

$$V_{2-3} = \frac{0.397}{n} D^{\frac{2}{3}} S^{\frac{1}{2}} = \frac{0.397}{0.013} (0.45)^{\frac{2}{3}} (0.011)^{\frac{1}{2}} = 1.88 \text{ m/s}$$

تصميم الخط ٤ - ٣:

$$A = 1.55 \times 10^{-2} + 1.40 \times 10^{-2} + 1.22 \times 10^{-2} = 4.17 \times 10^{-2} \text{ km}^2 = 41700 \text{ m}^2$$

$$t = 11 + \frac{90}{1.88} \times \frac{1}{60} = 11.80 \text{ min}$$

$$i = \frac{2880}{t + 20} = \frac{2880}{11.8 + 20} = 90.6 \text{ mm/hr} = 0.0906 \text{ m/hr}$$

$$Q = C \cdot i \cdot A = 0.40 \times 0.0906 \times 41700 = 1096.22 \text{ m}^3/\text{hr} = 0.42 \text{ m}^3/\text{s}$$

$$S = \frac{92 - 91}{90} = 0.011$$

$$Q = \frac{0.312}{n} D^{\frac{8}{3}} S^{\frac{1}{2}}$$

$$0.42 = \frac{0.312}{0.013} D^{\frac{8}{3}} (0.011)^{\frac{1}{2}}$$

$$D_{3-4} = (0.167)^{3/8} = 0.51 \text{ m} \cong 500 \text{ mm}$$

$$V_{3-4} = \frac{0.397}{n} D^{\frac{2}{3}} S^{\frac{1}{2}} = \frac{0.397}{0.013} (0.50)^{\frac{2}{3}} (0.011)^{\frac{1}{2}} = 2.02 \text{ m/s}$$

تصميم الخط ٥ - ٤:

$$A = 1.55 \times 10^{-2} + 1.40 \times 10^{-2} + 1.22 \times 10^{-2} + 1.05 \times 10^{-2} = 5.22 \times 10^{-2} \text{ km}^2 = 52200 \text{ m}^2$$

$$t = 11.8 + \frac{90}{2.02} \times \frac{1}{60} = 12.54 \text{ min}$$

$$i = \frac{2880}{t + 20} = \frac{2880}{12.54 + 20} = 88.51 \text{ mm/hr} = 0.08851 \text{ m/hr}$$

$$Q = C \cdot i \cdot A = 0.40 \times 0.08851 \times 52200 = 1848 \text{ m}^3/\text{hr} = 0.51 \text{ m}^3/\text{s}$$

$$S = \frac{91 - 90.2}{90} = 8.888 \times 10^{-3}$$