



CONSTGLASS



Table of results

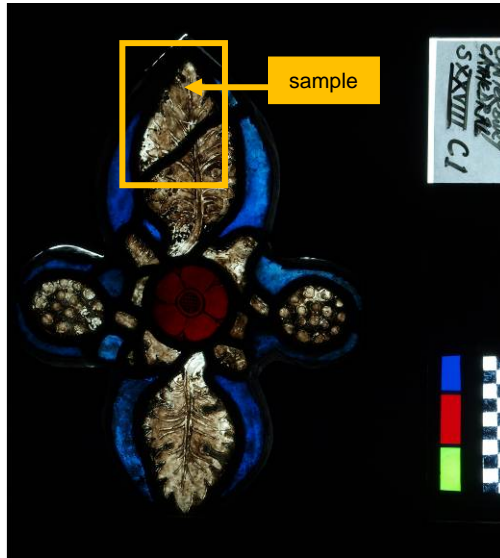


1-Pilot object

Pilot object:

Canterbury Cathedral CAN SXXVIII C1

Picture



Identification of the panel: CAN SXXVIII C1

Treatment:

Product: Polymer coating, possibly Viacryl® + Desmodur®.

Application: Probably applied with a brush.





CONSTGLASS

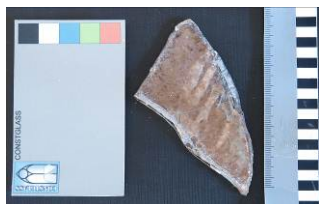
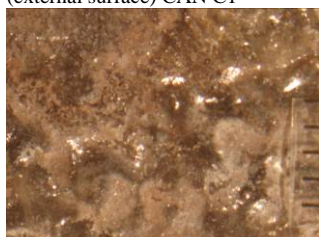


Table of results



2-Results

sample reference: CAN SXXVIII C1 External side

Questions	Techniques	Answers
<p>Morphology</p> <p><i>What is the physical appearance of the coating?</i></p> <p><i>Is the coating stable?</i></p>  <p>Sample sent for analysis to LHRM (external surface) CAN C1</p>  <p>Coating under optical microscope (external) CAN C1</p>	<p>Optical Microscope</p>	<p>Smooth, glossy, transparent surface. Fills all the pits and / or texture on the glass.</p> <p>It is very stable and solid.</p> <p>No visible deterioration of the film. It is uniform and smooth. There is no visible discolouration or loss of transparency. The support is a post-medieval glass with an irregular surface but not altered. Microscope observations reveal some little bubbles, but only on the glass interface. The adherence of the coating is good.</p>
	<p>Desktop tomography</p>	<p>n/a</p>
	<p>Phase-contrast tomography on Synchrotron</p>	<p>n/a</p>
<p>Chemical Composition</p>	<p>SEM</p>	<p>Not interesting for this investigation</p>
<p>Organic component composition</p> <p><i>What is the chemical composition of the coating?</i></p> <p><i>Is it Viacryl®?</i></p> <p><i>Is it Viacryl®? What is the ratio of Viacryl® and Desmodur®?</i></p> <p><i>Has the coating degraded or changed in any way?</i></p>	<p>FTIR (LRMH)</p>	<p>No conclusion on the composition of the polymer. It is close to Viacryl®. It was compared to other possible consolidants (Paraloid®, Motena®, Sinmast®, Primal®, Mastic® and Silicon spectra®) but none correspond to LRMH spectrum. The composition corresponds to an aliphatic amide.</p> <p>No visible deterioration of the coating. It is uniform and smooth.</p>
	<p>Molecular biology ATP measurements</p>	<p>No microbial infestation visible.</p>



CONSTGLASS



Table of results



Microbiology

**Test studies
Elimination**

Area selected for reversibility test with similar coating on CAN C1



C1 full panel reverse



C1 Coating



C1 Coating under optical microscope before reversibility test

Dichloromethane + Klucel G solvent gel in compress / poultice

Duration	Result
1 minute	Softened – removable with a scalpel. Gel has already become firmer.
5 minutes	The coating has gone white and started lifting from the glass.
10 minutes	Lifting off further – easily removable with a scalpel.
Reapplied fresh gel.	Softer and lifting off further.
ed 10 minutes later	
30 minutes	Flakier, could be removed with cotton wool swabs moistened with dichloromethane.
60 minutes	Gel had dried out, and flaky coating could be brushed away with a bristle brush. Some coating remaining in pits could be removed with a cotton wool swab moistened with dichloromethane.

Dichloromethane gel compress: Stages



1 Japanese paper application



2. Solvent gel application



3. Absorbent pad application



4. Melinex® sheet application



5. Removal of compress



6. Remaining flakes of coating brushed off



CONSTGLASS



Table of results



Reversibility (A)

How can we remove the coating without damage to the paint layer?

What method and solvent can we use?

Is the coating stable?

How are the solvents reacting with the glass corrosion, putty or lead?

How do we remove all trace of the solvent?

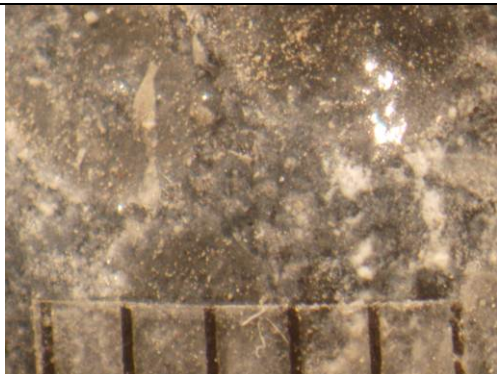
Test studies Re-treatability

No need. No treatment recommended.

Re-treatability

Do we need to re-treat the glass?

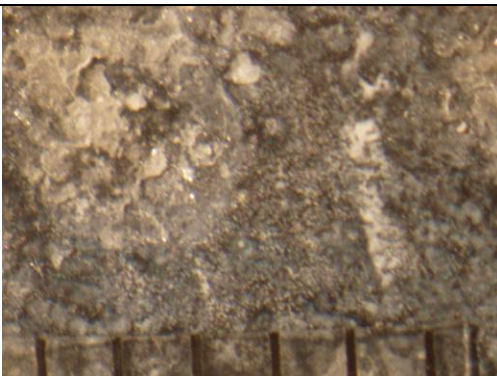
The piece of sample glass separated into two parts along the previously bonded break line, when it was under observation in the LHRM laboratory.



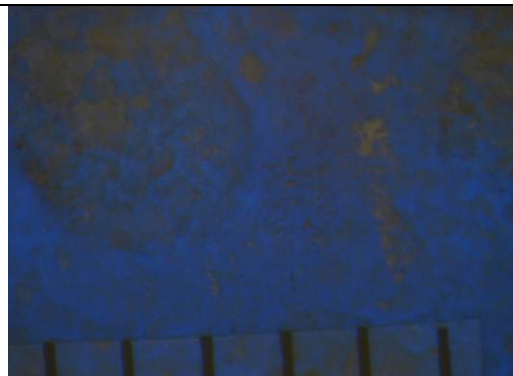
Before reversibility test in reflected light



Before reversibility test in transmitted light



After reversibility test in reflected light



After reversibility test in transmitted light



CONSTGLASS



Table of results



Reversibility (B)

How can we remove the coating without damage to the paint layer?

What method and solvent can we use?

Is the coating stable?

How are the solvents reacting with the glass corrosion, putty and lead?

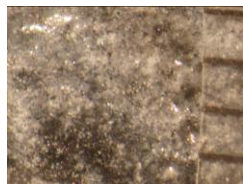
How do we remove all trace of the solvent?

Test studies Elimination

Area selected for reversibility test with similar coating on CAN C1



C1 Coating



C1 Coating under optical microscope before reversibility test

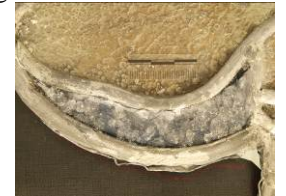
Ethanol + Klucel G solvent gel in compress / poultice.

Duration	Result
1 minute	Softened – removable with a scalpel
5 minutes	Further softened
10 minutes	Softer but still in place. Ethanol had been absorbed into pad or evaporated.
Reapplied fresh gel. Then observed 10 minutes later	Ethanol had all been absorbed into pad or evaporated, so fresh gel was applied using a thinner absorbent material.
30 minutes	Soft but still in place
60 minutes	Soft but still in place. Gel still moist
4hrs	Fresh gel re-applied
6hrs	Coating on surface removed, coating remaining in etched pits

Ethanol gel compress: Stages



1. Japanese paper application



2. Solvent gel application



3. Absorbent pad application



4. Melinex® sheet application



5. Removal of compress



6. Flake of coating remaining



7. Flakes brushed off



8. Final swab clean with Ethanol



CONSTGLASS



Table of results

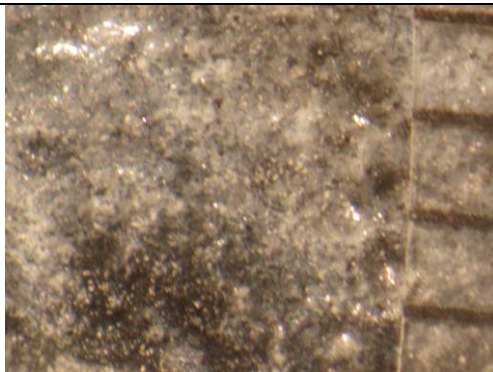


Retreatability

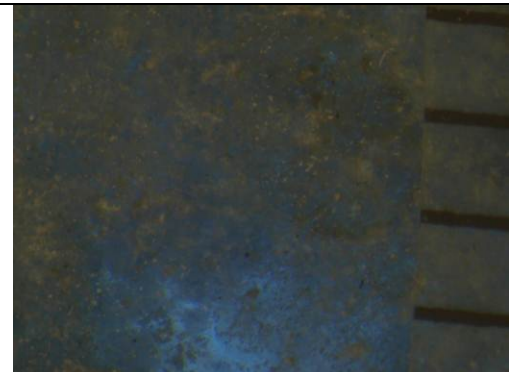
Do we need to re-treat the glass?

Test studies Re-treatability

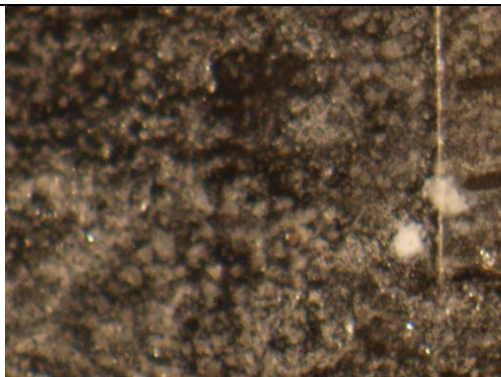
No need. No treatment recommended.



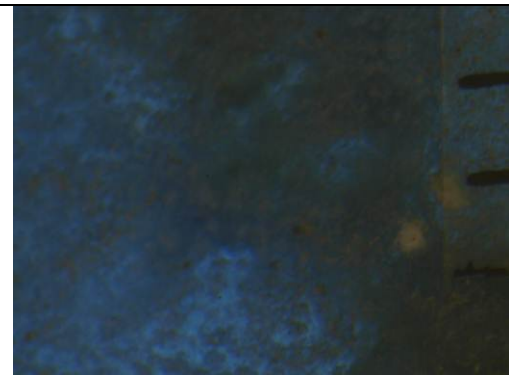
Before reversibility test in reflected light



Before reversibility test in transmitted light



After reversibility test in reflected light



After reversibility test in transmitted light





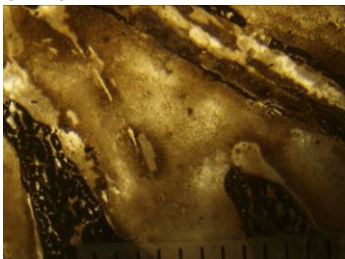
CONSTGLASS



Table of results



sample reference:	CAN C1 (inside)
--------------------------	-----------------

Questions	Techniques	Answers
<p>Morphology</p> <p><i>What is the physical appearance of the coating?</i></p> <p><i>Is the coating stable?</i></p>  <p>Fragment for Sample sent for analysis to LHRM (internal surface) CAN C1</p>  <p>Coating under optical microscope in reflected light (internal) CAN C1</p>  <p>Coating under optical microscope in transmitted light (internal) CAN C1</p>	<p>Optical Microscope</p>	<p>Smooth, glossy, transparent surface.</p> <p>It is very stable and solid.</p>
	<p>SEM</p>	<p>No visible deterioration of the film. It is uniform and smooth. There is no visible discolouration or loss of transparency. The support is a glass with black trace line paint and recovered by a brown matt. Glass paint is cracked or missing, with deposits between cracks.</p>
	<p>Desktop tomography</p>	<p>n/a</p>
	<p>Phase-contrast tomography on Synchrotron</p>	<p>n/a</p>



CONSTGLASS



Table of results



<p>Chemical Composition</p> <p><i>What is the chemical composition of the coating?</i></p> <p><i>Is it Viacryl®?</i></p> <p><i>Is it Viacryl®? What is the ratio of Viacryl® and Desmodur®?</i></p> <p><i>Is it the same coating on both the external and internal surface?</i></p>	<p>FTIR (LRMH)</p>	<p>The coating could be a mixture of Primal®, Viacryl® and the component in the polymer on the external surface.</p>
<p>Organic component composition</p> <p><i>Has the coating degraded or changed in any way?</i></p>	<p>Results from LHRM SEM</p>	<p>No visible deterioration, discolouration or loss of transparency of the coating.</p>
	<p>RAMAN</p>	<p>n/a</p>
<p>Microbiology</p>	<p>Molecular biology ATP measurements</p>	<p>No microbial activity was visible under optical microscope.</p>
<p>Reversibility</p>	<p>Test studies Elimination</p>	
<p>Retreatability</p> <p><i>Do we need to re-treat the glass?</i></p>	<p>Test studies Re-treatability</p>	<p>No need. No treatment recommended.</p>