

PROJECT BENGKEL TNB MALIM NAWAR

PUMP SIZING FOR HOSE REEL

A. DESIGN DATA

Total no. of Hose Reel : 9 nos
 Discharge per HR : 8 igpm
 Assume 3 in Operation : 3 X 8 = 24 Igpm
 Take Flowrate to be : 30 igpm = 8.2500001 m3/h = 2.291685 m3/h
 Static Head : 18 m 59.04 ft
 Distance of 2" (50mm) pipe
 from to furthes hose reel : 170 m 557.6 ft
 Pressure required at furthest NZ: 70 ft

B. PRESSURE LOST THROUGH FITTING

This data can be obtained from manufacurers valve/fitting cataloges of from std. Table

ITEM	PIPE SIZE	QUANTITY	LOST (ft)	EQV.LOSS(ft)
Gate valve	2" (50mm)	4	2.3	9.2
Strainer	2" (50mm)	1	30	30
Flexible Connection	2" (50mm)	2	2.3	4.6
Check Valve	2" (50mm)	1	20	20
L-bow	2" (50mm)	14	8.2	114.8
T-joint	2" (50mm)	6	10	60
Globe valve	2" (50mm)	0	-	0

Total Fitting Loss 238.6 ft

C. PUMP PRESSURE CALCULATION

Total Pressure Drop = (Length of Pipe work + Total Fitting Loss) X (Loss Per 100 Feet)

$$\begin{aligned}
 &= (170 + 238.6) \times \text{Loss per 100 feet} \\
 &= 408.6 \times 3.3 \text{ Loss per 100 feet} \\
 &= 408.6 \times 0.033 \\
 &= 13.4838 \\
 \text{Take} &= 14 \text{ ft}
 \end{aligned}$$

$$\begin{aligned}
 \text{Total Head} &= \text{Total Preesure Drop} + \text{Static} + \text{Pre. Req. at Nozzle} \\
 &= 14 + 59.04 + 70 \\
 &= 143.04 \text{ ft} = 43.61 \text{ m}
 \end{aligned}$$

Apply safety 12% :

$$\begin{aligned}
 &= 160.2048 \text{ ft} = 48.84 \text{ m} \\
 \text{Take Head} &= 165 \text{ ft} = 50.3 \text{ m}
 \end{aligned}$$

H	= 165 ft	= 50.3 m
Q	= 30 Igpm	= 8.25 m3/h
	= 36 Usgpm	= 2.292 L/s

Take ans. As :

H	=	165	ft	=	67	m
Q	=	30	lgpm	=	8.5	m ³ /h
	=	36	Usgpm	=	2.4	L/s

BRAKE HP

$$\text{Brake HP} = \frac{Q (\text{lgpm}) \times H (\text{ft}) \times \text{S.G}}{3960 \times \text{efficiency}}$$

$$.= \frac{(30 \times 165 \times 1)}{3300 \times 0.5}$$

$$= 3$$

Take	=	3	HP
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MOTOR HP

$$\text{HP (Motor)} = \frac{\text{BHP}}{0.75} \times 1.25$$

$$= \frac{3.75}{0.75} \times 1.25$$

Take	=	4	HP
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TANK SIZING

From UBBI pg 168, Water Storage Capacity

1 lit	=	0.21997 lgal
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1	HR	=	2,275	lit	
For each additional HR		=	1137.5	lit	
For	7	additional HR	=	7962.5	lit
For	8	HR	=	10,238	lit
		=	2251.9429	Igal	

But from UBBL:

Max.weter required for HR	=	9100	lit
		2001.727	Igal

Saiz Tank	=	5.00432	
Take	=	6	Compartment
	=	8W	x 12L x 4H