Araldite®

Agomet® Structural Adhesives

- Choice of simple processing methods at room temperature
- Rapid fixing and handling
- Good gap-filling properties
- Minimal surface preparation required
- Very high tensile and shear strength
- Good heat resistance
- Good performance over a wide temperature range
- High chemical resistance

HUNTSMAN

Agomet Adhesives

Introduction

Agomet adhesives are solvent free reactive acrylic systems, i.e. the strength of the adhesive (cohesion) itself is built through chemical reaction. In 2-component types, this process is started by mixing the components thoroughly. The mixture's low initial viscosity ensures thorough spreading all over the surface, an important pre-condition for final adhesion. As the reaction progresses, the viscosity increases constantly, until the adhesive is no longer free-flowing. Once the working time (potlife) of the mixture is exceeded, it can no longer be applied properly. The chemical reaction continues. The final strength of the bonded joint is reached after a number of hours or days, depending on the adhesive used, whereas the parts can be handled earlier.

Agomet adhesives are 2-component solvent-free adhesives that harden very rapidly. Following the addition of an initiator (hardener), the components react with one another, forming a high-strength polymer network within a brief period. Varying the amount of hardener is one method of adjusting the working time of the adhesive without affecting its properties appreciably. Various application techniques can be used depending on the type of adhesive.

Bonding with Agomet Adhesives

Bonding with Agomet adhesives offers a number of advantages over alternative joining methods:

- Combination of various materials with optimum utilisation of their specific properties.
- Full-surface load transfer combined with uniform tension distribution.
- Joint gaps are sealed to liquids and gases.
- No contact corrosion, due to the adhesive's insulating effect.
- No material damage, due to structure transformation by heat or stress peaks at drilled holes.
- Surface quality is maintained, discolouration and warping of parts is prevented.
- Enhanced freedom of design combined with weight-savings compared with other joining methods.

Joint design/construction

The construction of the part must be such that it is well-suited to an assembly procedure, utilising the strength of the adhesive most efficiently.

Special attention must be paid to the following points:

- The bonding surface must be sufficiently large
- The geometry of the bonding joint must be such that the stress load applied to the adhesive is in the form of compressive, tensile and shearing forces. Peeling and non-centric tensile forces (splitting) must be avoided.
- In certain cases the adhesive may require protection from external influence.
- A highly accurate fit is needed to ensure uniform load transfer and avoid stress peaks. This also facilitates compensation of production tolerances.
- A sufficient joint thickness is required to compensate for the varying expansion behaviour of bonded parts.

Surface preparation

Pre-treatment of the bonding surface is an important element in high quality, long-lasting adhesion to the substrate. Additional surface preparation also optimises the bonding strength.

The simplest form of pre-treatment is to wipe off adhering particles to obtain a clean, dry surface. Removal of natural and synthetic greases, oils and preservatives is best achieved with aqueous cleansing agents or organic solvents. Care must be taken that plastic surfaces are not damaged by cleaning mediums. Time and effort involved in surface degreasing can be considerably reduced by using Agomet F-types.

- Mechanical pre-treatment by means of grinding, brushing or blasting generally serves to remove surface layers and improve roughness. Blasting may produce additional benefits by chemically modifying the surface layer.
- Due to stringent work safety requirements and considerable disposal expense, chemical etching is generally only used if other methods do not result in adherence at all or an extremely high quality is required.
- Electrical and thermal methods such as corona treatment and flame treatment are used mainly on plastic surfaces with otherwise poor adhesion.

For more comprehensive information on Surface Preparation, please see Araldite Publication A15p

Agomet Adhesives Substrate Matrix

- Cold-curing
- Rapid handling
- High strength
- Gap filling
- Good heat and chemical resistance
- For industrial and craftsman applications

Methacrylates

	Aluminium	Non-ferrous metals	Stainless steel	Ferrite	Grey cast iron	Steel	Zinc	ABS	Acrylic glass	Polycarbonate	Polyester	Polystyrene	PUR, rigid	PVC, rigid	Duroplasts	Wood	Ceramics
Aluminium	2	1	2/1	1	2	1/2	2	2				2	2	2		1	1
Non-ferrous metals	1	2	2/1	1			2	1	1/2	1/2		1/2	2			1	1
Stainless steel	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1
Ferrite	1	1	2/1	1/2		1/2	2	2	2	2	1/2	2	2	1/2			1
Grey cast iron	2		2/1		2	2	2	2					2			1	2
Steel	1/2		2/1	1/2	2	2	2	2		2	2		2		1	1	2
Zinc	2	2	2/1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
ABS	2	1	2/1	2	2	2	2	2			2			1	2	1	1
Acrylic glass		1/2	2/1	2			2			1/2	2	1	2		1	1	1/2
Polycarbonate		1/2	2/1	2		2	2		1/2	2	2	1	2	2		1	2
Polyester			2/1	1/2		2	2	2	2			2	2				2
Polystyrene	2	1/2	2/1	2			2		1	1	2		2		1	1	2
PUR, rigid	2	2	2/1	2	2	2	2		2	2	2	2	2	2		1	1
PVC, rigid	2		2/1	1/2			2	1		2			2	2	1	1	
Duroplasts			2/1			1	2	2	1			1		1		1	
Wood	1	1	2/1		1	1	2	1	1	1		1	1	1	1	1	1
Ceramics	1	1	2/1	1	2	2	2	1	1/2	2	2	2	1			1	1/2

1 = Agomet F 300 - F 307
2 = Agomet F 310 - F 347

Example: to bond steel to ABS, "2" (Agomet series F 310 to F 347) are suitable.
Individual choice is dependant upon additional, optional characteristics (see overleaf)

Agomet Core Range Processing Options

Mixing systems

Resin	Hardener Options	Work Time (min)	Handling Time (min)	Full Curing (hours)	Viscosity (Pas)	Gap Filling (mm)	Lap Shear Strength (N/mm²)	Special Characteristics
F 310	Hardener powder - 3% Hardener paste - 2-5% Hardener D - 10%	8 - 12	16 - 20	12	22	3	30	Gap filling – 10 minute work life
F 311		20	35	24	25	3	30	Gap filling – 20 minute work life
F 315		8 - 12	20	12	3	0.5	30	Transparent in thin layers (not water white)
F 330		11 - 15	20	12	20	5	34	Gap filling – high temperature resistance
F 347		8 - 10	20	12	70	5	18	Gap filling for surfaces with poor adhesion. Available in cartridges

No-mix systems

F 300	Hardener lacquer 2 or Hardener lacquer spray	1 - 2	2 - 4	2	24	0.4	23	Very fast – 2 minute work life
F 305		1 - 2	2 - 4	2	4	0.4	25	Liquid – ideal for ferrites – 2 minute work life
F 310		8 - 12	16 - 20	12	22	0.4	30	10 minute work life
F 311		20	25	24	25	0.4	30	20 minute work life
F 315		8 - 12	25	12	3	0.4	30	Transparent in thin layers
F 330		11 - 15	20	12	20	0.4	34	Good temperature resistance
F 347		8 - 10	20	12	70	0.4	18	For surfaces with poor adhesion

A/B systems

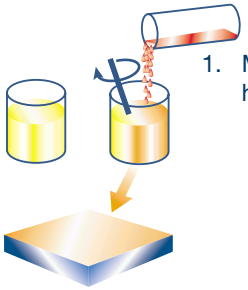
A Component	B Component	Work Time (min)	Handling Time (min)	Full Curing (hours)	Viscosity (Pas)	Gap Filling (mm)	Lap Shear Strength (N/mm²)	Special Characteristics
F 300 A	F 300 B+ 6% Hardener powder	1 - 2	2 - 4	2	24	4	23	Gap filling – very fast
F 305 A	F 305 B+ 6% Hardener powder	1 - 2	2 - 4	2	4	1	25	Liquid – very fast – ideal for ferrite bonding
F 307 A	F 307 B+ 4-6% Paste hardener	3 - 4	8	3	350	4	18	Low shrinkage – ideal for ferrite bonding
F 310 A	F 310 B+ 6% Hardener powder or paste	8 - 12	16 - 20	12	22	4	30	Gap filling – 10 minute work life

Note - Hardener D would be selected for use with 10:1 ratio dispensing equipment

Processing of Agomet Adhesives

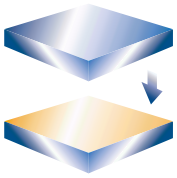
Mixing system

The classic manual processing method for small amounts of 2-component adhesive is to stir together the components in certain proportions. For Agomet acrylic adhesives, approx. 3% hardener powder or paste is added. The hardener powder is easier to work into low-viscosity products, whereas hardener paste is preferred for high-viscosity adhesives. The mixture must be processed within the given potlife.



1. Mix adhesive with hardener

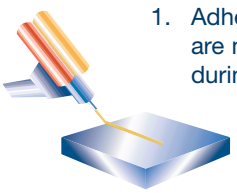
2. Apply mixture



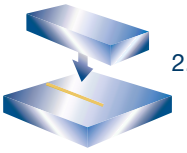
3. Bonding workpieces

Cartridge system

An easy way to avoid dosing and mixing errors is to use the **Agomet twin cartridge system.** The cartridges are specially designed for the mixing ratio of each adhesive. The components are mixed automatically when pressed out through the static mixer. Nozzle geometry and interior mixing spirals are tailor made for each product. The Agomet twin cartridges are operated with either manual or pneumatic guns. This system meets stringent workplace hygiene requirements.

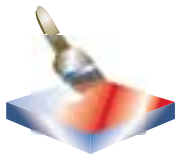


1. Adhesive components A+B are mixed automatically during applications

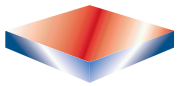


2. Bonding workpieces

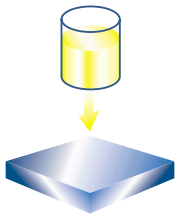
No-mix systems



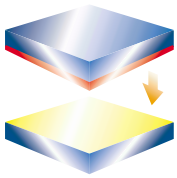
1. Pre-coating with hardener lacquer



2. Workpiece can be stored



3. Coating with adhesive



4. Bonding the workpieces

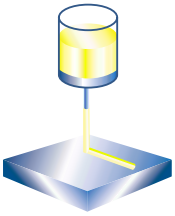
This method allows easier processing of very rapid curing methacrylate types. The **no-mix method** requires no mixing at all. The workpiece surface is pre-coated with fast-drying Agomet hardener lacquer. The dried parts can then be stored for several weeks or transported to another work-place without significant loss of reactivity. As soon as the adhesive contacts the hardener lacquer, hardening begins without any further mixing. This method can be used for joint gaps up to a maximum of 0.8 mm (with hardener lacquer application to both sides), but is not suitable for greater joint widths. Dosing, mixture and potlife problems are easily avoided by using the **no-mix method** as a "1-component" processing technique. This system is suitable for bonding operations, ranging from single parts up to series production.

A/B systems

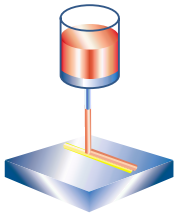
A/B systems are particularly well-suited for processing large volumes of adhesive in continuous large series production as well as for using highly reactive adhesives. The adhesive components are supplied separately and are usually processed in dosing systems, or by bonding robots. Pre-mixing is unnecessary in the case of these highly reactive and relatively thin adhesives. In this case, strips of the two substances are simply placed on top of one another (method 1) or component A is placed on one workpiece and component B on the other one (method 2). Contact at the interface of the two components during joining is then sufficient to achieve complete curing. In the case of slower curing adhesive types, mixing can also be done with a static mixer in the dosing equipment (method 3).

Note - hardener must be added to component B before use.

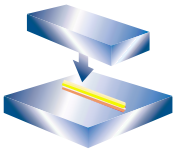
Method 1



1. Applying component A to workpiece 1



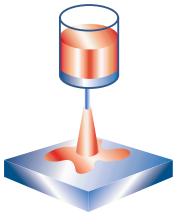
2. Applying component B (with hardener) on top of the A-strip



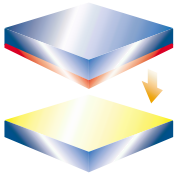
3. Bonding workpieces

Method 2

1. Applying component A to workpiece 1

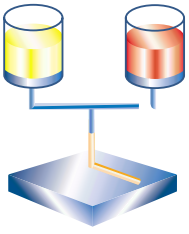


2. Applying component B (with hardener) to workpiece 2

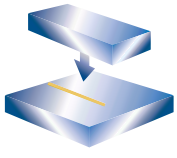


3. Bonding workpieces

Method 3



1. Applying mixture of components A and B to workpiece 1



2. Bonding workpieces

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