



woellner
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Austria

Geosil® – ready to use alkali silicates for Geopolymers



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Content

- **Introduction Woellner Group**
- **Basics of alkali silicates, production methods, properties**
- **GEOSIL® Products**
- **Alkali silicates + Brown Cole Fly Ash**

Introduction

Introduction

- Owned by Dr. Eduard Wöllner family foundation
- 120 years of experience (founded in 1896)
- Head Office in Ludwigshafen / Germany
- Main product groups:
 - industrial silicates
 - raw materials and additives for paints, plasters and construction materials
 - process chemicals for industrial water circuits

- Approx. 140 employees
- Annual turnover approx. 50 million Euros
- Locations in Germany and Austria



Introduction



Ludwigshafen:
headquarter and
production site



Bad Köstritz:
production site



Gratwein-Straßengel:
sales department and
production site

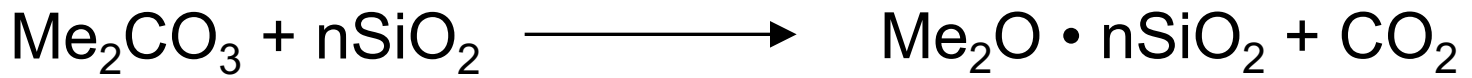
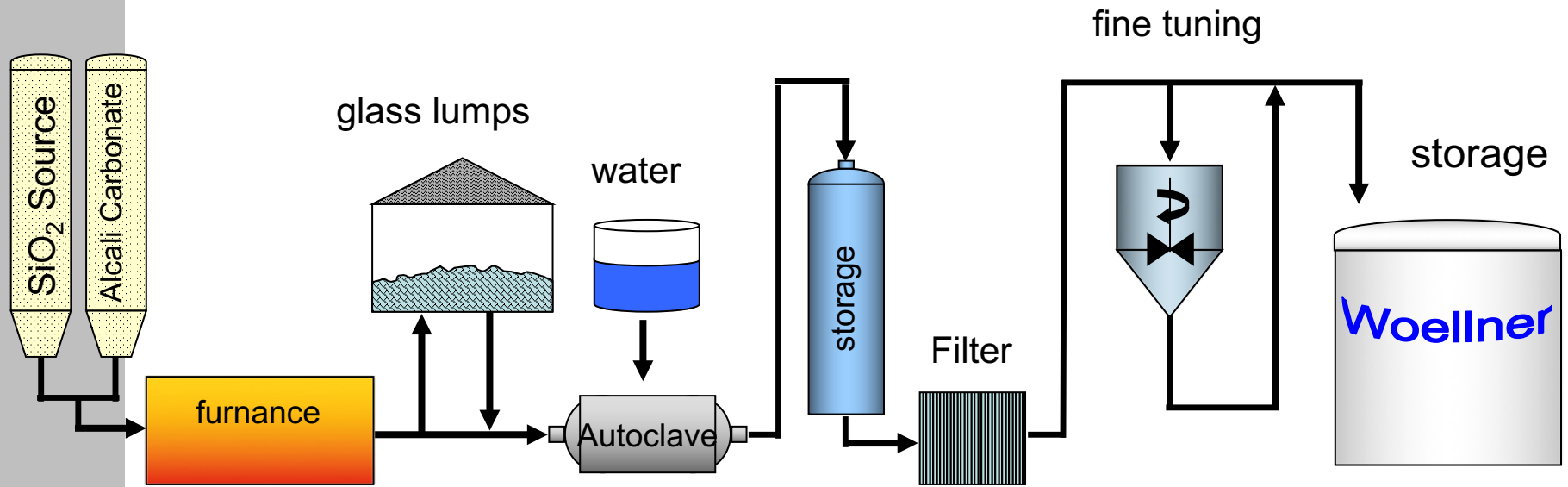


Basics of alkali silicates

Basics of alkali silicates

- Glasses soluble in water, resulting from combinations of alkali metal oxide (Na, K, Li) & silica (SiO_2) in varying proportions
- Alkali silicates are generally not distinct stoichiometric chemical substances
- no specific chemical formula for each product
- Trivial name = Waterglass
- Products available as solution and powder

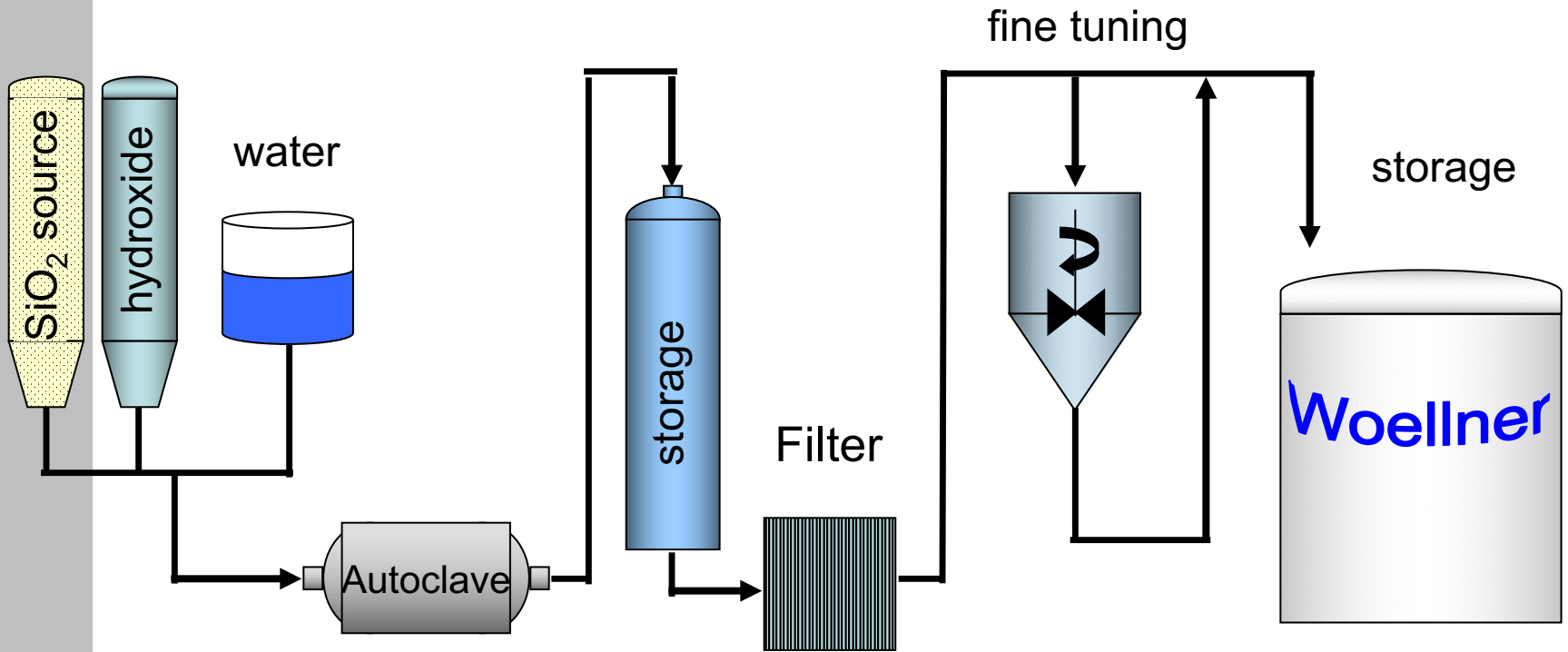
Melting / solving process



Me = Na, K



Hydrothermal process



Me = Na, K

Basics of alkali silicates

Molar ratio (MR) → mol SiO₂ / mol Me₂O

Weight ratio (WR) → % SiO₂ / % Me₂O

Molar ratio ↔ Weight ratio

Sodium silicate: MR = 1,032 • WR

Potassium silicate: MR = 1,566 • WR

Lithium silicate: MR = 0,497 • WR

Basics of alkali silicates

Technical significant liquid Na, K & Li-silicates and mixtures thereof:

- molar ratio ($\text{SiO}_2 : \text{Na}_2\text{O}$) 1,7 to 3,9
- molar ratio ($\text{SiO}_2 : \text{K}_2\text{O}$) 1 to 3,9
- molar ratio ($\text{SiO}_2 : \text{Li}_2\text{O}$) 2,5 to 5

pH-value of silicate solution between 11 – 14

Properties

- inorganic chemistry
- good chemical reactivity
- sticky solutions
- good adhesion properties
- incombustible
- capable to seal
- reinforcing
- good availability

GEOSIL[®] Products

GEOSIL[®] Products

- ready formulated mixtures
- userfriendly - no hydroxide handling
- high purity of raw materials
- reproduceable & controlled production process
- guarantee of chemical composition
- long shelf life / stable solution
- worldwide shipping

GEOSIL[®] Products

Name		Type
1	Geosil 34417	Sodium silicate
2	Geosil 54217	Sodium / potassium mixed silicate
3	Geosil 14515	Potassium silicate (ADR product)

GEOSIL[®] Products

	Name	Type
1	Geosil 34417	Sodium silicate
2	Geosil 54217	Sodium / potassium mixed silicate
3	Geosil 14515	Potassium silicate (ADR product)
4	Geosil 14517	Potassium silicate (non ADR product)!

BETOL[®] Products

Name		Type
1	Betol 39 T and 52 T	Sodium silicates
2	Betol K 35 T	potassium silicate
3	Betol H 35	Hardener for alkali silicates

Application with GEOSIL[®] and Betol[®] Products

- geopolymer concrete
- geopolymer adhesive
- geopolymer mortar
- inorganic foam
- toxic waste immobilisation
- composites
- steel coating
- thermal insulation boards
- fire protection boards
- refractory bricks
- pavement stone
- facade elements
- arts & decoration

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