMBER: 27-0004
MAT'L.: BAR, FLAT, 3/4" X 1" C.D.
UNS G10180
F.F.E.S. SPEC. NO.: AB-01204AW
EST. WT.: 0.20 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653
<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO</th>
<th>DESCRIPTION</th>
<th>QTY</th>
<th>EST WT</th>
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<td>FTG, HYD CRIMP #6 HOSE X 3/8 NPT</td>
<td>2</td>
<td>0.19</td>
</tr>
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</table>

**Diagram:**
- Hose length: 38"
- Ref: 40.1/8"
- 3/8" NPT at both ends

**Dimensions:**
- Hose length: 38"
- Ref: 40.1/8"

**Tolerances:**
- Fractional: ±1/32
- Decimal: ±1/16
- Angular: ±1.1°

**Project Information:**
- Title: Hose Assy, Hydraulic
- Organization: Forest Fire Experiment Station
- Location: Roscommon, Michigan 48653
- Date: January 18, 1991
- Scale: None
- Drawing No.: 27-0041B
NOTE:
CASE HARDEN TO ROCKWELL 60 C 0.03" DEEP.

PART NUMBER: 20-0002
MAT'L.: BAR: RND., 1 1/2" DIA.
RYCASE/LEAD
UNS G11170/Pb
F.F.E.S. SPEC. NO: AC-00150AF
EST. WT.: 3.20 LBS.
PART NUMBER: 20-0010
MAT'L.: BAR, RD. 1" DIA C.D. 
UNS G10180
FFES SPEC. NO.: AC-00100AW
EST. WT.: 1.48 LBS.

6.3/4"

5/16"

5/32" DIA.

1/16" X 45° CHAM.

TYP

TYP

MICHIGAN DNR
FOREST MANAGEMENT DIVISION

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

TITLE: PIN, LATCH
SCALES: 1 = 2
DATE: OCT. 27, 1988
DUP. NO. 20-0010A
QUICK RELEASE PIN

TYPE: RING - GRIP QUICK RELEASE SELF LOCKING PIN.
SIZE: 3/8" DIA.
GRIP LENGTH: 1.50"
BALL: SPRING LOADED
SHEAR: 11,020 LBS.
MAT'L. TYPE: 303 STAINLESS STEEL
EST. WT.: 0.08 LBS.

McMASTER-CARR SUPPLY CO. 98404A375
P.O. BOX 4355
CHICAGO, ILLINOIS
60680-4355

APPROVED MANUFACTURERS

PART NO. 98404A375

APPROVED MANUFACTURERS

PART NO.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMON, MICHIGAN
48653

F.F.E.S. PART NO.: 33-0014

MICHIGAN
DNR
FOREST MANAGEMENT DIVISION

PROJECT NO.: 84-19

TITLE: PIN, 3/8" DIA., QUICK RELEASE

SCL: FULL

DATE: NOV. 07, 1988

DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED: KDB

STD. TOLERANCES

FRACTIONAL:

DECIMAL:

ANGULAR:

MILITARY

Revision
LATCH ADJUSTMENT

IF LATCH WILL NOT HOOK OVER TOP OF DEPTH ADJUSTER, GRIND EXCESS MATERIAL FROM TRUNION BUMPER. IF GAP IS GREATER THAN 1/16", ADD WELD MATERIAL TO TRUNION BUMPER SURFACE. TRUNION BUMPER MUST BE PARALLEL WITH LATCH FACE.

1/64" MIN. TO 1/16" MAX.

LATCH FACE

DEPTH ADJUSTER

TRUNION BUMPER
NOTE!
TO LOCATE ITEM NO. 6, BOLT IN PLACE ON TURF KNIFE, MOUNT TURF KNIFE, THEN WELD TO REAR SURFACE OF MOLDBOARD.

NOTE!
TO LOCATE ITEM NO.'S 2 & 3, USE SHARE LOCATING TABS, P/N 18-0052.

STAMP TOP EDGE OF PLOW STANDARD, USING 3/16" HIGH METAL STAMPS, PART NO. (20-0007) & DATE OF MANUFACTURE.
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<th>WT</th>
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**NOTE!**

TO LOCATE ITEM NO.'S 1, 2, 5 & 6, USE BASE FIXTURE, P/N 18-0005.

TO LOCATE ITEM NO.'S 4 & 8, USE MOULDBOARD BRACE FIXTURE, P/N 18-0005 & 18-0060.

TO LOCATE ITEM NO. 7, USE GUSSET FIXTURE, P/N 18-0007.

TO LOCATE ITEM NO.'S 5 & 6, USE NOSE CLAMPING FIXTURE, P/N 18-0009.

**FIXTURES AVAILABLE**

- 18-0005
- 18-0006
- 18-0007
- 18-0008
- 18-0009
- 18-0060

*P.O. BOX 119, KLETAN, MI 49118*

**FOREST FIRE EXPERIMENTATION**

MICHIGAN ONR

**DESIGN**

**PRODUCTION**

**FOREST MANAGEMENT**

**DIVISION**
ITEM | PART NO | Dwg | Description                  | Qty | Est. Wt. |
--- | --- | --- | --- | --- | --- |
1  | 00-0005 | C    | Standard, Blank, 52" Plow    | 1    | 141    |

<table>
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<tr>
<th>Item</th>
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<th>Description</th>
<th>Qty</th>
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**NOTE:**

Use drilling template P/N 18-0030.
NOTE!
USE L.H. MOULDBOARD BURNING TEMPLATE, P/N 18-0003.

PART NUMBER: 00-0240
MATT.: MAKE FROM P/N 00-0081
EST. WT.: 67.6 LBS.

FOREST FIRE EXPERIMENT STATION
MICHIGAN DNR
FOREST MANAGEMENT DIVISION
EXPERIMENT STATION
ERIE, MICHIGAN 49837-0001

NOTE!
USE L.H. MOULDBOARD BURNING TEMPLATE, P/N 18-0003.
NOTE!
USE R.H. MOULDBOARD BURNING TEMPLATE,
P/N 15-0004.

FLAT LAYOUT

PART NUMBER: 00-0241
MAT'L.: MAKE FROM P/N 00-0081
EST. WT.: 67.6 LBS.

"MOULDBOARD, R.H.: 52" PLOW, "4" HARD"
NOTE:
PRODUCE FROM ONE
3/8" X 60" X 108"
PLATE.
DO NOT EXCEED 5"
LONG FLAT AREA AT
ENDS OF ROLL.

PART NUMBER: 00-0081
MATERIAL: PLATE, 3/8" X 5' X 9' H.R.
UNS G10150
F.F.E.S. SPEC. NO.: AA-00659BC
EST. WT.: 688 LBS.
NOTE!
USE LAYOUT TEMPLATE P/N 18-0049.

PART NUMBER: 00-0407
MAT'L.: PLATE, 3/8" H.R.
UNS G10150
F.F.E.S. SPEC. NO.: AA-00648BC
EST. WT.: 18.7 LBS.

SCALE: 1 = 4
DATE: SEPT. 27, 1980
DRAWN: R. GREENE
CHECKED: KDB
APPROVED:

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

TITLE: BOTTOM PLATE
PROJECT NO.: 84-19
DGS NO. 00-0407B
PART NUMBER: 00-0086
MAT’L.: BAR, FLAT, 3/8" X 5" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00620AA
EST. WT.: 2.39 LBS.

NOTE!
USE LAYOUT TEMPLATE P/N 18-0051.

REVIEWED:
FOREST EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653
PROJECT NO.: 84-19
TITLE: GUSSET
SCALE: 1 = 4
DATE: SEP 07, 1989
DRAWN: R. GREENLAR
CHECKED: KDB
APPROVED: MICHIGAN DNR
FOREST MANAGEMENT DIVISION
PART NUMBER: 00-0084
MAT'L.: BAR, FLAT, 1/2" X 7" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00828AA
EST. WT.: 7.45 LBS.
NOTE!
USE EDGE CUT FIXTURE
P/N 18-0033.

PART NUMBER: 00-0418
MAT'L.: PLATE, 3/8" H.R.
ABRASION RESISTING
BRINELL HARDNESS 200-250
F.F.E.S. SPEC. NO.: AA-00648BG
EST. WT.: 4.75 LBS.
NOTE!
USE EDGE CUT FIXTURE
P/N 18-0033.

PART NUMBER: 00-0419
MAT'L.: PLATE, 3/8" H.R.
ABRASION RESISTING
BRINELL HARDNESS 200-250
F.F.E.S. SPEC. NO.: AA-00648BG
EST. WT.: 4.75 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

TITLE: SHARE, R.H.: 52" FIRELINE PLOW
SCALE: 1:4
DATE: OCT. 24, 1989
DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED: MICHIGAN DNR
FOREST MANAGEMENT DIVISION

PART DIMENSIONS:

- 1/16" offset
- 3/4" width
- 23° angle
- 3/8" thickness
- 1.5/8" length
- 24.3/8" length
- 21.5/8" length
PART NUMBER: 00-0408
MAT'L.: ANGLE, 3" X 3" X 1/4" H.R.
UNS K02600
F.F.E.S. SPEC. NO.: AK-41212AG
EST. WT.: 1.30 LBS.

17/32" DIA. TYP

1 1/2" TYP

1.3/8" TYP

1.1/2" TYP

1/2"

2.15/16"

BEND LINE

3/4"

3"

1/4" REF

4"

1/4" REF

1.1/2" TYP

1.1/2" TYP

1"

2"

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

TITLE: ANGLE, TURF KNIFE MOUNTING
SCALE: 1 = 2
DATE: SEPT. 28, 1986

DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED: 

PROJECT NO.: 84-19

MICHIGAN DNR
FOREST MANAGEMENT DIVISION
PART NO: 20-0009
EST. WT.: 9.76 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

MICHIGAN DNR
FOREST MANAGEMENT DIVISION

PART NUMBER: 20-0009
EST. WT.: 9.76 LBS.

SCALE: 1 = 4
DATE: OCT. 17, 1989
Dwg NO: 20-0009B
NOTE!
USE DRILL/BEND TEMPLATE, P/N 18-0031.

NOTE!
USE GAGE P/N 18-0032.

FLAT LAYOUT

PART NUMBER: 00-0417
MAT'L: PLATE, 1/2" H.R.
ABRASION RESISTING
BRINELL HARDNESS 200-250
F.F.E.S SPEC. NO.: AA-00848BG
EST. WT.: 10.2 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

KNIFE, TURF, R.H. BLANK
<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO</th>
<th>DWG</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<td>KNIFE, TURF, L.H. BLANK</td>
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<td>10.2</td>
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</tbody>
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**STANDARD TOLERANCES**

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<th>ANGULAR:</th>
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<tbody>
<tr>
<td>8 7/16</td>
<td>9 .083</td>
<td>26°</td>
</tr>
</tbody>
</table>

**FOREST FIRE EXPERIMENT STATION**

P.O. BOX 68    ROSCOMMON, MICHIGAN 48653

TITLE: KNIFE, TURF: L.H.
NOTE!
USE DRILL/BEND TEMPLATE, P/N 18-0031.

NOTE!
USE GAGE P/N 18-0032.

FLAT LAYOUT

PART NUMBER: 00-0416
MAT' L.: PLATE, 1/2" H.R.
ABRASION RESISTING
BRINELL HARDNESS 200-250
F.F.E.S. SPEC. NO.: AA-0084BG
EST. WT.: 10.2 LBS.

FOREST FIRE EXPERIMENT STATION
P. O. BOX 69
ROSCOMMON, MICHIGAN 48653

FOREST MANAGEMENT
DIVISION

APPROVED:
FOREST MANAGEMENT
DIVISION

MICHIGAN
DNR

DRAWN:
[Signature]

MICHIGAN"
PART NUMBER: 00-0452
MAT'L.: TUBE, RD., 5.1/2" OD X 1/4" WALL
DOM
UNS G10260
F.F.E.S. SPEC. NO.: AD-55008AM
EST. WT.: 18.6 LBS.

STANDARD TOLENCES
FRACTIONAL:
1/16 X .010 +.005
1/8 X .020 +.010
1/4 X .030 +.020
DECIMAL:
.010 +.005
.020 +.010
.030 +.020
ANGULAR:
3 FLAT = .005
3 FLAT = .010

DRAWN: R. GREENLAW
CHECKED: 
APPROVED:

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653
PROJECT NO.: 84-19
TITLE: SLEEVE TUBE
SCALE: 1 = 2
DATE: DEC.08, 1980
DRAWING NO.: 00-0452B
PART NUMBER: 00-0453
MAT'L.: PLATE, 5/8” H.R.
UNS G10150
F.F.E.S. SPEC. NO.: AA-01048BC
EST. WT.: 2.27 LBS.

6.7/8” DIA

3/16” X 45° CHAMFER

NOTE!
USE BURNING TEMPLATE, P/N 18-0043.

NOTE!
STD. TOLERANCES DRAMN:
FRACTIONAL. R. GREENLAW MICHIGAN
CHECKED: KDB
APPROVED: 3 DEC. 181111 FOREST FIRE EXPERIMENT STATION
FOREST MANAGEMENT DIVISION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653
PROJECT NO.: 84-19

SCALE: 1 = 2
DATE: DEC. 06, 1989
DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED: 3 DEC. 181111

MICHIGAN DNR
FOREST MANAGEMENT DIVISION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653
PROJECT NO.: 84-19

TITLE: SLEEVE FLANGE

NOTE!
USE BURNING TEMPLATE, P/N 18-0043.
PART NUMBER: 00-0456
MAT'L.: SHEET, 11 GA. H.R. PICK & OILED
ASTM A569
F.F.E.S. SPEC. NO.: AA-G1148AP
EST. WT.: 0.98 LBS.

NOTE!
USE BURNING TEMPLATE, P/N 18-0044.

NOTE!

END, GUARD: 4.1/2" HYD. CYL.
NOTE!
USE BENDING DIES, P/N'S 18-0045 & 18-0046.

FLAT LAYOUT

11 GA. (.1196)

REF

PART NUMBER: 00-0457
MAT'L.: SHEET, 11 GA. H.R. PICK & OILED
ASTM A569
F.F.E.S. SPEC. NO.: AA-G1148AP
EST. WT.: 2.95 LBS.

SIDE GUARD: 4.1/2" HYD. CYL.
<table>
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<tr>
<th>ITEM</th>
<th>PART NO</th>
<th>OMS</th>
<th>DESCRIPTION</th>
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<td>BEAM, 52&quot; PLOW, S/W</td>
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<td>P00-LAG</td>
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<td>GREASE FITTING: 1/4&quot;-29UN TAPERED</td>
<td>2</td>
<td>0.01</td>
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**NOTE:**
TRUNION INSTALLATION: USE LOCATING DOWELS, PART NUMBER 18-0040, TO LOCATE & WELD ITEMS NUMBER 1.
NOTE!
USE LOCATING
GAGE, P/N:
18-0048.
1. 00-0373 B BOSS, 3.1/2" OD X 25/32" ID 1 18.1
2. 00-0374 B BEAM, FRONT END CAP 1 13.43
3. 00-0384 B BOSS / BUSHING ASSEMBLY 1 7.34
4. 00-0384 C CHANNEL, BEAM 52" PLOW L.H. 1 46.1
5. 00-0385 C CHANNEL, BEAM 52" PLOW R.H. 1 46.1

PART NO: 00-0372
EST. WT.: 143 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 18 ANN ARBOR, MICHIGAN 48104

BEAM, 52" FIRELINE PLOW, S / W 4.0
PART NUMBER: 00-0373
MATERIAL: BAR, RND., 3.1/2" DIA., C.D.
RYCASE / LEAD
UNS G11170Pb
F.F.E.S. SPEC. NO.: AC-00350AF
EST. WT.: 18.1 LBS.

PART NUMBER: 00-0373
MATERIAL: BAR, RND., 3.1/2" DIA., C.D.
RYCASE / LEAD
UNS G11170Pb
F.F.E.S. SPEC. NO.: AC-00350AF
EST. WT.: 18.1 LBS.

PART NUMBER: 00-0373
MATERIAL: BAR, RND., 3.1/2" DIA., C.D.
RYCASE / LEAD
UNS G11170Pb
F.F.E.S. SPEC. NO.: AC-00350AF
EST. WT.: 18.1 LBS.

PART NUMBER: 00-0373
MATERIAL: BAR, RND., 3.1/2" DIA., C.D.
RYCASE / LEAD
UNS G11170Pb
F.F.E.S. SPEC. NO.: AC-00350AF
EST. WT.: 18.1 LBS.

PART NUMBER: 00-0373
MATERIAL: BAR, RND., 3.1/2" DIA., C.D.
RYCASE / LEAD
UNS G11170Pb
F.F.E.S. SPEC. NO.: AC-00350AF
EST. WT.: 18.1 LBS.

PART NUMBER: 00-0373
MATERIAL: BAR, RND., 3.1/2" DIA., C.D.
RYCASE / LEAD
UNS G11170Pb
F.F.E.S. SPEC. NO.: AC-00350AF
EST. WT.: 18.1 LBS.

PART NUMBER: 00-0373
MATERIAL: BAR, RND., 3.1/2" DIA., C.D.
RYCASE / LEAD
UNS G11170Pb
F.F.E.S. SPEC. NO.: AC-00350AF
EST. WT.: 18.1 LBS.

PART NUMBER: 00-0373
MATERIAL: BAR, RND., 3.1/2" DIA., C.D.
RYCASE / LEAD
UNS G11170Pb
F.F.E.S. SPEC. NO.: AC-00350AF
EST. WT.: 18.1 LBS.

PART NUMBER: 00-0373
MATERIAL: BAR, RND., 3.1/2" DIA., C.D.
RYCASE / LEAD
UNS G11170Pb
F.F.E.S. SPEC. NO.: AC-00350AF
EST. WT.: 18.1 LBS.

PART NUMBER: 00-0373
MATERIAL: BAR, RND., 3.1/2" DIA., C.D.
RYCASE / LEAD
UNS G11170Pb
F.F.E.S. SPEC. NO.: AC-00350AF
EST. WT.: 18.1 LBS.

PART NUMBER: 00-0373
MATERIAL: BAR, RND., 3.1/2" DIA., C.D.
RYCASE / LEAD
UNS G11170Pb
F.F.E.S. SPEC. NO.: AC-00350AF
EST. WT.: 18.1 LBS.
PART NUMBER: 00-0374
MAT'L.: PLATE, 1/2" H.R.
UNS G10080
F.F.E.S. SPEC. NO.: AA-00848AH
EST. WT.: 3.43 LBS.
PART NUMBER: 00-0384
MAT'L.: CHANNEL, STD., 6" X 13.0 LB.
UNS K02600
F.F.E.S. SPEC. NO.: AH-06130AG
EST. WT.: 46.1 LBS.

FOR FOREST FIRE EXPERIMENT STATION
P.O. BOX 98
ROSCOMMON, MICHIGAN 48653

PROJECT #: 84-19

TITLE: CHANNEL, BEAM, 52" PLOW L.H.
INSTALLATION NOTE
PRESS BUSHING INTO BOSS.
IF LOOSE FITTING THEN
SEAT WITH, "LOCTITE"
# RC/609.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO</th>
<th>DWG</th>
<th>DESCRIPTION</th>
<th>QTY</th>
<th>EST WT</th>
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<tbody>
<tr>
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<td>BOSS, 3&quot; O.D. X 1.1/2&quot; I.D.</td>
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<td>6.67</td>
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<tr>
<td>2</td>
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<td>BUSHING, 1.1/2&quot;OD X 1.1/4&quot;ID</td>
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<td>0.67</td>
</tr>
</tbody>
</table>

PART NUMBER: 00-0394
EST. WT.: 7.34 LBS.
PART NUMBER: 00-0377
MAT'L.: BAR, RND., 3" DIA.
COLD DRAWN
RYCASE / LEAD
UNS G11170Pb
FFES SPEC. NO.: AC-00300AF
EST. WT.: 6.67 LBS.

1.15/32" DRILL
1.1/2" REAM

STND. TOLERANCES

MICHIGAN
DNR
FOREST MANAGEMENT
DIVISION

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

TITLE: "BOSS, 3" O.D. X 1.1/2" I.D."
SCALE: 1 = 2
DATE: JUNE 27, 1980
REV.: 00-0377A
1/32" X 45° CHAMFER TYP

PART NUMBER: 20-0006
MAT'L.: BAR, RND., 1 1/2" DIA.
C.D. LEDLOY 300
UNS G12144
FFES SPEC. NO.: AC-00150AJ
EST. WT.: 0.67 LBS.

STD. TOLERANCES

FRACTIONAL: R. GREENE

DECENTAL: KDB

MICHIGAN DNR
FOREST MANAGEMENT DIVISION

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

TITLE: BUSHING, 1 1/2" X 1 1/4" I.D.
SCALE: 1 = 2
DATE: JUNE 28, 1988
DRAW NO.: 20-0006A
PART NUMBER: 00-0364
MAT'L.: BAR, FLAT, 3/8" X 1.1/4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00605AA
EST. WT.: 0.74 LBS.

STD. TOLERANCES

<table>
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<td>1 2</td>
<td>1 2 3</td>
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<tr>
<td>2 3 4 5</td>
<td>6 7 8</td>
<td>9 1</td>
<td>1 2 3</td>
</tr>
</tbody>
</table>

DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED: J.J.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

TITLE: BAR, FLAT, 3/8" X 1.1/4" H.R.
SCALE: 1 = 2
DATE: JUNE 19, 1989
DRAW NO.: 00-0364A
PART NUMBER: 00-0365
MAT'L.: BAR, FLAT, 1"X3.1/2"
UNS G10200
FFES SPEC. NO.: AB-01614AA
EST. WT.: 5.82 LBS.

STD. TOLERANCES

FRACTIONAL:

DECIMAL:

AMBIENT:

1 PLACE = .1
2 PLACES = .01
3 PLACES = .001

REVISION:

CHECKED:

APPROVED:

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68  ROSCOMMON, MICHIGAN 48653

MICHIGAN DNR
FOREST MANAGEMENT DIVISION

PROJECT NO.: 84-19

TITLE: BAR, FLAT, 1" X 3.1/2" HR

SCALE:

DATE: JUNE21, 1988

DRAWN: R. GREENLAB

CHECKED: KDB

APPROVED:

DATE: JUNE21, 1988

DRAWN NO. 00-0365A
PART NUMBER: 00-0366
MAT'L.: BAR, FLAT, 3/8" X 1.1/4" H.R.
UNS G10200
F.F.E.S. SPEC. NO. AB-00605AA
EST. WT.: 1.48 LBS.

STD. TOLERANCES

FRACTİONAL:

DECİDAL:
ANGULAR:

DRAWN:
R. GREENLAW

CHECKED:

APPROVED:

MICHİGAN DNR
KDB

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

PROJECT NO.: 84-19

TITLE: BAR, FLAT, 3/8" X 1.1/4" H.R.
SCALE: 1 = 2
DATE: JUNE 21, 1981

FOREST MANAGEMENT DIVISION
1.15/32" DRILL
1.1/2" REAM

#3 DIA.
THRU (1) WALL
1/4"-28UN TAP
3/8" DEEP

PART NUMBER: 00-0367
MAT'L.: BAR, RND. 3" DIA. C.D. RYCASE/LEAD
UNS G11170Pb
F.F.E.S. SPEC. NO.: AC-00300AF
EST. WT.: 2.63 LBS.

MICHIGAN DNR
FOREST MANAGEMENT DIVISION
FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

PROJECT NO.: 84-19
TITLE: BOSS, 3" O.D. X 1.1/2" I.D.
PART NUMBER: 00-0368
MAT'L.: BAR, FLAT, 3/8" X 1" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00604AA
EST. WT.: 0.20 LBS.

1/2" REF
3/8" REF
11/32" DIA.

PART NUMBER: 00-0368
MAT'L.: BAR, FLAT, 3/8" X 1" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00604AA
EST. WT.: 0.20 LBS.

MICHIGAN DNR
FOREST MANAGEMENT DIVISION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653
PROJECT NO.: 84-19
TITLE: BAR, FLAT, 3/8" X 1" H.R.
SCALE: 1 = 2
DATE: JUNE 33, 1980
DESIGN NO. 00-0368A
PART NUMBER: 00-0370
MAT'L.: BAR, FLAT, 3/8" X 2.1/2" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00610AA
EST. WT.: 0.57 LBS.
PART NUMBER: 00-0371
MAT'L.: PLATE, 3/8" H.R.
UNS G10080
F.F.E.S. SPEC. NO.: AA-00648AH
EST. WT.: 26.6 LBS.

PART NUMBER: 00-0371
MAT'L.: PLATE, 3/8" H.R.
UNS G10080
F.F.E.S. SPEC. NO.: AA-00648AH
EST. WT.: 26.6 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

TRUNION SUPPORT, MTG. PLATE

SCALE: 1 = 4
DATE: JUNE 27, 1988
Dwg. No. 00-0371B
PART NUMBER: 00-0381
MAT'L.: BAR, FLAT, 3/8" X 4 1/2" HR
UNS G10200
F.F.E.S. SPEC. NO.: AB-00618AA
EST. WT.: 1.76 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

TITLE: GUSSET

STANDARD TOLERANCES

| FRACTIONAL: | 0.125 5/32 3/16 1/8 5/32 7/32 1/4 5/32 3/16 |
| DECIMAL:    | 0.00 0.06 0.09 0.12 0.14 0.19 0.25 0.19 0.09 |

DRAWN: R. GREENWAY
CHECKED: KDB
APPROVED: P.O. BOX 68 ROSCOMMON, MICHIGAN 18653

PROJECT NO.: 84-19
SCALE: 1 = 2
DATE: JUNE 20, 1988

MICHIGAN
DNR
FOREST MANAGEMENT
DIVISION
NOTE!
BREAK ALL SHARP EDGES.

PART NUMBER: 00-0427
MAT'L.: BAR, FLAT, 1/4" X 1.1/2" HR
UNS G10200
F.F.E.S. SPEC. NO.: AB-00406AA
EST. WT.: 0.19 LBS.

NOTE!
SHARP EDGES.

25/64" DIA.

PART NUMBER: 00-0427
MAT'L.: BAR, FLAT, 1/4" X 1.1/2" HR
UNS G10200
F.F.E.S. SPEC. NO.: AB-00406AA
EST. WT.: 0.19 LBS.

NOTE!
SHARP EDGES.

25/64" DIA.
NOTE!
USE LAYOUT TEMPLATE, P/N 18-0035.

NOTE!
USE MACHINING FIXTURE, P/N 18-0036.

PART NUMBER: 00-0428
MAT'L.: BAR, FLAT, 3/4" X 4" H.R. UNS G10200
F.F.E.S. SPEC. NO.: AB-01216AA
EST. WT.: 1.36 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

TITLE: EAR, L.H.: PLOW LATCH
SCALE: 1 = 2
DATE: NOV.08,1988
DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED: 

STANDARD TOLERANCES

FRACTIONAL:

DECIMAL:

ANGULAR:

1/8 " = 1/32 "
1/16 " = 1/64 "
3.54 MM = .1 "
5.33 MM = .2 "
8.38 MM = .3 "
13.13 MM = .5 "
25.40 MM = 1.00 "

NOTE:

1" R
3.3/8"
1.5/8"
63/64" DIA.

2"
1/2" R
1.5/8"
2.3/8"

2.1/32"
5.1/4"
4" R
NOTE!
USE MACHINING FIXTURE
P/N 18-0036.

NOTE!
USE LAYOUT TEMPLATE,
P/N 18-0035.

PART NUMBER: 00-0429
MAT’L.: BAR, FLAT, 3/4" X 4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-01216AA
EST. WT.: 1.36 LBS.

NOTE! 3/4" REF

NOTE! 3/4" REF

1 1/2" R

1/2" R

1" R

2 1/32"

2.1/32"

2.3/8"

1.5/8"

3.3/8"

63/64" DIA.

3/4"

4"

4" R

5.1/4"

3/4"

4/" REF

1.5/8"
NOTE
USE MACHINING FIXTURE.
P/N 18-0037.

PART NUMBER: 00-0431
MAT'L.: BAR, FLAT, 1" X 2" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-01608AA
EST. WT.: 1.98 LBS.

STANDARD TOLERANCES

DRAWN: MICHIGAN DNR
R. GREENLAW

CHECKED:
KDB

APPROVED:
FOREST MANAGEMENT DIVISION

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSSCOMMON, MICHIGAN 48653

PROJECT NO.: 84-19

TITLE: BUMPER, TRUNION HOUSING
DRAW:
NOV. 09, 1988
SCALE: 1 = 2
DATE: 00-0431A
NOTE!
USE DRILLING FIXTURE, P/N 18-0039.

1/2" DIA. THRU BOTH WALLS IN LINE.

TYP
---9 . 1/4"
-------i
! 4.5/8"
!
--------- -,- -- -i- ------ ~g:= =:= =;:

PART NUMBER: 00-0442
MAT'L.: TUBE, RD., 6" O.D. X 1/2" WALL
DOM G10260
F.F.E.S. SPEC. NO.: AD-80014AM
EST. WT.: 29.2 LBS.

NOTE!
USE DRILLING FIXTURE, P/N 18-0039.
NOTE:
USE FIXTURE,
P/N 18-0017.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO</th>
<th>DWG</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<tr>
<td>1</td>
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<td>B</td>
<td>PIVOT SIDE</td>
<td>1</td>
<td>3.58</td>
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<tr>
<td>2</td>
<td>00-0346</td>
<td>B</td>
<td>BOSS, 3&quot; O.D. X 1.1/4&quot; I.D.</td>
<td>1</td>
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<tr>
<td>3</td>
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<td>BOSS, 3&quot; O.D. X 1.1/4&quot; I.D.</td>
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<td>2.48</td>
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<tr>
<td>4</td>
<td>00-0350</td>
<td>A</td>
<td>BAR, FLAT, 3/8&quot; X 1.1/4&quot; H.R.</td>
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<td>0.78</td>
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<tr>
<td>5</td>
<td>00-0351</td>
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<td>BAR, FLAT, 3/8&quot; X 1.1/4&quot; H.R.</td>
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<td>0.28</td>
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ITEM PART NO  
-----  -----  
1 00-0127 B  
2 00-0346 B  
3 00-0347 B  
4 00-0350 A  
5 00-0351 A  

PART NUMBER: 00-0357  
EST. WT.: 11.8 LBS.
### Table

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO</th>
<th>Dwg</th>
<th>Description</th>
<th>Qty</th>
<th>Est Wt</th>
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<tr>
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<td>B</td>
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<tr>
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<td>BOSS, 3&quot; O.D. X 1 1/4&quot; I.D.</td>
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<td>2.48</td>
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<tr>
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<td>BAR, FLAT, 3/8&quot; X 1 1/4&quot; H.R.</td>
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<tr>
<td>5</td>
<td>00-0351</td>
<td>A</td>
<td>BAR, FLAT, 3/8&quot; X 1 1/4&quot; H.R.</td>
<td>1</td>
<td>0.28</td>
</tr>
</tbody>
</table>

**NOTE:** USE FIXTURE, P/N 18-0017.

**Diagram:**

1. **1**
   - 2.1/2" REF.
   - 9/16"
   - TYP 1/4
   - 9" REF.
   - 7.7/16"
   - 1.5/16"
   - 8" REF.

2. **2**
   - 1/4"
   - 4-PLCS

3. **3**
   - 8TD. TOLERANCE
   - DRAWN: MICHIGAN U.S.A.
   - FOREST MANAGEMENT DIVISION

4. **4**
   - 6"
   - 9/16"
   - TYP 1/4

5. **5**
   - 8"
   - 1 1/2"
   - 5"
   - 1/4"

**Part Number:** 00-0358

**Est. Wt.:** 11.8 LBS.
PART NUMBER: 00-0127
MAT'L.: BAR: FLAT, 3/8" X 7" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00628AA
EST. WT.: 3.58 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

TITLE: PIVOT SIDE

DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED:

MICHIGAN DNR
FOREST MANAGEMENT DIVISION

PROJECT NO.: 84-19
NO.: 00-0127B

SCALE: 1 = 2
DATE: MAY 10, 1989
NOTE:
BREAK ALL SHARP EDGES.

PART NUMBER: 00-0346
MAT'L.: BAR, RND., 3" DIA. C.D.
RYCASE / LEAD
UNS G11170Pb
F.F.E.S. SPEC. NO.: AC-00300AF
EST. WT.: 4.13 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

TITLE: BOSS, 3" O.D. X 1.1/4" I.D.

STANDARD TOLERANCES

FRACTIONAL: ±1/32 ±1/64 ±1/128

DECIMAL: ±0.01 ±0.005 ±0.0005

ANGULAR: ±0.1 ±0.05 ±0.01

DATE: MAY 11, 1989

DRAWN: MICHIGAN DNR
CHECKED:
APPROVED:

FOREST MANAGEMENT DIVISION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653
PART NUMBER: 00-0347
MAT'L.: BAR, RND., 3" DIA. C.D.
RCASE / LEAD
UNS G11170Pb
F.F.E.S. SPEC. NO.: AC-00300AF
EST. WT.: 2.48 LBS.

NOTE:
BREAK ALL
SHARP EDGES.
PART NUMBER: 00-0350
MAT'L.: BAR: FLAT, 3/8" X 1 1/4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00605AA
EST. WT.: 0.78 LBS.

STD. TOLERANCES

FRACTIONAL: R. GREENLAW
DECIMAL: KDB

MICHIGAN
DNR
FOREST MANAGEMENT
DIVISION

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

TITLE: BAR, FLAT, 3/8" X 1 1/4" H. R.
SCALE: 1 = 2
DATE: MAY 12, 1989
DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED:
PART NUMBER: 00-0351
MAT'L.: BAR: FLAT, 3/8" X 1 1/4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00605AA
EST. WT.: 0.28 LBS.

PART NUMBER: 00-0351
MAT'L.: BAR: FLAT, 3/8" X 1 1/4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00605AA
EST. WT.: 0.28 LBS.
PART NUMBER: 00-0126
MAT'L.: BAR: FLAT, 3/8" X 7" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00628AA
EST. WT.: 3.74 LBS.

1/4" R. TYP.

1.1/8" TYP.

6.1/16"
1.9/16"
3/8" REF.

7" REF.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

TITLE: PIVOT BOTTOM
SCALE: 1 = 2
DATE: MAY 10, 1989
DRAWN: R. GREENLAW
CHECKED: KDR
APPROVED: HENRY L. JD

MICHIGAN DNR
FOREST MANAGEMENT DIVISION
PROJECT NO.: 84-19
DUB. NO. 00-0126B
FLAT LAYOUT

PART NUMBER: 00-0342
MAT'L.: BAR: RND., 1/2" DIA. H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AC-00050AA
EST. WT.: .51 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

TITLE: HOSE GUIDE

MICHIGAN DNR
FOREST MANAGEMENT DIVISION
PROJECT NO.: 84-19

DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED:

FOREST MANAGEMENT DIVISION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

EST. WT.: .51 LBS.
PART NUMBER: 00-0349
MAT'L.: BAR: FLAT, 1/2" X 7" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-00828AA
EST. WT.: 7.25 LBS.

7'' REF.

1/2'' REF.

7.5/16''

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

MICHIGAN
DNR
FOREST MANAGEMENT DIVISION

PROJECT NO.: 84-19

TITLE:
BAR, FLAT, 1/2" X 7" H.R.

SCALE: 1 = 2
DATE: MAY 11, 1989
DIB: NO. 00-0349B

DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED: 

STD. TOLERANCES

FRACTIONAL:

DECIMAL:

ANGULAR:
PART NUMBER: 00-0352
MAT'L.: BAR: FLAT, 3/8" X 3 1/2" HR
UNS G10200
F.F.E.S. SPEC. NO.: AB-00614AA
EST WT.: 2.09 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

TITLE: BAR, FLAT, 3/8" X 3 1/2" H. R.
SCALE: FULL
DATE: MAY 12, 1989
DRAWN: R. GREENLAW
CHECKED: KDB
APPROVED:

MICHIGAN
DNR
FOREST MANAGEMENT
DIVISION
PROJECT NO.: 84-19
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<td>HANDLE</td>
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<td>HINGE</td>
<td>1</td>
<td>2.60</td>
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<td>3</td>
<td>00-0423</td>
<td>B</td>
<td>CLAW</td>
<td>1</td>
<td>4.59</td>
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<tr>
<td>4</td>
<td>00-0424</td>
<td>A</td>
<td>STOP</td>
<td>1</td>
<td>0.06</td>
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</table>

NOTE!
USE WELDING FIXTURE
PART NUMBER, 18-0034.

NOTE!
APPLY # 242 "LOCTITE"
THREAD TIGHT AGAINST
THREAD SHOULDER, CUT
OFF TO DIMENSION SHOWN.
NOTE!
BREAK ALL SHARP EDGES.

PART NUMBER: 00-0421
MAT' L.: BAR, FLAT, 1/2" X 1.1/2" HR
UNS G10200
F.F.E.S. SPEC. NO.: AB-00806AA
EST. WT.: 0.55 LBS.

3/16" X 45° CHAM. TYP

1.1/2" REF

1/2" REF

3/8"

1/4" R

1.5/8"

NOTE!
BREAK ALL SHARP EDGES.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

TITLE: HANDLE: PLOW LATCH
SCALE: FULL
DATE: OCT 30, 1986

DWS NO: 00-0421B
NOTE!
BREAK ALL SHARP EDGES.

PART NUMBER: 00-0423
MAT'L.: BAR, FLAT, 2" X 2.1/4" H.R.
UNS G10200
F.F.E.S. SPEC. NO.: AB-03209AA
EST. WT.: 4.59 LBS.
PART NUMBER: 00-0424
MAT'L.: PRODUCE FROM
P/N TS-06GF16
3/8" UNC X 2" LONG
HEX. HD. CAP SCREW
PLATED
EST. WT.: 0.06 LBS.

1/32" X 45° CHAMFER.

Michigan
DNR
FOREST MANAGEMENT DIVISION
FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653
PROJECT NO.: 84-19
TITLE: STOP: PLOW LATCH
SCALE: FULL
NOTE: 00-0424A

Date: Oct. 30, 1989

[Diagram of a screw with dimensions and marks]
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<th>HT</th>
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<td>BLADE, COULTER, 24&quot; O.D.</td>
<td>1</td>
<td>42.0</td>
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<tr>
<td>20-0023</td>
<td>C HUB W/C</td>
<td>1</td>
<td>13.6</td>
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<tr>
<td>20-0027</td>
<td>B BEARING RACE (MODIFIED)</td>
<td>1</td>
<td>0.63</td>
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<tr>
<td>20-0024</td>
<td>A BEARING RACE RETAINER</td>
<td>1</td>
<td>0.06</td>
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<tr>
<td>WS08-BG</td>
<td>WASHER, LOCK: 1/2&quot; PLATED STEEL</td>
<td>1</td>
<td>0.02</td>
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<tr>
<td>PO02-LAGF</td>
<td>GREASE FTNG.: 1/8&quot; X 45°</td>
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<td>0.01</td>
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<td>20-0021</td>
<td>C DEPTH CONTROL FLANGE, L.H. W/C</td>
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<td>C DEPTH CONTROL FLANGE, R.H. W/C</td>
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<td>TS-070018</td>
<td>CAPSCREW: 3/8&quot; X 2 COP LNE</td>
<td>6</td>
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<tr>
<td>WS07-BG</td>
<td>WASHER, LOCK: 7/16&quot; PLATED STEEL</td>
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<td>0.01</td>
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<td>TS-07GP</td>
<td>NUT, HEX.: 1/4&quot; CAP SCREW</td>
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<td>20-0005</td>
<td>B BEARING, ROLLER</td>
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<td>20-0025</td>
<td>B SHAFT, COULTER</td>
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<td>33-0015</td>
<td>B WASHER, HARDENED STEEL</td>
<td>2</td>
<td>0.18</td>
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<td>A SEAL, FELT, 3/8&quot; SQUARE</td>
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<td>0.02</td>
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<td>20-0026</td>
<td>B BEARING BLOCK</td>
<td>2</td>
<td>1.25</td>
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<tr>
<td>KG-807</td>
<td>KEY, WOODRUFF: 7/8&quot; W/C</td>
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<td>20-0020</td>
<td>C COULTER ARM W/C: 52&quot; PLOW</td>
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<td>16.6</td>
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<td>WS12-BG</td>
<td>WASHER, LOCK: 3/4&quot; PLATED STEEL</td>
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<td>TS-12HP</td>
<td>NUT, HEX.: 1/4&quot; CAP SCREW</td>
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</table>

**FOREST FIRE EXPERIMENT STATION**

EST. WT.: 128 LBS.
Coulter Blade

- Outside Dia.: 24"  
- Center Hole Inside Dia.: 3.3/4"  
- Beveled outside edge: taper 3/16" x 1.1/4"  
- Hole Dia.: 1/2"  
- Total No. of Holes: 6  
- Total No. of Bolt Circles: 2

- Hole spacings: 3 • 120° apart on a 6.1/2" dia. bolt circle  
- 3 • 120° apart on a 7" dia. bolt circle

- Bolt Circle Displacement: 60°

- Material: Plate, 3/8" alloy steel, Type AR 400  
- Abrasion Resisting

- Hardness Range: 360 / 400 Brinelle  
- Finish: Paint, Black Enamel

- Est. wt.: 42.0 lbs.

Approved Manufacturers

- ERB & ROBERTS INCORPORATED  
  2383 S.W. ARCHER ROAD  
  P.O. BOX 657  
  GAINESVILLE, FLORIDA  
  32602

Part No.: 20-0028
PART NUMBER: 20-0024
MAT'L.: MAKE FROM SCREW, CAP
HEX. HD. 1/2" - 13UN X
1" LONG
P/N: TS-08EG08
EST. WT.: 0.06 LBS.
PART NUMBER: 20-0025  
MAT'L.: BAR, RND., 1.1/8" DIA.  
COLD FINISHED ALLOY  
TURNED, GROUND & POLISHED  
UNS G41420  
F.F.E.S. SPEC. NO.: AC-00112BJ  
EST. WT.: 2.21 LBS.  

SHAF...
WASHER

TYPE: EXTRA THICK, FINISHED, HARDENED STEEL

NOMINAL BOLT SIZE: 1.1/8"
INSIDE DIA.: 1.5/32"
OUTSIDE DIA.: 2.1/4"
THICKNESS: 7/32"
FINISH: BLACK OXIDE
EST. WT: 0.18 LBS.

APPROVED MANUFACTURERS

McMASTER-CARR SUPPLY CO.
P.O. BOX 4355
CHICAGO, ILLINOIS
60680-4355

PART NO.

98029A039

PROJECT NO.: 84-19

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

TITLE:
WASHER, HARDENED STEEL, FINISHED

F.F.E.S. PART NO.: 33-0015
NOTE!
BREAK ALL SHARP CORNERS.

PART NUMBER: 20-0026
MAT'L.: BAR, RND., 5" DIA.
CONTINUOUS CAST GREY IRON
F.F.E.S. SPEC. NO.: AC-00500AV
EST. WT.: 1.25 LBS.
PART NUMBER: 20-0018
MAT'L.: PRODUCE FROM F.F.E.S.
P/N 33-0016
EST. WT.: 0.02 LBS.

STANDARD TOLERANCES

DRAFT: R. GREENLAW
CHECKED: KDB
APPROVED: MICHIGAN DNR
FOREST MANAGEMENT DIVISION

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

TITLE: SEAL, FELT, 3/8" SQUARE
**Type:** Oil - Grease Seal  
**Width:** 3/8"  
**Height:** 3/8"  
**Material:** Felt Compound  
**Estimated Weight:** 0.03 lbs. / ft.

---

**Approved Manufacturers**  
SKF BEARING INDUSTRIES  
1100 FIRST AVENUE  
KING OF PRUSSIA, PENNSYLVANIA  
19406-1352  

**Part No.**  
38188-5-SKF  

---

**F.F.E.S. Part No.:** 33-0016  

---

**Title:** Felt, 3/8" Square  

---

**Project No.:** 84-19  

---

**MICHIGAN DNR**  
FOREST MANAGEMENT DIVISION  

---

**Forest Fire Experiment Station**  
P.O. BOX 68  
ROSCOMON, MICHIGAN 49653  

---

**Scale:** FULL  
**Date:** MAY 31, 1980  
**No.:** 33-0016B
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<td>COULTER ARM</td>
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<td>A</td>
<td>BAR, FLAT, 3/8&quot; X 2&quot;</td>
<td>1</td>
<td>0.53</td>
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</table>

---

**Diagram:**

- **Part Number:** 20-0020
- **Estimated Weight:** 16.6 lbs.
- **Title:** COULTER ARM W/C: 52" PLOW

**Forest Fire Experiment Station**

P.O. Box 68
Roscommon, Michigan 48653

Project No.: 84-19

Forest Management Division

Michigan DNR
NOTE!
USE BURNING TEMPLATE
P/N: 18-0058.

NOTE!
CENTER PUNCH 3 - PLACES
W/ BURNING TEMPLATE IN
POSITION.
**PART NUMBER:** 00-0484  
**MAT'L.:** BAR, FLAT, 3/8" X 2" H.R.  
UNS G10200  
**F.F.E.S. SPEC. NO.:** AB-00608AA  
**EST. WT.:** 0.53 LBS.

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<tr>
<th>STD. TOLERANCES</th>
<th>R. GREENLAW</th>
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<tr>
<td>FRACTIONAL: 8 TO 0.125 = +0.25</td>
<td>CHECKED:</td>
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<tr>
<td>6 IN. OR LESS = +0.0625</td>
<td>KDB</td>
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<tr>
<td>0.126 TO 0.250 = +0.03125</td>
<td>APPROVED:</td>
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<tr>
<td>DECIMAL: ANGULAR:</td>
<td></td>
</tr>
<tr>
<td>0.001 TO 0.005 = +0.0003125</td>
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</tr>
<tr>
<td>0.006 TO 0.010 = +0.000625</td>
<td></td>
</tr>
</tbody>
</table>

**FOREST FIRE EXPERIMENT STATION**  
P.O. BOX 68  
ROSCOMMON, MICHIGAN 48653  
**PROJECT NO.:** 84-19  
**TITLE:** BAR, FLAT  
**SCALE:** 1 = 2  
**DATE:** MAY 14, 1990  
**DRAWN:** R. GREENLAW  
**CHECKED:** KDB  
**APPROVED:**

**MICHIGAN DNR**  
FOREST MANAGEMENT DIVISION
1/2" DIA.
3 - PLCS. 
EQ. SPC'D.
120° APART 
ON A 6.1/2" DIA.
BOLT CIRCLE.

NOTE!
USE DRILLING 
FIXTURE P/N 
18-0057.

ITEM | PART NO | DWG | DESCRIPTION | QTY | EST. WT.
--- | --- | --- | --- | --- | ---
1 | 00-0487 | B | FLANGE | 1 | 7.01
2 | 00-0488 | C | HOUSING | 1 | 6.62

1/4" NO WELD
AT SPOTFACE

PART NUMBER: 20-0023
EST. WT.: 13.6 LBS.
PART NUMBER: 00-0487
MAT' L.: PLATE, 1/2" H.R.
UNS G10150
F.F.E.S. SPEC. NO.: AA-00848BC
EST. WT.: 7.01 LBS.

NOTE!
BREAK ALL SHARP CORNERS.

NOTE!
USE BURNING TEMPLATE P/N 18-0061.

NOTE!
APPROVED:

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

TITLE:
FLANGE, COULTER HUB

SCALE: 1 = 2
DATE: MAY 17, 1990

MICHIGAN DNR
FOREST MANAGEMENT DIVISION

PROJECT NO. 84-19

DRAFT: R. GREENLAW
CHECKED: KDB
APPROVED:
1" DIA.
S'FACE

0.534"

1/64" X 45°
CHAMFER
TYP

LETTER "R" DRILL
THRU 1 - WALL
1/8" NPT TAP

27/64" DRILL THRU
1 - WALL
1/2" - 13 UN TAP

NOTE!
BREAK ALL
SHARP EDGES.

1.44

0.68

3.38

3.120

2.41

typ

3.1/2"

1/2" - 13 UN TAP

NOTE!
BREAK ALL
SHARP EDGES.

188

2.188

+ .004

- .000

.000

.005

.000

.005

5.38

4.000

2.188

6.62 LBS.

EST. WT.

PART NUMBER: 00-0488

MAT'L.: BAR, RND., 3.1/2" DIA. C.D.

RYCABE / LEAD

UNS G11170/Pb

F.F.E.S. SPEC. NO.: AC-00350AF

EST. WT.: 6.62 LBS.

FOREST FIRE EXPERIMENT STATION

P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

MICHIGAN
DNR

FOREST MANAGEMENT
DIVISION

PROJECT NO. 84-19

TLE
HOUSING, COULTER HUB

FULL

DATE
1984-12-18

00-0488C
ROLLER BEARING & RACE

BEARING TYPE: STANDARD SOLID ROLLER
TOTAL ROLLERS: 7
ROLLER DIA.: 0.4375
INSIDE DIA.: 1.125" NOM.
LOAD RATING @ 100 R.P.M.: 2950 LBS.
OUTSIDE DIA.: 2.187" INSTALLED NOM.
OPERATING SPACE: 4.000"
RACE TYPE: SPLIT OUTER
EST. COMBINED WT.: 2.15 LBS.

APPROVED MANUFACTURERS

BERLISS BEARING COMPANY
644 ROUTE 10
P.O. BOX 45
LIVINGSTON, NEW JERSEY 07039

PART NO.
PA-97664

APPROVED MANUFACTURERS

F.F.E.S. PART NO.: 20-0005

MICHIGAN DNR
FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

PROJECT NO.: 84-19
PART NO.: 20-0005B
<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO</th>
<th>Dwg</th>
<th>Description</th>
<th>Qty</th>
<th>Est Wt</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>00-0485</td>
<td>B</td>
<td>MOUNTING RING</td>
<td>1</td>
<td>5.54</td>
</tr>
<tr>
<td>2</td>
<td>00-0486</td>
<td>A</td>
<td>PIPE, 10&quot;, SCH. 40, BLACK</td>
<td>1</td>
<td>9.69</td>
</tr>
</tbody>
</table>

**Diagram:**

- Part Number: 20-0021
- Est. Wt.: 15.5 LBS.

**Title:** COULTER DEPTH CONTROL FLANGE L.H. W/C

**Scale:** 1 = 2

**Forest Fire Experiment Station**

P.O. Box 68, Roscommon, Michigan 48653

Project No.: 84-19
1/2" DIA.
3 - PLCS.
EQ. SPC'D.
120° APART
ON A 6.1/2" DIA.
BOLT CIRCLE.

NOTE!
USE DRILLING
FIXTURE P/N
18-0056.

NOTE!
USE BURNING
TEMPLATE P/N
18-0059.

PART NUMBER: 00-0485
MAT'L.: PLATE, 3/8" H.R.
UNS G10150
F.F.E.S. SPEC. NO.: AA-00648BC
EST. WT.: 5.54 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

SCALE: 1 = 2
DATE: MAY 15, 1980

MICRANIC
DNR
FOREST MANAGEMENT
DIVISION

FOREST FIRE EXPERIMENT STATION
MOUNTING RING: DEPTH CONTROL FLANGE
PART NUMBER: 00-0486
MAT'L.: PIPE, 10".
SCHEDULE 40, BLACK
UNS K03000
FFES SPEC. NO.: AF-04160AY
EST. WT.: 9.69 LBS.

STD. TOLERANCES

PART NUMBER: 00-0486
MAT'L.: PIPE, 10"
SCHEDULE 40, BLACK
UNS K03000
FFES SPEC. NO.: AF-04160AY
EST. WT.: 9.69 LBS.

FOREST FIRE EXPERIMENT STATION
P.O. BOX 68
ROSCOMMON, MICHIGAN 48653

PIPE, 10", SCH. # 40, BLACK
NOTE 1:
FOR INTERNAL COMPONENT INSTALLATION, USE TOOL P/N's 18-0063, 18-0064, 18-0065 & 18-0066. TO EXTRACT THE END GLAND, USE P/N 18-0067.

NOTE:
ROD DIA. = 1.1/2"
STROKE = 13"
BORE = 4.1/2"
PORTS = 3/8" NPT FEMALE