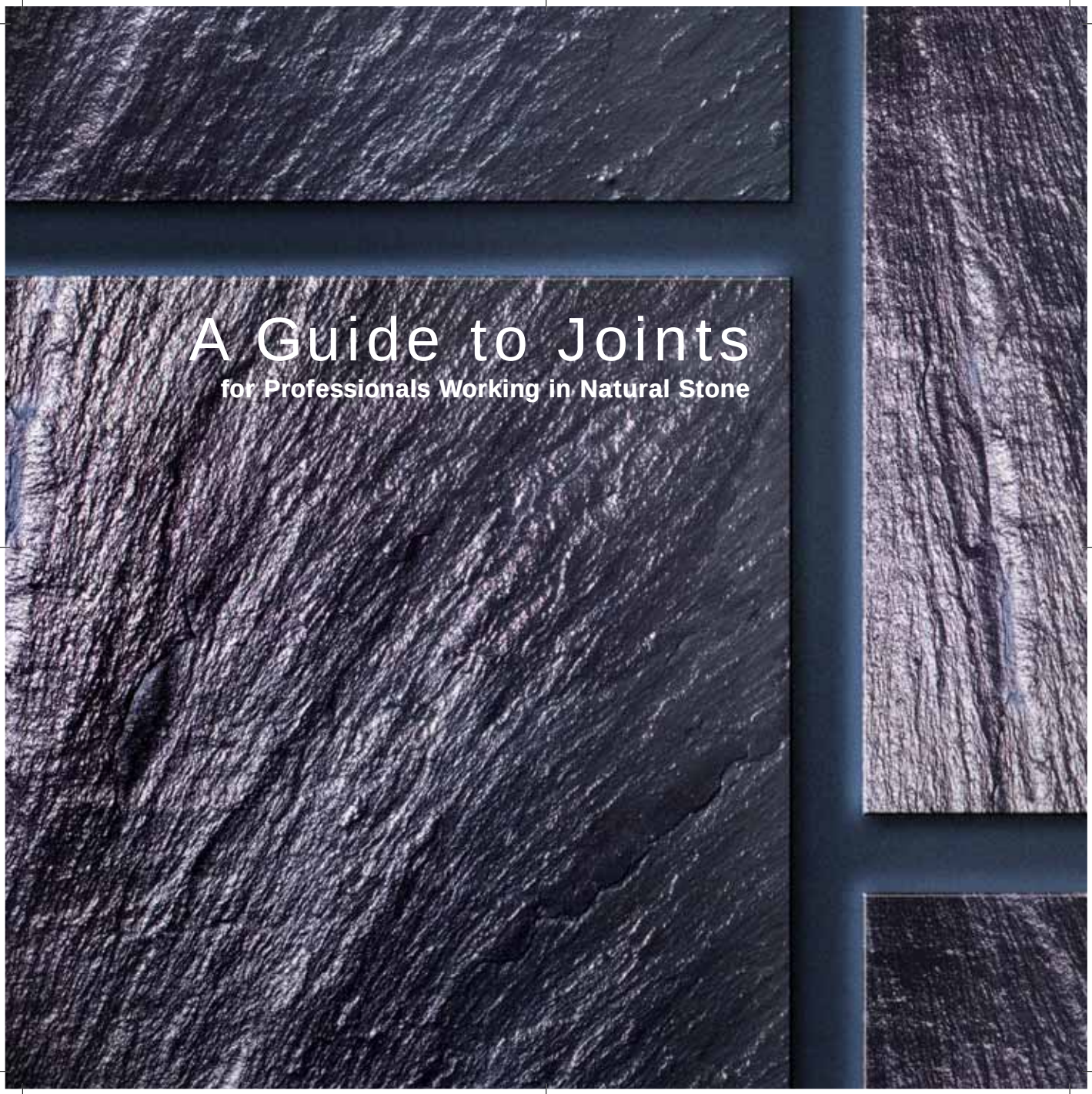
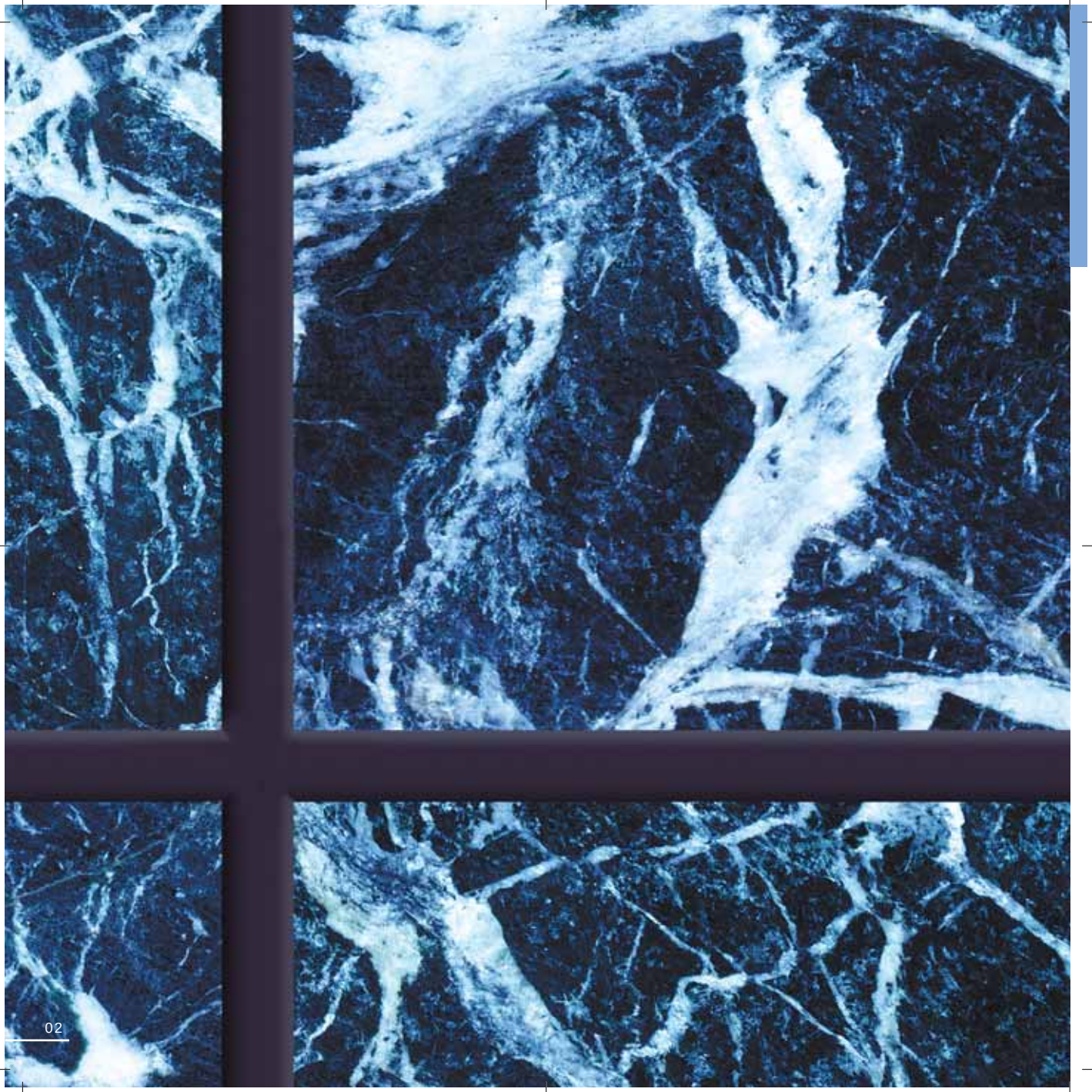


A Guide to Joints

for Professionals Working in Natural Stone



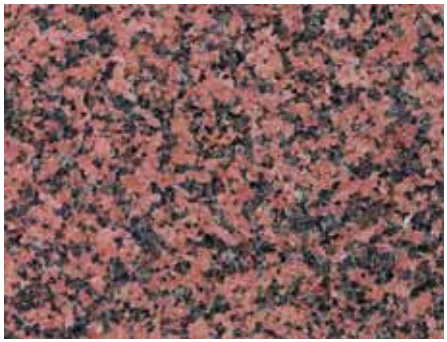
Finding your way around.

More than just a question of honour.

Jointing natural stone - a small job with big consequences

Looking in the current literature on "Natural Stone" for information on joints is usually a thankless task, even though correct joint work is the final step in ensuring that the hard work that goes into in tiling or paving yields high quality results. Incorrectly formed joints or joints made with the wrong materials not only render the work worthless, but can also result in costs that are impossible to estimate arising from complaints, cleaning or even damage.
Other possible consequences are legal disputes and the damage they do to the corporate image, and the loss of future orders. A company that saves on sealant is not only endangering its good reputation but is also running the risk of serious economic consequences.

As a leading manufacturer of sealants and adhesives, OTTO has created this jointing guide for builders and designers. It is intended as a guide to possible "stumbling blocks" in jointing natural stone and to help avoid making expensive mistakes in the choice of joint sealants. It also serves to make buyers of building services more aware of the problems and to highlight the importance of expecting high standards.



Natural stone has been in the creation over 50 million years.
The wrong sealant can wipe out Nature's work in an instant.

Why high-quality stone requires a high-quality setting.

Protection and good looks

Jointing natural stone is very different from other types of joint work. This is due to extreme conditions in the areas of application and to the very varied material properties that have to be taken into account. As well as meeting aesthetic conditions, sealant for natural stone has to protect the stone and its substructure from attack by water or chemicals reliably over many years.

Threat from oily plasticizers

A disadvantage of many traditional silicones is the proportion of oily plasticizers which under heat or pressure can migrate into the outer areas of the stone, leaving ugly, undesirable stains. Many PU sealant products continue to be slightly sticky. As a result, dirt and dust particles stick to the sealant giving the joint an unattractive appearance.

Ugly "grease stains" on the edges caused by the wrong sealants which release plasticizer into the stone.

Exposure to physical and chemical agents

Then there are the purely technical demands made permanently of natural stone joint sealants:
these include high resistance to ultra-violet radiation, secure adhesion to many different materials, flexibility under pressure and tension, and resistance to notching.

A specialist in every situation.

Unobtrusively successful:
OTTOSEAL® S 70

Unobtrusive. This sums up all the demands that a perfect joint sealant for natural stone must meet: it should not undergo any changes in response to physical and chemical influences, it must not get dirty and it must enhance the interesting appearance of the natural stone.

Guaranteed against migratory staining

OTTOSEAL® S 70 is a neutrally cross linking silicone sealant which is suitable even for extremely demanding areas of application. It is very resistant to compression, tension and ultraviolet light; withstands wear and ageing and exhibits excellent adhesive properties.
Even under pressure there is no danger of the dreaded migratory staining appearing with OTTOSEAL® S 70. This has been proven and certified in testing to rigorous US standards.
For the user's peace of mind, OTTO even guarantees this property. Its high silicone content makes OTTOSEAL® S 70 easy to smooth. On the other hand, slow skin formation means that long lengths of joint can be made in one pass. Nevertheless, OTTOSEAL® S 70 hardens off quickly after jointing.

OTTOSEAL® S 70 is available in 30 standard colours and various surface textures; it can be produced in any colour to match natural stone on request.

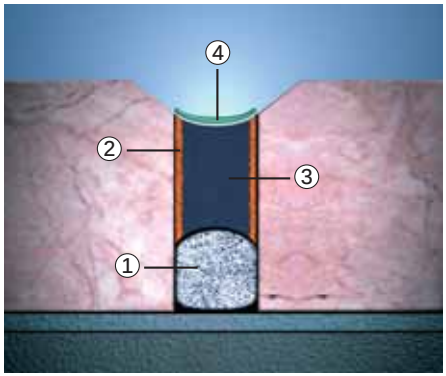
The hardest job in the world.

The daily challenge

Sealant in a natural stone joint is constantly exposed to thrust, tensile, shear and peel forces. So that the joint sealant can function perfectly even under these circumstances, the seal must be constructed correctly. The sealant can only move freely and compensate for movement without tearing if three sided adhesion is avoided.

Use cord to avoid three sided adhesion

Packing out the joint with an appropriately sized OTTO PE foam rod prevents contact with the third side. Before the PE foam rod is positioned, the sides of the joint must be cleaned and if necessary pre-treated with the correct primer to obtain optimum adhesion.



Typical structure of a facade joint.
1. PE foam rod
2. Primer
3. OTTOSEAL® S 70
4. Smoothing agent

Only professional smoothing agents give a professional result

Commercial washing up liquid is frequently used as a smoothing agent to smooth over sealants. However, this can stain natural stone.
OTTO marble silicone smoothing agent avoids this staining to a large extent and is also kind to your skin.
Please see the technical data sheet for OTTOSEAL® S 70 (www.Otto-chemie.de) for details on using cleaners and primers.

Tip:
With sandstone, mask off the edges of the joint before applying the sealant, as it is difficult to remove stray spots from the surface of the stone. Only use suitable masking tape that does not mark the stone.


OTTO SEAL EX
OTTO Primer 1216
OTTO Fugenboy
klein · small · petit · klein
Anti Schimmel Spray
Gegen Schimmel, Algen, Moder
OTTO CHEMIE
OTTO Cleaner T

Systematically better.

Complete programme for natural stone joints

OTTO offers users a whole range of sealing products coordinated with OTTOSEAL® S 70 natural stone sealant. This ensures that the individual components work together to achieve the desired result - a well-executed joint.

Along with suitable cleaners and primers for any surface and PE foam rod for all standard joint widths, OTTO also supplies a smoothing agent with dermatologically tested ingredients which is kind to the skin and minimises staining on the stone and the joint and which is specially formulated for delicate marble and natural stone. Using an OTTO spatula gives the joint the optimum shape.

Acrylic glass (Makrolon, Plexiglas® etc.)	R
Acrylic sanitary ware (e.g. bath tubs)	+/1101
Aluminium, anodised	+
Aluminium, polished	+
Aluminium, powder-coated, TGIC-free	R/1101
Artificial stone	+/1216
Brass*	+
Chrome	1216
Ceramics, glazed	+
Ceramics, unglazed	+
Concrete	1215/1218
Copper*	+
(Decorative) concrete blocks	+/1216
Epoxy resin coating	R
Fibre cement	1215
Glass	+
Iron, sand blasted	+
Lead	+
Melamin resin sheet	1216
Natural stone/marble	+/1216
Plaster	+/1215
Plastic profiles e.g. Vinnolit	+
Polyester	+
Polypropylene (PP)	R
Porous concrete	1215
PVC, rigid	1217
PVC, flexible, film	+
Sandstone	1102
Stainless steel, rustproof	+/1216
Tin, galvanised iron	+/1216
Tin plate	1216
Wood, painted (solvent-based)	+
Wood, painted (water-based)	+
Wood, varnished (solvent-based)	+
Wood, varnished (water-based)	+
Wood, untreated	+

Recommended OTTO Primers for optimum bonding of OTTOSEAL® S 70 with different materials

+ = good adhesion without primer
R = consultation or pre-test required

* OTTOSEAL® S 70 might react with coloured metals such as copper and brass. Ensure thorough ventilation during curing.

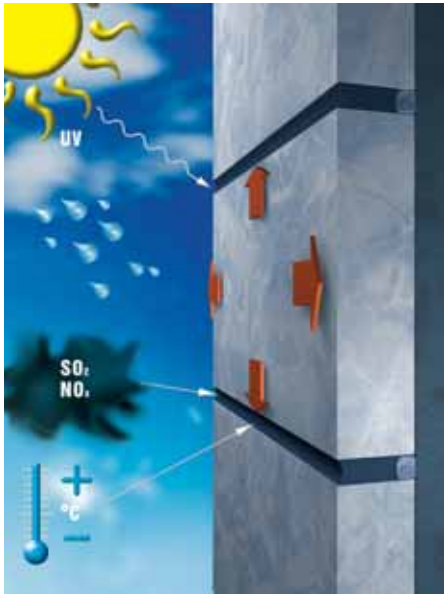
Sun, south-facing and seventy degrees.

Extreme exposure on facades

With temperatures possibly ranging from -40 to +100 °C, exhaust fumes, precipitation and constant exposure to UV light, sealants for façades need to be of a very high quality indeed.

To stop water or emissions penetrating behind the stone, the sealant must offer permanent resistance to these extreme conditions and absorb any movement in the façade caused by fluctuations in the temperature.

With its outstanding chemical and physical properties, OTTOSEAL® S 70 meets these challenges superbly. Its high resistance to UV and ageing make it a natural stone sealant which will maintain the value of a façade over many decades and help avoid costly maintenance and renovation work. The OTTO guarantee against edge staining gives additional assurance.



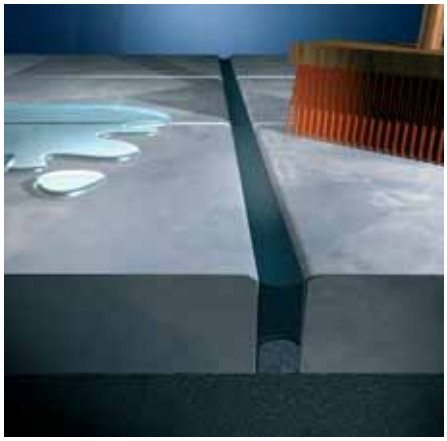
The sealant is exposed to UV radiation, precipitation, chemical emissions and fluctuations in temperature and subjected to stress in all directions; it must withstand all of these without loosing the ability to function.

All sealed up in the pool and the bathroom.

Despite water, chemicals and cleaners

Using natural stone in wet areas or under water such as bathrooms or swimming pools requires a sealant with special properties. OTTOSEAL® S 70 is also the optimum solution for this range of applications. As well being suitable for use with natural stone, OTTOSEAL® S 70 also includes a fungicide which prevents the growth of mould.
Using OTTOSEAL® S 70 to seal joints in natural stone in permanently wet areas ensures outstanding performance; it is neutral in reaction and withstands attack from cleaning agents and disinfectants (e. g. chlorine) and mechanical damage from cleaning.

Its excellent bonding properties even make OTTOSEAL® S 70 suitable for use as an adhesive in this area. Furthermore, it is not corrosive.



Joints in bathrooms and other wet areas should be provided with a fungicidal agent and also withstand damage from cleaning and bathers.

Tough and resilient - that's the point.

Withstands high point loads

Sealants used in floor areas are particularly exposed to mechanical stresses. Damage from heavy weights, rubbing and scraping from cleaning machines and the combination of many different kinds of materials with the natural stone make very high demands of the sealant.

OTTOSEAL® S 70 maintains value

The OTTOSEAL® S 70 properties meet these demands in full, thus contributing to maintaining the value and the attractive appearance of natural stone surfaces. OTTOSEAL® S 70's particularly high resistance to notch rupture inflicted by unusually high point loads and its ability to withstand ageing are also factors here. The OTTO guarantee against edge staining protects the user from unpleasant surprises after joint sealing is complete. Furthermore, after curing, OTTOSEAL® S 70 shows no trace of stickiness which could result in the joint becoming soiled.

The sealant can withstand notching from high point loads.

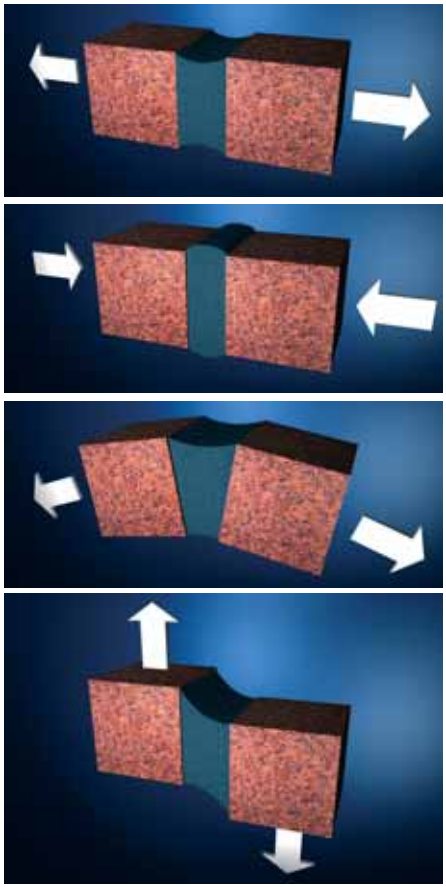
Stepping up together.

Joint sealants and movement

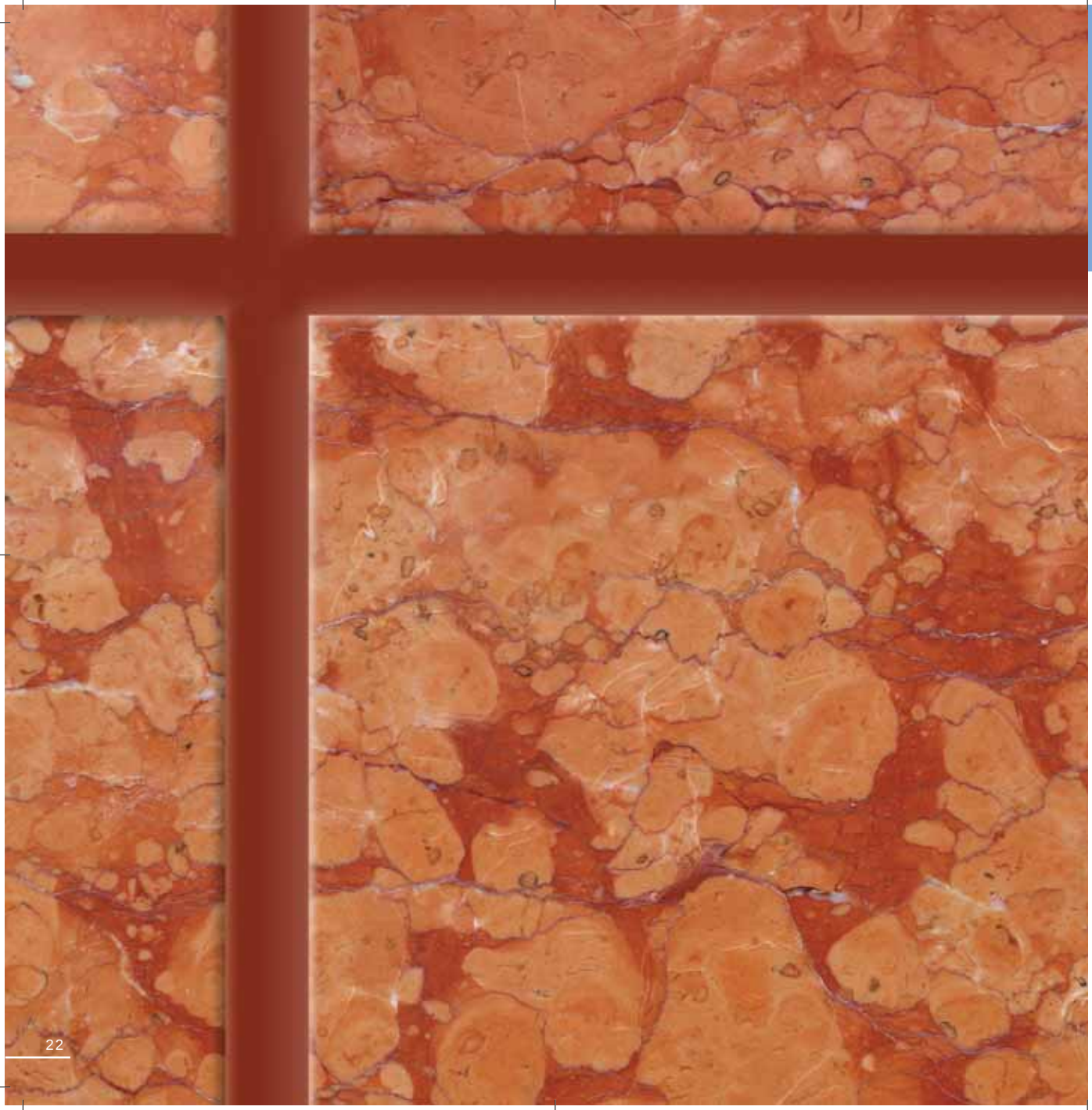
Natural stone surfaces on metal sub-structures make especially high demands on the elasticity of a joint sealant. Considerable movement is generated in free-standing staircases in particular. This means that the sealant has to "work with" the movement, absorbing it and compensating for it. With its non-corrosive properties, OTTOSEAL® S 70 is particularly suitable for metal staircases clad with natural stone.

Strong, firm, flexible bonding: OTTOSEAL® S 70 as an adhesive

OTTOSEAL® S 70 joint silicone is strong, but at the same time elastic, making it an excellent medium for absorbing movement without losing adhesiveness, without tearing under tensile stress or hardening and becoming brittle under compression. With its excellent adhesive properties, OTTOSEAL® S 70 is also used for bonding natural stone to metal, as well as functioning as a sealant.



Adhesives and sealants on natural stone steps have to absorb all kinds of stresses and movement without sustaining any damage.



And finally, did you know?

Which primer for which type of stone?

On most natural stones, OTTOSEAL® S 70 bonds very well even without a primer However, since the constituents of stone and the names given to different types of stone often vary a great deal, we recommend that you consult our technicians or, for rare types of stone for example, test the bonding strength yourself.

Technical properties OTTSEAL® S 70

Viscosity (23 °C):	non-sag, pasty
Density:	approx. 1.01 g/cm³
Shore-A hardness (DIN 53505):	approx. 30
Tensile elongation (DIN 53504):	approx. 400 %
Modulus at 100 % elongation:	approx. 0.50 N/mm²
Movement capability:	20 %
Temperature resistance:	- 40 °C up to + 180 °C
Tooling temperature:	+ 5 °C up to + 35 °C
Skin-forming time (23°C, 50 % RH):	approx. 5 min.
Shelf life:	12 months from the date of manufacture at room temperature
Tensile strength (DIN 53504):	approx. 1.4 N/mm²
Curing in 24 hours (23°C, 50 % RH):	approx. 3 mm

These data are not intended for use in preparing specifications. Please contact OTTO-CHEMIE before writing specifications.

We would like to thank the company Gerloff & Söhne, Eschwege, for allowing us to print the photograph on page 6. Photo Page 18: Getty Images

OTTO CHEMIE

Sealants • Adhesives

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