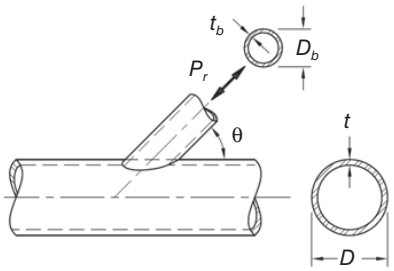
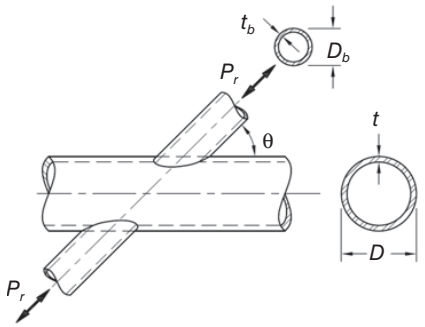
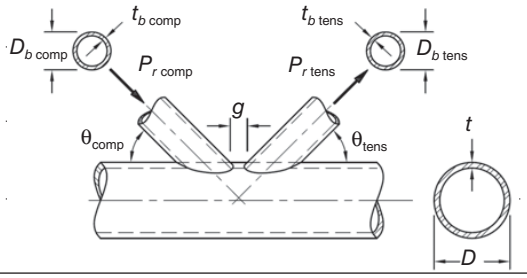
## 8.5 CONNECTION NOMINAL STRENGTH TABLES

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

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

**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.

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

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.*