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SUPPLEMENT 6.9F-I
DIMENSIONAL TOLERANCES
FOR
FABRICATION/INSTALLATION OF COMPONENT SUPPORTS

A. Fabrication Tolerances

Below listed tolerances are to be used unless otherwise specified on the drawing or applicable specifications.

<u>DESCRIPTION</u>	<u>TOLERANCES</u>
1. <u>Length</u>	
Support (except rods) up to 12"	$\pm 1/8"$
Support (except rods) over 12"	$\pm 1/4"$
Rods	$\pm 1/2", -1/4"$
2. <u>Angular Assemblies</u>	$\pm 2^\circ$ of the specified angle or see Table 6.9F-I
3. <u>Plate Squareness</u>	
Up to 6" (inclusive)	$\pm 1/16"$
Up to 9" (inclusive)	$\pm 3/32"$
Up to 12" (inclusive)	$\pm 1/8"$
Up to 15" (inclusive)	$\pm 5/32"$
For each increase of up to 3" in the plate size, the tolerance limits increase by $\pm 1/32"$.	
*4. <u>Straightness of Beams and Columns</u>	
Up to 10' Length (L) inclusive	$\pm 1/8"$
(L) greater than 10' but less than 20'	$\pm 1/4"$
(L) greater than 20' but less than 30'	$\pm 3/8"$
For each incremental increase up to 10', the tolerance increases by $1/8"$.	
*5. <u>Camber of Beams & Columns</u>	$\pm 1/4"$
*6. <u>Flange to Web Offset of Beams & Girders</u>	$\pm 1/4"$

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*7. Web Flatness

(To be measured between stiffeners, if applicable, or in the length equal to web depth.)

DEPTH OF BEAM

3"	$\pm 1/32"$
6"	$\pm 1/16"$
9"	$\pm 3/32"$

For each increase in web depth, increase the tolerance by $\pm 1/32"$.

*8. Warpage & Tilt of Flange $1/8"$ Max.

*9. Depth of Beams or Girders

Up to 6'	$\pm 3/16"$
Over 6'	$\pm 5/16"$

*10. Plate Flatness

Dimensions up to 12" (inclusive)	$\pm 1/8"$
Dimensions over 12" up to 24" (inclusive)	$\pm 1/4"$
Dimensions greater than 24"	$\pm 3/8"$

11. Holes (other than pin holes)

Size (dia.)	$\pm 1/16"$
Centerline location	$\pm 1/8"$

*12. Clamps

Inside dia. of clamps up to 4"	$\pm 1/8"$
Inside dia. above 4" up to 12"	$\pm 1/4"$ 0
Inside dia. over 12"	$\pm 3/8"$ 0

13. General Machining
(Unless otherwise specified)

Fraction dimensions	$\pm 1/32"$
Decimal dimensions	$\pm .010"$

* Tolerances apply to site fabricated components only.



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B. Installation Tolerances

Below listed tolerances are to be utilized unless otherwise specified on the drawing or applicable specifications. Component Support Mechanical Inspection Cards may be utilized for documenting ASME III inspections.

DESCRIPTIONTOLERANCE1. Column Line Location & PlumbnessA. Dead Wt. Supports

Axial (pipe)
Plumbness

$\pm 12"$
 $\pm 2^\circ$ or See Table
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B. Seismic Restraints, Anchors,
Guides, Etc.

Pipe wall thickness (t) = $\frac{1}{2}"$
Pipe wall thickness (t) = $\frac{3}{8}"$
Pipe wall thickness (t) = $\frac{1}{2}"$

$\pm 2-\frac{1}{2}"$
 $\pm 2-3/4"$
 $\pm 3"$

In general, for each $\pm 1/8$ inch change in pipe wall thickness, the tolerance increases by $\pm \frac{1}{2}$ inch.

C. Attachments to Structural Steel Members

From Centerline of the reaction member $\pm 2"$

(If specific location is not specified in the drawing, it shall be considered from the centerline of the member.)

Plumbness

$\pm 2^\circ$ or See Table
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(If attachment is not to the centerline of the reaction member.)

NOTE:

When more than one direction plane is involved, the resultant value shall not exceed the allowable tolerances.

2. Elevation

$\pm 2"$



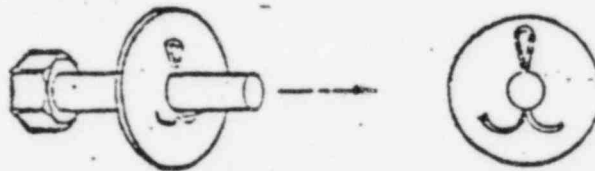
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3. Levelness

Attachement for sliding supports,
anchor bases, floor stands, etc.

1/16" Max. in.
every 12"

4. Cotter pins should be fully opened to the extent that they cannot become dislodged from the pin or bolt they are securing, and such that they do not present a hazard to personnel. See Example:

EXAMPLE

5. Cotter pins shall be the maximum size the cotter pin hole will permit.
6. Clearances for seismic restraints to allow for radial pipe expansion shall be a maximum 1/16 inch on three sides with the pipe supported as shown on the drawing.
7. Piping Clearances

A minimum 2-inch clearance shall be maintained, including pipe insulation, with respect to other piping when installing piping according to design locations.



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FIGURE 6.9F-1
COMPONENT SUPPORT MECHANICAL INSPECTIONS

COMPONENT SUPPORT MECHANICAL INSPECTIONS

No.	Description	QC		INSPECTION		NUT		REWORK RECORD												
		QC	QC	QC	QC	QC	QC	QC	QC	QC	QC	QC								
1.	Verify received material																			
2.	Verify column line location plumbness and levelness																			
3.	Verify column line location plumbness and levelness																			
4.	Verify elevation																			
5.	Verify size & configuration																			
6.	Verify clearance between pipe (or insulation & structural member)																			
7.	Verify thread step position (in cold position)																			
8.	Verify fasteners (size, thread engagement, surface contact lubricant)																			
9.	Verify Bolt Nut Installation																			
10.	Verify Bolt Nut Installation																			
11.	Verify Bolt Nut Installation																			
12.	Verify Bolt Nut Installation																			
13.	Verify Bolt Nut Installation																			
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50.	Verify Bolt Nut Installation																			

① Check marks (✓) entered by QC and NUT to indicate hold points. All inspection points indicated by (✓).
 Hold/In inspection points not required indicated by N/A.
 ② QC and NUT initials and dates entered after inspection is completed.
 ③ The applicable date of revision is entered at top of column. Rework hold/inspection points are established by check marks (✓), (X)'s and N/A as in note ①. Rework inspections are initiated and noted in the column (✓).
 ④ Check marks (✓) entered to indicate satisfactory inspections.
 ⑤ Check marks (✓) entered to indicate unsatisfactory inspections.



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TABLE 6.9F-1

EQUIVALENT LINEAR DIMENSIONAL TOLERANCES
FOR
ANGULAR ASSEMBLIES

X L	Up to 6"	6"+ to 12"	12"+ to 18"	18"+ to 24"	24"+ to 30"	Increment of 6"
6"+	$\pm 1/4"$	$\pm 5/16"$	$\pm 3/8"$	$\pm 7/16"$	$\pm 1/2"$	Increase in Tolerance by
6"+ to 24"	$\pm 1/2"$	$\pm 5/8"$	$\pm 3/4"$	$\pm 7/8"$	$\pm 1"$	
24" Up	$\pm 1"$	$\pm 1-1/4"$	$\pm 1-1/2"$	$\pm 1-3/4"$	$\pm 2"$	
Deviation "D"						

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TITLE: CP-CPM 6.9F (APPENDIX F) FABRICATION AND INSTALLATION OF COMPONENT SUPPORTS	ORIGINATOR: <i>[Signature]</i>	3/26/80 DATE
	REVIEWED BY: <i>[Signature]</i>	3/27/80 DATE
	APPROVED BY <i>[Signature]</i> CONSTRUCTION PROJECT MANAGER	3/27/80 DATE

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