

Evaluation NEMOSINE Questionnaire User requirements – MOVIES

Summary of the results

1. ABOUT THE QUESTIONNAIRE

Representativity vs .Heterogenity

Although the responses to the questionnaire were not stupendous in terms of numbers, they are representative for a specific category of film archives, organized in ACE and FIAF (22 out of 79 responses). The average size of their collections ranges between 50.00-200.000 reels or cans. Only one respondent holds a big collection of more than 1 Mio reels.

For the rest of the respondents there is a great variety in size - the smallest collection has 15 reels - and type of collection ranging from mixed media archives, film foundations, private film collectors.

Although the questionnaire didn't explicitly evaluate the geographic location of the archives, the majority (80%) is located in Europe, running low temperature vaults. Archives located in countries where running low temperature vaults is problematic because it is wet and humid face very different challenges. Not to speak about the lack of funding for building proper vaults in the first place.¹

Despite the heterogeneity of the sample, it's particularly the comments from the archives that helped to understand their preservation needs and what they expect (or not expect) from packages as envisaged by NEMOSINE. The NEMOSINE project will definitely benefit from the archive's great technical experience in safeguarding and preserving acetate and nitrate based materials.

2. SCEPTICISM FACING INNOVATION

2.1 Some of the answers suggest that the development of NEMOSINE package is an unnecessary effort because

- a) **The package is not considered as an active conservation tool:**² it is mainly considered as a container that has to protect the reel against blows.
- b) Archives have a workflow in place to deal with conservation, which is more or less effective
- c) Priorities are others than improving long term storage and its management, namely:
 - Preservation: duplication and digitization

¹ David Walsh, Slow Disasters: How Neglect Continues to Destroy our Film Heritage. In: Journal of Film Preservation, N.º 99 (10/2018), p. 23-30.

² The definition of active and passive in film preservation usually states: conservation is 'passive' (film sits in can on shelf), while 'active' approaches are restoration or other interventions - therefore this question was ambiguous.



- Improve vaults and climatization

2.2. Intelligent packaging is considered a good idea, but requires large efforts to introduce it: money, work and time, available space.

2.3 The unpredictability of **costs** creates a serious **reluctancy**

- a) NEMOSINE packages are supposed to be very expensive because of its sophistication.
- b) Archives without budget consider it a joke, a luxury for rich film archives.
- c) It is a current practice, even in best equipped film archives, to reuse the containers in which the reels enter the collections.

3. NEMOSINE AS AN ALTERNATIVE FOR UNAFORDABLE EXPECTATIONS IN THE MID-TERM

3.1. For most of the responding archives, the main solution for degradation problems is to accelerate digitization and reproduction, to build new vaults or improve climatization and storage.

3.2. The proven efficiency of the conditioned vaults allows to trust and wait for such solutions. However the responses show a different reality:

- a) There are not adequate vaults (24% answers)
- b) There is no budget to build them
- c) There is no temperature control (25% answers)
- d) Temperature is over 16°C and RH over 40% (35% answers)
- e) Nitrates are held together with vinegar affected materials without climate control.

3.3. **NEMOSINE packages should be considered as an interim solution**

- a) For an individual film waiting for its restoration moment
- b) as a real alternative for the new vaults to be built because it means
 - less investment in climatization equipment
 - energy and cost saving
 - minor and gradual investment in the acquisition of packages instead of a big and punctual investment
 - the advantage of a continuous monitoring of the reels.

4. MAGNETIC TAPES

4.1. Magnetic tapes (both ComMags or SepMags) are a secondary priority in the film archives. Solutions are designed for the image and not all conserve them in different climatization





conditions. It is also a (wrong) practice to maintain the separated magnetic tape with the image, in the same container.

- 4.2. NEMOSINE should insist in the need of separating them and, although out of scope of the project, develop a sensor to monitor the degradation of these materials. In fact, it is under study the implementation of the detection of the magnetic tape gasses.

5. ENVIRONMENTAL ASSESSMENT

- 5.1. HR and temperature are the main values monitored in film archives
- 5.2. Only 10% of the respondents monitor pollutants continuously.
- 5.3. 66% do not monitor, their indicators are to smell, watch and touch
- 5.4. Acetic acid is the main concern
- 5.5. When monitoring VOCs, NOx is the principal worry, but Ozone is also mentioned by one archive. NOx derivation is an aggressive oxidant. For this reason, Nemosine is considering the convenience of including the detection of this oxidise between the sensor capabilities.

6. COLLECTION ASSESSMENT MOVIES

- 6.1. Base identification (CA001, CA002) is not a critical problem. Respondents (34 of 68) are using confident and non-expensive (but risky and aggressive) methods, and only two of them would spent more than 1000€ but no more than 5000€ in a new or different tool. However, the fact that e.g. a laboratory has to identify the materials from film archives suggests that the film archives base identifications are not as accurate as they should be.
- 6.2. Degradation level assessment (CA004)
 - a) 23 of 34 acknowledge the need for a degradation assessment method is required, but only one archive would pay between 1000€ to 5000€ for an efficient tool. ³Respondents rely on regular film inspection (reel by reel) as FIAF recommends, but this is not realistic, because it is a huge time and workforce consuming task. It consists in rewinding each reel to ventilate and dissipate gases and to check visually in that moment the state of degradation. This is particularly critical for nitrate films.
 - b) The potential of NEMOSINE package lies in the continuous monitoring of reels for a long period. The crucial question is: What is the life expectancy of sensors and the MOFs? How long can they be used?
 - c) Both questions are being studied, but it is still too soon for determining it as the Nemosine project is at its 20th month of 48.

³ It must be stated that the respondents didn't know if this was supposed to be a 'per Package' price, or an overall price referring to exactly how many smart package units? This question was not clear.





7. PACKAGE MADE OF...

- 7.1. There are diverse preferences as regards the material of cans. Aluminium and plastic cans are most widely used, but there are more comments from the respondents on plastic cans.
- 7.2. Nobody refuses plastic, it is the most appreciated material. But its price is a problem.
- 7.3. Resistance is mentioned as a problem as boxes used in laboratories and distribution companies are not robust enough. NEMOSINE should focus on the strength of the boxes, valid for storage, handling and transport.
- 7.4. Even though polypropylene is an efficient material for our purpose, Nemosine is also considering other low cost thermoplastic materials that match the required functionalities.

8. VENTILATED CANS

- 8.1. To disipate film gases is a need and respondents appreciate ventilated cans for this reason. This is the other great purpose of the regular inspection recommended by FIAF. The comments on it have been explained in 6.2.
- 8.2. Ventilated cans require climatization and air renewal. Whithout this controlled air exchange ventilated cans will work against the whole reels in the vault by polluting the ambient. And this would be as dangerous for nitrates, as for acetates.
- 8.3. Closed cans pose obviously a high risk if not maintained, because the build up of detrimental gases will destroy the film at an increased rate.
- 8.4. NEMOSINE packages will still need the climatization, although they will allow a more relaxed conditions of temperature and RH, independent of in the end they are ventilated, closed or mixed. Air renewal is energy consuming and film archives should maintain this operation in all their vaults. Although it is not yet determined how much, the Nemosine package will allow to relax the climatization conditions, and it will produce an energy saving, and costs. One responding archive with an important nitrate film collection questions the utility of the NEMOSINE packages for nitrate films because, once the decomposition has started, it requires a more frequent inspection and forces the change of the box each time.
- 8.5. Up to what extent How will THE NEMOSINE PACKAGES help TO manage THIS PRACTICAL PROBLEM? The Nemosine sensors must alert of the nitrate degradation advance by detecting NOx gasses and it is still under study how to implement the alert system for each decomposition stage. Furthermore, the alerts from Nemosine packages and sensors should reduce the need of visual inspections.

9. PR PROBLEMS

- 9.1. Main problems are caused by derivatives of NOx and AA gases the degradation of nitrates and acetates, and magnetic tapes also, makes impossible their reproduction and digitization.
- 9.2. Solutions PR003

- a) There are some long term and efficient solutions like freezing and others whose purpose, in the end, is to win time.



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- b) To separate the vinegar syndrome affected materials prevents the dissemination of its catalytic effect, but it is not a curative solution
- c) Special chemical treatments are not preventive but curatives for a short-medium period.
- d) Molecular sieves: this solution requires money, time and workforce for inspection, so respondents are not satisfied with it. Its main problem is that it does **not alert**.
- e) Monitoring, which is another inspection need, and its problems.
- f) Selection: one archive proposes to check if it's a unique material and destroy the redundant, another archive proposes segregation and then reduction of RH, packing in vapour tight bags and -5°C storage, which is a good practice to avoid problems.

10. MOULD

10.1. To clean the film and to reduce RH below 60% or 50% is common practice, but is it sufficient?

- a) 60% or 50% RH for films is questionable, because it is only valid for magnetic tapes. The problem affects not only mould, it produces also base chemical degradation.
- b) Another element that respondents do not mention with regard to mould is temperature. However, the most effective for slowing down mould proliferation it is the combination of low relative humidity and cold temperature. One archive declares that cleaning the film and reducing RH does not eliminate mould at 100%, but it is a good practice.⁴

The Nemosine CURATIVE package is intended to eliminate fungus and microorganisms, as well as to adsorb higher acetic acid emissions in extreme degradation cases. This curative package will also be efficient in non conditioned environments.

11. NEEDS

Are the boxes an active conservation tool?

- 11.1. Almost 50% (15 of 34 respondents) agreed while 11 denied. Their comments are not considering the function of the box, neither discuss the proposed characteristics of NEMOSINE.
- 11.2. Ventilation appears again as a need.
- 11.3. An important practice, even in very important collections, is to reuse the boxes in which the reels enter the collection. Only one archive emphasized the utility of ventilated cans and how they improve conservation.
- 11.4. Against this argument other respondents stated that key for conservation are ambient conditions, rather than any kind of boxes. One archive refers to the research of Bigourdan and

⁴ Non of the archives has mentioned that proper conservation conditions (40% RH and 5° Celsius, air exchange) help avoid mould problems.





Reilly and his conclusion in favor of the conditioned vaults.⁵ And beyond this, other respondents indicated that the NEMOSINE package should control the weight of humidity in each reel.

12. MOST URGENT NEEDS

12.1 The same considerations than before:

- a) Change of boxes and cold vaults.
- b) Reproduction and digitization
- c) Personnel and budget for all those needs.
- d) Ventilation
- e) Time

13. COMENTS & OBJECTIONS TO NEMOSINE

13.1. The most positive comment deserves to be quoted entirely: “In relation to nitrates, a constant monitoring can be very useful to warn us of any chemical change that may occur, thus avoiding any type of loss. The acetates collection, from our current situation with a strong investment in the installation of cold, consider a change of cans, is totally unfeasible, but I find it very interesting for those collections in which assuming the construction and maintenance of such facilities is unfeasible; with Nemosine, if it really works and preserves the films in the same way as a volt does at low temperature and humidity, it could be a really important alternative, to be able to buy tin by tin, little by little, a system that preserves the filmic heritage, and even in case of emergency situations due to natural disasters such as floods.”

13.2. Nevertheless, there are feelings and consistent arguments opposed to Nemosine that are well summarized by the following comments:

- a) Archive 1(200.000 reels) prefers plastic cans, but don't considers cans to be an alternative active tool for preservation. The NEMOSINE package will be interesting only if it is competitive in price, because there are good products on the market already.
- b) Archive 2 (250.000 reels) doubts that NEMOSINE will be cost-effective, particularly not for nitrates, perhaps with regard to small acetate collections. Referring to Bigourdan's research, the danger can be excessive dehumidification of the reel when there is no monitoring of the weight and the humidity in the film.
- c) Costs of Nemosine package: Archive 3 (250.000 reels) clarifies the expectancy about prices and highlights the geographical difference in needs: the same degradation problems are more urgent in tropical and subtropical countries, because the decay is quicker.

⁵ Jean-Louis Bigourdan and James M. Reilly “Effectiveness of Storage Conditions in Controlling the Vinegar Syndrome: Preservation Strategies for Acetate Base Motion-Picture Film Collections”.
https://www.imagepermanenceminstitute.org/webfm_send/307





14. PROPOSALS AND CHALLENGES FOR THE NEMOSINE PACKAGES. FACING CRITICS, MAKING QUESTIONS

14.1. NEMOSINE package could be a great advantage for the regular inspection thanks to the continuous monitoring of reels for a long period. The life expectancy of the NEMOSINE package is a crucial question. Is it the same for every element?

- a) Sensors
- b) MOFs foam

The functional life of the MOF's foam and of the sensors will be crucial. Both must last the same, allowing to replace them and to inspect the reel at the same time.

14.2. How does NEMOSINE package manage the humidity and temperature conditions? These factors depend on the climatization of the vault rather than on each reel. Then, for a more precise -but not individual- control of each reel, RH and T measurements should be divided into sections inside the vault.

14.3. NEMOSINE must be seen also as an alternative for unaffordable expectations and as an interim solution: Good conservation until the reproduction or digitization step.

14.4. To showcase the individual use of the package inside a vault or a collection. Nemosine is useful even if not all the packages in a vault are going to be changed. To change all the cans in a vault would be necessary to achieve the energy saving that the package can provide. The change of the whole packages in a vault is more feasible for small vaults, which usually are for nitrates.

14.5. Package on demand:

- a) The color of the lid is frequently used to distinguish film bases, e.g. nitrate, acetate or film types (negatives, prints ...). Different colours are feasible as it is an easy and very extended industrial process.
- b) Could the sensor be separated, one for nitrates and other for acetates? Will it have an impact on the price? To separate sensors by their functionalities could save costs and work out well for a gradual implementation in the film collections.

14.6. Box Size:

The Nemosine package prototype is a round box for 35mm film and 38cm diameter. Once the functionalities of this prototype are checked, the Nemosine project will analyse a rectangular shape solution.

