

PRODUCT DESCRIPTION

ARON ALPHA TYPE 221 is a one component (requires no mixing), humidity cure, instant adhesive technology. It is designed for assemblies which require uniform stress distribution and strong tension and/or shear strength.

The product provides rapid bonding on a wide range of materials including metals, plastics, and elastomers. The penetrating (wicking) viscosity formula works best for close/no gap fill applications.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Formula	221
Appearance	Colorless, Transparent
Base Monomer	Ethyl 2-Cyanoacrylate
Viscosity (cps)	2
Specific Gravity (d ²⁰)	1.05
Boiling Point (°C/°F) @667Pa	62/144
Flash Point (Closed cup, °C/°F)	83/181
Freezing Point (°C/°F)	-30/-22
Solubility parameter	10 ~ 11

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)
	221
PVC (rigid)	3
Polymethylmethacrylate (PMMA)	5
ABS	3
Polycarbonate (PC)	10
Natural Rubber	3
Steel	10
Copper	2
Phenolic Resin	3
PVC (rigid) to Steel	10
Aluminum to ABS	10
Phenolic Resin to Copper	3
Neoprene Rubber to Steel	5
Neoprene Rubber to ABS	10

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 results 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	221
Appearance	Colorless, Transparent
Specific Gravity (d ²⁰)	1.25
Hardness (Rockwell M)	85
Glass Transition Point (°C/°F)	(145/293)

Adhesive Properties:

Tensile strength measured in psi

Material (Substrate bonded to substrate material)	Tensile Strength (psi)
	221
PVC (rigid)	5,000
Polymethylmethacrylate (PMMA)	5,000*
ABS	3,600*
Polycarbonate (PC)	5,000
Natural Rubber	360*
Steel	4,600
Copper	5,000
Phenolic Resin	5,000*
PVC (rigid) to Steel	2,600
Aluminum to ABS	2,100
Phenolic Resin to Copper	3,600
Neoprene Rubber to Steel	360*
Neoprene Rubber to ABS	360*

* Material Failure

Tensile Shear strength measured in psi

Material (Substrate bonded to substrate material)	Tensile Shear Strength (psi)
	221
PVC (rigid)	1,000*
Polymethylmethacrylate (PMMA)	710*
ABS	710*
Polycarbonate (PC)	1,000*
Natural Rubber	70*
Steel	2,840
Copper	3,000
Phenolic Resin	1,000*
PVC (rigid) to Steel	1,000*
Aluminum to ABS	710*
Phenolic Resin to Copper	1,000*
Neoprene Rubber to Steel	70*
Neoprene Rubber to ABS	70*

* Material Failure

Test conditions—Test specimen

Tensile strength:	0.5 x 0.5 x 1.5 in; bonding area 0.25 in ²
Tensile shear strength:	for plastic/rubber 0.1 x 1.0 x 4.0 in; bonded area 0.5 in ² for metal 0.064 x 1.0 x 4.0 in; bonded area 0.5 in ²
Bonding atmosphere:	72-75°F, 58-62% relative humidity
Test Methods:	ASTM D2095, D3164, D1002

SPECIFICATIONS

Military Specification: Mill-A-46050C Type II Class 1
Medical Device Assembly: USP Class VI

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 32°F and 40°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 Safety Data Sheet (SDS) 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 sales@toagosei.net