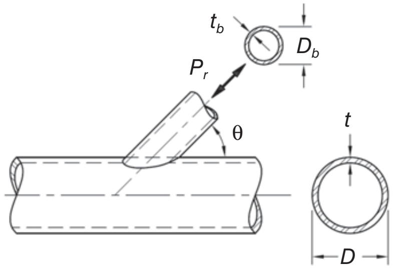
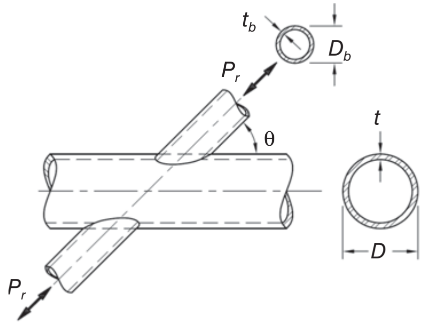
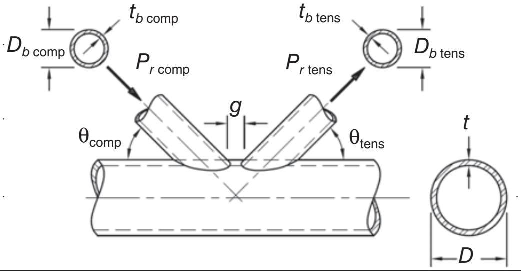
Table 8-1. Nominal Strengths of Round HSS-to-HSS Truss Connections

Connection Type	Connection Nominal Axial Strength*
General Check For T-, Y-, Cross- and K-Connections with Gap, when $D_{b\,(\text{tens/comp})} < (D - 2t)$	Limit State: Shear Yielding (Punching) $P_n = 0.6 F_y t \pi D_b \left(\dfrac{1 + \sin\theta}{2\sin^2\theta} \right)$ (K2-4) and (K2-9) $\phi = 0.95$ (LRFD) $\Omega = 1.58$ (ASD)
T- and Y-Connections 	Limit State: Chord Plastification $P_n \sin\theta = F_y t^2 \left(3.1 + 15.6\beta^2\right) \gamma^{0.2} Q_f$ (K2-3) $\phi = 0.90$ (LRFD) $\Omega = 1.67$ (ASD)
Cross-Connections 	Limit State: Chord Plastification $P_n \sin\theta = F_y t^2 \left(\dfrac{5.7}{1 - 0.81\beta} \right) Q_f$ (K2-5) $\phi = 0.90$ (LRFD) $\Omega = 1.67$ (ASD)
K-Connections with Gap or Overlap 	Limit State: Chord Plastification $\left(P_n \sin\theta\right)_{\text{compression branch}} = F_y t^2 \left(2.0 + 11.33 \dfrac{D_{b\,comp}}{D} \right) Q_g Q_f$ (K2-6) $\left(P_n \sin\theta\right)_{\text{tension branch}} = \left(P_n \sin\theta\right)_{\text{compression branch}}$ (K2-8) $\phi = 0.90$ (LRFD) $\Omega = 1.67$ (ASD)

Functions

$Q_f = 1$ for chord (connecting surface) in tension

$Q_f = 1.0 - 0.3U(1 + U)$ for chord (connecting surface) in compression

$$U = \left| \frac{P_r}{AF_c} + \frac{M_r}{SF_c} \right|$$

where P_r and M_r are determined on the side of the joint that has the lower compression stress. P_r and M_r refer to the required axial and flexural strength in the HSS. $P_r = P_u$ for LRFD; P_a for ASD. $M_r = M_u$ for LRFD; M_a for ASD.

$$Q_g = \gamma^{0.2} \left[1 + \frac{0.024\gamma^{1.2}}{\exp\left(\dfrac{0.5g}{t} - 1.33 \right) + 1} \right] \qquad \text{(K2-7)}$$

Note that exp(x) is identical to 2.71828^x, where 2.71828 is the base of the natural logarithm.

* Equation references are to the AISC *Specification*.