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**“GUSTAV BERGER’S ORIGINAL FORMULA®”  
PRODUCTS FOR ART CONSERVATION**

**GUSTAV BERGER’S ORIGINAL FORMULA® 371/ BEVA® 371  
THINNER 372  
BEVA® O.F. 371 FILM  
GUSTAV BERGER’S O.F. PVA INPAINTING MEDIUM  
GUSTAV BERGER’S O.F. ISOLATING PVA SPRAY VARNISH  
BEVA® O.F. FINISHING VARNISH  
BEVA® O. F. D-8-S  
BEVA® O.F. GEL**

**Technical report written by Eugenie Knight supervised by prof. Gustav Berger**



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## Introduction

Since the publication of the first edition of this Brochure in 1990, the following important events took place:

1. "La Foderatura, metodologia e tecnica", by Gustav A. Berger, was published by Nardini Editore in Florence, in 1992. Although small in size, this book was bursting with practical information for the practicing restorer/conservator.
2. Since 1990, **C.T.S. S.r.l. is the only producer in Europe authorized by Gustav Berger to use both marks Gustav Berger's Original Formula 371 and BEVA 371 for the products he developed.** BEVA stands for Berger Ethylene Vinyl Acetate (its components). In the following pages, when either of the two registered trademarks is used, the name is applicable to the other as well.
3. "Conservation of Paintings, Research and Innovations", by G.A. Berger with W.H. Russell, was published by Archetype Publications Ltd., 6 Fitzroy Square, London, W1T 5HJ, England, 2000. This extensive, and richly illustrated, 360-page book chronicles some of Berger's work in his 50-year career as a conservator of paintings and researcher in conservation. In it, Berger addresses various problems a practicing restorer might encounter and provides solutions based on the latest developments in painting technology and materials science. He also describes his investigations carried out jointly with Professor Russell into the deterioration (cracking, cupping and blistering) of canvas paintings and other art objects. The book was reviewed by Eugenie Knight in "Il Giornale dell'Arte", September 204 and *Kermes*, Nardini Editore, October - December 2004).

## GUSTAV BERGER'S ORIGINAL FORMULA 371® / BEVA® 371

### COMPOSITION

Elvax 150 resin (copolymer based on ethylene vinyl acetate)

Laropal K-80 (resin based on cyclohexanone)

A-C 400 (copolymer based on ethylene vinyl acetate)

Cellolyn 21 (phthalate ester of hydroabietyl acid)

Paraffin (paraffinic hydrocarbons)

In total the solid products are the 40% of the composition.

Diluted in toluene and suitable solvents in order to substitute the 'naphta' used in the U.S.A., not available in Italy, - the total solvent percentage is 60%.

### INSTRUCTIONS FOR USE

These instructions are based on relevant publications regarding the many uses of G. BERGER'S ORIGINAL FORMULA® 371 as well as a recent visit to Gustav Berger's conservation studio to observe his latest methods. We intend to share with you periodically additional information on the use of this versatile adhesive. All work with G. BERGER'S ORIGINAL FORMULA® 371 adhesives should be performed in a well ventilated room.

#### 1. Preparation of the adhesive

From a fresh can of G. BERGER'S ORIGINAL FORMULA® 371 remove a certain quantity of the product and add about the same volume of Thinner 372 or VM&P naphtha or xylene (if you want to retard drying), or a mixture of both, making it a 37% solution (ratio 1:1). Cover the can but do not close it, then warm in a double boiler (far from flames) until solution is clear and liquid. Stir occasionally. In this form, G. BERGER'S ORIGINAL FORMULA® 371 is the standard adhesive for lining and can be applied to both the old canvas and the new support. The most suitable manner of application is with a medium nap paint roller. The roller may be immersed directly into the can, or the pan often sold with the paint roller



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may be used. When through, the excess of G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 in the roller may be squeezed back into the can, the roller removed from its holder and immersed in a well-covered jar of thinner until needed again. If frequently used, the roller might be kept moist and pliable by wrapping it in thin polyester film. There is virtually no waste, even the contents of the storage jar can later be used for facings.

## 2. Preparation of the painting

The painting is prepared for lining, as might be required in each case, performing one or all of the following operations, usually in the order listed below:

- "Face" painting, if necessary.
- Remove painting from stretcher and flatten tacking edges.
- Reattach loose paint (if necessary, consolidate entire painting) using G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 or your favourite method.
- Join the tears, fill losses. If losses were badly filled before, the old varnish must be removed and the fillings corrected.
- Revarnish painting for protection.
- Place painting, face-down, on a board covered with silicone-coated paper. Tape tacking edges to the board so painting would not move. Level the back of the painting carefully with a scalpel shaving off all protruding knots, burls and ridges of canvas weave. Do not sand it.
- Correct deformations in the plane of the painting by vapour-treatment.
- Depending on the desired degree of penetration, either coat the back of the painting with G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371, or spray with an 8-10% solution G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 in naphtha and/or toluene (1:3 or 1:4). Allow to dry overnight.

It is best to perform all operations with G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 at the end of the day so as not to remain exposed to the solvent fumes for too long.

## 3. Preparation of the lining fabrics

Some of the steps in the preparation of the painting require time to dry. These pauses may be used to prime the lining fabrics with a spray-coating of G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 or BEVA O.F. D-8-S.

Berger uses the following lining laminate:

- a sandwich layer of fine, flexible synthetic fabric (e.g.: Dacron-Polyester) (the finer and more regular the weave, the better);
- an interleaf of polyester film (optional);
- a backing fabric.

While the sandwich layer and the backing fabric may be prepared in large sheets well ahead of time, stored indefinitely and cut to size when needed, the polyester film interleaf should be made as the very last step before the actual lining.

## 4. Preparation of the sandwich layer and the backing fabric

The fine polyester fabric is lightly tacked to a large strainer and sprayed with a thinned solution of G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 or BEVA O.F. D-8-S from both sides, then left to dry.

The backing fabric is prepared in a similar fashion, except that spraying with G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 is done on one side only, the side which will be attached to the laminate.

## 5. Preparation of the interleaf

A piece of heavy polyester film (5 - 7,5 mil thick) is cut about 5 - 7 cm larger than the painting to serve as interleaf. It provides the lining with sufficient stiffness to resist deformation and it forms a good moisture barrier.



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The cut piece is lightly tacked to a board, covered with silicone-coated paper. The interleaf is coated with a continuous coat of G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371. Since the polyester film does not absorb any G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371, this coat dries in about 15 minutes. The polyester film is then inverted and its reverse coated with G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371. The dry polyester film is placed on a carefully cleaned cardboard.

The painting is placed on top of it, 'face-up'. The outline of the painting is marked on the polyester film with a fine felt-tip pen.

The painting is removed and an additional line is marked within the outline, about 3 mm inside the borders.

The interleaf is cut along the inside line to be slightly smaller than the painting. Because paintings are often irregular, it is better to cut the polyester film with scissors. This should be done immediately preceding lining, in order to prevent contamination of the polyester film.

## 6. Assembling the laminate

The vacuum hot-table is carefully cleaned. It must be remembered that the vacuum table accentuates every unevenness, be it on the table or within the laminate. Therefore, each layer of the laminate should be carefully inspected for any impurities before being put for lining.

The following steps are to be taken:

- Cover the table with a sheet of polyester film, about 1 – 1.5 mil thick. This instead of silicone-coated paper which seldom lies flat on the hot-table (experienced practitioners can easily dispense with this step, since there is practically no danger for G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 penetrating the backing fabric, if properly prepared).
- Place backing fabric on the polyester film or hot-table, with the side which was sprayed G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 facing up.
- Put dry, pre-cut interleaf on top of the backing fabric and align carefully with the threads of the backing fabric.
- With a tacking iron press down lightly two adjacent corners of the interleaf to the backing fabric to make sure it will stay in the aligned position.
- Put sandwich layer on top of the interleaf. With a pencil or chalk mark the continuation of the outlines of the interleaf on the sandwich layer. Starting from the centre, smoothen it lightly with both hands.
- While the painting is still on a board, cut the four corners of the tacking margins, so that the painting can be aligned within the outlines marked on the sandwich layer (if trimming of the tacking margins is unacceptable, register-marks can easily be drawn to show the exact position of the corners).
- Place painting on the sandwich layer 'face-up' and align it with the help of the register marks. Press down lightly to attach the layers in perfect alignment.
- Put "breathers" around the edges of the painting.
- Cover laminate with the membrane and evacuate the air.
- Do not start heating the table immediately. This permits you to check the laminate once more, this time under pressure. It also assures better evacuation of the air which might otherwise be hampered once the different layers fuse together.
- Heat table until surface temperature of the painting reaches 150 °F (65 °C) in all parts of the painting. At least five paper thermometers should be used for each thermal blanket heating the table, one in each corner and one in the centre. Do not rely on electronic thermostats and/or contact thermometers alone.
- Allow to cool slowly, under pressure, to at least 85-90 °F (35-40 °C). The latest stress measurements carried out by Russell and Berger have shown rapid cooling to be stressful to paintings.

Please, note that the assembly of fabrics in the above described laminate has been worked out to alternate a porous layer with a non-porous one in order to assure a good evacuation of air and a proper distribution of pressure within the laminate. This permits lowering the vacuum pressure to a minimum,



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although a stronger vacuum often assures a better looking lining. Also note that with the above arrangement the use of a membrane is not absolutely required. Consequently, the vacuum can be arranged to join the layers of the laminate without applying pressure to the face of the painting. In addition, alternating porous and non-porous layers facilitates the reversibility of the laminate.

### **MISCELLANEOUS USES**

**FACINGS:** Thin G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 with the THINNER 372 (1:3 or 1:4) or VM&P naphtha. Because G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 will stick to a wet surface, wet-strength tissue may be placed in the usual manner for a facing and wetted and tamped into the most rough surface with a soft brush. The G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 facing mixture can then be rolled or brushed immediately over the wet facing. Do not go over areas of drying G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 a second time, the facing may lift. Proceed as required on hot table between sheets of silicone paper, when dry.

**BLISTERS:** Prepare a mixture of G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 (1:3 or 1:4) with the THINNER 372 or VM&P naphtha. This may be flowed into the cracks and crevices of the paint, or injected under the paint layer, warm. Let dry 24 hours, cover with a small piece of silicone paper and flatten with a tacking iron. Blisters may be faced, if required.

**REMOVAL OF FACINGS:** Spray or flow the THINNER 372 or VM&P naphtha over sections about 10 cm at a time, cover with a piece of polyester film and warm slightly for two or three minutes. Facing will then peel directly off. Alternate method, cover faced painting with a piece of newspaper (10 cm) and wet well with the THINNER 372 or VM&P naphtha. Proceed as above. Facing should peel off attached to the newspaper. Clean face of the painting with the THINNER 372 or VM&P naphtha, removing all traces of G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371.

**VAPOUR TREATMENT:** To flatten heavily cupped or deformed paint films vapour treatment is best performed before G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 is applied. This treatment is not without hazard, and requires extensive study and experience.

**FIXING MINOR FLAKES:** Lightly transfer G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371- the THINNER 372 or benzene mixture (1:3), preferably warm, from point of brush to edges of flaked paint. It will immediately draw around and under flakes. Cover with facing paper and press down to remove excess G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 which might form a ridge under the paint. This precaution is important in interlayer delamination or on non-absorbing grounds. Allow to dry 24 hours. Cover with a piece of silicone paper and flatten with tacking iron.

### **IMPORTANT NOTE**

It is imperative to employ silicone paper above and below all work whether linings or small tacking jobs. G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 will stick to Teflon coated irons, polyester film and everything else. **NEVER** use G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 **directly** when mounting a painting on any hard, inflexible support. **ALWAYS put a piece of fine fabric** between painting and solid support first.

**REMOVAL OF A LINING MADE WITH G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371:** To remove a lining made with G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371, place the painting on the hot-table, apply - by brush or spray - VM&P naphtha to the back of the lining and cover with a sheet of polyester film. The hot-table should be preheated to about 120°F (50-55°C). Wait about five minutes and test to see if the lining can be peeled. If not, repeat the above process.



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When G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 has been softened to the proper degree, the lining will be easy to remove without stress to the old canvas. If the painting is large, this may be done in sections.

**GUSTAV BERGER'S ORIGINAL FORMULA<sup>®</sup> 371** is available in 1 litre and 5 litre cans.

## REFERENCES

G.A. Berger and W.H. Russell "*Conservation of paintings: Research and Innovations*":  
Chapter II - Consolidation of flaking paint films: Modifications of the vacuum envelope for consolidation, pp. 23-44  
Chapter III - Tears in canvas paintings and their proper closing, pp. 45-62  
Chapter IV - The use of water in the conservation of canvas paintings: Benefits and hazards, vapor treatment, 'shrinkers' and other problems, pp. 63-80  
Chapter VI - Lining and mounting with BEVA, pp. 85-108

## THINNER 372

A thinner expressly formulated for G. Berger's line of products.

**THINNER 372** is available in 5 litre and 25 litre cans.

## BEVA<sup>®</sup> O.F. 371 FILM / BEVA<sup>®</sup> 371 FILM

### COMPOSITION

As an improvement, our film is attached to a silicone-coated polyester film which makes both the film and the release sheet fully transparent.

BEVA<sup>®</sup> O.F. 371 FILM is made of pure G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 adhesive (solution) developed by G. A. Berger in 1970.

BEVA<sup>®</sup> O.F. 371 FILM comes sandwiched between a white silicone-coated paper and a silicone-coated Polyester film release sheet. The BEVA<sup>®</sup> O.F. 371 FILM and its polyester film release sheet are completely transparent and dimensionally stable.

### GENERAL FEATURES:

- BEVA<sup>®</sup> O.F. 371 FILM is solvent-free and does not produce any harmful solvent vapours during application.
- The transparent support allows the film to be cut precisely any shape and to place it exactly where desired. This is particularly useful in the consolidation of collages and sensitive materials.
- Since the BEVA<sup>®</sup> O.F. 371 FILM does not adhere to anything before it is activated with either heat or solvents, it can be inserted into loose areas and delaminating paint can be properly aligned while the adhesive is inactive. The adhesive is then activated with a hot air blower. This procedure eliminates any staining and is least harmful to the texture of the paint.
- BEVA<sup>®</sup> O.F. 371 FILM forms a cushion which prevents weave interference. A double layer of the film may be used where the weave is pronounced.
- BEVA<sup>®</sup> O.F. 371 FILM is ideally suited for transparent linings.
- BEVA<sup>®</sup> O.F. 371 FILM is equally useful for textile and paper conservators. Since it is not a liquid, it can be applied to small, clearly defined areas without fear of spreading.



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- BEVA<sup>®</sup> O.F. 371 FILM can be removed from absorbent surfaces by using hexane or acetone, provided these solvents do not damage the art work involved. These solvents do not dissolve the film but merely swell it and, therefore, do not contaminate or stain absorbent materials.

## INSTRUCTIONS FOR USE

### 1. Preparation of the Support

- Align the painting on the support and mark its outline on it.
- Cut a piece of the BEVA<sup>®</sup> O.F. 371 FILM to cover the outlined area.
- Remove the white cover sheet. The BEVA<sup>®</sup> O.F. 371 FILM remains on the inside of the polyester film release sheet (the Film side feels soft to the touch and looks slightly matte).
- Place the BEVA<sup>®</sup> O.F. 371 FILM on the outlined area of the support with the shiny polyester film to the outside.
- To transfer the BEVA<sup>®</sup> O.F. 371 FILM onto the support, heat your hot-table to 150°F (65°C) then use either vacuum, hand pressure, or roller.
- NO NEED FOR THE ADHESIVE TO DRY, YOU MAY PROCEED WITH LINING WITHOUT DELAY.

### 2. Preparation of the Painting

- Consolidate all loose paint.
- Close tears and holes.
- "Face" painting, if necessary.
- Remove the painting from its stretcher.
- Clean the back of the painting. Shave off any protruding knobs and extraneous materials. If the painting was lined before, remove old lining, adhesive, etc., in order to get the back of the original canvas as even as possible.
- Any necessary pre-treatment should be performed prior to lining.

### 3. Lining the Painting

- Place the prepared support on the hot-table, film-side up, and remove the silicone coated polyester film release sheet.
- Place the painting on the area covered by the BEVA<sup>®</sup> O.F. 371 FILM.
- Activate the BEVA<sup>®</sup> O.F. 371 FILM by raising the temperature to 150°F (65°C) to achieve an instant nap-bond.
- Cool under light pressure applied by hand, brush, roller, or vacuum.

### 4. Helpful suggestions

- If lining at temperatures lower than 150°F (65°C) is desired, the BEVA<sup>®</sup> O.F. 371 FILM should be sprayed lightly with naphtha or white spirit, after having been attached to the selected support. The sprayed BEVA<sup>®</sup> O.F. 371 FILM will become tacky like a contact cement and may be used as such at about 100-110°F (40-50°C). The painting can be mounted using hand or vacuum pressure. At this temperature, there is usually no danger to even the most delicate textures and paint films because at elevated temperature the canvas and paint film are sufficiently relaxed to allow for distortions to be eliminated with minimal pressure. A hot-air blower can be very useful for local treatments with the BEVA<sup>®</sup> O.F. 371 FILM. A firm bond will result after cooling and evaporation of the sprayed-on solvent.
- BEVA<sup>®</sup> O.F. 371 FILM has excellent adhesion to wax, although its strength will be greatly diminished.



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BEVA<sup>®</sup> O.F. 371 FILM if available in rolls, 69 cm. wide and 5 m, 25 m, 50 m long.

Two or more pieces of BEVA<sup>®</sup> O.F. 371 FILM may be joined by taping them together from the back of the polyester film release sheet.

## REFERENCES

G.A. Berger and W.H. Russell "Conservation of paintings: Research and Innovations":

Chapter III - Tears in canvas paintings and their proper closing, pp. 45-62

Chapter IX - Unconventional treatments for contemporary paintings : vacuum lining without a membrane, pp.149-174

## GUSTAV BERGER'S O.F. PVA INPAINTING MEDIUM

### COMPOSITION

Polyvinylacetate in alcohols and ketons.

### PRIOR RESEARCH

The use of PVA (AYAB) as a new inpainting medium and varnish for the restoration and conservation of Old Masters was introduced to the profession by Mario Modestini in 1953. It was a revolutionary method, extensively tested, which was since accepted by many leading museums and private conservators worldwide.

When the production of AYAB was discontinued, many professional began searching for an acceptable substitute. It seems that several researchers, working independently of each other, found Mowilith 20 to be such and acceptable substitute. However, the solvents and their proportions used in the various formulations and, particularly, the "know-how" differ greatly.

Having worked with the AYAB inpainting medium since its introduction to the profession, G. Berger developed a formula for Mowilith 20 which most closely resembles AYAB.

### INSTRUCTIONS FOR USE

G. BERGER'S O.F. PVA INPAINTING MEDIUM is sold in concentrate form containing 35% solids. For inpainting (retouching) it should be diluted in ethyl alcohol (1:4) to make a 7% solution of PVA (five times the quantity sold).

Because of the low surface tension of the PVA medium (and its high polarity) PVA wets dry pigments readily. Dry pigments are kept on the palette and mixed with inpainting medium as desired.

PVA is a strong adhesive and a 7% solution of G. BERGER'S O.F. PVA INPAINTING MEDIUM produces firm, lean, matte films, similar to gouache, which can be saturated (made to be shiny) by a thin coat of Paraloid B-67.

Any amount of G. BERGER'S O.F. PVA INPAINTING MEDIUM can be added to this pigment mixture to produce very saturated and transparent glazes.

Upon drying, even very saturated paints show no brush stroke, and flatten out to a very thin paint layer with little "paint build-up". Layers of INPAINTING MEDIUM can be separated from each other by local varnishing with Paraloid B-67. The retouched areas can also be consolidated by spraying with G. BERGER'S O.F. PVA INPAINTING MEDIUM or G. BERGER'S O.F. ISOLATING PVA SPRAY VARNISH. Although this method is not a complete isolation it permits the intermixing of paints "wet on wet".





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Small changes of the colour tone can also be accomplished by glazes with varnish or watercolour which, in turn, can be "fixed" with G. BERGER'S O.F. ISOLATING PVA SPRAY VARNISH. Thus, G. BERGER'S O.F. PVA INPAINTING MEDIUM can give a wide range of surface effects, from totally matte to high gloss.

G. BERGER'S O.F. PVA INPAINTING MEDIUM stays permanently reversible in alcohol, aromatic petroleum solvents and/or water of low alkalinity.

G. BERGER'S O.F. PVA INPAINTING MEDIUM is removable in alcohol, while retouches made with Paraloid B-72 require the use of toluene for their removal. Toluene is a stronger solvent than alcohol, and is more harmful to oil paintings than alcohol. In addition, the viscosity of G. BERGER'S O.F. PVA INPAINTING MEDIUM is lower than that of Paraloid B-72 - the only other stable synthetic medium used in conservation.

On hot, muggy days (under conditions of high R.H.) the solvents of all PVA's attract water from the air. This raises the viscosity of the inpainting medium which then becomes sticky and does not "wet" the surface properly. The addition of a few drops of acetone will help solve this problem.

Only a small amount of medium should be used at any given time, and the unused portion should be discarded at the end of each inpainting session.

#### **IMPORTANT NOTICE**

G. BERGER'S O.F. PVA INPAINTING MEDIUM is especially suited for the restoration of oil paintings, gouaches and tempera. This medium is not suited for most acrylic paintings which are usually soluble in alcohol.

**GUSTAV BERGER'S O.F. PVA INPAINTING MEDIUM** is available in 200 ml bottles.

#### **REFERENCES**

G.A. Berger and W.H. Russell "Conservation of paintings: Research and Innovations":  
Chapter XI - Inpainting Using PVA Medium: Mario Modestini's pioneering research, pp.191-216

## **GUSTAV BERGER'S O.F. ISOLATING PVA SPRAY VARNISH**

#### **COMPOSITION**

Polyvinylacetate in a mixture of polar organic solvents.

#### **INSTRUCTIONS FOR USE**

Fine inpainting (retouching) requires a large amount of painstaking work. Multiple coatings, fine glazes, delicate and intricate design is often necessary to compensate for damages in order to successfully imitate the original surface texture and rhythm of the painting.

However, fine glazes are easily damaged when, in an attempt to bring out the colour saturation of an Old Master painting, varnish is applied by brush. With this in mind G. BERGER'S ISOLATING PVA SPRAY VARNISH was designed to serve as a fixative for such retouches, and to protect fresh retouches when the painting is varnished.

G. BERGER'S ISOLATING PVA SPRAY VARNISH is a carefully balanced formulation of vinyl resins and fast drying solvents. It can be applied to a recently varnished painting without causing "spotting" or "orange peel".



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An application of G. BERGER'S ISOLATING PVA SPRAY VARNISH dries within 1-2 hours. Because a single layer of finishing varnish is often insufficient to achieve a uniform coat, the painting can be varnished again, as soon as the isolating spray has dried, using Beva O.F. Finishing Varnish, or any other varnish soluble in hydrocarbons.

Because its solvents are fast drying (alcohol, acetone, toluene, etc.) G. BERGER'S ISOLATING PVA SPRAY VARNISH can be applied to absorbent surfaces with minimal staining.

This means that many modern and contemporary paintings can be sprayed with it without causing a colour change. Following this isolation, additional coats of more low molecular varnishes, such as Paraloid B-67, can be applied.

Because its vinyl resins are colourless, stable, and clear, G. BERGER'S ISOLATING PVA SPRAY VARNISH can be used to 'isolate' acrylic paintings from any overpainting, or varnishing, which they might require for their protection.

Although the application of PVA on acrylics is irreversible, such an isolating coating might nevertheless prove useful as a protection for the surface of these paintings, since PV A's do not change or discolour.

#### **IMPORTANT NOTICE**

G. BERGER'S ISOLATING PVA SPRAY VARNISH is a carefully balanced mixture of vinyl resins and solvents formulated to produce an even, cohesive film when sprayed at 40 lb air pressure. For best results, it should be sprayed as supplied, without further dilution or additives.

**GUSTAV BERGER'S ISOLATING PVA SPRAY VARNISH** is available in 1 l bottles.

#### **REFERENCES**

E.R. de la Rie and C.W. McGlinchey, 'New Synthetic Resins for Picture Varnishes', Preprints of Contributions to the IIC Congress in Brussels (1990). pp.168 - 173

G.A. Berger and W.H.Russell "Conservation of paintings: Research and Innovations":  
Chapter XI - Inpainting Using PVA Medium: Mario Modestini's pioneering research, pp.191-216,

## **BEVA® O.F. FINISHING VARNISH**

#### **COMPOSITION**

Polycyclohexanone and ethylene vinyl acetate in hydrocarbon solvents.

#### **INSTRUCTIONS FOR USE**

BEVA® O.F. FINISHING VARNISH is a stable, colourless, reversible varnish, made from cyclohexanone resins dissolved in especially purified low-aromatic solvents.

BEVA® O.F. FINISHING VARNISH was designed primarily for use in the conservation and inpainting of Old Masters. It was formulated to achieve:

- \* Optimal wetting and penetration to enhance and bring out the colours.
- \* Lowest possible solvent action on the original paint film.
- \* Lowest possible solvent action on the materials used for inpainting.
- \* Maximum resin content for best covering power.
- \* Minimum yellowing with age.

BEVA® O.F. FINISHING VARNISH dries into a film which has excellent flattening properties. If levelling of surface irregularities is required, BEVA® O.F. FINISHING VARNISH can be "rubbed" by hand, when dry, just like mastic or dammar.



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## REVERSIBILITY

BEVA<sup>®</sup> O.F. FINISHING VARNISH can be removed with purely aliphatic solvents during the first few weeks following application with a minimal effect on the inpainting, be it old or recent. Thereafter, the varnish remains easily soluble in naphta or low-aromatic solvents for 20-30 years of normal exposure to life.

BEVA<sup>®</sup> O.F. FINISHING V ARNISH is available in 1 litre cans.

## REFERENCES

G.A. Berger and W.H. Russell "Conservation of paintings: Research and Innovations":  
Chapter XI - Inpainting Using PVA Medium: Mario Modestini's pioneering research, pp.191-216.

## BEVA<sup>®</sup> O.F. D-8-S

### COMPOSITION

Ethylene vinyl acetate, polyvinylacetate and polyvinylalcohols in aqueous dispersion.

BEVA<sup>®</sup> O.F. D-8-SPECIAL - With Prof. Berger's permission materials available in Europe were substituted for the American materials.

### INSTRUCTIONS FOR USE

#### 1. Description

BEVA<sup>®</sup> O.F. D-8-S is an aqueous, non-ionic dispersion which consists mainly of an ethylene vinyl acetate emulsified by a volatile material which evaporates during drying, without leaving a residue. Application in dispersion permits the use of resins of still higher viscosity and greater flexibility than G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371. However, BEVA<sup>®</sup> O.F. D-8-S requires more aromatic mixtures for removal than G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371. An emulsion, it is sensitive to freezing, and should be stored with this in mind.

BEVA<sup>®</sup> O.F. D-8-S contains 55% of solid resins, and therefore solidifies rapidly when applied to porous materials.

#### 2. Aging and reversibility

BEVA<sup>®</sup> O.F. D-8-S dries to a clear, colourless film which is not soluble in water. It was tested extensively and found to be removable in toluene and xylene. After prolonged accelerated aging its solubility increases, and BEVA<sup>®</sup> O.F. D-8-S becomes soluble also in alcohol, indicating that during aging the breakage of crosslinks exceeds their formation. Mixtures of toluene, alcohol, and mineral spirits will remove BEVA<sup>®</sup> O.F. D-8-S from porous materials without leaving a residue.

#### 3. Strip-lining with BEVA<sup>®</sup> O.F. D-8-S

The adhesive strength and flexibility of BEVA<sup>®</sup> O.F. D-8-S makes it useful for strip-lining.

Apply a heavy coat of BEVA<sup>®</sup> O.F. D-8-S, approx. 1.2 cm-wide to both fabrics about to be joined.

If the painting is very sensitive to water, G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 should be applied to the edge of the painting instead of BEVA<sup>®</sup> O.F. D-8-S.

After a short drying period (about 15 minutes) when BEVA<sup>®</sup> O.F. D-8-S becomes transparent but is still tacky and slightly milky, the strip-lining is glued to the edges of the painting using an iron set to 180-200°F (82-90°C).



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#### 4. Using BEVA<sup>®</sup> O.F. D-8-S in lining of certain paintings

For safety reasons, no aqueous adhesive should ever be applied directly to the reverse of any canvas painting. This includes BEVA<sup>®</sup> O.F. D-8-S.

In exceptional cases, the back of the painting may be isolated with PVA solution, Paraloid B-72, or G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 then coated with BEVA<sup>®</sup> O.F. D-8-S.

BEVA<sup>®</sup> O.F. D-8-S can be substituted for Plextol B-500 (Primal AC-33) in cold linings, using the method described by V. Mehra.

The formula of BEVA<sup>®</sup> O.F. D-8-S can be modified to produce a water-reversible adhesive for facing and lining of mural paintings.

#### 5. Using BEVA<sup>®</sup> O.F. D-8-S for textiles and heat-sealing

BEVA<sup>®</sup> O.F. D-8-S is useful for hand ironing and textiles. Its high viscosity gives it strong tack, and prevents the adhesive from penetrating into the art objects to which it adheres.

In heat-sealing, BEVA<sup>®</sup> O.F. D-8-S does not have the strong, instant grip of G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 nor does it adhere to as many materials. These qualities, however, can be achieved by adding a thin coat of diluted G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 in toluene (1:4) to the sandwich layer prepared with BEVA<sup>®</sup> O.F. D-8-S, or by coating the back of the painting or textile with G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371. Such 'priming' with G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 is best applied only 30-60 minutes before ironing.

G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 may be applied to the back of the painting, or textile, by spraying.

Alternating layers of BEVA<sup>®</sup> O.F. D-8-S and G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 produce laminates which combine the best qualities of both adhesives: the high viscosity and flexibility of BEVA<sup>®</sup> O.F. D-8-S and the strong tack and easy reversibility of G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371.

#### 6. Helpful hints

It is advisable to prepare sandwich layers with BEVA<sup>®</sup> O.F. D-8-S in large sizes, as the last operation of the day. By doing so, the conservator does not clutter up working space, and avoids exposure of the sticky surface to dust which may be raised by other activities in the studio. Dry Beva-coated sandwich layers can be stored indefinitely, always ready for use.

**BEVA<sup>®</sup> O.F. D-8-S** is available in 1 litre and 5 litre bottles.

#### **REFERENCES**

G.A. Berger and W.H. Russell "Conservation of paintings: Research and Innovations":  
Chapter XII – Special projects, pp. 217-243

## **BEVA<sup>®</sup> O.F. GEL**

#### **COMPOSITION**

Ethylene vinyl acetate and acrylic resins in aqueous dispersion.



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## INSTRUCTIONS FOR USE

BEVA<sup>®</sup> O.F. GEL is a newly developed aqueous dispersion of ethylene vinyl acetate and acrylic resins. In its pure form or diluted with water BEVA<sup>®</sup> O.F. GEL is an excellent water-based adhesive dispersion, easy to apply, with good slip and adhesion to a very wide range of surfaces.

When partially dried, it becomes a stiff gel. In this form, BEVA<sup>®</sup> O.F. GEL turns into a strong contact adhesive with excellent adhesion to canvas, polyester and Beva-coated surfaces.

When fully dried, BEVA<sup>®</sup> O.F. GEL turns into a heat-seal adhesive, with the same low-activation temperature as G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 (60-65 °C, 150-160 °F).

BEVA<sup>®</sup> O.F. GEL, G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 and BEVA<sup>®</sup> O.F.D-8-S adhere to each other in every form of application.

The following procedure is recommended when using BEVA<sup>®</sup> O.F. GEL as a contact adhesive:

1. Prepare the surfaces about to be adhered to make them as smooth and clean as possible.
2. Prime the reverse of the painting to be adhered with an isolating coat of G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 about 2-3 hours prior to application of BEVA<sup>®</sup> O.F. GEL.
3. Mark the outline of the painting on the new support (make register marks).
4. Coat the new support with a heavy layer of BEVA<sup>®</sup> O.F. GEL and let it dry until tacky (30-60 minutes) depending on the temperature and R.H.
5. Place painting between the register marks and apply light pressure over all of its surface using tampons, soft rollers, vacuum or other means as the case may require.
6. Let the laminate dry for at least 48 hours in a horizontal position.

## REVERSIBILITY

BEVA<sup>®</sup> O.F. GEL can be reversed with water, toluene, xylene, iso-propyl alcohol or ethanol. This fact facilitates clean-up and corrections.

Spraying with any or all of the above solvents reverts the dried adhesive back to the gel form and makes it reusable as a contact adhesive.

BEVA<sup>®</sup> O.F. GEL contains high-molecular-weight polymers which give it the desired tackiness and the retention of solvents necessary for an effective contact adhesive. For these reasons, it dissolves only slowly. Aging tests have shown that due to cross-linking and chain-breaking, BEVA<sup>®</sup> O.F. GEL becomes less soluble in toluene and more soluble in isopropyl alcohol after prolonged aging under UV radiation.

If the effect of any of the solvents (water, toluene, xylene, isopropyl alcohol or ethanol) needed to reverse the BEVA<sup>®</sup> O.F. GEL lining is undesirable, or the time required is objectionable, the solution is to coat the surfaces to be joined with a layer of G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 first. This makes it possible to remove the lining using heat or benzene or the THINNER 372, if and when necessary.

## IMPORTANT NOTICE



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BEVA<sup>®</sup> O.F. GEL was designed to be used in cases where heat application is not desirable. It is quite effective as a contact adhesive which is made heat-reversible by the use of a G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371 interlayer.

In cases where the application of heat is not desirable even for the removal of BEVA<sup>®</sup> O.F. GEL (the reversibility of the treatment), then low-aromatic solvents will remove the G. BERGER'S ORIGINAL FORMULA<sup>®</sup> 371.

BEVA<sup>®</sup> O.F. GEL was designed for modern paintings which cannot be treated with heat or are too large to be treated with the help of heat.

BEVA<sup>®</sup> O.F. GEL is a good all-around adhesive paste for papers and textiles.

**BEVA<sup>®</sup> O.F. GEL** is available in 1 litre and 5 litre bottles.

#### REFERENCES

G.A. Berger and W.H.Russell "*Conservation of paintings: Research and Innovations*":

Chapter IX – Unconventional treatments for contemporary paintings: vacuum lining without a membrane, pp. 149-174