

REPLACING BURNERS IN A PENNEKAMP LEHR - BELTWIDTH : 4 500 mmCONSUMPTION : before replacing : 237 Nm³ / day – after replacing : 165 Nm³ / day

old configuration			new configuration		
Section 1 :	2 Burners tg1a	replaced by	2 Burners G-Lehrs G7		
Section 2 :	2 Burners tg1a	replaced by	2 Burners G-Lehrs G7		
Section 3 :	1 Burner tg1a	unchanged	1 Burner tg1a		
Section 4 :	1 Burner tg1a	unchanged	1 Burner tg1a		

Difference in consumption measured the day before and the day after replacement - same article - same settings.

Consumption Line X - Pennekamp burners : 6 x tg1a

DATA replacement day - measured during visit				Ambient Temp in C°:		30.0	Pennek burners in all sections
Date	Hour	time runned	Counter	Gas Pressure in Bar :		0.050	
Day 0	07:30		76344.20	consumed	m³/24H	Nm³/24H	
Day 0	10:37	0.1299	76376.80	32.60	251.04	237.36	

Consumption Line X- G-LEHRS burners : 4 x G7 + Pennekamp burners : 2 x tg1a

DATA following day- measured during visit				Ambient Temp in C°: 30.0			G-Lehrs burners sections 1&2
Date	Hour	time runned	Counter	Gas Pressure in Bar : 0.050			
Day 0 + 1	08:31		76547.30	consumed	m³/24H	Nm³/24H	
Day 0 + 1	10:31	0.0833	76561.80	14.50	174.00	164.52	

Difference : 72.84 Nm³/day -31 %

Difference in consumption months before and after replacement - various articles - gas-counter readings done by our engineer.

Consumption Line X - Pennekamp burners : 6 x tg1a

DATA 63 days before replacement				Ambient Temp in C°:		30.0	Pennek burners in all sections
Date	Hour	time runne	Counter	Gas Pressure in Bar :		0.050	
Day 0 - 63	13:51		65706.00	consumed	m³/24H	Nm³/24H	
Day 0	07:30	62.7354	76344.20	10 638.20	169.57	160.33	

Consumption Line X - G-LEHRS burners : 4 x G7 + Pennekamp burners : 2 x tg1a

DATA 76 days after replacement				Ambient Temp in C°:		30.0	G-Lehrs burners sections 1&2
Date	Hour	time runne	Counter	Gas Pressure in Bar :		0.050	
Day 0 +1	10:31		76561.80	consumed	m³/24H	Nm³/24H	
Day 0 +77	10:07	75.9833	83147.92	6 586.12	86.68	81.95	

Difference : 78.38 Nm³/day -49 %

For every new client we make a study (for free) of the client's situation and calculate the possible gain in consumption for the running article.

We visited this factory 2 months before 'Day 0' (day of replacement) and our study calculated a possible gain of 28 %.

Replacing is done without stopping the production. At the installation day the gain was 31 %, but the article and settings were different.

Line X - Situation BEFORE REPLACING BURNERS : 6 x Pennekamp tg1a

Annealing Lehr Pennekamp - Belt 4500 mm - total length 29 m - total capacity : 120 ton

1 bottle green - 363 gr - round 88.5 mm

4 heated : 9 000 mm / 1 neutral : 2250 / 1 exhaust : 2250 mm / 2 cooled : 4 500 mm

Beltwidth : 4 500 mm

Unused left side : 75 30 mm

Unused right side : 122 50 mm

Nr of art in width : 42 pcs

Nr of art in length : 40 distance : 3 800 mm

Beltspeed (sec) : 390 distance : 3 400 mm

Dim art (diam) : 88.5 mm

Weight art : 363 gr 310 mm high

	Colors :	Data known or measured
glass :	green	Data calculated
machine :	12S DG	Data estimated

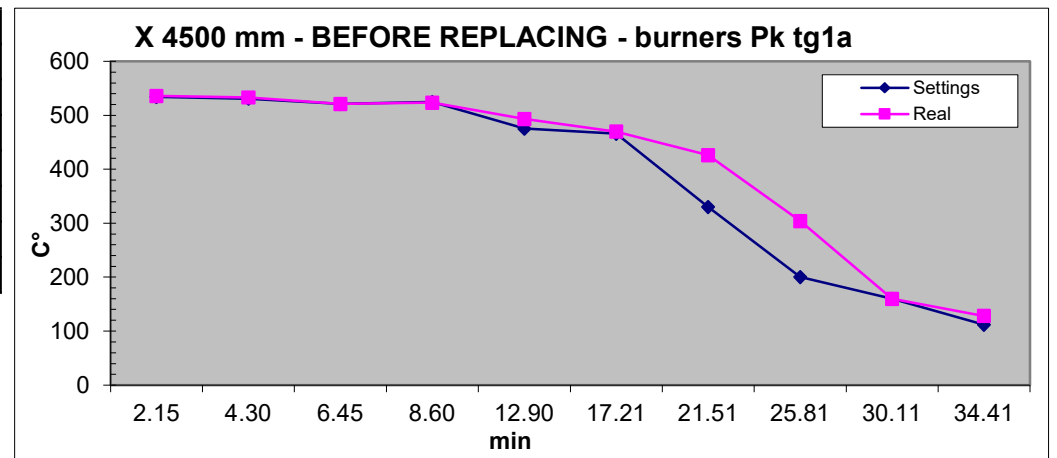
burner : 6 x tg1a	140	kW
GAS	237	Nm³/24H
	22	kWh/ton

distance between art in width :	14.29	mm
distance between art in length :	6.50	mm
speed of the belt :	523	mm/min
speed of the machine :	230	art / min
production per day :	120	Tons / day

Length	1125	1125	1125	1125	2250	2250	2250	2250	2250	2250	9000	1950	28950
Sect nr	Sect 1 F	Sect 1 B	Sect 2 F	Sect 2 B	Sect 3	Sect 4	Sect 5	Sect 6	Sect 7	Sect 8	open	Table	
Nr contr	1	1	1	1	1	1	1	1	1	1	Spray		
Nr Burners	RF	LB	RF	LB	RB	LB	Neutral	Exh	Cool	Cool	top 5 600		
Nr conv fans	1	1	1	1	1	1	1	1	2	4			
Temp set	534	531	521	525	475	466	330	200	160	112			
Temp reached	536	533	521	523	493	470	426	304	160	128			
Time (min)	2.15	4.30	6.45	8.60	12.90	17.21	21.51	25.81	30.11	34.41	51.62	55.35	

Direction cross conveyor : Left > Right					avg
C° IN L :	534	554	521	519	532
C° IN R :	474	479	448	454	464
C° tunnel out L :	138	142	146	136	141
C° tunnel out R :	154	148	141	142	146
C° spray L :	72	66	68	73	70
C° spray R :	49	66	70	69	64
C° end Lehr :	43	41	40	44	42

Result Anneal	Time above 520 C° :	8.60 min	Total time
not measured	Time in tunnel :	34.41 min	55.35
	Cool speed 520 > 400 C° :	10.49 C° / min	
	Cool speed 400 > 200 C° :	30.92 C° / min	



REPLACEMENT OF BURNERS

Replacing 4 burners started on 'Day 0' at 11H00 and took 3 hours : 1 hour for the first one and 2 hours for the 3 following.

The production was never interrupted - burners were replaced one by one.

The job was done by the factory's personnel : 1 electrician and 1 mechanic.

Our engineer supervised the job and noted the gas counters.

RELIABILITY OF G-LEHRS BURNERS

Our burners practically never go in alarm, a week without an alarm is the norm.

If necessary restarting is done at a push of the reset button or via the central supervising system.

MAINTENANCE

The burner does not need to be dismantled for inspection or repair, replacing electrodes is extremely simple and does not require disassembly of the burner.

Cleaning the fan or other parts is not necessary because we close the connection to the tunnel when the burner is not burning.

It is the hot air flowing out when the burner is not burning that makes the fan dirty or leaves smooth on the torches.

The maintenance staff always tells us that they are extremely satisfied with our burners, no alarms, no breakdowns, no maintenance.

REFERENCES :

Ardagh Germany : In every factory, in every Pennekamp annealing line, our burners G5 and G7 replace the original burners in the first 2 sections, average gain 25 %.

Verallia Spain : In every factory, in every Pennekamp annealing line, our burners G5 and G7 replace the original burners in the first 2 sections, average gain 25 %.

Many other referencies, mainly in Europe but also in the rest of the world.

Antonini annealing lehrs : We developed the burner G6, based on the G5, adapted to replace existing Antonini burners with comparable results.

When calculating the payback time of the investment, the price of the CO2 rights should also be taken in account.

If the payback time is less than 2 years we (normally) give the possibility to 'pay in consumption'.

MU nv / G-Lehrs

Dennenlaan 1

2222 Heist-op-den-Berg

Belgium

Tel : +32 475 832 875

info@lehrs.be

www.lehrs.be

Meet us at GLASSTEC 22-25 Oct 24 – G-LEHRS by MU – Hall 14 / G44



We participate in Glasstec since 2004.