

Planetary Cooler Temperature Profile and Radiation and Convection Losses



Revision 2
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Input Data

Production Rate	2 200	tpd	Tube Diameter	1.8	m
T _{Ambient}	21	°C	Tube Length	15.8	m
Height above sea level	1 089	m	# of tubes	10	
Atmospheric Wind Speed	1	m/s	Emmissivity	0.85	
			Kiln diameter	4.4	m

TEMPERATURE MEASUREMENTS

Length [m]	Tube 1	Tube 2	Tube 3	Tube 4	Tube 5	Tube 6	Tube 7	Tube 8	Tube 9	Tube 10	Tube 11
0	256	255	302	241	185	205	272	229	195	245	
1	362	387	416	354	284	310	382	329	329	362	
2	414	409	465	405	334	351	421	364	333	410	
3	465	444	532	455	465	433	491	420	400	477	
4	497	500	544	491	461	457	550	464	498	481	
5	510	561	556	537	495	475	563	511	512	522	
6	538	542	432	481	470	479	577	456	529	447	
7	423	440	480	471	470	417	479	493	458	535	
8	490	455	450	400	460	398	434	422	419	400	
9	419	440	359	509	443	430	460	445	422	365	
10	412	405	485	380	300	342	450	390	365	360	
11	372	362	372	402	384	374	460	372	350	345	
12	368	285	355	367	330	320	335	340	378	400	
13	394	410	443	443	207	380	440	412	394	461	
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Legend

	Shell Temperatures that are 50 °C below the average
	Shell temperatures that are 50°C above the average
	Shell temperatures that exceed the recommended maximum shell temperature of 450°C. These shell sections require immediate attention.

Results

Radiation Losses	26865159	kJ/h	
Convection Losses	2672249	kJ/h	
Radiation & Convection Losses (total)	29537408	kJ/h	
Specific Radiation & Convection Losses	322	kJ/kg product	

Planetary Cooler Tubes Temperature Profile

