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LAMPIRAN

Lampiran 1. Contoh Perhitungan Selisih Suhu Brondolan

Persamaan berikut digunakan untuk menghitung jumlah suhu brondolan:

$$\Delta T = T_2 - T_1$$

Keterangan

ΔT = selisih suhu brondolan °C

T_2 = suhu akhir brondolan °C

T_1 = suhu awal brondolan °C

Contoh perhitungan selisih suhu pada hari pertama adalah sebagai berikut

$$\Delta T = 92{,}0\ °C - 55{,}7\ °C$$

$$\Delta T = 36{,}3\ °C$$

Lampiran 2. Contoh Perhitungan Panas Per Satuan Massa

Rumus yang digunakan untuk mencari kabutuhan panas per satuan massa tenera dan dura adalah:

$$qtenera = Cptenera \cdot \Delta T$$

$$qdura = Cpdura \cdot \Delta T$$

Keterangan:

qtenera = kebutuhan panas per satuan massa brondolan tenera (kJ/kg brondolan)

qdura = kebutuhan panas per satuan massa brondolan dura (kJ/kg brondolan)

Cptenera = kalor jenis brondolan tenera (kJ/kg°C)

Cpdura = kalor jenis brondolan dura (kJ/kg°C)

ΔT = selisih suhu brondolan (°C).

Contoh perhitungan energi panas per satuan massa pada hari pertama adalah sebagai berikut:

$$qtenera = 2{,}7014 \text{ kJ/kg°C} \times 36{,}3 \text{ °C}$$

$$= 98{,}060 \text{ kJ/kg brondolan}$$

$$qdura = 2{,}2318 \text{ kJ/kg°C} \times 36{,}3 \text{ °C}$$

$$= 81{,}014 \text{ kJ/kg brondolan}$$

Lampiran 3. Contoh Perhitungan Massa *Steam* Spesifik

Rumus yang digunakan untuk mencari massa *steam* spesifik brondolan tenera dan dura

$$m\mathit{steam}\text{,tenera} = \frac{\text{qtenera}}{hfg}$$

$$m\mathit{steam}\text{,dura} = \frac{\text{qdura}}{hfg}$$

Keterangan:

m_{st} = massa *steam* spesifik brondolan tenera (kg steam/kg brondolan)

m_{sd} = massa steam spesifik berondolan dura kg steam/kg brondolan)

qtenera = kebutuhan panas per satuan massa brondolan tenera (kJ/kg brondolan)

qdura = kebutuhan panas per satuan massa brondolan dura (kJ/kg brondolan)

hfg = panas laten *steam* (kJ/kg *steam*).

Contoh perhitungan massa steam spesifik pada hari pertama adalah sebagai berikut:

$$\text{msteam,tenera} = \frac{98{,}057\ \text{kJ/kg brondolan}}{2.163\ \text{kJ/kg}\ steam}$$

msteam,tenera = 0,04533 kg *steam*/kg brondolan

$$m\mathit{steam}\text{,dura} = \frac{81{,}014\text{kJ/kg brondolan}}{2.163\ \text{kJ/kg}\ steam}$$

m*steam*,dura = 0,03745 kg steam/kg brondolan

Lampiran 4. Hasil Perhitungan Selisih Suhu Brondolan

Hari	Suhu awal (°C)	Suhu akhir (°C)	ΔT (°C)
1	55,7	92	36,3
2	52,5	93	40,5
3	54,3	90	35,7
4	53,6	93	39,4
5	54,3	90	35,7
6	53,9	91	37,1
7	55,3	95	39,7
8	52,8	93	40,2
9	53,4	91	37,6
10	54,1	92	37,9
11	55,2	90	34,8
12	53,7	91	37,3
13	54,7	92	37,3
14	52,9	91	38,1
15	55,5	90	34,5
16	54,6	91	36,4
17	53,1	90	36,9
18	55,4	93	37,6
19	53,7	91	37,3
20	54,5	92	37,5
21	53,6	92	38,4
22	53,4	93	39,6
23	52,9	91	38,1
24	53,4	92	38,6
25	55,8	93	37,2
26	53,2	90	36,8
27	53,8	91	37,2
28	54,5	92	37,5
29	54,9	92	37,1
30	54,2	92	37,8

Lampiran 5. Hasil Perhitugan Kebutuhan Panas Per Satuan Massa

Hari	ΔT (°C)	cp tenera (kJ/kg°C)	q tenera (kJ/kg brondolan)	Cp dura (kJ/kg°C)	q dura (kJ/kg brondolan)
1	36,3	2,7014	98,060	2,2318	81,014
2	40,5	2,7014	109,406	2,2318	90,388
3	35,7	2,7014	96,439	2,2318	79,675
4	39,4	2,7014	106,435	2,2318	87,933
5	35,7	2,7014	96,439	2,2318	79,675
6	37,1	2,7014	100,221	2,2318	82,800
7	39,7	2,7014	107,245	2,2318	88,602
8	40,2	2,7014	108,596	2,2318	89,718
9	37,6	2,7014	101,572	2,2318	83,916
10	37,9	2,7014	102,382	2,2318	84,585
11	34,8	2,7014	94,008	2,2318	77,667
12	37,3	2,7014	100,762	2,2318	83,246
13	37,3	2,7014	100,762	2,2318	83,246
14	38,1	2,7014	102,923	2,2318	85,032
15	34,5	2,7014	93,198	2,2318	76,997
16	36,4	2,7014	98,330	2,2318	81,238
17	36,9	2,7014	99,681	2,2318	82,353
18	37,6	2,7014	101,572	2,2318	83,916
19	37,3	2,7014	100,762	2,2318	83,246
20	37,5	2,7014	101,302	2,2318	83,693
21	38,4	2,7014	103,733	2,2318	85,701
22	39,6	2,7014	106,975	2,2318	88,379
23	38,1	2,7014	102,923	2,2318	85,032
24	38,6	2,7014	104,273	2,2318	86,147
25	37,2	2,7014	100,491	2,2318	83,023
26	36,8	2,7014	99,411	2,2318	82,130
27	37,2	2,7014	100,491	2,2318	83,023
28	37,5	2,7014	101,302	2,2318	83,693
29	37,1	2,7014	100,221	2,2318	82,800
30	37,8	2,7014	102,112	2,2318	84,362

Lampiran 6. Hasil Perhitungan Massa *Steam* Spesifik

Hari	Tekanan uap terukur (bar)	Tekanan atmosfer (bar)	Tekanan absolut (bar)	hfg (kJ/kg *steam*)	msteam tenera (kg *steam*/kg brondolan)	msteam dura (kg *steam*/kg brondolan)
1	2	1	3	2163	0,04534	0,03745
2	1,9	1	2,9	2165	0,05053	0,04175
3	2,3	1	3,3	2157	0,04471	0,03694
4	2,1	1	3,1	2161	0,04925	0,04069
5	1,9	1	2,9	2165	0,04454	0,03680
6	2,2	1	3,2	2159	0,04642	0,03835
7	2,5	1	3,5	2153	0,04981	0,04115
8	2,2	1	3,2	2159	0,05030	0,04156
9	2,2	1	3,2	2159	0,04705	0,03887
10	2,3	1	3,3	2157	0,04747	0,03921
11	1,9	1	2,9	2165	0,04342	0,03587
12	2,2	1	3,2	2159	0,04667	0,03856
13	2,2	1	3,2	2159	0,04667	0,03856
14	2,3	1	3,3	2157	0,04772	0,03942
15	2,1	1	3,1	2161	0,04313	0,03563
16	2,2	1	3,2	2159	0,04554	0,03763
17	2,1	1	3,1	2161	0,04613	0,03811
18	1,9	1	2,9	2165	0,04692	0,03876
19	2,3	1	3,3	2157	0,04671	0,03859
20	2,1	1	3,1	2161	0,04688	0,03873
21	2,2	1	3,2	2159	0,04805	0,03969
22	2,2	1	3,2	2159	0,04955	0,04094
23	2,2	1	3,2	2159	0,04767	0,03938
24	2,1	1	3,1	2161	0,04825	0,03986
25	2,2	1	3,2	2159	0,04655	0,03845
26	2,4	1	3,4	2155	0,04613	0,03811
27	2	1	3	2163	0,04646	0,03838
28	2,1	1	3,1	2161	0,04688	0,03873
29	2	1	3	2163	0,04633	0,03828
30	2,1	1	3,1	2161	0,04725	0,03904

Lampiran 7. Output SPSS Analisis Deskriptif

Descriptives

			Statistic	Std. Error
ΔT (°C)	Mean		37,5367	,26044
	95% Confidence Interval for Mean	Lower Bound	37,0040	
		Upper Bound	38,0693	
	5% Trimmed Mean		37,5407	
	Median		37,4000	
	Variance		2,035	
	Std. Deviation		1,42647	
	Minimum		34,50	
	Maximum		40,50	
	Range		6,00	
	Interquartile Range		1,30	
	Skewness		,094	,427
	Kurtosis		,249	,833
q tenera (kJ/kg)	Mean		101,4009	,70356
	95% Confidence Interval for Mean	Lower Bound	99,9620	
		Upper Bound	102,8398	
	5% Trimmed Mean		101,4119	
	Median		101,0320	
	Variance		14,850	
	Std. Deviation		3,85354	
	Minimum		93,20	
	Maximum		109,41	
	Range		16,21	
	Interquartile Range		3,51	
	Skewness		,094	,427
	Kurtosis		,249	,833
q dura (kJ/kg)	Mean		83,7743	,58123
	95% Confidence Interval for Mean	Lower Bound	82,5856	
		Upper Bound	84,9631	
	5% Trimmed Mean		83,7834	
	Median		83,4695	
	Variance		10,135	

	Std. Deviation		3,18355	
	Minimum		77,00	
	Maximum		90,39	
	Range		13,39	
	Interquartile Range		2,90	
	Skewness		,094	,427
	Kurtosis		,249	,833
msteam tenera (kg steam/kg berondolan)	Mean		,0469	,00033
	95% Confidence Interval for Mean	Lower Bound	,0463	
		Upper Bound	,0476	
	5% Trimmed Mean		,0470	
	Median		,0468	
	Variance		,000	
	Std. Deviation		,00180	
	Minimum		,04	
	Maximum		,05	
	Range		,01	
	Interquartile Range		,00	
	Skewness		,058	,427
	Kurtosis		,215	,833
msteam dura (kg steam/kg berondolan)	Mean		,0388	,00027
	95% Confidence Interval for Mean	Lower Bound	,0382	
		Upper Bound	,0393	
	5% Trimmed Mean		,0388	
	Median		,0387	
	Variance		,000	
	Std. Deviation		,00149	
	Minimum		,04	
	Maximum		,04	
	Range		,01	
	Interquartile Range		,00	
	Skewness		,060	,427
	Kurtosis		,220	,833

Lampiran 8. Output SPSS Uji Normalitas Shapiro-Wilk

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
q tenera (kJ/kg)	,116	30	,200*	,965	30	,413
q dura (kJ/kg)	,116	30	,200*	,965	30	,413
msteam tenera (kg steam/kg brondolan)	,125	30	,200*	,963	30	,364
msteam dura (kg steam/kg brondolan)	,125	30	,200*	,963	30	,359

*. This is a lower bound of the true significance.

Lampiran 9. Output SPSS Uji Paired Sample T-Test

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	q tenera (kJ/kg) - q dura (kJ/kg)	17,62657	,66999	,12232	17,37639	17,87674	144,099	29	,000
Pair 2	msteam tenera (kg steam/kg brondolan) - msteam dura (kg steam/kg brondolan)	,00816	,00031	,00006	,00804	,00828	143,265	29	,000