

(A) TYPICAL ELEVATION

(1)	END POST	(7)	BARBED WIRE
(2)	HORIZONTAL BRACE	(8)	CONCRETE FOOTING
(3)	BRACE POST	(9)	EARTH ANCHOR - "T" POST
(4)	ANGLE BRACE	(10)	STAY
(5)	"T" POST	(11)	POST CAP
(6)	STRESS POST		



**BARBED WIRE FENCE**

REVIEWED BY THE PARK STANDARDS COMMITTEE, AND APPROVED BY THE CHIEF OF DESIGN & CONSTRUCTION

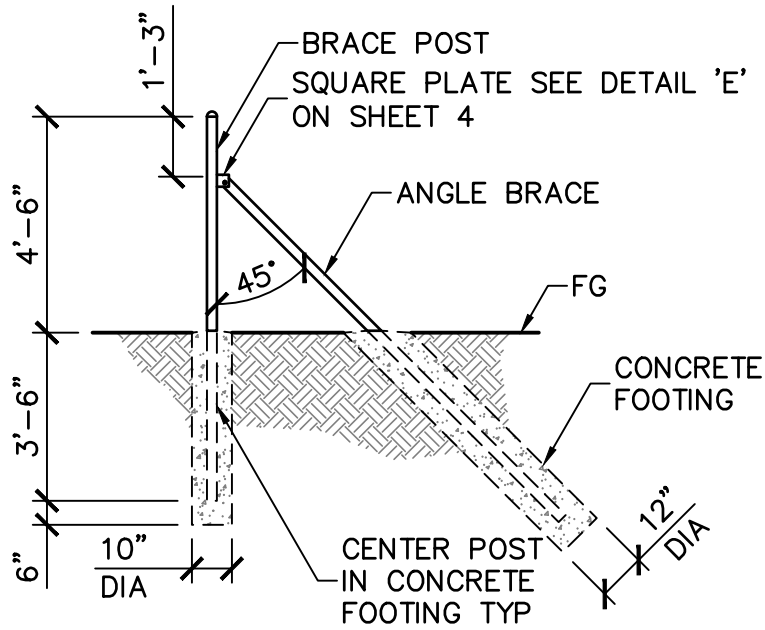
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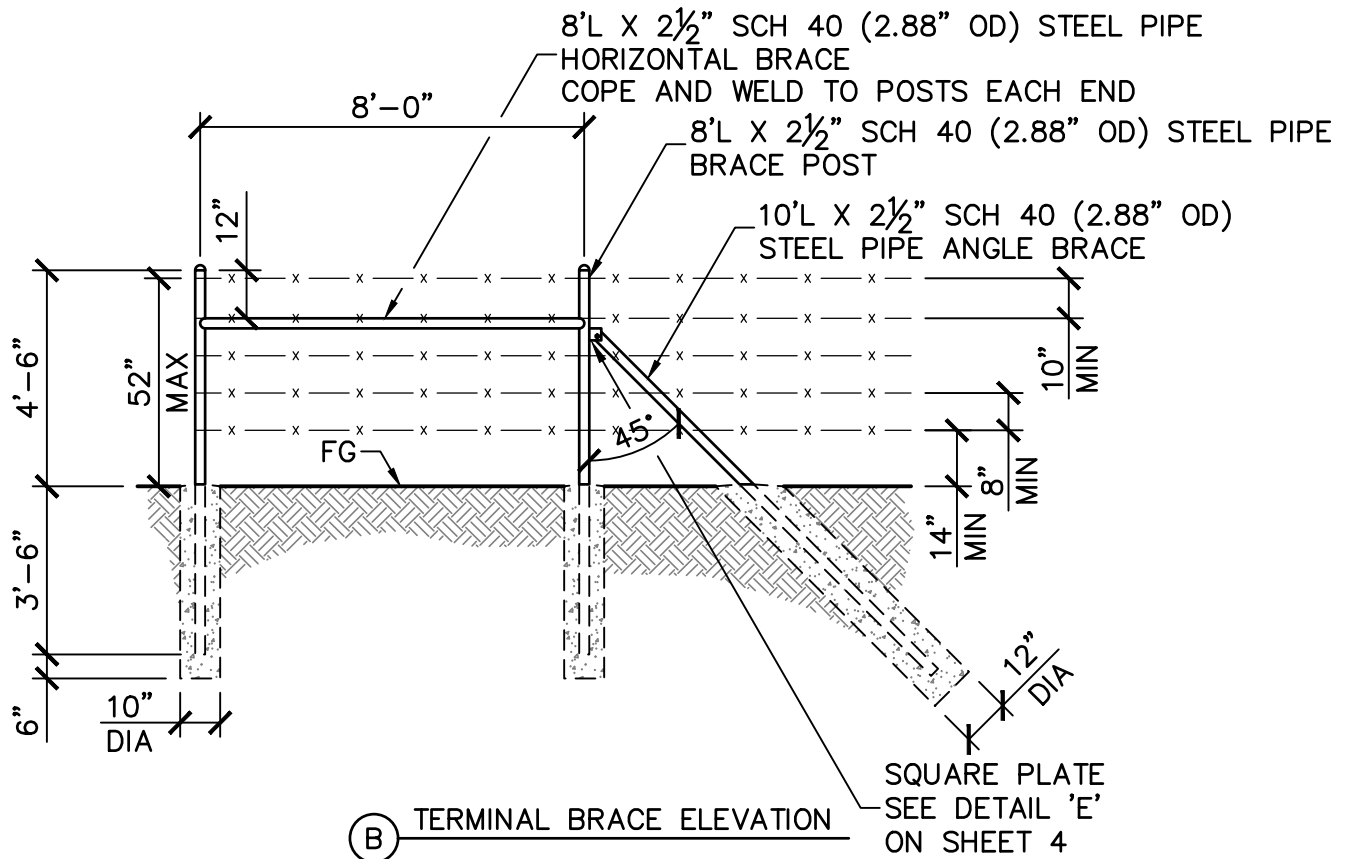
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**EAST BAY REGIONAL PARK DISTRICT - STANDARD PLANS**



(C) INTERMEDIATE ANGLE BRACE ELEVATION



(B) TERMINAL BRACE ELEVATION



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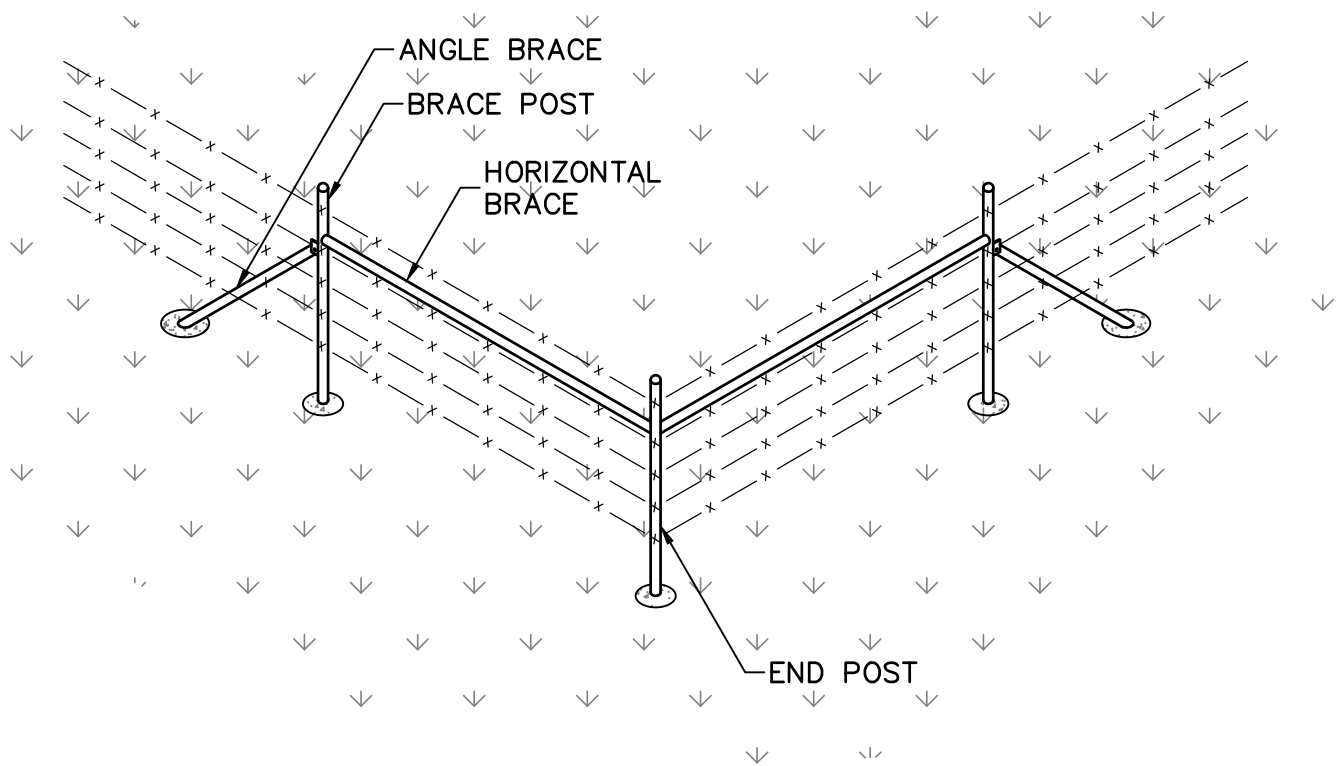
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(D) TWIN TERMINAL BRACE – ISOMETRIC VIEW



**BARBED WIRE FENCE**

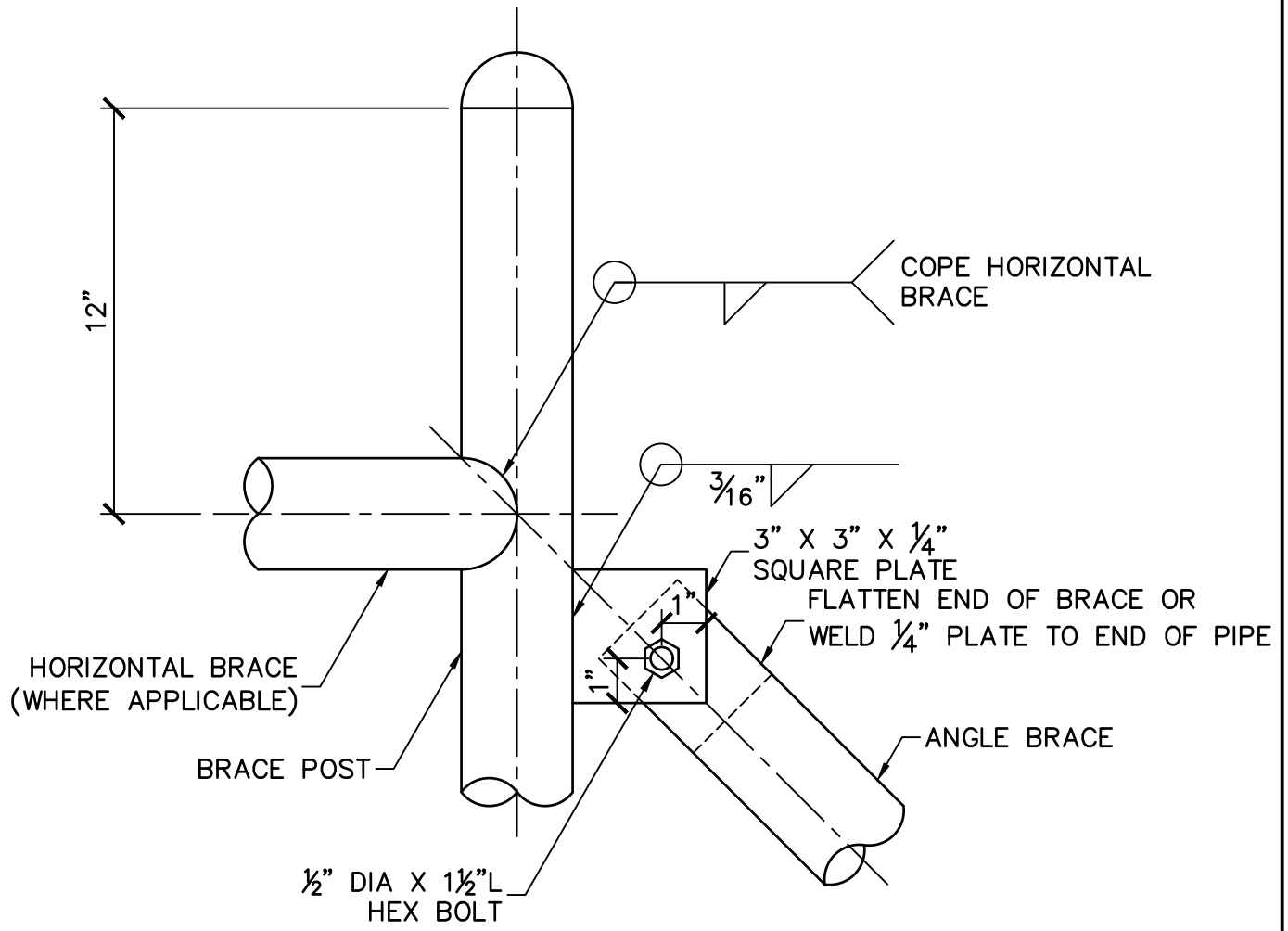
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(E) SQUARE PLATE



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## MATERIALS

### 1. FENCE POSTS AND BRACES

- 1.1. "T" POSTS (LINE PICKETS) SHALL BE CLASS B STEEL, HEAVY-DUTY STUDDED "T" SECTION POSTS, WEIGHING 1.33 POUNDS PER LINEAR FOOT, 6' LONG WITH GREEN ENAMEL FINISH, CONFORMING WITH ASTM A702.
- 1.2. END POST, BRACE POST, HORIZONTAL BRACE, ANGLE BRACE AND STRESS POST SHALL BE 2½" SCHEDULE 40 (2.88 OD) STEEL PIPE.
- 1.3. INTERMEDIATE ANGLE BRACE INCLUDES A BRACE POST AND AN ANGLE BRACE WITH ASSOCIATED FOOTINGS, AS SHOWN ON THE DRAWINGS.
- 1.4. TERMINAL BRACE SECTION INCLUDES AN END POST, BRACE POST, HORIZONTAL BRACE, AND AN ANGLE BRACE WITH ASSOCIATED FOOTINGS, AS SHOWN ON THE DRAWINGS.
- 1.5. ALL POSTS SHALL BE CAPPED TO PREVENT WATER FROM GETTING INTO THE PIPES. POSTS MAY BE CAPPED WITH A WELDED CIRCULAR METAL CAP OR FILL THE TOP 6" WITH CONCRETE. DOME THE TOP OF THE CONCRETE.
- 1.6. ALL POSTS, BRACES AND ALL NECESSARY FITTINGS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.
- 1.7. POST CAP, ANCHOR PLATES AND OTHER REQUIRED FITTINGS AND HARDWARE SHALL BE STEEL, MALLEABLE IRON OR WROUGHT IRON AND SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 75-1.05, "GALVANIZING" OF THE STANDARD SPECIFICATIONS.

### 2. BARBED WIRE

- 2.1. BARBED WIRE SHALL BE 15½ GAUGE OKLAHOMA, HIGH-TENSILE, 4 POINT, CLASS III GALVANIZED PER ASTM-854.

### 3. WIRE CLIPS OR FASTENERS, STAYS AND EARTH ANCHOR

- 3.1. BARBED WIRE SHALL BE FASTENED TO ALL POSTS WITH 12 TO 12½ GAUGE WIRE CLIPS. WIRE CLIPS OR FASTENERS MUST BE GALVANIZED AND SIMILAR TO STRENGTH OF FENCE WIRE.
- 3.2. STAYS SHALL BE 9½ GAUGE HIGH TENSILE GALVANIZED STEEL WIRE. MINIMUM LENGTH SHALL BE THE DISTANCE BETWEEN THE TOP AND BOTTOM WIRES + 4 INCHES.
- 3.3. EARTH ANCHOR SHALL BE THE SAME AS THE "T" POSTS USED FOR LINE PICKETS.

### 4. FOOTINGS

- 4.1. PORTLAND CEMENT: ASTM C150 STANDARD SPECIFICATIONS FOR PORTLAND CEMENT. IT SHALL BE TYPE II FOR GENERAL CONSTRUCTION AND ONLY ONE BRAND SHALL BE USED ON THE PROJECT.
- 4.2. CONCRETE AGGREGATES: ASTM STANDARD SPECIFICATIONS FOR CONCRETE AGGREGATES (C-33), INCLUDING METHODS OF SAMPLING AND TESTING. OBTAIN FROM ESTABLISHED SOURCES PROVEN TO BE HIGHLY RESISTANT TO ALKALI IN CEMENT.
- 4.3. MIXING WATER SHALL BE FREE FROM IMPURITIES THAT WOULD BE INJURIOUS TO CONCRETE.
- 4.4. STRENGTH AND DESIGN REQUIREMENTS FOR ALL FOOTINGS: MINIMUM COMPRESSIVE STRENGTHS FOR CONCRETE AT 28 DAYS SHALL BE 2,500 POUNDS PER SQUARE INCH. MINIMUM CEMENT CONTENT PER CUBIC YARD SHALL BE 4 SACKS. MAXIMUM AGGREGATE SIZE SHALL BE 1".



## **BARBED WIRE FENCE**

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WORKMANSHIP

5. FENCE POSTS AND BRACES

- 5.1. POSTS SHALL BE SET PLUMB AND TOPS SHALL NOT APPEAR TO DEVIATE HORIZONTALLY FROM THE ALIGNMENT. POST TOPS SHALL ALSO APPEAR TO CONFORM SMOOTHLY TO GRADE CHANGES IN ALIGNMENT.
- 5.2. IN GENERAL, IN DETERMINING THE POST SPACING, MEASUREMENT WILL BE MADE PARALLEL TO THE SLOPE OF THE NATURAL GROUND AND ALL POSTS SHALL BE PLACED IN A VERTICAL POSITION.
- 5.3. "T" POSTS (LINE PICKETS) SHALL BE DRIVEN TO THE DEPTH INDICATED ON THE DRAWINGS IN ALL SOILS. BENT OR DAMAGED POSTS WILL NOT BE ACCEPTED. IN LOCATIONS WHERE THE "T" POSTS CANNOT BE DRIVEN, POSTS SHALL BE SET IN A CONCRETE FOOTING 10" IN DIAMETER AND 3' DEEP AT NO ADDITIONAL COST TO THE DISTRICT.
- 5.4. "T" POSTS SHALL BE SPACED AT NO MORE THAN 10' INTERVALS, MEASURED FROM CENTER TO CENTER OF POSTS.
- 5.5. STRESS POSTS SHALL BE INSTALLED AT VERTICAL ANGLE POINTS WHERE GRADE CHANGE IS LESS THAN 30 DEGREES. STRESS POSTS SHALL ALSO BE INSTALLED AT MID-POINT IN THE FENCE RUN, OR EVERY 300 FEET, WHICHEVER IS LESS.
- 5.6. VERTICAL ANGLE POINTS IN THE FENCE ALIGNMENT, WHERE THE VERTICAL GRADE CHANGE IS 30 DEGREES OR MORE, SHALL BE CONSIDERED TERMINAL POINTS FOR RUNS OF FENCE IN EITHER DIRECTION FROM THE GRADE BREAK. TWIN TERMINAL BRACES ON SLOPES ALONG THE ALIGNMENT GREATER THAN 30 DEGREES (OR 58%) FROM THE HORIZONTAL SHALL BE MODIFIED DIMENSIONALLY TO CONFORM TO THE DEGREE OF SLOPE WHERE INSTALLED.
- 5.7. HORIZONTAL BRACES SHALL BE WELDED TO END POST AND BRACE POSTS IN A STRONG AND SECURE MANNER AND IN SUCH A WAY AS TO PREVENT WATER FROM ENTERING THE PIPE.
- 5.8. ANGLE BRACE SHALL BE BOLTED TO A SQUARE PLATE ON BRACE POST AS SHOWN ON THE DRAWINGS.
- 5.9. HORIZONTAL ANGLE POINTS IN THE FENCE ALIGNMENT, WHERE THE ANGLE OR DEFLECTION IS 19 TO 54 DEGREES, SHALL USE AN INTERMEDIATE ANGLE BRACE.
- 5.10. HORIZONTAL ANGLE POINTS IN THE FENCE ALIGNMENT, WHERE THE ANGLE OR DEFLECTION IS 55 DEGREES OR MORE, SHALL BE CONSIDERED AS CORNERS AND TWIN TERMINAL BRACES SHALL BE INSTALLED.
- 5.11. WHEN CROSSING A DEEP RAVINE OR ANY OTHER STREAMBED OR WASH, TERMINAL BRACES SHALL BE INSTALLED. THE LOWEST LEG OF THE TERMINAL BRACE SHALL BE SET IN RELATIVELY UNDISTURBED SOIL ABOVE THE HIGHEST POINT OF OBVIOUS STREAM FLOW EVIDENCE OR ACTIVE EROSION FEATURES. ONE OR MORE 6' ANCHOR "T" POSTS SHALL BE INSTALLED AS A BREAK AWAY FENCE SECTION BETWEEN TERMINAL BRACES.
- 5.12. AT BOTH HORIZONTAL AND VERTICAL ANGLE POINTS WHERE WIRE TENSION WILL PULL, PUSH OR BEND SECTIONS OF LINE POSTS OUT OF VERTICAL AND/OR HORIZONTAL ALIGNMENT, INTERMEDIATE ANGLE BRACES SHALL BE INSTALLED.
- 5.13. ON STRAIGHT RUNS OF FENCE GREATER THAN 500' AND NOT OTHERWISE INTERRUPTED BY OTHER BRACING REQUIREMENTS DUE TO CORNERS, HORIZONTAL ANGLES, CURVES OR GRADE BREAKS OR GATES, INTERMEDIATE ANGLE BRACES SHALL BE INSTALLED AT 500' MAXIMUM INTERVALS.



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6. BARBED WIRE

- 6.1. BARBED WIRE SHALL BE STRETCHED TO SUFFICIENT TENSION PRIOR TO BEING FASTENED TO POSTS. TEMPERATURE VARIATIONS MUST BE CONSIDERED.
- 6.2. WHEREVER POSSIBLE, WIRE WILL BE ATTACHED TO FENCE POST ON SIDE RECEIVING MOST PRESSURE.
- 6.3. BARBED WIRE SHALL BE ATTACHED TO "T" POSTS WITH 12 TO 12½ GAUGE GALVANIZED WIRE CLIPS.
- 6.4. BARBED WIRE SHALL BE ATTACHED TO STRESS POSTS AND BRACE POSTS WITH GALVANIZED TIE WIRE. TIE WIRE SHOULD BE WRAPPED AROUND THE VERTICAL POST ONE TIE AND TWISTED AROUND THE WIRE AT LEAST 5 TIMES. WIRE SHALL BE DOUBLE WRAPPED AT END POSTS AND TWISTED AROUND ITSELF AT LEAST 5 TIMES.
- 6.5. WIRE SPLICES – WESTERN UNION SPLICE SHALL HAVE A MINIMUM OF 8 WRAPS ON EACH SIDE OF CENTER, TIGHTLY WOUND AND CLOSELY SPACED.

7. WELDING

- 7.1. WELDING TO BE AWS CERTIFIED AND PREQUALIFIED FOR THE WELDING TO BE PERFORMED.
- 7.2. WELDS TO BE REASONABLY SMOOTH AND UNIFORM WITH SPATTER REMOVED.



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