SELECTION OF SEALANTS

INTRODUCTION

This TECHnote summarises typical sealant types used for different applications in construction. On the selection of sealants, BRANZ Bulletin Issue 601 *Sealants for cladding joints* notes, "It has been estimated that sealants account for up to 1% of the building cost and the filled joints cause 10% of the cost of subsequent problems. Of the 1%, about a quarter is the material cost. There is little point (and great risk) in skimping on the cost of material to save money".
The service life of a typical sealant is about 10 to 20 years which means replacement is required two or three times in the 50-year life of a building. Access for this maintenance is an important design consideration. Refer to manufacturers' technical data before final selection.

Purpose	Sealant - chemical type	Curing method	Characteristics	Comments
Roof, gutter and metal cladding	Silicone – neutral cure	Absorption of atmospheric moisture.		Not satisfactory for high movement. Good weather resistance but cannot be painted.
Bituminous membrane roofing	Bituminous mastics	Does not undergo a chemical cure but gradually loses solvent and becomes brittle.	Low cost, low movement capacity and low resistance to solvents or UV exposure.	Can stain masonry. Polyurethane sealant is available for bituminous membrane.
Glass	Silicone – acid cure for some specialist glass. Silicone – neutral cure for general weather seals and structural glazing.	Absorption of atmospheric moisture.	Acid cure not recommended for alkaline substrates e.g. concrete and fibre cement, and can affect metallic coated steel, zinc, lead, copper and brass.	Surface preparation critical. Suitable for fast moving joints.
Kitchen and bathroom	Silicone – neutral cure	Absorption of atmospheric moisture.		
Cool rooms and where absolute vapour barrier is required	Butyl rubber mastics	Does not undergo a chemical cure but gradually loses solvent and becomes brittle.	Low cost, low movement capacity and low resistance to solvents or UV exposure.	
General purpose gap filling - internal	Acrylic based gap filler	Latex based and cured by the evaporation of its water content causing a partial chemical cure.	Have some water resistance but not recommended for use in exterior moving joints.	Should be painted for better durability.
General purpose gap filling - external	Polyurethane modified silicone	Absorption of atmospheric moisture.		Can be painted. Adheres to a wide range of materials.
Masonry wall control joints	Elastomeric polyurethane, 1 and 2 part formulations	1 part: Cure by oxidation or by reaction with atmospheric moisture. (up to 3 weeks). 2 part: Cure by a chemical reaction between each part. (1-2 weeks). High movement formulation allow for wider joint design.	Good puncture and tear resistance and less likely to harden with age. Vulnerable to damage until fully cured. Cure time effectually limits the joint depth to 15 mm and the consequent width to 30 mm.	Substrates must be completely dry during application. Does not stain masonry and can be painted. Compatible with bituminous substrates when primer is applied. Unsuitable in a salt water environment. Can adhere to a variety of substrates without priming but priming increases performance.
Floor control joints	1 and 2 part fast cure high performance trafficable elastomeric polyurethane	Cure by oxidation or by reaction with atmospheric moisture.	2 part systems for higher movement and enhanced puncture resistance.	
Floors - chemical resistant	2 part epoxy	Cure by a chemical reaction between each part.		Limited movement.

Silicones generally can be formulated for a high, medium or low modulus of elasticity (measure of stiffness – high elasticity ensures good shape recovery).
Polysulfide sealants are an early technology initially favoured for their resistance to fuel spills. Today they have been largely displaced by polyurethanes, which are equal or better in performance, more cost effective and less hazardous.

Selection factors

- Compatibility with the substrate(s).
- Amount of joint preparation.
- Need to prime the joint.
- Movement capacity.
- Service life.
- Ease of installation.
- Fire rating and acoustic properties.

Standards and classifications

There are no Australian standards for sealants.

ISO 11600 *Building construction – Jointing products – Classification and requirements for sealants.*
This international standard classifies:
Type – by usage.
G - glazing sealants for use in glazing joints, and
F - construction sealants for use in building joints other than glazing.
Class – by function.
Class: A measure of the test amplitude and movement capacity.
Subclass: A measure of tensile modulus and of elastic recovery. Under this classification a sealant for a masonry control joint could be Type F Class 25 (% movement capacity) HM (high modulus). The standard then sets out the required values and test methods that define the acceptable quality.

ASTM C920 *Standard Specification for Elastomeric Joint Sealants.*
This American standard lists descriptive classifications and nominates required values.
Type:
S – single component.
M – multi-component.
Grade: NS – non-sag.
Class: e.g. 50 - cyclic movement of increase and decrease of 50% of the joint width.
Use: e.g. **T** – trafficable.
M – tested on mortar.
G – tested on glass.

Relevant worksections

0181 Adhesives, sealants and fasteners – and those referenced by this worksection.
0333 Stone repair
0411 Waterproofing – external and tanking.