

PRODUCT DESCRIPTION

ARON ALPHA TYPE 403TB is a one component (requires no mixing), humidity cure, rubber toughened instant adhesive with increased flexibility and peel strength along with enhanced resistance to shock and thermal cycling.

The product provides rapid bonding on a wide range of materials including metals, plastics and elastomers.

APPLICATIONS

- Ferrite magnets to plastic and metal housing
- Loudspeaker parts (surround, voice coil)
- Tacking o-rings in metal grooved enclosures
- EPDM to aluminum
- Steel to epoxy composite
- Rubber to rubber
- Rubber to metal gasket
- Metal to metal
- Plastic to plastic
- E-cores
- Steel cover plates in transformers
- Disk drives
- Plastic or metal housings of electric motors

TYPICAL PROPERTIES OF UNCURED MATERIAL

Formula	403TB
Appearance	Black
Base Monomer	Ethyl 2-Cyanoacrylate
Viscosity (cps)	1,000
Specific Gravity (d ²⁰)	1.13
Boiling Point (°C/°F)	60/140
Flash Point (Closed cup, °C/°F)	83/181
Freezing Point (°C/°F)	-20/-4
Solubility parameter	11 ~ 12
Surface Tension (dynes/cm)	34

TYPICAL CURING PERFORMANCE

Under normal conditions, the atmospheric moisture initiates the curing process. Although full functional strength is developed in a relatively short time, curing continues for at least 24 hours before full chemical/solvent resistance is developed.

Cure Speed vs. Substrate:

Material (Substrate bonded to substrate material)	Setting Time (sec)
	403TB
PVC (rigid)	15
ABS	10
Steel	60
Stainless Steel	60
Aluminum	90
Copper	10
PVC (rigid) to Steel	60
Copper to Phenolic Resin	10
Aluminum to ABS	90
Stainless Steel to Neoprene	60

Cure Speed vs. Bond Gap:

The rate of cure will depend on the bond line gap. Thin bond lines result in faster cure speeds, increasing the bond gap will slow the rate of cure.

Cure Speed vs. Humidity:

The rate of cure will depend on the ambient relative humidity. High humidity result in faster cure speeds, lower humidity result in slower rate of cure.

Cure Speed vs. Accelerator:

Where cure speed is unacceptably long due to large gaps or low humidity, applying accelerator chemistry to the surface will improve cure speed. However, this can reduce ultimate strength of the bond and therefore testing is strongly recommended to confirm effect.

TYPICAL PROPERTIES OF CURED MATERIAL

Formula	403TB
Appearance	Black
Specific Gravity (d ²⁰)	1.25
Hardness (Rockwell M)	77
Refractive Index (n ²⁰)	n/a
Rate of Line Expansion	145
Glass transition point (°C/°F)	140/284
Dielectric Constant	3.5 (10MC, 10°C/50°F)
Volume Dielectric Resistivity	10 ¹⁴ (Ω-cm, 30°C/86°F)
Soluble in the following solvents	Acetone, Nitromethane, Dimethylformamide Dimethyl sulfoxide

Adhesive Properties:

Tensile strength measured in psi

Material (Substrate bonded to substrate material)	Tensile Strength (psi)
	403TB
PVC (rigid)	3,600
ABS	3,000
Steel	5,500
Stainless Steel	5,700
Aluminum	5,400
Copper	6,400
PVC (rigid) to Steel	2,800
Copper to Phenolic Resin	4,300
Aluminum to ABS	2,600
Stainless Steel to Neoprene	360*

* Material Failure

Tensile shear strength measured in psi

Material (Substrate bonded to substrate material)	Tensile Strength (psi)
	403TB
PVC (rigid)	1,000*
ABS	710*
Steel	3,300
Stainless Steel	3,800
Aluminum	2,400
Copper	2,800
PVC (rigid) to Steel	1,000*
Copper to Phenolic Resin	1,000*
Aluminum to ABS	710*
Stainless Steel to Neoprene	70*

* Material Failure

Impact resistance

Material (Substrate bonded to substrate material)	Impact (kgf cm/cm ²)
	403TB
Steel	30
Stainless Steel	13
Aluminum	13
Copper	15
Brass	13

T-peeling strength (psi)

Material (Substrate bonded to substrate material)	Bond strength peel (psi)
	403TB
Steel	21
Aluminum	21

Heat resistance (psi)

Bonding strength in tensile shear (psi)

Temperature (°F) x hours	Bond strength (psi)
	403TB
248 °F x 1 hour	2,100
248 °F x 6 hours	2,000
248 °F x 12 hours	2,000

Thermal shock resistance (psi)

(176 °F x 1 hour and -22 °F x 1 hour) x 10 cycles

Material (Substrate bonded to substrate material)	Bond strength (psi)
	403TB
Steel to ABS	210

Test conditions—Test specimen

Tensile strength:	0.5 x 0.5 x 1.5 in; bonding area 0.25 in ²
Tensile shear strength:	1.0 x 4.0 x 0.06~0.12 in; bonding area 0.5 in ²
Impact strength:	1.0 x 1.0 x 0.375 in and 1.0 x 1.75 x 0.75 in; bonding area 1.0 in ² with 24 hour cure time
T-peel strength:	0.12 x 1.0 x 6.0 in (for steel) & 0.008 x 1.0 x 6.0 in (for aluminum)
Heat resistance:	1.0 x 4.0 x 0.06~0.12 in; bonding area 1.0 in ² with 24 hour cure time and measured at room temperature after cooling.
Bonding atmosphere:	72-75°F, 58-62% relative humidity
Test Methods:	ASTM D2095, D3164, D950, D1876, D1002

SPECIFICATIONS

Military Specification: Mill-A-46050C Type II Class 3

Directions for Use:

Clean the surfaces to be bonded and then apply ARON ALPHA[®]. Be sure to apply ARON ALPHA[®] to only one of the surfaces to be bonded, preferably the smaller surface or the surface on which the ARON ALPHA[®] cure time is slowest or on the substrate surface facing upwards.

Common errors in applying ARON ALPHA[®] is to apply an excessive quantity of ARON ALPHA[®] or to apply too little of a quantity of ARON ALPHA[®] in a wide, thin film.

Dispensing in excess is a waste of ARON ALPHA[®] as well as potentially damaging to the appearance of the bonded materials in the way of chlorosis (blooming) and/or solvent cracks.

Dispensing not enough of the ARON ALPHA[®] monomer may cause the monomer to harden before actual bonding starts and this will reduce the bond strength to a great extent. This is especially the case with rubber materials due to catalysts on the surface.

Make sure that the nozzle of the ARON ALPHA[®] container is in direct contact of the material surface to be bonded so that you can apply an optimum quantity of ARON ALPHA[®] from the container.

Immediately after dispensing adhesive, mate the two surfaces and let the ARON ALPHA[®] monomer spread between the two surfaces. It is not necessary to spread the monomer by using a rubbing motion.

ARON ALPHA[®] monomer, if kept in the form of a mound or fillet on the substrate surface, typically does not cure for 5 to 10 minutes and retains sufficient bond strength.

Optimum quantity of ARON ALPHA[®]

The thinner the film of the ARON ALPHA[®] monomer on the surface to be bonded, the greater the resulting bond strength. An excessive quantity of ARON ALPHA[®] never helps increase the bond strength. On the contrary, it may bring about chlorosis, solvent cracks, or erosion by the ARON ALPHA[®] monomer of the surface to be bonded. Test results indicate that with ARON ALPHA[®] the optimum quantity to be applied at one time is 0.004 - 0.006 g/cm² or 0.03 - 0.05 mm in terms of film thickness. On the basis of the value of 5 mg/cm², you can obtain standard bond strengths as shown in the tables above.

Storage:

Store product in the unopened container in a dry location.

Humidity

- Avoid moist, humid storage conditions.
- Fasten cap tightly to avoid exposure to moisture.
- Store with desiccant.

Temperature

- Avoid storing at a high temperature.
- When storing ARON ALPHA[®] for an extended period, refrigerate between 40°F and 50°F.

Sunlight

- Avoid direct exposure to ultraviolet light (keep in light-proof packaging).

Other

- Never store ARON ALPHA[®] with an accelerator or primer.

Warning:

Eye and Skin irritant. Bonds skin instantly. *Combustible* – keep away from heat and flames. For safe handling information on this product, consult the Material Safety Data Sheet (MSDS) before using.

Disclaimer:

Please be advised that test results are those which were prepared at Toagosei America's laboratory. The results may vary under actual application conditions.

It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof.

Material removed from original containers may be contaminated during use. Do not return product to the original container. Toagosei cannot assume responsibility for product which has been contaminated or stored under conditions other than previously indicated.

If additional information is required, please contact your Toagosei Technical Department or Customer Service Representative at 614-718-3855 or 1-800-338-5192 or via email at salesorder@toagosei.net