

# Cylinder Speed Charts



## Cylinder Speed

This chart will help you calculate the time required for an Enerpac cylinder to lift a load when powered by a 10,000 psi Enerpac hydraulic pump.

The Cylinder Speed Chart can also be used to determine the pump type and model best suited for an application when you know the plunger speed required.

To determine:

### Cylinder plunger speed

An RC-308 cylinder (30 ton) is powered by a 50 Series Hushh pump. While lifting the load, the cylinder plunger will require 3.2 seconds to travel 1 inch.

30 ton		50 ton		75 ton		100 ton		Pump Type	
No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load
0.24	3.30	0.41	4.00	0.56	3.00	0.68	2.50	0.54	2.70
0.130	19.60	3.30	33.20	4.80	47.7	6.20	61.90	1/2 hp Econo	
0.240	19.60	4.80	33.20	6.40	47.7	8.30	61.90	1/2 hp Subm	
1.80	1.80	2.80	19.80	4.90	22.7	5.20	29.50	20 Series Co	
1.61	6.50	1.80	11.10	1.50	15.90	1.90	20.60	30 Series Hu	
1.61	3.20	1.61	11.10	1.50	8.00	1.90	10.30	50 Series Hu	
1.38	.84	.65	1.40	.34	2.10	1.20	2.70	8000 Series	
0.60	48.80	10.20	82.90	14.68	118.3	19.06	155.0	Turbo Pump	
0.780	48.70	13.30	82.90	19.10	118.3	24.80	154.7	PA-133	
0.60	43.30	1.00	73.70	1.50	106.0	1.90	137.5	10 Series	
0.46	13.00	.80	22.10	1.10	31.80	1.50	41.30	Modular Air	
1.90	9.70	3.30	16.60	4.80	23.90	6.20	30.90	Atlas Pump	

To determine:

### Best matching pump

Your 30 ton cylinder needs to move a load at a speed of 6.50 seconds per inch. Simply go down from the top of the chart, to the value of 6.50 seconds per inch. Then follow the chart

30 ton		50 ton		75 ton		100 ton		Pump Type	
No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load
0.24	3.30	0.41	4.00	0.56	3.00	0.68	2.50	0.54	2.70
0.130	19.60	3.30	33.20	4.80	47.7	6.20	61.90	1/2 hp Econo	
0.240	19.60	4.80	33.20	6.40	47.7	8.30	61.90	1/2 hp Subm	
1.80	1.80	2.80	19.80	4.90	22.7	5.20	29.50	20 Series Co	
1.61	6.50	1.80	11.10	1.50	15.90	1.90	20.60	30 Series Hu	
1.61	3.20	1.61	11.10	1.50	8.00	1.90	10.30	50 Series Hu	
1.38	.84	.65	1.40	.34	2.10	1.20	2.70	8000 Series	
0.60	48.80	10.20	82.90	14.68	118.3	19.06	155.0	Turbo Pump	
0.780	48.70	13.30	82.90	19.10	118.3	24.80	154.7	PA-133	
0.60	43.30	1.00	73.70	1.50	106.0	1.90	137.5	10 Series	
0.46	13.00	.80	22.10	1.10	31.80	1.50	41.30	Modular Air	
1.90	9.70	3.30	16.60	4.80	23.90	6.20	30.90	Atlas Pump	

to the right to find that the 50 Series Hushh pump is most suitable for your application.

## Number of Pump Handle Strokes per Inch of Cylinder Plunger Travel

Cyl. Capacity ▶	5 ton		10 ton		15 ton		25 ton		30 ton		50 ton		75 ton		100 ton		Pump Type	Page
	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load		
▼ Power Source Manual	7	7	15	15	21	21	34	34	43	43	73	73	105	105	137	137	P-391	52
	2	7	4	15	5	21	8	34	10	43	16	73	24	105	30	137	P-392	52
	1	7	2	15	3	21	5	34	7	43	11	73	16	105	21	137	P-80/84/801	54
	1	7	1	15	1	21	2	34	3	43	5	73	7	105	9	137	P-802/842	52
	1	3	1	8	1	11	1	18	1	23	2	38	2	55	3	71	P-462/464	54

## Seconds per Inch of Cylinder Plunger Travel

Cyl. Capacity ▶	5 ton		10 ton		15 ton		25 ton		30 ton		50 ton		75 ton		100 ton		Pump Type	Page
	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load		
Battery	3.7	5.9	8.4	13.0	11.8	18.8	19.3	30.9	Not recommended								WalkPac™	60
Electric (speed based on 60 Hz)	.30	3.0	.67	6.7	.94	9.4	1.5	15.5	1.9	19.5	3.3	33.2	4.8	47.7	6.2	61.9	1/2 hp Economy	62
	.09	1.0	.21	2.2	.29	3.1	.48	5.2	.61	6.5	1.0	11.1	1.5	15.9	1.9	20.6	Titan	64
	.40	3.0	.90	6.7	1.3	9.4	2.1	15.5	2.6	19.5	4.4	33.2	6.4	47.7	8.3	61.9	1/2 hp Submerged	68
	.25	1.4	.56	3.2	.79	4.5	1.3	7.4	1.6	9.3	2.8	15.8	4.0	22.7	5.2	29.5	20 Series Compact	72
	.09	1.0	.21	2.2	.29	3.1	.58	5.2	.61	6.5	1.0	11.1	1.5	15.9	1.9	20.6	30 Series Hushh	76
	.09	.50	.21	1.1	.29	1.6	.58	2.6	.61	3.2	1.0	5.5	1.5	8.0	1.9	10.3	50 Series Hushh	76
Air (speed based on 100 psi air pressure)	.06	.13	.13	.29	.19	.41	.30	.67	.38	.84	.65	1.4	.94	2.1	1.2	2.7	8000 Series	82
	.92	7.5	2.1	16.7	2.9	23.6	4.8	40.0	6.0	48.8	10.2	82.9	14.7	119.3	19.1	155.0	Turbo Pump	86
	1.2	7.4	2.7	16.8	3.8	23.6	6.2	38.6	7.8	48.7	13.3	82.9	19.1	119.3	24.8	154.7	PA-133	88
	.09	6.6	.21	14.9	.29	20.9	.48	34.3	.60	43.3	1.0	73.7	1.5	106.0	1.9	137.5	10 Series	89
Gasoline	.07	2.0	.16	4.5	.22	6.3	.36	10.3	.46	13.0	.80	22.1	1.1	31.8	1.5	41.3	Modular Air	90
	.30	1.5	.67	3.4	.94	4.7	1.5	7.7	1.9	9.7	3.3	16.6	4.8	23.9	6.2	30.9	Atlas Pump 2.5 hp	92
	.12	1.1	.28	2.4	.39	3.4	.64	5.6	.81	7.1	1.4	12.1	2.0	17.3	2.6	22.5	Atlas Pump 5.0 hp	92
	.12	.59	.28	1.3	.39	1.9	.64	3.1	.81	3.9	1.4	6.6	2.0	9.5	2.6	12.4	Atlas Pump 5.5 hp	92

No Load indicates the plunger speed as the plunger extends towards the load (1st stage).  
Load indicates the plunger speed as the load is lifted at a system pressure of 10,000 psi (2nd stage).

### Formula V = A ÷ Q

$$V \text{ (sec/in)} = A \text{ (in}^2\text{)} \div Q \text{ (in}^3\text{/min)}$$

V = Cylinder plunger speed in seconds per inch

A = Cylinder effective area in square inches

Q = Pump oil flow in cubic inches

### Example

At what speed (V) will the RC-308 (30 ton) cylinder move when powered by a 20 Series electric driven Hushh pump?

20 Series pump:  
Oil flow Q, (no load) is 240 in<sup>3</sup>/min

RC-308 cylinder:  
Effective area A is 6.50 in<sup>2</sup>

$$V = 6.50 \text{ in}^2 \div 240 \text{ in}^3\text{/min} \times 60 = 1.60 \text{ sec/in}$$

$$\text{Cylinder Plunger Speed (sec/in)} = \frac{\text{Cylinder Effective Area (in}^2\text{)}}{\text{Pump Flow Rate (in}^3\text{/min)}} \times \frac{60 \text{ sec}}{1}$$