

Product name: Aron Alpha Type 401X, 402X, 403X

400X Series

Heat and Impact resistant, metal bonding grade

The Aron Alpha 400X series are modified ethyl 2-cyanoacrylate adhesives. They give a strong bond to metal surfaces, and are more heat and impact resistant with metal than other Cyanoacrylate adhesives. These characteristics make these adhesives suitable for metal bonding application.

If you have any questions, we are always available to help you. Thank you for your continued business.

Application Examples:

1. All industries

- Metal bonding with heat, impact, vibration: Metal

2. Other

- Heat, impact, vibration: Metal, Ceramic

- Temporarily bonding, heat, impact, vibration: Glass

Features:

- Good bonding strength to various materials (especially metal)
- Good tensile shear strength under heated conditions or after heating
- High impact strength

Physical Properties of Aron Alpha 400X Series

		401X	402X	403X
Liquid State (before curing)	Appearance	Colorless, Transparent		
	Main Ingredient	Ethyl 2-cyanoacrylate		
	Viscosity (cps, 77°F)	2	85	1500
	Specific Gravity (d ²⁰)	1.05		
	Boiling Point (°C/°F, 5 mmHg)	About 60/140		
	Surface Tension (dynes/cm)	34		
	Flash Point (°C/°F, closed type)	83/181		
	Freezing Point (°C/°F)	-30/-22		
	Solubility Parameter	10-11		

		401X	402X	403X
Solid State (after curing)	Appearance	Colorless, Transparent		
	Specific Gravity (d ²⁰)	1.25		
	Refractive Index (n ²⁰)	1.49		
	Hardness (Rockwell M)	85		
	Rate of Line Expansion (x 10 ⁻⁴)	1.1		
	Glass Transition Point (°C/°F)	140/284		
	Dielectric Constant (10MC, 50°F)	3.5		
	Volume dielectric resistivity (Ω-cm, 86°F)	10 ¹⁴		
	Solvent	Acetone, Dimethyl formamide, Dimethyl sulfoxide		

Setting Times (in seconds for various materials)

Material	Setting Time (sec)		
	401X	402X	403X
Steel	15	30	60
Aluminum	15	60	120
Copper	3	5	5
Stainless Steel	15	30	60
Rigid PVC/Steel	15	30	60
Copper/Phenolic resin	5	10	30
Aluminum/ABS	15	60	120
Stainless Steel/Neoprene	15	60	120

Bonding Strengths (Tensile measured in psi for various materials)

Material	Tensile Strength (psi)		
	401X	402X	403X
Steel	5800		
Aluminum	5800		
Copper	5800		
Stainless Steel	6400		
Rigid PVC/Steel	2800		
Copper/Phenolic resin	4300		
Aluminum/ABS	2600		
Stainless Steel/Neoprene	360*		

*Material Failure

Bonding Strengths (Shear measured in psi for various materials)

Material	Shear Strength (psi)		
	401X	402X	403X
Steel	3300		
Aluminum	2500		
Copper	2800		
Stainless Steel	3100		
Rigid PVC/Steel	1000*		
Copper/Phenolic resin	1000*		
Aluminum/ABS	710*		
Stainless Steel/Neoprene	70*		

* Material Failure

Impact Strength (kgf cm/cm²)

Material	401X	402X	403X
Steel	28		
Aluminum	13		
Copper	15		
Stainless Steel	13		
Brass	13		

Heat Resistance (psi)

a) Measured under heated conditions

Temperature (°F) x hours	401X	402X	403X
212 x 6	2800		
212 x 12	2800		
266 x 6	1400		
266 x 12	1400		
302 x 6	570		
302 x 12	430		

b) Measured at room temperature after cooling

Temperature (°F) x hours	401X	402X	403X
212 x 6	3300		
212 x 12	3300		
266 x 6	2700		
266 x 12	2600		
302 x 6	1800		
302 x 12	1600		

Testing Details and Conditions for Testing

Test Pieces' measurements

Tensile strength: 0.5 x 0.5 x 1.5 inch; bonded area 0.25 sq. inch

Tensile shear strength:

for plastic and rubber 0.1 x 1.0 x 4.0 inch; bonded area 0.5 sq. inch

for metal 0.064 x 1.0 x 4.0 inch; bonded area 0.5 sq. inch

Bonding atmosphere: 72-75°F (22-24°C), 58-62% relative humidity

Testing Methods: ASTM D2095, D3164, and D1002

REGULATION

Military Specification – Mill-A-46050C Type II Class varies

Medical assembly - US Plastics Class VI

HOW TO APPLY ARON ALPHA

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, the surface on which the Aron Alpha set time is longer, or the surface looking upward.

A common error in applying Aron Alpha is to apply an excessive quantity of Aron Alpha or to apply too small of a quantity of Aron Alpha in a wide thin film. In the former case, it is waste of Aron Alpha as well as damaging to the appearance of the bonded materials. This may also bring about chlorosis or solvent cracks. In the latter case, the Aron Alpha monomer may harden before the actual bonding starts and this will reduce the bond strength to a great extent. This is particularly the case with rubber materials.

Therefore, make sure that the nozzle of the Aron Alpha container is touching the surface to be bonded so that you can apply an optimum quantity of Aron Alpha from the container. Immediately after that, 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 on the surface, does not harden for 5 to 10 minutes and retains sufficient bond strength.

OPTIMUM QUANTITY OF ARON ALPHA

With Aron Alpha bonding, the thinner the film of the Aron Alpha monomer on the surface to be bonded, the greater is 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.

On the other hand, a too scarce quantity of Aron Alpha will also produce unsatisfactory bond strength, hence defective products. 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.

The optimum quantity applied can also be a measure of production control at your plant. That is, from the predetermined bond area of the material to be bonded, you can figure out in advance how many products or parts can be bonded with, for example, an Aron Alpha 20 gram bottle. With the figure thus obtained, you can maintain a quantified control of Aron Alpha bonding operation, minimizing the bonding cost and eliminating defective end products.

STORAGE

Conditions to consider when storing Aron Alpha

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.

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