

SNBI ITEM GUIDANCE

B.IE.02 Inspection Begin Date

Report the date for the inspection type performed. For multiple day inspections, record the first day that field inspection begins.

If multiple site visits occur for scour monitoring inspections, for a triggering storm event, report the first site visit date for that storm event.

B.IE.03 Inspection Completion Date

Report the completion date for the inspection type performed.

For single day inspections report the same date that field inspection begins.

If multiple site visits occur for scour monitoring inspections, for a triggering storm event, report the last site visit date for that storm event.

B.IR.02 Fatigue Details

Report whether the bridge has AASHTO fatigue category E or E' details using one of the following codes. See tables for of E and E' fatigue details.

<u>Code</u>	<u>Description</u>
N	No E/E' details
Y	E/E' details are present

B.SP.03 Number of Beam Lines

Report the number of principal beam lines include the main longitudinal load-carrying members of the superstructure such as beams, girders, trusses, and arches or arch ribs, but do not include stringers of a floor beam system or spandrel walls of an arch.

Code = Number of principle beam lines, main longitudinal load carrying members.
(ie. Beams, girders, trusses, aches/arch ribs)

Code 1 = Slab, box culvert, concrete and masonry arch, or rigid frame bridges

Code 0 = Pipe culvert

B.SP.04 Span Material

Report the principal span material of the main longitudinal load-carrying members of the span such as beams, girders, trusses, arches, or pipes, but does not include the floor system.

<u>Code</u>	<u>Description</u>	<u>Code</u>	<u>Description</u>
A01	Aluminum	P01	Plastic – Polyethylene
C01	Reinforced concrete – cast in place	PX	Plastic - other
C02	Reinforced concrete – precast	S01	Steel – rolled shapes
C03	Prestressed concrete – pre-tensioned	S02	Steel – welded shapes
C04	Prestressed concrete – cast-in-place post-tensioned	S03	Steel – bolted shapes
C05	Prestressed concrete – precast posttensioned	S04	Steel – riveted shapes
CX	Concrete – other	S05	Steel – bolted and riveted shapes
F01	FRP composite – aramid fiber	SX	Steel – other
F02	FRP composite – carbon fiber	T01	Timber – glue laminated
F03	FRP composite – glass fiber	T02	Timber – nail laminated
FX	FRP composite – other	T03	Timber – solid sawn
I01	Iron – cast	T04	Timber – stress laminated
I02	Iron – wrought	TX	Timber – other
M01	Masonry – block	X	Other
M02	Masonry – stone		

B.SP.06 Span Type

Report the span type using the following codes.

<u>Code</u>	<u>Description</u>	<u>Code</u>	<u>Description</u>	<u>Code</u>	<u>Description</u>
A01	Arch – under fill without spandrel	G01	Girder/beam – I-shaped adjacent	M01	Movable – vertical lift
A02	Arch – open spandrel	G02	Girder/beam – I-shaped spread	M02	Movable – bascule
A03	Arch – closed spandrel	G03	Girder/beam – tee-beam	M03	Movable – swing
A04	Arch – through	G04	Girder/beam – inverted tee-beam	MX	Movable – other
A05	Arch – tied	G05	Girder/beam – double-tee adjacent	P01	Pipe - Rigid
B01	Box girder/beam – single	G06	Girder/beam – double-tee spread	P02	Pipe - Flexible
B02	Box girder/beam – multiple adjacent	G07	Girder/beam – channel adjacent	S01	Slab – solid
B03	Box girder/beam – multiple spread	G08	Girder/beam – channel spread	S02	Slab – voided
B04	Box girder/beam – segmental	G09	Girder/beam – girder & floor beam	T01	Truss – deck
F01	Frame – three-sided	G10	Girder/beam – through girder	T02	Truss – through
F02	Frame – four-sided	GX	Girder/beam – other	T03	Truss – pony
F03	Frame – K-shaped	L01	Cable – suspension	X01	Other – railroad flat car
F04	Frame – delta-shaped	L02	Cable – cable-stayed	X02	Other – ferry transfer
		L03	Cable – extradosed	X03	Other – floating
		LX	Cable – other	X	Other

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B.SP.13 Deck Stay-In-Place Forms

Report the type of deck stay-in-place forms for the span configuration. When there is a combination of stay-in-place form types, code the predominant type based on the deck area.

<u>Code</u>	<u>Description</u>
0	None
C01	Concrete – reinforced
C02	Concrete – prestressed
F01	FRP composite
M01	Metal
T01	Timber
X	Other

Code C01 = when a precast reinforced concrete panel is used with a CIP reinforced concrete placement on top.

Code C02 = when a precast prestressed concrete panel is used with a CIP reinforced concrete placement on top.

Table 20: Component Condition Ratings

B.C.05 Bridge Railings

B.C.06 Bridge Railings Transition

B.C.07 Bridge Bearings

CODE	SNBI Condition	SNBI Description
9	EXCELLENT	Isolated inherent defects.
8	VERY GOOD	Some inherent defects.
7	GOOD	Some minor defects.
6	SATISFACTORY	Widespread minor or isolated moderate defects.
5	FAIR	Some moderate defects; strength and performance of the component are not affected.
4	POOR	Widespread moderate or isolated major defects; strength and/or performance of the component is affected.
3	SERIOUS	Major defects; strength and/or performance of the component is seriously affected. Condition typically necessitates more frequent monitoring, load restrictions, and/or corrective actions.
2	CRITICAL	Major defects; component is severely compromised. Condition typically necessitates frequent monitoring, significant load restrictions, and/or corrective actions in order to keep the bridge open.
1	IMMINENT FAILURE	Bridge is closed to traffic due to component condition. Repair or rehabilitation may return the bridge to service.
0	FAILED	Bridge is closed due to component condition and is beyond corrective action. Replacement is required to restore service.

B.C.08 Bridge Joints - The entire code description must be satisfied for the code to apply.

CODE	SNBI Condition	SNBI Description
N	NOT APPLICABLE	Bridge does not have deck joints.
9	EXCELLENT	Isolated inherent defects.
8	VERY GOOD	Some inherent defects.
7	GOOD	Some minor defects.
6	SATISFACTORY	Widespread minor or isolated moderate defects.
5	FAIR	Some moderate defects.
4	POOR	Widespread moderate or isolated major defects.
3	SERIOUS	Some major defects.
2	CRITICAL	Widespread major defects.
1	IMMINENT FAILURE	Joints have failed and are ineffective.
0	FAILED	Joints have failed and present a safety hazard.

B.C.10 Channel Protection Condition - The entire code description must be satisfied for the code to apply.

CODE	SNBI Condition	SNBI Description
N	NOT APPLICABLE	Bridge does not cross over water or channel protection devices do not exist.
9	EXCELLENT	Isolated inherent defects.
8	VERY GOOD	Some inherent defects.
7	GOOD	Some minor defects.
6	SATISFACTORY	Widespread minor or isolated moderate defects.
5	FAIR	Some moderate defects; performance of the channel protection is not affected.
4	POOR	Widespread moderate or isolated major defects; performance of channel protection is affected.
3	SERIOUS	Major defects; performance of channel protection is seriously affected. Condition typically necessitates more frequent monitoring or corrective actions.
2	CRITICAL	Major defects; channel protection is severely compromised. Condition typically necessitates more frequent monitoring or corrective actions. Widespread major defects.
1	IMMINENT FAILURE	Channel protection has failed, but corrective action could restore it to working condition.
0	FAILED	Channel protection is beyond repair and must be replaced.

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B.C.11 Scour Condition - The entire code description must be satisfied for the code to apply.

CODE	SNBI Condition	SNBI Description
N	NOT APPLICABLE	Bridge does not cross over water.
9	EXCELLENT	No scour.
8	VERY GOOD	Insignificant scour.
7	GOOD	Some minor scour.
6	SATISFACTORY	Widespread minor or isolated moderate scour.
5	FAIR	Moderate scour; strength and stability of the bridge are not affected.
4	POOR	Widespread moderate or isolated major scour; strength and/or stability of the bridge is affected.
3	SERIOUS	Major scour; strength and/or stability of the bridge is severely affected. Condition typically necessitates more frequent monitoring, load restrictions, and/or corrective actions.
2	CRITICAL	Major scour; strength and/or stability of the bridge is severely compromised. Condition typically necessitates frequent monitoring, significant load restrictions, and/or corrective actions to keep the bridge open.
1	IMMINENT FAILURE	Bridge is closed to traffic due to scour condition. Channel rehabilitation may return the bridge to service.
0	FAILED	Bridge is closed due to scour condition and is beyond corrective action. Bridge replacement is needed to restore service.

B.C.14 NSTM Inspection Condition

B.C.14 Underwater Inspection Condition

CODE	SNBI Condition	SNBI Description
N	NOT APPLICABLE	Component does not exist.
9	EXCELLENT	Isolated inherent defects.
8	VERY GOOD	Some inherent defects.
7	GOOD	Some minor defects.
6	SATISFACTORY	Widespread minor or isolated moderate defects.
5	FAIR	Some moderate defects; strength and performance of the component are not affected.
4	POOR	Widespread moderate or isolated major defects; strength and/or performance of the component is affected.
3	SERIOUS	Major defects; strength and/or performance of the component is seriously affected. Condition typically necessitates more frequent monitoring, load restrictions, and/or corrective actions.
2	CRITICAL	Major defects; component is severely compromised. Condition typically necessitates frequent monitoring, significant load restrictions, and/or corrective actions in order to keep the bridge open.
1	IMMINENT FAILURE	Bridge is closed to traffic due to component condition. Repair or rehabilitation may return the bridge to service.
0	FAILED	Bridge is closed due to component condition and is beyond corrective action. Replacement is required to restore service.

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COMPONENT CONDITION RATING GUIDANCE

Defect Descriptions

Density of Defects

Isolated – occur in one or a few concentrated locations.

Widespread - present in many separate areas of the component.

Some - more than isolated and less than widespread

Minor severity defects could be considered as CS2.

Moderate severity defects could be considered as CS3.

Major severity defects could be considered as CS4.

Inherent defect could be considered as CS1

Severity of Defects

Inherent Defect

Material defects or workmanship/normal construction defects that are not attributed to deterioration.

Minor

One where damage or deterioration has initiated but is not yet considered significant.

Moderate

One where damage or deterioration are significant, but the strength and performance of the component are not affected.

Major

One where damage or deterioration affect the strength and/or performance of the component, as determined by a structural review and/or hydraulic review.

For joints, bearings, railings, and railing transitions, a major defect prevents the component from functioning as intended.

Table 46: DEFECT SEVERITY guidance for component condition ratings regardless of material.

Defect	Minor (CS2 - fair)	Moderate (CS3-poor)
Distortion	Distortion that has been mitigated or does not require mitigation.	Distortion that requires mitigation but has not been addressed.
Settlement (1)	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits. (2)
Scour (3)	Exists within tolerable limits established for the bridge.	Exceeds tolerable limits but is less than the critical limits established for the bridge.

(1) The Settlement defect applies to substructure components, pipes, and other components that are directly affected by settlement. Indirect effects of settlement on superstructure and deck components are evaluated by the resulting defects.

(2) Tolerable settlement can be considered as uniform or differential settlement that is not causing other bridge defects or increased.

(3) The critical limit for scour is the scour depth at which the bridge becomes unstable.

Table 47: CONCRETE DEFECTS – condition rating guidance

Defect	Minor (CS2 - fair)	Moderate (CS3-poor)
Delamination, Spalling, Patched Area	Delamination, small spall, or patched area that is sound.	Large spall or patched area that is unsound or showing distress.
Exposed Rebar	Present without measurable section loss.	Present with measurable section loss.
Exposed Prestressing	Present without section loss.	Present with section loss.
Cracking	Unsealed narrow width cracks or unsealed narrow pattern (map) cracking.	Medium cracks or extensive pattern (map) cracking.
Abrasion, Wear, Scaling	Exposed coarse aggregate, but the aggregate remains secure in the concrete.	Coarse aggregate is loose or has popped out of the concrete matrix.
Efflorescence, Rust Staining	Surface white or leaching with little or no build-up. No rust staining present	Rust staining or heavy build-up of efflorescence.

Spall defect descriptions:

- Small spall: ≤ 1” deep or ≤ 6” in diameter.
- Large spall: > 1” deep or > 6” in diameter.

Concrete crack defect descriptions:

- **Hairline** (SNBI-Insignificant) – crack width < 0.004” (prestressed) or 0.012” (reinforced), or sealed narrow (SNBI-medium) width crack.
- **Narrow** (SNBI-Medium) – crack width ranging from 0.004 – 0.009” (prestressed) or 0.012 to 0.05” (reinforced).
- **Medium** (SNBI-Wide) – crack width > 0.009” (prestressed) or 0.05” (reinforced).
- **Moderate** (SNBI Medium) pattern (map) – crack spacing of 1 ft. to 3 ft.
- **Extensive** (SNBI-Heavy) pattern (map) – crack spacing < 1 ft.

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Table 48: STEEL – condition rating guidance

Defect	Minor (CS2 - fair)	Moderate (CS3-poor)
Corrosion (1)	Freckle rust. Corrosion has initiated.	Section loss is evident.
Cracking	Crack that has been effectively arrested.	Crack that has not been arrested.
Connection (2)	Loose fasteners, or pack rust without distortion. Connection is in place and functioning as intended.	Missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion.

(1) Weathering Steel - a well-formed patina is considered a protective coating and is not considered a defect.

(2) Connection defect applies to any members of a component that are fastened by bolts, rivets, or welds.

Table 49: MASONRY – condition rating guidance

Defect	Minor (CS2 - fair)	Moderate (CS3-poor)
Efflorescence, Rust Staining	Surface white or leaching with little or no build-up. No rust staining present	Rust staining or heavy build-up of efflorescence.
Mortar Breakdown	Cracking or partial depth voids.	Full depth voids.
Splits, Spalls	Block or stone has split or spalled with no shifting.	Block or stone has split or spalled with shifting.
Patched Area	Sound patch.	Unsound patch.
Displacement	Block or stone has shifted slightly out of alignment.	Block or stone has shifted significantly out of alignment or is missing.

Table 50: TIMBER – condition rating guidance

Defect	Minor (CS2 - fair)	Moderate (CS3-poor)
Cracking	Crack that has been effectively arrested.	Crack that has not been arrested.
Connection	Loose fasteners, or pack rust without distortion. Connection is in place and functioning as intended.	Missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion.
Decay, Section Loss	Affects up to 10% of the member section.	Affects more than 10% of the member section.
Cracks, Shakes	Penetrates 5% to 50% of the thickness of the member; not in a high stress zone.	Penetrates more than 50% of the member thickness and length equal to or greater than the member depth or penetrates more than 5% of the member thickness in a high stress zone.
Splits, Delamination	Length less than the member depth or arrested with effective actions taken to mitigate.	Length equal to or greater than the member depth.
Abrasion, Wear	Affects up to 10% of the member section.	Affects more than 10% of the member section.

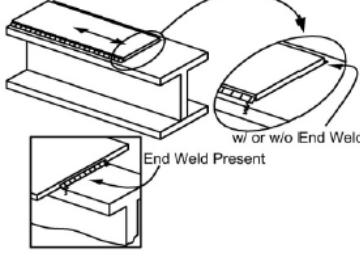
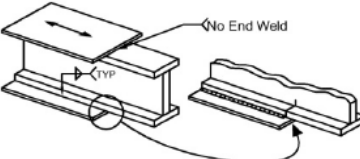
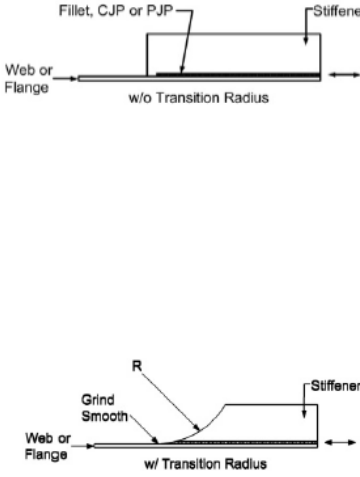
Table 52: BRIDGE BEARINGS – condition rating guidance.

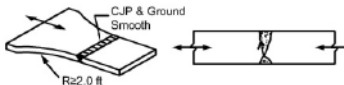
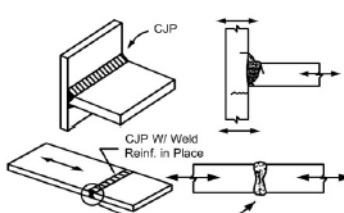
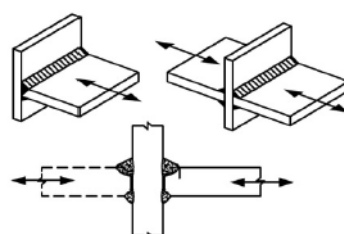
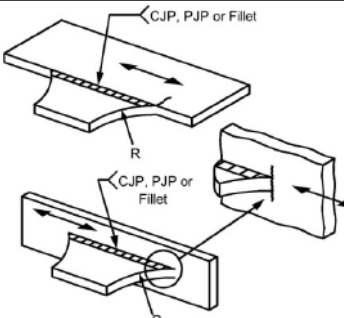
Defect	Minor (CS2 - fair)	Moderate (CS3-poor)
Movement	Minor restriction.	Restricted.
Alignment	Lateral or vertical alignment that is inconsistent with temperature conditions but is tolerable.	Approaching limits of lateral or vertical alignment for the bearing.
Bulging, Splitting, Tearing	Bulging less than 15% of bearing thickness.	Bulging 15% or more of bearing thickness. Splitting or tearing. Bearing's surfaces are not parallel.
Loss of Bearing Area	Up to 10%	More than 10%
Corrosion	Freckled rust. Corrosion has initiated.	Section loss is evident.
Connection	Loose fasteners, or pack rust without distortion. Connection is in place and functioning as intended.	Missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion.

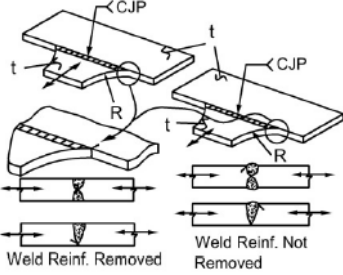
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Table 53: BRIDGE JOINTS – condition rating guidance

Defect	Minor (CS2 - fair)	Moderate (CS3-poor)	Major (CS4-severe)
Leakage	Minimal. Minor dripping through the joint.	Moderate. More than a drip and less than free flow of water.	Free flow of water through joint.
Seal Adhesion	Adhered for more than 50% of the joint height.	Adhered 50% or less of joint height but still some adhesion.	Complete loss of adhesion.
Seal Cracking	Surface crack.	Crack that partially penetrates the seal.	Crack that fully penetrates the seal.
Seal Damage	Seal abrasion without punctures.	Punctured, torn, or partially pulled out.	Punctured completely through, pulled out, or missing.
Debris Impact	Partially filled with hard packed material, but still allowing free movement.	Completely filled; impacts joint movement.	Completely filled; prevents joint movement.
Adjacent Deck or Header	Edge deterioration or spall 1" or less deep or 6" or less in diameter. No exposed rebar. Patched area that is sound.	Spall greater than 1" deep or greater than 6" diameter. Exposed rebar. Delamination or unsound patched area that makes the joint loose.	Spall, delamination, unsound patched area, or loose joint anchor that prevents the joint from functioning as intended.
Metal Deterioration or Damage	Freckled rust. Metal has no cracks or impact damage. Connection may be loose but functioning as intended.	Section loss, missing or broken fasteners, cracking of the metal, or impact damage. Joint still functioning.	Section loss, cracking of the metal, damage, or connection failure that prevents the joint from functioning as intended.

Description	Category	Constant A (ksi ³)	Threshold $(\Delta F)_{TH}$ ksi	Potential Crack Initiation Point	Illustrative Examples
Section 3—Welded Joints Joining Components of Built-Up Members					
<p>3.5 Base metal at the termination of partial length welded cover plates having square or tapered ends that are narrower than the flange, with or without welds across the ends, or cover plates that are wider than the flange with welds across the ends:</p> <p>Flange thickness ≤ 0.8 in. Flange thickness > 0.8 in.</p>	<p>E E'</p>	<p>11×10^8 3.9×10^8</p>	<p>4.5 2.6</p>	<p>In the flange at the toe of the end weld or in the flange at the termination of the longitudinal weld or in the edge of the flange with wide cover plates</p>	
<p>3.7 Base metal at the termination of partial length welded cover plates that are wider than the flange and without welds across the ends.</p>	<p>E'</p>	<p>3.9×10^8</p>	<p>2.6</p>	<p>In the edge of the flange at the end of the cover plate weld</p>	
Section 4—Welded Stiffener Connections					
<p>4.3 Base metal at the termination of longitudinal stiffener-to-web or longitudinal stiffener-to-box flange welds:</p> <p>With the stiffener attached by fillet welds and with no transition radius provided at the termination:</p> <p>Stiffener thickness < 1.0 in. Stiffener thickness ≥ 1.0 in.</p> <p>With the stiffener attached by welds and with a transition radius R provided at the termination with the weld termination ground smooth:</p> <p>$R \geq 24$ in. 24 in. $> R \geq 6$ in. 6 in. $> R \geq 2$ in. 2 in. $> R$</p>	<p>E E'</p> <p>B C D E</p>	<p>11×10^8 3.9×10^8</p> <p>120×10^8 44×10^8 22×10^8 11×10^8</p>	<p>4.5 2.6</p> <p>16 10 7 4.5</p>	<p>In the primary member at the end of the weld at the weld toe</p> <p>In the primary member near the point of tangency of the radius</p>	

Section 5—Welded Joints Transverse to the Direction of Primary Stress					
Description	Category	Constant A_3 (ksi ³)	Threshold $(\Delta F)_{TH}$ ksi	Potential Crack Initiation Point	Illustrative Examples
5.2 Base metal and weld metal in or adjacent to complete joint penetration groove welded butt splices, with weld soundness established by NDT and with welds ground parallel to the direction of stress at transitions in width made on a radius of not less than 2 ft with the point of tangency at the end of the groove weld (see also Figure 6.13.6.2-1).	B	120×10^8	16	From internal discontinuities in the filler metal or discontinuities along the fusion boundary	
5.3 Base metal and weld metal in or adjacent to the toe of complete joint penetration groove welded T or corner joints, or in complete joint penetration groove welded butt splices, with or without transitions in thickness having slopes no greater than 1:2.5 when weld reinforcement is not removed. (Note: cracking in the flange of the 'T' may occur due to out-of-plane bending stresses induced by the stem).	C	44×10^8	10	From the surface discontinuity at the toe of the weld extending into the base metal or along the fusion boundary	
5.4 Base metal and weld metal at details where loaded discontinuous plate elements are connected with a pair of fillet welds or partial joint penetration groove welds on opposite sides of the plate normal to the direction of primary stress.	C as adjusted in Eq. 6.6.1.2.5-4	44×10^8	10	Initiating from the geometrical discontinuity at the toe of the weld extending into the base metal or, initiating at the weld root subject to tension extending up and then out through the weld	
Section 6—Transversely Loaded Welded Attachments					
6.1 Base metal in a longitudinally loaded component at a transversely loaded detail (e.g. a lateral connection plate) attached by a weld parallel to the direction of primary stress and incorporating a transition radius R with the weld termination ground smooth.				Near point of tangency of the radius at the edge of the longitudinally loaded component	
$R \geq 24$ in.	B	120×10^8	16		
24 in. $> R \geq 6$ in.	C	44×10^8	10		
6 in. $> R \geq 2$ in.	D	22×10^8	7		
2 in. $> R$	E	11×10^8	4.5		
(Note: Condition 6.2, 6.3 or 6.4, as applicable, shall also be checked.)					

Description	Category	Constant A (ksi ³)	Threshold $(\Delta F)_{TH}$ ksi	Potential Crack Initiation Point	Illustrative Examples
Section 6—Transversely Loaded Welded Attachments					
<p>6.2 Base metal in a transversely loaded detail (e.g. a lateral connection plate) attached to a longitudinally loaded component of equal thickness by a complete joint penetration groove weld parallel to the direction of primary stress and incorporating a transition radius R, with weld soundness established by NDT and with the weld termination ground smooth:</p> <p>With the weld reinforcement removed:</p> <p>$R \geq 24$ in.</p> <p>24 in. $> R \geq 6$ in.</p> <p>6 in. $> R \geq 2$ in.</p> <p>2 in. $> R$</p>	<p>B</p> <p>C</p> <p>D</p> <p>E</p>	<p>120×10^8</p> <p>44×10^8</p> <p>22×10^8</p> <p>11×10^8</p>	<p>16</p> <p>10</p> <p>7</p> <p>4.5</p>	<p>Near points of tangency of the radius or in the weld or at the fusion boundary of the longitudinally loaded component or the transversely loaded attachment</p>	
<p>With the weld reinforcement not removed:</p> <p>$R \geq 24$ in.</p> <p>24 in. $> R \geq 6$ in.</p> <p>6 in. $> R \geq 2$ in.</p> <p>2 in. $> R$</p> <p>(Note: Condition 6.1 shall also be checked.)</p>	<p>C</p> <p>C</p> <p>D</p> <p>E</p>	<p>44×10^8</p> <p>44×10^8</p> <p>22×10^8</p> <p>11×10^8</p>	<p>10</p> <p>10</p> <p>7</p> <p>4.5</p>	<p>At the toe of the weld either along the edge of the longitudinally loaded component or the transversely loaded attachment</p>	
Section 7—Longitudinally Loaded Welded Attachments					
<p>7.1 Base metal in a longitudinally loaded component at a detail with a length L in the direction of the primary stress and a thickness t attached by groove or fillet welds parallel or transverse to the direction of primary stress where the detail incorporates no transition radius:</p> <p>$L < 2$ in.</p> <p>2 in. $\leq L \leq 12t$ or 4 in.</p> <p>$L > 12t$ or 4 in.</p> <p>$t < 1.0$ in</p> <p>$t \geq 1.0$ in.</p>	<p>C</p> <p>D</p> <p>E</p> <p>E'</p>	<p>44×10^8</p> <p>22×10^8</p> <p>11×10^8</p> <p>3.9×10^8</p>	<p>10</p> <p>7</p> <p>4.5</p> <p>2.6</p>	<p>In the primary member at the end of the weld at the weld toe</p>	