



## LAMPIRAN

### Kondensor

Fungsi	=	Mengkondensasikan steam							
		dari	310 °C	ke	100 °C				
Type	=	2-4 Shell and Tube Heat Exchanger							
Dasar pemilihan	=	Umum digunakan dan mempunyai range perpindahan panas yang besar							
Perhitungan :									
1	Dari neraca panas :								
	Kebutuhan pendingin	=	60781,7386 kg/jam	=	133720 lb/jam				
	Kebutuhan bahan	=	1.922,8932 kg/jam	=	4230,37 lb/jam				

						visko	0,04		
						$T_{av}$	=	478,15	K
	Komposisi	Laju alir	% berat		$k$ (Btu / lb <sup>o</sup> F.h)			$k$ campuran	
	Steam	1922,89	1,00		0,0248			0,0248	
	Total	1922,89	1					0,0248	
						$T_{av}$	=	478,15	K
	Komposisi	Laju alir	% berat		$cp$ (Btu / lb. °F)			$cp_{campuran}$	
	Steam	1922,89	1,00		0,48			0,48	
	Total	1922,89	1					0,48	
						$T_{av}$	=	478,15	K
	Komposisi	Laju alir	% berat		$\rho$ (lb/ft <sup>3</sup> )			$\rho$ campuran	
	Steam	1922,89	1,00		43,16			43,16	
	Total	1922,89	1					43,16	
						$T_{av}$	=	478,15	K
2	Suhu fluida masuk	=	310 °C	=	590 °F (T1)			S	0,04
	Suhu fluida keluar	=	100 °C	=	212 °F (T2)			R	21
	Suhu pendingin in	=	30 °C	=	86 °F (t1)				
	Suhu pendingin ou	=	40 °C	=	104 °F (t2)				
	$\Delta T$ LMTD	=	$\frac{504 - 108}{\ln \frac{504}{108}}$	=	257,068568 °F				
	$\Delta T$	=	$F_T \times \Delta T$ LMTD	Temperatur diff factor ( $F_T$ ) = 0,9					
		=	239,07377 °F						(Kern, fig 19)



3	Menentukan suhu kalori									
	Tc dan tc, dipakai temperatur rata-rata :									
	$t_{av}$	=	95	$^{\circ}\text{F}$	=	308,15	K	(pendingin)		
	$T_{av}$	=	401	$^{\circ}\text{F}$	=	478,15	K	(bahan)		
	Dipilih tipe		= 2-4 Heat Exchanger							
	Digunakan Shell and Tube dengan ukuran									
	OD, BWG	=	3/4	in	16	BWG				
	Pitch	=	1	in	Square Pitch					
	Panjang Tube	=	45	ft						
	Dari Tabel 10 Kern diperoleh									
	ID	=	0,620	in						
	a"t	=	0,302	in <sup>2</sup>						
	a"	=	0,1963	ft <sup>2</sup> /ft panjang						
	Asumsi :									
	$U_D$	=	75	-	150	btu/jam.ft <sup>2</sup> . $^{\circ}\text{F}$				(Kern tabel 8)
	$U_D$	=	150	btu/jam.ft <sup>2</sup> . $^{\circ}\text{F}$						
	A	=	Q	=	14522204,92					
			UD	x	$\Delta T$	150	x	239,074		
						=	404,957434	ft <sup>2</sup>		
	Nt	=	A	=	404,9574336					
			L	x	a	45	x	0,1963		
						=	45,8433728			
	Digunakan Nt	=	76							(Kern, tabel 9)
	Shell passes	=	6							
	ID shell	=	13 1/4	in						
	Tube OD	=	3/4	in						





**LAPORAN PRAKTIK KERJA LAPANGAN  
PT. PETROKIMIA GRESIK  
DEPARTEMEN PRODUKSI III A**



10. $U_C$	=	$h_{io} \times h_o / h_{io} + h_o$							
	=	2563	x	225,10	/	2563	+	225,10	
	=	206,9242		Btu/j ft <sup>2</sup> °F					
11. $U_D$	=	$Q / (A \times \Delta t \text{ LMTD})$							
	=	14522204,9158							
	=	404,957	x	239,0738					
	=	150		Btu/j ft <sup>2</sup> °F					
Rd hitung	=	$U_C - U_D / U_C \times U_D$							
	=	206,924	-	150	/	206,9242	x		
	=	0,0018		Btu/j ft <sup>2</sup> °F					
Rd perhitungan > Rd data (Kern ; T 12)									
0,00183	>	0,001		untuk media air					
Spek									
Tipe	=	2-4 Shell and Tube Heat Exchanger							
Dasar pemilihan	=	permukaan perpindahan panas yang luas							
Jumlah	=	1 buah							
Tube									
	OD	=	3/4	OD	16	BWG			
	Panjang	=	45	ft					
	Pitch	=	1	in	Square	Pitch			
	Jumlah Tube	=	76	Buah					
Shell									
	ID	=	13	in					
	Passes	=	6						
Bahan Konstruksi	=	Carbon Steel							
HE Area	=	404,957	ft						