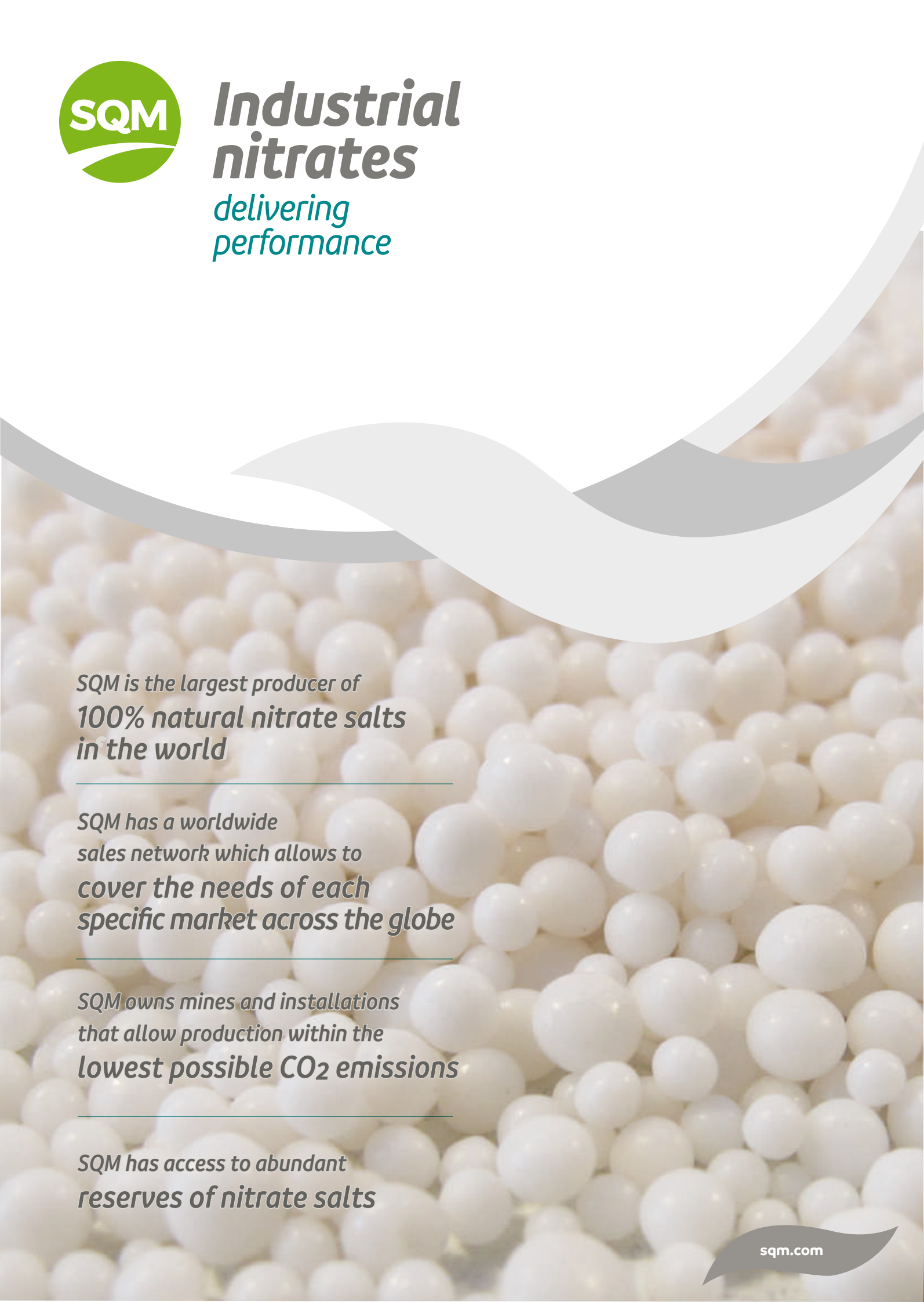
Industrial nitrates

delivering performance



SQM is the largest producer of
100% natural nitrate salts in the world

SQM has a worldwide sales network which allows to
cover the needs of each specific market across the globe

SQM owns mines and installations that allow production within the
lowest possible CO_2 emissions

SQM has access to abundant
reserves of nitrate salts

sqm.com

SQM production facility
Coya Sur, Chile

SQM entered the industrial chemical business over 30 years ago, producing and selling 100% natural nitrates. These are used as raw materials in a great number of industrial production processes.

The highly refined nitrates are used in a wide variety of applications that are part of our everyday life. From glass manufacturing, metal treatment, recycling to explosives for civil works. This broad range of applications, combined with a customer base is spread all over the globe. SQM has active customers in different businesses, therefore it has a good knowledge of the applications in which the industrial nitrates are used for.

With access to vast, premium quality natural resources SQM creates products that meet its customers demanding specifications with the lowest environmental impact compared to any competitor.

As the leading producer and supplier of industrial nitrates and solar thermal salts, SQM tailors its solutions to drive results for its customers in demanding applications and industries. With a range of industrial applications, both old and new, SQM drives performance and delivers essential products.

- On-time product delivery
- 100% natural nitrates
- Personalized local service
- Global sales network
- Easy handling
- Free-flowing product
- Different grades adjusted to each end-use
- Different packaging configurations
- Produced with much lower CO_2 emissions and far less environmental impact compared to synthetically produced nitrates

Main uses of sodium nitrate

- Explosives
- Glass
- Insulation materials
- Metal recycling and metal treatment
- Frits for ceramic enamels and glazes
- Adhesives
- Various chemical processes
- Storage of thermal energy

Main uses of potassium nitrate

- High quality glass
- Frits for ceramic enamels and glazes
- Metal treatment
- Pyrotechnics
- Various chemical processes
- Storage of thermal energy

Ceramic glazes

Thanks to their oxidizing and fluxing properties, sodium and potassium nitrate are used in the production of frits, which are applied as glazes on ceramic and metal bodies

Solar energy

Sodium and potassium nitrate are used to store thermal energy in Concentrated Solar Power Plants. Solar salts for this specific application contain a blend of 60% sodium nitrate and 40% potassium nitrate by weight ratio used as a storage and heat transfer medium. Unlike traditional photovoltaic plants, these plants use a "thermal battery" that contains molten sodium nitrate and potassium nitrate, which store the heat collected during the day.

Explosives

Sodium nitrate, a strong oxidizing agent, is used in civil explosives.

Pyrotechnics

Black powder containing potassium nitrate is used to launch pyrotechnics skyward.

High quality glass

Sodium nitrate is used as a refining agent in tableware and high quality types of glass. Potassium nitrate is used to strengthen the properties of the glass, making it more resistant.

NOOR Ouarzazate solar plant.
Photo courtesy of Acwa Power Morocco

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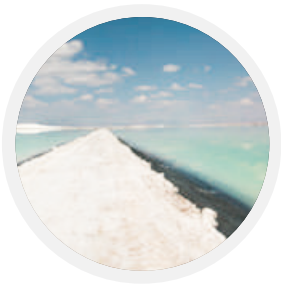
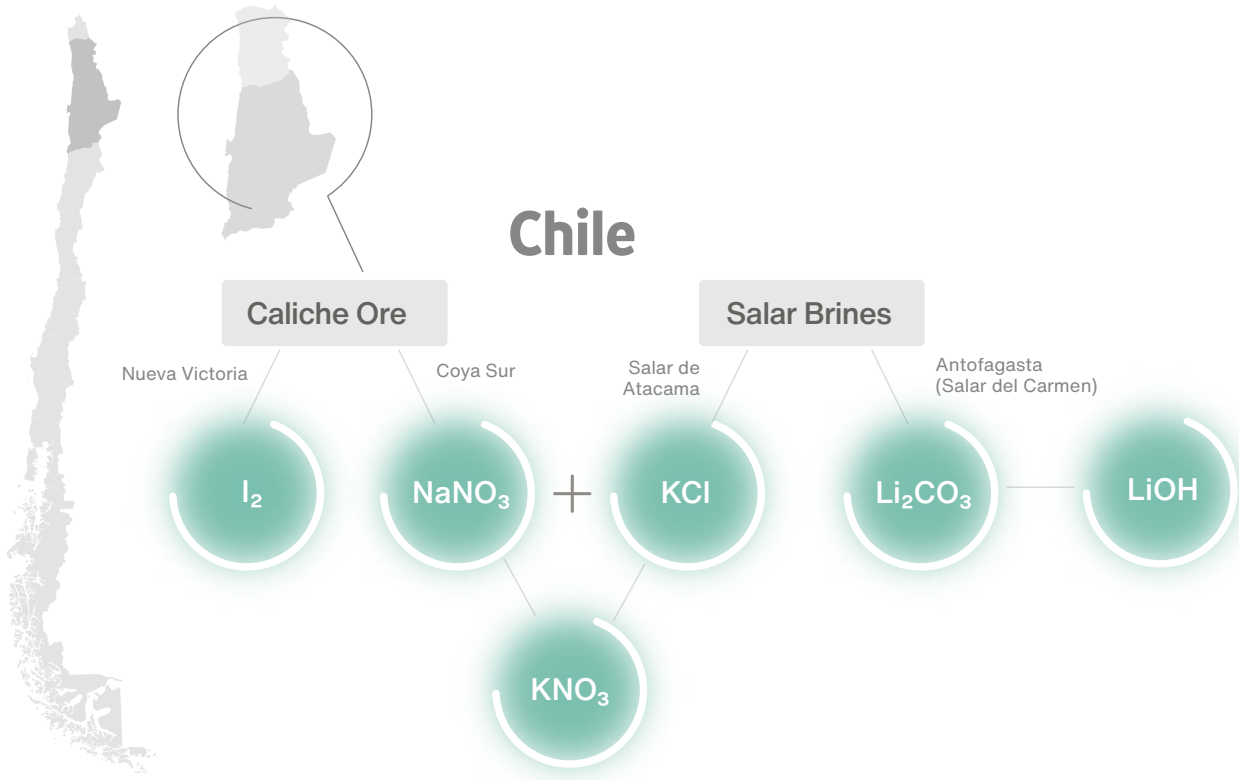
SQM's sodium nitrate & potassium nitrate

Annually, SQM produces around 1,5 million MT of sodium and potassium nitrate from Caliche ore and Salar brines, two natural resources found in northern Chile. Caliche is mined from surface deposits in the Atacama Desert, from which are obtained sodium nitrate and iodine. The salar brines are pumped from the underground in the Salar de Atacama (Atacama Salt Flat) after which they are transferred to large solar evaporation ponds to physically separate the desired elements. Main derived products are lithium chloride, potassium chloride, magnesium chloride, boric acid and potassium sulphate. Nitrates are produced after the caliche mineral is crushed and exposed to a leaching process with water. Sodium nitrate is obtained from this leached solution by crystallization. Part of the obtained sodium nitrate goes through another stage of processing during which potassium chloride, from the Salar de Atacama is added. The mixture is then subject to other processes such as crystallization, refining and drying to yield potassium nitrate.

Caliche Ore



Salar Brines



Sodium nitrate ($NaNO_3$)

The properties of sodium nitrate enable it to be used in a great variety of applications, including the production of glass, metal treatment, ceramics, explosives and various chemical processes. SQM produces five grades of sodium nitrate for industrial applications, each one with a different purity grade:

- ***Sodium Nitrate Industrial (SSI), industrial grade - prilled**, Purity: 98% min*
- ***Sodium Nitrate Technical (SST), technical grade - prilled,** Purity: 99,2% min*
- *Sodium Nitrate Refined (SSR), refined grade - prilled, **Purity: 99,5% min***
- ***Sodium Nitrate Refined (SSR-C) refined grade - crystalline,** Purity: 99% min*
- ***Sodium Nitrate Refined (SSR-CS), solar grade - crystalline,** Purity: 99,5% min*

Specifications $NaNO_3$

Overview specifications	Sodium nitrate		Industrial grade (prilled)	Technical grade (prilled)	Refined grade (prilled)	Refined grade (crystalline)	Refined grade (crystalline)
General description							Thermo-solar grade
Chemical formula			$NaNO_3$	$NaNO_3$	$NaNO_3$	$NaNO_3$	$NaNO_3$
Appearance			White prills	White prills	White prills	White crystails	White crystals
Anticaking agent			NO	NO	NO	YES	NO
Internal code			SSI	SST	SSR	SSR-C	SSR-CS
Chemical specifications							
guaranteed							
Purity	$NaNO_3$	%	98 min	99,2 min	99,5 min	99 min	99,5 min
Chloride	Cl	%	0,48 max	0,18 max	0,08 max	0,25 max	0,08 max
typical							
Sulfate	SO_4	%	< 0,15	< 0,1	< 0,1	< 0,1	< 0,1
Insolubles		%	< 0,1	< 0,05	< 0,05	< 0,05	< 0,05

All grades are low in heavy metals

Potassium nitrate (KNO_3)

SQM produces potassium nitrate to be used also in a variety of applications, including glass, frits, metal treatment and other chemical processes. It comes in two physical forms, crystallized and prilled, which comes in five grades of purity:

- *Potassium Nitrate Technical (NPC-T) - crystalline, Purity: 99,3% min*
- *Potassium Nitrate Technical (NPP-T) - prilled, Purity: 99,3% min*
- *Potassium Nitrate Refined (NPP-R) - prilled, Purity: 99,8% min*
- *Potassium Nitrate Refined (NPC-R) - crystalline, Purity: 99,8% min*
- *Potassium Nitrate Refined (NPC-RS), thermo-solar grade - crystalline, Purity: 99,6% min*

Specifications KNO_3							
Overview specifications	**Potassium nitrate**		Technical grade (crystalline)	Technical grade (prilled)	Refined grade (prilled)	Refined grade (crystalline)	Refined grade (crystalline)
General description							Thermo-solar grade
Chemical formula			KNO_3	KNO_3	KNO_3	KNO_3	KNO_3
Appearance			White crystals	White prills	White prills	White crystals	White crystals
Anticaking agent			YES	NO	NO	YES	NO
Internal code			NPC-T	NPP-T	NPP-R	NPC-R	NPC-RS
Chemical specifications							
guaranteed							
Purity	KNO_3	%	99,3 min	99,3 min	99,8 min	99,8 min	99,6 min
Chloride	Cl	%	0,2 max	0,2 max	0,03 max	0,03 max	0,1 max
typical							
Sulfate	SO_4	%	< 0,1	< 0,2	< 0,02	< 0,01	< 0,05
Insolubles		%	< 0,02	< 0,05	< 0,02	< 0,02	< 0,01
All grades are low in heavy metals