ACRALOCK®
Engineered Bonding Solutions

PP 1-SERIES

METHACRYLATE STRUCTURAL ADHESIVE
PRELIMINARY TECHNICAL DATA SHEET

ADHESIVE DESCRIPTION

ACRALOCK PP 1 series is an advanced, two component, 1:1 mix ratio, medium shear strength coupled with excellent toughness, low elongation low energy surface bonding adhesives. PP 1 series is available as 2 – 3 min open time version and is specially designed to bond low energy surfaces such as PE, PP, POM and PTFE as well as all kinds of other thermoplastics and various metal surfaces without surface primers and with minimal to no other surface preparation[a,b]. Due to its temperature resistant and high ignition temperature formulation, PP 1 series can be used with plastic filet welding in cured and uncured stage. Packaging options include 50 & 400 ml side by side cartridges and 20 l & 200 l drum containers for application with meter-mix dispensing equipment.

PERFORMANCE HIGHLIGHTS

Working time 2 to 3 minutes
Primerless Metal Bonding
Low Exotherm adhesives
Gap fill 0,5 to 4 mm
Good Environmental/Chemical Resistance[(b)]
Good temperature resistance
Permanent toughness and elasticity
No Sagging
Non Critical mix ratio
Stable formulations

BENEFITS

Good for small and medium assembly applications
No surface treatment or priming required for most metals[(a)]
Reduced Print Through, less post finish work
Thin film to medium gap fill application possible
Durable bond performance in harsh environments
Combination with filet welding possible
Excellent fatigue characteristics and shock load resistance
Vertical surface and overhead applications possible
Easy to use with cartridges and meter mixing eqipment
Shelf-life 3 months @ 25° C, 6 months @ 5 – 8° C

PRODUCT PROPERTIES @ 22° C

Product	Adhesive/Activator	Working Time (Minutes)	Fixture Time (Minutes)
PP 1-02 NAT	PP 1-02 A / PP 1-02 B	2 – 3	> 180

(x): Fixture time is time to reach > 0,5 MPa lap shear strength on Polypropylene, t = 2 mm
Full cure after 24 h

TYPICAL ADHESIVE WET PROPERTIES

Property	Component A	Component B	A + B mixed
Colour	Amber	Off white	Natural
Mix Ratio (Volume)	1	1	
Mix Ratio (Weight)	1	1	
Viscosity kps (Pa.s)	80 - 150	30 – 60	
Density (g/cm^3)	0,95 – 1,00	0,95 – 1,00	0,95 – 1,00

TYPICAL ADHESIVE CURED PHYSICAL PROPERTIES

Tensile strength:	14 - 18 MPa
Modulus:	700 - 800 MPa
Elongation:	10 - 20 %
Lap Shear strength, ASTM D1002:	12 – 15 MPa
Shore D:	70 - 80
Operating Temperature:	- 55 – 85°C
Max Temperature resistance:	150°C, 1h

Cured Adhesive is generally resistant to salt solutions, hydrocarbons and acid and bases with a PH from 3 to 10.
Cured Adhesive is not recommended for exposures to polar solvents and stronger acids or bases (see note b).
Operating Temperature range for this product is from - 40 to 120° C with intermittent exposure of -55 to 150° C (see note c)

RECOMMENDED SUBSTRATES (See important notes below)

Polyesters	Acrylics	PVC/FPVC/CPVC	Vinyl Esters
Polyester Gelcoats	ABS	Styrenics	SMC/BMC
Epoxies	Vinylesters	Stainless Steel	Carbon Steel
Aluminium	Topcoats	Coated Metals	Polyurethanes
PU - Rim	PA – RIM	Polycarbonate	PMMA
PET	Polyolefins	Polyacetals	PTFE

NOT RECOMMENDED FOR BONDING

Glas	Hot Dipped Galvanized Steel	Wood

TYPICAL LAP SHEAR STRENGTH VALUES @ 22°C, ISO 1465

Carbonfibre epoxy laminate:	15 MPa [e] (cohesive failure)
Stainless steel 1.4301:	7 MPa [e] (adhesive/cohesive failure)
Carbon Steel S355:	12 MPa [e] (adhesive/cohesive failure)
Aluminium AW 6060	14 MPa [e] (adhesive/cohesive failure)
ABS:	5 MPa [e] (substrate failure)
PC	8 MPa [e] (substrate failure)
Polyester RTM laminate	9 MPa [e] (substrate failure)
PA RIM	5 MPa [e] (substrate failure)
HDPE:	7 MPa [e] (substrate failure)
PPC:	6 MPa [e] (substrate failure)
PTFE:	6 MPa [e] (adhesive/cohesive failure)
Stainless steel 1.4301:	15 MPa [h] (adhesive/cohesive failure)
Carbon steel S355:	14 MPa [g] (adhesive/cohesive failure)
Aluminium AW 6060:	14 MPa [h] (adhesive/cohesive failure)
Carbonfibre epoxy laminate:	15 MPa [f] (cohesive failure)
Polyester RTM laminate	8 MPa [f] (substrate failure)
ABS:	5 MPa [f] (substrate failure)
KTL:	8 MPa [f] (substrate failure)
HDPE:	5 MPa [f] (substrate failure)
PPC:	5 MPa [f] (substrate failure)
PTFE:	5 MPa [f] (adhesive/cohesive failure)

[e]: bondline gap 0,5 mm, IPA wipe
[f]: bondline gap 0,5 mm, IPA wipe, after Kataplasmatestcycle, -30/+70°C, 12h each, 5 cycles
[g] bondline gap 0,5 mm, Grinding 40 grit sandpaper, AP1 wipe, after Kataplasmatestcycle, -30/+85°C, 12h each, 5 cycles
[h] bondline gap 0,5 mm, AP1 wipe, after Kataplasmatestcycle, -30/+85°C, 12h each, 5 cycles

IMPORTANT NOTES

a.) Surface Preparation: The need for surface preparation must be determined by the user based on comparative testing of unprepared and prepared substrates to determine if strengths are adequate for application. Clean adhesive failure is not desired for long-term durable performance. In all cases initial shear strength tests must be followed up with simulated or actual durability tests to assure that surface conditions do not lead to degradation of the bond over time under service conditions. Subsequent changes in substrates or bonding conditions will require re-testing.

1. Most thermoplastics listed above can be bonded with no surface preparation other than a dry wipe or air blow-off. If contamination is visible or suspected, wipe with alcohol prior to bonding. Low surface energy plastics like polyolefins, thermoplastic polyesters and fluorocarbon plastics are generally bondable as well with this special products, due to variations in compositions a determination on each substrate type is necessary.

2. Metals as received aluminum, stainless steel, cold rolled steel, carbon steel are bondable without additional surface preparation, EBS strongly suggest to use the AP1 metal cleaner on all metal surfaces and only using faster curing versions with working times less $\leq$ 40 minutes, if bonding metal to metal in thin bond gaps > 0,015" bond gap must be maintained.

3. Thermoset composites are generally bonded without preparation, however mold releases and process can produce varied bonding performance and testing should be performed.

4. Due to the wide range of different surfaces and qualities each single type has to be tested by the customer prior to use

b.) It is the user's responsibility to determine the suitability of each adhesive for its intended use on substrates and application. EBS strongly recommends laboratory and end-use testing representative of the environmental conditions and how the bonded assembly will be used. Read and understand TDS and MSDS before using. Bonds are generally resistant to the effects of heat, water and moisture, aqueous chemicals and most petroleum hydrocarbons, including gasoline, motor oil and diesel fuel. Not recommended for immersion or long term exposure to concentrated acids or bases, or aggressive organic solvents such as toluene, ketones, and esters. It is the user's responsibility to determine the suitability of each adhesive for its intended use and application. Please contact EBS for technical assistance.

c.) Cohesive strength at -40 and 85°C retains a minimum of 500 psi as measured on aluminum. Bonds are resistant to intermittent exposures from -55 to 150° C, provided bonding assembly is in a fixture and not under shear load. User must determine suitability for continuous exposures beyond operating temperature range.

d.) The shelf life of Components A and B in unopened containers is approximately 3 months from the date the product is delivered from EBS facilities. Shelf life is based on steady state storage between 55°F and 80°F (18°C and 25°C). Exposure, intermittent or prolonged, above 80°F/25°C will result in a reduction of the stated shelf life. Shelf life of both components can be extended by air-conditioned or refrigerated storage between 5°C and 8°C to 6 month.

Product recommendations contained herein are based on information we believe to be reliable.
All values presented above are typical properties obtained under controlled conditions at the EBS, LLC. Laboratory or an outside certified laboratory. The values are intended to be used only as a guide for selection and further end-use evaluations. The ultimate suitability for any intended application must be verified by the END USER under their anticipated test conditions. This product is intended for use by skilled individuals at their own risk. Since specific use, materials and product handling are not controlled by EBS, our warranty is only limited to the replacement of defective EBS products.

SAFETY, HANDLING AND APPLICATION

VERY IMPORTANT: Read Material Safety Data Sheet before handling or using this product. Engineered Bonding Solutions, LLC (hereinafter referred to as "EBS") adhesives are supplied in dual component cartridges, 5 gallon pails and 50 gallon drums to facilitate mixing through approved meter mix dispensing equipment. We do not suggest mixing by hand. Please contact your EBS representative for questions about dispensing equipment. The chemical reaction that occurs when components A and B are mixed generates heat. The amount of heat generated is controlled by the mass and thickness of the mixed product. Large masses over 5 mm thick can develop heat in excess of 250°F/121°C and generate harmful, flammable vapors. Larger curing masses should be carefully moved to a well-ventilated area where the chance of personal contact is minimized.

The working time is the approximate time that the adhesive remains fluid and will still wet the surface of the adherend after mixing component A (adhesive) and component B (activator). The fixture time is the approximate time after mixing the two components that allow the part to be moved or unclamped. This is generally shortly after exotherm is reached for particular bonding condition. Parts can generally be put in service when 75 percent of full strength is developed, which occurs once the bonded assembly has cooled back to ambient temperatures. Higher ambient temperatures will shorten the working time and colder temperatures will lengthen the working time. The reported data presented in the TDS are based on tests conducted under laboratory conditions of 75°F/24°C. For applications in hot or cold ambient conditions please contact your EBS representative.

Prior to bonding, ensure substrates are clean and free of surface contaminants. All dispensing equipment should be in good operating condition and QC ratio checks performed periodically to ensure consistent and accurate dispensing. Use only adhesive dispensing equipment approved by your EBS sales representative. All wetted metal parts should be stainless steel, always purge enough adhesive on a non-porous surface (FRP or plastic) to ensure proper mixed color is maintained. Check the cure profile to ensure the working time and fixture time match the reported values for A and B components listed on the front page. If all QC checks are in order, continue with the assembly operation and be careful to ensure that parts are bonded to a minimum gap thickness of 0.02"(.5mm) and maximum gap of 0.5" (12,5 mm). *All adhesives with working times below 30 minutes can boil in gaps approaching 12,5 mm or even less if using even faster formulas. This could lead to reduced physical properties.* After the adhesive is fully applied, consistent pressure should be applied to allow squeeze out, then also, parts should not be repositioned once substrates are bonded. Any movement of parts will entrap air in the bonded joints, which will reduce performance. The bonded assembly should then be clamped in position and not be disturbed until the fixture time has elapsed.

EBS recommends the use of alcohol or industrial solvents for cleaning excess adhesive. This should be done when the adhesive is still wet or soft and care must be taken to prevent the cleaning solvent or alcohol from coming in contact with the adhesive as this could lead to an under-cure of the exposed edges. The use of tape and a sharp edge to remove excess adhesive is best practice. Also, partially cured adhesive can be carefully removed with a sharp knife. Removal of cured adhesive should be scraped or cut with a sharp blade which is preferred to sanding or grinding. High speed sanding or grinding of large areas will produce heat and produce noxious fumes and should be avoided or only be done with protective breathing apparatus.