# Pigment Reference Set: (Resource for technical art history (MA) and scientific analysis)

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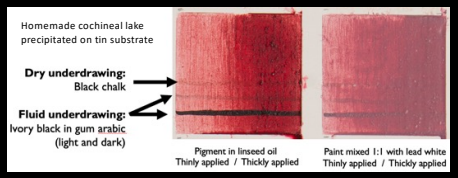
## 1. INTRODUCTION

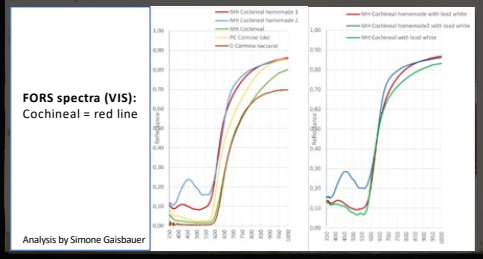
The Pigment Reference Set (PRS) of 85 schematic paint-outs incorporates pigments used by artists in 15th–17th century Europe.

Arranged into 7 colour families, the PRS reveals how pigments and paints behave in their 'pure' form, applied in different thicknesses on top of a carbon black underdrawing and a chalk-glue ground. The paints were also mixed 1:1 with lead white.




Two complete sets are available: one at the University of Amsterdam, and the other at the Mauritshuis (The Hague).

All of the paint-outs have been documented and analysed using a variety of technologies (in cooperation with the **Mauritshuis** and the **Rijksmuseum**), including: photography, XRF, XRD, FORS, RIS, DRSI, false-colour IR, UV, and micro-sampling.




The PRS allows for the analyses of individual pigments, unencumbered by the complex mixtures and layering often encountered in real artworks. Both within and outside the academic setting, this allows for comparison with the analytical results from actual art objects.
The data can be used as a reference to interpret more complex paint systems on historic artworks and the results of scientific analyses.

**Student learning outcomes:**
By using the PRS as a learning tool, students will be able to:

- understand the visual, optical and handling properties of pigments and oil paint, and relate these to their physical and chemical composition,
- relate the result(s) of scientific analyses to specific pigments and their origin,

3 BLUE

- better understand, recognise and identify the materials found in artworks,
- gain insight into the historical sources and making process of pigments.

## 2. REFERENCES

**Pigment list, and observations made during paint preparation and application:**
Link to online spreadsheet

**Other pigment and material databases:**

- CHSOS pigments checker
- INRiM hyperspectral imaging pictorial material database,
- C2RMF database of pigments under UV and IR radiations,
- IRUG infrared and Raman spectral database
- CAMEO materials database;
- Pigments through the ages

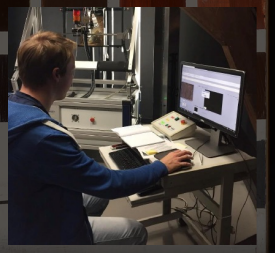
**Technical Art History at the University of Amsterdam:** Link to website

4 YELLOW

## 3. PLAN

The PRS can be incorporated into several courses (focusing on Technical Art History, but also open to students from other specialisations) within the Conservation & Restoration department at the University of Amsterdam:

- Chemistry of materials in art
- Physics and materials in art
- Historical reconstructions
- Object analysis
- Analytical tools



5 BROWN EARTHS

**e.g. in the course 'Object Analysis'**

The students are presented with a case study of a historical (17th century) painting containing red pigments that cannot be identified visually.

The students would carry out scientific analyses on the object using the technologies that are available.

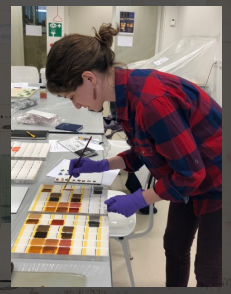
They would compare their results with the PRS, and could also carry out additional analysis on the PRS to further contextualise their results and interpret the analytical data.

6 GREEN

## 4. STUDENT ENGAGEMENT

The PRS was made by students and faculty from the MA programme in **Technical Art History (TAH)**: one of 10 specialisations within the department of Conservation & Restoration at the University of Amsterdam (UvA).

By making observations during the preparation, application and drying of paints, the students learned about their visual and physical characteristics: translucency, opacity, tinting strength, pigment/volume concentration, viscosity, etc. (Link to spreadsheet).



7. Layers and mixing

They experienced the act of paint-making themselves, which helped to understand the affordances and limitations of the materials used by traditional European painters.

**Engagement outside of the classroom:**

The PRS has the potential to become an invaluable resource for conservators, students, researchers and scientists.
Through a website, users could search for information about traditional pigments, and how each of them behaves under different analytical conditions.
In the future, we intend to create a database and online platform to make this resource freely accessible to a wider scientific and educational community.

1 BLACK AND WHITE