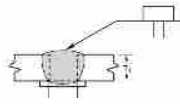

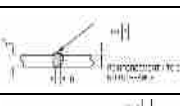
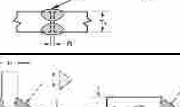
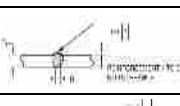
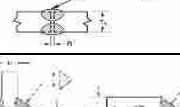
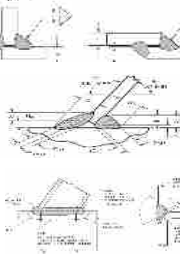
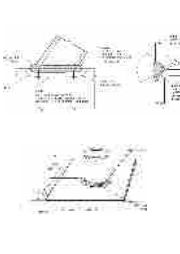


Comparison between Non-tubular and Tubular WPS/PQR for preparation.

Item	Non-tubular structure		Tubular structure	
Applicable for	Structure beam, plate (as formed, PG, rolled plate, box)			Structure pile, tubular (as rolled 1 seam, 2 seams, API 2B)
Thickness range (T)	3 mm to unlimited (Table 4.2)			3 mm to unlimited (Table 9.10)
Diameter range (DN)	Rolled plate or box pipe DN > 600 (Table 4.2)			DN > 20 and over (Table 9.10)
Type of Welds qualified WPS	WPS qualified with Section 4			WPS qualified with Section 9
	CJP Groove Welds for Nontubular Connections			CJP Groove Welds for Tubular Connections
	PJP Groove Welds for Nontubular Connections			PJP Groove Welds for Tubular T-, Y-, and K connections and Butt Joints
CJP definitions	1-CJP with backing/ backgouging as Figure 3.3 *exception prequalified CJP joint B-L1-S without backing/ backgouging *para 3.xx, figure 3.xx is prequalified items by AWS.		inside accessible joint (backgouging), inaccessible or accessible for backing strip.	4-CJP butt joint with backing or backgouging
			inside inaccessible joint	5-CJP butt joint without backing or backgouging
			inside accessible joint (backgouging), inaccessible or accessible for backing strip.	6-CJP T-, Y-, K-connections with backing or backgouging
			inside inaccessible joint	7-CJP T-, Y-, K-connections without backing welded from one side only
PJP definitions	2-PJP without backing/backgouging as Figure 3.2 *para 3.xx, figure 3.xx is prequalified items by AWS.			8-PJP without backing/backgouging for butt joints
				9-PJP without backing/backgouging for T-, Y-, K-connections
Fillet definitions	3-Fillet for Nontubular connections including: Plate as Figure 3.5 and Skew Tee joint (plates) as Figure 3.4, nontubular box pipe (DN>600) as Figure 9.12, Sample test figure 4.15 for plate *para 3.xx, figure 3.xx is prequalified items by AWS. *Skew T joint over prequalified valve will add the Z compensation table 9.5			10-Fillet for T-Y-K connections as figure 9.12 (above) with pipe to plate, sample test figure 9.21 (below) for pipe. *Only Fillet for TYK, why? Because Butt joint is not Fillet :))
PQR preparations	PQR testing	WPS nontubular	WPS tubular	PQR testing
Plate + Plate (Section 4) CJP groove with backing & back gouging	Tensile, Root bend, Face bend, Side bend. * Additional of Macroetch test if WPS cover PJP, Table 4.2 & 4.3	1- Nontubular (CJP) 2- Nontubular (PJP)* 3- Nontubular (Fillet plate + Skew Tee + Box pipe)	4- CJP butt (backing or backgouging) DN > 600 6- CJP T-, Y-, K-connections (backing or backgouging) DN > 600	N.A
Plate + Plate (Section 4) PJP groove without backing & back gouging	Tensile, Root bend, Face bend, Side bend, Macroetch see Table 4.3 for more note on PJP T-corner joints ... rarely use.	2- Nontubular (PJP) 3- Nontubular (Fillet plate + Skew Tee + Box pipe)	N.A	N.A
Pipe+Pipe (Section 9) CJP with Backing (backgouging will be cost very big sample!). In this case, the backing is backing strip, remained inside the pipe will qualified CJP for tubular, but NOT for Plate !!!!	* for qualifying the Nontubular CJP, the WPS must mention about the backing &(and) not or!! back gouging as per para 3.13.2	1- Nontubular (CJP)* 2- Nontubular (PJP) 3- Nontubular (Fillet plate + Skew Tee + Box pipe)	4-CJP butt joint (backing or backgouging) 6-CJP T-, Y-, K-connections (backing or backgouging) 8-PJP Butt 9-PJP TKY, 10-fillet	Testing acording to Table 9.10 Normally the Backgouging is use for tubular DN > 600 --> mean of CJP with backgouging and reweld. We sue the 1st PQR will save more money! If the tubular DN<600, the backgouging is impossible, the backing strip can be considered for the CJP with backing in Tubular concept. We will use the 4th PQR for cover many case of joints.
Pipe+Pipe (Section 9) CJP without Backing/backgouging. (welding one side only but assure that welding technique ability to full penetration - no defect at root - Tip: strichtly control root gap in WPS)	* for qualifying the Nontubular CJP, the WPS must mention about the backing &(and) not or!! back gouging as per para 3.13.2	1- Nontubular (CJP)* 2- Nontubular (PJP) 3- Nontubular (Fillet plate + Skew Tee + Box pipe)	4-CJP butt joint (backing or backgouging)* 6-CJP T-, Y-, K-connections (backing or backgouging)* 5-CJP butt joint (without backing or backgouging)* 7-CJP T-, Y-, K-connections (without backing or backgouging)***	* additional of backing is not essential variable. * you can make PQR with out backing, but can you assure that your welder will have skill enough to make it full penetration at root by one side welding? Depend on your skills. ** to cover the TKY case, the PQR sample must be in 6GR as per Figure 9.25 * to cover the TKY case, the testing of PQR must be added with Mock-up test samples as per Para 9.15.4.1 (2)