

ART-SORB[®]

HIGH PERFORMANCE HUMIDITY
CONTROL AGENT
FOR THE CONSERVATION OF ART

Styles for any
Situation

Art-Sorb is a moisture-sensitive silica material which adsorbs and desorbs moisture in order to offset changes in external relative humidity (RH). By this process *Art-Sorb* will maintain a sealed climate at a specific RH... one which you choose.

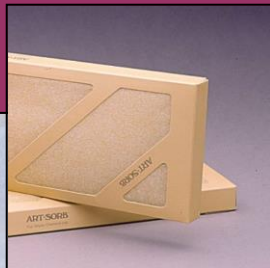
- Available in beads, sheets, and cassettes for simple incorporation into any container
- Precise humidity control ($\pm 5\%$)
- Over five times greater moisture buffering ability than other products
- Pre-conditioned to your specified relative humidity (40-70% at intervals of 5% RH) at no additional cost
- Typically 5% the required amount of ordinary silica gel
- Non-dusting and non-reactive for easy handling
- Complete technical support including toll free help line
- 60 years experience in high performance silica technology
- Both direct sales and qualified distributors
- *Affordable*

Art-Sorb FOR DISPLAY?

STORAGE?

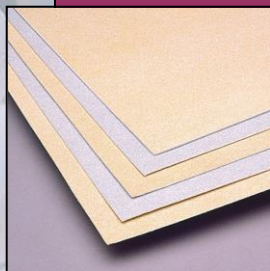
SHIPPING?

YES.



Cassette Type

full & half sizes available



Sheet Type

Can be custom cut to size



Bead Type



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The Original Art-Sorb[®] - Time tested and proven

Fuji Silysia Chemical, LTD.

INTRODUCTION

Fuji Silysia Chemical, Ltd. was established in 1965. Since its establishment, we have devoted ourselves to the development of specialty silica. Because of their high quality, our silica products have earned a good reputation both in Japan and abroad and each product occupies the largest share in its respective market. We believe the application of silica will spread into various fields as industrial chemical technology develops. Therefore, it is no exaggeration to say that silica has enormous future growth potential. In order to meet the needs of a new age, we are now stressing the development of products which can immediately respond to the changing world.

ART-SORB

Fuji Silysia Chemical, Ltd. manufactures and distributes **Art-Sorb**, an innovative humidity control material designed for the art preservation societies and affiliated service industries throughout the world. Beginning in April 1996, we have made available an expanded range of **Art-Sorb** styles and humidity levels never before offered to the United States conservation community.

If you have heard of **Art-Sorb**, or used it in the past, you are already aware of how well it works at establishing stable microclimates. If not, you probably have had to settle for using silica gel and are wondering:

Is **Art-Sorb** similar to ordinary desiccant silica gel? **Definitely not!**

Art-Sorb actually gives off water vapor, as well as adsorbs it, to maintain a specific relative humidity (RH) which is ideal for the artwork's particular needs. It was designed for this purpose. This is not the case with silica gel which can only adsorb water, then must be dried out after it is saturated. By nature, silica gel is not meant to control humidity, only lower it. **Art-Sorb** is the premier product for precise humidity control in terms of performance, cost effectiveness, and simplicity.

Do you have medals in a case you would like to keep at a lower humidity? We have 40% **Art-Sorb** in convenient cassette form. Perhaps a large display case which needs to be at 65%? Without a doubt, our bead type will do the job. For the painting which needs to be at 50%, the sheet style is ideal. In fact, we carry **Art-Sorb** in almost all forms from 40%-70% RH (at intervals of 10%), and pre-conditioned so you may choose the perfect level of relative humidity to protect your artwork. Several styles... multiple RH levels...many choices.

Whether you are a conservator yourself, or work within the conservation community, you will certainly find this product to be of interest. For more in depth information about **Art-Sorb** please contact Fuji Silysia directly. We look forward to working with you in the future.

Art-Sorb Complete Information Packet

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Pre-Conditioning

Art-Sorb comes pre-conditioned to your specifications, between 40%-70% RH (at intervals of 5%), at no charge. Different styles are available in certain regions of this range, please check for availability. This means that every batch of *Art-Sorb* generated is designed to consistently keep its particular climate at your chosen ideal level. We can provide advice as to which relative humidity levels are best suited for various types of art. Below are a few examples:

Metal, Stone Works	RH 40%
Papers, Woods, Clothes	RH 50-60%
Oil Paintings, Mixed Media	RH 50-60%
Asian Lacquer-Ware	RH 60-70%
Textiles	RH 40-60%

High Moisture Capacity (EMC = Equilibrium Moisture Capacity)

Once *Art-Sorb* has conditioned its surroundings to be at your set point; it is at equilibrium with this climate (EMC). *Art-Sorb* has a very high moisture capacity throughout the entire RH range, meaning it can adsorb or desorb a very large percent of its total weight in water without becoming dysfunctional. The larger the capability of water retention the better the ability to buffer change. Also, *Art-Sorb* does not off-gas and will even take in a small amount of organic volatiles. Please see the chart below detailing EMC values for *Art-Sorb* and other materials.

High M-Value

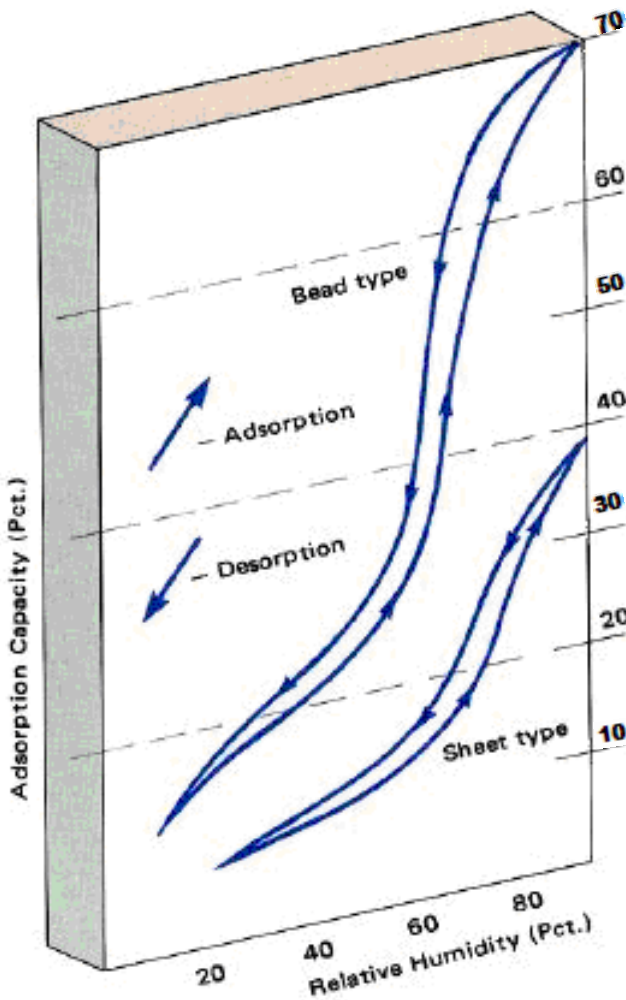
M-Value (specific moisture reservoir) can be thought of as the unit by which the buffering ability of a silica gel can be measured. It represents the amount of water in grams that is gained or lost by one kilogram of gel when the RH changes by 1%. Translation: the more water that can be buffered per 1 kg of gel, the better the performance and the higher the M-Value. If you view the table below, *Art-Sorb* outperforms ordinary silica gel by actually increasing its M-Value.

	Ordinary Silica Gel				<i>Art-Sorb</i>	
	<i>Regular Density Silica</i>		<i>Intermediate Density Silica</i>			
RH%	EMC	M-Value	EMC	M-Value	EMC	M-value
40	25.0	3.5	5.0	1.5	22.0	4.0
50	28.5	2.0	6.5	1.5	26.0	9.0
60	30.5	1.5	8.0	3.0	35.0	19.0
65					46.0	
70	32.0	1.0	11.0	6.0	54.0	13.0
80	33.0	1.0	17.0	15.5	67.0	7.0

Minimal Hysteresis Problems

Hysteresis describes the condition where silica gel's adsorption curve lies below its desorption curve. The greater the difference between the two curves the longer the time needed to switch from taking in water to releasing, as the conditions change. Therefore, a region exists where the gel is not working efficiently. Whereas most ordinary silica products are extremely subject to this problem, *Art-Sorb's* hysteresis is almost negligible, as seen by the graph below, giving it the ability to switch functions very quickly from taking in water to releasing it as needed.

Typical Data For *Art-Sorb* Adsorption/Desorption Curve (at 25° C).



Response Time

Frequent short-term exposure to non-ideal conditions is a major factor in the damage of artwork over time. Due to *Art-Sorb*'s combined properties of high moisture capacity, large M-Value, and virtual lack of hysteresis, the speed of reaction to a change in humidity is maximized and the time until restoration of ideal RH is minimized.

Complete Inertness / Ease of Handling / Immunity to Temperature Changes

Art-Sorb was designed to make the protection of artwork precise and easy. Unlike older methods, *Art-Sorb* is completely inert; it can be in direct contact with the artwork with absolutely no reaction. Likewise, all the forms of *Art-Sorb* were designed to be safe and easy to handle, store, and use without problems such as dusting or odor. All of the properties of *Art-Sorb* are completely temperature independent, unlike many silica materials, which have severe performance variations as the temperature fluctuates.

Infinite Life Span / Re-Conditionability (Temporary Method)

Art-Sorb can be re-used any number of times, but although *Art-Sorb* is a silica based material, its vastly different properties combine to make a material that will need to be reconditioned very infrequently. This process can easily be done in-house using a humidity-controlled room, if available. However, the most popular method of reconditioning is a simple process of directly misting the *Art-Sorb* with water until the appropriate weight is achieved.

Economic Efficiency

Because *Art-Sorb* so greatly outperforms other gels much less is needed. This translates into saving not only on the product itself but also in the conservation of area to incorporate it into future displays, crates and storage facilities. As it can be reconditioned over and over, its value increases even further.

Recommended Amounts (Assuming Well Sealed Case)

Recommending a "standard" amount of *Art-Sorb* for your application is somewhat difficult due to many factors, such as leaks in the crate/case, sunlight, temperature extremes, etc. The type which is best to use is based on which form is the most convenient to incorporate and the desired RH for the particular media. Additionally, it is recommended that some extra *Art-Sorb* be kept on site, which can serve as a temporary replacement when a particular case or crate needs to be reconditioned.

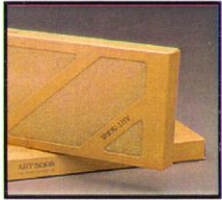
On the next page you will find an estimate for calculating how much *Art-Sorb* is needed per cubic foot. When you factor in some of the examples above which may increase the necessary working amount of *Art-Sorb*, an additional percentage of *Art-Sorb* should be used to provide a safety zone.

In actuality each project is different and is treated as such - with a complete checklist of prevalent factors outlined. We would make sure all of your ideas are incorporated into efficiency, convenience, and most of all - performance, ensuring that *Art-Sorb* is the best buffering agent you ever use.



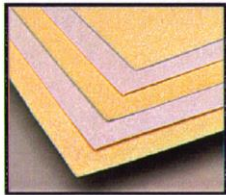
BEAD TYPE

Base recommendation is 1 pound of **Art-Sorb** in bead form from 16 cubic feet (500g/m³). Please refer to accompanying information sheet detailing actual size of beads and cost.



CASSETTE TYPE

Base recommendation is 1 full cassette for about 26 cubic feet (75% of the volume of beads). Half cassettes are half that at 13 cubic feet. Constructed of PE/PP sheets packed with beads using an archival quality immersion-type adhesive of polyvinyl chloride acetate polymer base. Please refer to accompanying information sheet detailing actual size of cassette, composition, and cost.



SHEET TYPE

Sheets are ideal for use in small volumes such as framing systems. They should be cut to fit as much of the available backing space as possible for complete protection. They are constructed of non-woven PE/PP fibers impregnated with **Art-Sorb** particles. Please refer to accompanying sheet detailing actual size of sheets, composition, and cost.

Precaution of *Art-Sorb* Usage

Art-Sorb is very sensitively preconditioned. Please see the following instructions to use *Art-Sorb* in an appropriate way.

Air-Tight Showcase

Art-Sorb cannot perform with sufficient efficiency when wet or dry air flows into the showcase. It is essential to make cases air-tight.

Preconditioning of Showcase

Before *Art-Sorb* is placed in the showcase, it is necessary to adjust a relative humidity value in a showcase to the desired level by using a dryer or humidifier

Appropriate Quantity

Please follow the guidelines stated below when setting up *Art-Sorb* in an air-tight showcase.

Bead Type	1 lb/16ft ³
Full-Size Cassette	1 cassette/26 ft ³
Half-Size Cassette	1 cassette/13 ft ³
Sheet Type	1 sheet/3.5 ft ³

Note: Sometimes it is necessary to change *Art-Sorb* quantity when considering characteristics, and quality of materials exhibited in a showcase.

Placement

Please keep *Art-Sorb* with as little air in a showcase as possible for its excellent performance. When using *Art-Sorb* beads in a showcase, a layer of beads less than 3 cm thick should be placed in an open container. It is recommended to place *Art-Sorb* in a showcase after artwork is displayed. As soon as *Art-Sorb* is set in a showcase, quickly shut the door and make sure it is completely air-tight.

Handling of *Art-Sorb*

In order to maintain *Art-Sorb* performance, place it in a showcase within 10 minutes of unpackaging it.

Maximizing Efficiency Air-Gel Interface

The more contact *Art-Sorb* has with its sealed environment the better. It is able to condition the surroundings within a minimal amount of time. The air-gel interface can be maximized by spreading the bead type out as thoroughly and evenly as possible, such as in shallow flat trays or in porous plastic tubes (maximum depth is 3 cm). The old desiccant drawers, which comes standard on many case type systems, are ideal for this purpose. This same theory applies to all of the *Art-Sorb* forms, in that the greater the contact with surroundings the better the performance characteristic. *Art-Sorb* moves moisture by the process of diffusion. Most display cases will have some leaks that circulate air; however, a small fan can be incorporated where appropriate to enhance the performance of *Art-Sorb*.

Methods of Incorporating *Art-Sorb* Into Display, Storage & Crating

When using *Art-Sorb* some preliminary steps can be taken to ensure even better performance. For example, the closer your case or crate is to being completely sealed the better, *Art-Sorb* will work on the environment within. Attempts to further seal any type of storage system will be of benefit.

Tip: Clear aquarium PVC tubing is a very inexpensive and nearly invisible method of sealing gaps in sliding glass doors or edges of storage vehicles/cases.

Before inserting *Art-Sorb* into the case it is advised to bring the humidity to a level which is in the general area of where the *Art-Sorb* will be maintaining it. By doing so, the *Art-Sorb* is not unnecessarily exposed to extreme conditions at the onset and the amount of time that *Art-Sorb* can be used before re-conditioning is extended. Once this is achieved, a minimum amount of exposure time outside the packaging before sealing *Art-Sorb* within the case/crate is recommended; maximum time unsealed should be no more than 5-10 minutes. If you have to break open a package and need to re-seal the remaining *Art-Sorb*, heat seal it into a heavy gauge PE tubing to store for later use. You could also use some of the 2 gallon size Ziploc type bags (double bagging is recommended). If you are going to store *Art-Sorb* for any significant time outside of its factory packaging you should set up a schedule to check the *Art-Sorb* by hygrometer periodically.

Incorporating *Art-Sorb* is the creative part. Since there are so many ways to do this here are a few, but you may feel free to contact Fuji Silysia Chemical to discuss your specific project in detail. In display cases, common methods include: creating a recessed area, such as a trap door in the bottom, covered by peg-board and then fabric to hide the *Art-Sorb*. Also, an elevated platform on the bottom of the display case with the *Art-Sorb* underneath is a good method. By placing *Art-Sorb* beads in cotton bags or inside flexible tubing (with slits or holes in it) you have a few more methods. There really are numerous ways to sneak *Art-Sorb* into your situation. In the case of storage or shipping, where aesthetics are unimportant, the only real concern (which applies as well to display situations) is the need to use *Art-Sorb* and then hide it in a false floor with only the one air exchange portal. Finally, when using the sheets in a frame, the sheet must be sealed completely within the frame both in the back and front. Think of it as a mini-display case.

Tip: When using cassettes, keep their axis flat versus positioning the cassette vertically against gravity. When hung vertically the beads pack densely into the bottom, creating a poor amount of bead/air contact. Also you can create smaller cassettes by cutting the cassette into halves or thirds. Once you cut the cassette you will need to reinforce the weak side (the one which was cut) with some piece of archival material of your choice which seals the entire open edge of the cassette. You could take the beads out and put them in a mesh or cotton bag as well. Just remember to calculate the correct amount of beads for the cubic volume that you have.

Art-Sorb Specification Sheet

Available Level of RH% Preconditioning, Actual Size, and Packaging Style
/ Composition

Pricing

- Please call our sales office for our latest prices.
- Calculation table for required amounts on the next page.

Available Levels of RH% Pre-Conditioning

Beads	70%	65%	60%	50%	40%
Sheets	NA	NA	60%	50%	NA
Cassettes	NA	NA	60%	50%	40%
Half Cassettes	NA	NA	60%	50%	40%

Actual Size, Packaging Styles / Composition

	Actual Size (in)	Pieces Per Case
Beads	1/16-3/16 diameter	1 case = 2 tins (8 kg each)
Sheets	1/8h x 20w x 20d	1 case = 2 packs of 10
Cassettes	1 5/8 x 13 w x 4 3/8d	1 case = 22 packs of 1
Half Cassettes	7/8 x 13 w x 4 3/8d	1 case = 22 packs of 2

* minimum order quantity required

Packaging Composition	
Sheets	Made of <i>Art-Sorb</i> particles impregnated in a PE/PP (polyethylene, polypropylene) non-woven fiber matrix, 100g <i>Art-Sorb</i> /sheet.
Cassettes	Made of a PE/PP sheet frame sealed using a PVA (polyvinylacetate) immersion adhesive, packed with 750g <i>Art-Sorb</i> beads.
Half	Same as Cassette packed with 400g <i>Art-Sorb</i> beads.

All packaging styles are completely sealed for storage until use and can be re-sealed after opening.

Note: Orders are priced F.O.B. warehouse. In special cases importing from our Japan facilities may be required and will be shipped C.I.F. to the nearest port. All prices are subject to change without prior notice.

Calculation Table for Required Amounts

Lbs. of Beads or # of Cassettes/Half Cassettes Beads(ft³) Cassette(ft³) ½ Cassette(ft³)

1	16	26	13
2	32	52	26
3	48	78	39
4	64	104	52
5	80	130	65
6	96	156	78
7	112	182	91
8	128	208	104
9	144	234	117
10	160	260	130
11	176	286	143
12	192	312	156
13	208	338	169
14	224	264	182
15	240	290	195
16	256	416	208
17	272	442	221
18	288	468	234
19	304	494	247
20	320	520	260
21	336	546	273
22	352	572	286
23	368	598	299
24	384	624	312
25	400	650	325
26	416	676	338
27	432	702	351
28	448	728	364
29	464	754	377
30	480	780	390
31	496	806	403
32	512	832	416

Example A 1 lb beads = 16ft³ = 1/32 of 1 case
 1 cassette = 26ft³ = 1/4 of 1 case
 1 half cassette = 13ft³ = 1/8 of 1 case

Example B 32 lbs beads = 512ft³ = 1 case (2 tins)
 32 cassettes = 832ft³ = 8 cases
 32 half cast = 416ft³ = 4 cases



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