100-130fsw CC

Wednesday, January 7, 2026 12:00 PM

$Data = \frac{130}{33} + 1 = 4.94$

$SP = 1.2$

$DF = 1.0$

$TGD = 5.2\ g/L$

$w = \frac{Data - SP}{Data - DF} = \frac{P^{loop}_{N_2+He}}{P^{DIL}_{N_2+He}} = \frac{3.74}{3.94} = 0.95$

$F^{DIL}_{O_2} = \frac{DF}{Data} = \frac{1.0}{4.94} = 0.20$

Constrain $P_{N_2} = 2.70$ and check resultant gas density:

$F^{DIL}_{N_2} = \frac{P_{N_2}}{w \cdot Data} = \frac{2.70}{0.95 * 4.94} = 0.575$

$\therefore F^{DIL}_{He} = 1 - F^{DIL}_{O_2} - F^{DIL}_{N_2} = 1 - 0.20 - 0.575 = 0.225$

Loop Gas Fractions:

$F^{loop}_{O_2} = \frac{1.2}{4.94} = 0.243$ $F^{loop}_{N_2} = w F^{DIL}_{N_2} = 0.95 * 0.575 = 0.546$

$F^{loop}_{He} = w F^{DIL}_{He} = 0.95 * 0.225 = 0.213$

Loop Gas Density =

$(F^{loop}_{O_2} \cdot d_{O_2} + F^{loop}_{N_2} d_{N_2} + F^{loop}_{He} d_{He}) * Data$

$= (0.243 * 1.428 + 0.546 * 1.251 + 0.213 * 0.179) * 4.94$

$= 1.068 * 4.94 = 5.28$

Resultant gas density is > 5.2 g/L ∴ use gas density formulation:

$$F_{He}^{loop} = \frac{Sp\, d_{O_2} + (Data - Sp)\, d_{N_2} - TGD}{Data\,(d_{N_2} - d_{He})}$$

$$= \frac{1.2 * 1.428 + 3.74 * 1.251 - 5.2}{4.94 * 1.072}$$

$$= \frac{1.192}{5.296} = 0.225$$

$$\therefore F_{He}^{Dil} = \frac{F_{He}^{loop}}{w} = \frac{0.225}{0.95} = 0.237$$

$\therefore$ Diluent mix is **TMX 20/24**