ALCOLIN

TECHNICAL DATA SHEET

ALCO-FLEX NEUTRAL CURE SILICONE

Description

ALCO-FLEX NEUTRAL CURE is a versatile, high quality, low modulus neutral curing silicone sealant with excellent adhesion to a wide variety of substrates. It provides a durable, flexible, watertight seal ideal for internal and external sealing applications, waterproofing and weatherproofing in and around the construction site and home. It is also excellent for use as an adhesive where an elastic gap filling bond is required.

Features & Benefits

- Neutral curing - not corrosive to metals and suitable for alkaline surfaces.
- Waterproof & abrasion resistant - long lasting bond durability.
- UV resistant - non-yellowing.
- Heat resistant - can go up to +150°C.
- Flexible at low temperatures - as low as -50°C.
- Permanently elastic - ideal for shock and vibration resistant bonding.
- Low shrinking on curing - no pulling away from joints, ideal for sealing.
- Non-sag - can apply on vertical surfaces.
- Movement accommodation of 50% - ideal for sealing of expansion and movement joints.
- Low odour - ideal for use in areas with poor ventilation.

Applications

- Sealing of connecting and expansion joints in walls and floors.
- Sealing of gutters, gutter outlets, and around building flashes.
- Perimeter sealing of doors, windows and cladding panels.
- Industrial sealant for the automotive, aircraft and ship-building industries.
- Sealant for the electrical and electronics industries e.g. encapsulation of wires, insulating appliances.
- Sanitary-ware applications i.e. sealing around bathroom and kitchen fittings, baths, showers and sinks.
- Sealant in silo and container construction.
- Sealing between materials with different expansion coefficients.
- Suitable as an adhesive where an elastic gap filling bond is required that will resist vibrations.
- Ideal for sealing in cars, caravans, boats, bus and truck bodies.
- Bonding of small mirrors.

Adhesion

ALCO-FLEX NEUTRAL CURE exhibits excellent adhesion to alkaline surfaces such as concrete, fibrous cement, mortar and plaster. It also offers excellent primerless adhesion to many non-porous materials e.g. ceramics, glass, enamel, porcelain, coated wood, painted surfaces, epoxide, canvas, rubber, most metals (mild steel, aluminium, lead, copper, tin, galvanized iron, brass or zinc) and some plastics (acrylics, polyester, polyacrylate, polycarbonates, polystyrene, fiberglass, formica, and rigid PVC).

Standards

- ISO 11600F + G25LM.
- CE Mark: EN 15651-1 F Ext–Int–CC / EN 15651-2 G-CC / EN 15651-3 S.
- DIN 18540 Part 2. Sealing of exterior wall joints in building using joint sealants.

Limitations

- ALCO-FLEX NEUTRAL CURE used in contact with marble, granite, quartzite, and similar natural stone, may cause staining.
- May become discoloured in contact with some organic elastomers, which tend to bleed oil or solvents into the silicone, e.g. EPDM, APTK, Neoprene and Bituminous surfaces.
- Not suitable for use in joints subjected to traffic.
- Will not adhere to some plastics such as polyethylene, polypropylene and Teflon.
- Width of the joint must be at least 4x greater than maximum expected joint movement.
- CANNOT be over-painted.
- NOT SUITABLE FOR FISH TANKS (contains a fungicide).
- Do not apply sealant when relative humidity is below 10% - cure rate will be affected.

Safety instructions

ALCO-FLEX NEUTRAL CURE is non-toxic; however, it is advisable to wear gloves in order to avoid direct skin contact. In the event of skin or eye contact, rinse thoroughly and immediately with water. Seek medical assistance if irritation or discomfort persists. Avoid breathing in vapours. Always work in a well-ventilated area. Keep out of reach of children! Cured silicone rubber can be handled without any health risk. Refer to our Safety Data Sheets for further toxicological information and comprehensive handling instructions.

Surface preparation

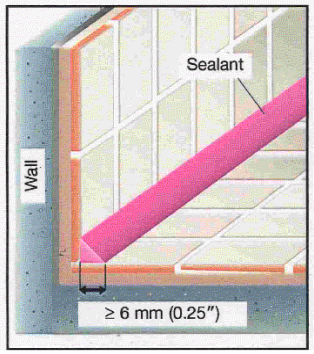
Ensure surfaces are clean, dry and free of loose materials, dust, grease, rust and other contaminants. Surfaces such as metals and glass should be degreased with a solvent e.g. acetone. Plastics should be lightly abraded with emery paper. Soaps or detergents used to clean the surface must be rinsed away thoroughly with clean water to ensure that all traces of the soaps are removed before sealing. Use backing material when sealing deep cavities. If the area being sealed needs to be painted, ensure that the paint has dried before applying sealant. You cannot paint over silicone sealant! Poor surface preparation may result in the delamination of the silicone.

Directions for use

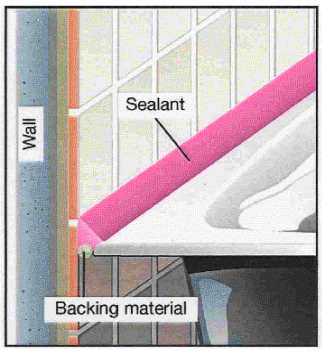
1. Ensure that surfaces are prepared as above.
2. Cut tip off cartridge and screw the nozzle onto the cartridge. Cut the tip of nozzle at an angle to achieve the desired bead size. Apply silicone with a caulking gun in a continuous bead to the prepared joint.
3. Use masking tape to get a clean, even sealant line and to eliminate cleaning difficulties on porous surfaces. Be sure to remove the tape before sealant begins to skin.
4. Smooth down after application (within 5 minutes) before skin formation occurs, by using a flat or rounded tool, or even a finger, dipped in soapy water.
5. Sealant dries to touch in 1 hour and reaches full cure after approximately 24 hours.
6. If the area being sealed, needs to be painted, ensure that the paint has dried COMPLETELY before sealing with ALCO-FLEX NEUTRAL CURE.

Additional application notes

Back-up materials: These are used to partially fill the cavity to control sealant depth, make the bottom of the sealant concave and as a bond breaker to prevent uneven stresses. Suitable back-up materials are closed cell PVC foam, polyurethane foam, polyethylene foam and polyethylene tape.



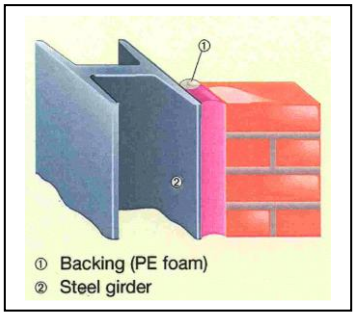
Situation requiring no backing material

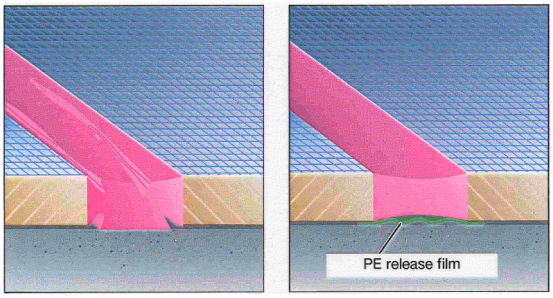


Situation requiring backing material

Joint design: Make sure the joint design is right. For expansion joints, the sealants should be used in the correct width to depth ratio. Refer to appendix "Calculation of joint dimension and design of expansion joints"

Construction Joint





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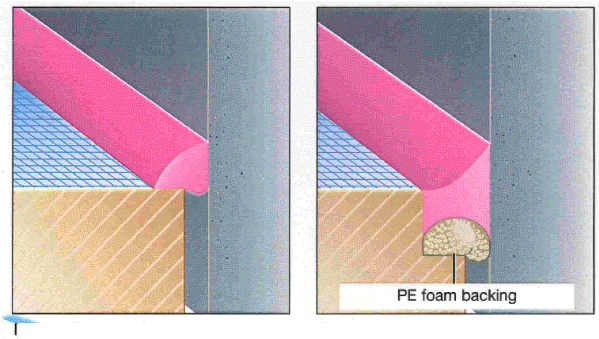

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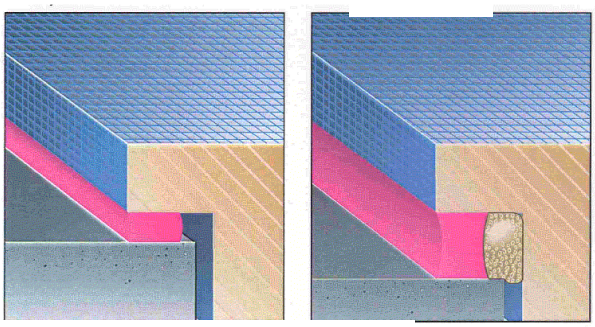

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Cleaning

- Uncured silicone can easily be removed from the hands or tools using a clean solvent-soaked cloth, e.g. turpentine or paraffin. If removing uncured silicone from clothing, check fabric colour fastness before applying the solvent.
- Fully cured sealant can be removed by mechanical means, i.e. with a sharp knife or chemically using a Silicone stripper.

Storage stability

ALCO-FLEX NEUTRAL CURE has a shelf life of at least 18 months if stored in a cool (below 25°C), dry place in its original moisture-tight container. If the material is kept beyond the recommended shelf life, it is not necessarily unusable, but a check should be performed to observe whether the product is still workable, apply-able and uncured. To maximize the shelf life of the opened cartridge, we recommend that the nozzle be removed and a piece of plastic placed over the cartridge tip after which the nozzle must be screwed back on. A large screw inserted into the nozzle tip also helps.

Product packaging

- 300ml cartridge

Product data

i. Physical data – Uncured Silicone

Appearance		Homogenous clear paste
Application temperature		Min. +5°C to Max. +50°C
Coverage – 300ml cartridge		12 meters (5mm x 5mm joint)
Curing rate (23°C, 55RH)		Approx. 1-2mm / 24hrs
Density	ISO 1183	1.01g/cm^3 at 23°C
Flash Point	DIN 5794	430°C
Skin over time	BS 5889 Ap. A	Approx. 25 - 25 min
Slump resistance	ISO 7390	0.00mm
Tack free time	ASTM C-679-71	Approx. 10 – 20 min
Packaging sizes		300ml Cartridges
Shelf life		18 months when sealed and stored below 25°C

ii. Performance data – Cured Silicone (4 weeks @ 23°C, 55% RH)

Appearance		Clear, elastic, rubber like
Application temperature	ISO 8339	Min. +5°C to Max. +50°C
Chemical resistance		Water, soap, brine – excellent Inorganic dilute acids, alkalis, mineral oils, grease, oil, fuel, hydrocarbons – very good
Elastic Recovery	ISO 7389	~93%
Elongation at break	ISO 8339	300 - 400% [500 – 600% / ISO 37]
Modulus at 100% elongation	ISO 8339	0,34 – 0,36 MPa [0,33 – 0,35MPa/ISO37]
Movement accommodation factor		~50%
Service temperature range		Min. -50°C to Max. +150°C
Shore A hardness	ISO 868	23 – 25
Tensile strength	ISO 8339	0,55 – 0,65 MPa [0,90 – 1,00MPa / ISO 37]

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APPENDIX: Calculation of Joint Dimension and Design of Expansion Joints

In all joints in buildings, there is a certain amount of movement caused by thermal expansion or contraction of structural components, expansion or contraction because of moisture absorption or evaporation, and settling of buildings. The more the sealant is stretched, the greater the tensile force acting on the contact surfaces, and the greater the demands on the adhesive qualities of the jointing compound. Similar considerations also apply to compression. Since joint movement is fixed by the type of structural component, its length, coefficient of expansion and the maximum temperature difference that the joint can be subjected to over a 12-month period, the amount of stress to which the sealant is going to be exposed to through this joint movement can be determined by calculating and then fixing the joint width. The wider the joint, the less will be the movement, expressed as a percentage of the width, and vice versa.

Part 1: Calculation to determine whether or not silicone in a joint can accommodate movement

In the following examples, assume metal sections of fixed length have a total maximum movement, due to expansion and contraction of 3mm.

Example 1: Joint width is 5mm. Percentage movement absorbed by sealant will be:

$$\frac{\text{Total maximum movement}}{\text{Joint Width}} \times 100\%$$

$$= \frac{3\text{mm}}{5\text{mm}} \times 100\% \quad = 60\%$$

Load is too high because joint width is too narrow - no sealant could be used satisfactorily in this joint.

Example 2: Joint width is 15mm. Percentage movement absorbed by sealant will be:

$$\frac{\text{Total maximum movement}}{\text{Joint Width}} \times 100\%$$

$$= \frac{3\text{mm}}{15\text{mm}} \times 100\% \quad = 20\%$$

This load is permissible. The % movement that can be absorbed by the silicone as Movement Accommodation is 20 – 25%.

Part 2: Calculation of Joint Dimension

By calculating the total amount of movement expected, it is possible to fix the joint width to ensure that the percentage movement to be absorbed by the sealant does not exceed 25%

Example: To calculate joint width required to seal a concrete structure using concrete panels 5m in length.

Let the length of the structural unit L = 5m.
Let the coefficient of expansion of concrete [illegible] x [illegible] per °C
Let the maximum expected temperature differential over 12 months t = 70°C
Let the change of length of the structural components due to moisture absorption LM = 0,25mm/m

Then total movement TM will be expressed by the following formula:

$TM = ([illegible] \times \Delta t \times L) + (L \times LM)$

$TM = (11 \times 10^{-6} \times 70°C \times 5m) + (5m \times 0{,}25mm/m)$

$TM = (11 \times 10^{-6} \times 70°C \times 5 \times 10^{3}mm) + 125mm$

$TM = 3{,}85mm + 1{,}25mm$

$TM = 5{,}1m$

Joint width necessary in order not to exceed permissible percentage movement i.e. 25% is:

Joint width W = $\frac{\text{TM X 100}}{\text{Percentage movement absorbed}}$ mm

= $\frac{\text{5,1mm x 100}}{\text{25\%}}$ = 20,4mm

The joint width should be at least 21mm. As the sealant should be used in a specified width to depth ratio as per the table "Joint Sealant Dimensions", the bead must be 21mm x 12mm in size.

Part 3: Table of Joint Sealant Dimensions according to DIN 18540

Distance between joints in meters	**0 - 2**	**2 - 3.5**	**3.5 - 5**	**5 - 6.5**	**6.5 - 8**
Joint width in mm (minimum size at time of sealing)	10	15	20	25	30
Recommended depth of sealant in mm	8	10	12	15	15
Permissible variation in depth of sealant in mm	±2	±2	±2	±3	±3
Recommended diameter of back-up material in mm	15	20	25	32	38

Part 4: Table for calculating number of cartridges of silicone required per 100m of joint

	Width of join in mm								
Depth of joint in mm		6	8	10	12	15	20	25	30
	6	12	16	19	23	29	38	48	58
	8	16	21	26	31	38	51	64	77
	10	19	26	32	38	48	64	80	96
	12	23	31	38	46	58	77	96	115
	15	29	38	48	58	72	96	119	143
	20	38	51	64	77	96	127	159	191
	25	48	64	80	96	120	159	199	239

Another method of calculating the number of cartridges required for a **rectangular joint** is by using the following formula:

Number of cartridges = $\frac{\text{length (m) x width (mm) x depth (mm)}}{\text{300 (cartridge volume in ml)}}$

For a **corner bead** (as in bathtubs, etc.), the amount of sealant required would be half that required for a rectangular joint!

Part 5: Table of coefficient of expansion for various building materials (x $^{10\text{-}6}K^{-1}$)

When planning joints, it is necessary to know the type of substrate on which the silicone sealant will be used. The more the substrate expands and contracts, the larger the joint seals must be to accommodate the movement

Metals	
Aluminium	23.5
Lead	29
Chromium nickel steel	17
Copper	16.5
Steel	11.5
Brass	18.5
Zinc	36

Cementitious Material	
Concrete	10
Aggregate concrete	11
Aerated concrete	11

Natural Stone	
Basalt	9
Dolomite	8
Gypsum	25
Marble (depends on type)	2 - 20
Travertine	7

Synthetic stone	
Lime – sandstone	8.5
Ceramic Tiles	6

Glass	
Glass	8
Quartz glass	0.5

Wood	
Following the grain	8
Across the grain	0.5