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# Barcelona, Mural G-333: a case study of the first public ceramic wall by Eduardo Chillida

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MACBA MUSEU D'ART CONTEMPORANI DE BARCELONA

*Eduardo Chillida did the mural Barcelona, Mural G-333 in 1998 on request of MACBA. It was his first public ceramic wall. It is composed of 416 plates of refractory concrete and copper oxide paint 591 cm tall and 1555cm width. The wall was produced in collaboration with Hans Spinner, German artist friend and regular partner of Chillida. The plates of refractory concrete were baked at 1300 degrees. Afterwards, Chillida painted them and finally they were baked again at 1120 degrees.*

*Nowadays, twenty years after the mural was done, it shows a good conservation condition. However, we can appreciate a chromatic change due to several factors. On one hand all the agents of deterioration due to the fact that the work is installed on an outside wall. On the other, the aging of the constituent materials. Barcelona, Mural G-333 is a contemporary work where the artist's hand has suffered some changes due to the aging of the protecting layer applied during the manufacturing of the plates. With this poster we would like to introduce a study in order to asses the viability of a possible future intervention.*

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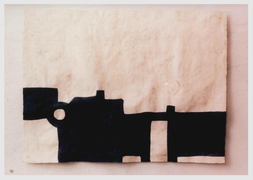
### EDUARDO CHILLIDA'S PUBLIC SCULPTURE

With over forty projects in cities around the world, Eduardo Chillida's public sculpture has played a fundamental role in his artistic career. The artist always defended it as a mechanism for guaranteeing universal access to art. Chillida made *Barcelona, Mural G-333* in 1998, three years after the opening of the building that hosts MACBA and four years before his death. In all his public interventions, location was of the utmost importance. During his visit to Barcelona to supervise the installation of the work, he explained that when he saw the Museum for the first time he thought the area around Richard Meier's white building had a weak point: the dividing wall to one side of the building separating the Museum from the rest of the area. He thought it didn't integrate the Museum with the neighbourhood. For that reason, on being asked to produce a work for the outside of the building he decided to create a ceramic mural for this concrete wall and place it three-metres high. *Barcelona, Mural G-333* is the first large ceramic mural made by the artist during his long career.

### WORK PROCESS

The work was produced at the studio of Hans Spinner – a German ceramicist highly regarded by Chillida – in Grasse, in the South of France, where the sculptor had made most of his ceramic pieces. After firing the plaques of refractory concrete that make up the mural at 1,300 degrees centigrade, Chillida painted them in copper rust and fired them again at 1,120 degrees. During this double-firing process the rust acquired a characteristic black colour and a texture half-way between sculpture and engraving. The way Chillida uses clay and other materials that can be fired does not correspond to the traditional concept of ceramics; it is more of an architectural essay.



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## STATE OF CURRENT CONSERVATION

### MOUNTING SYSTEM

The mural is mounted using a Fischer ZYKON FZP® anchoring system affixed to the rear of each tile: a special cylindrical-conical drill bit was used to perforate the tiles, allowing an anchor to be inserted. The tiles are then anchored to the square metallic substructure mounted on the wall, such that the anchoring system is completely hidden.

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### CONSTITUTIVE MATERIALS

The mural is made up of ceramic tiles of refractory concrete. Generally this kind of cement is made up of clay, additives, sand and aluminous cement, meaning a wide range of minerals are present: among them calcite, calcium carbonate and aluminum oxide.

The refractory concrete tiles themselves and the copper oxide paint applied to them are both in good conditions. The ceramic material is cohesive, without signs of disintegration, fissures, cracks or peeling of the tiles or the polychrome layer. This layer, applied in copper oxide, is well adhered to the tile of refractory concrete.

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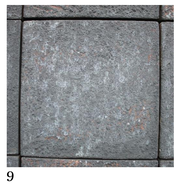
### SURFACE PROTECTIVE LAYERS

On the surface of the work there are whitish spots or deposits: this may be caused by the degradation of the protective layer of siloxane resins which has brought to the surface — together with the crystallization of salts in the surface — microbiological activity and agents of atmospheric contamination. The protective layer it can be clearly seen over the replacement tiles (figure 8).
Another aspect worth noting is the bleaching effect of the avian detritus present on the mural.

The general state of the mural is good, though there is a slight change in color.

If we compare the current appearance of the mural and the two pieces that were stored and not exhibited (figures 6 and 10) we can observe a certain shift in the colors of the mosaic, specifically in the areas painted black. A whitish layer is present, principally in the lower part of the tile, possibly caused by an accumulation of rainwater or atmospheric humidity.

In the replacement tiles that have been stored in their original packaging since they were created no spots or deposits are visible on the surface, while these are present on the tiles of the exhibited mural. (figures 9, 11 and 12)



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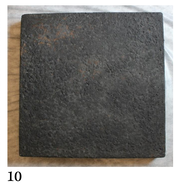

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## DETERIORATION FACTORS

Any deterioration of the mural can principally be attributed to the fact that it is exhibited outdoors.

## FACTORS INTRINSIC TO THE MATERIALS AND PROTECTIVE COATING

### REFRACTORY CONCRETE/ COPPER OXIDE

After firing, these materials are resistant to corrosion and to high temperatures. Faced with deterioration factors, their elasticity and hardness may be diminished, and the aggregate may suffer some decay.

### SILOXANE RESIN PROTECTIVE LAYER

The resin Rubson Invisible® is a colorless liquid based on siloxane resins in an organic dissolvent. The polymer decay of siloxanes occurs when chemical bonds are broken, reducing the mechanical properties of the compounds.

This decay occurs when various factors are combined, such as exposure to UV rays, the presence of water, variations in temperature or contact with atmospheric ozone.

## ENVIRONMENTAL FACTORS

### HUMIDITY, SUNLIGHT, TEMPERATURE

Relative humidity. Because it is exhibited outdoors, the mural is exposed to variations in the relative humidity of the environment. While Barcelona is not a city that receives a lot of rain, the proximity to the sea in the Raval neighborhood means that the relative humidity oscillates between a minimum of 55% and a maximum of 90%.

Temperature. The Mediterranean climate has mild daily and seasonal changes in temperature, with little risk of freezing. This August, however, temperatures did reach 34ºC during the day.

Sunlight. This is the most important bleaching factor, due to the high levels of UV exposure in Barcelona. This year during June and July the exposure levels reached 10.

### ATMOSPHERIC POLLUTION

| | Origin | Effect upon the mural |
|---|---|---|
| $NO_2$/Nitrogen dioxide | Combustion (heating, vehicles, boats) | oxidation |
| $O_3$/ Environmental or atmospheric ozone | Photochemical reaction between nitrogen oxides and volatile organic compounds | oxidation |
| CO/Carbon monoxide | | Combined with $H_2O$ produces acidification. |
| $CO_2$/ Carbon dioxide | combustion (heating, vehicles, boats) | |
| $SO_2$/ Sulphur dioxide | electric plants and other industrial activity | combined with $H_2O$ and $O_2$ produces acid rain. Acidification. |
| PM/ airborne particulate matter | 10 and 2,5 micras come from motors, tyres, vehicle brakes and dust from construction | airborne particles create deposits on surfaces |
| VOC/ volatile organic compounds | vehicles, industry, dissolvents | |

### MICROBIOLOGICAL ACTIVITY

Cultures of samples taken from various points on the mural have revealed the significant presence of the fungi Aspergillus brasiliensis and Penicilum rugulosum, both visibly colored and very common in exteriors. Given that humidity in ceramic tiles tends to descend and accumulate in the lower part of the mural, it is not surprising that the largest colonies of these fungi are located in this area.

## CONCLUSIONS, PROPOSAL AND VIABILITY

The slight change of colors visible in the mural *Barcelona, Mural G-333* at present does not impede a correct viewing of the work, and might be considered part of the mosaic's patina. In any case, the fact that we do not have sufficient historical perspective makes it difficult to have a full vision of how this process of decay will evolve. The present state of conservation of the work does not represent a threat to the its integrity.

Hypothesis.
In our opinion the aging of the Rubson Invisible resin® and the possible surface migration account for part of the change in color of the mural.

On the basis of the morphological characteristics of the visible stains and taking into account the proximity of the sea and the location of the stains on the lower part of the mural, these stains might be salt deposits on the surface of the work.

Future interventions.
We should use various analytic techniques to determine the origin of the slight discoloration that can be seen particularly in the dark tiles. As the changes in color evolve it will be determined whether a surface cleaning is required. The tiles shall not be dismantled for this purpose.

[1 and 3] *Barcelona, Mural G-333.* Photos: Gasull fotografía, 2016
[2] Eduardo Chillida. Photo: Unknown, 1998
[4] *Proyecto mural de Barcelona.* Photo: Archivo Chillida, c. 1996
[5] Eduardo Chillida working in the Hans Spinner workshop. Photo: Hans Spinner, c. 1998
[6, 7, 8 and 10] Stored replacement tiles. Photos: Alejandro Castro, 2017
[9, 11 and 12] Detail of the *Barcelona, Mural G-333* tiles. Photos: Lluís Roqué, 2017

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