

Kiln Energy Efficiency

Innovative Pre-Drying System

The Anzac pre-dryer is specifically designed to increase the efficiency of the kilns thermal processes. Heat energy from the hot combustion exhaust gases generated within the heat chamber is used to preheat the feed material and vaporise excess moisture. While the feed material is gravity supplied into the pre-dryer, a fan draws the hot exhaust gases through the feed enabling moisture to be removed.

Excessive moisture content consumes valuable heat energy when it is vaporised during any thermal treatment process. Heat energy in the kiln is generally provided by the combustion of fuels, mainly LPG and diesel; by decreasing the moisture levels within the kiln, we are able to increase the overall thermal efficiency. The Anzac pre-drying system facilitates the removal of unnecessary moisture, decreasing fuel consumption and the associated costs.

The intricate design of the Anzac pre-drying system promotes maximum interaction between the feed and the hot combustion gases. Anzac have also insulated the pre-dryers so as to encapsulate the heat energy and make the most efficient use of it. This carefully designed feature is extremely effective in reducing the moisture content of the feed material and therefore the kilns running costs.

In cooperation with the University of Western Australia, Anzac have completed a study of the benefits associated with feed pre-drying. This study was carried out in the context of the application of the Anzac pre-dryers within the gold industry.

Detailed testing and analysis has shown that Anzac's pre-dryers are typically capable of reducing the moisture content from approximately 35% to around 25%. This is effectively removing 38% of the moisture originally contained within the feed material. Such a dramatic reduction in moisture content leads to significant financial benefits.

Not only does the pre-dryer increase efficiency by reducing moisture content, but also delivers further savings through the increased temperature of the feed as it is delivered into the kiln. This allows for lower fuel consumption in the raising of the feed temperature to the desired level.

The table below shows the annual financial savings generated by the pre-dryer for different throughputs and kiln sizes with regards to the moisture reduction. Strip size was based on a 20hr strip at the maximum feed rate for each kiln. Savings will vary depending on fuel prices and the throughput of the regeneration system.

Kiln		HK380	HK510	HK640	HK870	HK1100	HK1300	HK1500	HK1800	HK210	
Avg Strip Size (kg Dry Carbon)		2,000	4,000	6,400	12,000	18,000	26,000	35,000	47,120	64,000	
Number of Strips Regenerated, per Week	LPG at \$1.02/l	1	\$2,600	\$5,300	\$8,400	\$15,800	\$23,700	\$34,200	\$46,000	\$61,900	\$84,100
		2	\$5,300	\$10,500	\$16,800	\$31,500	\$47,300	\$68,300	\$92,000	\$123,800	\$168,200
		3	\$7,900	\$15,800	\$25,200	\$47,300	\$71,000	\$102,500	\$138,000	\$185,800	\$252,300
		4	\$10,500	\$21,000	\$33,600	\$63,100	\$94,600	\$136,700	\$184,000	\$247,700	\$336,400
		5	\$13,100	\$26,300	\$42,100	\$78,800	\$118,300	\$170,800	\$230,000	\$309,600	\$420,500
		6	\$15,800	\$31,500	\$50,500	\$94,600	\$141,900	\$205,000	\$276,000	\$371,500	\$504,600
	Diesel at \$1.40/l	1	\$2,600	\$5,100	\$8,200	\$15,400	\$23,000	\$33,300	\$44,800	\$60,300	\$81,900
		2	\$5,100	\$10,200	\$16,400	\$30,700	\$46,100	\$66,500	\$89,600	\$120,600	\$163,800
		3	\$7,700	\$15,400	\$24,600	\$46,100	\$69,100	\$99,800	\$134,400	\$180,900	\$245,700
		4	\$10,200	\$20,500	\$32,800	\$61,400	\$92,100	\$133,100	\$179,200	\$241,200	\$327,600
		5	\$12,800	\$25,600	\$41,000	\$76,800	\$115,200	\$166,400	\$224,000	\$301,500	\$409,500
		6	\$15,400	\$30,700	\$49,100	\$92,100	\$138,200	\$199,600	\$268,800	\$361,800	\$491,400