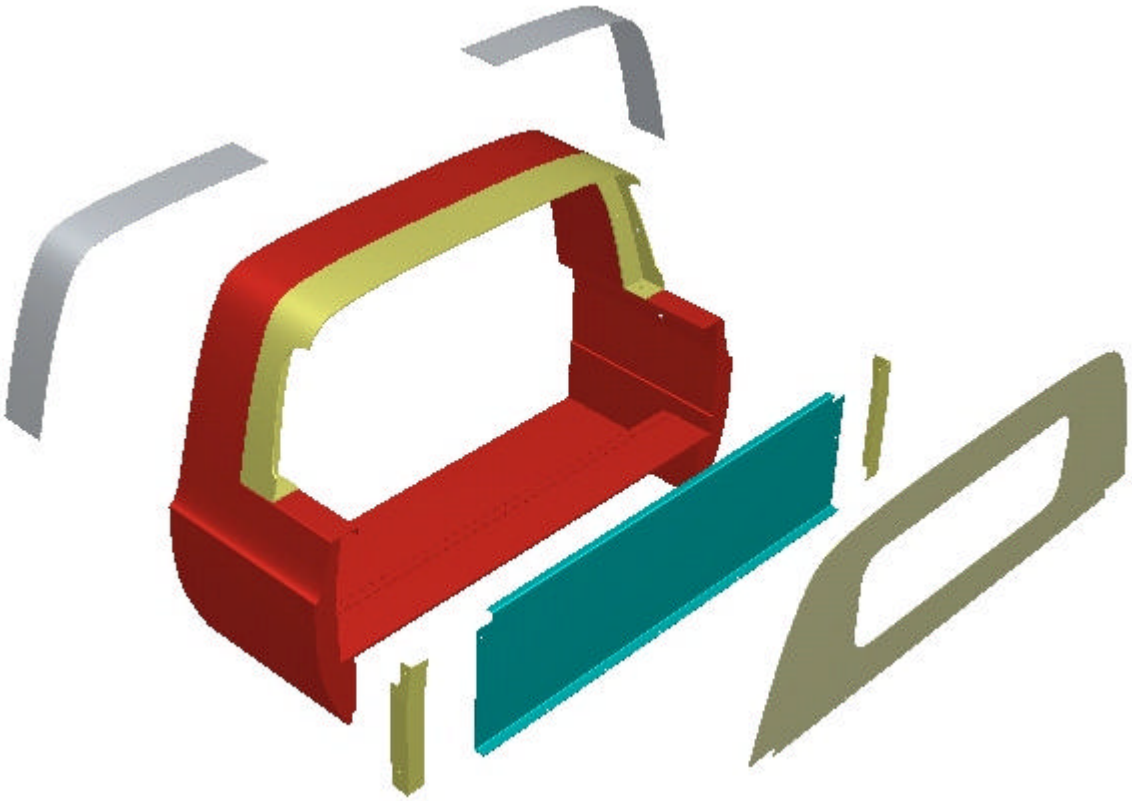
ROSCOMMON EQUIPMENT CENTER

Project Number 62 **April 2000**



Converting the M1009 Blazer To Cab and Cargo Box Style

National Association of State Foresters
in Cooperation with
Michigan's Forest Fire Experiment Station

REC Project No. 62

Converting the M1009 Blazer To Cab and Cargo Box Style

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Disclaimer

Introduction

The M1009 Commercial Utility Cargo Vehicle (CUCV) is the military version of a General Motors Model K10516 Blazer. There are a few differences between these mid-1980's military vehicles and their civilian counterpart. The most notable is the quasi-24 volt electrical system of the M1009.

The M1009 has a rear "cap" that covers the rear seat and cargo area. This cap is easily removed, as is the rear seat and spare tire rack. Doing this exposes a five foot long cargo deck that is 50 inches between the rear wheel wells. Building a rear cab panel behind the front seat would covert the M1009 into a short box pickup capable of hauling a small water tank. Because of the wide availability of the M1009 through the Federal Excess Personal Property (FEPP) program and the dwindling availability of other small vehicles such as the M880 and M1008 trucks, REC was asked to develop rear cab panel plans. These are included in this report. Also discussed is proper loading of this vehicle.

Weights and Loading

Before going any further, it must be realized that the payload capacity of the M1009 is very limited. First you must decide if it can do the required job.

The Blazer's maximum water capacity will be 50-80 gallons. In order to achieve the high end of this range, a light weight tank material and water handling equipment must be used. Also, miscellaneous storage must be kept to an absolute minimum. Only the most weight conscious operators will stay below the 6400 lbs. Gross Vehicle Weight Rating (GVWR) with 80 gallons of water. Sixty to seventy gallons of water is a better target and this means that the Blazer is best suited as a grass fire or patrol vehicle.

The M1009 curb weight and weight ratings in pounds are:

	Curb Weight	Weight Ratings[1]
Front	2,835	2,945 (FAWR)
Rear	2,365	3,455 (RAWR)
Total	5,200	6,400 (GVWR)

The available payload is approximately 1,200 lbs. and the wheelbase is 106.5 inches.

REC Newsnote No. 12, Weights and Loading of M1009 CUCV 3/4 Ton Blazer, discusses the possibility for adding a water tank with the original M1009 configuration. That is, leaving the rear cap as is and installing a tank in the back. For this report some weight will be removed when converting the M1009 to a cargo box truck. Removing the rear cap lightens the vehicle by 160 pounds. The rear seat will not be used, it weighs 60 pounds, and removing the spare tire will reduce the weight by 60 pounds, also. In total 280 pounds can be removed. The rear cab panel that is shown in the Appendix B drawings can be used to close off the rear of the operator's compartment. The cab panel with window glass will add approximately 100 pounds to the vehicle. The revised curb weight for the REC cargo box style M1009 will be as follows:

Cargo Box M1009 Curb Weight	
Front	2,875 pounds
Rear	2,145 pounds
Total	5,020 pounds

A water tank constructed of 1/8 inch aluminum sheet with dimensions of approximately 48 inches wide, 18 inches tall, and 16 inches long, will hold about 60 gallons of water. The weight of the tank, including water, will be approximately 560 pounds. Adding a small pump and water delivery accessories mean that the 60 gallon tank complete and full of water will be a minimum of 600 pounds. Installing the tank near the back of the cargo bed, centered about 24 inches behind the rear axle, will prevent the front axle from being overloaded and should balance the vehicle nicely. The Aqua-Duk 12 volt electric driven roller pump[2] or an under the hood belt driven pump, would provide adequate flow and could save weight compared to an auxiliary engine driven pump system.

[1] The FAWR (Front Axle Weight Rating) and RAWR (Rear Axle Weight Rating) vary for different CUCV models. The listed ratings are the more conservative, a wise choice to use with an older vehicle.

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The estimated weight for the completed vehicle with tank and two occupants, but without stored items, will be about 6,000 pounds. That is approximately 95 percent of the gross vehicle weight rating, leaving the potential of a few hundred pounds for stored items like hand tools or saws.

Remember to weigh the completed vehicle with occupants and all items that will be dispatched to assure the final product does not exceed any of the axle or vehicle weight ratings. REC provides a calculator on its web site (see Footnote 2) to input the weights of the specific items you plan to add to a vehicle. Your inputs will provide an estimate of the final vehicle weight.

[2] REC evaluated the Aqua-Duk pump for member agencies as Project #50. This pump is singled out here only because its 12 volt DC electric drive is unique and may provide benefits for this situation. This should not be taken as an endorsement for this product to the exclusion of others. An online version of Project #50 is available at http://www.RoscommonEquipmentCenter.com.

Cab Panel Fabrication

The REC rear cab panel design (90-6200C) is mostly made of 14 gauge steel sheets and a portion of the existing cargo box "cap." Steel cutting and bending equipment will be required. The steel sheet is too thin to cut with an acetylene torch. Warpage will be too great. Plasma or saw cutting are best. If you do not have this capability, take the drawings to a steel supplier. Full service steel warehouses will cut and form the pieces for you.

Be careful of warpage when welding these pieces as well. The design is set up for MIG welding with corner joints meeting inside corner to inside corner.

The drawings for this design are found in Appendix B. Fabrication follows the process below.

- The front portion of the original cap is cut off as shown in drawing 90-6201B. This part fits and seals properly to the back of the "cab" top and will help us form an extension to the cab top. See Photos 1 and 2 in Appendix A.
- The cab back (90-6209B) aligns with the front edge of the cargo floor. The existing cargo floor screws are used to fasten the panel to the floor. Seal between the cab back and the floor with 1/8 inch thick closed cell foam strips to reduce the potential of water entering the cab. Two pieces of angle stiffen the panel.
- Two mounting angles (90-6205B and 90-6206B) secure the cab back (90-6209B) to the inside of cargo box sides. Closed cell foam will be needed to fill the gaps between the angles and the box sides. See Photo 3 in Appendix A.
- The cap back (90-6203B) bolts on top of the cab back (90-6206B). It is cut to match the curves of the modified cap (90-6201B).
- The steel cap top halves (90-6202B) are formed over the top of the modified cap (90-6201B) by wrapping and bolting it to the modified cap. The cap back (90-6203B) is then welded to these parts and all seems are welded water tight. See Photos 4 and 5 in Appendix A. Tack weld in position only. Remove for finish welding to reduce damage to modified cap.
- Use silicone caulk to seal between gaps.
- Install a window with gasket. An auto glass dealer can help with this.

M1009 Electric System

The U.S. Military used a 24 volt electrical system standard, hence the M1009 looks like it is 24 volt. Actually the civilian Blazer's 12 volt system is largely intact in the M1009. The 12 volt system has been modified to allow 24 volt starting and to supply 24 volt power for military accessories. The only true 24 volt component is the starter motor.

REC Newsnote No. 10, Conversion of M1008 and M1009 Electric Systems to 12 Volt, provides step-by-step instructions for converting the M1009's 24 volt electric system back to 12 volt. This publication can be downloaded from the REC web site.

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Appendix A - Photos

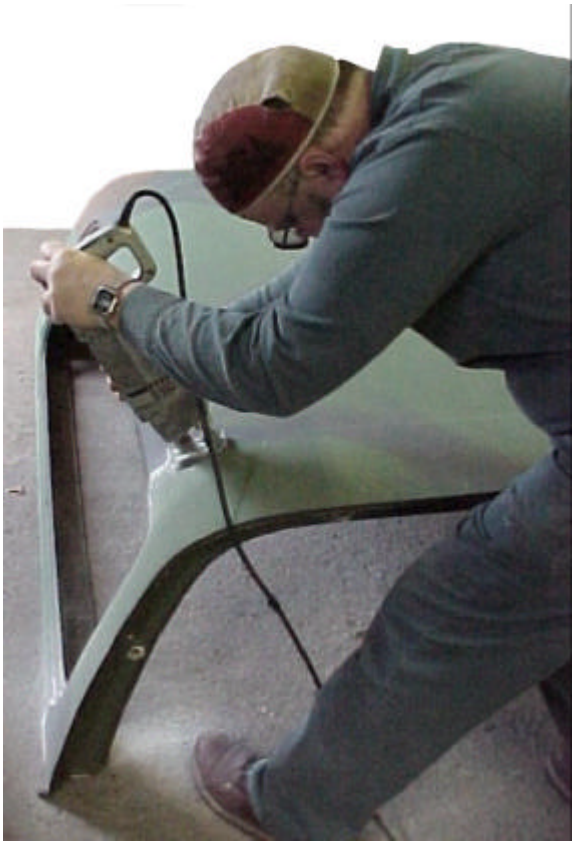

Photo 1 – The front of the cap is sawed off.

Photo 2 – The modified cap remounted to the cab top.

Photo 3 – Sheet metal screws hold the mounting angles to the vehicle's side panels.

Photo 4 – The steel panel extension to the cab top is wrapped and bolted to the modified cap. The cap back can be used to locate it fore and aft.

Photo 5 – The cap back panel is tack welded to the cap top extension. Once securely tacked together, remove the components to finish the welding process off the vehicle.

Photo 6 – This is the finished cab prior to paint and window installation.

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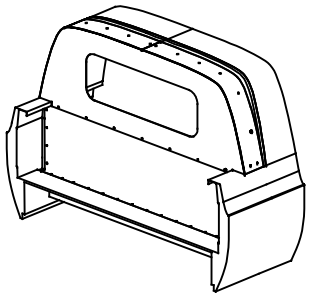
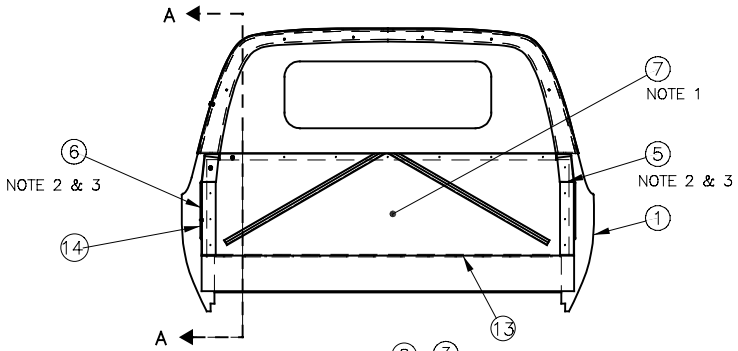
Appendix B - Drawings

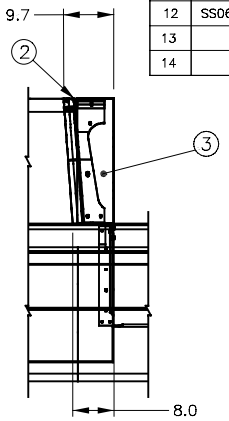
Drawing	Drawing Name
90-6200C	Cap Assembly
90-6201B	Modified Cap
90-6202B	Cap Top
90-6203B	Cap Back
90-6204C	Cab Back
90-6205B	Angle, LT
90-6206B	Angle, RT
90-6207B	Angle, Brace LH
90-6208B	Angle, Brace RH
90-6209B	Cab Back W/C

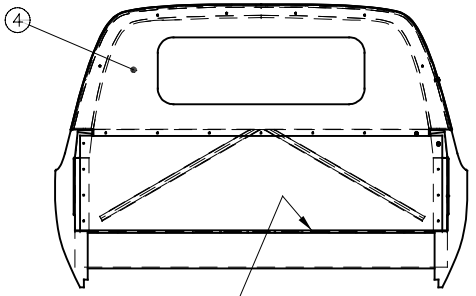


COMPONENT LIST

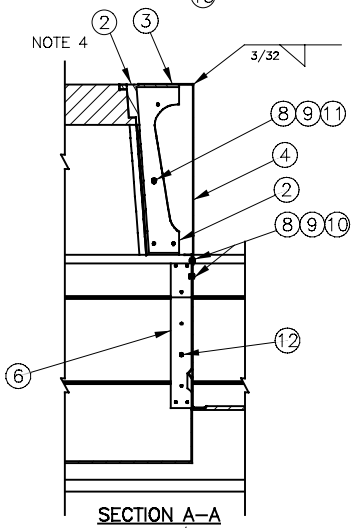
ITEM	PART NO	DWG	DESCRIPTION	QTY
1	–	–	BLAZER BODY	1
2	90–6201	B	MODIFIED CAP	1
3	90–6202	B	CAP TOP	2
4	90–6203	B	CAP BACK	1
5	90–6205	B	ANGLE, LT	1
6	90–6206	B	ANGLE, RT	1
7	90–6209	B	CAB BACK WC	1
8	TS–04GP	–	NUT, HEX 1/4–20UN GR5 PLTD	33
9	WS04–BC	–	WASHER, LOCK 1/4 SPRING TYPE PLTD	33
10	TS–04GG04	–	CAP SCREW, HEX 1/4 UNC X 1/2 GR 5 , PLTD	15
11	TS–04GG06	–	CAP SCREW, HEX 1/4 UNC X 3/4 GR5 PLTD	18
12	SS06–18A08BB2	–	SCREW, SHEET METAL #10 X 1/2 PANHEAD PLTD	18
13	–	–	1/8 X 1 CLOSED CELL FOAM 72"	1
14	–	–	3/8 X 1 CLOSED CELL FOAM 10"	2







NOTE:USE EXISTING BOLTS TO MOUNT ITEM 3 TO ITEM 1



SECTION A–A
SCALE:3/16

NOTE: 1)USE ITEM 4 FOR HOLE LOCATIONS IN ITEM 7, DRILL 9/32 HOLES, 7 PLACES
2)USE ITEM 7 FOR HOLE LOCATIONS IN ITEMS 6 & 7, DRILL 9/32 HOLES, 8 PLACES
3)USE ITEMS 6 & 7 FOR HOLE LOCATIONS IN ITEM 1. DRILL 9/64 HOLES 18 PLACES
4)USE ITEM 5 FOR HOLE LOCATIONS IN ITEM 2., DRILL 9/32 HOLES 18 PLACES

PART NO: 90–6200
EST WT: 74.4 LBS (LESS MODIFIED CAP)

STD. TOL.
DECIMAL:
1 PLACE + – 0.06
2 PLACE + – 0.03
3 PLACE + – 0.005
ANGULAR:
+ – 1 DEG.

NO.	BY	DATE	REVISION

DRAWN: DGP
CHECKED:
APPROVED:

DATE: 03/09/00
SCALE: 1/8
PROJECT NO.: REC 62

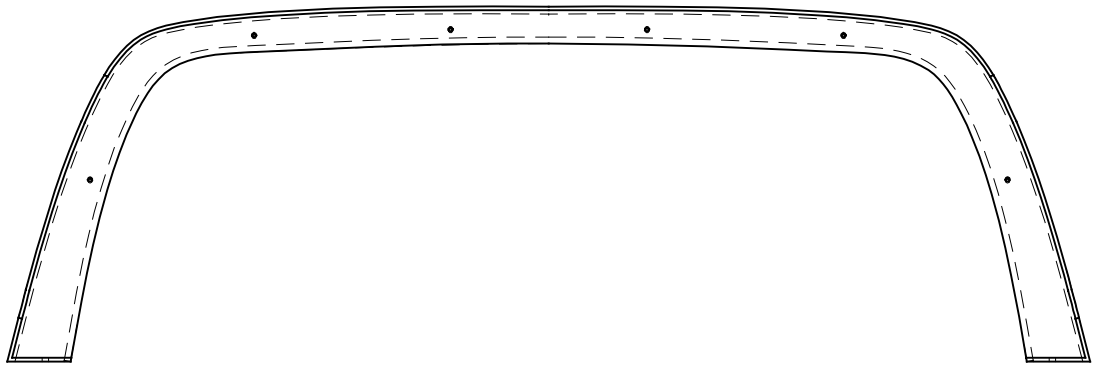
FOREST FIRE EXPERIMENT STATION
P.O. BOX 68 ROSCOMMON, MICHIGAN 48653

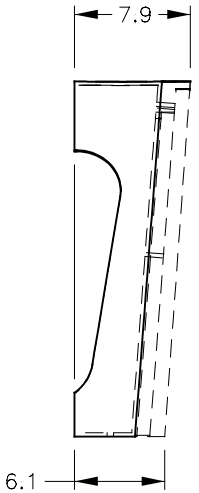
TITLE: CAP ASSEMBLY

DNR
FOREST MANAGMENT DIVISION

DWG. NO. 90–6200C

Return to Drawing List



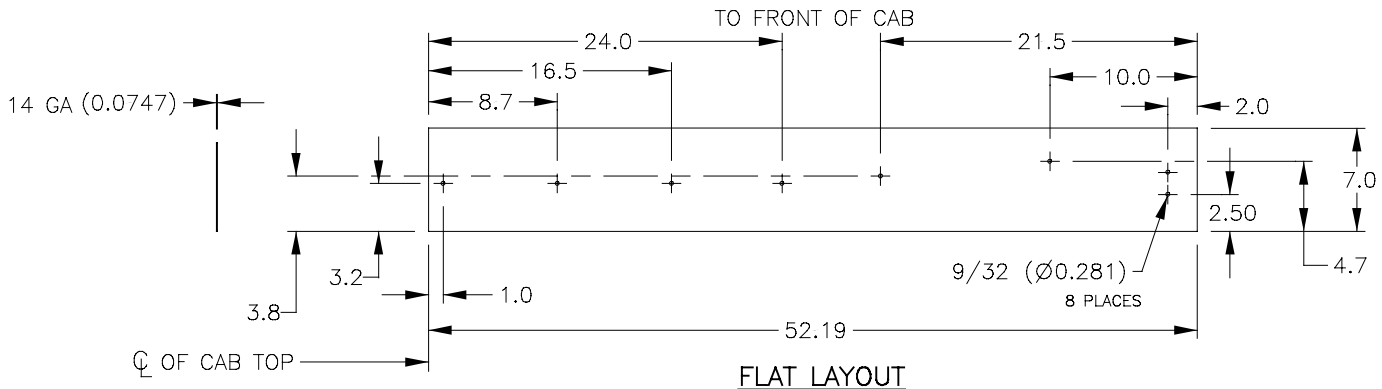


NOTE: MAKE FROM FRONT PORTION OF CHEVY BLAZER CAP

PART NO: 90-6201
EST WT: 36.6 LBS

STD. TOL.				DRAWN: DGP	DNR FOREST MANAGMENT DIVISION
DECIMAL: 1 PLACE + - 0.06, 2 PLACE + - 0.03, 3 PLACE + - 0.005				CHECKED:	
ANGULAR: + - 1 DEG.	NO.	BY	DATE	REVISION	APPROVED:
DATE: 03/09/00	FOREST FIRE EXPERIMENT STATION				
SCALE: 1/8	P.O. BOX 68 ROSCOMMON, MICHIGAN 48653				
PROJECT NO.: REC 62	TITLE: MODIFIED CAP				DWG. NO. 90-6201B

Return to Drawing List



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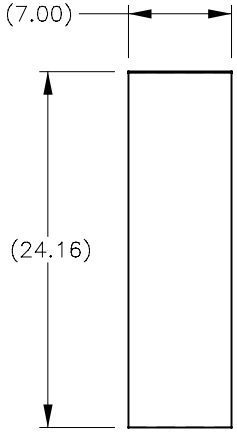

2 REQ'D.
FORM TO CONTOUR OF CAP

PART NO: 90–6202
MAT'L: SHEET 14 GA (0.747) HR P&O
ASTM A569
FFES SPEC NO: AA–G1458AP
EST WT: 6.60 LBS

STD. TOL.				DRAWN: DGP	DNR FOREST MANAGMENT DIVISION
DECIMAL: 1 PLACE + – 0.06, 2 PLACE + – 0.03, 3 PLACE + – 0.005				CHECKED:	
ANGULAR: + – 1 DEG.	NO.	BY	DATE	REVISION	APPROVED:
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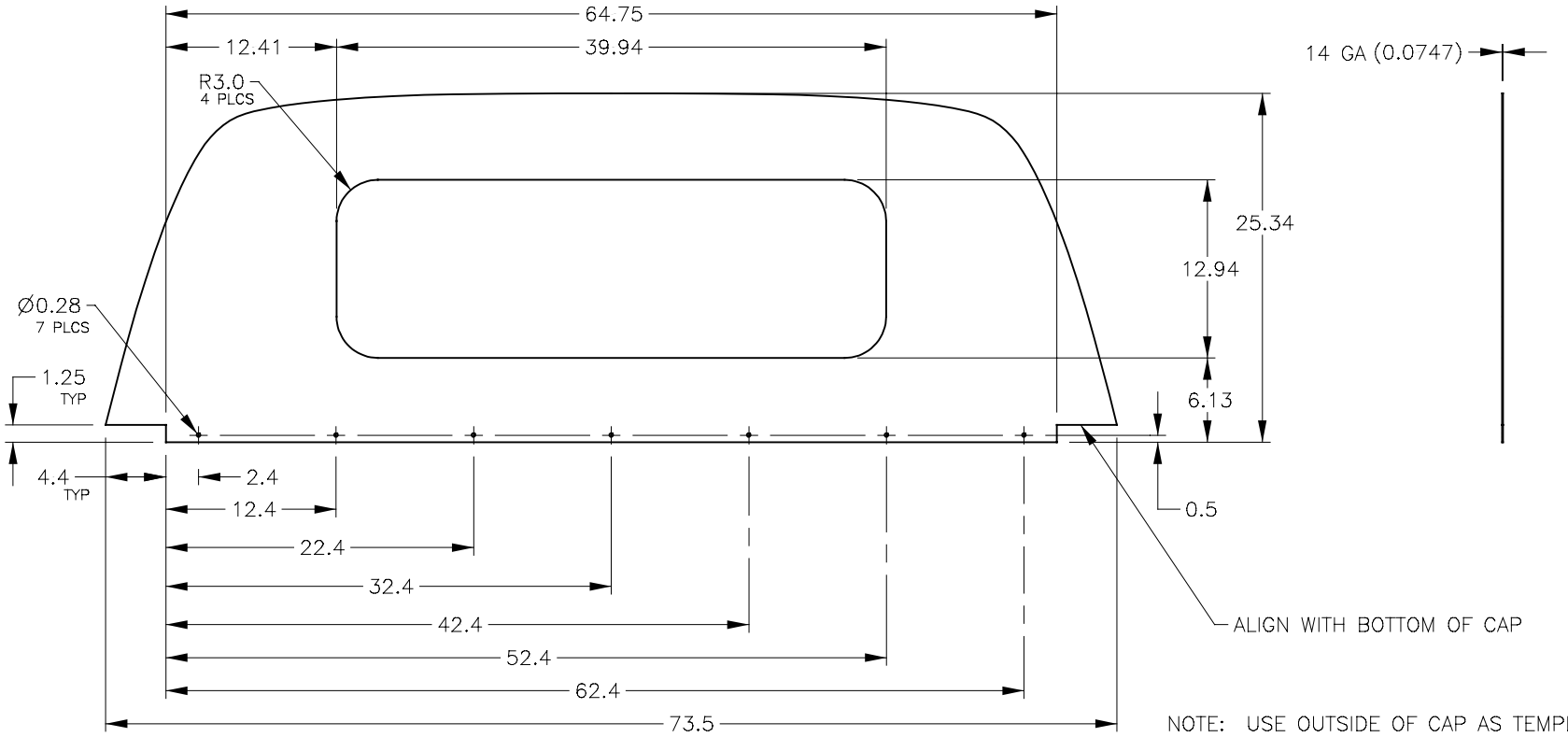
PROJECT NO.: REC 62	TITLE: CAP TOP				DWG. NO. 90–6202B

Return to Drawing List



PART NO: 90-6203
MAT'L: SHEET 14 GA (0.0747) HR P&O
ASTM A569
FFES SPEC NO: AA-G1458AP
EST WT: 24.0 LBS

STD. TOL.				DRAWN: DGP	DNR FOREST MANAGMENT DIVISION
DECIMAL: 1 PLACE + - 0.06, 2 PLACE + - 0.03, 3 PLACE + - 0.005				CHECKED:	
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PROJECT NO.: REC 62	TITLE: CAP BACK				DWG. NO. 90-6203B

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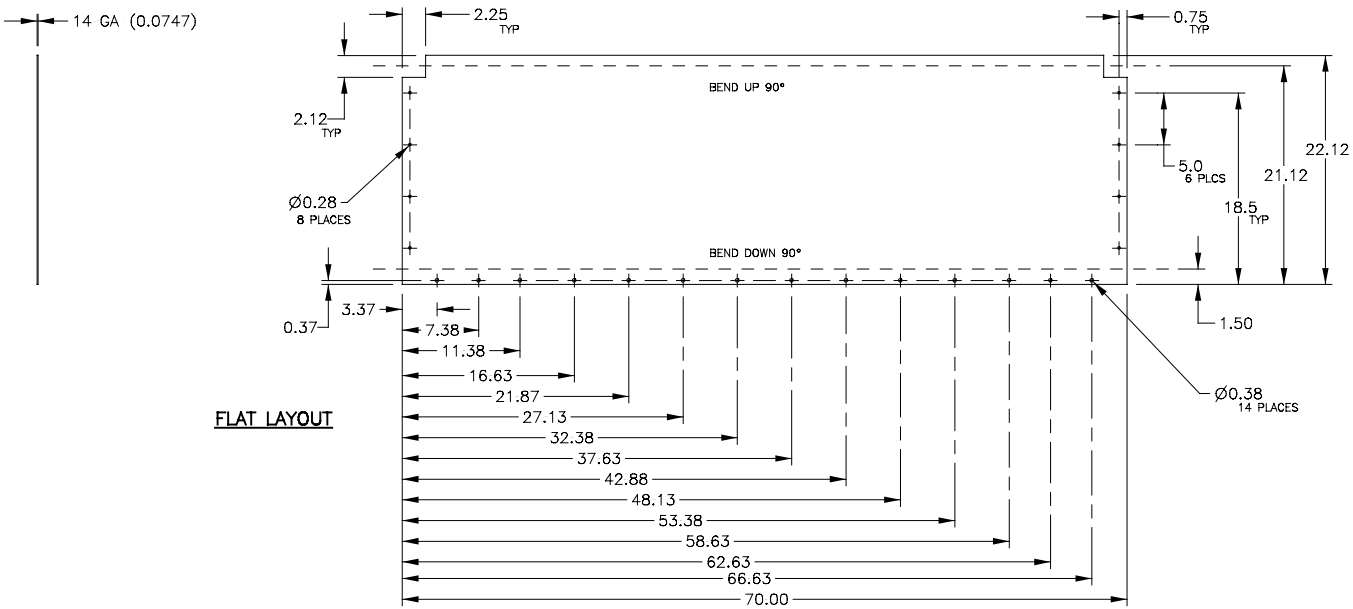

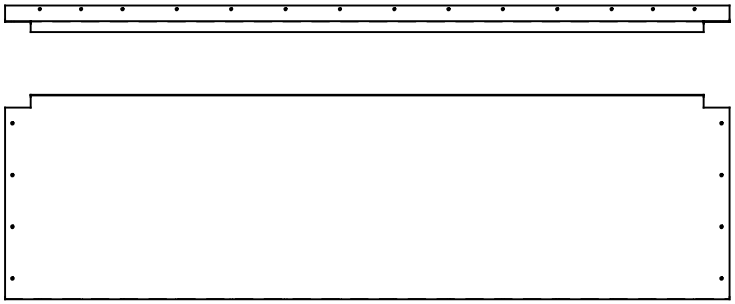

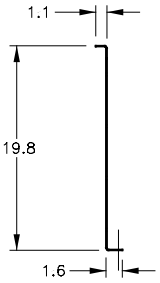

PART NO: 90-6204
MAT'L: SHEET 14 GA (0.0747) HR P&O
ASTM A569
FFES SPEC NO: AA-G1458AP
EST WT: 32.8 LBS

STD. TOL. DECIMAL: 1 PLACE +-0.06, 2 PLACE +-0.03, 3 PLACE +-0.005; ANGULAR: +-1 DEG.	NO.	BY	DATE	REVISION	DRAWN: DGP; CHECKED: ; APPROVED:	DNR FOREST MANAGMENT DIVISION
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PROJECT NO.: REC 62	TITLE: CAB BACK					DWG. NO. 90-6204C

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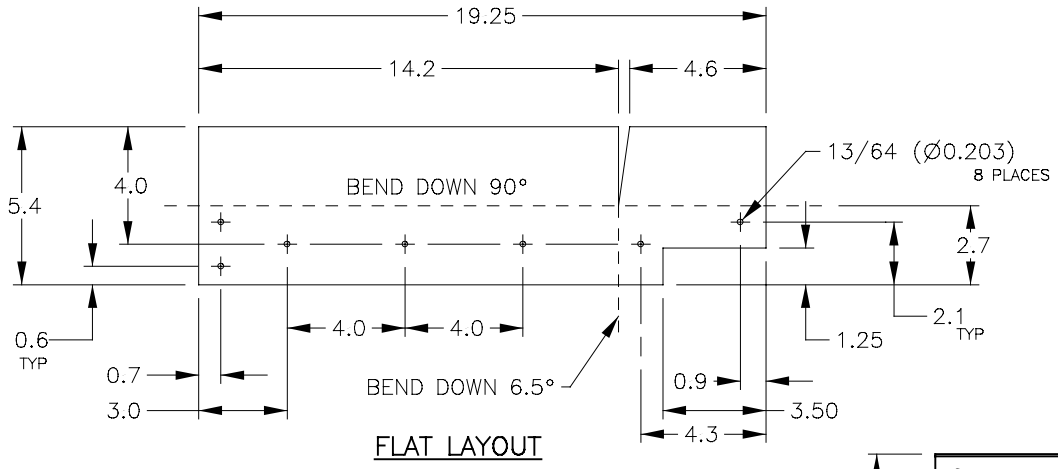

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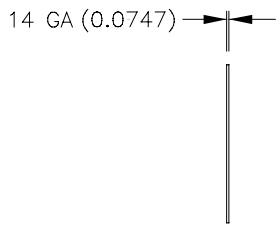

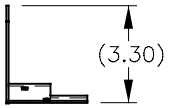

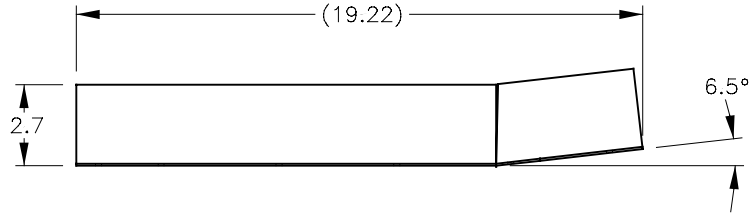

PART NO: 90–6205
MAT'L: SHEET 14 GA (0.0747) HR P&O
ASTM A569
FFES SPEC NO: AA–G1458AP
EST WT: 2.22 LBS

STD. TOL.					DRAWN: DGP
DECIMAL: 1 PLACE + – 0.06, 2 PLACE + – 0.03, 3 PLACE + – 0.005					CHECKED:
ANGULAR: + – 1 DEG.	NO.	BY	DATE	REVISION	APPROVED:
DATE: 03/09/00	FOREST FIRE EXPERIMENT STATION				DNR FOREST MANAGMENT DIVISION
SCALE: 1/4	P.O. BOX 68 ROSCOMMON, MICHIGAN 48653				
PROJECT NO.: REC 62	TITLE: ANGLE, LT				DWG. NO. 90–6205B

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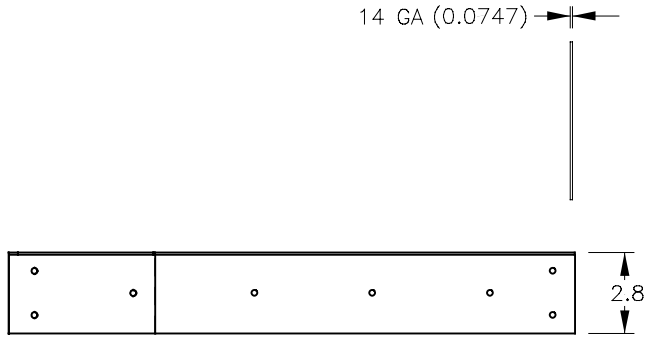

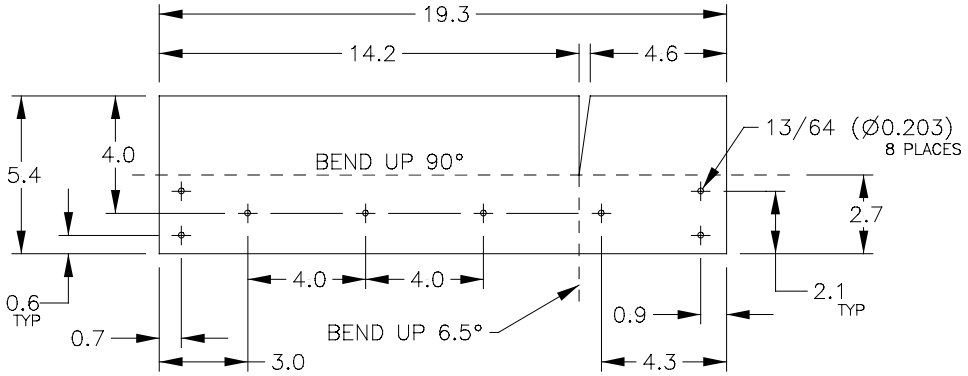

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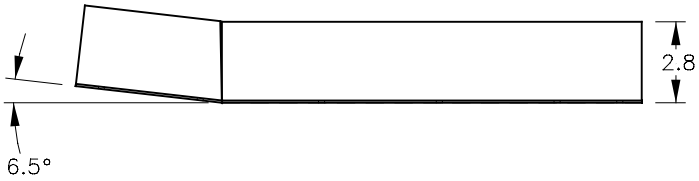

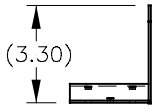

PART NO: 90–6206
MAT'L: SHEET 14 GA (0.0747) HR P&O
ASTM A569
FFES SPEC NO: AA–G1458AP
EST WT: 2.22 LBS

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DECIMAL: 1 PLACE + – 0.06, 2 PLACE + – 0.03, 3 PLACE + – 0.005				CHECKED:	
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PROJECT NO.: REC 62	TITLE: ANGLE, RT				DWG. NO. 90–6206B

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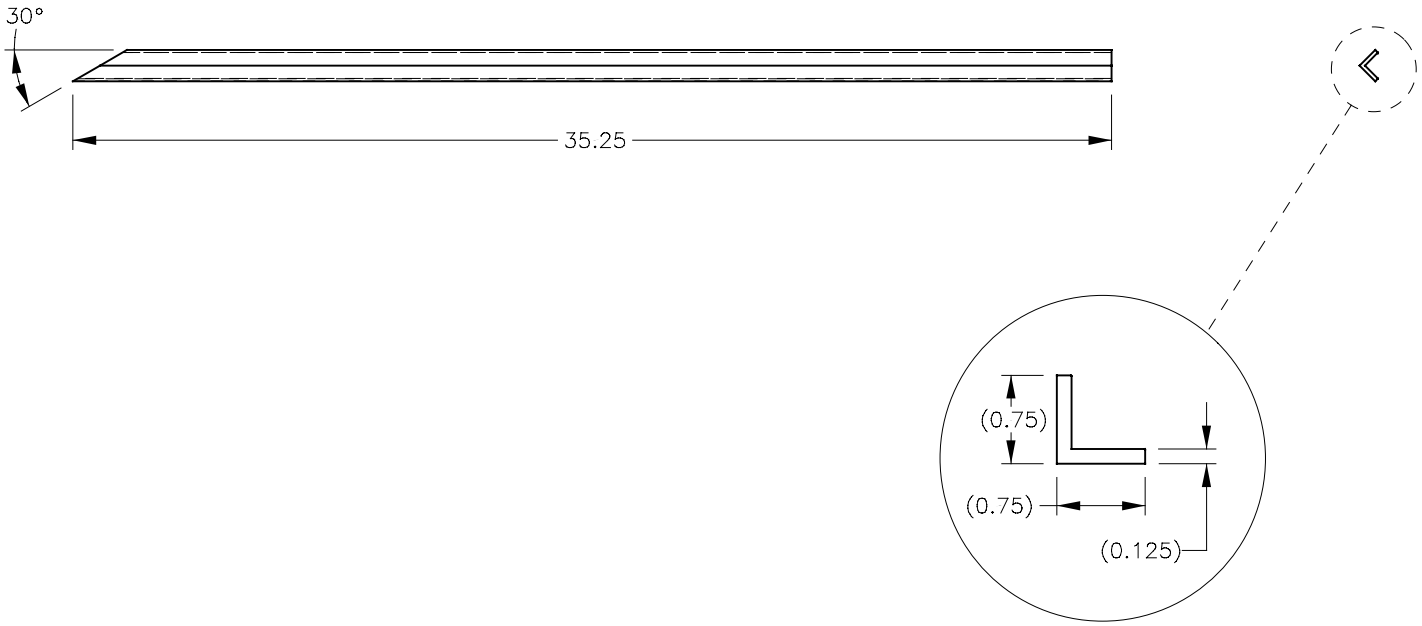

PART NO: 90-6207
MAT'L: ANGLE 1 X 1 X 1/8
K02600
FFES SPEC NO: AK-20404AG
EST WT: 1.67 LBS

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DECIMAL: 1 PLACE +-0.06, 2 PLACE +-0.03, 3 PLACE +-0.005				CHECKED:	
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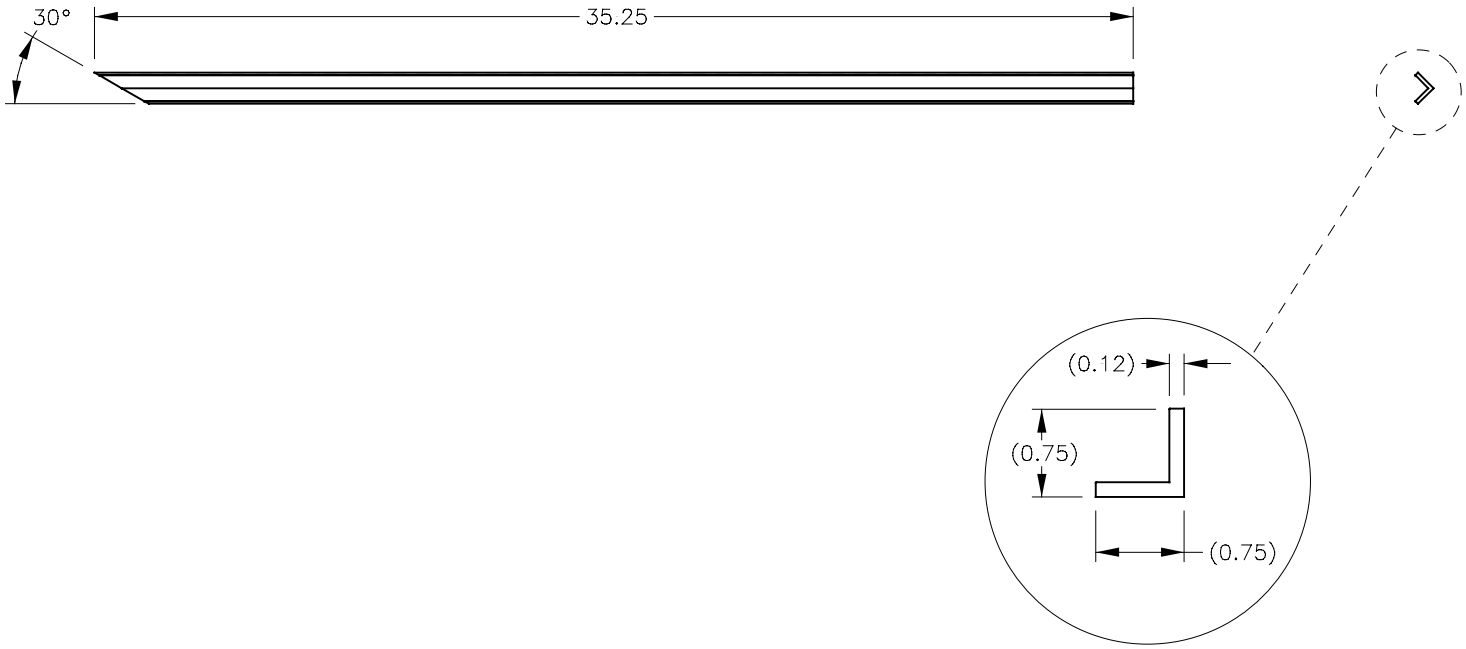
Return to Drawing List



PART NO: 90-6208
MAT'L: ANGLE 1 X 1 X 1/8
K02600
FFES SPEC NO: AK-20404AG
EST WT: 1.67 LBS

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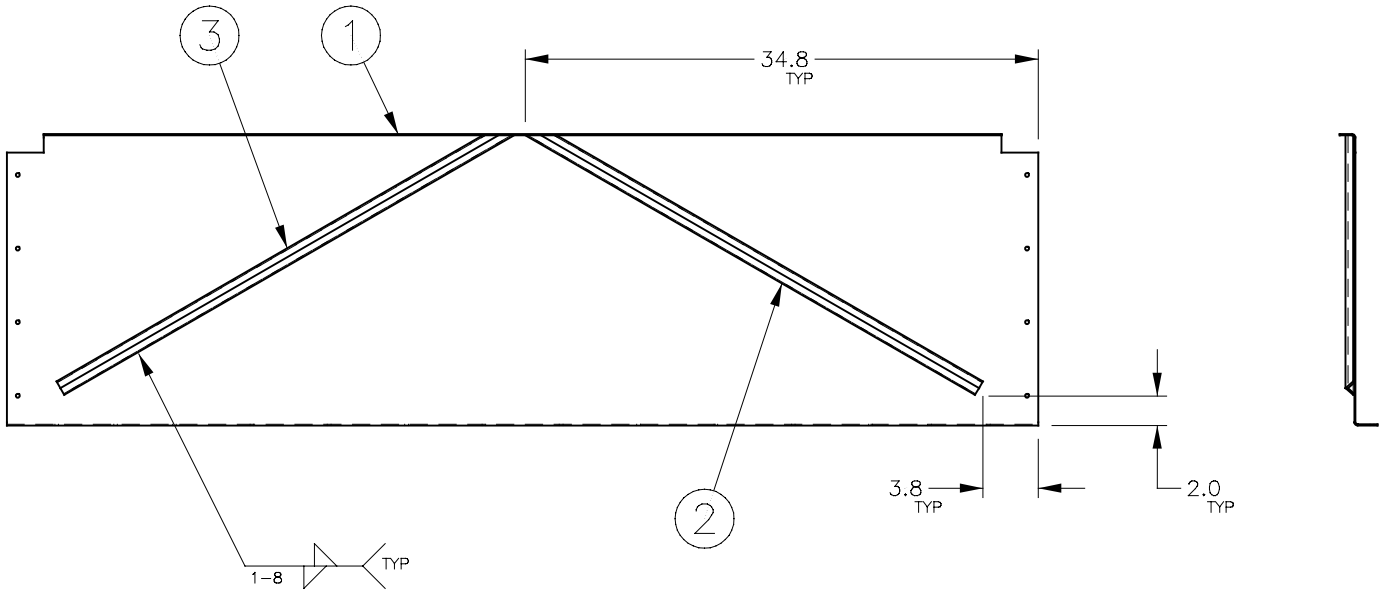
DATE: 3/30/00	FOREST FIRE EXPERIMENT STATION				
SCALE: 1/4	P.O. BOX 68 ROSCOMMON, MICHIGAN 48653				
PROJECT NO.: REC 62	TITLE: ANGLE, BRACE RH				DWG. NO. 90-6208B

Return to Drawing List

COMPONENT LIST				
ITEM	PART NO	DWG	DESCRIPTION	QTY
1	90-6204	C	CAB BACK	1
2	90-6207	B	ANGLE BRACE, LEFT	1
3	90-6208	B	ANGLE BRACE, RIGHT	1



PART NO: 90-6209
EST WT: 35.8 LBS

STD. TOL.					DRAWN: DGP
DECIMAL: 1 PLACE +-0.06, 2 PLACE +-0.03, 3 PLACE +-0.005					CHECKED:
ANGULAR: +-1 DEG.	NO.	BY	DATE	REVISION	APPROVED:
DATE: 3/30/00	FOREST FIRE EXPERIMENT STATION				
SCALE: 1/8	P.O. BOX 68 ROSCOMMON, MICHIGAN 48653				ROSCOMMON EQUIPMENT CENTER
PROJECT NO.: REC-62	TITLE: CAB BACK W/C				DWG. NO. 90-6209B

Return to Drawing List