FiRe^2: an online database for photographic and cinematographic film technical data

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Among the great variety of our Cultural Heritage, photographic and cinematographic materials are fundamental and direct witnesses of the past. As often happens when dealing with materials of cultural interest, even photographic and cinematographic films can undergo severe deterioration, aging, and color fading throughout the time, leading to the need for proper restoration, conservation, and preservation of these materials. In this context, even though the digitization process is becoming more and more essential, analyzing and studying the analog materials remains fundamental to perform a retrieval or a correction faithful to the original material. For this reason, the lack of technical information (especially for the oldest materials) and the absence of open-source archives of the producing companies underlines the actual and concrete need for a database of physical, chemical, and sensitometric data of both cinematography and photographic films.

The aim of this work is the creation and the promotion of FiRe^2, a big and unique database of cinematographic and photographic materials to support the work of conservators, restorers, and researchers, as the availability of information and the cooperation between institutions and professionals are essential for preserving our Cultural Heritage.

CCS Concepts: • **Applied computing → Digital libraries and archives**.

Additional Key Words and Phrases: Film Restoration, Color in Film, Photographich Film, Cinematographic Film, Sensitometry, Film Gamuts

ACM Reference Format:
Beatrice Sarti, Alice Plutino, Arianna Crespi, Giulia Morabito, and Alessandro Rizzi. 2022. FiRe^2: an online database for photographic and cinematographic film technical data. *ACM J. Comput. Cult. Herit.* 1, 1, Article 1 (January 2022), 12 pages. https://doi.org/10.1145/3532520

1 INTRODUCTION

Film restoration is a complex process involving many different fields, from the physical and chemical aspects to the cultural background in which the film has been produced. In this way, the first step in film restoration is the historical and philological research, because, unlike other kinds of Cultural Heritage objects, usually many different copies of the same photograph or motion picture are available, but all of them could differ in their state of conservation or content: e.g. a copy may be censored, another may present intertitles, another may introduce unreleased sequences. This aspect of film restoration is widely studied, and today many researchers focus on film philology reconstruction or on the analysis of a specific historical period or movement [2].

Researchers and restorers often rely on public archives to collect all the information needed for their work, as the documentation process is fundamental to performing a correct film restoration. However, the lack of strict international guidelines makes this task to be hard for the professional figures working on photographic and cinematographic collections, as film restoration still struggles to establish a binding professional code comparable to those already in place in fine art restoration and heritage conservation [3]. And this is especially true because

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XXXX-XXXX/2022/1-ART1
https://doi.org/10.1145/3532520

of the absence of the availability of technical information and scientific knowledge in this field: while there are plenty of historical archives, the retrieval of scientific data is often hard. Producing companies provide informative datasheets of each film produced, including all the technical features of the product as well as their sensitometric curves and the information for the film stock characterization. Nevertheless, these datasheets are not always available, especially for the oldest materials. Moreover, many archives do not have public access or only provide partial information. In this way, this work aims at supporting the work of conservators, restorers and researchers, and at starting to fill the lack in technical knowledge concerning film materials. In the first part of this paper, we want to underline the importance and the need for acquiring and collecting scientific data that has led us to the creation of FiRe^2, a completely free open-source database for cinematographic and photographic films, which is introduced and discussed in the second part of this work. Finally, in the last part of this paper, we invite the readers to join our project promoting the collaboration between both privates and institutions to retrieve technical data that may be otherwise be lost.

2 THE NEED FOR A TECHNICAL DATABASE

Every restoration project should be characterized not only by the study of the history of the film but also by an in-depth analysis of the original material. Very often, the movie or the photography contents are considered more important than the analog film itself. However, all the images are nothing but the result of the radiation-matter interaction between the film material and the light. This means that the physical and chemical properties of the material composing the film (with its specific emulsion, dyes, and sensitivity) determine the intrinsic characteristic of each image. In this way, it is also important to consider that over the years, the film industry and the various producing companies developed different films with different emulsions and dyes. For this reason, thinking about the images as separate and independent entities from the material of which they are composed is deeply wrong and can lead to incorrect conservation or unfaithful retrieval of the cultural object. According to the material they are made of, every film has a different response to the light interaction and can have a different gamut (i.e. the subset of color that can be reproduced within a color space or by a device).

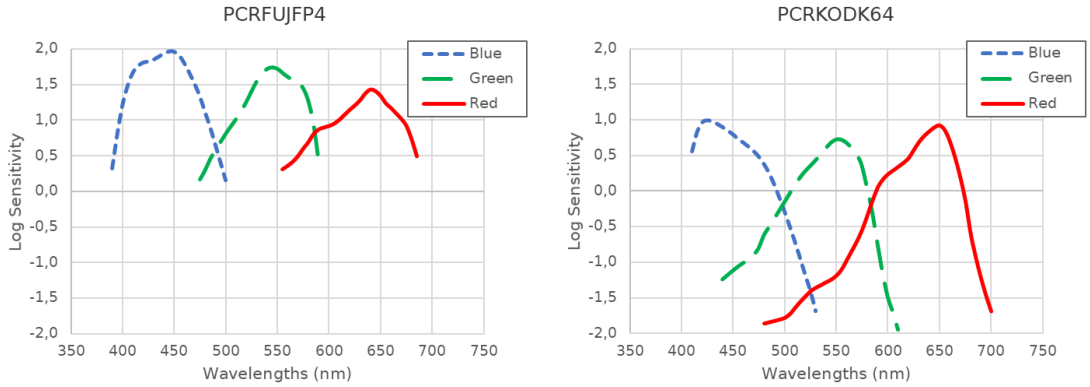


Fig. 1. Comparison of the spectral sensitivity curves of two reversal film stocks: Fujichrome Provia 400X Professional [RXP] (PCRFUJFP4) by Fujifilm and the Kodachrome 64 (PCRKODK64) by Kodak.

In order to have a clear and complete idea of this concept, figure 1 and figure 2 show the spectral sensitivity curves and the spectral dye density curves respectively of two reversal: Fujichrome Provia 400X Professional [RXP] (PCRFUJFP4) by Fujifilm and the Kodachrome 64 (PCRKODK64) by Kodak. The spectral sensitivity describes how the three emulsion layers of the film are sensitive to the electromagnetic radiation. Since higher values

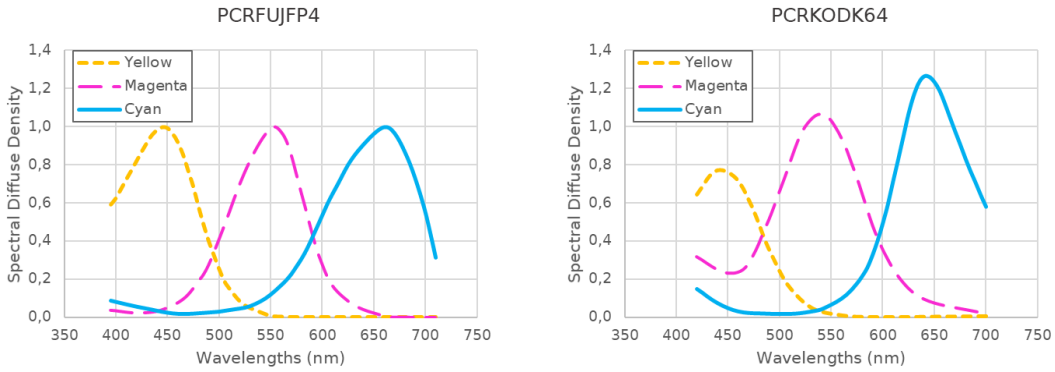


Fig. 2. Comparison of the spectral dye density curves of two reversal film stocks: Fujichrome Provia 400X Professional [RXP] (PCRFUJFP4) by Fujifilm and the Kodachrome 64 (PCRKODK64) by Kodak.

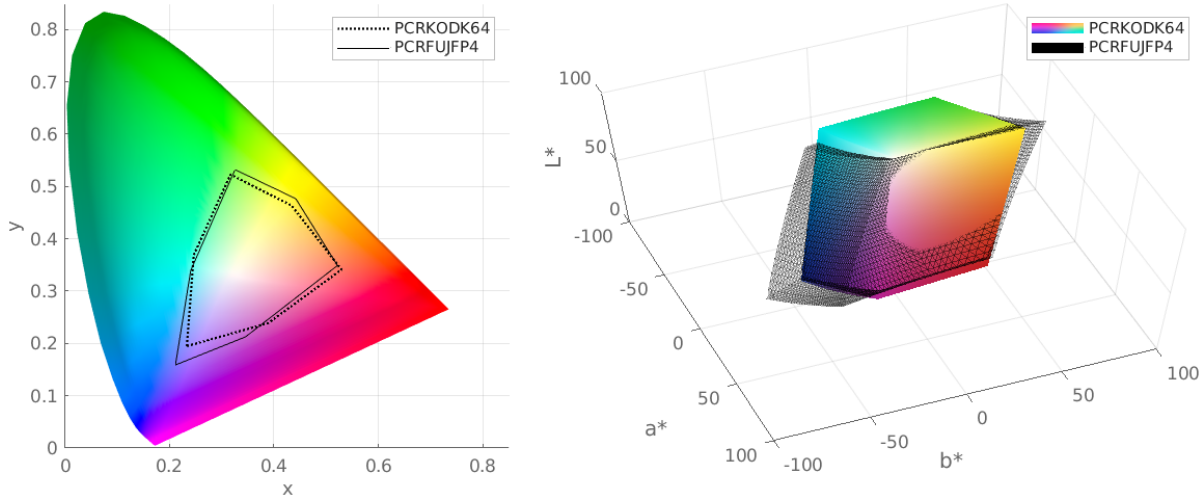


Fig. 3. Comparison of the gamut of two reversal film stocks: Fujichrome Provia 400X Professional [RXP] (PCRFUJFP4) by Fujifilm and the Kodachrome 64 (PCRKODK64) by Kodak. On the left the gamuts are represented in two-dimensions in the CIE Chromaticity Diagram, on the right in three-dimensions in the CIELab color space

indicate a more light-sensitive emulsion, Fujichrome Provia 400X Professional is significantly more sensitive than Kodachrome 64 and can more emphasize the colors. Moreover, the other parameter that matters in the spectral sensitivity representation is the wavelength where two sensitivity curves cross. That is because every emulsion layer act as a band-pass channel filter and so a wider curve overlapping means a lower color saturation. The spectral dye density describes the percentage of absorbed and transmitted radiation as a function of wavelength. As before, a wider overlap in the curves and the evident differences between the two films lead to less-saturated colors in the resulting images: for example, higher values of the cyan and magenta curves in the blue region of the spectrum (400 – 450 nm) of the Kodachrome 64 implies that these two emulsion layers transmit less the incident radiation than those of Fujichrome Provia 400X Professional, leading to less saturated color in the blues.

All of these differences reported in the spectral sensitivity and in the spectral dye density curves imply that the two film stocks will have a different subset of colors that they can or cannot reproduce. This is the definition of gamut, whose comparison for Fujichrome Provia 400X Professional and the Kodachrome is represented in figure 3. Fujichrome Provia 400X Professional has a wider gamut more saturated in the regions of blues and yellow but less advanced in the region of cyans.

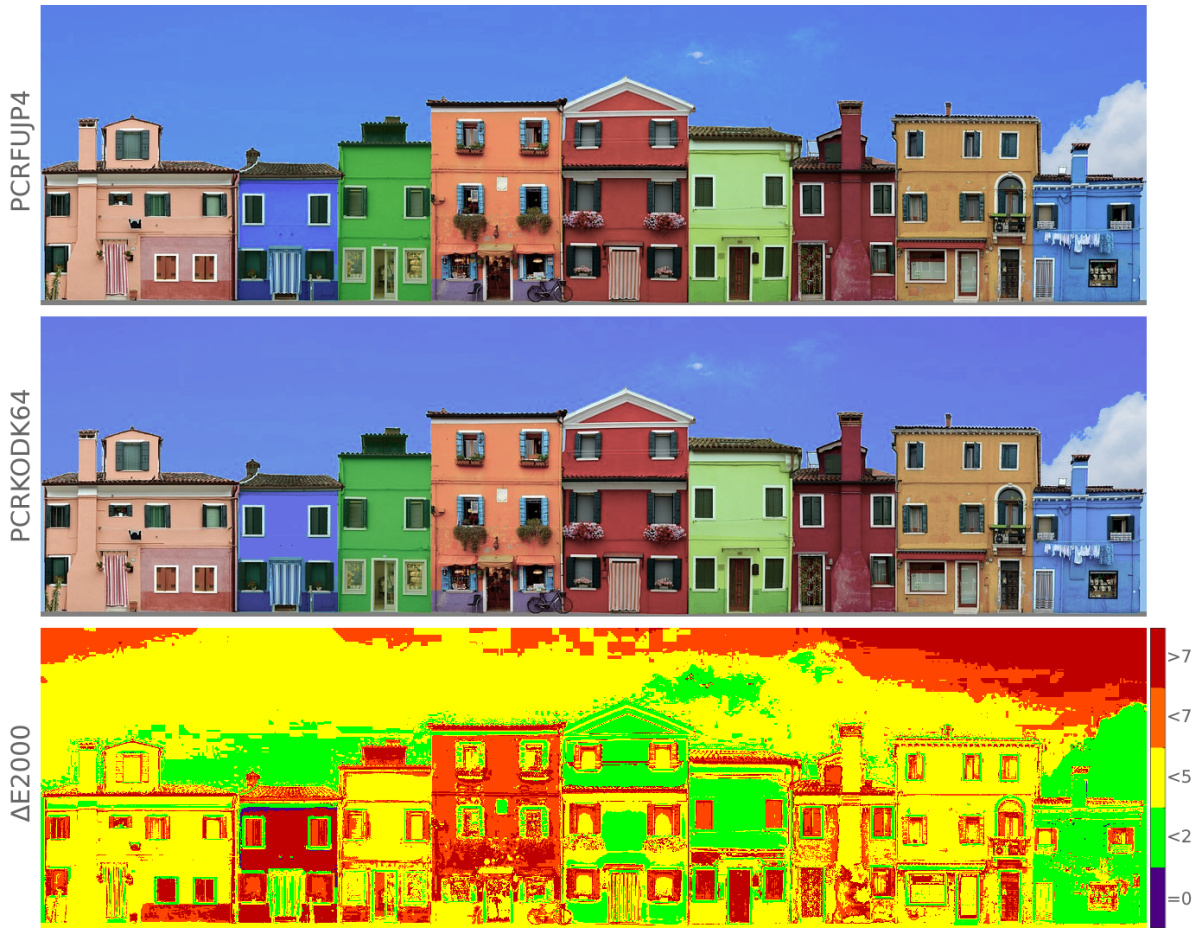


Fig. 4. Comparison of the gamut of two reversal film stocks: Fujichrome Provia 400X Professional [RXP] (PCRFUJFP4) by Fujifilm and the Kodachrome 64 (PCRKODK64) by Kodak. Please, note that images colors can be subject to changes depending on the visualization device or the printing system.

The same image produced by the two film stocks is different as well, and an example is shown in figure 4. Here the two images are obtained applying the ICC color profile of the two reversal films within an absolute colorimetric intent. Thant means that every in-range colors are not modified, while the out-range colors are clipped to the closest color upon the gamut surface. The color comparison is supported by the spatial distribution of the color differences. The increase of color difference is coded by a set of false colors, for which purple and

green correspond to no difference at all and a color distance hard to perceive by the human eye ($0 \leq \Delta E < 2$); yellow, orange and red are used for perceptible differences ($\Delta E < 5$, $\Delta E < 7$ and $\Delta E > 7$ respectively).
In light of this comparison, it became clear that the differences in the two images are the direct result of the differences between the material they are made of. Since every object has a diverse response to the light interaction, different formulations of films lead to distinct properties as well as dissimilar gamuts. Consequently, for every film there will be colors that can be reproduced and others that will not.

This is complicated by the fact that, over the years, the film industry has faced a lot of innovations: the development of different film base materials, the advancement of many acquisitions and projection instruments, as well as printing and developing machines. One of the most tangible and rapid changes has been the continuous introduction of new coloring techniques: indeed, since the invention of film, one of the great hurdles has been adding color to black-and-white motion pictures. Attempts to color films have been numerous and various during the years and many different techniques and dyes have been used [7, 8, 10, 12]. Every (motion or still) picture is the result of the interaction of different cameras, film stocks (with their specific emulsion, dyes, and sensitivity), printing machines, and projection technologies. The varied combination of all these elements produces a different final image. In this way, analyzing, studying and understanding the chemical and physical properties of materials that compose the film and the technical features behind the photographic and cinematographic filmmaking are fundamental to setting up a solid restoration workflow faithful to the original materials. Nevertheless, today there is a lack of documentation and research in the field of cinema technical history, in particular in the study of the materials which composed the film base, colorant or dyes over the years. This lack of knowledge is even more dangerous today, in the *digital era*, where the introduction of digital technologies and digital intermediates, which today completely changed the technologies to acquire, restore and access the films. Since the superior manageability and reversibility of digital intermediate, more and more archives are embarking on massive digitization initiatives to improve the access to their materials. However, most of the time, the conversion from analog to digital is made without effective color control and management. This leads to issues in color reproducibility in digital systems, since not all the current display and projection devices have the same gamut and can reproduce the same color palette of an analog film, and this is clearly visible when comparing the original analog film and the digital. Reconstructing the exact set of colors of the original films is a challenging task, complicated by the lack of technical information that leaves the experts to perform a subjective manual color correction or a restoration with a visual comparison. Consequently, it is fundamental to analyze, study and understand the technical history of photographic and cinematographic films, to set up conservation, restoration and preservation workflows that are faithful to the original materials even if employing modern acquisition and fruition tools.

The availability of technical and sensitometric data about the film would support the preservation and restoration work, making the whole process easier and more objective: some errors in tones and color reproduction could be avoided and the specific film features could be supported by mathematical and physical models and this would be the next step of our project as well. In this way some attempts have already been made in the works of Gschwind [5], and Rizzi [11] but many improvements need to be achieved in order to reproduce a faithful color film perception. The creation of this platform is also intended as a base for growth and integration with future studies as the development of sensitometric analysis and scientific investigations on new materials.

3 THE DATABASE

To catalog and organize the different techniques and materials used along with the history of photography and cinema, many works have been already realized and published [4]. Nevertheless, much technical information on film sensitometry and emulsions has been lost, and even if some efforts have been made to create dataset

collections and catalogs, very few works are open source and have been published [9], and the available archives could be incomplete or deal only with historical information.

Starting from this need, different existing archives have been merged and different sensitometric and technical information about films have been added to create a unique open-source database available for every researcher. First of all, we made an evaluation and a classification of the films collected by Rudolf Gschwind in Historische Kleinbildfilm Datenbanke archive [1]. Those data have been subsequently updated with the technical information included in Barbara Flueckiger's database Timeline of Historical Film Colors [4] and with the private technical dataset made by Nicola Mazzanti in his career [6].

Together with the technical information listed in the database, we also collected technical files of various kinds (e.g., images, white papers, technical reports). These files are mainly technical datasheets and sensitometric graphics, that are useful to define the qualitative aspects of a film such as exposure, sensitivity, optical transfer functions or dyes spectral densities. All those files have been classified in the database as well and are downloadable from the website.

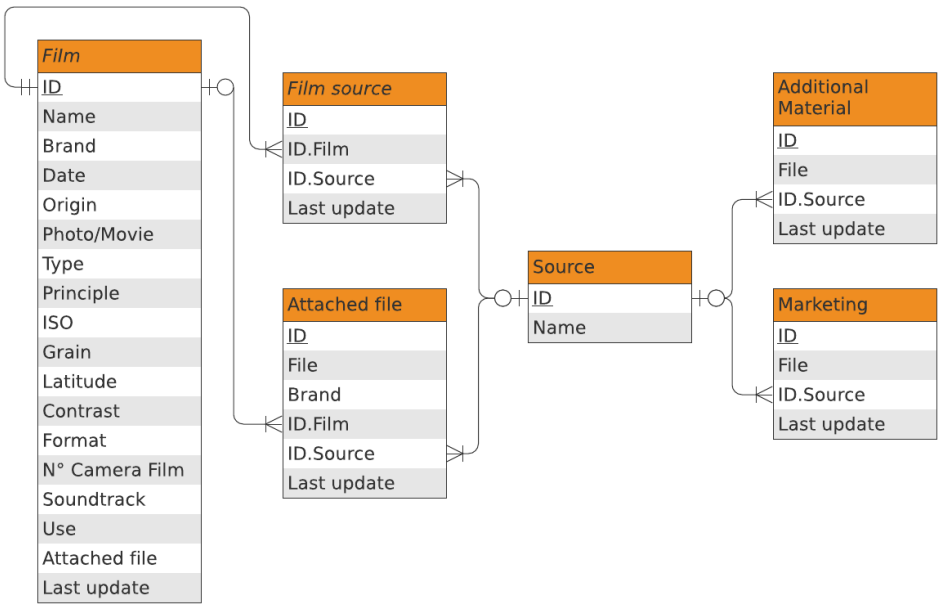


Fig. 5. ER model built to develop the database.

According to the material collected, the logical structure of FiRe^2 is shown in the Entity Relationship Diagram in figure 5. The *Film* entity and the *Attached file* entity are the most important entities of the database. The first one is made up with the list of film stocks and their main features, whose list of attributes are described in 1. The second one consists of the collection of all the technical datasheets and documents related to the film material. Since these two entities would be related to each other with a many-to-many relationship, the *Film source* entity serves as joining table. The *Additional Material* entity collects all the general information not related to a specific film. The *Marketing* entity consists of all the materials related to marketing and advertising. Finally, every entity has a relationship with the *Source*, which collects all the references to the archive we have referred to in order to collect our data.

Table 1. Description of the attribution of the Film entity

Attribute	Description
ID	Film Identification Code
Name	Film stock name
Brand	Film production company
Date	Date/period of film stock production
Origin	Production country
Photo/Movie	Photographic
	Cinematographic
Type	Positive
	Negative
	Reversal
	Black and White
	Color
Principle	Additive (2 or 3 colors)
	Subtractive (2 or 3 colors)
ISO	Film speed
Grain	Film granularity
Latitude	Film exposure latitude
Contrast	Film final contrast
Format	8 mm
	16 mm
	35 mm
	...
N° Camera Film	Number of motion picture camera film
Soundtrack	With Soundtrack
	Without Soundtrack
Use	General film use
Update	Data of last update

As can be seen in table 1, in order to classify and identify the different film stocks, we developed a unique identification code, illustrated in figure 6. It consists of a unique alphanumeric code of nine-character length, that summarizes the main characteristics of each film: the use (1 character), the type (2 characters), the production company (3 characters) and the specific film name (3 characters). For example, in the figure, the Fujicolor Positive Film Eterna-CP 3521 film stock has been classified as M-CP-FUJ-FPC, where M (Movie)-CP (Color Positive)-FUJ (Fujicolor)-FPC (first letters of the film-stock name).

After the preliminary analysis of data collection and identification and database creation, we created a specific website to make the results of this research available to the community of restorers, archivists, and professionals in the field of film restoration. The website, available in English or Italian at https://mips.di.unimi.it/photofire/, is divided into six main sections: *Homepage*, *About Us*, *Archive*, *Help Us*, *Contacts* and *Partnerships*.

The *About Us* section provides an overview of the FiRe^2 project and briefly explains how the archive section works. The *Archive* section presents three subsections: *Film database*, *Marketing&Advertising* and *Additional material*.

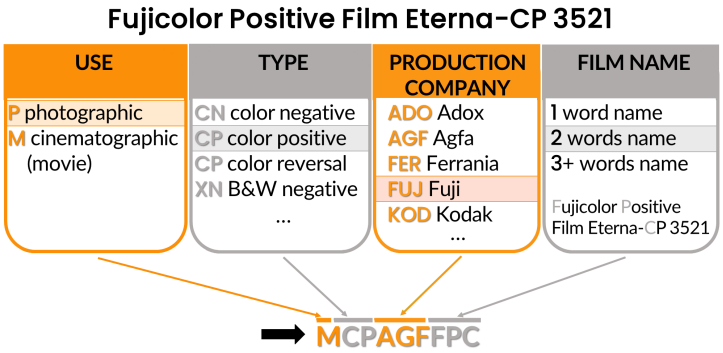
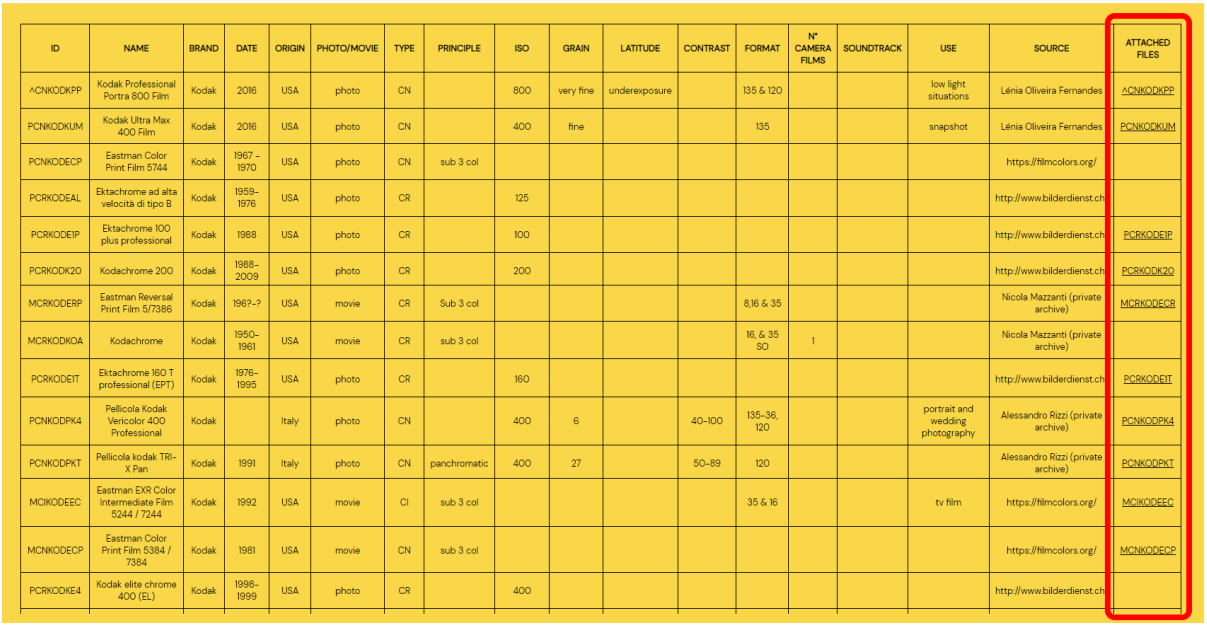


Fig. 6. Univoque ID for Film



ID	NAME	BRAND	DATE	ORIGIN	PHOTO/MOVIE	TYPE	PRINCIPLE	ISO	GRAIN	LATITUDE	CONTRAST	FORMAT	N° CAMERA FILMS	SOUNDTRACK	USE	SOURCE	ATTACHED FILES
^CNKODKPP	Kodak Professional Portra 800 Film	Kodak	2016	USA	photo	CN		800	very fine	underexposure		135 & 120			low light situations	Lénia Oliveira Fernandes	^CNKODKPP
PCNKODKUM	Kodak Ultra Max 400 Film	Kodak	2016	USA	photo	CN		400	fine			135			snapshot	Lénia Oliveira Fernandes	PCNKODKUM
PCNKODECP	Eastman Color Print Film 5744	Kodak	1967 - 1970	USA	photo	CN	sub 3 col									https://filmcolors.org/	
PCRKODEAL	Ektachrome ad alta velocità di tipo B	Kodak	1959-1976	USA	photo	CR		125								http://www.bilderdienst.ch	
PCRKODE1P	Ektachrome 100 plus professional	Kodak	1988	USA	photo	CR		100								http://www.bilderdienst.ch	PCRKODE1P
PCRKODK2O	Kodachrome 200	Kodak	1988-2009	USA	photo	CR		200								http://www.bilderdienst.ch	PCRKODK2O
MCRKODERP	Eastman Reversal Print Film 5/7386	Kodak	196?-?	USA	movie	CR	Sub 3 col					8,16 & 35				Nicola Mazzanti (private archive)	MCRKODECR
MCRKODKOA	Kodachrome	Kodak	1950-1961	USA	movie	CR	sub 3 col					16, & 35 SO	1			Nicola Mazzanti (private archive)	
PCRKODE1T	Ektachrome 160 T professional (EPT)	Kodak	1976-1995	USA	photo	CR		160								http://www.bilderdienst.ch	PCRKODE1T
PCNKODPK4	Pellicola Kodak Vericolor 400 Professional	Kodak		Italy	photo	CN		400	6		40-100	135-36, 120			portrait and wedding photography	Alessandro Rizzi (private archive)	PCNKODPK4
PCNKODPKT	Pellicola kodak TRI-X Pan	Kodak	1991	Italy	photo	CN	panchromatic	400	27		50-89	120				Alessandro Rizzi (private archive)	PCNKODPKT
MCIKODEEC	Eastman EXR Color Intermediate Film 5244 / 7244	Kodak	1992	USA	movie	CI	sub 3 col					35 & 16			tv film	https://filmcolors.org/	MCIKODEEC
MCNKODECP	Eastman Color Print Film 5384 / 7384	Kodak	1981	USA	movie	CN	sub 3 col									https://filmcolors.org/	MCNKODECP
PCRKODKE4	Kodak elite chrome 400 (EL)	Kodak	1998-1999	USA	photo	CR		400								http://www.bilderdienst.ch	

Fig. 7. Example of results from the *Film Database* section.

The *Film database* subsection is the core of the website because it allows the user to search for specific film stocks and access the collected information. It is possible to search film stock by name, ID code, brand, type or photo/movie. Alternatively, it is possible to access the full film collection by selecting "view all". Figure 7 show, for example, some of the results of the films by Kodak we have collected. It is important to notice that the last column, enclosed in red in the figure, provides the links to visualize and download for free the attached file (i.e. the technical datasheets of the film like the example in figure 8) we have collected. Unfortunately, due to the lack

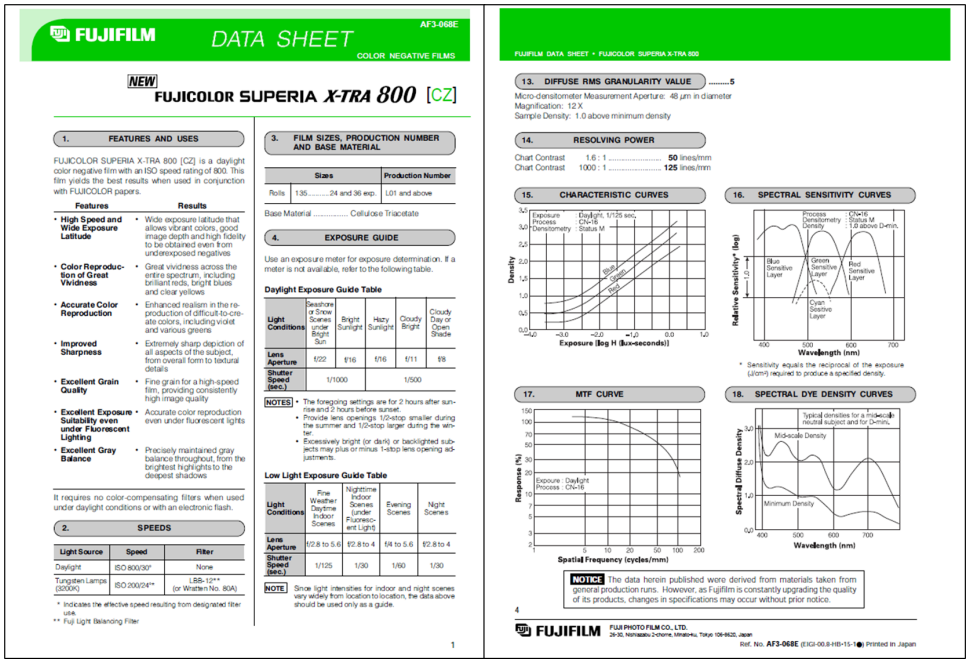


Fig. 8. Example of attached file in the *Film database* section and downloadable from the PhotoFiRe^2 website: some pages of the technical datasheet of the *Fujicolor SUperia X-Tra 800* film.

of information available, not all fields could be completed for all the films.
The *Additional material* subsection contains general information about the film stock, unrelated to the singularity of a specific film (see an example in figure 9).
Finally, the *Marketing&Advertising* subsection contains non-technical materials, like images, or advertisement fliers. Some examples are showed in figure 10.

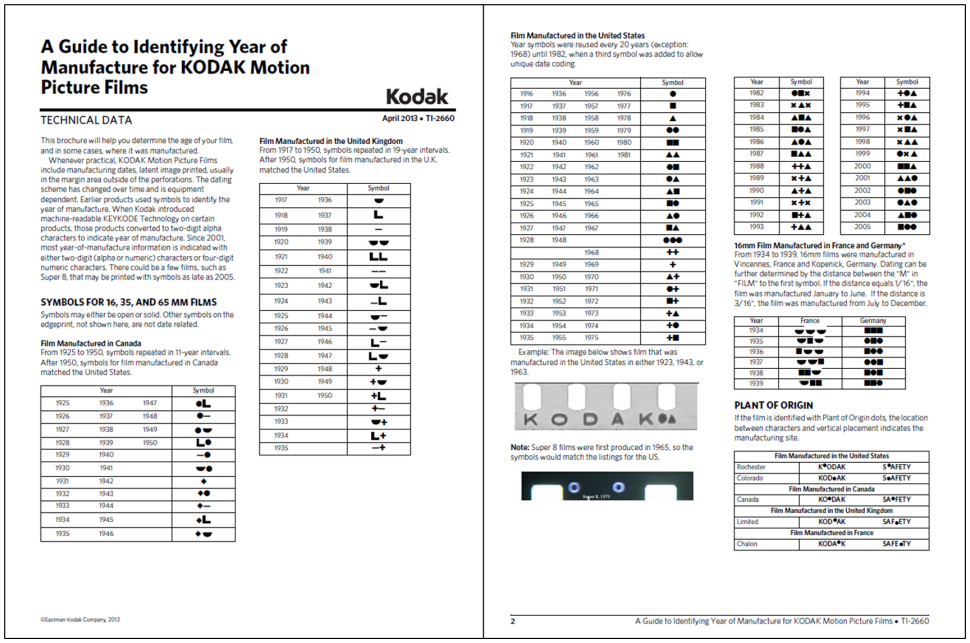
The *Help Us* section is another very important section of the website because it is devoted to creating collaboration between institutions, sharing new film material on the website and updating the database. This section provides a quick form to complete for all the researchers who want to share their film materials. A more specific description of the procedure to contribute to the database is in the last session of this paper.

The *Contacts* section contains information about the website and database developers and curators. There is also the possibility to subscribe to the website newsletter to receive news and updates.

In conclusion, the *Partnerships* website section presents a list of researchers, institutions and archives, who joined the project and took part in FiRe^2.

The database is in constant growth. The last updates come from two personal archives: one from Lénia Oliveira Fernandes, Photograph Conservator at the Rijksmuseum of Amsterdam, and the other from Prof. Alessandro Rizzi, one of the authors of this paper. Whit the last 203 updates, we have currently collected 78 items for additional materials and 601 photographic and cinematographic films (233 of which have attached files with technical data) from 22 producing companies used from 1935 to 2018.

Since the database is conceived to be always in continuous evolution and growth, the next step will be the introduction of the addition of the Digital index (DX). It is a standard encoding for 35 mm and APS photographic



A Guide to Identifying Year of Manufacture for KODAK Motion Picture Films

Kodak

TECHNICAL DATA

April 2013 • TI-2660

This brochure will help you determine the age of your film, and in some cases, where it was manufactured.

Whenever practical, KODAK Motion Picture Films include manufacturing dates, latent image printed, usually in the margin area outside of the perforations. The dating scheme has changed over time and is equipment dependent. Earlier products used symbols to identify the year of manufacture. When Kodak introduced machine-readable KEYKODE Technology on certain products, those products converted to two-digit alpha characters to indicate year of manufacture. Since 2001, most year-of-manufacture information is indicated with either two-digit (alpha or numeric) characters or four-digit numeric characters. There could be a few films, such as Super 8, that may be printed with symbols as late as 2005.

SYMBOLS FOR 16, 35, AND 65 MM FILMS

Symbols may either be open or solid. Other symbols on the edgeprint, not shown here, are not date related.

Film Manufactured in Canada

From 1925 to 1950, symbols repeated in 11-year intervals. After 1950, symbols for film manufactured in Canada matched the United States.

Year			Symbol
1925	1936	1947	●L
1926	1937	1948	●–
1927	1938	1949	●◡
1928	1939	1950	L●
1929	1940		–●
1930	1941		◡●
1931	1942		✦
1932	1943		✦●
1933	1944		✦–
1934	1945		✦L
1935	1946		✦◡

Film Manufactured in the United Kingdom

From 1917 to 1950, symbols repeated in 19-year intervals. After 1950, symbols for film manufactured in the U.K. matched the United States.

Year		Symbol
1917	1936	◡
1918	1937	L
1919	1938	–
1920	1939	◡◡
1921	1940	LL
1922	1941	––
1923	1942	◡L
1924	1943	–L
1925	1944	◡–
1926	1945	––◡
1927	1946	L–
1928	1947	L◡
1929	1948	✦
1930	1949	✦◡
1931	1950	✦L
1932		✦–
1933		◡✦
1934		L✦
1935		–✦

©Eastman Kodak Company, 2013

Film Manufactured in the United States

Year symbols were reused every 20 years (exception: 1968) until 1982, when a third symbol was added to allow unique date coding.

Year				Symbol
1916	1936	1956	1976	●
1917	1937	1957	1977	■
1918	1938	1958	1978	▲
1919	1939	1959	1979	●●
1920	1940	1960	1980	■■
1921	1941	1961	1981	▲▲
1922	1942	1962		●■
1923	1943	1963		●▲
1924	1944	1964		▲■
1925	1945	1965		■●
1926	1946	1966		▲●
1927	1947	1967		■▲
1928	1948			●●●
		1968		++
1929	1949	1969		+
1930	1950	1970		▲+
1931	1951	1971		●+
1932	1952	1972		■+
1933	1953	1973		+▲
1934	1954	1974		+●
1935	1955	1975		+■

Example: The image below shows film that was manufactured in the United States in either 1923, 1943, or 1963.

Note: Super 8 films were first produced in 1965, so the symbols would match the listings for the US.

Year		Symbol
1982		●■x
1983		x▲x
1984		▲■▲
1985		■●▲
1986		▲●▲
1987		■▲▲
1988		++▲
1989		x+▲
1990		▲+▲
1991		x+x
1992		■+▲
1993		+▲▲

Year		Symbol
1994		+●▲
1995		+■▲
1996		x●▲
1997		x■▲
1998		x▲▲
1999		●x▲
2000		■■▲
2001		▲▲●
2002		●■●
2003		●▲●
2004		▲■●
2005		■●●

16mm Film Manufactured in France and Germany*

From 1934 to 1939, 16mm films were manufactured in Vincennes, France and Kopenick, Germany. Dating can be further determined by the distance between the "M" in "FILM" to the first symbol. If the distance equals 1/16", the film was manufactured January to June. If the distance is 3/16", the film was manufactured from July to December.

Year	France	Germany
1934	◡◡◡	■■■
1935	◡■◡	●●●
1936	■◡◡	■●●
1937	◡◡■	●■■
1938	■■◡	■●■
1939	◡■■	■■●

PLANT OF ORIGIN

If the film is identified with Plant of Origin dots, the location between characters and vertical placement indicates the manufacturing site.

Film Manufactured in the United States		
Rochester	K●ODAK	S●AFETY
Colorado	KOD●AK	SA●FETY
Film Manufactured in Canada		
Canada	KO●DAK	SA●FETY
Film Manufactured in the United Kingdom		
Limited	KOD●AK	SAF●ETY
Film Manufactured in France		
Chalon	KODA●K	SAFE●TY

2 A Guide to Identifying Year of Manufacture for KODAK Motion Picture Films • TI-2660

Fig. 9. Example of attached file in the *Additional Material* section and downloadable from the PhotoFiRe[2] website: some pages of *A Guide to Identifying Year of Manufacture for KODAK Motion Picture Films.*

Fig. 10. Example of advertising posters by Kodak and Ferrania in the *Marketing&Advertising* section and downloadable from the PhotoFiRe[2] website.

film and cartridges. It was first introduced by Kodak in 1983 and consists of a barcode for the automatic setting of ISO sensitivity.

4 CONTRIBUTING TO THE DATABASE

The website, Photo FiRe^2 aims, not only at being a permanent and updated database of film technical data but also at being a reference point for researchers and experts. In fact, the proposed framework wants to promote the exchange of material to encourage the sharing of knowledge in film restoration by inviting users to participate in the project.

This feature of the website is represented by the *Help us* section. Here, everyone can contribute to the database sharing technical material, which will be subject to a process of examination, and then uploaded to the website with the corresponding reference. To share the material users should just complete the very simple form in figure 11, and subsequently we will contact them for the material (analog or digital) sending. Everyone that would take part in this project will receive their credit appearing in the *Partners* section of the website. Nevertheless, in this process there is no need for registration and the users can remain anonymous if they want to.

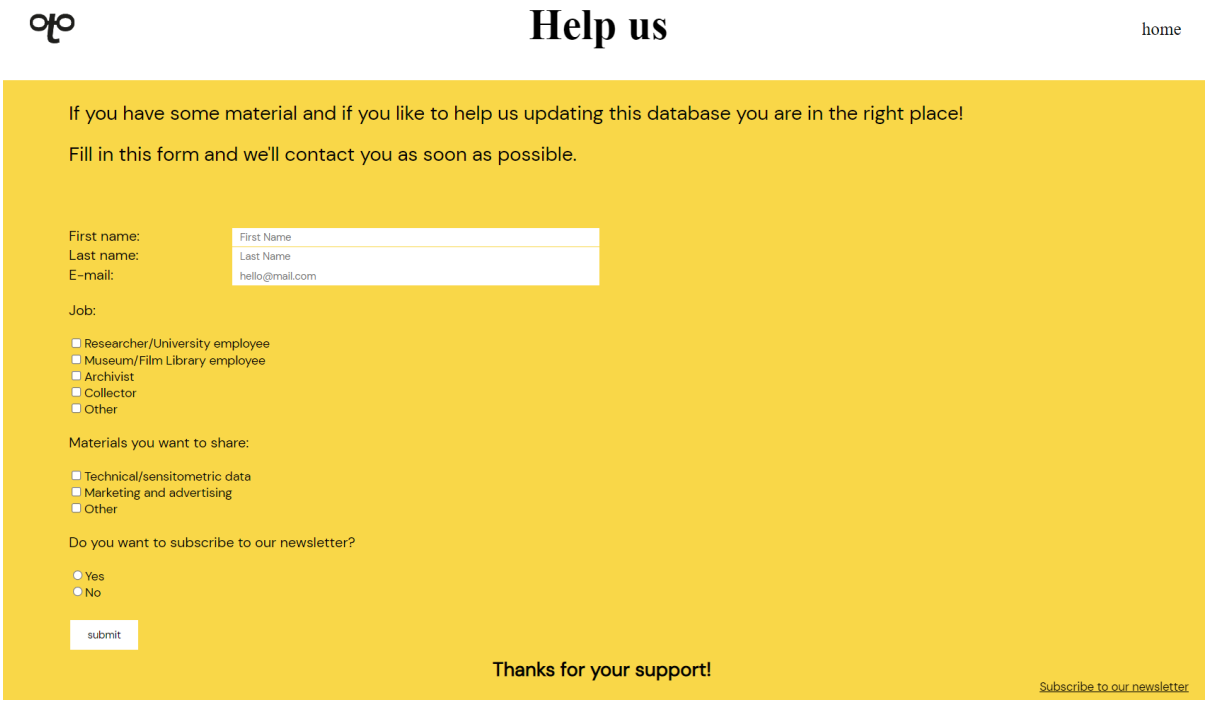


Fig. 11. Screenshot of the *Help us* section from the PhotoFiRe^2 website.

At the moment, as described in the previous sections, in the database we aim at sharing official material and information from different brands, thus it will be just subject to a simple process of validation and classification. Anyway, in the future, we will evaluate also the possibility to share documents and best practices coming from experts' personal experiences concerning the handling of film materials in developing and printing steps, as well as technical advice and recommendations. Nevertheless, this extension will require a longer and exhaustive step of validation and a different classification.

5 CONCLUSIONS

This work intends to raise awareness of the need for retrieving and acquiring scientific data among conservators, restorers, and film professionals. Analyzing, investigating, and comprehending the chemical and physical composition of films is crucial to properly conserve the film and obtain a faithful reconstruction for digital restoration.

In this work, we focus mainly on the technical material collection, classification, and divulgation that lead to the creation of a wide open-source technical database of cinematographic and photographic materials used along with the history. In this way, this work aims also at supporting the work of conservators, restorers, and researchers and at starting to fill the lack of technical knowledge concerning film materials.

This research led to the cataloging of 601 films, each one with useful specifications and 233 of them also with attachments, including photographic images, illustrative sheets, links to useful sites or sensitometric curves; and 78 documents of additional materials.

However, this study encountered several issues, such as the difficulty in finding technical data, both online and on the archives of the production houses, sometimes nonexistent or often inaccessible.

The realization of this preliminary website wants to provide an access point for the sharing of knowledge, a key aspect of scientific research. Thus, the archiving and classification of any kind of material are also fundamental activities in the field of Cultural Heritage, not only to maintain a trace of the past but also to support the activities of restoration and conservation itself.

ACKNOWLEDGMENTS

The authors would like to thank Rudolf Gschwind, Erwin Zbinden, Nicola Mazzanti and Lénia Oliveira Fernandes for the fruitful discussions and for contributing to our project sharing with us their knowledge and documentation.

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