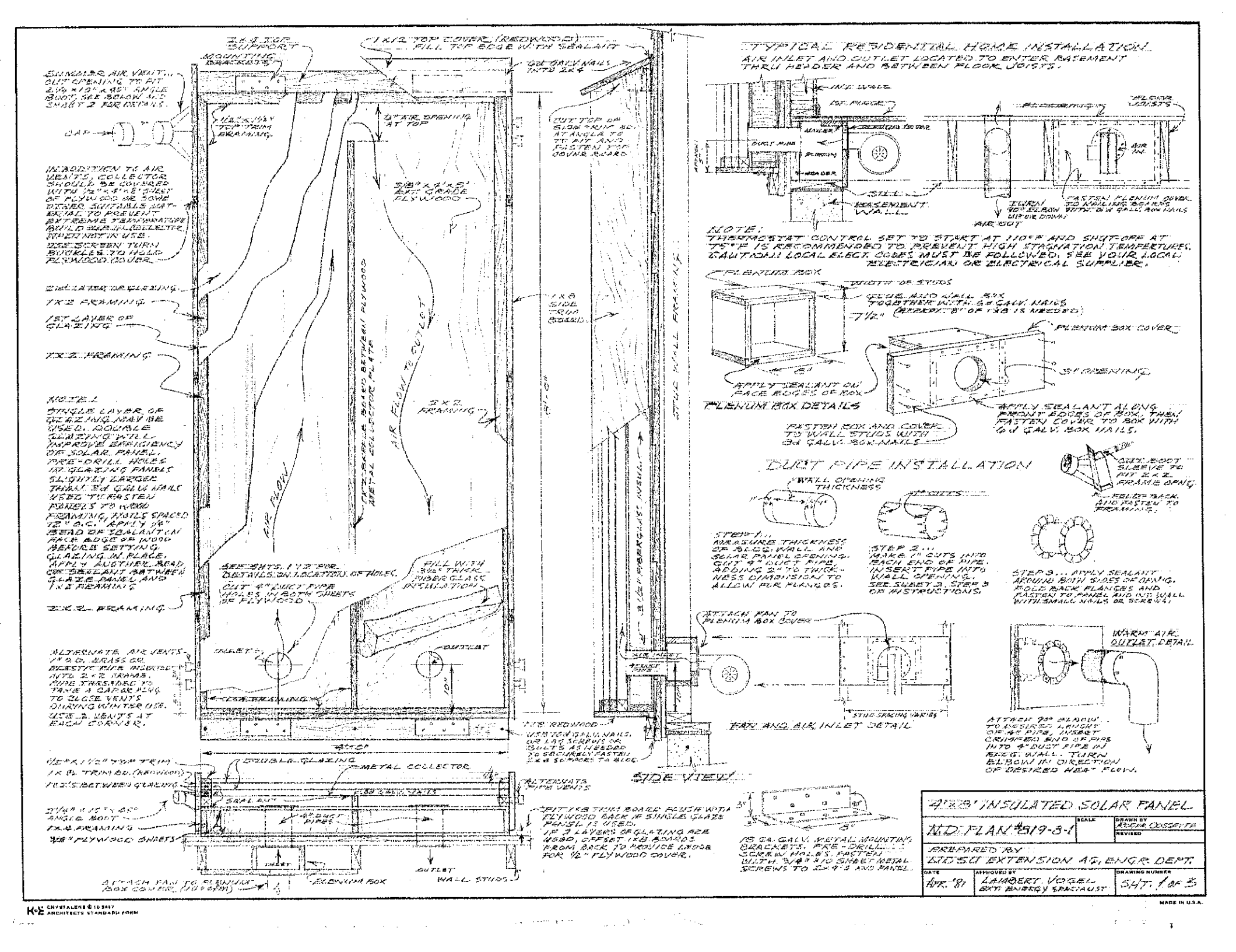


TYPICAL RESIDENTIAL HOME INSTALLATION

AIR INLET AND OUTLET LOCATED TO ENTER BASEMENT THRU HEADER AND BETWEEN FLOOR JOISTS.

NOTE: THERMOSTAT CONTROL SET TO START AT 110°F AND SHUT-OFF AT 75°F IS RECOMMENDED TO PREVENT HIGH STAGNATION TEMPERATURES. CAUTION! LOCAL ELECT. CODES MUST BE FOLLOWED. SEE YOUR LOCAL ELECTRICIAN OR ELECTRICAL SUPPLIER.

PLENUM BOX DETAILS

DUCT PIPE INSTALLATION

STEP 1... MEASURE THICKNESS OF BLOCK WALL AND SOLAR PANEL OPENING. CUT DUCT PIPE ADDING 2" TO THICKNESS DIMENSION TO ALLOW FOR FLANGES.

STEP 2... MAKE 1" CUTS INTO EACH END OF PIPE. INSERT PIPE INTO WALL OPENING. SEE SHEET 3, STEP 3 OF INSTRUCTIONS.

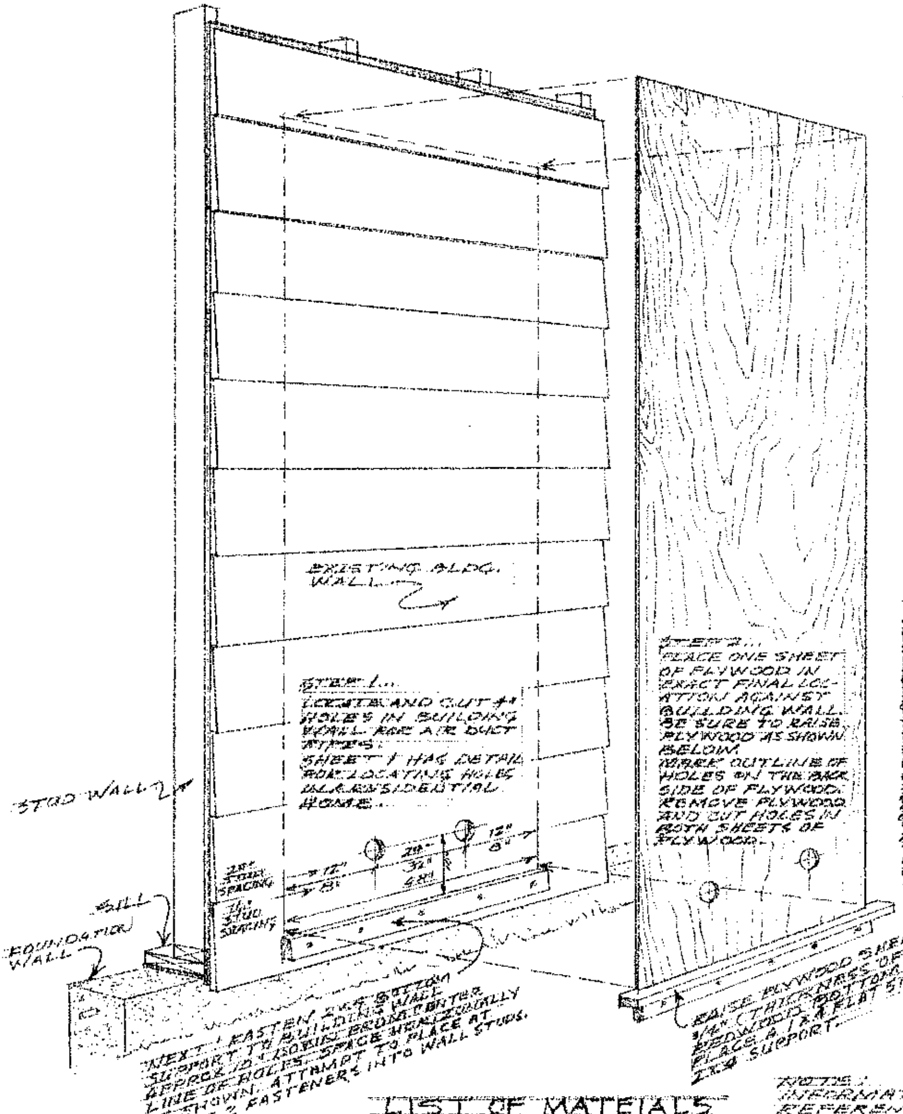
STEP 3... APPLY SEALANT AROUND BOTH SIDES OF OPNG. FOLD BACK FLANGES AND FASTEN TO PANEL AND INSULWALL WITH SMALL NAILS OR SCREWS.

FAN AND AIR INLET DETAIL

18 GA. GALV. METAL MOUNTING BRACKETS. PRE-DRILL SCREW HOLES. FASTEN WITH ¾" #10 SHEET METAL SCREWS TO 2x4's AND PANEL

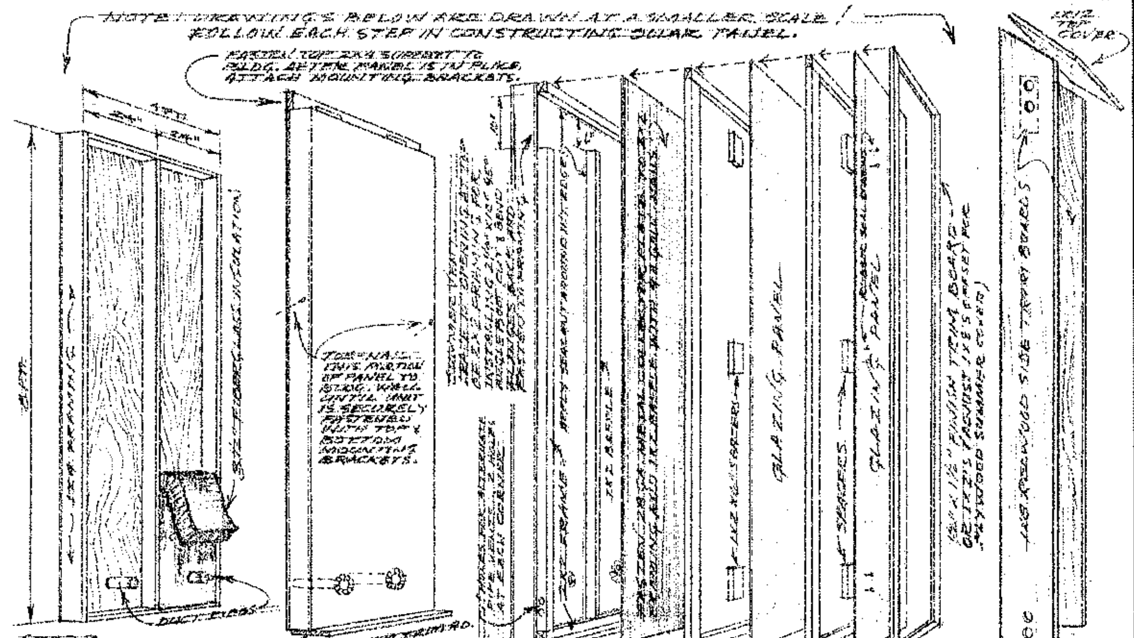
4'x8' INSULATED SOLAR PANEL

M.D. PLAN #919-8-1	SCALE	DRAWN BY: ROGER OSGOOD; REVISED
PREPARED BY: MOSU EXTENSION AG. ENGR. DEPT.		
DATE: APR. '81	APPROVED BY: LAMBERT VOGEL EXT. ENERGY SPECIALIST	DRAWING NUMBER: SHT. 1 OF 3



STEP 1...
LOCATE AND CUT 4" HOLES IN BUILDING WALL FOR AIR DUCT PIPES.
SHEET 1 HAS DETAIL FOR LOCATING HOLES IN RESIDENTIAL HOME.

STEP 2...
PLACE ONE SHEET OF PLYWOOD IN EXACT FINAL LOCATION AGAINST BUILDING WALL. BE SURE TO RAISE PLYWOOD AS SHOWN BELOW.
MARK OUTLINE OF HOLES ON THE BACK SIDE OF PLYWOOD. REMOVE PLYWOOD AND CUT HOLES IN BOTH SHEETS OF PLYWOOD.



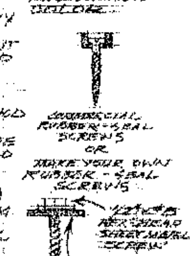
STEP 3...
CONSTRUCT 1x4 FRAME AS SHOWN.
FASTEN ONE SHEET OF PLYWOOD TO BACK SIDE OF FRAME.
SEE SHEET 1 FOR DETAILS OF CUTTING AND INSTALLING DUCT PIPES.
INSERT PIPES AND WRAP 3½" FIBERGLASS SNUGGLY AROUND PIPES AS INSULATION IS INSTALLED.
FASTEN 2nd SHEET OF PLYWOOD IN PLACE, USE GLUE AND 4d GALV. NAILS.
ATTACH 1x8 REDWOOD TRIM TO THE BOTTOM OF FRAME. SEE SHEET 1 FOR CARPET INSTRUCTIONS.

FOLD BACK PIPE FLANGES AS SHOWN. USE SEALANT UNDER FLANGES AROUND OPENING. FASTEN FLANGES WITH #10-¾" LONG SHT. METAL SCREWS.
EXERCISE CARE IN PUSHING DUCT PIPES THRU OPENINGS IN BLDG. WALL WHEN PANEL IS PUT INTO PLACE.
FOLD & FASTEN DOWN FLANGES OF PIPES INSIDE OF BLDG.

STEP 4...
FASTEN 2x2 FRAME AND 1x2 BAFFLE BOARD TO PLYWOOD SURFACE. USE GLUE AND 8d GALV. NAIL. APPLY SEALANT AROUND INTERIOR EDGES.
FASTEN METAL COLLECTOR PLATE TO 2x2 FRAME & 1x2 BAFFLE BOARD WITH 4d GALV. NAILS. APPLY A ¼" BEAD OF SILICONE SEALANT BETWEEN WOOD AND COLLECTOR PLATE TO PROVIDE A WORKING SEAL THAT WILL PREVENT AIR LEAKS.

STEP 5
FASTEN 1x2 FRAME AND SPACERS WITH 6d GALV. NAILS AS SHOWN. APPLY AN 1/8" BEAD AROUND INTERIOR EDGES.
PAINT METAL SURFACE AND WOOD FRAMING AND 1x2 SPACERS WITH HI-HEAT RESISTANT PAINT. (SEE SHT. 1 FOR PAINTS AVAILABLE.)
FASTEN 1st LAYER OF GLAZING TO 1x2 FRAME WITH 3d GALV. NAILS OR HEAVY STAPLES. APPLY A ¼" BEAD OF SEALANT BETWEEN WOOD AND GLAZING PANEL.
IF 2ND LAYER OF GLAZING IS USED, FOLLOW SAME METHOD DESCRIBED ABOVE.
(THE 2nd 1x2 FRAME AND SPACERS NEED NOT BE PAINTED WITH HI-HEAT RESISTANT PAINT.)
FASTEN ½ x 1½ TRIM BOARD WITH 4d GALV. FINISH NAILS. MITER CORNERS.

STEP 6...
FASTEN 1x8 REDWOOD SIDE AND TOP BOARDS WITH 6d GALV. NAILS. DRILL AND INSTALL AIR DUCT HOLES AND PIPES. SEE SHT. 1 FOR DETAILS. STAIN OR PAINT AS DESIRED WITH EXTERIOR FINISH AND COLOR.



NOTE!
BEFORE ASSEMBLING COLLECTOR UNIT, ALL LUMBER (FRAMING AND PLYWOOD) SHOULD BE PRIMED WITH ONE COAT OF LATEX OR OIL BASE WOOD PRIMER. AN ADDITIONAL TOPCOAT OF EXTERIOR PAINT IS OPTIONAL.

HOWEVER, IF A REDWOOD APPEARANCE IS DESIRED, DO NOT PRIME REDWOOD 1x8 TRIM BOARDS, 1x12 TOP COVER, OR ½" x 1½ TRIM BOARDS. USE REDWOOD EXTERIOR STAIN.

IF NATURAL WOOD FINISH IS DESIRED, COAT ALL LUMBER WITH WOOD SEALER INSTEAD OF PAINT PRIMER. USE HEAVY DUTY MARINE VARNISH FOR 2nd & 3rd TOPCOATS.

NOTE:
INFORMATION GIVEN HEREIN IS FOR EDUCATIONAL PURPOSES. REFERENCE TO COMMERCIAL PRODUCTS OR TRADE NAMES IS MADE WITH NO DISCRIMINATION INTENDED AND NO ENDORSEMENT BY THE NORTH DAKOTA COOPERATIVE EXTENSION OR AG. ENGR. DEPT. IS IMPLIED.

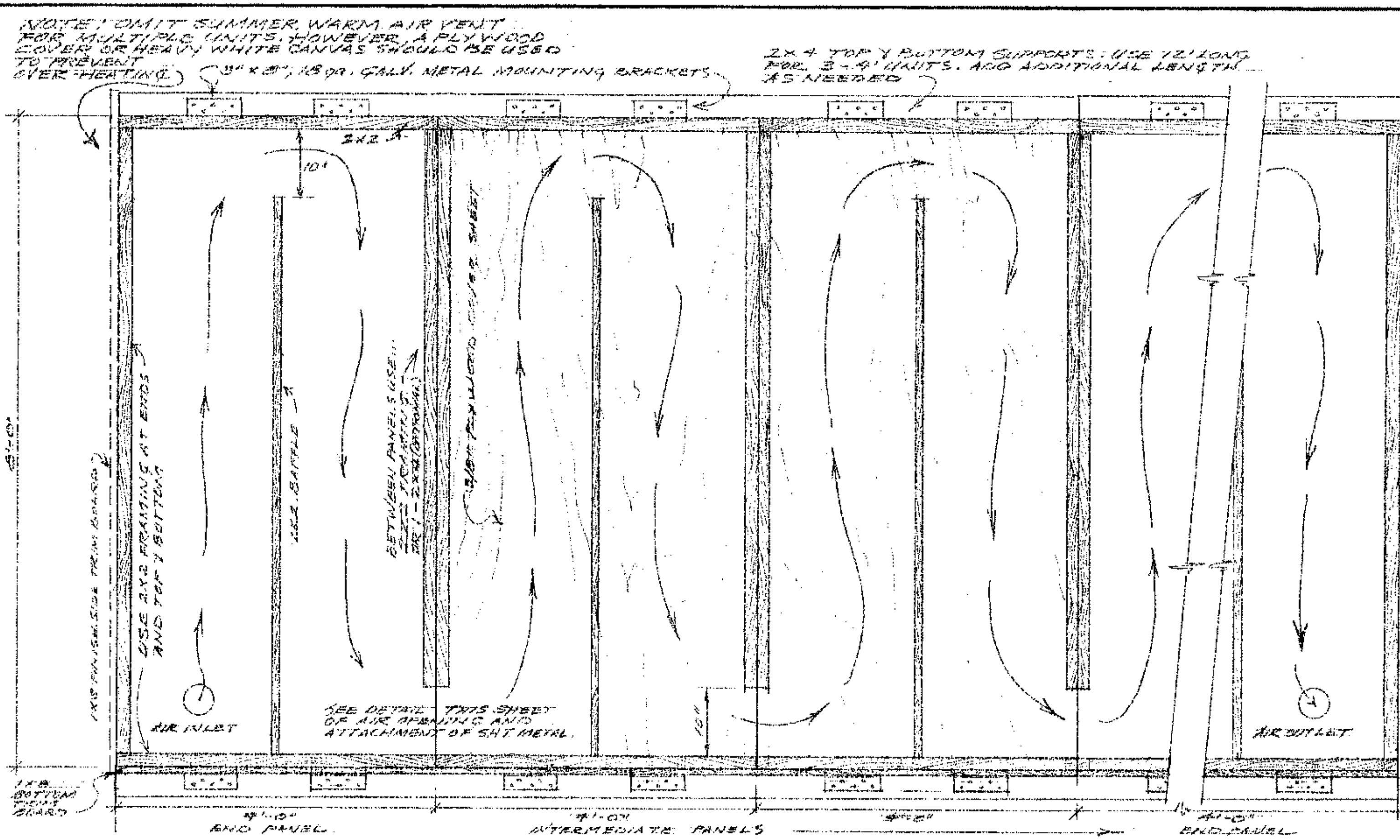
LIST OF MATEIALS

2... 5/8" x 4' x 8' PLYWOOD, INTERIOR A-C GRADE (INT. WITH EXT. GLUE) OR EXT. C-C.
4... 1 x 4 x 8' #2 PINE OR HEMLOCK CLEAR (FRAMING MEMBERS)
3... 2 x 2 x 8' and 1 - 1 x 2 x 8' " " " (" and BAFFLE BD.)
6... 1 x 2 x 8' #2 PINE OR HEMLOCK (FRAMING BETWEEN LAYERS OF DOUBLE GLAZING)
3... ½" x 1½" x 8' PINE OR HEMLOCK (DOOR STOP TRIM OR LATTICE) OR 1x2's
1... 1 x 8 x 22' REDWOOD TRIM BOARDS. (2 - 9 FT. SIDES, 1 - 4 FT. BOTTOM)
1... 1 x 12 x 4'-2" REDWOOD TOP COVER.
1... 2 x 4 x 8' FIR OR REDWOOD (TOP & BOTTOM SUPPORTS.)
1... 28 ga. x 4' x 8' GALV. SHEET METAL (COLLECTOR PLATE)
2... 4' x 8' SHEETS OF GLAZING MATERIAL (THICKNESS DEPENDS ON BRAND.)
2... 24" x 8' STRIPS OF 3½" FIBERGLASS INSULATION (32 sq. ft.)
CAUTION! DO NOT USE RIGID BEADED STYROFOAM OR STYRENES, LOOSE FILL OR FOIL COATED INSULATIONS. HIGH TEMP. OF COLLECTOR (APPROX. 200° F) MAY CAUSE MELTING OR INTERNAL COMBUSTION WITHIN COLLECTOR.
APPROX. 2 FT. OF 4" AIR DUCT PIPE and 1 - 90° ELBOW (ALUM. OR GALV. SHEET)
8... 1" O.D. THREADED PIPES WITH CAP OR PLUG. (APPROX. 4" LONG.) BRASS, IRON OR PLASTIC (PVC) IF [illegible] USED.

3... ½ GAL. TUBES OF PLIABLE SILICONE SEALANT. (SERVICE TEMP. RESISTANCE OF 350° F.)
1... QT. OF HI-HEAT RESISTANT OR ABSORBER PAINT (BLACK)
2... QTS. OF WOOD PRIMER (LATEX OR OIL BASE)
1... QT. OF TOPCOAT EXT. FINISH. OPTIONAL (LATEX OR OIL BASE)
1... PT. OF REDWOOD STAIN (OPTIONAL)
4... 18 ga. 3" x 3" x 8" MOUNTING BRACKETS (add 2 for SIDES)
40... #10 - ¾" R.H. OR SHT. METAL SCREWS
1... "DAYTON" 4C443 "SHADED POLE BLOWER FAN, 100 cfm, 115 V. ROUND AIR OUTLET.

4... ½" RUBBER-SEAL SCREWS (SEE DETAILS)
1 lb. EA. OF 3d, 6d and 8d GALV. BOX NAILS
½ lb. EA. OF 4d & 6d FINISH GALV. NAILS
1... ½" x 4' x 8' A-C INT. WITH EXT. GLUE PLYWOOD FOR SUMMER COVER.
8... SCREW-TURN BUTTONS.

4'x8' INSULATED SOLAR PANEL			
N.D. PLAN # 819-8-1	SCALE: NONE	DRAWN BY: [illegible]	REVISED
PREPARED BY: NDSU EXTENSION AG. ENGR. DEPT.			
DATE: APR. '81	APPROVED BY: LAMBERT VOGEL, EXTENSION [illegible] SPECIALIST	DRAWING NUMBER: SHT. 2 OF 3	



NOTES:

CONSTRUCTION PROCEDURE IS DEPICTED STEP BY STEP ON SHEET 2.
BUILD EACH UNIT SEPARATELY AND MOUNT TO BUILDING WALL, FOLLOWING EACH STEP CAREFULLY. LENGTH OF TOP AND BOTTOM SUPPORTS WILL BE DETERMINED BY THE NUMBER OF PANELS DESIRED.

THE DRAWINGS ON THIS SHEET INDICATE CONSTRUCTION STAGE AT STEP 4 ON SHT. 2, SHOWING THE PLYWOOD BASE AND THE 2x2 FRAMING ATTACHED WITH AIR SPACES SHOWN IN THEIR PROPER LOCATION.

PANELS SHOULD BE BOLTED TOGETHER AT STEP 3 CONSTRUCTION STAGE. USE 3 - 1/4" x 2" BOLTS WITH WASHERS. DRILL HOLES IN 1x4'S, 12" FROM TOP AND BOTTOM, AND AT CENTER.

BE SURE TO LAY SEALANT BEAD AT JOINT BETWEEN PANELS JUST BEFORE 2x2 FRAMING IS ATTACHED TO PLYWOOD SURFACE.

SEE SHEET 1 FOR DETAILS OF COOL AIR INLET AND WARM AIR OUTLET. SEE FAN SIZE GUIDE BELOW.

FAN SIZE GUIDE...

		DAYTON'S S.P. BLOWER CAT. NOS.
1 PANEL	140 cfm	#2C610
2 TO 3 PANELS ..	148 cfm	#4C446
4 TO 5 PANELS ..	350 cfm	#2C841

WALL OPENING SIZE / PLENUM OPNG.

FAN SIZE	INLET	OUTLET	BOX COVER
140 cfm	4"	4"	3" HOLE
148 cfm	4"	4"	3" HOLE
350 cfm	6"	6"	5" HOLE

LIST OF MATERIALS FOR 3-PANEL UNIT... WOOD TYPES: PINE, FIR, HEMLOCK OR REDWOOD

6... 3/8" x 4' x 8' PLYWOOD, INTERIOR A-C GRADE (INT. WITH EXT. GLUE) OR EXT. C-C GRADE
2... 1x4x12' AND 9... 1x4x8' PINE OR HEMLOCK (FRAMING MEMBERS)
2... 2x2x12' AND 6... 2x2x8' (OR 2... 2x2x8' AND 2... 2x4x8') FRAMING.
3... 1x2x7' BAFFLE BOARDS
12... 1x2x12' FOR FRAMING BETWEEN GLAZING LAYERS (OR 4... 1x2x12', 4... 1x2x8', 4... 1x4x8')
2... 1/2" x 1 1/2" x 12 AND 4... 1/2" x 1 1/2" x 8' TOP TRIM BOARDS (DOORSTOP OR LATTICE)
OPTIONAL TOP TRIM... USE 2-1x2x12', AND 4... 1x2x8'.
2... 1x8 x 9', 1-1x8x12', AND 1x12 x 14' REDWOOD TRIM BOARDS (TOP, BOTTOM & SIDES)
2... 2x4 x 12' FIR OR REDWOOD (TOP AND BOTTOM SUPPORTS)
3... 28 GA. x 4' x 8' GALV. SHEET METAL (COLLECTOR PLATE)
6... 4' x 8' SHEETS OF GLAZING MATERIAL (SEE TYPES BELOW)
6... 24" x 8' STRIPS OF 3 1/2" FIBERGLASS INSULATION (96 sq. ft.) SEE SHT. 2 FOR CAUTION NOTE.
1... 2 FT. OF 4" DUCT PIPE, 1-90° ELBOW, EITHER ALUM. OR GALV. METAL.
SEE SHEET 1 FOR DETAILS OF PLENUM BOX, APPROX. 1x8 x 4' IS NEEDED.

1... "DAYTON" BLOWER, No. 4C446, 148 cfm, S.P. (OPTIONAL THERMOSTATIC CONTROLS.)
12... 18 ga. 3" x 3" x 8" MOUNTING BRACKETS
200... #10 - 3/4" R.H. WOOD SCREWS OR SHT. METAL SCREWS (MOUNTING BRACKET SCREWS)
3... 1/12 GAL. TUBES OF PLIABLE SILICONE SEALANT (CHECK TEMP. RESISTANCE OF 350°)
2... QTS. EACH OF WOOD PRIMER AND HI-HEAT RESISTANT OR ABSORBER PAINT (FLAT BLACK)
1... QT. OF TOPCOAT EXTERIOR FINISH (OIL BASE OR LATEX) OR REDWOOD STAIN, OR FOR A NATURAL WOOD FINISH, USE 2 TO 4 COATS OF MARINE VARNISH.
2 LBS. EACH OF 3d, 4d, 6d GALV. BOX NAILS, AND 1 lb. EACH OF 4d & 6d GALV. FIN. NAILS.
100... 3/4" RUBBER SEAL SCREWS (FASTEN 2nd LAYER OF GLAZING TO SPACER BLOCKS)
3... 1/2" x 4' x 8' AC INT. WITH EXT. GLUE PLYWOOD FOR SUMMER COVER.
12... SCREEN TURN-BUCKELS

TYPES OF GLAZING MATERIALS

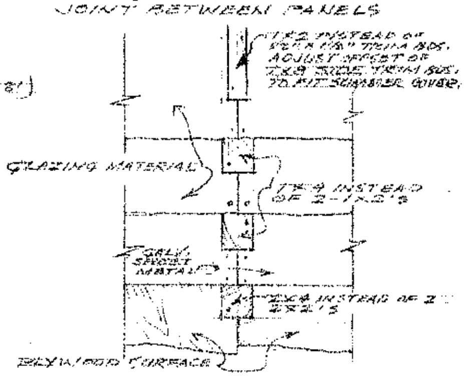
- .040 THICKNESS, "SUN-LITE, PREMIUM II" REINF. FIBERGLASS AVAILABLE IN 24" OR 48" WIDE ROLLS. MADE BY KALWALL SOLAR DIVISION, BOX 237, MANCHESTER, NEW HAMPSHIRE, 03105.
- 3M "FLEXIGARD", .011 THICKNESS, CLEAR PROTECTIVE FILM.
- "FILON" 1/16" THICKNESS, FLEXIBLE PLASTIC.

TYPES OF HEAT RESISTANT PAINTS

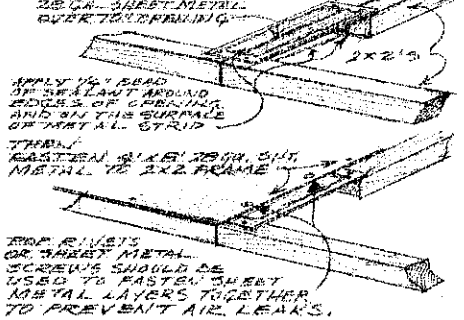
- "DERUSTO" BARBEQUE, FLAT BLACK # H-64
- "SEULLER-O'BRIEN" FAST DRY, BLACK (SPRAY CAN)
- 3-M SOLAR KIT #0 - SOLAR-2 (CONTAINS PRIMER AND FLAT BLACK TOP COAT)

OTHER BRANDS ACCEPTABLE IF MIN. 275° TEMP. RESIST. IS INDICATED ON LABEL.

ALTERNATE LUMBER USE AT JOINT BETWEEN PANELS



AIR OPENING BETWEEN PANELS DETAIL



PROCEED TO STEP 5, FASTEN 1x2 & 1x3 FRAMING TO SHEET METAL SURFACE.

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4'x8' INSULATED SOLAR PANEL		
N.D. PLAN #819-8-1	SCALE	DRAWN BY R. COSSETTE / REVISED
PREPARED BY NDSU EXTENSION AG. ENGR. DEPT.		
DATE APR '81	APPROVED BY LAMBERT VOGEL, EXTENSION ENERGY SPECIALIST	DRAWING NUMBER SHT. 3 of 3