

MATERIAL FOCUS

Lascaux 4176 Medium for Consolidation

Sally Marriott

History and use

In 2004 *Lascaux Colours* and *Restauro* first marketed their 'Medium for Consolidation' as a direct replacement for BASF's discontinued 'Acronal 300D' (acrylic copolymer dispersion). The adhesive was developed in cooperation with the Swedish National Heritage Board following the discontinuation of Acronal 300D, due to lack of industrial demand. Acronal 300D was introduced by BASF in the 1960s as an industrial adhesive to laminate paper. However, it was soon adopted for other applications on account of its excellent capillary properties, quick drying time and adhesive strength; properties which made it highly suitable for the consolidation of paintings and water sensitive gilt surface.¹ Following the discontinuation of Acronal 300D, Lascaux were approached to develop an alternative product to suit conservation needs, with the consolidation of medieval polychromy specifically in mind.



Since its introduction, Lascaux 4176 has made its way on to the shelves of many conservation studios and museum departments. It is purchased as a thin liquid, ready for immediate use in 250ml, 500ml and 1litre bottles, making it extremely convenient, particularly when working in situ. In practical terms, the growing popularity of Lascaux 4176 is partly due to the fact that solvents are not required. It has excellent penetration and adhesive strength and can be used on a variety of surfaces, with little, if any, affect on the saturation of the surrounding paint following clearance.

According to Lascaux

"The Medium for Consolidation has excellent penetrating power due to its low viscosity. This allows for the safe and efficient consolidation of loose and chalking paint layers, even on water sensitive surfaces such as gilding or thin layers of distemper. These can be consolidated without swelling or spotting on wooden or textile supports".²

Composition

According to manufacturer's details, Lascaux 4176 is composed of a fine aqueous dispersion of acrylic copolymer, based on acrylate ester, styrene and methacrylate ester. In 2004, The Royal Institute of Technology, Stockholm, carried out research in order to ascertain the constituents and ageing properties of the adhesive. With the aid of Py-GCMS analysis³, the monomer constituents were identified as butyl acrylate, methyl acrylate, methylmethacrylate and styrene. Like most polymer dispersions, Lascaux 4176 was also found to contain various additives (3%) and solvents (2%), including non-ionic surfactants, de-foamers and fungicide.

General properties

Despite the low viscosity of Lascaux 4176 when used at full strength, it can be thinned with water if necessary. Due to its excellent penetration capabilities and adhesive strength, very little adhesive is generally required. After application through tissue,

brush or syringe, as appropriate, Lascaux 4176 dries to a clear and flexible film. According to the manufacturer's details, the minimum film formation temperature (MFT) of the adhesive is approximately 4°C and it has a pH of approximately 8.5 (at full strength).

Solubility

After curing, the adhesive is soluble in aromatic hydrocarbons, esters, and ketones. However, in practice residues left on the paint surface can be easily removed with saliva up to 24 hours after application.

Stability

Results of accelerated ageing tests published by Hedlund and Johansson⁴ suggest that Lascaux 4176 is a suitable material for conservation. Accelerated ageing was carried out in Stockholm using a QUV Accelerated Weathering Tester⁵, in which samples were exposed to direct water contact, a humid environment, heat (60°C) and UV radiation for a maximum of 1500 hours. Results of these tests found the adhesive to exhibit good stability and indicated that it is non-yellowing. In 2005, further tests were carried out by James Parker at the British Museum; the results of which were published that year.⁶ These also found Lascaux 4176 to remain readily soluble and exhibit minimal yellowing following aging. The aged samples were found to have become more acidic, yet on the basis of the results as a whole, the adhesive was considered suitable for use in conservation.⁷

Case Study from Polly Saltmarsh**(Sally Woodcock Paintings Conservation, Cambridge)**

I used Lascaux 4176 during the treatment of paintings in St Botolph's Church, Cambridge, while working with a team of conservators during a large site project run by Tobit Curteis Associates and Sally Woodcock Paintings Conservation.

The chancel and the east wall of the church were redecorated in the 19th century to a design by George Frederick Bodley. A large painting on canvas hangs at the apex of the east wall and, due to its scale, the work was treated in situ and accessed by scaffolding. The unvarnished paint layer was thought to be in an oil medium, although it had a very matt, dry appearance. It was in a stable condition except for one large area on the lower right side, which had suffered from extensive paint de-lamination and flaking. This was likely to have been caused by local water infiltration, resulting in the failure of adhesion between the ground layer and the canvas support. The affected area had large passages of loss where the canvas was exposed and the remaining flakes of paint were extremely raised.

Due to the uncontrolled environment within the church, traditional adhesives such as isinglass and gelatine were not considered appropriate, as they can promote mould growth, especially in areas that have suffered water damage. Instead Lascaux 4176 was chosen as a suitable adhesive due to its low viscosity and matte finish. As it requires no preparation (such as warming or diluting), it was well-suited to use on site. A fine brush was used to feed the consolidant into the cracks between the raised paint flakes. These were then gently massaged back into place using a heat-controlled spatula and silicon release

paper.

Lascaux 4176 was very successful in this instance. It is useful for treating church paintings, as an acrylic polymer is more stable in an uncontrolled environment than traditional animal-based adhesives. It was found to be easy to control and application could be very precise. The fine dispersion meant that it was quickly drawn away from the paint surface to the critical area under raised paint flakes. When used sparingly, the adhesive matched the matt surface of the paint layer. The only drawback was the build-up of excess adhesive on the surface, created during the reattachment of the most severely raised flakes. This caused increased saturation and gloss, although it was possible to remove some of this excess using acetone rolled over the affected area with a cotton swab. However, due to the sensitive nature of the paint layer it was not possible to remove all the residues.

Case Study from Janet Brough (Brighton and Hove Museum Services)

Consolidation of paint layers is often one of the most difficult and tedious tasks conservators face. Additions to the consolidant range are always useful, and Lascaux 4176 was first brought to my attention by Sophie Rowe, an ICON accredited conservator who specialises in the conservation of organic artefacts, particularly ancient Egyptian material. Personally my preference is for traditional adhesives, such as sturgeon glue, as they are normally very effective in penetrating layers of paint. There are occasions however when they are not suitable. For instance when a rigid support has shrunk and a gap exists underneath the paint flakes, animal glues do not always provide the level of cushioning and support needed.

When asked to contribute a piece for 'The Picture Restorer', I thought it might be interesting to see how 4176 behaved as a consolidant for a painting on a flexible support. 'The Picnic' by Marjorie Brookes was flaking very badly; it had a very powdery ground, and areas of canvas shrinkage and tented paint. It would have been difficult to draw an aqueous consolidant through the canvas at the edges without first removing the stretcher. I also wanted to avoid using heat, as this may have damaged the impasto.

Lascaux 4176 was applied to each flake with a brush, using the stereomicroscope. Used neat, and without any suction from the reverse, it was immediately drawn into the very narrow cracks and the void between paint and canvas. The glue was drawn into the canvas fibres as well; a dilute solution in effect acted as a size, before introducing the final consolidant. It caused some staining on the reverse along the line of the cracks, although it didn't spread into surrounding areas.

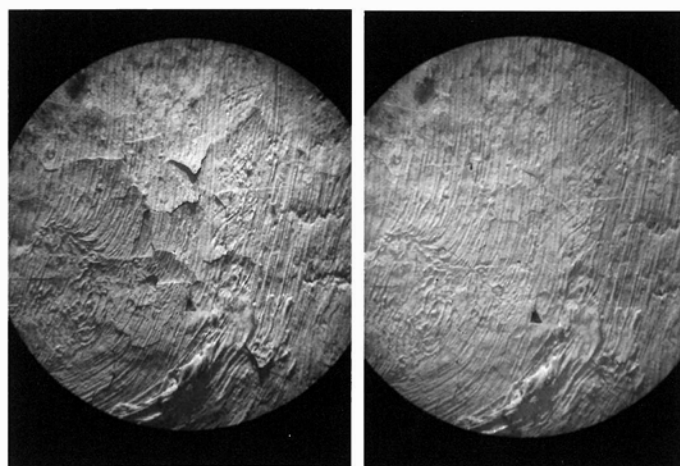
Consolidation was carried out before cleaning, so that the dirt layers would act as a release layer, separating the adhesive from the paint surface; excess adhesive was removed immediately before it could dry. The water in the consolidant softened the paint and ground layers, so that after a minute or two the flaking area could be rolled with a damp swab to remove excess adhesive from the cracks and assist in the flake laying process. The consolidant seemed to support the loose paint immediately; the area was then covered and weighted for several hours.

Lascaux 4176 appeared to work very well, with the flakes well stuck and no apparent changes to the impasto or to the colour of

the paint. However, a disadvantage is the necessity to protect paint surfaces from excess consolidant during treatment. If the surface is sensitive to water, or cannot be cleared with solvents, 4176 may not be suitable (unless the work is done in such a localised manner, that no excess consolidant reaches the surface).

Consolidants that form a solid film when dry serve to support fragile paint when the support has shrunk, but on a flat work of art any adhesive left under the paint surface may be visually disturbing, so it is important to remove all excess adhesive before drying. Also, dried glue may appear as a shiny line in wide cracks in the paint layer.

Some conservators may feel that any acrylic-based material is unsympathetic as a replacement consolidant for deteriorated protein layers. Certainly acrylics do not age in the same way as traditional animal product glues. Although more research is needed before 4176 precludes the use of other consolidants, there are clearly many instances where it has the potential to be extremely useful.



Details of flaking paint at lower left of 'The Picnic' before treatment (left) and after treatment (right), circa 40x magnification

Notes:

¹Hans Peter Hedlund and Mats Johansson 'Prototypes of Lascaux's Medium for Consolidation: Development of a new custom-made polymer dispersion for use in conservation', *Restauro*, Volume 6, 2005, p.432.

²<http://www.lascaux.ch/english/restauro/pdf/58351.02.pdf>. ³GCMS carried out by Bronwyn Ormsby at Tate, London, 2004 (see Hedlund and Mats Johansson op.cit.) ⁴Hedlund and Johansson op.cit., p.432-439. ⁵QUV Accelerated Weathering Tester from Q-Panel was used to artificially age samples of Lascaux 4176 (applied as thin coatings on aluminum plates), by exposing the samples to 4 minutes of direct water spray, 4 hours at 50°C in a humid atmosphere and UV-A-irradiation at 60 °C for 4 hours with an intensity of 0.63 W/m². This sequence was then repeated for periods of 500, 1000 and 1500 hours respectively. See Hedlund and Johansson op.cit., p.436. ⁶James Parker 'Testing adhesive emulsions for use in the conservation of ethnographic artefacts', *Conservation News*, May 2005, Issue 96, p.24-27. During this study, heat and light ageing were undertaken on samples prepared as thin films, which were exposed to 70°C in a convection oven and a Microscopical light fastness tester for 28 days. ⁷Parker J. op.cit., p.26-27.

Suppliers:

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LASCAUX COLOURS & RESTAURO: Barbara Diethelm AG, Zürichstrasse 42, CH-8306 Brüttsellen, Switzerland (Tel 0041 44 807 41 41, Fax 0041 44 807 41 40, info@lascaux.ch).

TALAS ONLINE: www.talasonline.com.

Further reading:

Lascaux 4176 'Medium for Consolidation' Material Safety Data Sheet: http://talasonline.com/photos/msds/Lascaux_Medium_for_Consolidation%20_MSDS.pdf.