



Instruction Sheet for Aracast XU 426 / XU 430

Epoxy Resin Casting System for Domestic Sinks and Vanity Units

Aracast XU 426 is a white mineral filled epoxy resin. Mixed with Hardener XU 430, a liquid anhydride hardener, it gives a hot setting system for the casting of domestic sinks, vanity units and similar household items.

This system offers the following features:

- Ease of processing by Automatic Pressure Gelation (APG).
- Supplied fully formulated, the system enables processing at reduced labor outlay and also excludes the safety risks associated with the handling of mineral fillers.
- Patent protection
- The cured product has:
 - Excellent heat resistance
 - Excellent abrasion resistance
 - Excellent mechanical toughness
 - Excellent chemical/stain resistance against common household materials

Key properties of resin and hardener:

Aracast XU 426

Appearance: Opaque, heavy white paste at 25° C, readily pourable at > 80° C

Density: 2.06 Mg/m³ at 25° C

Viscosity: 15,000 - 30,000 cP at 80° C (Brookfield RVT, spindle 5, 10 rpm)

Hardener XU 430

Appearance: Clear, pale yellow liquid

Density: 1.19 Mg/m³ at 25° C

Viscosity: 500 - 700 cP at 25° C

Mixing ratio:

	parts by weight	parts by volume
XU 426	100	100
XU 430	22	38

Instructions for use:

Mixing

1. Heat the Aracast XU 426 resin in its original container to 85 - 90° C in an oven or induction heater.
2. Preweigh the correct amount of resin into the mixing drum, unless mixing is to be carried out in the drum as supplied.
3. Add the hardener XU 430 (at room temperature) to the preheated resin.
4. Stir thoroughly under vacuum (for at least 10 minutes) to ensure that the resultant mixture is uniform and de-aerated. The mix temperature should be 60 - 65° C.

Note: Mixing under vacuum is normal practice in the production of high quality castings. This procedure minimizes any tendency to the formation of voids due to entrapped air.

Viscosity versus time characteristics (typical values), Brookfield RVT, spindle 5

Temperature	60° C	70° C	80° C
Initial viscosity	5,000 - 10,000 cP	2,000 - 3,000 cP	1,000 - 2,000 cP
Usable life in large bulk	5 h	2.5 h	1.5 h
Peak exotherm temp. in large bulk, reached after	132° C 11 h	147° C 4.5 h	163° C 3 h

Processing

XU 426 / XU 430 is best processed by the Automatic Pressure Gelation (APG) process (see notes). This technique facilitates mold filling of the resin-hardener mixture and eliminates risk of shrinkage marks on the castings. Open casting or vacuum-gravity casting is possible in favorable circumstances, i.e. when the riser does not unduly restrict the flow into the mold.

Schedules for APG processing will vary according to mold design and casting weight. The following schedule is typical:

1. Preheat molds and platens to 150 - 170° C.
2. Inject the resin-hardener mixture at 60 - 65° C under 28 psi to fill the mold in 1½ - 2 minutes.
3. Maintain pressure for 6 - 8 minutes.
4. Release pressure, open unit and demold the casting.
5. Post cure the casting, suitably supported, in an oven for 2 hours at 135° C.

Molds

Steel or aluminum molds are recommended for use with XU 426 / XU 430. Choice of mold material depends on the number of lifts required from each mold. As Araldite resins offer strong adhesion to most materials, molds must normally be treated with release agent. Mold materials and release agents are described in CIBA-GEIGY Instruction manual No. M19 Mold Preparation for Araldite and Ureol Resins.

For XU 426 / XU 430 the mold treatment to be used is Procedure 6b (silicone grease precoat + spray-applied silicone topcoat).

Molds should be designed so that air can escape at the highest point.

Curing

For APG processing, curing schedules depend on mold design, etc. For typical schedule, see processing above.

For conventional processing, preheat the mold to 80° C. Pour the casting and gel for at least 8 hours at 80° C before demolding.

Post curing (APG and conventional processes)

Postcure the casting for at least 2 hours at 135° C.

Typical Properties:

Curing schedule: APG processing followed by postcure of 2 hours at 135° C.

Physical and Mechanical

Tensile Strength	ISO / R 527 (ASTM D 638)	11,600 - 12,500 psi
Flexural Strength	ISO 178-1975 (ASTM D 790)	14,500 - 16,700 psi
Flexural Modulus	ISO 178-1975 (ASTM D 790)	1.35 - 1.45 x 10 ⁶ psi
Compressive Strength	ISO 604	24,600 - 29,000 psi
Surface Bond Strength	ASTM D 592-84	1,500 psi (adhesive failed)
Hardness	ASTM D 2583-81	
	Impressor 934-1	56
	Impressor 935	88
Abrasion Resistance	Ciba Test Method A*	450 - 580
Izod Impact Strength	ASTM D 256 Method A notched	0.5 - 0.75 ft.lb.f/in
Izod Impact Strength	Tested to ASTM D 256 <u>but</u> unnotched	2.1 - 2.8 ft.lb.f/in
Impact Resistance	ANSI Z124.3 - 4.3 24" drop	no cracks
Impact Resistance	ASTM 3029-84	27 in. lb.
Impact Resistance	Ciba Test Method B*	15.5 - 17.0 in.
Specific Gravity	ASTM D 792-A	1.83 - 1.87
Coefficient of linear expansion	ASTM D 696-79	28 - 35 x 10 ⁻⁶ per ° C
Temperature of Deflection under Load	ISO 75-1974 Method A	105° - 115° C
Glass Transition Temp.	TMA flexural mode	110° - 120° C
Heated Pan Test (185° C)	ANSI Z124.6 - 5.6	no change
Resistance to Applied Heat (230° C)	AS 3558.23	no change
Cigarette Burn Resistance	ANSI Z124.6 - 5.4	repairable
Cigarette Burn Test	European Sink Standard (H)	no change

Typical Properties: (Continued)

Color	Minolta Chromameter CR 200 tested on molded surface	L value 91.0 to 94.0 a value -1.4 to -0.8 b value 0.4 to 2.5 +0.03 (change in b value)
Light Stability	Ciba Test Method C* 14 days exposure	
Color Fastness (hot water)	AS 3558.3 (4 days boiling water)	no visible change
Gloss (60° Gardner)	ASTM D 523-80	89%
Water Resistance (100 h at 150° F)	ANSI Z124.3 - 6.3 (Type I)	1.4%
Water Resistance Cycle	ANSI Z124.6 - 6.2	2,000 cycles, no failure
Water Absorption	ISO 62-1980 Method 1 (24 h at 23° C) Method 3 (30 min. at 100° C)	8 - 10 mg 14 - 16 mg
Plastic Sink Wear & Cleanability Test	ANSI Z124.6 - 5.3	first clean 1.3% second clean 0.8%

CIBA-GEIGY Test Methods *

- Method A: Abrasion Resistance: Measured using a Taber Abraser Model 503 fitted with S 42 paper, 500 gram weights on each arm. 100 cycles were used and with test specimens weighed before and after testing the result was calculated as follows: Wear factor = Weight loss (grams) x 10,000.
- Method B: Impact Resistance: A cast sheet (300 x 300 x 6mm) is clamped in a jig. A 910g round ended weight is dropped from increasing heights. The height at which a crack first appears in a sample is recorded.
- Method C: Light Stability: Specimens were exposed in a HERAEUS SUNTEST CPS artificial sunlight machine fitted with a UV filter - cut off 290 nm. The total irradiance was 400 W/m² (34 W/m² over the range 300 - 400 nm). Color change in b value was measured using a MINOLTA CHROMA METER CR 200 after 14 days.

The following tables show the extensive testing which has been carried out on Aracast APG molded systems to demonstrate their suitability for a wide range of domestic applications.

The following ratings are used:

0	cleans with plain water and sponge
1	cleans with domestic polish
2	cleans with gentle cream cleaner
3	needs abrasive cleaner
4	severe attack

Chemical Resistance Tests ANSI Z124.6 - 5.5

16 hours at 73° F exposure covered and uncovered

✓ Acetone	1
✓ Ammonia solution (10%)	1
Amyl Acetate	0
✓ Citric Acid solution (10%)	0
Chlorobenzene	0
Dichloromethane base Paint Stripper	4
✓ Ethyl Acetate	0
✓ Ethyl Alcohol (alcohol)	0
✓ Hydrogen Peroxide (3% in water)	0
Hydrogen Peroxide (10% bleach)	0
Hypochlorite Bleach (11% concentration)	0
Lime solution (2% in water)	1
✓ Naphtha	1
Methanol	0
Petrol	0
Phenol	3
Pine Oil	1
Sodium Bisulphite (saturated solution)	0
Sodium Hydroxide (10% caustic soda)	0
✓ Sodium Hypochlorite (concentrated bleach)	0
Teepol (5% solution)	0
✓ Toluene	0
1,1,1 Trichloroethylene	0
Tribasic Sodium Phosphate (1%)	0
✓ Trisodium Phosphate (5% in water)	0
✓ Urea 6%	0
✓ Vinegar	1
Water (distilled)	0

Stain Resistance Tests ANSI Z124.6 - 5.2

16 hours at 73° F exposure covered and uncovered

Beet Juice	0
Black Clothing Dye	3
Black Washable Ink	0
Black Shoe Polish	0
Coffee (10% in water)	0
Gentian Violet Solution	2
Grape Juice	0
Hair Dye	0
Iodine Solution	3
Lipstick	0
Mercurichrome (2% solution)	0
Mustard Paste	0
Nail Hardener	0
Nail Varnish Remover	0
Nail Varnish (Red)	1
Tea (10% in water)	0
Wet Tea Bag	0
White Wine Vinegar	0

Household Product Tests

16 hours at 73° F exposure covered and uncovered

Bleach (concentrated)	0
Chlorox Bleach	0
Comet Slurry	0
Cream Cleaner	0
Lime Away	0
Liquid Detergent	0
Liquid Plumber	0
Nail Polish Remover	0
Neet	0
Pinesol	0
Scrubbing Bubbles	0
Scrub Free	0
Shaving Lotion	1
Soft Abrasive Cleaner	0
Soft Srub	0
Washer Detergents (5% in water)	0
Ultrabrite Toothpaste	0

Foodstuff Exposure Tests

16 hours at 73° F exposure covered and uncovered

Beet (canned)	0
Catfish	0
Cider Vinegar	0
Coffee (brewed)	0
Garlic Clove	0
Grape Juice	0
Grapefruit (red)	0
Grapefruit (white)	0
Lemon	0
Liver Blood	2
Mustard (yellow)	0
Onion (red)	0
Onion (yellow)	0
Red Wine	2
Spaghetti Sauce	0
Tea Bag	0
Tuna (fresh)	0
White Vinegar	0

Pressure Gelation Process:

With traditional casting techniques the completed components may show shrinkage flaws due to non-progressive gelation. These flaws necessitate either scrapping the components or their repair by expensive patching operations. Such faults can be eliminated through use of the CIBA-GEIGY Pressure Gelation Process.

The principle of the technique is to induce progressive gelation from the outside of the casting inwards. The mold is preheated to a temperature substantially higher than that of the casting mixture. To ensure continuous compensation for reaction shrinkage during gelation, a modest pressure (typically 4.2 - 42 psi - 0.3 - 3 bar) is applied to the mixture in the feeder until gelation is completed. As it is essential that the resin in the feeder should gel last, the feeder must be correctly positioned and may be separate from the mold.

For XU 426 / XU 430 the Automatic Pressure Gelation (APG) Process is preferred. Molds are mounted in automatic heating, clamping and stripping fixtures - and the mixture is fed into the mold under pressure. APG processing facilitates mold filling and offers substantial processing economies.

Further information on Pressure Gelation and guidance on the choice of plant are available from Ciba-Geigy, Formulated Systems, East Lansing.

Cleaning of Equipment:

Mixing equipment, containers, etc. must be cleaned before the resin mixture has hardened. Acetone, cellulose thinners and methoxypropanol are suitable cleaning agents. Suppliers' literature should be consulted.

Note: These solvents and their vapors are flammable - due precaution must be taken against fire risks. The use of methoxypropanol as an alternative to acetone and cellulose thinners significantly reduces the flammability hazard. Adequate ventilation is essential where solvents of the type listed here are in use - in order to ensure that vapor levels are kept below the relevant Occupational Exposure Limits. Furthermore, such solvents should not be allowed to come in contact with the skin. Measures to prevent contact are given under Caution below.

Storage:

The resin and hardener should be stored in a dry place at 5 - 25° C. In these conditions the XU 426 has an assigned shelf life of 12 months and XU 430 of 3 years.

Note: XU 430 hardener is hygroscopic: as it deteriorates if allowed to absorb moisture the containers must be securely closed when not in use. It is important to keep XU 430 stored in its original containers. If transfer to different containers is necessary, these must be plastics, plastic-lined or glass. The uncured hardener is incompatible with most metal containers.

Caution:

Araldite resins and hardener are generally quite harmless to handle provided that certain precautions normally taken when handling chemicals are observed. The uncured materials must not, for instance, be allowed to come into contact with foodstuffs or food utensils, and measures should be taken to prevent the uncured materials from coming into contact with the skin, since people with particularly sensitive skin may be affected. The wearing of impervious rubber or plastic gloves will normally be necessary: likewise the use of eye protection. The skin should be thoroughly cleansed at the end of each working period by washing with soap and warm water. Disposable paper towels - not cloth towels - should be used to dry the skin. Adequate ventilation of the working area is recommended. These precautions are described in greater detail in CIBA-GEIGY MANUAL NO. M37 HANDLING PRECAUTIONS FOR ARALDITE EPOXY RESIN MATERIALS and in CIBA-GEIGY Product Safety Information for the individual products. These publications are available on request and should be referred to for more detailed information.

First Aid:

In case of contact

Eyes:	Promptly flush eyes with water for at least 15 minutes.
Skin:	Wash promptly with mild soap and water
Inhalation:	Remove to fresh air. Give oxygen if breathing is difficult.
Ingestion:	If conscious, give large quantities of water. Get IMMEDIATE medical attention.

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XU 426 / XU 430
CIBA-GEIGY Corp. 1994
Printed in U.S.A.
CR 6/1/94