



CONSTGLASS



Table of results



1- Pilot Object

Pilot object:	The <i>Last Judgement</i> , BOURGES	Bay 4, panel 15
Picture	<p>© LRMH</p> <p>© LRMH</p>	<p>Identification of the panel :</p> <p>Bay : 4 Panel : 15</p> <p>Internal face, transmitted light External face, reflected light</p> <p>Green lines locate the pieces compared to those of panel 13.</p> <p>Treatment : none</p>

2-Results

Sample reference:	<i>BOU_b4p15_E_v1 to v5 : glasses with uniform alteration layer</i>
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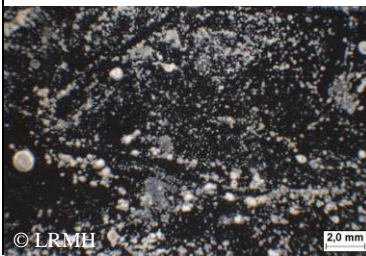
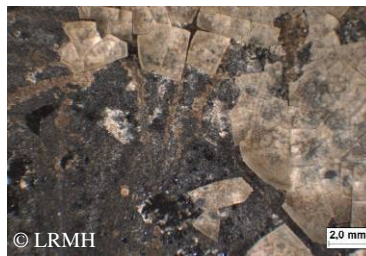

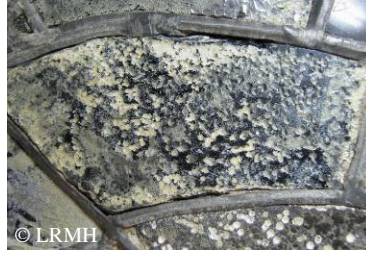
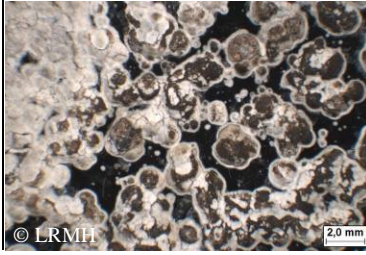
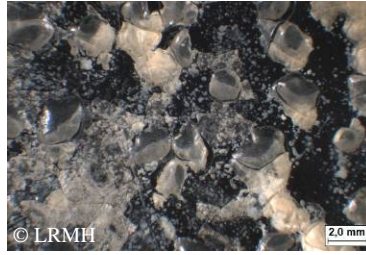
Questions	Techniques	Answers	
		b4p15 : no protection	b4p13 : protected by Viacryl
<p>Morphology</p> <ul style="list-style-type: none"> - What is the degree of alteration of the glasses? - Is it more or less altered than protected panel in the same registry? 	<p>Optical Microscope</p>	<p>© LRMH</p>	<p>© LRMH</p>
		<p>© LRMH 2.0 mm</p> <p>v1 - White glass</p>	<p>© LRMH 2.0 mm</p> <p>White glass</p>


		b4p15 : no protection	b4p13 : protected by Viacryl® 1
		 <p>© LRMH</p>	 <p>© LRMH</p>
		 <p>© LRMH</p> <p>2.0 mm</p>	 <p>© LRMH</p> <p>2.0 mm</p>
		<p><i>v2 - Beige glass</i></p>  <p>© LRMH</p>	<p><i>Beige glass</i></p>  <p>© LRMH</p>
		 <p>© LRMH</p> <p>2.0 mm</p>	 <p>© LRMH</p> <p>2.0 mm</p>
		<p><i>v3 - Dark red glass</i></p>  <p>© LRMH</p>	<p><i>Dark red glass</i></p>  <p>© LRMH</p>
		 <p>© LRMH</p> <p>2.0 mm</p>	 <p>© LRMH</p> <p>2.0 mm</p>
		<p><i>v4 - Red glass</i></p>	<p><i>Red glass</i></p>



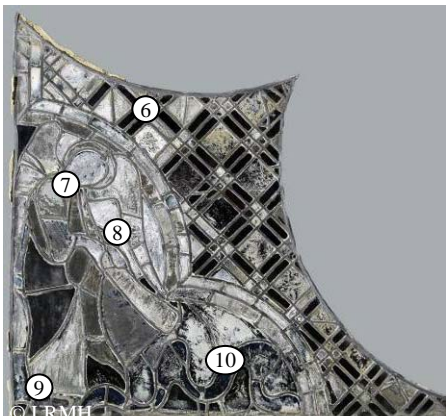
		b4p15 : no protection	b4p13 : protected by Viacryl
		<p>© LRMH</p>	<p>© LRMH</p>
		<p>© LRMH 2.0 mm</p> <p>v5 - Yellow glass</p>	<p>© LRMH 2.0 mm</p> <p>Yellow glass</p>
		<p>Whatever the colour of the glass (red, dark red, yellow, beige or white), a uniform alteration layer (crust) was developed. It is brownish, except on beige glass where it is white only.</p> <p>This crust is thin, that means the glasses were cleaned during a previous restoration (1853 or 76?).</p>	<p>The weathering of glass restart between flakes and where coating disappeared: white and brown corrosion products are growing. Running water may cause the first phenomenon because it is drying more slowly under the coating and create a humid confined area.</p> <p>The protection of the pieces by the coating is no more effective, except under the Viacryl® still adhesive.</p>

Sample reference: BOU_b4p15_E_v6 & v7 : glasses with alteration by craters

Questions	Techniques	Answers			
		b4p15 : no protection	b4p13 : protected by Viacryl		
<p>Morphology</p> <ul style="list-style-type: none"> - What is the degree of alteration of the glasses? - Is it more or less altered than protected panel in the same registry? 	<p>Optical Microscope</p>	 <p>© LRMH</p>	 <p>© LRMH</p>		
		 <p>© LRMH 2.0 mm</p>	 <p>© LRMH 2.0 mm</p>		
		<p>v6 - Red glass</p>		<p>Red glass</p>	
		 <p>© LRMH 10 mm</p>	 <p>© LRMH</p>		
		 <p>© LRMH 2.0 mm</p>	 <p>© LRMH 2.0 mm</p>		
		<p>v7 - dark blue glass</p>		<p>Dark red glass</p>	
<p>Craters are only on some glasses at various stage of alteration.</p> <p>The dark blue piece is severely weathered, nearly without "healthy" glass remaining. This is the only case on this panel.</p>		<p>The glasses compared show the Viacryl® has a protective action on the glass. Of course there is a new type of alteration on the dark red glass (network of brown products under the cracks), but no craters appears.</p>			

	<h1>CONSTGLASS</h1>	
<h2>Table of results</h2>		

Sample reference	Microbiology tests
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Questions	Techniques	Answers
<p>Microbiology</p> <ul style="list-style-type: none"> - Is there a biological contamination? - Is there an active infestation?  <p>© LRMH</p>	<p>Molecular biology ATP measurements</p> <p>(Microscopical analysis, metabolic activity and taxonomical description of microorganism)</p>	<p>No consolidation treatment (in storage, 5 samples):</p> <ul style="list-style-type: none"> - accumulation of dust and dirt, no visible fungal infestation - medium metabolic activity (ATP Ø 208 RLU/25 cm² with a maximum at 320 RLU/25 cm² within layers of dust and dirt !) - isolated microorganisms: <i>P. expansum</i>, <i>P. chrysogenum</i>, <i>Cladosporium herbarum</i>, <i>Cl. cladosporioides</i>, <i>Ulocladium chartarum</i>, <i>Epicoccum purpurascens</i>, <i>Aspergillus versicolor</i>, <i>A. fumigatus</i>, <i>Chaetonium globosum</i>, <i>Stachybotris chartarum</i> and <i>Botritis cinerea</i> (fungi; medium contamination) as well as one bacterium (not identified; low contamination). <p>In comparison to the panel 13 (coated panel), there is nearly the same microbial consortium, but the biological activity is less present on the un protected panel (panel 15) than on the protected one (panel 13).</p>

Conclusion: Weathering of glass seems to be more advanced without coating.

The same white and brown corrosion products are present in the two cases: on the whole surface (panel 15) or only between flakes of Viacryl® (panel 13). It appears Viacryl® protected the glass for a short period (5, maybe 10 years?), even if the weathering between cracks is severe for dark red, red and yellow pieces.

This hypothesis has to be moderate because there is no photograph of the panels after the cleaning in 1975.