STEULER Refractory | Linings

LIME KILNS
PULP AND PAPER INDUSTRY

FOCUS ON PERFORMANCE

INNOVATION
AND PERFORMANCE

WE UNDERSTAND YOUR PLANTS

Optimum solutions are created in dialogue and by considering all parameters and system conditions. We also examine upstream and downstream processes to gain a more comprehensive understanding of the operating and production conditions. With our customer, we then look at our large range of materials and select the technically most sensible and most economical system, and jointly develop a solid complete solution that yields maximum plant availability. Supplying a complete solution means providing smooth project management for our customers.

WE DELIVER SAFETY

Steuler offers competence and performance across all supply levels and processes – from own research and development through state –of-the-art engineering, in-house production "Made-in-Germany", reliable transport logistics up to professional supervision and installation of the refractory lining. Our primary target is the trouble-free availability of your lime kiln.

WE ARE TECHNOLOGY PARTNER - MORE THAN JUST THE PROVEN ROUTINE

With our technical sales team as interface between lime kiln operators and Steuler research and development and our engineering team, we develop the most suitable solution for every individual plant. From energy optimization projects through special lifter designs, we personally accompany our customers in long term.

Ignition and heating-up of a newly lined lime kiln.

New construction of a lime kiln for a pulp mill capacity upgrade. Inside view of refractory lining can be seen in the background of the picture.

Steuler is exclusive refractory technology partner for lime kilns of Andritz Pulp + Paper. Together we are shaping the future for lime kiln refractory performance.

MADE-TO-MEASURE
CONCEPTS

ENERGY SAVING

- Throughout 2-layer lining system with insulation layer and wear resistant hot face layer
- Semi dense "hybrid" bricks as a good compromise for 1 layer lining requirements
- Special lifter designs for optimized heat transfer

OPERATION SAFETY

- Outstanding insulation bricks with excellent resistance to moving loads
- High temperature resistance of insulation bricks to protect steel shell in emergency case of hot face layer collapse
- High pre-firing of bricks to avoid post-expansion from mullitization during operation

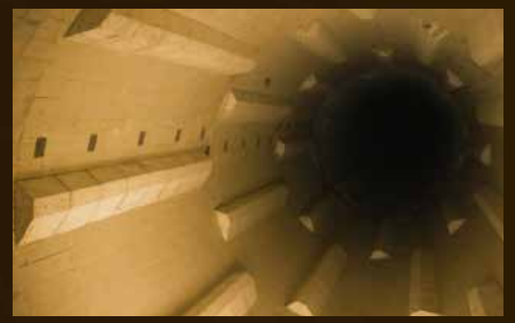
ENGINEERING EXCELLENCE

- In-house engineering with strong practical orientation
- Most modern software for thermal or stress calculations
- Precise installation and assembly drawings with 3D perspectives and focus on details
- Operation or even pre-startup conservation recommendations

PERFORMANCE MATERIALS

- Widest range of alumina silicate performance linings for lime kilns in pulp mills
- Burning zone linings with no reaction with lime mud up to 1.400 °C / 2.250 °F
- Insulation bricks optimized for rotary kiln application
- Wide range of semi dense hybrid bricks

Lime Kiln cooler discharge area with high wear resistant, reinforced concrete



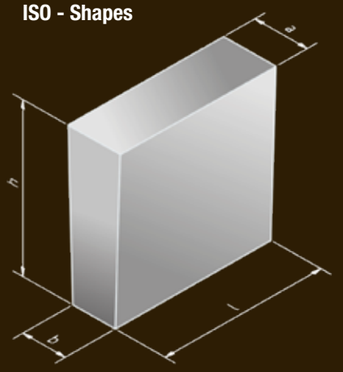
Special shape lifter blocks with stainless steel reinforced matrix and high temperature pre-firing.

PERFORMANCE MATERIALS
FOR MAXIMUM PLANT AVAILABILITY

The best material is not always the material of the highest quality - the best material is precisely the right type of material and classification for our customers' specifications in their production processes and product grades. Steuler offers a wide range of materials and various production methods to meet all technical requirements and budget considerations.

Brand	Classification	Raw material base	Chemical Composition			Physical Properties			Refractoriness under load	Thermal Shock Resistance	Thermal Expansion (linear)	Thermal Conductivity		
			Al_2O_3	SiO_2	Fe_2O_3	Bulk Density	Apparent Porosity	Cold Crushing Strength	DE (t 05) / RUL (t 05)	water quench cycles	1000 °C 1.832 °F	400 °C 752 °F	800 °C 1.472 °F	1200 °C 2.192 °F
			%			g/cm³	Vol. %	N/mm²			%	W/mK		
HEATING ZONE (HOT FACE)														
Steuler ST 302	FC 40	Fireclay	43	52	1,2	2,35	15	60	1310 °C / 2390 °F	20	0,55	1,20	1,35	1,50
Steuler ST 403 LW	FC 35	Fireclay	36	57	1,8	1,45	40	25	1260 °C / 2300 °F	30	0,58	0,80	0,85	0,90
Steuler ST 302 MW	FC 35	Fireclay	37	57	1,4	1,75	30	40	1280 °C / 2336 °F	30	0,57	0,90	1,00	1,05
HEATING ZONE (INSULATION LAYER)														
Porimol M 950	-	Moler	9	77	7,0	1,00	60	18	1050 °C / 1922 °F	30	0,45	0,45	0,50	-
Steuler ST 403 LW	FC 35	Fireclay	36	57	1,8	1,45	40	25	1260 °C / 2300 °F	30	0,58	0,80	0,85	0,90
INTERMEDIATE ZONE (HOT FACE)														
Steuler ST 402	FC 40	Fireclay	45	50	1,2	2,35	15	50	1330 °C / 2426 °F	20	0,55	1,20	1,35	1,50
Steuler ST 302 MW	FC 35	Fireclay	37	57	1,4	1,75	30	40	1280 °C / 2336 °F	30	0,57	0,90	1,00	1,05
Suprema SA 65 MW	HA 55	Andalusite	65	32	0,9	2,25	27	50	1550 °C / 2822 °F	30	0,55	1,10	1,20	1,25
INTERMEDIATE ZONE (INSULATION LAYER)														
Porimol M 950	-	Moler	9	77	7,0	1,00	60	18	1050 °C / 1922 °F	30	0,45	0,45	0,50	-
Steuler ST 403 LW	FC 35	Fireclay	36	57	1,8	1,45	40	25	1260 °C / 2300 °F	30	0,58	0,80	0,85	0,90
BURNING ZONE (HOT FACE)														
Suprema SA 65 MW	HA 55	Andalusite	65	32	0,9	2,25	27	50	1550 °C / 2822 °F	30	0,55	1,10	1,20	1,25
Suprema SA 60	HA 55	Andalusite	60	37	1,0	2,58	14	90	1610 °C / 2930 °F	30	0,55	1,65	1,75	1,90
Suprema SA 70	HA 65	Andalusite, Corundum	70	27	0,8	2,70	15	90	1650 °C / 3002 °F	30	0,58	1,65	1,75	1,90
Suprema KS 954	HA 95	Corundum, Spinel	95	0,2	0,2	3,18	18	70	> 1670 °C / 3038 °F	15	0,83	2,90	2,80	3,00
BURNING ZONE (NSULATION LAYER)														
Steuler ST 403 LW	FC 35	Fireclay	36	57	1,8	1,45	40	25	1260 °C / 2300 °F	30	0,58	0,80	0,85	0,90

ISO - Shapes



Type	Dimensions in mm					Volume
	a	b	h	l	k	dm^3
3K 215	103	87,5	150	198	15,5	2,829
3K 315	103	92,5	150	198	10,5	2,903
3K 415	103	95,5	150	198	7,5	2,948
3K 615	103	98	150	198	5	2,985
P 15	83	78	150	198	5	2,391
P+ 15	93	88	150	198	5	2,688
216	103	86	160	198	17	2,994
316	103	92	160	198	11	3,089
416	103	94,5	160	198	8,5	3,128
516	103	96,5	160	198	6,5	3,160
616	103	97,5	160	198	5,5	3,176
P 16	83	77,5	160	198	5,5	2,542
P+ 16	93	87,5	160	198	5,5	2,859
218	103	84	180	198	19	3,332
318	103	90,5	180	198	12,5	3,448
418	103	93,5	180	198	9,5	3,502
518	103	95,5	180	198	7,5	3,537
618	103	97	180	198	6	3,564
718	103	97,7	180	198	5,3	3,576
818	103	98,3	180	198	4,7	3,587
P 18	83	77	180	198	6	2,851
P+ 18	93	87	180	198	6	3,208
220	103	82	200	198	21	3,663
320	103	89	200	198	14	3,802
420	103	92,5	200	198	10,5	3,871
520	103	94,7	200	198	8,3	3,914
620	103	96,2	200	198	6,8	3,944
720	103	97	200	198	6	3,960
820	103	97,8	200	198	5,2	3,976
P 20	83	76,2	200	198	6,8	3,152
P+ 20	93	86,2	200	198	6,8	3,548
222	103	80	220	198	23	3,986
322	103	88	220	198	15	4,160
422	103	91,5	220	198	11,5	4,236
522	103	94	220	198	9	4,291
622	103	95,5	220	198	7,5	4,323
722	103	96,5	220	198	6,5	4,345
822	103	97,5	220	198	5,5	4,367
P 22	83	75,5	220	198	7,5	3,452
P+ 22	93	85,5	220	198	7,5	3,888

Type	Dimensions in mm					Volume
	a	b	h	l	k	dm^3
223	103	78,9	230	198	24,1	4,142
323	103	87	230	198	16	4,326
423	103	91	230	198	12	4,417
523	103	93,4	230	198	9,6	4,472
623	103	95	230	198	8	4,508
723	103	96	230	198	7	4,531
823	103	97	230	198	6	4,554
P 23	83	75	230	198	8	3,598
P+ 23	93	85	230	198	8	4,053
225	103	77	250	198	26	4,455
325	103	85,5	250	198	17,5	4,665
425	103	90	250	198	13	4,777
525	103	92,7	250	198	10,3	4,844
625	103	94,5	250	198	8,5	4,888
725	103	95,5	250	198	7,5	4,913
825	103	96,5	250	198	6,5	4,938
P 25	83	74,5	250	198	8,5	3,898
P+ 25	93	84,5	250	198	8,5	4,393
125	103	50,7	250	198	52,3	3,804
225	103	77,0	250	198	26,0	4,455
325	103	85,5	250	198	17,5	4,665
425	103	90,0	250	198	13,0	4,777
525	103	92,7	250	198	10,3	4,844
625	103	94,5	250	198	8,5	4,888
725	103	95,5	250	198	7,5	4,913
825	103	96,5	250	198	6,5	4,938
P 25	83	74,5	250	198	8,5	3,898
P+ 25	93	84,5	250	198	8,5	4,393
228	103	73,7	280	198	29,3	4,898
328	103	83,5	280	198	19,5	5,170
428	103	88,4	280	198	14,6	5,306
528	103	91,3	280	198	11,7	5,386
628	103	93,1	280	198	9,9	5,436
728	103	94,9	280	198	8,1	5,486
828	103	95,7	280	198	7,3	5,508
P 28	83	73,5	280	198	9,5	4,338
P+ 28	93	83,5	280	198	9,5	4,893
NF 1	230		114	64		1,678
NF 1-50	230		114	50		1,311
NF 1-38	230		114	38		0,996

SUPERVISION AND INSTALLATION **WORLDWIDE**

- **More than 300 experienced refractory installers are part of the Steuler Group – they are ready to install your made-to-measure lining**
- **On your demand, exclusively experienced Steuler specialists carry out technical consultation and supervision of third party installation crews. Also technical seminars and pre-installation trainings are offered**
- **Steuler operates their own tool distribution and maintenance center in Germany. All tools are based on latest technology and HSE standards**
- **We continuously train, qualify and develop our installation crews – we are dedicated to supply cutting-edge installations**

REFRACTORY MANAGEMENT – WE DELIVER SAFETY

Steuler offers competence and performance across all supply levels and processes – we keep the bigger picture in mind whilst also not losing sight of the special details, from the first consultation through to delivery, supervision and installation – Our customers always have a strong team on hand for all project levels.

This team plans and coordinates the qualified implementation, agreements and details for the production. They provide the specifications for professional control of all factors, so that made-to-measure linings can be installed precisely.

STEULER - MORE THAN JUST REFRACTORIES

STEULER

Refractory | Linings

STEULER-KCH GmbH
REFRACTORY LININGS
56427 Siershahn | GERMANY
Phone: +49 2623 600-768
E-Mail: refractories@steuler-kch.de

www.steuler-linings.com