

STEULER

**MAINTENANCE WORK
IN SULPHURIC ACID PLANTS**
ACIDPROOF AND REFRACTORY MATERIALS

**COBRAS 2009,
FLORIANÓPOLIS, BRASIL**

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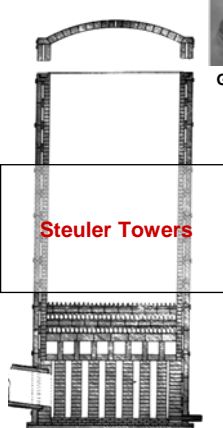
Company History |

Foundation 1908


Known Processes:
Birkeland Eydesche Process
Pauling Process
Contact Process (W.Ostwald)
Haber Bosch Process

**Development of
Potassium Silicate
Mortar**

**Acid Proof Brick
Material**



Steuler Towers




Georg Steuler

**Large Scale
Production of Nitric
Acid / H₂SO₄**

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Company History 1908
Steuler Group



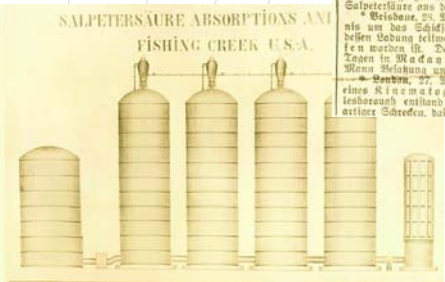
SALPETERSÄURE ABSORPTIONS ANLAGE
INNSBRUCK.

August 1908.


20	<i>St.</i>	<i>Hansbeuch</i>	
	<i>Waggon Dresden 46 St.</i>		
	42	<i>Hül. Formeisen 150 x 9 x 8</i>	
	42 L	
	42 B.R.	
	42 L	
	42 B.R.	
	42 L	
	200	<i>Jangweiden</i> .. I	10.800 <i>St.</i>
	<i>Waggon Dresden 46 St.</i>		
	42	<i>Hül. Formeisen 150 x 9 x 8</i>	
	42 2.	
	42 1.L.	
	42 2.	
	350	<i>Jangweiden</i> .. I	
	105 200 x 125 x 2	
	105	<i>Hornweiffen</i> 250 x 125 x 2	
	1350	<i>Wälzpa.</i> 272 x 200 x 13	15400 <i>St.</i>
			St. 26200 <i>St.</i>

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Company History 1913
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SALPETERSÄURE ABSORPTIONS ANL.
FISHING CREEK U.S.A.



Hamburg-Amerika
Linie.

Abgebildet von Kapitän zum Postkapitän
... President Lincoln.

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			St. 26200 <i>St.</i>

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Steuler Group	Year of Foundation: 1908 Turnover 2008: 310 Mio. Euro Employees: App. 1750
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Certification:



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Corrosion protection materials	<i>Acid proof (chem. resistant) materials</i> <i>Refractory (Fire resistant) materials</i>
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Especially in sulphuric acid plants the corrosion protection materials have to withstand extreme chemical, mechanical and thermal demands which makes regular shut downs for maintenance work necessary.

***Protection of structures,
components, equipment***

***Protection of environment around
the plant***



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A broad variety of different types of corrosion protection systems is suitable for the possible types of chemical, thermal or mechanical attack which will occur in sulphuric acid plants:

Acid proof materials:

Bricks and tiles

Coatings and Floorings

Self levelling, Spray or Trowel applied, FRP...

Rubber linings

NR, IR, IIR, CIIR, BIIR, SBR, CSM...

Thermoplastic linings

PE, PP, PVC, PVDF, PTFE...

Refractory materials:

Bricks

Masses, Mortars, Fibres

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Acidproof bricks and tiles:

Ceramic bricks and tiles
Carbon bricks, -tiles/graphite bricks
Fusion-cast basalt bricks
Stoneware
Natural stone grade (Granite)



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Acidproof materials for
bedding and jointing:

Synthetic resin materials

Epoxy resin (EP)

(moderate chemical attack)

Polyester (UP) and Vinylester (VE) resin

(Allround systems)

Furane (FU) and Phenolic (PF) resin

(highly resistant against acids)

Potassium silicate materials

Waterglass (WG)



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Refractory materials

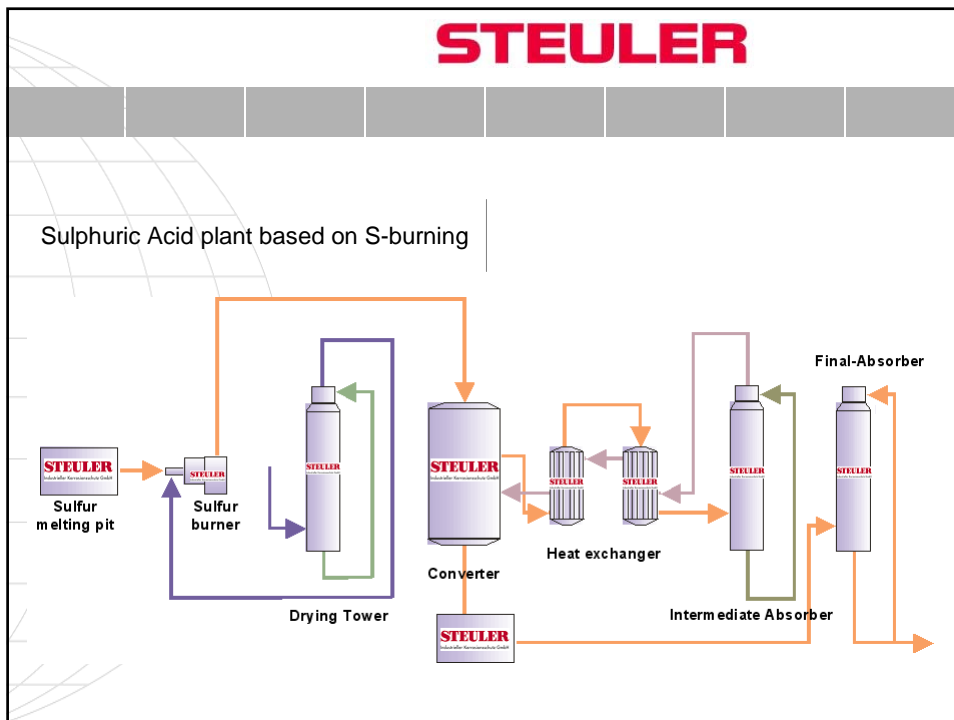


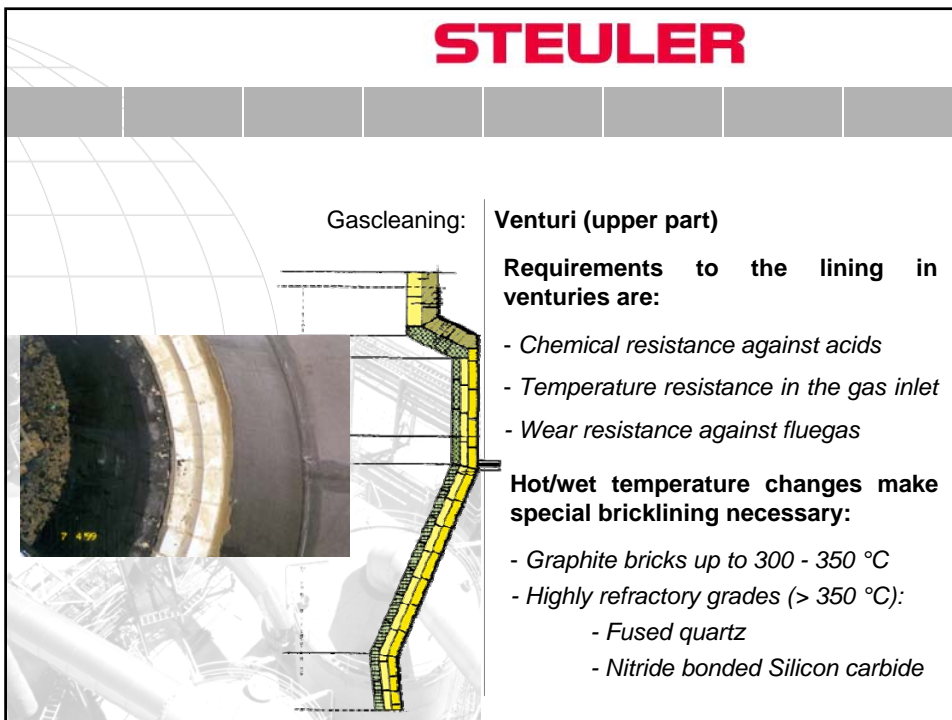
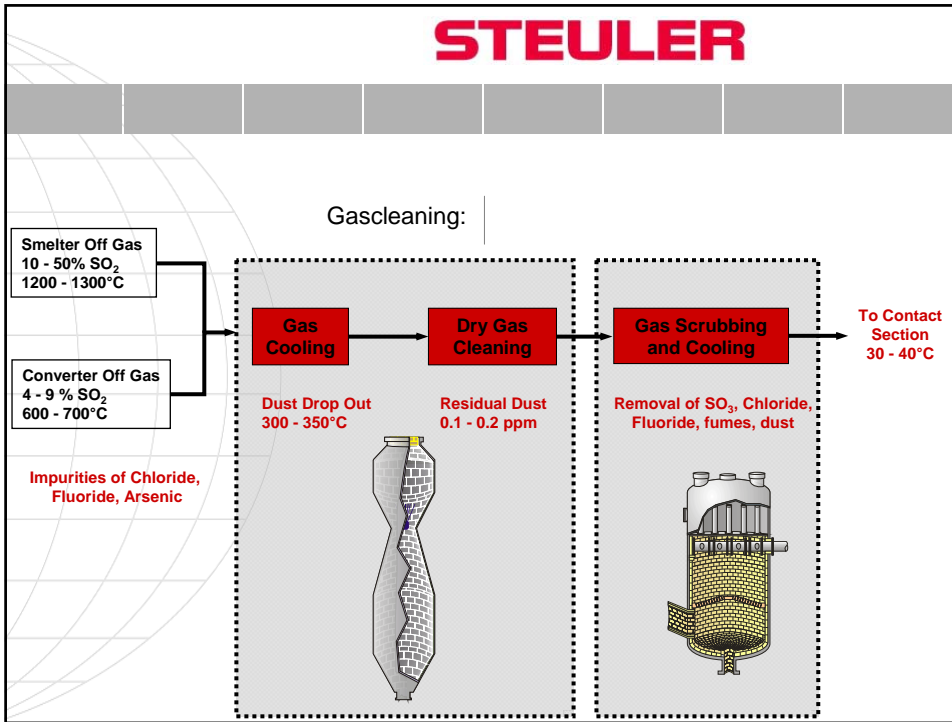
Bricks (Formed materials)

- Schamottebricks*
- Bauxite bricks*
- Andalusite bricks*
- Silica bricks*
- Silicon carbide bricks*
- Corundum, Chromecorundum bricks*

Non formed materials

- Chemical bonded fire proof mortars*
- Ceramic bonded fire proof mortars*
- Masses and Fibres*





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Example: *In the upper part of a venturi the mortar joints were damaged by unexpected high operating temperatures. In a very short shut down of 48 h all the joints in the nozzle roof area should be renewed*



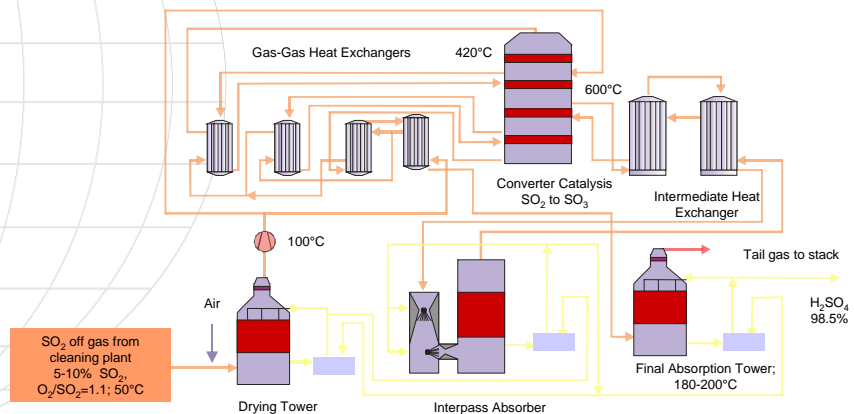
Damaged joints in a venturi



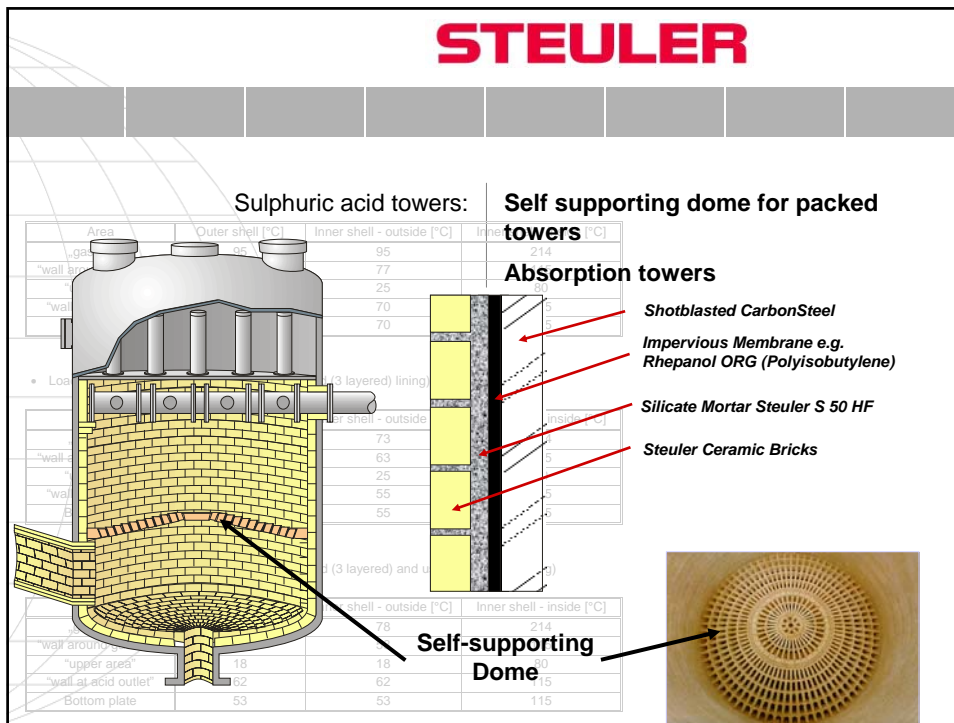
After repairwork

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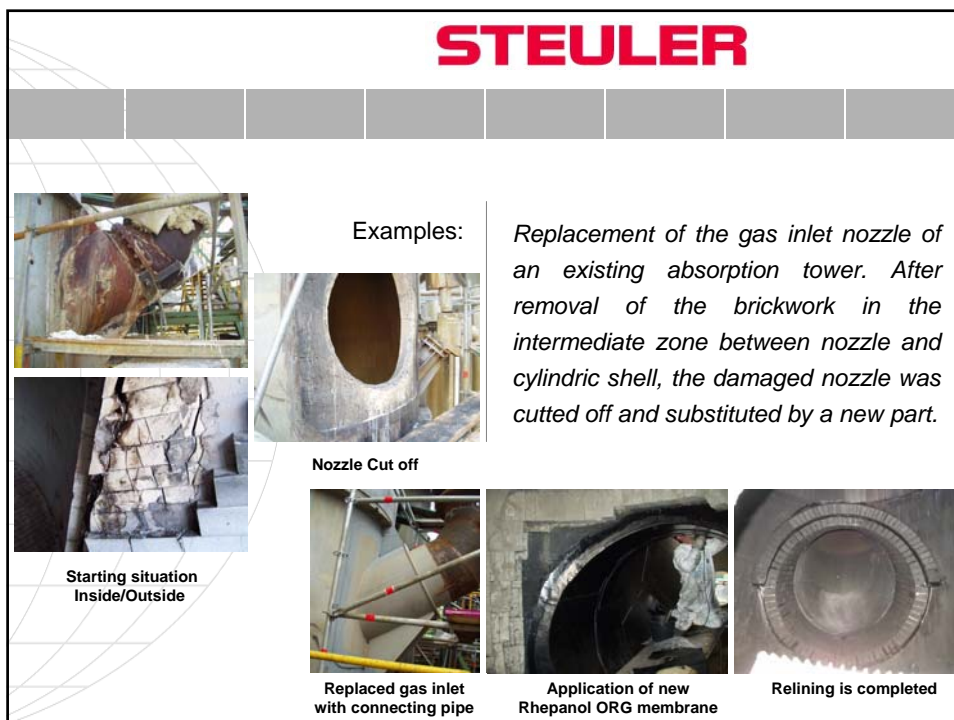
Sulphuric acid production | Double catalysis



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Examples:

Erection of a new drying tower while the production process is still going on. After finishing 50 % of the corrosion protection job including self supporting dome, the tower was set by crane on the final position



Bricklining work under process



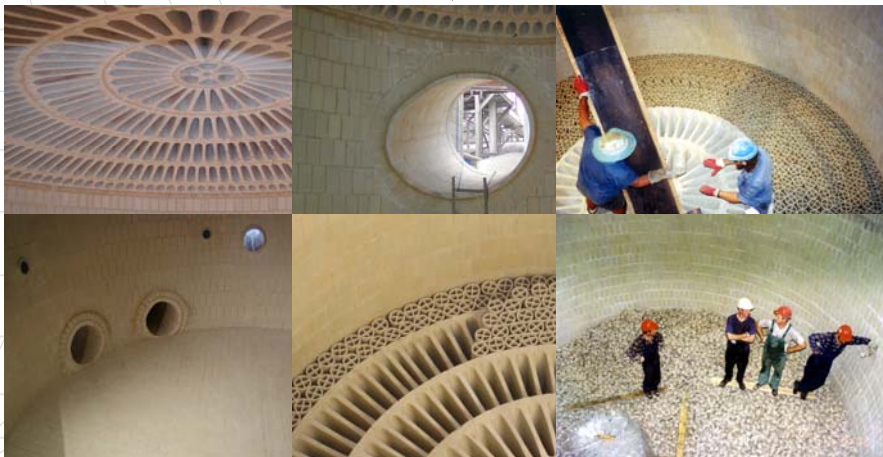
Installation of the self supporting dome



„Flying“ DT

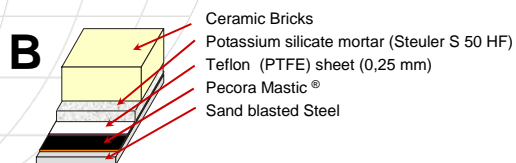
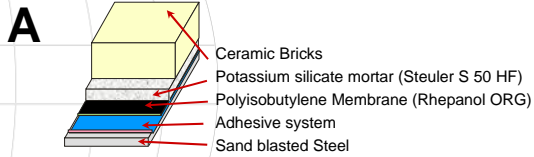
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Examples:



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Sulphuric acid towers: *Different lining designs*



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Acidproof tilings: **The requirements to the lining on floor surfaces in all areas are similar:**

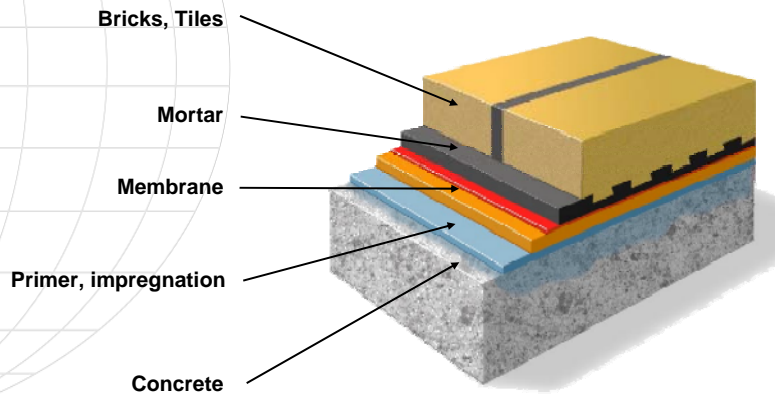
- Resistance against H_2SO_4 up to 98 %
- Temperature resistance up to 100 °C
- Resistance against mechanical attack
- Crack bridging characteristics



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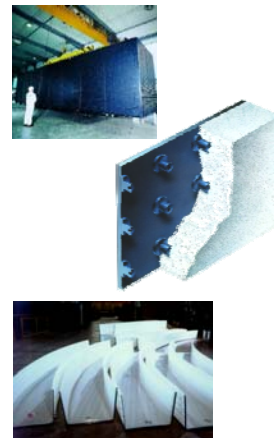
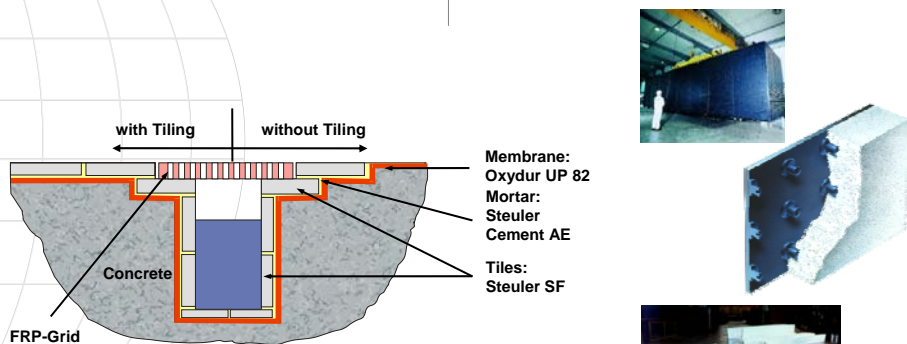
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Acidproof tilings: *Floor area H₂SO₄-plant*



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Acidproof tilings: *Sumps, pits and drains H₂SO₄-plant*



Mechanically anchored thermoplastic linings

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Examples: *Floor areas which were under operation for several years without any service make extensive maintenance work necessary*



Damaged concrete areas



Areas after shutdown

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I would like to thank you for your attention

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Surface Protective Systems
Refractory Systems
Plastics Engineering

We master aggressive media

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