

FIGURE 10.10

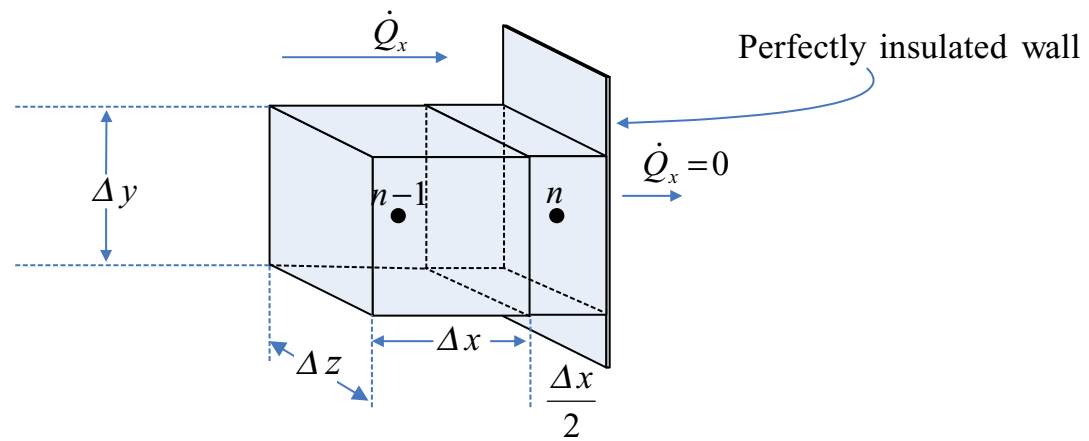


FIGURE 10.11

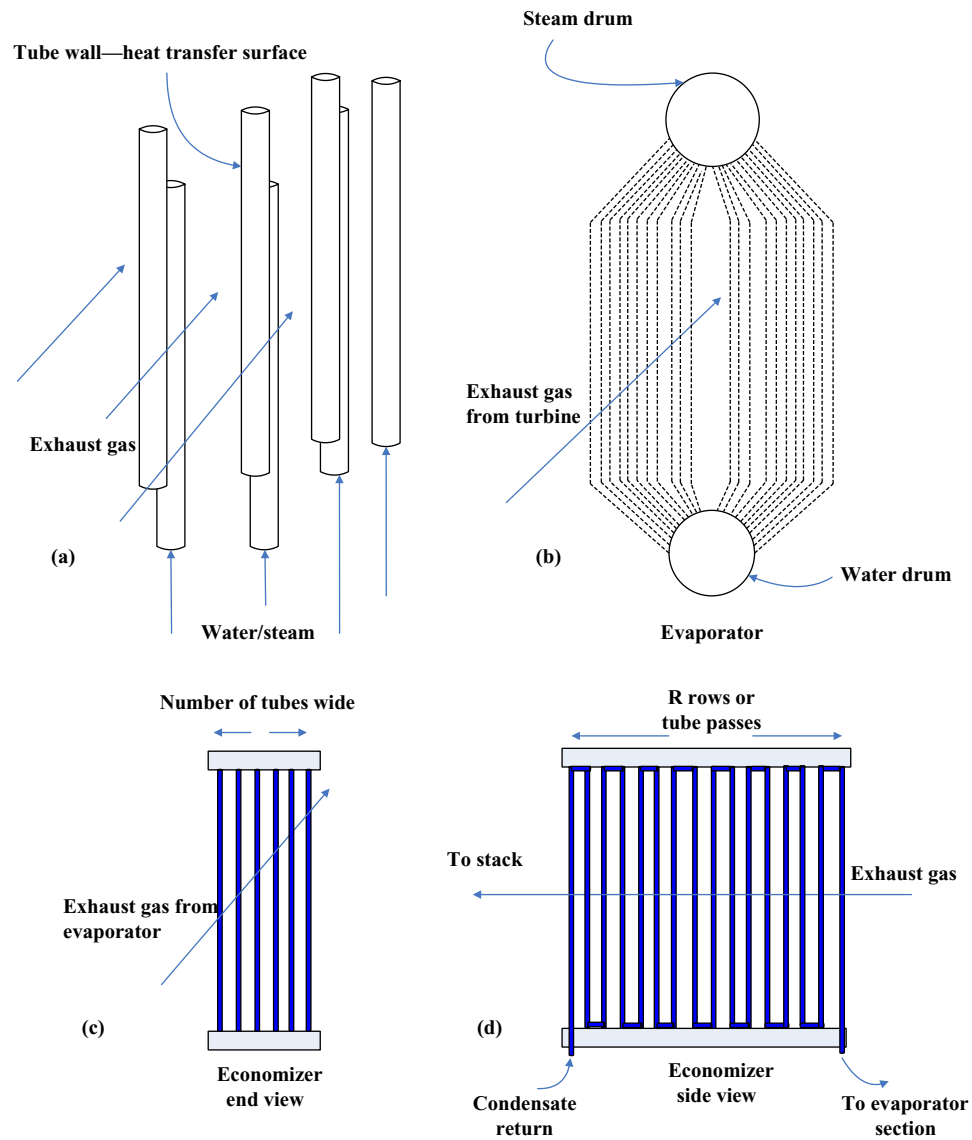


FIGURE 10.12

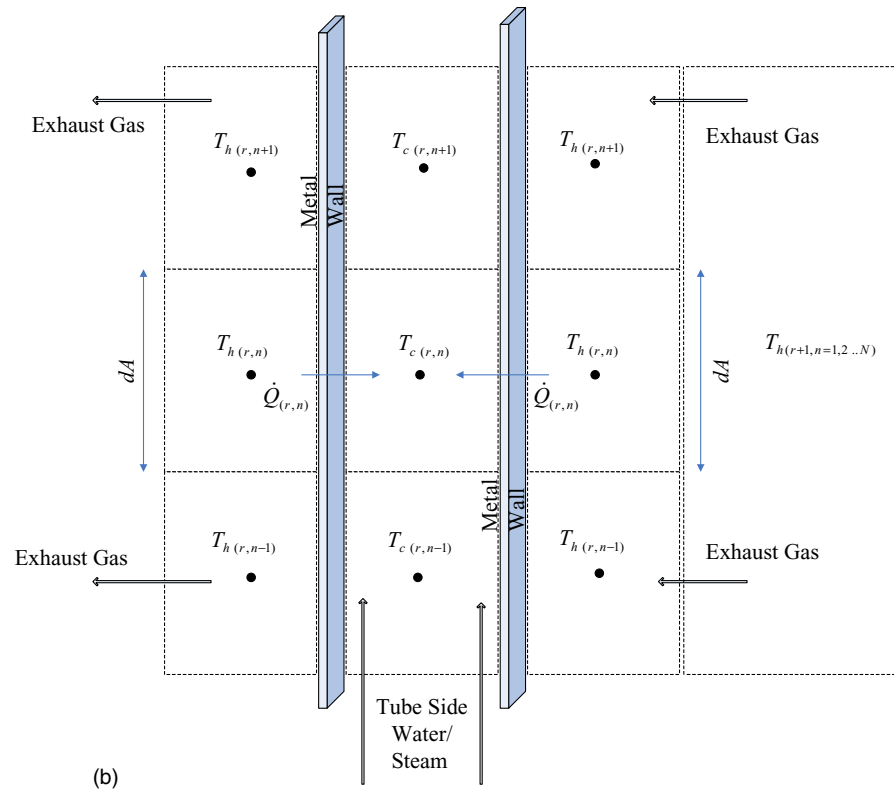
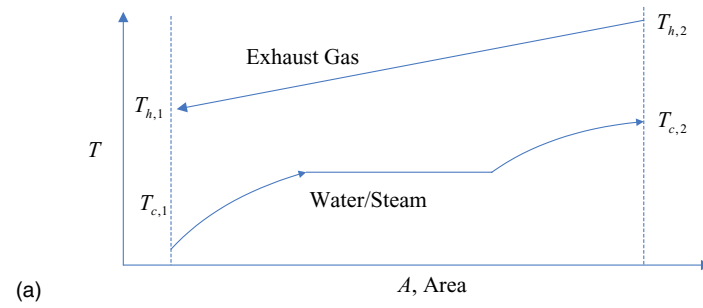


FIGURE 10.13

	A	B	C	D	E	F	G	H	I	J	K	L
1	Numerical Solution Economizer Tubes Temperature Profile											
2					To Stack					Exhaust Gas		
3	Tube Data	data input in green cells			←							
4	Outside Diameter	2	in			Tube Pass =	1			Tube Pass =	2	
5	Inside Diameter	1.81	in		Position	$U_{(i=1, n=1..N)}$	$T_{h(i=1, n=1..N)}$	$T_{c(i=1, n=1..N)}$	Position	$U_{(i=2, n=1..N)}$	$T_{h(i=2, n=1..N)}$	$T_{c(i=2, n=1..N)}$
6	Number of Tubes Wide	20			1	20.2121146	251.524	77	1	20.239291	254.12729	81.941269
7	Tube Spacing	4	in		2	20.2161156	251.524	77.33331824	2	20.24329	254.12729	82.270724
8	Tube Length	15	ft		3	20.2201009	251.524	77.66607783	3	20.247272	254.12729	82.599623
9	Number Tube Passes	200			4	20.2240706	251.524	77.99827911	4	20.251239	254.12729	82.927966
10	k_{wall}	25	btu/hr-ft-°F		5	20.2280248	251.524	78.32992239	5	20.255191	254.12729	83.255754
11					6	20.2319636	251.524	78.66100802	6	20.259127	254.12729	83.582987
12	Water Flow Data				7	20.235887	251.524	78.99153632	7	20.263047	254.12729	83.909665
13	$F_o = F_{water}$	111096	lb/hr		8	20.2397952	251.524	79.32150764	8	20.266952	254.12729	84.235788
14	$T_{c(i=R, n=1)}$	77	°F		9	20.2436883	251.524	79.65092233	9	20.270842	254.12729	84.561358
15	P_{water}	290.08	psia		10	20.2475663	251.524	79.97978073	10	20.274717	254.12729	84.886374
16					11	20.2514294	251.524	80.3080832	11	20.278577	254.12729	85.210837
17					12	20.2552776	251.524	80.6358301	12	20.282421	254.12729	85.534747
18	Exhaust Flow Data				13	20.259111	251.524	80.9630218	13	20.286251	254.12729	85.858104
19	$F_h = F_{exhaust}$	840327.8	lb/hr		14	20.2629297	251.524	81.28965866	14	20.290066	254.12729	86.18091
20	$G_h = G_{exhaust}$	16806.56	lb/ft ² -hr		15	20.2667338	251.524	81.61574106	15	20.293867	254.12729	86.503164
21	$T_{h(i=R, n=1)} \dots T_{h(i=R, n=N)}$	251.524	°F									
22												
23												
24	Finite Difference Data											
25	dL	1	ft									
26	number nodes / tube	15										

FIGURE 10.14

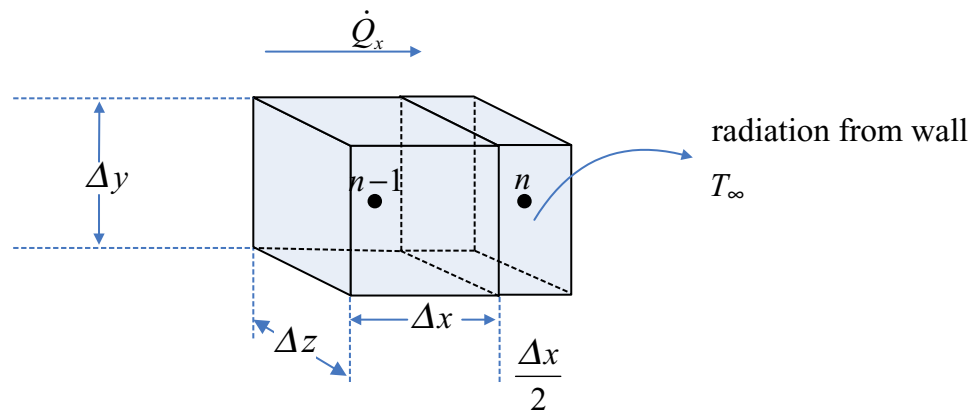


FIGURE 10.15

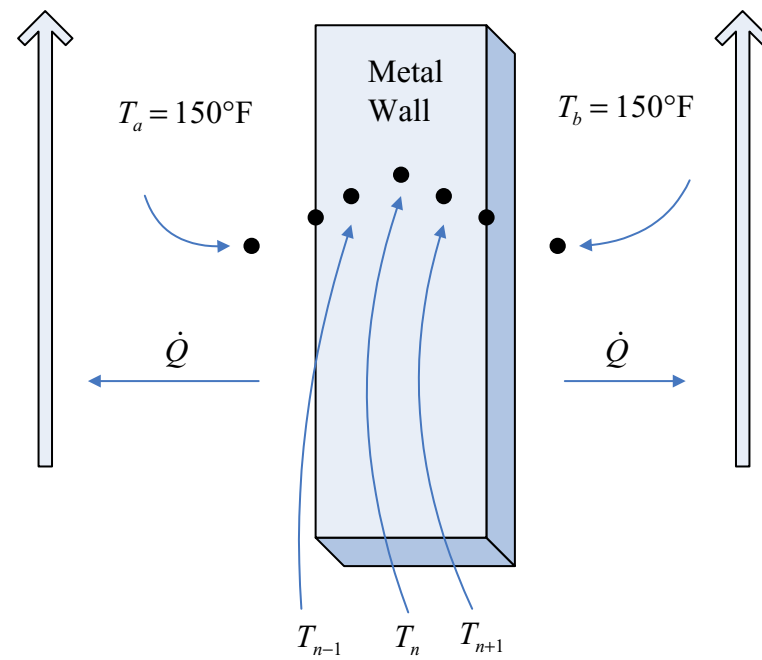


FIGURE 10.16

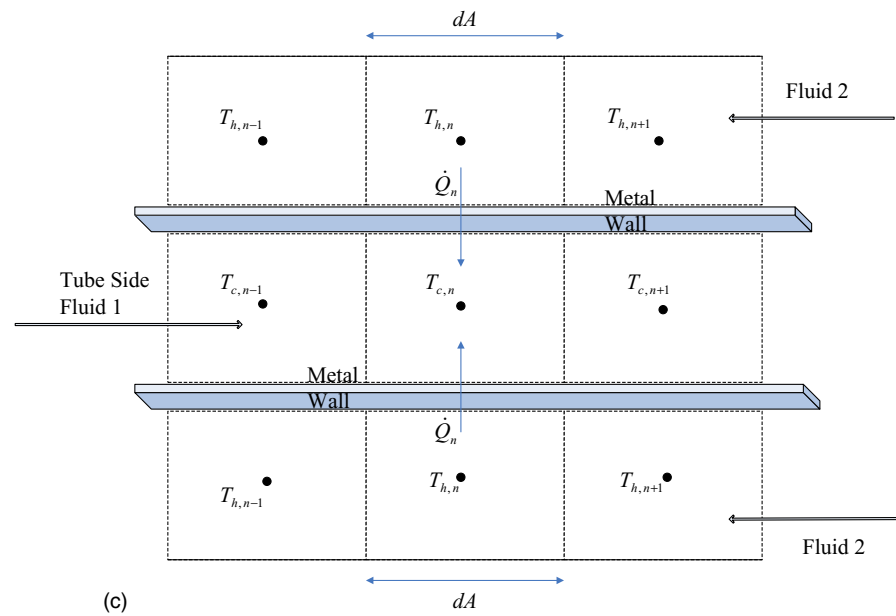
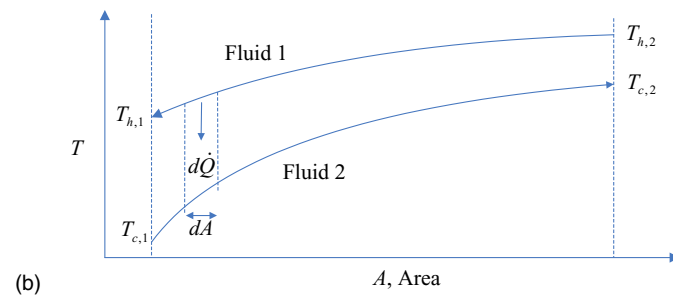
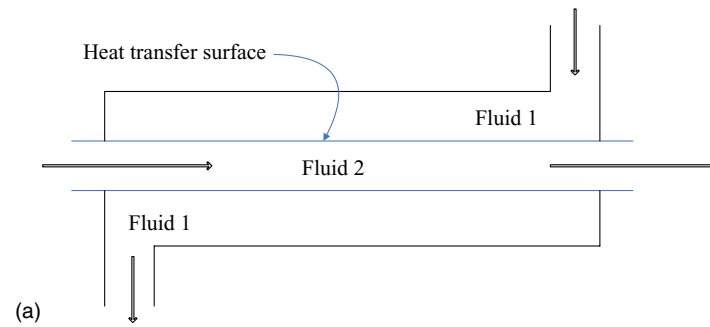


FIGURE 10.17

	A	B	C	D	E	F	G	H	I	J	K	L
1	Numerical Solution Economizer Tubes Temperature Profile											
2					To Stack					Exhaust Gas		
3	Tube Data	data input in green cells			←							
4	Outside Diameter	2	in			Tube Pass =	1			Tube Pass =	2	
5	Inside Diameter	1.81	in		Position	$U_{(r=1, n=1..N)}$	$T_{h(r=1, n=1..N)}$	$T_{c(r=1, n=1..N)}$	Position	$U_{(r=2, n=1..N)}$	$T_{h(r=2, n=1..N)}$	$T_{c(r=2, n=1..N)}$
6	Number of Tubes Wide	20			1	20.2107242	251.524	77	1	20.238597	254.08703	81.957699
7	Tube Spacing	4	in		2	20.2147981	251.524	77.33462074	2	20.242659	254.08703	82.287956
8	Tube Length	15	ft		3	20.2188551	251.524	77.66865172	3	20.246704	254.08703	82.617631
9	Number Tube Passes	200			4	20.2228954	251.524	78.00209364	4	20.250732	254.08703	82.946724
10	k_{wall}	25	btu/hr-ft-°F		5	20.2269191	251.524	78.33494717	5	20.254744	254.08703	83.275236
11					6	20.2309264	251.524	78.66721298	6	20.25874	254.08703	83.603168
12	Water Flow Data				7	20.2349172	251.524	78.99889178	7	20.262719	254.08703	83.930519
13	$F_o = F_{water}$	111096	lb/hr		8	20.2388918	251.524	79.32998423	8	20.266681	254.08703	84.257291
14	$T_{c(r=R, n=1)}$	77	°F		9	20.2428502	251.524	79.66049104	9	20.270628	254.08703	84.583485
15	P_{water}	290.08	psia		10	20.2467926	251.524	79.99041289	10	20.274558	254.08703	84.909101
16					11	20.250719	251.524	80.31975048	11	20.278473	254.08703	85.234139
17					12	20.2546295	251.524	80.64850451	12	20.282372	254.08703	85.558602
18	Exhaust Flow Data				13	20.2585243	251.524	80.97667566	13	20.286254	254.08703	85.882488
19	$F_h = F_{exhaust}$	840327.8	lb/hr		14	20.2624034	251.524	81.30426465	14	20.290122	254.08703	86.2058
20	$G_h = G_{exhaust}$	16806.56	lb/ft ² -hr		15	20.266267	251.524	81.63127217	15	20.293973	254.08703	86.528537
21	$T_{h(r=R, n=1)} \dots T_{h(r=R, n=N)}$	251.524	°F									
22												
23												
24	Finite Difference Data											
25	dL	1	ft									
26	number nodes / tube	15										

FIGURE 10.18

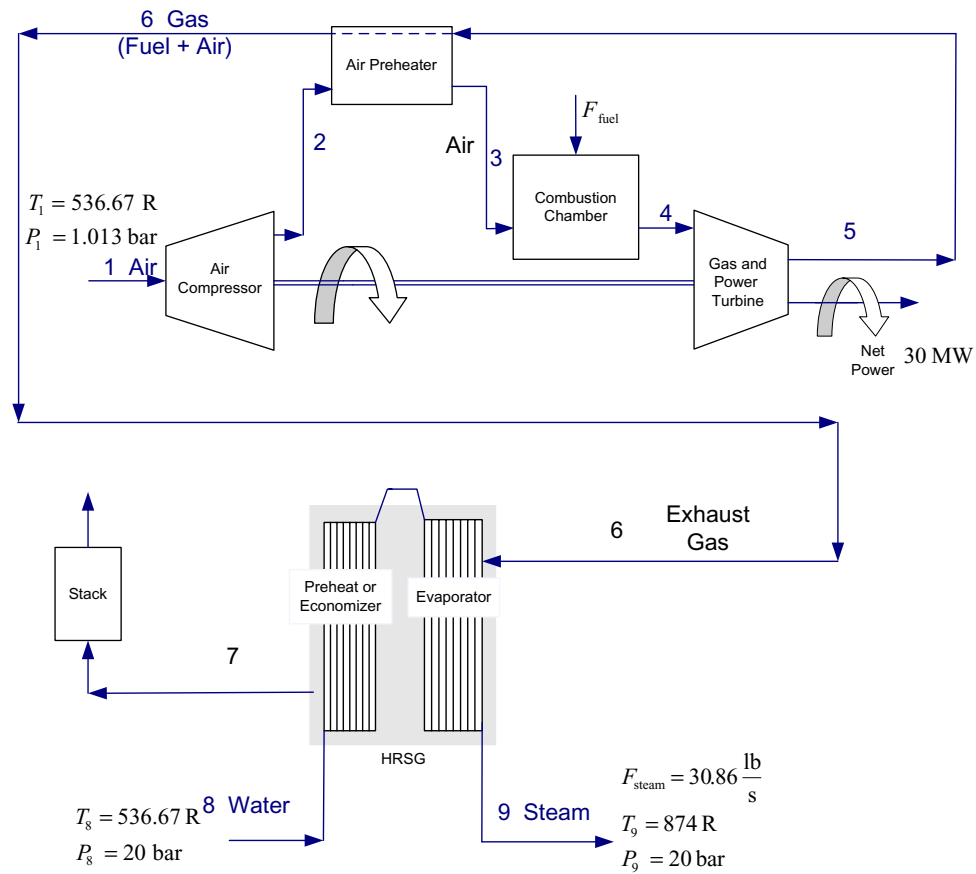


FIGURE 10.2

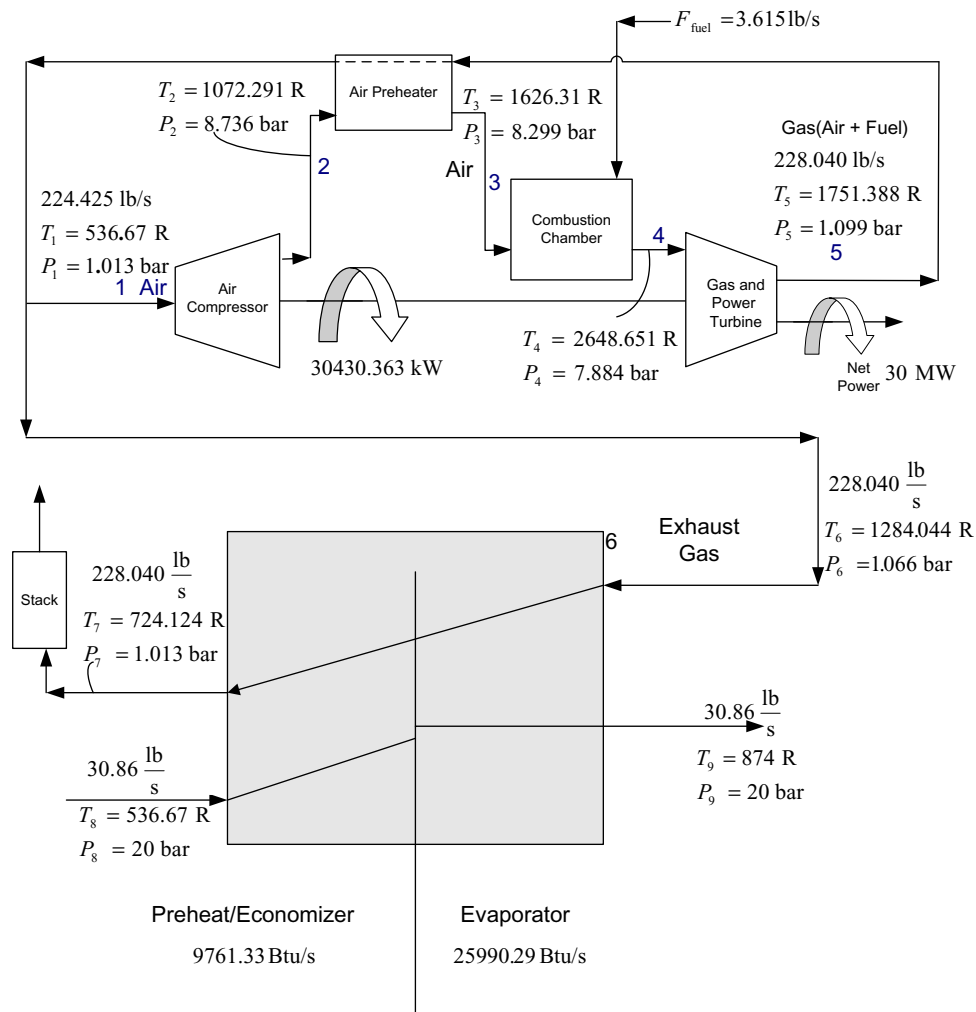


FIGURE 10.3

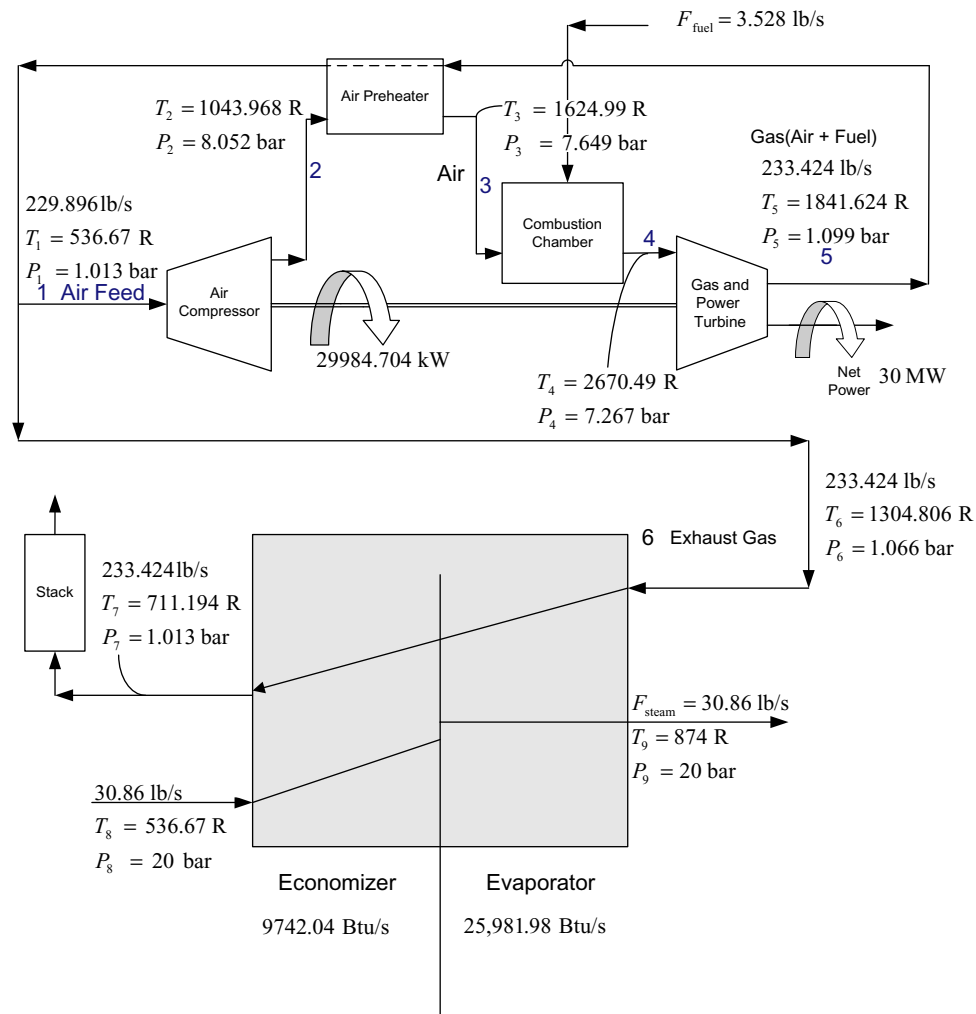


FIGURE 10.4

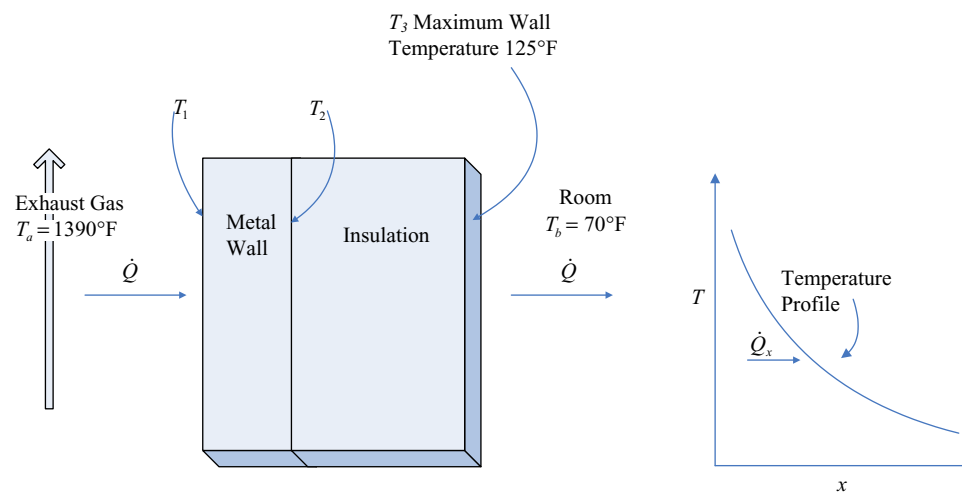


FIGURE 10.5

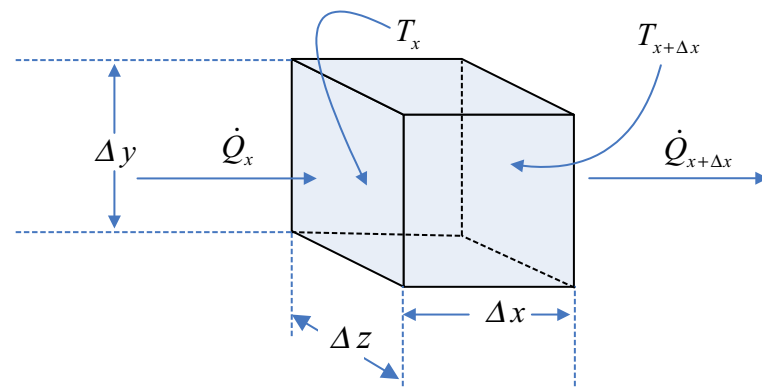


FIGURE 10.6

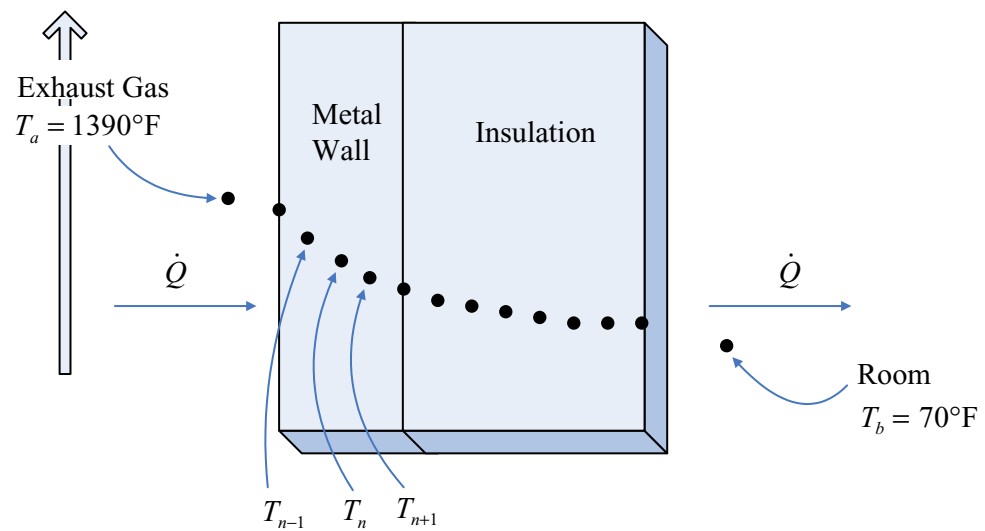


FIGURE 10.7

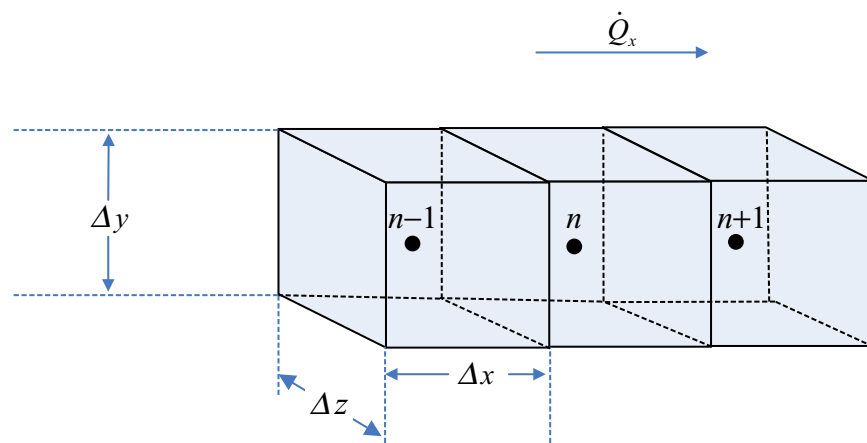


FIGURE 10.8

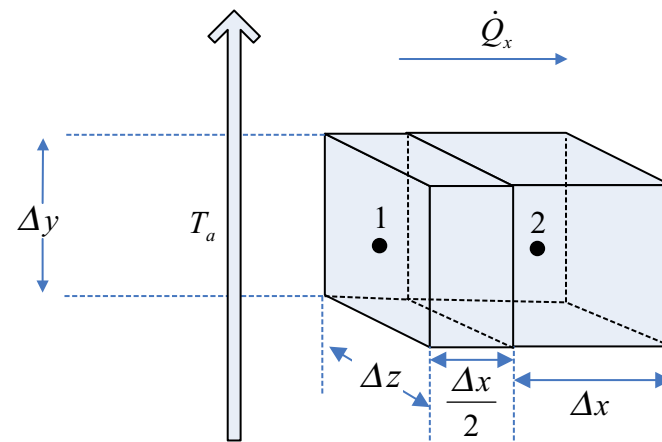


FIGURE 10.9