

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

SHOP SET, FUEL AND ELECTRICAL SYSTEM: FIELD MAINTENANCE,
 BASIC, LESS POWER (4910-754-0714) AND

SHOP SET, FUEL AND ELECTRICAL SYSTEM: FIELD MAINTENANCE,
 SUPPLEMENTAL NO. 2, LESS POWER (4910-390-7775):

INSTALLATION IN ONE SEMITRAILER, VAN, SHOP, 6 TON, 2-W, M146

Headquarters, Department of the Army, Washington D.C.
 20 February 1974

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1. General

a. The instructions contained in this bulletin are to be used as a guide for installation of Basic Field Maintenance Fuel and Electrical System Shop Set 4910-754-0714 and Supplemental No. 2 Field Maintenance Fuel and Electrical System Shop Set 4910-390-7775.

b. These instructions are to be followed, as prescribed, in most instances. Slight variations to the installation may be made at the discretion of the Officer in charge.

c. Complete lists of items contained in the shop sets are included in SC 4910-95-CL-A65 and SC 4910-95-CL-A01 (including change no. 1).

d. Precautions should be observed when drilling holes through the body to insure that waterproof characteristics of the body are retained. All hardware extending through the floor of the trailer should have the outer parts covered with undercoating similar to that used on the under side of vehicles. Care should be taken that holes drilled into the floor do not penetrate the frame or cross members of the vehicle.

e. Items not mentioned in this bulletin that are components of the shop set may be stowed in the work tables or other convenient places in such a manner as to avoid damage in transit.

f. Modification of the electrical system of the shop van should be performed by either a facilities engineer or a qualified electrician MOS 52F.

g. Each shop set will be mounted in one 6-Ton, 2-W semi-trailer shop van M146.

CAUTION

Do not drill holes through cross members or into frames of vehicles or cabinets. If necessary, move the item to be mounted slightly so that drilled holes will avoid these structures.

h. Ground all electrically powered equipment mounted in the trailer to the chassis as a safety precaution against electrical shock to the operator.

i. One ground rod with cable assembly is included in the shop set for each trailer. Drive the ground rod into the ground and secure the cable assembly to the chassis of the trailer each time the shop set is placed in operation.

2. Rewiring Trailer for 220 Volts and Installing Electrical Equipment

See figures 1 and 2, and table 1.

CAUTION

Avoid interference with and/or damage to mechanism mounted in main switch box.

a. Disconnect the two wires from the top terminals in the main switch box and remove the 110-volt 2-wire electrical receptacle connector located on the exterior lower right front corner of the van.

b. Install the 100-amp, 220-volt, 4-wire, 4-pole electrical receptacle and plug.

c. Install nipple.

d. Install lower right front junction box (8 x 6 x 4).

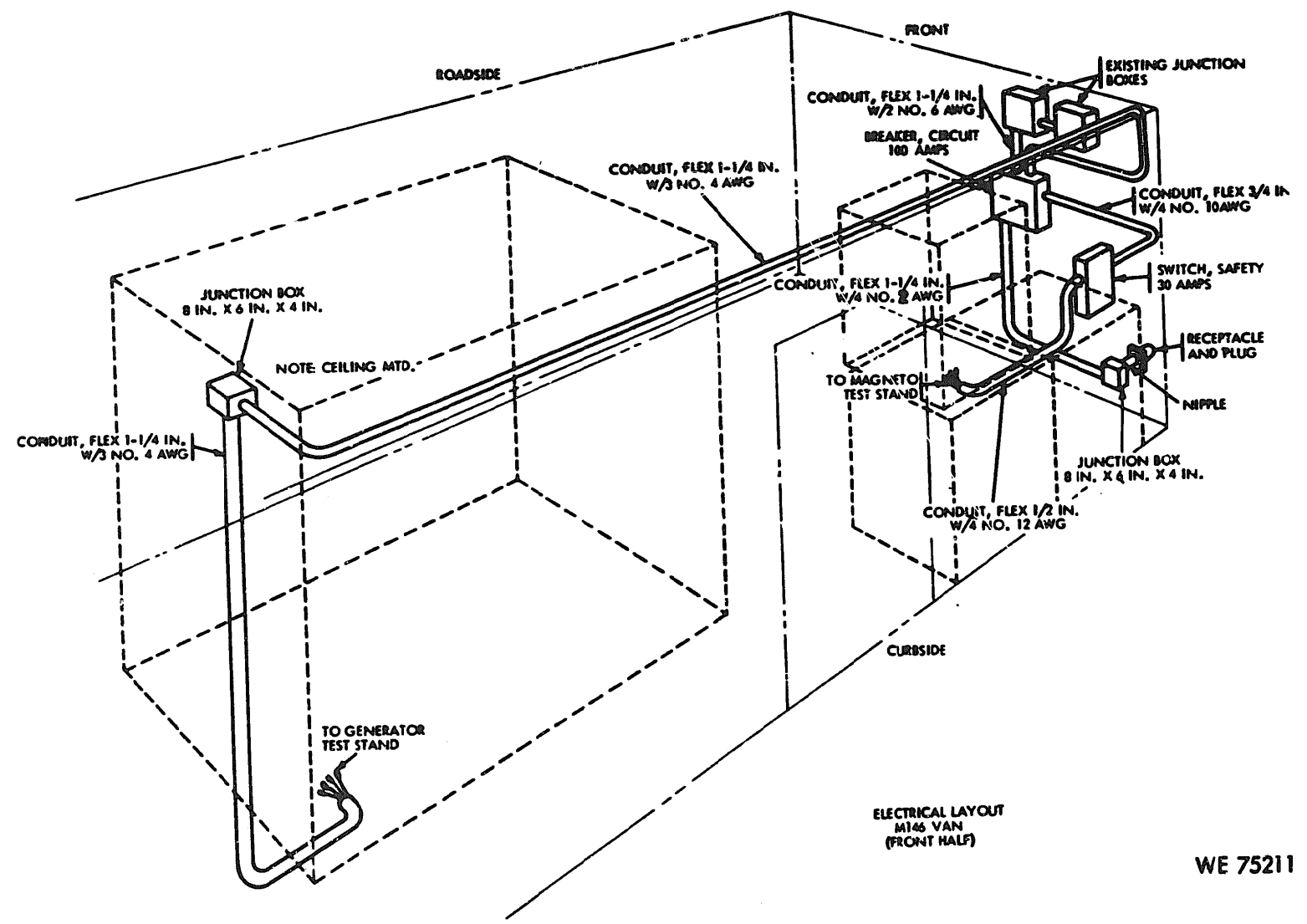
e. Install 100-amp circuit breaker.

f. Install 30-amp safety switch.

g. Install junction box (8 x 6 x 4) for test stand.

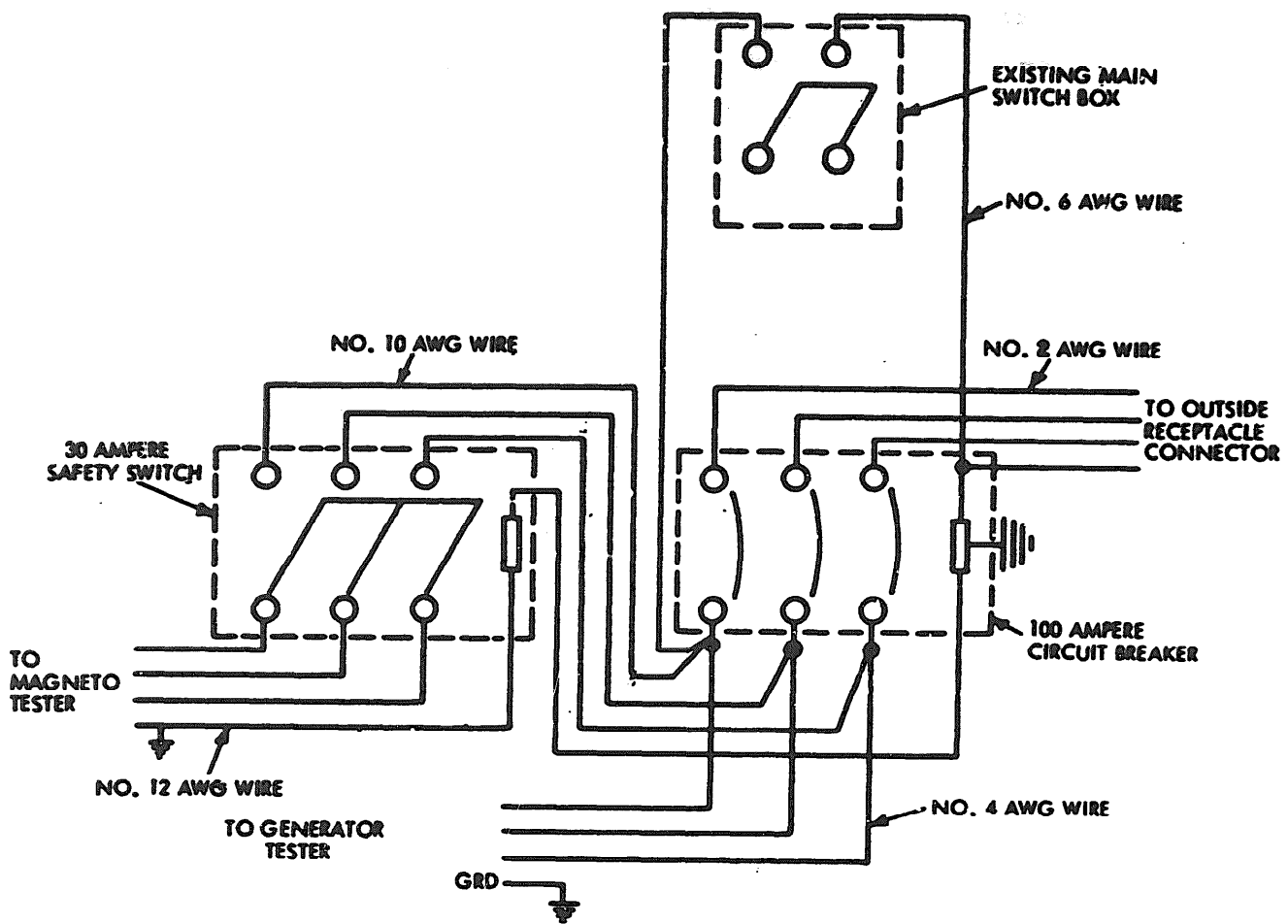
h. Connect items b through g using flexible conduit and wire indicated in figure 1.

Figure 1. Electrical Layout - Front Part



ELECTRICAL LAYOUT
M146 VAN
(FRONT HALF)

WE 75211



THIS WIRING DIAGRAM USED FOR BOTH M109 - M146 ELECTRICAL SYSTEM

WE 75207

Figure 2. Electrical system wiring diagram.

Table 1. Installation Kit for Mounting the Shop Van

FSN	Nomenclature	Qty
5180-140-6873	INSTALLATION KIT: Consisting of the following:	1 kt
5925-242-2266	Breaker, enclosed circuit, 100-amp, 120/208-vac, 125/250-vdc, 3-pole, groundable neutral, NEMA 1 enclosure, Westinghouse cat no. S-EB3100 or equal	1 ea
5925-086-8452	Switch, safety, 30-amp, 240-v, 3-pole SN, NEMA 1 enclosure, Square D cat no. H321N or equal	1 ea
5920-825-6458	Fusetron, 15-amp, 250-v, Bussmann symbol no. FRN 15 or equal	3 ea
5975-284-7004	Conduit, flexible metal, 1/2-inch size, single strip	5 ft
5975-178-1223	Conduit, flexible metal, 3/4-inch size, single strip	10 ft
5975-178-1225	Conduit, flexible metal, 1-1/4-inch size, single strip	40 ft
5975-660-5844	Connector, flexible conduit, 1/2-inch size, straight, insulated throat, Thomas and Betts no. 3112 or equal	1 ea
5975-681-4714	Connector, flexible conduit, 1/2-inch size, 90-degree, insulated throat, Thomas and Betts no. 3132 or equal	1 ea
5975-681-4721	Connector, flexible conduit, 3/4-inch size, straight, insulated throat, Thomas and Betts no. 3115 or equal	2 ea
5975-681-4719	Connector, flexible conduit, 1-1/4-inch size, straight, insulated throat, Thomas and Betts no. 3118 or equal	6 ea
5975-681-4711	Connector, flexible conduit, 1-1/4-inch size, 90-degree, insulated throat, Thomas and Betts no. 3138 or equal	2 ea
5975-280-7196	Box, junction, 8 x 6 x 4, screw cover, galvanized	2 ea

Table 1. Installation Kit for Mounting the Shop Set in the Shop Van -
Continued

FSN	Nomenclature	Qty
5935-258-9986	Receptacle, 100-amp, 250-vdc, 4-wire, 4-pole, weather resistant, 1-1/2-inch hub size, threaded cap, Crouse-Hinds no. AREA 10475 or equal	1 ea
5935-572-6400	Plug, conduit, Crouse-Hinds no. PLG5 or equal	1 ea
4730-196-1470	Nipple, conduit, 1-1/4- x 4-inch	1 ea
5975-100-8785	Locknut, conduit, 1-1/4-inch	4 ea
5975-100-8706	Bushing, conduit, 1-1/4-inch, insulated, O.Z. no. A-125 or equal	2 ea
5340-924-1683	Strap, conduit, 1/2-inch size, Thomas and Betts no. 1211 or equal	4 ea
5340-341-2945	Strap, conduit, 3/4-inch size, Thomas and Betts no. 1212 or equal	9 ea
5340-925-2283	Strap, conduit, 1-1/4-inch size, Thomas and Betts nc. 1214 or equal	30 ea
6145-184-3880	Wire, copper, single conductor, no. 12 AWG, type TW, 600-volt, stranded, white finish	10 ft
6145-184-5492	Wire, copper, single conductor, no. 12 AWG, type TW, 600-volt, stranded, black finish	25 ft
6145-184-5491	Wire, copper, single conductor, no. 10 AWG, type TW, 600-volt, stranded, black finish	40 ft
6145-990-3001	Wire, copper, single conductor, no. 10 AWG, type TW, 600-volt, stranded, white finish	15 ft
6145-923-2220	Wire, copper, single conductor, no. 6 AWG, type THW, 600-volt, stranded, black finish	15 ft
6145-939-4948	Wire, copper, single conductor, no. 4 AWG, type THW, 600-volt, stranded, black finish	110 ft
6145-051-9790	Wire, copper, single conductor, no. 2 AWG, type THW, 600-volt, stranded, black finish	35 ft
5305-854-6690	Screw, tapping, pan head, slotted, steel, cadmium plated, no. 10-12, 5/8 long	65 ea

Table 1. Installation Kit for Mounting the Shop Set in the Shop Van -
Continued

FSN	Nomenclature	Qty
5306-225-8508	Bolt, machine, hex-hd, 5/16-18UNC-2A, 3 lg, box of 100	24 ea
5305-071-1772	Bolt, machine, hex-hd, 1/2-13UNC-2A, 3 lg, box of 50	4 ea
4520-272-8661	Elbow, stove pipe, 90 deg, 6 dia, adjustable	3 ea
5310-011-3111	Nut, plain, hexagon, 5/16-18UNC-2B, box of 144	24 ea
5310-655-9544	Nut, plain, hexagon, 3/8-16UNC-2B, box of 144	4 ea
5310-609-4089	Nut, plain, hexagon, 1/2-13UNC-2B, box of 50	4 ea
5305-269-3220	Screw, cap, hexagon head, 3/8-16UNC-2A, 3 lg, box of 100	4 ea
5305-883-0628	Sheet metal screw, pan head, no. 8, 1/2 lg	18 ea
.	Steel sheet, carbon, hot rolled, 0.0598 thk, 1 pc, 25-1/2 x 22-1/2	1 ea
.	Steel sheet, carbon, hot rolled, 0.0320 thk, 3 pc, 1-1/2 x 1/2	3 ea
.	Steel sheet, carbon, hot rolled, 0.125 thk, 26 pc, 1 x 3	26 ea
.	Steel sheet, carbon, hot rolled, 0.250 thk, 4 pc, 3 x 3	4 ea
4520-202-7375	Stove, pipe, 6 dia, 2 ft lg	1 ea
4710-756-1203	Tubing, plastic, 1 od, 10 ft lg, 100 ft coil	1 ea
5310-579-2071	Washer, flat, 3/8 bolt size, 1 lb	4 ea
5310-579-2072	Washer, flat, 1/2 bolt size, 1 lb	4 ea
5310-579-2074	Washer, flat, 5/16 bolt size, 1 lb	24 ea
5310-637-9541	Washer, lock, 3/8 bolt size, box of 100	4 ea

Table 1. Installation Kit for Mounting the Shop Set in the Shop Van -
Continued

FSN	Nomenclature	Qty
5310-515-9957	Washer, lock, 1/2 bolt size, box of 100	4 ea
5310-515-9961	Washer, lock, 5/16 bolt size, box of 100	24 ea
8040-262-9031	Adhesive, reclaimed ru liquid, general purpose, 1 qt can, MMM-A-1617	1 qt

3. Modification of Middle Road-side Window

a. Remove the screen assembly from the left center window of the trailer.

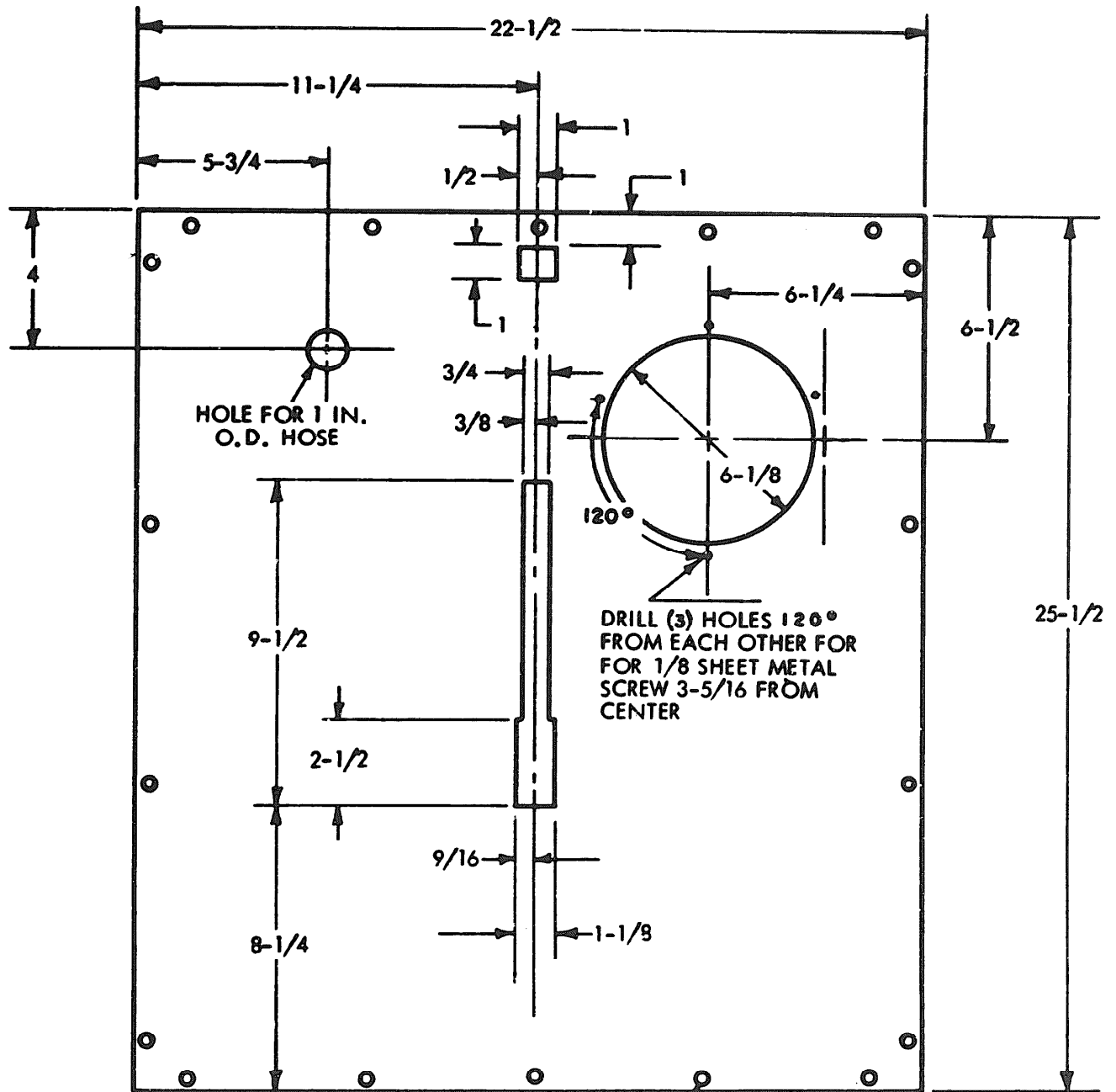
b. Remove the screen wire from the screen frame; discard the screen wire.

c. Apply a thin coat of adhesive MMM-A-1617 (8040-262-9031) to the outer edge of the screen

frame and replace the frame in the trailer window. Fabricate a window adapter as shown in figure 3 (see table 2 for material). Place the adapter in the screen frame. Using the screen frame as a template, mark and drill eighteen 5/64-inch holes through the window adapter. Remove the window adapter and apply a thin coat of adhesive to the outer edge. Replace the adapter in the screen frame and secure with 18 no. 6-18 x 3/8 thread forming tapping screws.

Table 2. Materials to be Used for Fabrication

Material	Application	Qty
1/16-inch metal sheet stock 25-1/2 by 22-1/2 inches	Window modification (fig 3)	1
1/32-inch metal sheet stock 1/2 by 1-1/2 inches	Stove pipe clips (fig 4)	3
1/8-inch metal sheet stock 1 x 3 inches	Mounting plates for cabinets and worktables (underneath shop van)	26
1/4-inch metal sheet stock 3 x 3 inches	Mounting plates for test stand (underneath shop van)	4



NOTE:
ALL DIMENSIONS SHOWN
ARE IN INCHES.

DRILL (18) 3/16 HOLES TO
LINE UP WITH HOLES IN
WINDOW

HEAT VENT PLATE FOR WINDOW
(M109 AND M146 VAN)
MAKE FROM 1/16 SHEET STOCK METAL

WE 75208

Figure 3. Fabrication instructions for heat vent plate for window.

4. Installation of the Shop Equipment

designated position is shown in figure FO-1.

a. The floor plan for the trailer with each item in its

b. Equipment to be mounted in the trailer is listed in table 3.

Table 3. Equipment to be Mounted in Trailer

FSN	Nomenclature	Qty
7125-330-0130	CABINET, STORAGE:	2
4910-261-5868	CLEANER AND TESTER SPARK PLUG:	1
4910-205-3046	TABLE, WORK:	1
4910-543-7772	TABLE, WORK:	2
4910-767-0218	TEST STAND, AUTOMOTIVE GENERATOR AND STARTER:	1
4910-912-3960	TEST STAND, IGNITION MAGNETO:	1
4910-392-2939	TESTER, ENGINE DISTRIBUTOR:	1
5120-293-1439	WISE, MACHINIST'S:	1

5. Mounting the Storage Cabinet, Work Tables, and 500-amp Test Stand

NOTE

The test stand is to be bolted to the floor of the trailer using the existing bolt holes in the skids of the stand (see fig FO-1).

a. The hardware for mounting the following items is listed in table 4.

b. Mount the front roadside work table 4910-543-7772.

c. Mount the front curbside storage cabinet 7125-330-0130.

d. Mount the 500-amp test stand 4910-767-0218.

e. Mount the rear roadside work table 4910-205-3046.

f. Mount the rear curbside work table 4910-543-7772.

g. Vent the 500-amp test stand as shown in figure 4. Hardware required is listed in table 5.

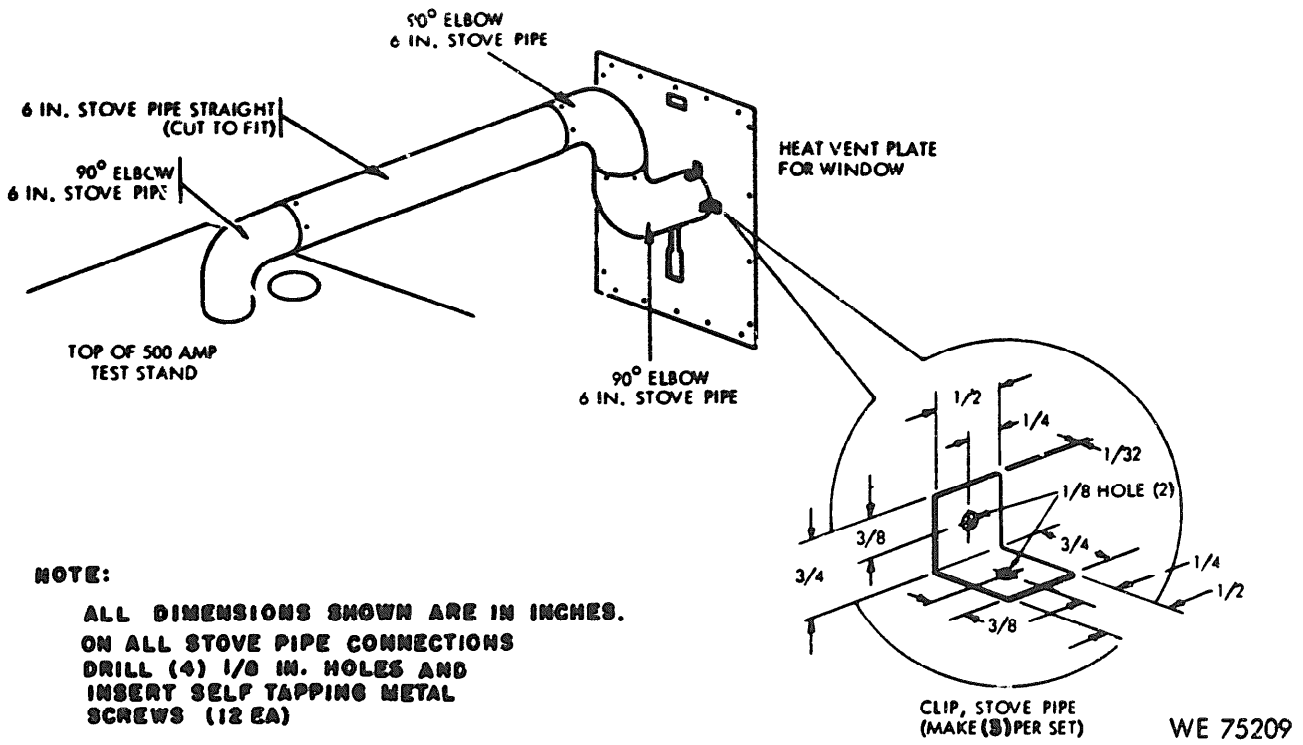


Figure 4. Fabrication of stove pipe clips and installation of test stand vent.

Table 4. Hardware for Mounting Storage Cabinet, Tables, and Test Stand

FSN	Nomenclature	Qty
CABINET AND TABLES		
5306-225-8508	BOLT, MACHINE: hex-hd, 5/16-18UNC-2A, 3 lg (box of 100)	16
5310-011-3111	NUT, PLAIN, HEXAGON: 5/16-18UNC-2B (box of 144)	16
5310-579-2074	WASHER, FLAT: 5/16 bolt size (1 lb)	16
5310-515-9961	WASHER, LOCK: 5/16 bolt size (box of 100)	16
.....	FABRICATED MOUNTING PLATES: for under side of trailer, 1 w, 3 lg, 1/8 thk, center drilled (see table 2)	26
500-AMP TEST STAND		
5305-071-1772	BOLT, MACHINE: hex-hd, 1/2-13UNC-2A, 3 lg (box of 50)	4
5310-609-4089	NUT, PLAIN, HEXAGON: 1/2-13UNC-2B (box of 50)	4
5310-579-2072	WASHER, FLAT: 1/2 bolt size (1 lb)	4
5310-515-9957	WASHER, LOCK: 1/2 bolt size (box of 100)	4
.....	FABRICATED MOUNTING PLATES: for under side of trailer, 3 x 3 x 1/4 thk, center drilled (see table 2)	4

Table 5. Hardware for Venting 500 Amp Test Stand

FSN	Nomenclature	Qty
4520-272-8661	ELBOW, STOVE PIPE: 90 degree, 6-inch dia, adjustable	3
4520-202-7375	STOVE PIPE: 6-inch dia	2 ft
4710-756-1203	TUBING, PLASTIC: 1 od (100-ft coil)	10 ft
5305-883-0628	SHEET METAL SCREW: pan head, no. 8, 1/2 long	18

Table 5. Hardware for Venting 500 Amp Test Stand - Continued

FSN	Nomenclature	Qty
.....	FABRICATED STOVE PIPE CLIPS: for holding vent to window adapter	3
.....	FABRICATED WINDOW MODIFICATION (see fig 3)	1

6. Mounting the Ignition Magneto Tester, Spark Plug Tester, Distributor Tester, and Vice

tested on the front curbside storage cabinet.

a. The hardware for mounting the following items is listed in table 6.

d. Mount the distributor tester on rear curbside work table.

b. Mount the spark plug tester on the front roadside work table.

NOTE

NOTCH CASE FOR BOLT HEAD CLEARANCE.

c. Mount the ignition magneto

e. Mount the vise on the roadside work table.

Table 6. Hardware for Mounting Testers

FSN	Nomenclature	Qty
	SPARK PLUG TESTER	
5306-225-8508	BOLT, MACHINE: hex-hd, 5/16-18UNC-2A, 3 lg (box of 100)	4
5310-011-3111	NUT, PLAIN, HEXAGON: 5/16-18UNC-2B (box of 144)	4
5310-515-9961	WASHER, LOCK: 5/16 bolt size (box of 100)	4
5310-579-2074	WASHER, FLAT: 5/16 bolt size (1 lb)	4
	IGNITION MAGNETO TEST STAND	
5303-269-3220	SCREW, CAP, HEXAGON HEAD: 3/8-16UNC-2A, 3 lg (box of 100)	4
5310-655-9544	NUT, PLAIN, HEXAGON: 3/8-16UNC-2B (box of 144)	4

Table 6. Hardware for Mounting Testers - Continued

FSN	Nomenclature	Qty
	IGNITION MAGNETO TEST STAND - Continued	
5310-637-9541	WASHER, LOCK: 3/8 bolt size (box of 100)	4
5310-579-2071	WASHER, FLAT: 3/8 bolt size (1 lb)	4
	DISTRIBUTOR TESTER	
5306-225-8508	BOLT, MACHINE: hex-hd, 5/16-18UNC-2A, 3 lg (box of 100)	4
5310-011-3111	NUT, PLAIN, HEXAGON: 5/16-18UNC-2B (box of 144)	4
5310-515-9961	WASHER, LOCK: 5/16 bolt size (box of 100)	4
5310-579-2074	WASHER, FLAT: 5/16 bolt size (1 lb)	4

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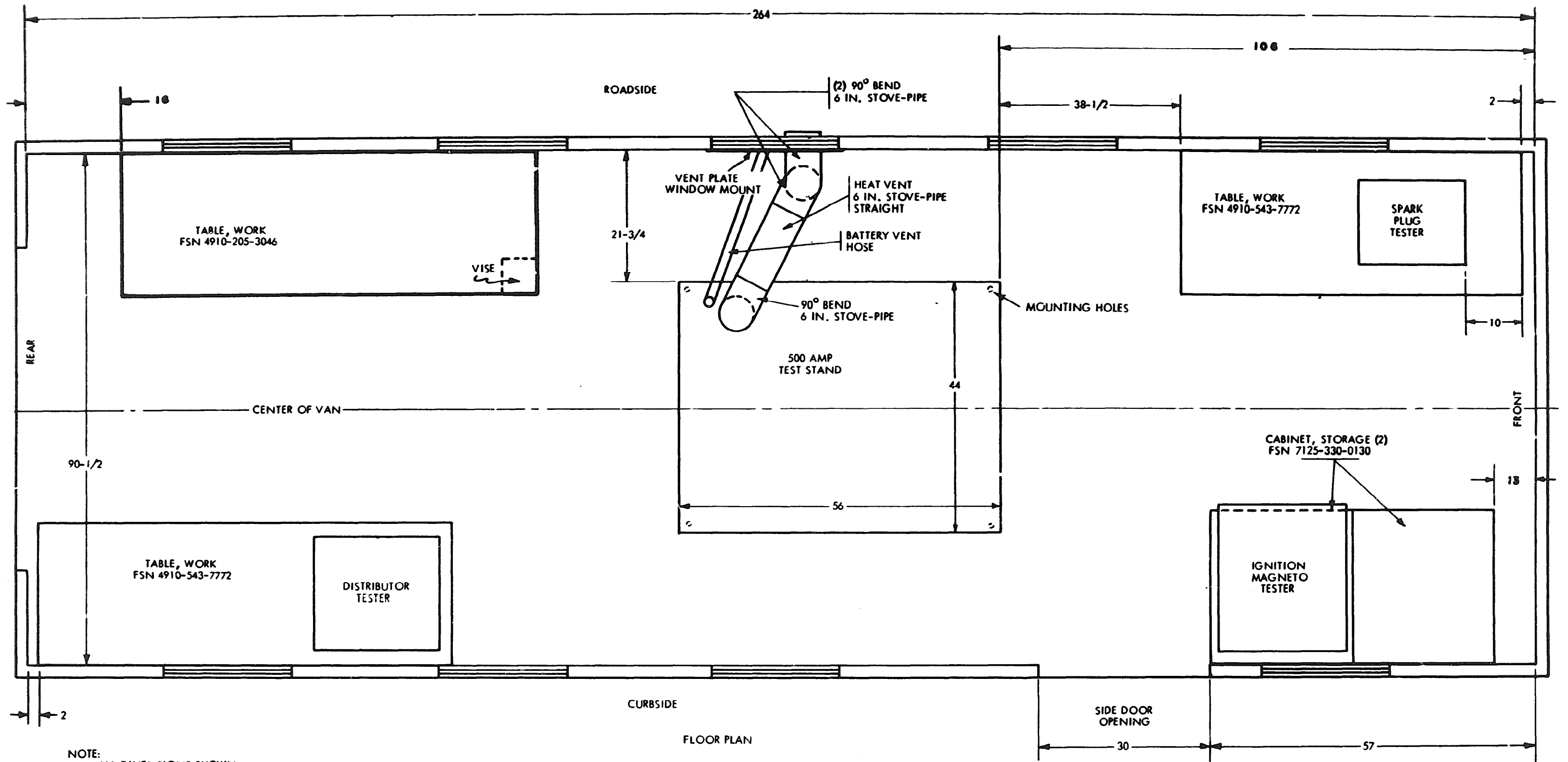
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FUEL AND ELECTRIC
SHOP SET
M146 VAN LOADED

WE 75210

Figure FO-1. Trailer floor plan for installation of equipment.

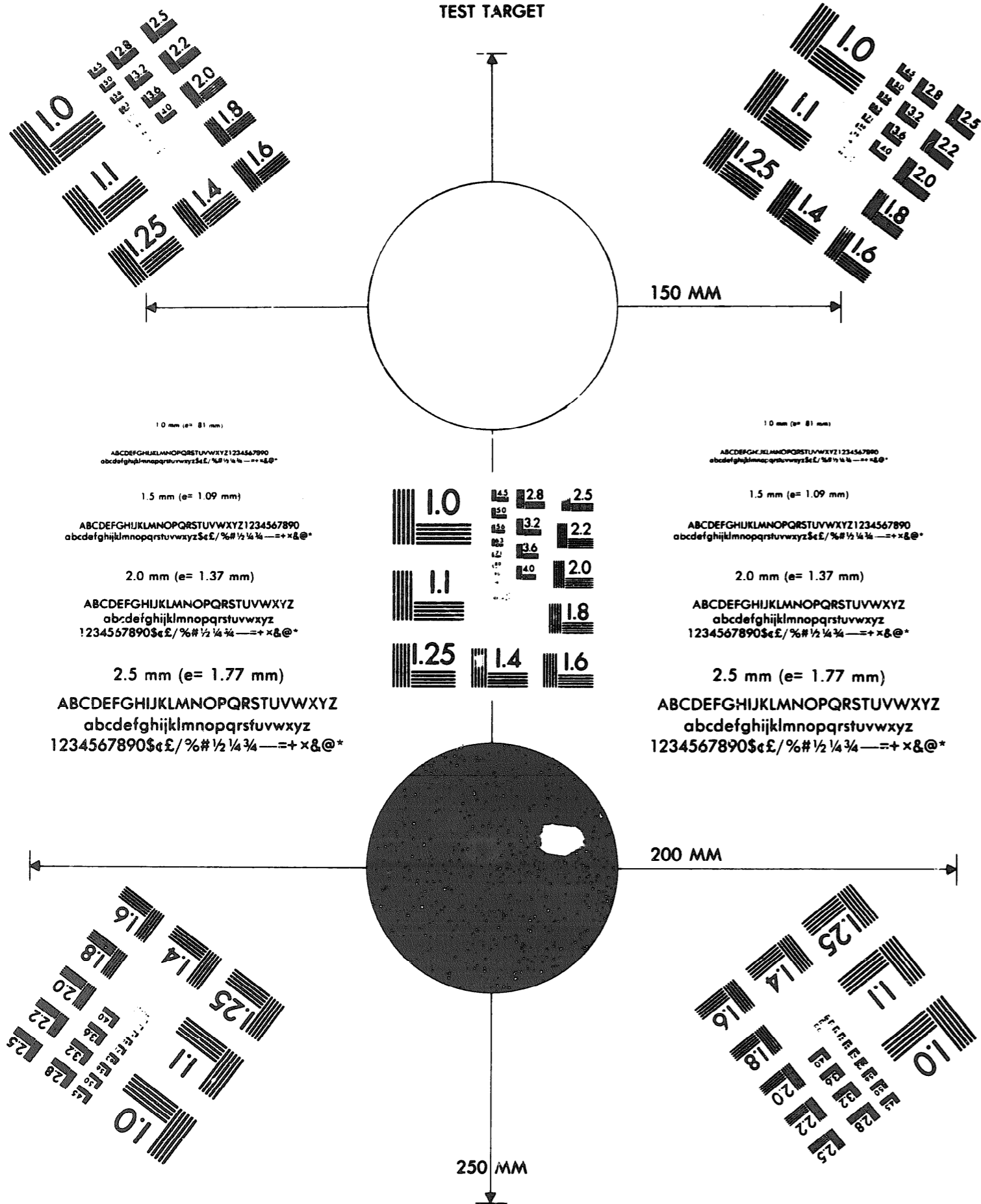
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DATE



DEPARTMENT OF THE ARMY
MICROFORM
TEST TARGET



10 mm (e= 81 mm)

ABCDEFGHIJKLMN OPQRSTUVWXYZ 1234567890
abcdefghijklmnopqrstuvwxyz \$%& /%# 1/2 1/4 3/4 — = + x & @ *

1.5 mm (e= 1.09 mm)

ABCDEFGHIJKLMN OPQRSTUVWXYZ 1234567890
abcdefghijklmnopqrstuvwxyz \$%& /%# 1/2 1/4 3/4 — = + x & @ *

2.0 mm (e= 1.37 mm)

ABCDEFGHIJKLMN OPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890 \$%& /%# 1/2 1/4 3/4 — = + x & @ *

2.5 mm (e= 1.77 mm)

ABCDEFGHIJKLMN OPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890 \$%& /%# 1/2 1/4 3/4 — = + x & @ *

10 mm (e= 81 mm)

ABCDEFGHIJKLMN OPQRSTUVWXYZ 1234567890
abcdefghijklmnopqrstuvwxyz \$%& /%# 1/2 1/4 3/4 — = + x & @ *

1.5 mm (e= 1.09 mm)

ABCDEFGHIJKLMN OPQRSTUVWXYZ 1234567890
abcdefghijklmnopqrstuvwxyz \$%& /%# 1/2 1/4 3/4 — = + x & @ *

2.0 mm (e= 1.37 mm)

ABCDEFGHIJKLMN OPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890 \$%& /%# 1/2 1/4 3/4 — = + x & @ *

2.5 mm (e= 1.77 mm)

ABCDEFGHIJKLMN OPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890 \$%& /%# 1/2 1/4 3/4 — = + x & @ *

200 MM

250 MM