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LAMPIRAN 1

Tabel Perhitungan Pengambilan Data

0°	Pd (Pa)	Ps (Pa)	Hs	ΔHp	His	V (m/s)	g(m/s2)	$V^2/2g$	H	Pa (Pa)	Pv (Pa)	ρ.g	NPSHa	f (Hz)	$Q(m^3/s)$
1400	6890	-3390	0.3	1.049	0.0058	0.33	9.8	0.0058	1.415	101000	3450	9800	9.913	23.000	0.00020
2400	55200	-6770	0.3	6.323	0.0053	0.31	9.8	0.0053	6.689	101000	3450	9800	9.568	22.000	0.00019
3000	82700	-10200	0.3	9.480	0.0048	0.30	9.8	0.0048	9.844	101000	3450	9800	9.218	21.000	0.00018
3500	110000	-16900	0.3	12.949	0.0044	0.29	9.8	0.0044	13.313	101000	3450	9800	8.534	20.000	0.00017
30°	Pd (Pa)	Ps (Pa)	Hs	ΔHp	His	V (m/s)	g(m/s2)	$V^2/2g$	H	Pa (Pa)	Pv (Pa)	ρ.g	NPSHa	f (Hz)	$Q(m^3/s)$
1400	20700	-3390	0.3	2.458	0.0058	0.33	9.8	0.0058	2.824	101000	3450	9800	9.913	23.000	0.00020
2400	41400	-10200	0.3	5.265	0.0053	0.31	9.8	0.0053	5.631	101000	3450	9800	9.218	22.000	0.00019
3000	55200	-16900	0.3	7.357	0.0048	0.30	9.8	0.0048	7.722	101000	3450	9800	8.534	21.000	0.00018
3500	75800	-20300	0.3	9.806	0.0044	0.29	9.8	0.0044	10.171	101000	3450	9800	8.187	20.000	0.00017
45°	Pd (Pa)	Ps (Pa)	Hs	ΔHp	His	V (m/s)	g(m/s2)	$V^2/2g$	H	Pa (Pa)	Pv (Pa)	ρ.g	NPSHa	f (Hz)	$Q(m^3/s)$
1400	20700	-10200	0.3	3.153	0.0058	0.33	9.8	0.0058	3.519	101000	3450	9800	9.218	23.000	0.00020
2400	55200	-16900	0.3	7.357	0.0053	0.31	9.8	0.0053	7.722	101000	3450	9800	8.534	22.000	0.00019
3000	68900	-27100	0.3	9.796	0.0048	0.30	9.8	0.0048	10.161	101000	3450	9800	7.494	21.000	0.00018
3500	89600	-44000	0.3	13.633	0.0044	0.29	9.8	0.0044	13.997	101000	3450	9800	5.769	20.000	0.00017
60°	Pd (Pa)	Ps (Pa)	Hs	ΔHp	His	V (m/s)	g(m/s2)	$V^2/2g$	H	Pa (Pa)	Pv (Pa)	ρ.g	NPSHa	f (Hz)	$Q(m^3/s)$

1400	6890	-16900	0.3	2.428	0.0058	0.33	9.8	0.0058	2.793	101000	3450	9800	8.534	23.000	0.00020
2400	13800	-54200	0.3	6.939	0.0053	0.31	9.8	0.0053	7.304	101000	3450	9800	4.728	22.000	0.00019
3000	20700	-67700	0.3	9.020	0.0048	0.30	9.8	0.0048	9.385	101000	3450	9800	3.351	21.000	0.00018
3500	-6890	-77900	0.3	7.246	0.0044	0.29	9.8	0.0044	7.610	101000	3450	9800	2.310	20.000	0.00017

Tabel Perhitungan Spesifikasi Kerja Pompa

Q (m) Similiarity Law	Head (m) Similiarity Law	0°
0.0002	1.413818302	1400
0.000342857	4.1548946	2400
0.000428571	6.492022813	3000
0.000514286	9.348512851	3500
Q (m) Similiarity Law	Head (m) Similiarity Law	30°
0.00019	2.823001975	1400
0.000325714	8.296169069	2400
0.000407143	12.96276417	3000
0.000488571	18.66638041	3500
Q (m) Similiarity Law	Head (m) Similiarity Law	45°
0.00018	3.517899934	1400
0.000308571	10.33831817	2400
0.000385714	16.15362215	3000

0.000462857	23.26121589	3500
Q (m) Similiarity Law	Head (m) Similiarity Law	60°
0.00017	2.79238973	1400
0.000291429	8.206206554	2400
0.000364286	12.82219774	3000
0.000437143	18.46396475	3500

LAMPIRAN 2

```
% Loading data
data1 = load('pump_3600_02_a2.txt'); % Original data in .txt
data2 = load('pump_3600_03_a3.txt'); % Original data in .txt
% Create fft using Hanning window
tacq = 1.59980469; % the last row of 1st coloumn
num_dat = 40960;   % data number
t=0:(tacq/num_dat):(tacq-(tacq/num_dat)); % x-axis for time domain
dt=(tacq/num_dat); % data interval for time domain

Max_Number=max(size(data1));
N=fix(log10(Max_Number)/log10(2));
Max_Number=max(size(data2));
N=fix(log10(Max_Number)/log10(2));

% Frequency axis domain
freq=0;
freqf=(1/dt)/10;
df=freqf/(2^N/2);
freq=0:df:freqf-df;

% FFT Caalculation from Original signal
s1h1=hanning(num_dat).*data1(:,3); % coloumn selection: depends on
channel
s1h2=hanning(num_dat).*data2(:,3); % coloumn selection: depends on
channel

xfft1=fft(s1h1(1:2^N)); xfft1=abs(xfft1(1:2^N/2))*dt;
% xfft1 = 20*log10(xfft1/max(xfft1));

xfft2=fft(s1h2(1:2^N)); xfft2=abs(xfft2(1:2^N/2))*dt;
% xfft2 = 20*log10(xfft2/max(xfft2));

% Plot waveform (time domain)
figure(1)
subplot(2,1,1)
plot(t,data1(:,3))
xlabel('Time (s)'); ylabel('Amplitude (V)')
axis([0 0.1 -0.3 0.3]);
% axis([0 0.1 -1 6]);


subplot(2,1,2)
plot(t,data2(:,3))
xlabel('Time (s)'); ylabel('Amplitude (V)')
axis([0 0.1 -0.3 0.3]);
% axis([0 0.1 -1 6]);

% Plot FFT (Frequency domain)
figure(2)
subplot(2,1,1)
plot(freq, xfft1);
xlabel('Frequency (Hz)'); ylabel('Amplitude (V)');
```

```
axis([0 500 0 3e-3]);
% axis([0 500 0 1.2]);

subplot(2,1,2)
plot(freq, xfft2);
xlabel('Frequency (Hz)'); ylabel('Amplitude(V)');
axis([0 500 0 3e-3]);
% axis([0 500 0 1.2]);
```