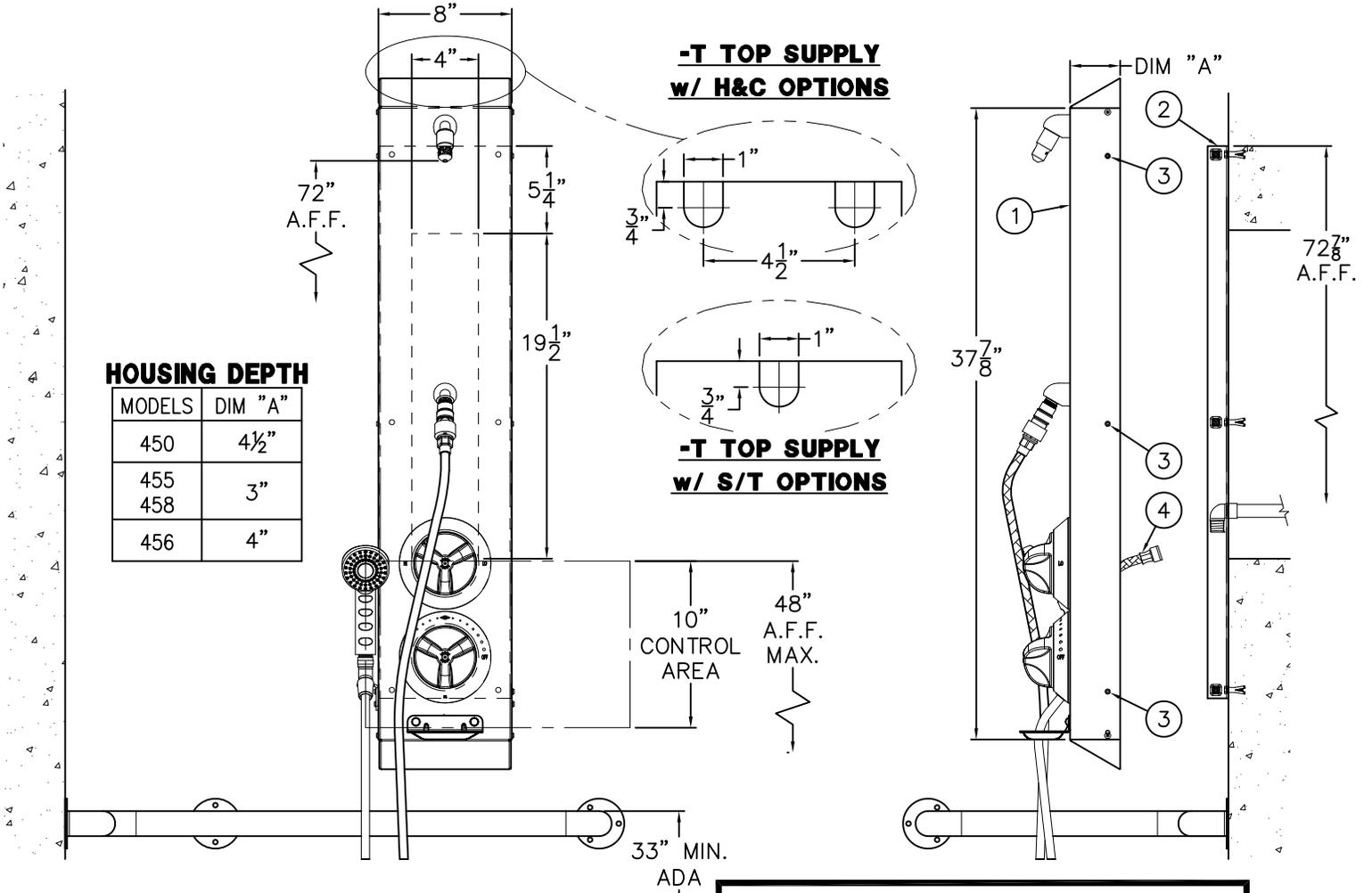




REFERENCE DRAWINGS					
		CARTRIDGES		AIR-CONTROL VALVE	
FLEX SHOWERHEAD	9970-102-003			VALVE BODY	9975-090-001
HANDICAP SEAT	9900-350-001	FLO-CLOZ	9975-000-001	VALVE CONNECTIONS	9905-006-001
GLIDE RAIL	9970-103-001	T/P VALVE (SHOWN)	9975-005-002	PUSHBUTTON/ESCUTCHEON	9957-300-001
SHOWER HEAD	9970-102-003	T/P VALVE ADJUST	9900-007-001		
DIVERTER	9975-080-002	T/P VALVES PRIOR TO JUNE 2014	9975-006-001		



**HOUSING DEPTH**

MODELS	DIM "A"
450	4½"
455	3"
458	3"
456	4"

REFER TO ACCESSIBILITY GUIDELINES FOR COMPLETE INSTALLATION REQUIREMENTS. THIS FIXTURE MEETS ADA ACCESSIBILITY GUIDELINES WHEN INSTALLED CORRECTLY.

**NOTE:**  
 MAXIMUM RECOMMENDED WORKING PRESSURE IS 100PSI; TEMPERATURE IS 130°F; OUTLET TEMPERATURE IS RECOMMENDED AT A MAXIMUM OF 105°F.

**INSTALLATION INSTRUCTIONS:**

- A- DISASSEMBLE SHOWER HOUSING ASSEMBLY ① FROM WALL MOUNTING FRAME ② BY REMOVING VANDAL RESISTANT SCREWS ③ FROM THE HOUSING.
- B- INSTALL MOUNTING FRAME AT DESIRED HEIGHT AND ANCHOR FRAME ② TO WALL USING HARDWARE BY OTHERS.
- C- PROVIDE SUPPLY ROUGH-INS IN THE AREA INDICATED. THOROUGHLY FLUSH SUPPLY LINES.

- D- MAKE UP SUPPLY CONNECTIONS TO ½" NPS HOSE END INLETS ④ WHILE SUPPORTING HOUSING OFF THE FLOOR. NOTE: SUPPLY INLET CONNECTION WILL ACCOMMODATE A ½" NPT MALE ADAPTER.
- E- ASSEMBLE THE SHOWER HOUSING ① TO THE MOUNTING FRAME ② USING SCREWS PROVIDED.

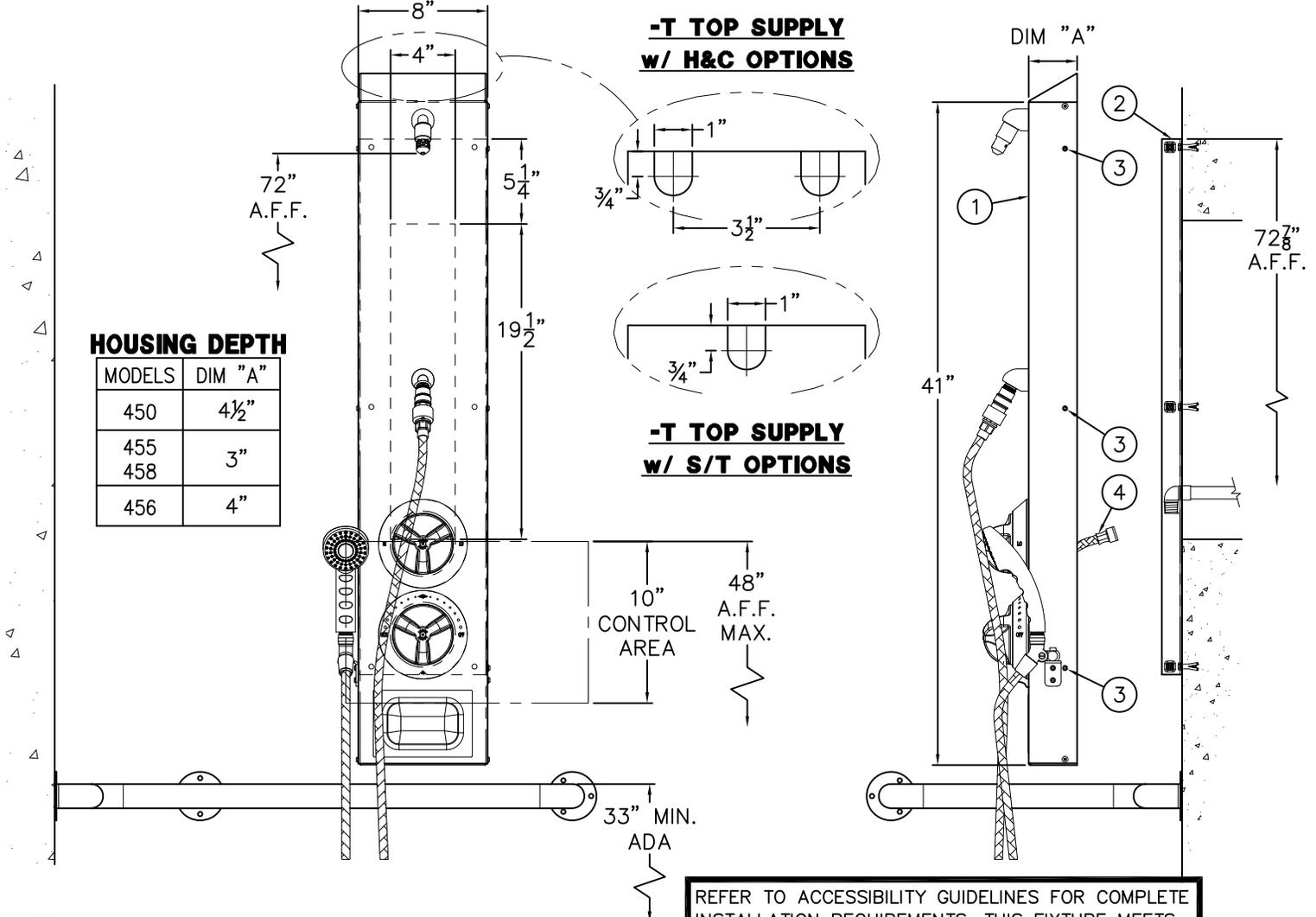
**WARNING:**  
 PRIOR TO MAKING INSTALLATION, SUPPLY LINES MUST BE FLUSHED OF ALL FOREIGN MATERIAL SUCH AS PIPE DOPE, CHIPS, SOLDER, ETC. VALVE MUST BE DRAINED PRIOR TO BEING SUBJECTED TO FREEZING TEMPERATURES.

ACORN ENGINEERING COMPANY P.O. BOX 3527 Industry, CA 91744 15125 Proctor Ave Industry, CA 91746 (626) 336-4561 FAX (626) 961-2200	<b>TITLE</b> <b>APEX SURFACE MOUNTED ADA SHOWER - CAT. #450BBF</b>		
	<b>MANUFACTURE DATE</b> OCTOBER 2010 TO PRESENT	<b>DATE ISSUED</b> 11/04/10	<b>DRAWING NUMBER</b> 9900-045-002
	<b>DATE REVISED</b> 06/01/14 C		



**REFERENCE DRAWINGS**

FLEX SHOWERHEAD	9970-102-003	FLO-CLOZ	9975-000-001	T/P VALVE PRIOR TO JUNE 2014	9975-006-001
HANDICAP SEAT	9900-350-001	T/P VALVE (SHOWN)	9975-005-002		
GLIDE RAIL	9970-103-001	T/P VALVE ADJUST	9900-007-001		
SHOWER HEAD	9970-102-003	VALVE BODY	9975-090-001		
VALVE CONNECTION	9905-006-001	PUSHBUTTON/ESC.	9957-300-001		



**HOUSING DEPTH**

MODELS	DIM "A"
450	4 1/2"
455	3"
458	3"
456	4"

**NOTE:**  
 MAXIMUM RECOMMENDED WORKING PRESSURE IS 100PSI; TEMPERATURE IS 130°F; OUTLET TEMPERATURE IS RECOMMENDED AT A MAXIMUM OF 105°F.

**INSTALLATION INSTRUCTIONS:**

- A- DISASSEMBLE SHOWER HOUSING ASSEMBLY ① FROM WALL MOUNTING FRAME ② BY REMOVING VANDAL RESISTANT SCREWS ③ FROM THE HOUSING.
- B- INSTALL MOUNTING FRAME AT DESIRED HEIGHT AND ANCHOR FRAME ② TO WALL USING HARDWARE BY OTHERS.
- C- PROVIDE SUPPLY ROUGH-INS IN THE AREA INDICATED. THOROUGHLY FLUSH SUPPLY LINES.

REFER TO ACCESSIBILITY GUIDELINES FOR COMPLETE INSTALLATION REQUIREMENTS. THIS FIXTURE MEETS ADA ACCESSIBILITY GUIDELINES WHEN INSTALLED CORRECTLY.

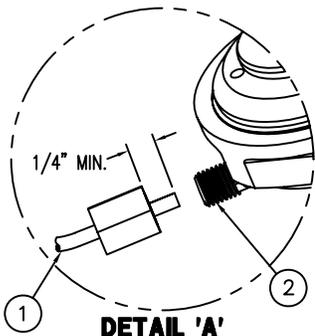
- D- MAKE UP SUPPLY CONNECTIONS TO 1/2" NPS HOSE END INLETS ④ WHILE SUPPORTING HOUSING OFF THE FLOOR. NOTE: SUPPLY INLET CONNECTION WILL ACCOMMODATE A 1/2" NPT MALE ADAPTER.
- E- ASSEMBLE THE SHOWER HOUSING ① TO THE MOUNTING FRAME ② USING SCREWS PROVIDED.

**WARNING:**  
 PRIOR TO MAKING INSTALLATION, SUPPLY LINES MUST BE FLUSHED OF ALL FOREIGN MATERIAL SUCH AS PIPE DOPE, CHIPS, SOLDER, ETC. VALVE MUST BE DRAINED PRIOR TO BEING SUBJECTED TO FREEZING TEMPERATURES.

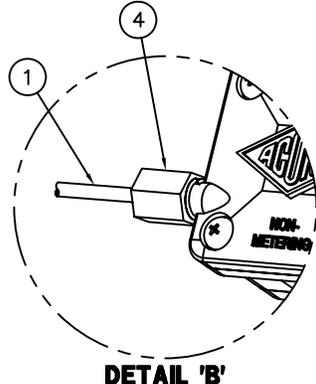
ACORN ENGINEERING COMPANY P.O. BOX 3527 Industry, CA 91744 15125 Proctor Ave Industry, CA 91746 (626) 336-4561 FAX (626) 961-2200	TITLE <b>APEX SURFACE MOUNTED SHOWER - CAT. #450BBF-RD</b>		
	MANUFACTURE DATE <b>OCTOBER 2010                  TO PRESENT</b>	DATE ISSUED <b>11/04/10</b>	DRAWING NUMBER <b>9900-046-001</b>
	DATE REVISED <b>06/01/14 D</b>		



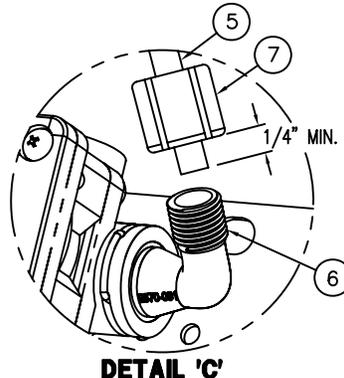
SIDE OUTLET SHOWN



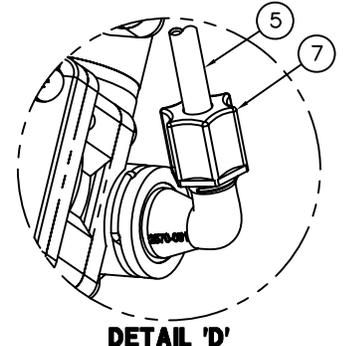
**DETAIL 'A'**



**DETAIL 'B'**



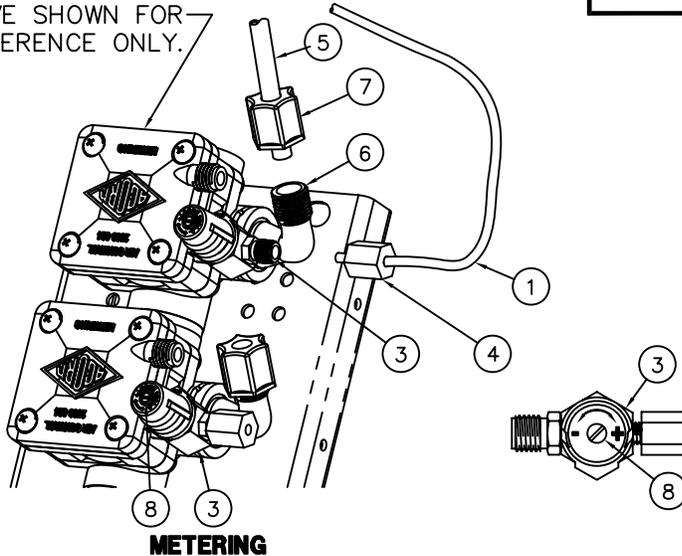
**DETAIL 'C'**



**DETAIL 'D'**

NOTE: PENAL-WARE & ECO-RAIN SHOWER FIXTURES USE 1/4" O.D. RISER TUBING WHILE OTHER SHOWER-WARE FIXTURES USE 3/8" O.D. TUBING.

AIR-CONTROL 03M-MA2 VALVE SHOWN FOR REFERENCE ONLY.



**METERING**

REFERENCE DRAWINGS	
REPAIR PARTS	DRAWING
VALVE BODY	9955-006-003
CHECKSTOP	9956-040-003
PUSHBUTTON/ESCUTCHEON	9957-300-001
METERING SERVOMOTOR	9955-000-003

NOTE:  
 • ALL TUBING SHOULD BE CUT SQUARE AND BE FREE OF BURRS OR DEFORMITIES TO ENSURE A WATER TIGHT CONNECTION.  
 • EXTEND TUBING AT LEAST 1/4" BEYOND FERRULE NUT AND INSERT TUBING INTO CONNECTION OPENING BEFORE TIGHTENING.  
 • TUBING SHOULD BE FREE OF KINKS TO ENSURE PROPER OPERATION.  
 • MAXIMUM RECOMMENDED WORKING WATER PRESSURE IS 100 PSI; TEMPERATURE IS 130° F; OUTLET TEMPERATURE IS RECOMMENDED AT A MAXIMUM OF 105° F.  
 WARNING:  
 PRIOR TO MAKING INSTALLATION, SUPPLY LINES MUST BE FLUSHED OF ALL FOREIGN MATERIAL SUCH AS PIPE DOPE, CHIPS, SOLDER, ETC. VALVE MUST BE DRAINED PRIOR TO BEING SUBJECTED TO FREEZING TEMPERATURES. MAXIMUM RECOMMENDED OUTLET WATER TEMPERATURE IS 105° F.

TIMING IS ADJUSTABLE FROM 5 TO 60 SECONDS AND IS ACCOMPLISHED BY ROTATING TIMING SCREW (8). TURNING THE TIMING SCREW CLOCKWISE INCREASES METERING TIME WHILE TURNING THE SCREW COUNTERCLOCKWISE DECREASES METERING TIME.

**INSTALLATION INSTRUCTIONS:**

- A- MOUNT FIXTURE IN ACCORDANCE TO MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- B- ASSEMBLE PUSHBUTTONS AND OR SHOWER NOZZLES TO FIXTURE IF REQUIRED.
- C- CONNECT 1/8" O.D. POLYETHYLENE AIR LINE (1) TO PUSHBUTTON (2) AND VALVE TIMER ASSEMBLY (3). SEE DETAILS 'A' & 'B'. HAND TIGHTEN FERRULE NUT (4) PROVIDED.

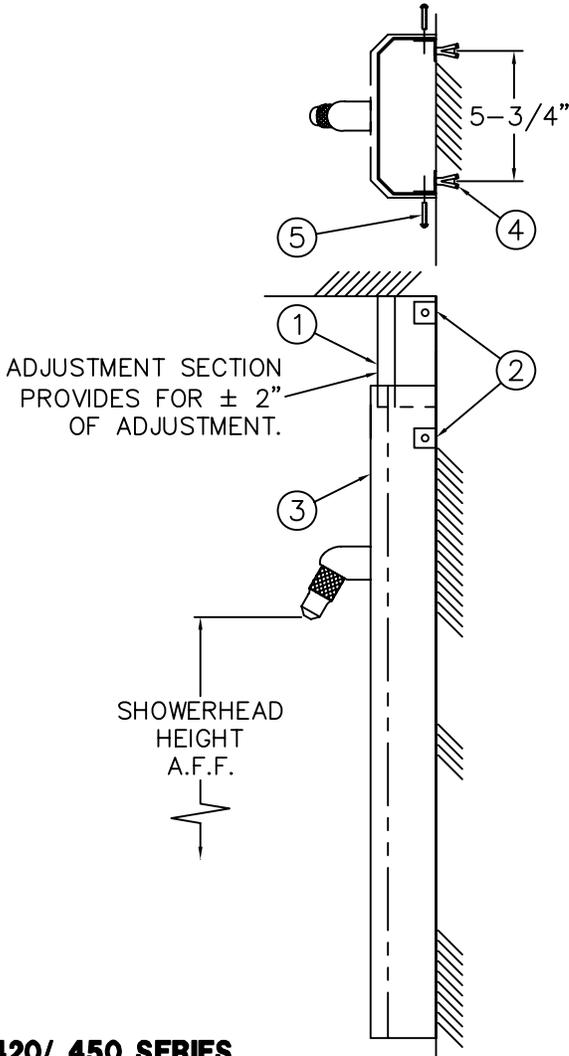
- D- CONNECT SHOWER RISER (5) TO VALVE ASSEMBLY ELBOW (6). SEE DETAIL 'C' AND 'D'. HAND TIGHTEN FERRULE NUT (7) PROVIDED.
- E- AFTER THOROUGHLY FLUSHING SUPPLY LINES, MAKE UP CONNECTIONS TO VALVE ASSEMBLY INLET(S) 1/2" NPT OR 1/2" NPS FLEX HOSE AS REQUIRED.

ACORN ENGINEERING COMPANY P.O. BOX 3527 INDUSTRY, CA. 91744 (626) 336-4561 FAX (626) 961-2200	<b>TITLE</b> <b>HAND OPERATED, AIR-CONTROL VALVE SHOWER CONNECTIONS</b>		
	<b>MANUFACTURE DATE</b> OCTOBER 2010 TO PRESENT	<b>DATE ISSUED</b> 10/28/10	<b>DRAWING NUMBER</b> 9900-006-003
		<b>DATE REVISED</b>	



**IMPORTANT!**

WALL ANCHORS AND ANCHORING HARDWARE ARE BY OTHERS.



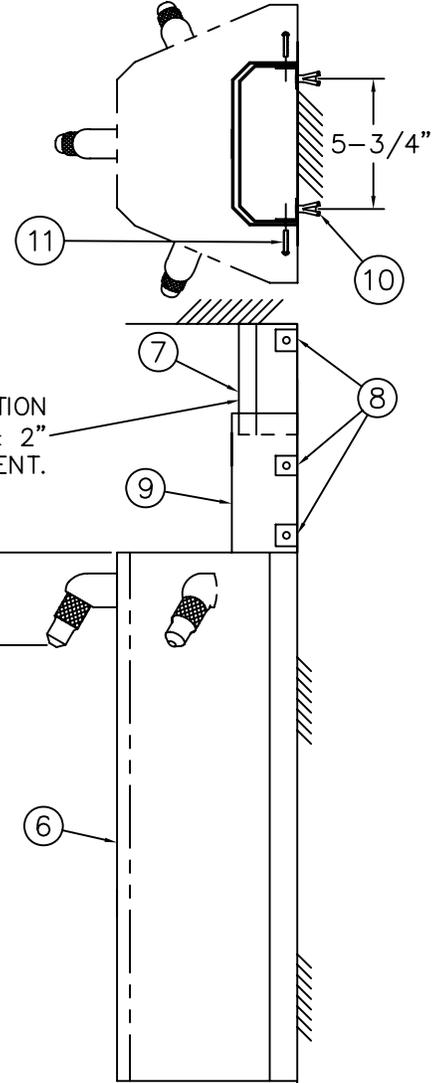
**420/ 450 SERIES**

**INSTALLATION INSTRUCTIONS (420/450 SERIES)**

AFTER COMPLETION OF TOP SUPPLY ROUGH-INS:

- A- POSITION ADJUSTMENT SECTION ① UP TO CEILING. USING ADJUSTMENT SECTION AS A TEMPLATE, MARK POSITION FOR L-CLIPS ②.
- B- FOLLOWING THE APPROPRIATE FIXTURE INSTALLATION INSTRUCTIONS, USE EXTENDED HOUSING ③ AS A TEMPLATE TO MARK POSITIONS FOR L-CLIPS ②.
- C- INSTALL WALL ANCHORS ④ (BY OTHERS) FOR L-CLIPS. POSITION L-CLIPS ② WITH CAGE NUT FACING OUTWARD FOR ATTACHMENT OF HOUSING AND FASTEN TO WALL (WALL FASTENERS BY OTHERS).
- D- ASSEMBLE ADJUSTMENT SECTION ① TO L-CLIPS USING #10-32 SCREWS ⑤ PROVIDED.
- E- COMPLETE FIXTURE INSTALLATION WITH HOUSING ② OVER ADJUSTMENT SECTION ①.

**NOTE:** FOR 420 SERIES SHOWERS (NOT SHOWN), CEILING ADJUSTMENT SECTION ASSEMBLES OVER HOUSING.



**460/ 470 SERIES**

**INSTALLATION INSTRUCTIONS (460/470 SERIES)**

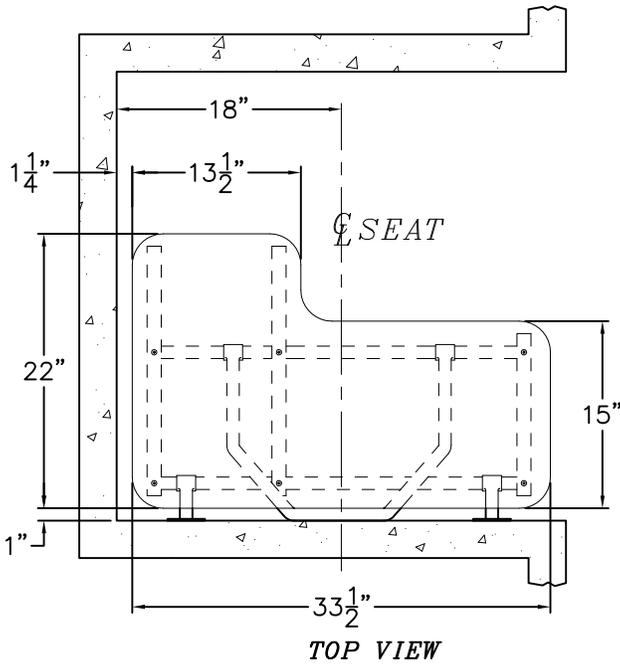
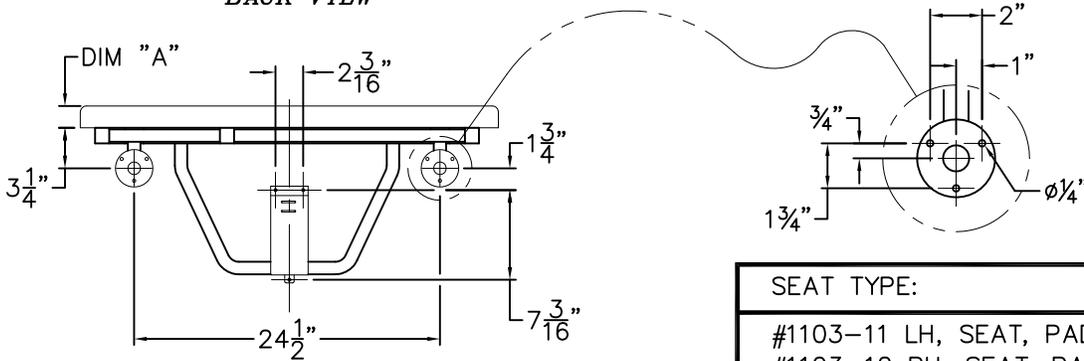
AFTER COMPLETION OF TOP SUPPLY ROUGH-INS:

- A- MOUNT HOUSING ⑥ TO WALL PER APPROPRIATE FIXTURE INSTALLATION INSTRUCTIONS.
- B- POSITION ADJUSTMENT SECTION ⑦ UP TO CEILING. USING ADJUSTMENT SECTION AS A TEMPLATE, MARK POSITION FOR L-CLIPS ⑧.
- C- POSITION SUPPLY COVER ⑨ AND USE AS A TEMPLATE TO MARK POSITION FOR L-CLIPS ⑧.
- D- INSTALL WALL ANCHORS ⑩ (BY OTHERS) FOR L-CLIPS. POSITION L-CLIPS ⑧ WITH CAGE NUT FACING OUTWARD FOR ATTACHMENT OF HOUSING AND FASTEN TO WALL (WALL FASTENERS BY OTHERS).
- E- ASSEMBLE ADJUSTMENT SECTION ⑦ TO L-CLIPS USING #10-32 SCREWS ⑪ PROVIDED.
- F- ASSEMBLE SUPPLY COVER ⑨ TO L-CLIPS USING #10-32 SCREWS ⑪ PROVIDED.

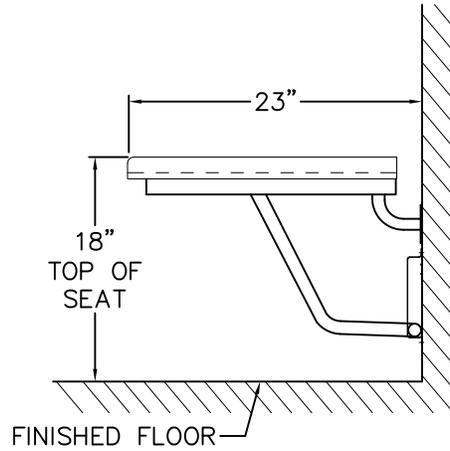
<p>ACORN ENGINEERING COMPANY P.O. BOX 3527 INDUSTRY, CA. 91744 (626) 336-4561 FAX (626) 961-2200</p>	<p>TITLE <b>APEX OPTION -SC SUPPLY COVER for MODEL #420, #450, #460 &amp; #470</b></p>		
	<p>MANUFACTURE DATE</p> <p><b>JULY 1969</b></p> <p><b>TO PRESENT</b></p>	<p>DATE ISSUED</p> <p><b>10/05/92</b></p> <p>DATE REVISED</p> <p><b>06/22/04</b></p>	<p>DRAWING NUMBER</p> <p><b>9900-056-001</b></p>



BACK VIEW



SEAT TYPE:	DIM 'A'
#1103-11 LH, SEAT, PADDED #1103-12 RH, SEAT, PADDED	3/4"
#1103-21 LH, SEAT, PHENOLIC #1103-22 RH, SEAT, PHENOLIC	1/2"
#1103-31 LH, SEAT, SS #1103-32 RH, SEAT, RH	1/8"



REFERENCE DRAWING	
-RD REINFORCED PANEL	9900-351-001

**INSTALLATION INSTRUCTIONS:**

A- USING FOLDED SEAT FRAME AS A TEMPLATE MARK HOLES ON WALL OR REINFORCED PANEL FOR MOUNTING FLANGES AND SUPPORT LEG GUIDE BRACKET FOR WALL ANCHORS AND ANCHORING HARDWARE BY OTHERS. FOR -RP PANEL MOUNTING, #10 x 1" LONG STAINLESS STEEL PHILIPS HEAD SHEET METAL SCREWS ARE RECOMMENDED. FOR WALL MOUNTING, #10 x 2" LONG STAINLESS STEEL PHILIPS HEAD SHEET METAL SCREWS ARE RECOMMENDED.

- B- SEAT SHOULD BE MOUNTED ON CENTER WITH 34" WIDE ACORN -RP REINFORCED PANEL. REFER TO PANEL DETAIL WITH JOB INSTALLATION INSTRUCTIONS FOR CUSTOM PANEL SIZE INFORMATION.
- C- THE SEAT IS PROPERLY INSTALLED IF IT FOLDS UP AND DOWN FREELY, YET STAYS IN THE UP POSITION WITHOUT ASSISTANCE.

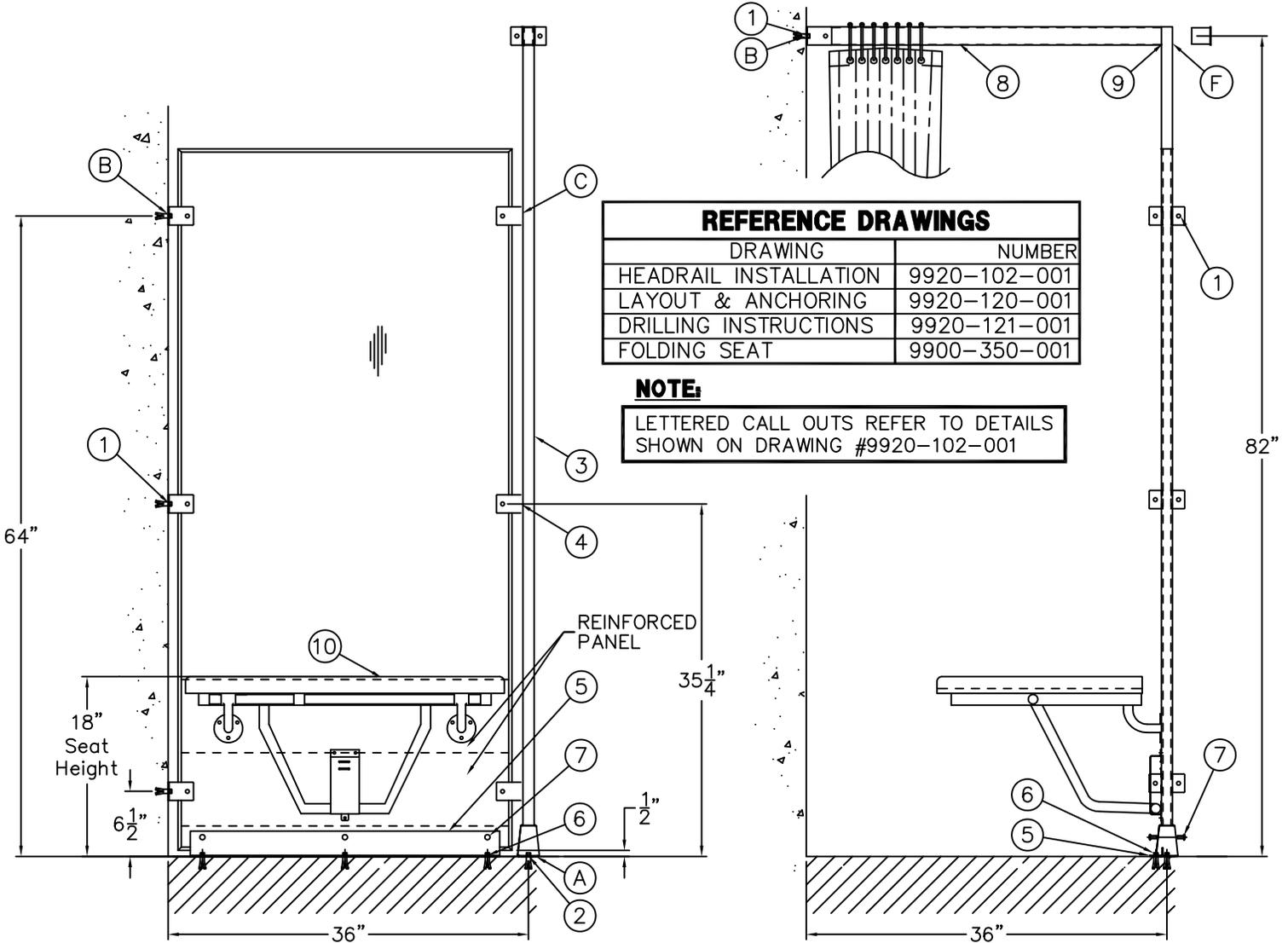
CONSULT APPLICABLE CODES FOR SEAT HEIGHT & LOCATION REQUIREMENTS. RECOMMENDED SEAT HEIGHT IS 18" ABOVE FINISHED FLOOR.

IMPORTANT: THIS SHOWER SEAT IS INTENDED TO MEET OR EXCEED CURRENT ADA CODE REQUIREMENTS. SEAT REQUIRES ADEQUATE IN-WALL, WALL BACKING OR OTHER SECURE METHOD OF ANCHORING.



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TITLE		
<b>FOLDING PADDED SEAT CATALOG * 1103 SERIES (A.D.A.)</b>		
MANUFACTURE DATE	DATE ISSUED	DRAWING NUMBER
<b>JANUARY 1, 1980 TO PRESENT</b>	<b>04/07/93</b>	<b>9900-350-001</b>
	DATE REVISED	
	<b>09/13/10</b>	



REFERENCE DRAWINGS	
DRAWING	NUMBER
HEADRAIL INSTALLATION	9920-102-001
LAYOUT & ANCHORING	9920-120-001
DRILLING INSTRUCTIONS	9920-121-001
FOLDING SEAT	9900-350-001

**NOTE:**  
LETTERED CALL OUTS REFER TO DETAILS SHOWN ON DRAWING #9920-102-001

**INSTALLATION INSTRUCTIONS:**

- A- REVIEW SHOWER ROOM LAYOUT DRAWINGS IF REQUIRED. USE A CHALK LINE TO LOCATE AND MARK WALL BRACKETS AND POST CENTERLINES AS APPROPRIATE. INSTALL FLOOR AND WALL ANCHORS BEFORE ASSEMBLING COMPARTMENT.
- B- DRILL AND ANCHOR MOUNTING POINTS ON WALL FOR WALL BRACKETS (1) (FOR PANEL AND HEADRAIL), AND ON FLOOR FOR (2) CENTER OF POST. FLOOR ANCHOR PROVIDED FOR POST.
- C- DRILL MOUNTING HOLES TO POST (3) AND ASSEMBLE U-CLIPS (4) TO POST WITH HARDWARE PROVIDED.
- D- PROVIDE TEMPORARY PANEL SUPPORT 1/2" AFF AND DRILL MOUNTING HOLES IN PANEL. SECURE TO WALL BRACKETS (1) AND U-CLIPS (4) WITH HARDWARE PROVIDED.

- E- USE FLOOR ANGLE (5) AS A TEMPLATE TO LOCATE AND DRILL FLOOR AND PANEL FOR FLOOR ANCHORS (6) AND PANEL MOUNTING HOLES (7). INSTALL FLOOR ANCHORS, AND MOUNT FLOOR ANGLE TO FLOOR WITH INSTALLER PROVIDED ANCHORING HARDWARE (6) FOR .313" DIAMETER PUNCHING. SECURE PANEL TO FLOOR ANGLE WITH HARDWARE PROVIDED.
- F- FIT HEADRAIL WITH END CAP (8) IN WALL BRACKET (1), AND POST WITH END CAP (9), DRILL MOUNTING HOLES AND SECURE TO POST AND WALL BRACKET WITH HARDWARE PROVIDED.
- G- LOCATE SEAT (10) 18" AFF AND IN CENTER OF PANEL DRILL (9) MOUNTING HOLES AND INSTALL WITH HARDWARE PROVIDED.
- H- ALL WALL AND FLOOR ANCHORS AND ANCHORING HARDWARE ARE PROVIDED BY OTHERS, UNLESS OTHERWISE SPECIFIED.

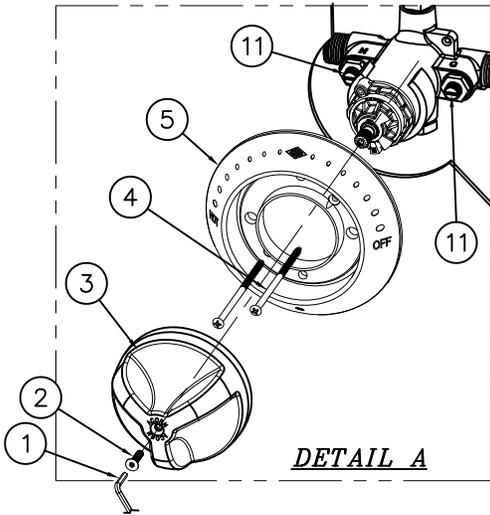


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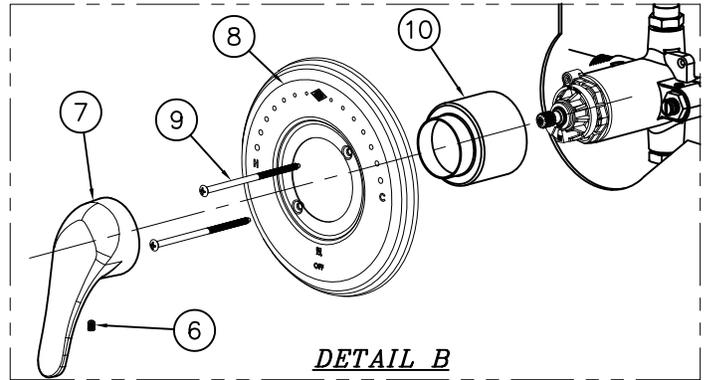
TITLE <b>(ADA) SEAT MOUNTING ON REINFORCED (-RP) DIANA PANEL</b>		
MANUFACTURE DATE <b>JANUARY 1997 TO PRESENT</b>	DATE ISSUED <b>05/07/10</b>	DRAWING NUMBER <b>9900-351-002</b>
	DATE REVISED	



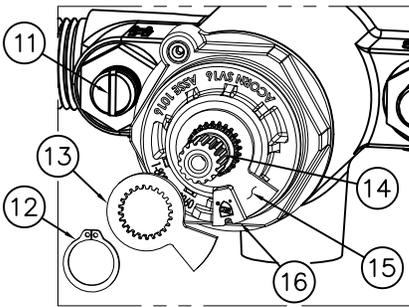
REFERENCE DRAWINGS	
ASSEMBLIES	NUMBER
T/P VALVE	9975-005-002



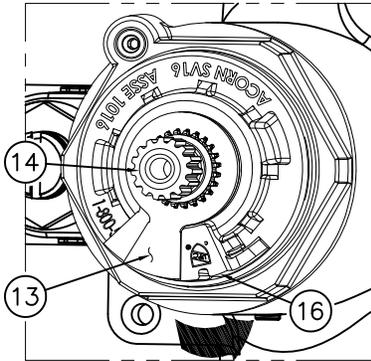
DETAIL A



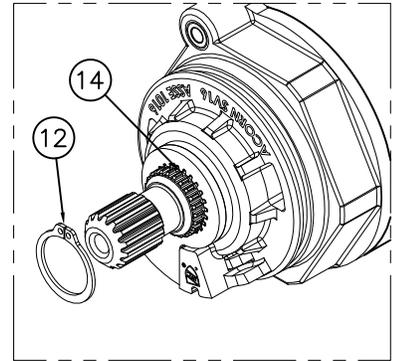
DETAIL B



DETAIL C



DETAIL D



DETAIL E

**INSTRUCTIONS:**

A-REMOVE TRI-LEVER HANDLE TRIM: SEE DETAIL A

- a- USING CENTER REJECT ALLEN WRENCH ① REMOVE HANDLE SCREW ② AND REMOVE HANDLE ③.
- b- REMOVE ESCUTCHEON ④ BY REMOVING SCREWS ⑤.

FOR OPTIONAL -LVR LEVER HANDLE TRIM: SEE DETAIL B

- a- REMOVE SET SCREW ⑥ AND HANDLE ⑦.
- b- REMOVE ESCUTCHEON ⑧ BY REMOVING SCREWS ⑨.
- c- PULL OFF VALVE SLEEVE ⑩.

**TEMPERATURE ADJUSTMENT:**

- B- ENSURE MAIN WATER SUPPLY IS ON.
- C- ENSURE CHECK STOPS ⑪ ARE OPEN.
- D- ENSURE VALVE IS IN THE OFF POSITION.
- E- USING SNAP RING PLIERS REMOVE RETAINING RING ⑫ AND THE FIRST TEMPERATURE LIMIT WASHER ⑬ ONLY FROM VALVE STEM ⑭. SEE DETAIL C.

NOTE: IF SECOND TEMPERATURE LIMIT WASHER ⑮ COMES OFF, RESETTING OF THE OFF STOP MAY BE REQUIRED, KEY AS CLOSE AS POSSIBLE ON THE COUNTER-CLOCKWISE SIDE OF BONNET STOP ⑯. USING HANDLE ③ OR ⑦ SLIGHTLY OPEN AND CLOSE VALVE TO ENSURE WATER WILL SHUT OFF. DETAIL C.

**TEMPERATURE ADJUSTMENT: CONTINUED:**

- F- USING HANDLE ③ OR ⑦ TURN VALVE STEM ⑭ COUNTER-CLOCKWISE TO INCREASE HOT, CHECKING OUTLET TEMPERATURE UNTIL DESIRED TEMPERATURE IS REACHED (RECOMMENDED 105° TO 110°). SLIDE FIRST TEMPERATURE LIMIT WASHER ⑨ OVER VALVE STEM ⑬ AND ENSURE SIDE OF WASHER RESTS AS CLOSE AS POSSIBLE TO CLOCKWISE SIDE OF BONNET LIMIT STOP ⑯. DETAIL D.
- G- WITH VALVE IN THE "ON" POSITION AND WATER RUNNING, USING SNAP RING PLIERS INSTALL RETAINING RING ⑫. ENSURE RETAINING RING ⑫ IS INSERTED PROPERLY INTO GROOVE ON VALVE STEM ⑭. DETAIL E.
- H- REINSTALL TRIM IN REVERSE ORDER.



ACORN ENGINEERING COMPANY  
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15125 Proctor Ave Industry, CA 91746  
(626) 336-4561 FAX (626) 961-2200

TITLE **-8 T/P TEMP/PRESS BALANCING MIXING VALVE - TEMPERATURE ADJUSTMENT**

MANUFACTURE DATE	DATE ISSUED	DRAWING NUMBER
<b>APRIL 2014</b>	<b>05/01/14</b>	
<b>PRESENT</b>	DATE REVISED	<b>9900-007-001</b>
	<b>09/01/16 B</b>	