3.6. Example (continue)

- Equipment design conditions (continue)

  - Condenser
    Material = Carbon Steel (from MSD)
    Design pres = Same as receiver (from Stripper PSV)
    = 1300 kPag
    Design temp = Max of 120 or 97+28 or relief temperature
    = 125 °C or relief temperature
    = 130 °C (rounded)
    Flange class = Class 150

  - Reboiler
    Tube side (High pressure side)
    Material = Carbon Steel (from MSD)
    Design pres = Based on steam header relief valve (from Design Basis)
    = Estimate at 1.1×4200
    = 4620 kPag
    = 4650 kPag (rounded)
    Design temp = Based on steam header design (from Design Basis)
    = Estimate at 257 + 100 (superheat) + 28 (margin)
    = 385 °C
    = 400 °C (rounded)
    Flange class = Class 600

    Shell side (Low pressure side)
    Material = Carbon Steel (from MSD)
    Design pres = Based on Stripper relief valve or $\frac{10}{13}$ HP side (if req.)
    = $P_d + \Delta P_{trays} + \Delta P_{pipe+hx}$ or $\frac{10}{13}$ HP side
    = 1250 + 25×0.12×6.895 + 5×6.895 or $\frac{10}{13}$×4650
    = 3577 kPag
    = 3580 kPag (rounded)
    Design temp = Max of 120 or 201+28 or relieving temp (later)
    = 229 °C
    = 235 °C (rounded)
    Flange class = Class 300

  - Feed-Bottoms Exchanger
    Shell side (High pressure side)
    Material = Carbon Steel (from MSD)
    Design pres = Based on Stripper relief valve
    = $P_d + \Delta P_{trays} + \Delta P_{elev} + \Delta P_{pipe} + \Delta P_{hx}$ for rated case
    = 1250 + 5×0.12×6.895 + 65×9.81×0.709/3.2808 + (5+20)×6.895
    = 1564 kPag
    = 1600 kPag (rounded)
    Design temp = Max of 120 or $T_{operating}$+28 or hot inlet (some companies)
    = Max of 120 or 150+28
    = 178 °C
    = 190 °C (rounded)
    Flange class = Class 300