

## 12-5 COMPLETE JOINT PENETRATION AND PARTIAL JOINT PENETRATION GROOVE WELDS

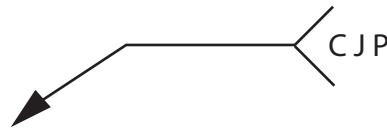
The Complete Joint Penetration (**CJP**) groove weld is a groove weld that extends completely through the thickness of components joined. The primary purpose for the use of the **CJP** groove welds is to transmit the full load-carrying capacity of the structural components they join. Most **CJP** welds require a specific edge preparation. The **CJP** welds should be used when deemed necessary, but should be kept to a minimum. Fillet welds are the preferred method of joining components owing to their overall economy, ease of fabrication and adaptability.

The Partial Joint Penetration (**PJP**) groove weld is a groove weld that does not extend completely through the thickness of components joined. The following **PJP** welds shall be prohibited:

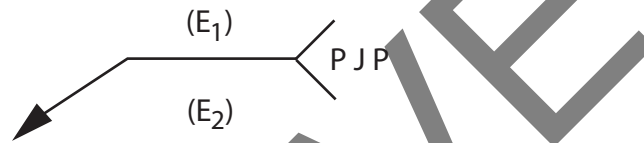
- **PJP** groove welds in butt joints except those conforming to AASHTO/AWS D1.5 (2002), Article 2.17.3 “Connections or Splices in Compression Members with Milled Joints” (AASHTO/AWS D1.5, 2002, Article 2.14).
- **PJP** groove welds where the applied tensile stress is normal to its effective throat (Caltrans BDS 2000, Table 10.3.1B Footnote c). Effective throat of a weld is the shortest distance from the joint root to its surface.

When a **CJP** groove weld or a **PJP** groove weld is used, the designer is encouraged not to detail specific groove details and not to call out the symbol for a specific weld type, i.e. a double-V-groove or square-groove. Instead, point the weld arrow to the joint location and call out **CJP** or **PJP** as shown in the following figures. The specific details are left to the Contractor/Fabricator. The Contractor/Fabricator is in the best position to choose the appropriate groove weld details in accordance with the current AASHTO/AWS welding codes for the welded joints in order to avoid undesirable effects such as excessive distortion based on the Contractor/Fabricator’s experience and operational capacities.

The welding symbol without dimensions designates a **CJP** weld, as follows:



The welding symbol with effective weld size ( $E_1$ ) for other side and ( $E_2$ ) for arrow side designates a **PJP** weld, as follows:



The effective weld size of a **PJP** groove weld shall be the depth of bevel with or without a deduction of 3 mm (1/8 in.) (AASHTO/AWS D1.5, 2002).

The welding symbol without dimensions designates a **PJP** weld with minimum effective weld size as specified by the AASHTO/AWS D1.5 (2002) Table 2.2, as follows:



**Table 2.2 AASHTO/AWS D1.5 (2002)**  
**Minimum Effective Weld Size for PJP Groove Welds<sup>1,2</sup>**

Base Metal Thickness of Thicker Part Jointed (T)	Minimum Effective Weld Size
$T \leq 20$ mm (3/4 in.)	6 mm (1/4 in.)
$T > 20$ mm (3/4 in.)	8 mm (5/16 in.)

Notes:

- Smaller welds may be approved by the Engineer based upon applied stress and use of appropriate preheat.
- Except that the weld size need not exceed the thickness of the thinner part.



## Reference

AASHTO/AWS. 2002. *Bridge Welding Code*, AASHTO/AWS D1.5M/D1.5:2002, American Association of State Highway and Transportation Officials, Washington, D.C.

Caltrans. 2000. *Bridge Design Specifications*, LFD Version, California Department of Transportation, Sacramento, CA.

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