



Drawworks Drive Calculations

VanWorks Manufacturing Inc.

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Drive Summary:

Sauer Series 90 pump (variable) driving fixed 100 cc Sauer Series 90 motor. Output to Funk 3 speed with planetary. Chain and sprockets (double 100) to drum.

Inputs:

Engine (Power Source) Performance Details:		
Available Horsepower:	120	hp
Minimum Speed:	1000	rpm
Maximum Speed:	1400	rpm
PTO Ratio:	120%	
(Use 100% for direct drive)		
Pump Details:		
Displacement:	100	c.c.
Variable Min. Displacement:	5%	(of Max.)
Volumetric Efficiency:	95%	
Mechanical Efficiency:	95%	
Max. Operating Pressure:	4500	psi
Charge Pump Displacement:	20	c.c.
Motor Details:		
Displacement:	100	c.c.
Volumetric Efficiency:	95%	
Mechanical Efficiency:	95%	
Variable (Y/N)?	N	
If Yes, Min. Displacement:		c.c.
Transmission Details:		
Transmission (Y/N)?	Y	
Number of Speeds:	3	
1st Gear:	6.63	(Tallest)
2nd Gear:	2.54	
3rd Gear:	1	
4th Gear:		(Fastest)
Efficiency:	97%	
Maximum Input Speed:	3000	rpm
Maximum Input Torque:	3600	in-lbs
(Only complete if applicable)		
Planetary (Or Gear) Drive Details:		
Gear Drive (Y/N)?	Y	
Ratio:	4.89	(In:Out=1)
Efficiency:	97%	
Maximum Input Speed:	3000	rpm
Maximum Output Torque:	60,000	in-lbs
(Only complete if applicable)		
Chain Drive Details:		
Chain Drive (Y/N)?	Y	
# of Teeth on Drive Sprocket:	21	(Small)
# of Teeth on Driven Sprocket:	76	(On Drum)
(Only complete if applicable)		
Drum & Wireline Details:		
Drum Core Diameter:	14	inches
Drum Flange Diameter:	30	inches
Wireline Break Strength:	25000	lbs
Desired Pull:	14000	lbs

Outputs:

Oil Flows:			Horsepower:				
Charge Pump Flow (Max):	8.88 gpm (us)	33.6 L/min	2.1 hp				
Pump Flow (Min):	1.51 gpm (us)	5.7 L/min	4.4 hp				
Pump Flow (Max):	42.16 gpm (us)	159.6 L/min	122.7 hp				
Motor Speeds:							
Motor Speed Min @ Max Displacement (Lo):		54.2 rpm					
Motor Speed Max @ Max Displacement (Lo):		1516.2 rpm					
Motor Speed Min @ Min Displacement (Hi):		0.0 rpm					
Motor Speed Max @ Min Displacement (Hi):		0.0 rpm					
Drum Speeds:							
	Core	Mid	Flange	Core	Mid	Flange	Max Drum
	Min Speed (ft/min)			Max Speed (ft/min)			rpm
1st Gear (or No Gear):							
Motor (Lo):	1.7	2.7	3.6	47.4	74.4	101.5	12.9
Motor (Hi):	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2nd Gear:							
Motor (Lo):	4.4	6.9	9.5	123.6	194.3	264.9	33.7
Motor (Hi):	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd Gear:							
Motor (Lo):	11.2	17.6	24.0	314.0	493.5	672.9	85.7
Motor (Hi):	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4th Gear:							
Motor (Lo):	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor (Hi):	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Drum Speeds:							
	Core	Mid	Flange	Core	Mid	Flange	
	Min Speed (m/min)			Max Speed (m/min)			
1st Gear (or No Gear):							
Motor (Lo):	0.5	0.8	1.1	14.4	22.7	30.9	
Motor (Hi):	0.0	0.0	0.0	0.0	0.0	0.0	
2nd Gear:							
Motor (Lo):	1.3	2.1	2.9	37.7	59.2	80.7	
Motor (Hi):	0.0	0.0	0.0	0.0	0.0	0.0	
3rd Gear:							
Motor (Lo):	3.4	5.4	7.3	95.7	150.4	205.1	
Motor (Hi):	0.0	0.0	0.0	0.0	0.0	0.0	
4th Gear:							
Motor (Lo):	0.0	0.0	0.0	0.0	0.0	0.0	
Motor (Hi):	0.0	0.0	0.0	0.0	0.0	0.0	
Max Line Pull:							
	Core	Mid	Flange	Core	Mid	Flange	
	Max Pull (lbs)			Max Pull (kgs)			
1st Gear (or No Gear):							
Motor (Lo):	60341.2	38399.0	28159.2	27365.6	17414.5	12770.6	
Motor (Hi):	0.0	0.0	0.0	0.0	0.0	0.0	
2nd Gear:							
Motor (Lo):	23117.2	14710.9	10788.0	10484.0	6671.6	4892.5	
Motor (Hi):	0.0	0.0	0.0	0.0	0.0	0.0	
3rd Gear:							
Motor (Lo):	9101.2	5791.7	4247.2	4127.5	2626.6	1926.2	
Motor (Hi):	0.0	0.0	0.0	0.0	0.0	0.0	
4th Gear:							
Motor (Lo):	#####	#####	#####	#####	#####	#####	
Motor (Hi):	0.0	0.0	0.0	0.0	0.0	0.0	