

Planetary Cooler Loading

CEMWIZARDS
Consulting Engineers



Revision 2
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Input Data

Clinker production	1 061	t/d
Heat consumption	4 046	kJ/kg cli
Percentage main burner	100	%
Ambient		
Temperature	18	°C
Altitude (height above sea level)	178	m
Planetary cooler tubes		
Number of tubes	11	-
Tube nominal diameter	1.65	m
Tube effective diameter (inside the lining)	1.5	m
Length (Cylindrical section)	12.5	m
Inlet area at elbow (cross sectional area of the inlet opening of a single tube)	0.5	m ²
Process parameters		
Primary Air Volume	8 353	Nm ³ /h
O ₂ at kiln inlet	3	%
Degree of decarbonation at the kiln inlet	25	%
False Air at the Kiln Hood	0.02	Nm ³ /kg cli
Water injection in cooler	0	l/min
Secondary air temperature	600	°C

Results

Parameter	Actual Value	Unit	Value as a % of the recommended Maximum Value	Comment
Velocity at lining	2.2	m/s	48%	Low. No wear issues, due to the cooling air velocity, are expected.
Velocity at elbow	7.6	m/s	31%	Low. No wear issues, due to the cooling air velocity, are expected.

Specific cooler loads

Surface load	1.64	t/m ² d	82%	Good. Normal clinker tube temperatures are expected.
Cross section load	55	t/m ² d	78%	The Cross section loading is good. No problems with dust recirculation in the cooler tubes are foreseen.
Volume load	3.61	t/m ³ d	82%	Good. The cooler volume is adequate.
Specific load (FLS)	4.20	t/m ^{2.5} d	115%	Too High. The cooler is overloaded for the current volume and surface area.

Expected values

Expected clinker exit T	180 - 190	°C
Energy Losses		
	kcal/kg cli	kJ/kg cli
Rad & conv	90	377
Sensible heat	25	105
Total	115	481