

Evaluation NEMOSINE Questionnaire User requirements - MOVIES



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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 760801



Introduction

As a follow up and building on the results of D1.1, a more elaborated and refined questionnaire has been developed and spread to a larger group of respondents. The aim was to gather more detailed and more qualitative as well as quantitative information about the quantity and composition of holdings, packages in use, environmental conditions and storage concepts, preservation status and how it is assessed, preservation problems and actual measures to deal with such, as well as requests and needs to improve the long-time storage conditions of the respective materials.

DFF and Filmoteca Valencia circulated the questionnaire to the members of the International Federation of Film Archives - FIAF (164 members) and the Association des Cinémathèques Européennes – ACE (44 members). DFF also sent the survey to 75 contacts that are not represented in FIAF and/or ACE: smaller regional archives, private collections, foundations, universities, film schools; museums with mixed media collection; experts & service providers; film festivals; stock footage and commercial film libraries; television archives, other. OEAW personally contacted five more institutions with smaller holdings as well as conservators and service providers.

Response statistics:

79 persons took the survey (at least in parts)¹. This is the number of reference for calculating the percentages given in this report.

Thereof, 51 persons fully completed the survey, 28 completed the survey at least partly.

Thereof, 41 respondents indicated name and institution (optional question).

Thereof, 22 respondents represent ACE / FIAF archives (ca. 28%).²

The total number of film reels held by the respondents of this survey is close to 4.000.000.

When evaluating the survey, qualitative statements have been pseudonymised, but to allow content related analysis, they are cross-referred by indicating the consecutive numbering of the respondents according to the number of page views (case). Therefore this cross reference can exceed the total number of 114 survey openings. Nevertheless, the individual respondent can be matched to this number (same numbers indicate the answer of this individual person/ institutional representative).

The questionnaire has six chapters, covering the topics Quantity, Packages, Environmental Assessment, Collection Assessment, Problems and Needs. The numbering of the questions is referring to the layout of the survey, which can be found in the appendix.

¹ We didn't count those who only opened the survey (total number including opening only =114, total)

² Followed by municipal and regional film archives (7) not represented by ACE or FIAF.

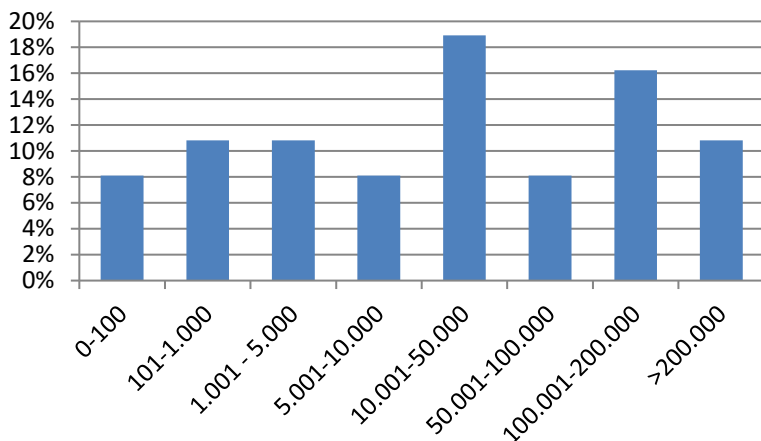




Q Quantity

Q002 Please indicate the size of your collection (reels or cans):

Fig. 1 Size of collection

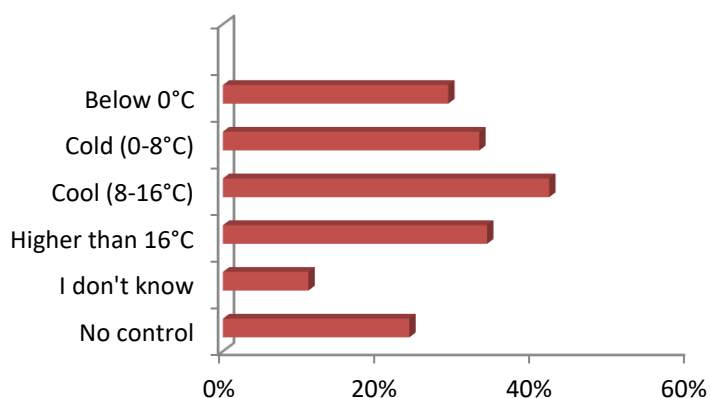


N= 79 ; Valid answers: 40

19% of the respondents have a medium sized film collection³ with more than 10,000 cans (19%), and 16% of the respondents have a large collection with more than 100,000 cans.

Q004 What is the climatic condition of your storage facility? Please indicate the percentage of your holdings stored under the given conditions (Multiple answers possible)

Fig 2 Temperature



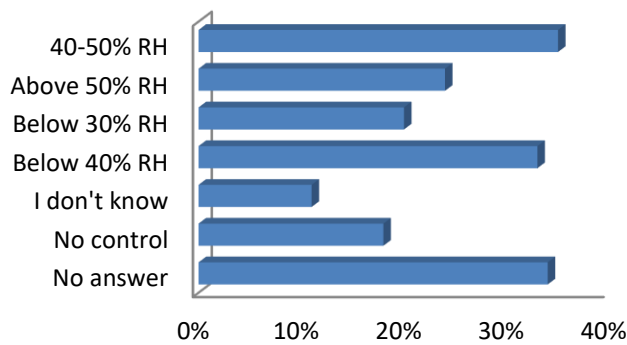
N= 79; Valid answers: 40

³ (while there is no given specification of the term medium" sized, so an assumption according to the results of the survey would be between 10.000 and 50.000 items)





Fig 3 Humidity:



RH=Relative humidity

Q005 Please comment and/or explain your storage conditions and strategy:

Participants were asked to outline their storage concepts more detailed.

Most respondents have different vaults with different climatic conditions, depending on the kind of material that is stored (e.g. nitrate or acetate, original negatives, release prints, pre-print elements, e.g. sound tracks, outtakes, work prints). For original negatives, nitrate, pre-print elements storage is often colder than for viewing prints (to save on energy costs).

More than 40% of the collections is stored in cool conditions (8°-16° Celsius) 24% of the respondents indicated that they do not have climate control, and 11% indicated that they don't know. One of the reasons is because the respondent doesn't have storage facilities, but depending on guest storage facilities whose climate conditions cannot be controlled.

The answers give a quite diverse description of situations and range from suboptimal situations to elaborated storage facilities and external storage. Several archives can provide storage options that are well monitored and individually optimized to meet the requirements of the respective materials and their preservation needs, while a few archives do not even have proper archival rooms or climate control. For some archives the actual storage situation is only an interim solution, other archives try to build partnerships with universities and/or private archiving centres on digitisation, restoration and storage. Analysing the answers it is obvious, that the awareness and knowledge about storage concepts is very high and in some cases perfectly implemented according to FIAF recommendations, while other archives cannot realise them mostly due to lack of funding.

Nr.	Comment
43	Storage was mainly designed for video tapes
85	we do have 3 spaces which contain the film collections, prints and original materiel of the Israeli collection. At the moments the prints and the original negatives are located in the same space, but we are intending to separate them
86	Coldest: Material on nitrate carrier, and pre-print elements. Warmer: Viewing prints and unprocessed material.



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- 91 We have two vaults: one for film material and another for video material. In the first, there is a separate compartment for nitrates and a transition space. We currently use plastic containers specially designed for conservation (project ibermedia / fiap 2009), with advice from a partner, which involved several Latin American archives and were manufactured in Chile. We are interested in being aware of technological innovations for storage that can eventually be used for Latin American archives. We have plans to expand our vault so we are interested in the subject of new packaging.
- 99 We have 4 vaults for keeping film collections in low temperature. Films with vinegar syndrome and nitrate are kept in regular storage without climate control and we have to keep them outside the city for government stipulations
- 104 Approximately 95% of our nitrate is processed and in climate controlled vaults (38 degrees F / 20% RH). The remaining 5% will be processed starting later this year and put with the rest into the climate controlled vaults.
- 105 Our main aims is to achieve correctly our two agreements: The first one with a private Archiving Center to restore and digitize our video and audio collection , and the second one with a University - Audiovisual Department - in order to restore , digitize and store our film collection . These agreements are in our perspective to let other and private institutions to get involved in the Film Preservation strategy. And to create a permanent link and collaboration between the archive and the University.
- 106 Since the building of the Film Archive in our city has been converted (rather than built) to serve as a storage facility and since the other vaults have been built for the preservation of paper-based collections (not film), the environmental conditions currently do not meet the best practice in the case of most elements (i.e. colour and black-and-white cellulose nitrate and acetate-based films and photographs, magnetic tapes and others).
- At the moment, Film Archive has got three different storage areas where:
- 1) we are able to control the temperature and relative humidity completely (12%);
 - 2) we are able to control only the relative humidity with portable dehumidifiers (83%);
 - 3) there is no control over the temperature or relative humidity (5%).
- 107 The storage facilities are an interim solution until the collections will be transferred to the new archive building (2024) with appropriate storage condition.
- 116 We as a service provider do not have a permanent film collection. All the films we have are temporarily stored in our facility. We separate safety films in good condition, nitrate films, film or mag tape with vinegar, video or mag tapes in good condition. Nitrate film and vinegar film are stored in ventilated fireproof cabinets with temperature about 20 degrees without humidity control. Other materials that are in good condition are stored in a storage room with temperature about 16 degrees and no humidity control.
- 132 We have a target that all collections should have 500 year remaining life expectancy. Older collections and color preservation elements are stored at minus 5C and newer/print collections are stored at 5C to meet this target.





- 135 The film collection is kept together with our book collections. The storage-rooms are not air-conditioned, especially in the summer month temperatures up to 30°C and more can be reached. The humidity is rarely above 45%. Climate and air-quality are not controlled, we are working on a climate concept for our collections.
- 185 RH/Temp monitoring and drying apparatus in one storage room
- 193 Unfortunately we don't have enough cool storage space available, therefore we put rare, valuable and delicate material to cool storage and distribution copies to access storage. Nitro cellulose material is in external storage.
- 199 We have about 80 % of filmic materials in our repository and about 20 % in external repositories
- 202 The storage of the film collection (60 %) is spatially separated from magnetic film sound (sepmag) (40%)
- 212 The storage conditions result from cost reasons and reasons of accessibility.
- 215 Our preferred conditions for storing films would be -20 C 35%RH. We do not have the resources to do this. We have just moved to a new facility for safety films: 1 vault -5 C 35% RH, 4 vaults +5 35% RH. There is no possibility to improve this in the future, either short term or long term. We are working on a project for a new facility for nitrates, aiming at -5C 35%, hoping to get it in a time frame of 10 years.
- 223 Storage rooms cannot be heated, no daylight, temperature and relative humidity not measurable, 80% of the film copies are stored in Dancan boxes.
- 227 With our old HVAC system (prod. 1986) actually we can have a certain control of ventilation and temperature hardly bringing it down to 8 degree Celsius, but not lower. We cannot control humidity so we do it mechanically by opening the vaults doors to create air flow.
- 231 No funding for proper storage facilities, therefore climate depending on guest storage facilities whose climate conditions we can't control. 49,7 % of the collection stored at above 16° C and above 50% RH due to building condition of guest storage building which has no temperature control and the outer walls of which have never been secured against humidity influx from outside.
- 236 At present, only a climatic monitoring of the magazines and storage areas for audio-visual media can take place. For the entire new accommodation of the historical archive of the city is currently a concept developed, which is to be implemented after 2024. In the reorientation, the archival accommodation of the audio-visual media will play a major role.
- 245 storage: external
- 246 successive transport of a part of the film collection into a climatic chamber with temperatures around -4 ° C
- 279 The materials in plastic support of cellulose acetate are at 10 vaults, according to their acetic degradation level; 8 of which are at 3°C and 30% RH, and 2 at 10°C and 40% RH. The materials

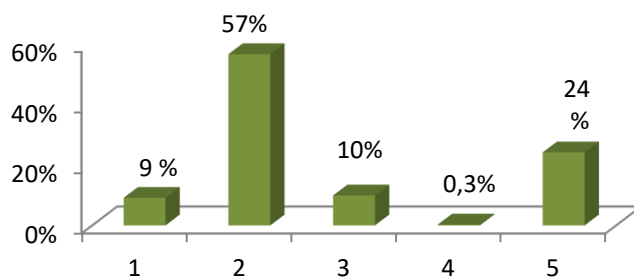


on cellulose nitrate support are distributed in 7 volts, of which 6 are at 3° C and 40% RH and 1 at 10°C and 40% RH. The short term strategy is to stabilize the chemical degradation of the film collection, with a forecast of freezing the collection, for which the facility is prepared.

329 We store positive print at 16° C and 50 % RH, and negative copies are stored in a small cellar at 10° C and 35 % RH.

Q006&7 What is the constitution of your film collection (chemistry of the film base)?

Fig. 4 Chemistry of film base



N= 79; Valid answers: 40

- (1) Nitrate
- (2) Acetate
- (3) Polyester
- (4) Other
- (5) Don't know

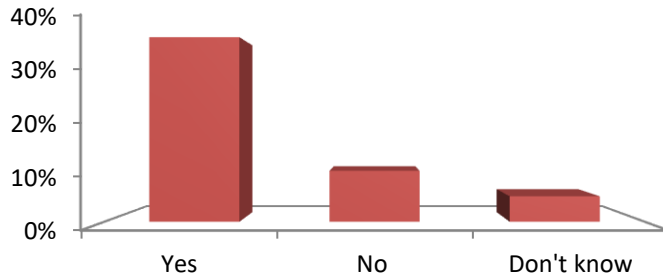
The majority of the film collections is based on Acetate film, followed by Polyester. Nitrate constitutes only 9% of the collections. 24% of the respondents indicated that they do not know what the constitution of their film collection is.

There are also a few other film carriers and video formats mentioned: Soundtracks on separate magnetic carriers, ozaphan films and video formats: D1, Digibeta, Beta, Ampex, DA88, as well as optical discs.



Q008 Does your film collection contain combined film elements with magnetic audio tracks alongside the film image (ComMag)?

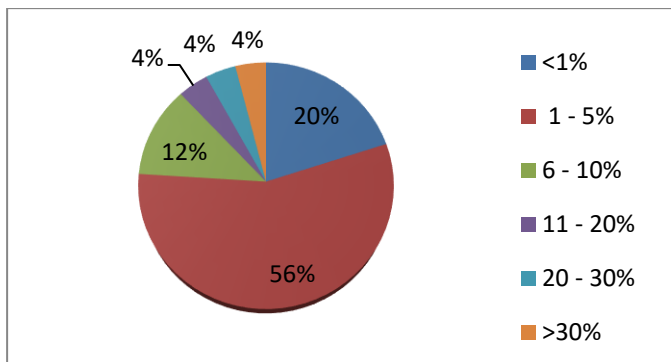
Fig 5: ComMags in collection



N= 79; Valid Answers: 40

Q009 If yes, please estimate in %

Fig. 6 Percentage of ComMags



N= 79; Valid answers: 25

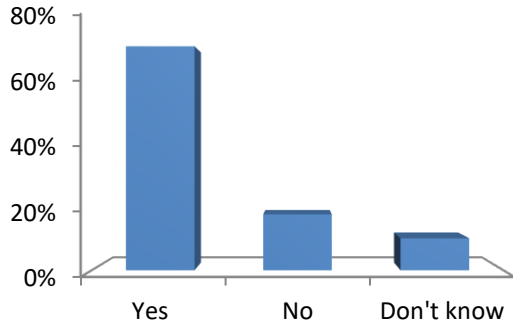
The percentage of ComMag holdings in the respondent collections is low and varies in 56% of the cases between 1-5%. This information is important, as the magnetic coating alongside the film image is giving an even more complex situation for the long-time preservation and chemical stability of materials. ComMags are more vulnerable to vinegar syndrome.

It is well known that full-coat magnetic film sound elements on cellulose acetate (so called SepMag tapes) are heavily suffering from vinegar syndrome. Therefore the next questions were outlined to collect data about their quantity and storage conditions:



Q010 Do you hold separate magnetic audio tapes / full-coat magnetic film sound elements on cellulose acetate base material (SepMag)?

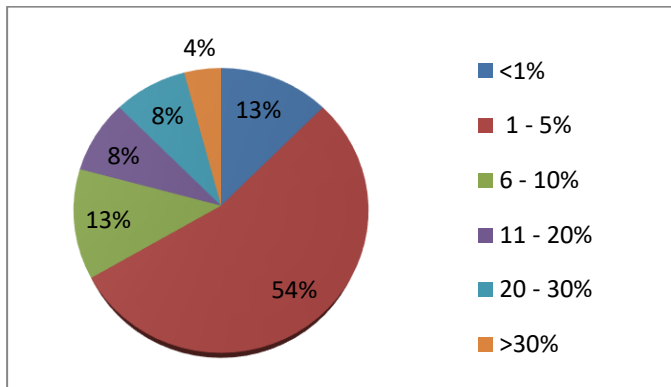
Fig. 7 SepMags



Valid answers: 39

Q011 If yes, please estimate in %

Fig.8: SepMags in collection



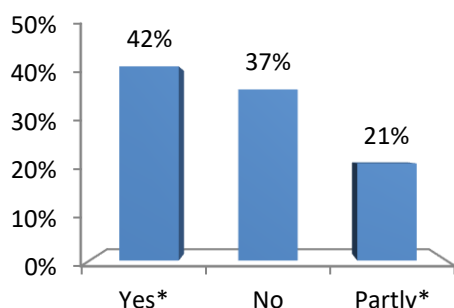
N= 79; Valid responses: 24

4% of the respondents indicate that their collection of SepMag tapes is larger than 30% of the total holdings, 8% holds between 20-30% of these materials, while the majority has only low numbers (1-5%) of SepMag tapes in their collections.



Q012 Are your SepMag stored in different cans as your movie films?

Fig.9



Valid answers: 43

Q013 Please comment and/or explain your storage conditions and strategy

The answers to this question show, that the situation for SepMag materials is also diverse, but seems to be in many cases worse than the storage situation of film materials only. Monetary reasons are again predominant:

Nr.	Comment
-----	---------

- | | |
|-----|--|
| 85 | we are trying to follow fiaf recommendation, it is a very hot country and its very difficult and expensive to lower the values of the storage |
| 105 | We are not satisfied of our holding and storage conditions, due to the lack of a sufficient comprehension and financial means in the Public sector. So I tried from the beginning to establish links and relations with the private institutions to spread the appreciation and the importance of the Cinematic Heritage Preservation. And our role is to assist them. |
| 106 | SepMags are stored in different storage rooms than film elements. Also severely deteriorated SepMags are kept separately from those SepMags, which are in good condition. However, there is no control over the temperature in both of these vaults. |
| 107 | The storage facilities are an interim solution until the collections will be transfered to the new archive building (2024) with appropriate storage condition |
| 132 | Good condition mag is stored at 8C, Vinegar affected mag is stored at -5C |
| 185 | for budgetary reasons, more or less ambient conditions, cf above |
| 193 | Most SepMags come in cardboard boxes. Since we keep elements in original packaging they stay in their cardboard boxes as long as these are in good condition. |
| 215 | in the past sepmags could be stored together with film in the same can - we are working on separating them. |
| 227 | We aim to set up a new clima system with which we can control the temperature and the humidity inside our six film vaults. We are open to new technology projects and are fan of green technologies. |



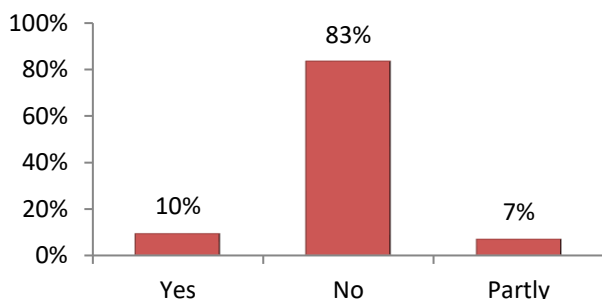
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- 228 11°C/40 HR for sepmag
- 231 No funding for proper storage facilities, therefore no proper separation of materials
- 236 The film and sound materials are subject to the same storage conditions.
- 245 Please note: so far, we trust the experience and the professionalism of the federal archive
- 249 We are about to develop new strategies.
- 326 Below 12%, below 30C RH

Q14 Are your SepMags stored under different climatic conditions as your movies?

Fig. 10 SepMags



P Package

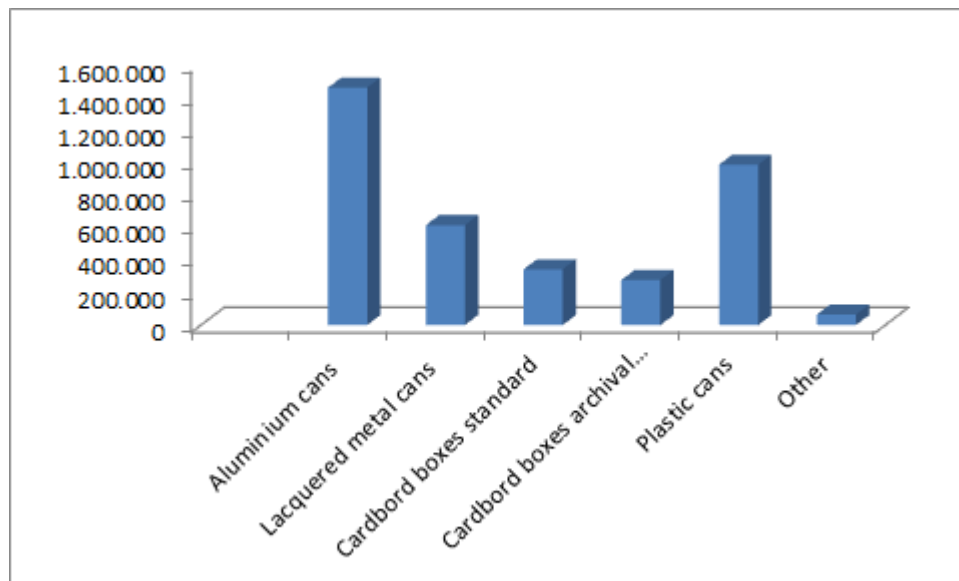
P001 Your films are stored in:

Respondents in (%) / collection (%)	Aluminium cans	Lacquered Metal cans	Cardboard boxes standard	Cardboard boxes archival quality	Plastic cans
10% of collection	26 % of respondents	37	58	71	22
20%	11	16	21	0	19
30%	22	11	11	0	11
40%	11	11	0	0	7
50%	4	5	0	0	11
60%	7	11	0	0	7
70%	11	0	0	14	11
80%	7	5	0	0	7
90%	4	5	11	0	4
100%	0	11	0	0	0

Fig 11 Your films are stored in....(total numbers)



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Total nr. of reels in respondents' collections: 3.957.877

The comments show, that the preference for package material is either based on conservation considerations / needs or logistical / practical aspects:

Nr.	Comment
99	Polypropylen boxes for small formats
106	Standard and archival quality cardboard boxes are actually less than 10%. We think it would be very handy if the cans which contain different film elements (print, negative, duplicates etc.) would be in different color. We also prefer cans which have smooth surface (good for labeling).
117	We use different cans depend on the clients' preferences. We mainly use the Kodak metal cans and plastic cans.
135	All 16mm Films (the majority of the collection) is stored in aluminium cans as well as cardboard boxes. Some of the films are stored in plastic cans and cardboard boxes. Audio Material is stored in Cardboard boxes.
185	Estimate. Not known precisely
193	Cans are not routinely replaced when the films enter the archive, therefore many different sizes and materials.
202	Negative film is stored in lacquered metal cans (within plastic bag). Positive Film and sepmag is stored in cardboard boxes (archive quality)
213	Metal cans which are nickel alloy (nickel, zinc)



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- 215 10 plastic unspecified and not ventilated (distributors cans)
we are aiming at 100% PP vented cans (Tuscan), but we cannot afford to recan everything (time and money are lacking)
- 231 Due to lack of funding, 95% of all cans/boxes have to remain the same as on arrival
- 236 Numbers are estimated
- 245 comment: I am not sure about the difference between aluminium cans and metal cans.
With aluminium cans I intend the cans used by the laboratories for film stock storage they are not lacquered, and have different labels (stickers) on them with specifications.
- 279 It is not in relation to the materials but to the colors, we use a color code to identify them more easily. Red for nitrates, black for negatives or preservation materials (acetates and polyester) and green for diffusion materials (acetates and polyester).
- 351 We have 95.8% lacquered metal cans, 3.8% archival PP/PE cans and 0.8% steel or ABS cans. Steel or ABS cans are going to be replaced by lacquered metal or archival PP/PE cans.

P003 Which of the materials above do you prefer for your film cans? Why?

Nr.	Comment
48	plastic, no rust
85	for original negatives we preferred coated metal cans, the cans sit on each other in a very safety way, our shelves at the archive is moving and stability is very important to us for print we use both plastic and metal cans
86	plastic
91	plastic cans (polypropylen). Now it's the best material we can provide here in Chile for storage film, without make an special importation.
99	aluminium because I think is a strong steady material
104	The metal cans seem to be doing a good job while in the climate controlled vaults. I would imagine cardboard to be bad for nitrate in general - especially deteriorating nitrate.
106	Don't have preferences at the moment. We'd rather prefer plastic or aluminium because of the functionality.
118	For nitrate especially decomposed nitrate and vinegar films, we prefer to use plastic cans because it would not get rusty and easy to clean.
131	plastic cans - is save of dust, spends a micro clima, allows to use molecular sieve



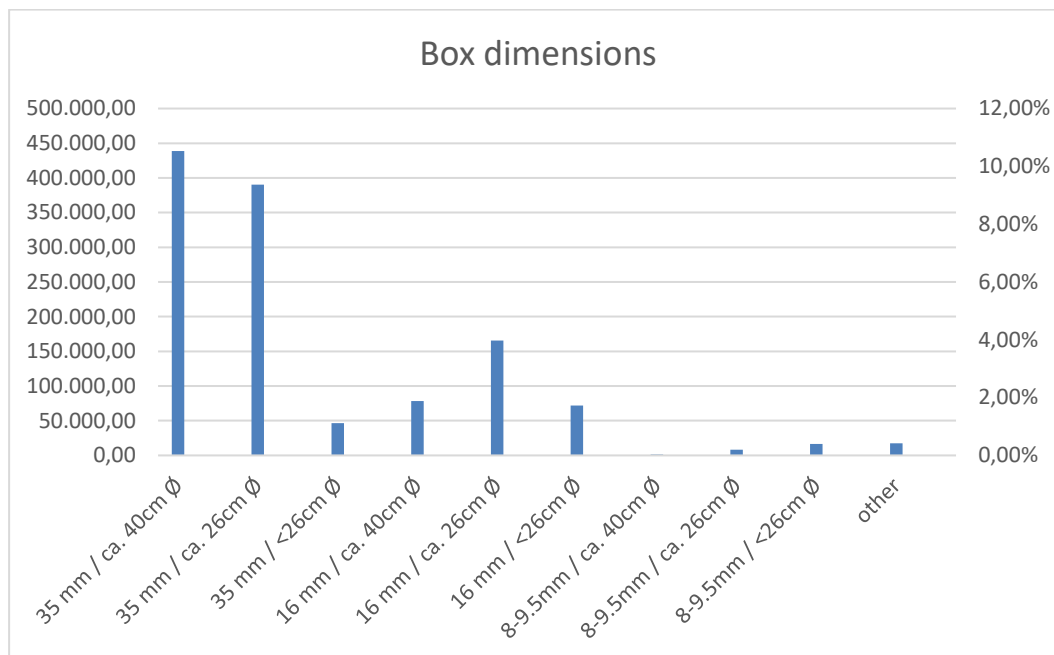


- 132 We prefer PP as they are inert and tested as such. They are however expensive and we only repackage ad hoc, since we know good macro climate is more important than packaging.
- 135 I would prefer either cardboard boxes (archival quality) or plastic cans allowing air circulation and easy to open.
- 193 Inert, archival quality cans; lacquered metal or PE or PP
- 199 plastic cans (polypropylen / polyolefin). It's light, clean and It has a good permanent
- 200 Desjardin Stone finished Type Hollywood.
- 215 Plastic cans are better to handle
- PP vented cans brand Tuscan for films that stay in-house or go to lab
- PP cans from Sary (CZ) or metal coated from Desjardin (FR) for films that travel (the Tuscan do not resist shipping with regular transporters)
- 223 plastic cans, good for transportation
- 226 As regards recommendations the FIAF, the nitrate materials should be stored only in the aluminium cans, the others - in the plastic cans.
- 227 plastic cans, because of the rust problems we have in some of the metal cans
- 228 Plastic cans, because of their stability.
- 231 Aluminium cans, since I was told in archive education that they don't interact chemically with films and tapes
- 236 So far only a small percentage of existing films has been repackaged. Plastic cans were purchased.
- 245 Aluminium cans, because they are light and they do not have the plastic smell.
- 246 We prefer for all materials aluminium cans and lacquered metal cans.
- 255 plastic cans (polypropylen / polyolefin)
- 279 Plastic cans made of polypropylen designed to ensure ventilation inside the can.
- 326 No preference
- 351 Lacquered metal cans. Because they are robust and have good resistance to corrosion.



P005 Please specify the common different box or can dimensions in your film collection and quantify them

Fig. 12:



N= 79; VA: 18

Only 18 valid answers were given to this question, and thereof not all formats were described (only 32% of the total holdings counted in this survey), most probably due to unavailability of information.

The results show that the majority of box dimensions is 35mm/40cm and 26cm diameter (20%), followed by 16mm/26cm diameter (5%), 16mm/ 40cm (2%) and 16mm smaller than 26cm diameter boxes (2%). The number of other box dimensions is very low (around or below 1%).

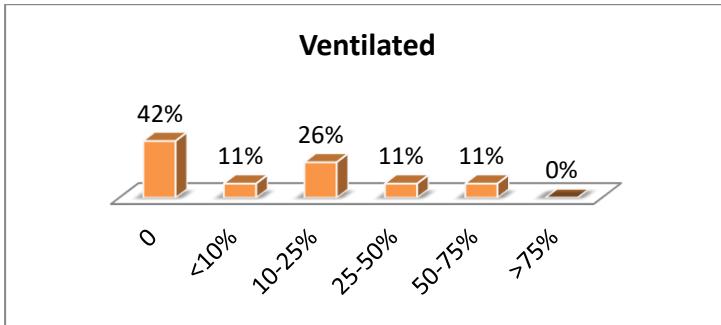
Please define and quantify other formats and can sizes, if possible (l * w * h):

Nr.	Comment
185	not inventorized yet, cannot derive information
202	not specified
215	6% are 70mm, tapes, cardboard boxes for sound, sound cassettes and I certainly have no time to give specifics (you gotta be kidding me!)
227	200 cans of diameter 60cm containing 35mm films (0.45%) 4300 cans of diameter 30cm containing 35mm films (98%)
246	We have no way of requesting this. We have all listed sizes.
279	70mm / 30mm / 28mm / 17,5mm. We use the same 35mm plastic cans for these formats, except for the 70mm, which we keep in the original cans.



P007 Your film cans are...

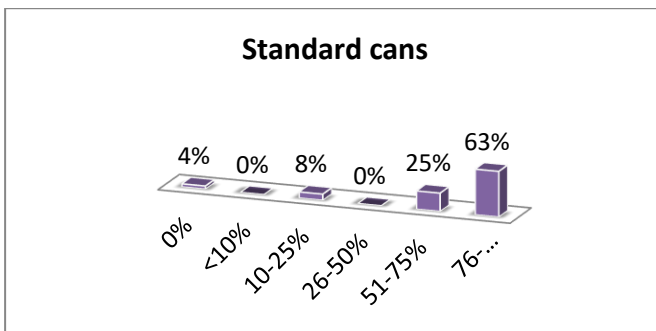
Fig 13



N=70, VA= 18

More than 40% of responding archives don't use ventilated cans at all. 11 % of the respondents use ventilated cans for less than 10% of their collection.

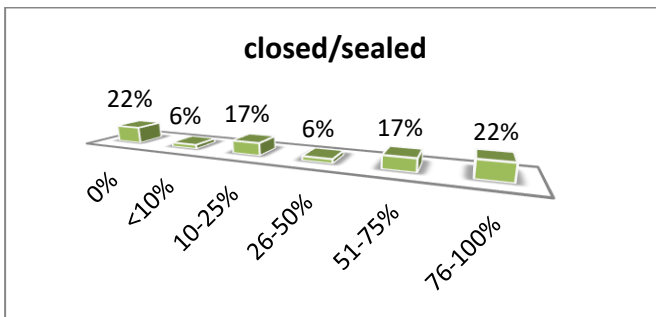
Fig14



N=79; VA=24

More than 60% of respondents store 76%-100% of their collection in standard cans.

Fig. 15



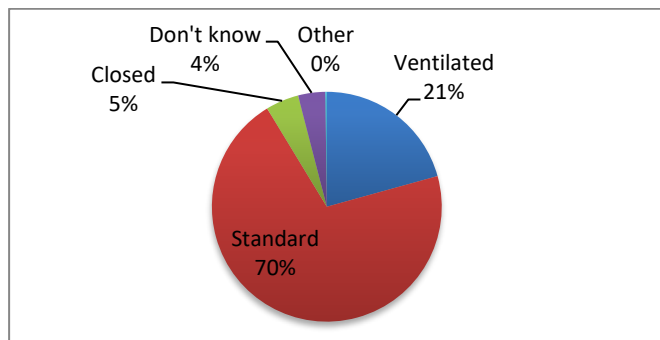
N=70; VA = 18

22% of respondents don't use sealed cans at all, 22% of respondents store the majority of their collection in standard cans.



Storage concept/situation cans summary:

Fig.16



4 % of the respondents indicated that they do not know about the storage situation.

P7_06 Please define other storage situation or comment:

Nr.	Comment
118	All our cans are standard.
135	All films are in film cans and cardboard boxes. Some of the cans are very tightly closed and can hardly be opened. Under these circumstances there is hardly any ventilation
215	we stored unprocessed amateur collections in their own containers grouped in plastic PP crates (after weeding out vinegars)
227	One part of the collection was stored for years in aluminium evacuation cans containing 6 metal reels each. Now we are in the end of the process of taking the reels out from the aluminium cans and re-ordering them in the vault. We do this for better ventilation and to avoid gases trap inside the evacuation cans.
236	We use the original packages
279	Our colleagues at the Film Archive have carried out studies with wood, arguing that the moisture and gas exchange ratio is much more effectively self-regulating than with plastic.

P8_01: What is your opinion on ventilated cans?

The majority of the respondents prefer ventilated cans, as they allow air circulation for removal of released gases. Only a few respondents answered, that they would recommend them only in combination with good climate control, or that they do not have an opinion yet:





Nr.	Comment
48	better than standard when in active a/c with fresh air
72	a very good idea
86	some ventilation is desirable
91	It's the best cans that we know until today.
99	do not know if it really helps
104	I think ventilated cans should be tried out in cold storage
106	It would be very beneficial to our collection. Looking forward to the development
107	Very good
118	The ventilated cans are good for the film inside but it will contaminate the storage space. Also as far as I have seen, the lid on ventilated cans are too loose and all the material especially plastic are too weak.
131	are critical, if the storage conditions are no perfect; be afraid what can be happen when vinegar odour from one copy enters the box of an healthy film in another box.
132	Ventilated cans are not necessary in good climate conditions. In general the effect of temperature and humidity greatly exceed effects of packaging.
135	Since a large part of our collection consists of cellulose acetate, the purchase of ventilated film cans would be an important conservation measure
193	appears useful concept
193	We would prefer ventilated cans to remove deterioration byproducts but our storage spaces do not have a fully satisfactory level of cleanliness (air-borne dust), therefore closed cans are used
199	Think that better that the tins have ventilation
212	The concentration of gases in the film cans can be reduced.
215	In climate controlled clean vaults: the best. I wouldn't recommend them to archives with poor climate control or poor staffing. Tuscan are the best but too fragile for transport StilDesign are sturdy but waste 20% of storage space (too high) - perfect for robots but not for humans DanCan ventilated are a joke.
227	Experts in the workshops we attended recommend ventilated cans. Gases released do not stay inside the cans to favor decomposing of the film. On the other hand, presence of the dust and other environment agents may increase inside the ventilated cans, because of the ventilation entrance
228	Very important for the gazes to escape.
231	Due to lack of funding, we never had a chance to study their qualities



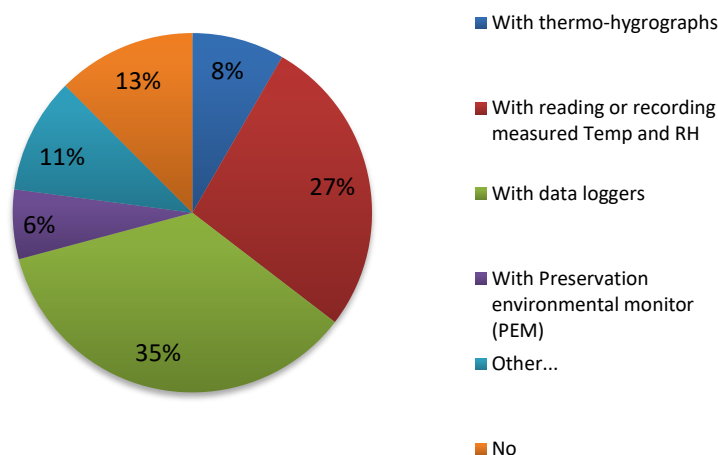


- 245 I have no opinion yet.
- 255 are supposed to better according to archival organizations
- 279 The cans with ventilation system in combination with low temperatures and air renewal are for now the best way to preserve the film collection, although in the nitrate materials should be monitored regularly, especially in those cases where some chemical alteration has been detected
- 351 Ventilated cans can facilitate removal of harmful acidic or oxidising gases from film materials.

E Environmental Assessment

E001 Do you monitor temperature and humidity in the storage facility? (multiple choice)

Fig.17



VA=68

E001_06a Please indicate other or comment:

Nr.	Comment
104	External monitoring for Academy. We rent their vaults.
227	We have 5 PEM by IPI but have to renew our subscription.
231	solely temperature measurement as we can't afford thermo-hygrographs, data loggers or PEM
245	the federal archive is doing this.
249	once in a project environment



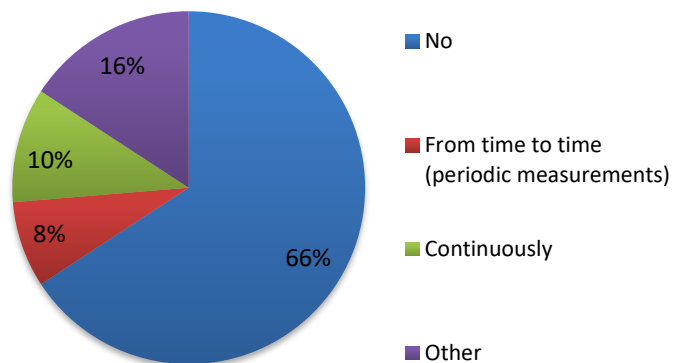
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E002 Do you monitor indoor air quality (pollutants) in your film storage?

The majority of the respondents indicate that they do not monitor the indoor quality in their film storage vaults (66%), while 10% monitor continuously the air quality:

Fig.18



VA=38

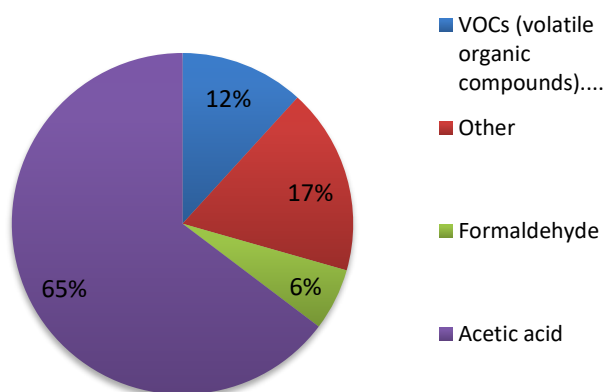
E0022_04 Comments

Nr.	Comment
86	not for all vaults
104	External monitoring for Academy. We rent their vaults.
132	Acetic acid monitoring in vinegar vaults

E003 What pollutants do you assess in the monitoring process?

Out of 17 valid answers, acetic acid is the most assessed chemical (65%), followed by others (17%), Volatile organic compounds (12%) and formaldehyde (6%).

Fig .19



VA= 17



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E003_03a VOCs please specify:

Nr. Comment

228 Nox: Oxyde d'azote, So2: Dioxyde de soufre, O3: Ozone

E003_4a If other, please specify:

Nr. Comment

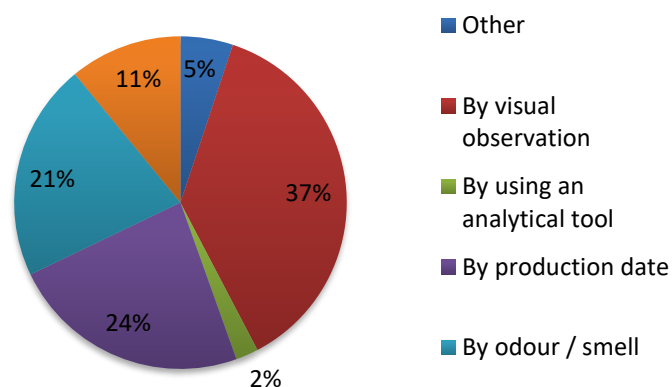
104 External monitoring for Academy. We rent their vaults.

231 mold

279 Nitrogen gases

CA Collection Assessment Movies**CA001 How do you identify the film composition (chemistry of film base?)**

Fig. 20



VA= 68

CA001_04a By using an analytical tool – Please specify:

Nr. Comment

185 IPI strips; FT-IR (Infrared-spectroscopy) if needed

228 Polarized filters for acetate/polyester detection





CA001_05a By chemical testing

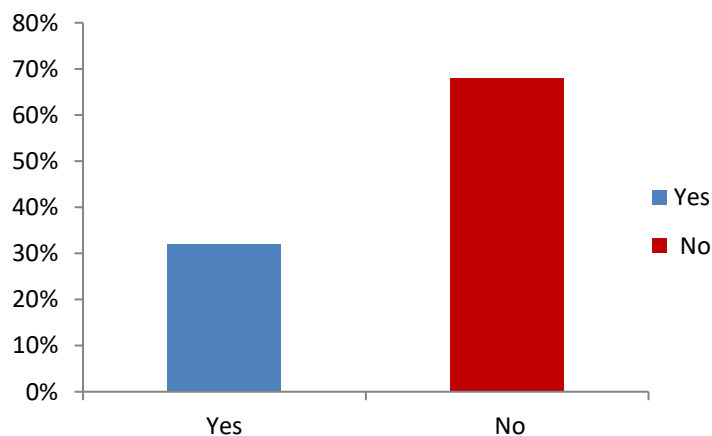
Nr.	Comment
106	If possible, then burning test. We did so to detect nitrocellulose film. Testing was done in collaboration with our fire department.
132	AD strips
118	Sinking test of nitrate using trichloroethylene.
215	float-test in trichloroethylene
226	We test it by using the trichlorethylene pure.
227	using AD-Strips, measuring the acetic acid level

CA001_06a Other

Nr.	Comment
193	By touch
213	AD strips
215	very occasional burn test for nitrate / diacetate

CA002 Do you need a more reliable method for identifying the film composition?

Fig. 21

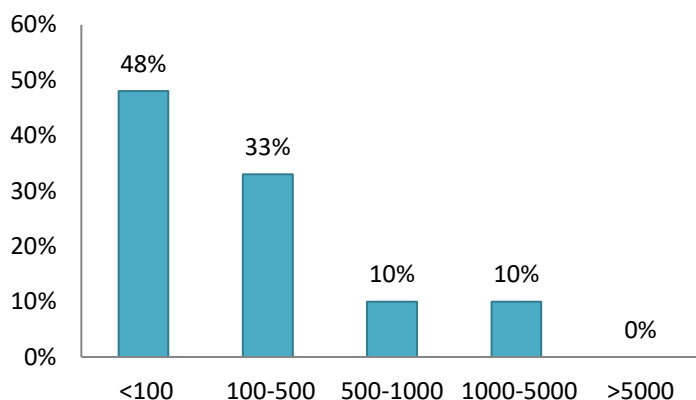


VA: 34



CA900 If yes, how much could you spend for such a tool? (in EURO)

Fig.22

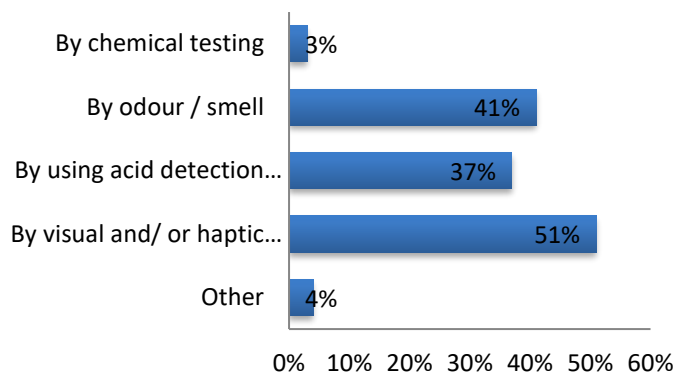


VA=21

Out of 21 respondents, almost 50% can only pay less than 100 EUR for a tool identifying the film composition.

CA003 How do you assess the condition/ degradation level of your films? (Multiple answers possible)

Fig.23



CA003_04a By chemical testing – free text

- research student project on determining CN decomposition

CA003_05a Other:

- with the help of our conservator
- AD strips
- as far as I know, we have had only one vinegar syndrome case. This was discovered by the laboratory.

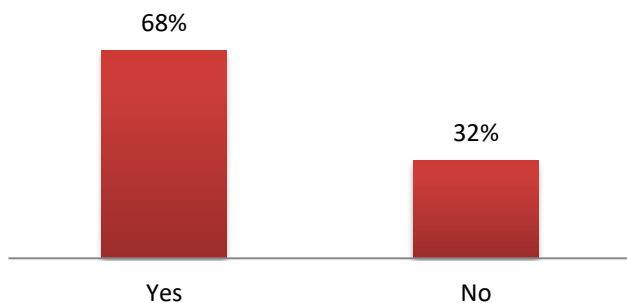


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CA004 Do you need a more reliable method for assessing the condition / degradation level of your films?

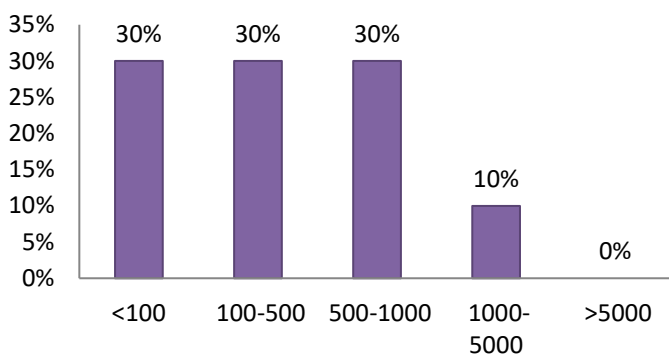
Fig.24



VA= 34

CA10_4bb = If yes, how much could you spend for such a tool?

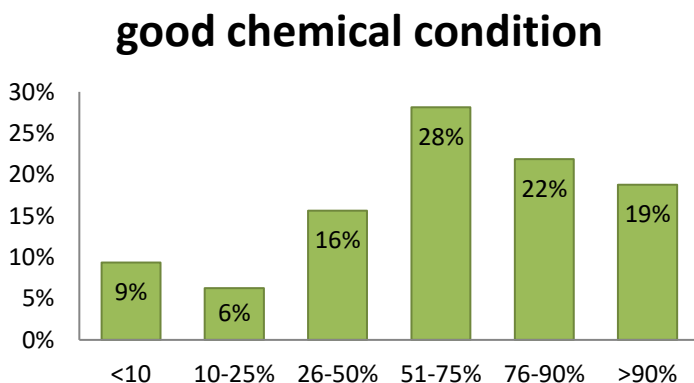
Fig.25



VA=10

CA005 How many of your films are in good, mediocre or poor chemical condition?

Fig. 26



VA= 32

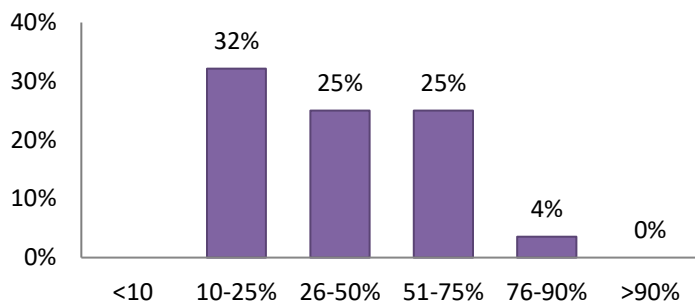
19% of the respondents indicate that, more than 90% of the collection is in good chemical condition. 9% indicated that less than 10% of their collection is in good condition.



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Fig. 27

mediocre chemical condition

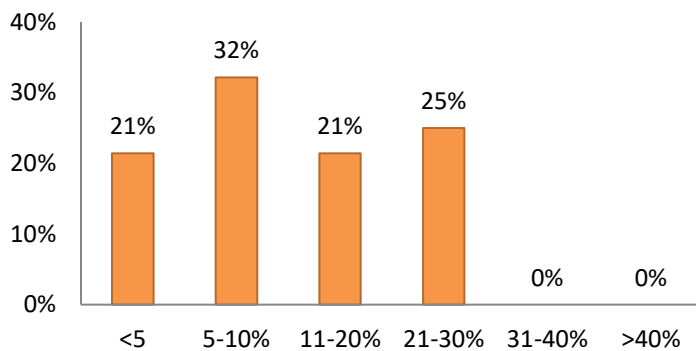


VA= 28

For 14% of the respondents, less than 10% of the collection is in mediocre condition, for 32% of the respondents, 10-25% of the collection is in mediocre chemical condition.

Fig.28

bad chemical condition



VA=28

25% of the respondents indicated that 21-30% of their collection is in bad chemical condition. Overall, the percentage of collections in bad condition is max. 30%.

CA005_11 I don't know

Only five of the total respondents indicated that they do not know the chemical condition of their collection (7%).

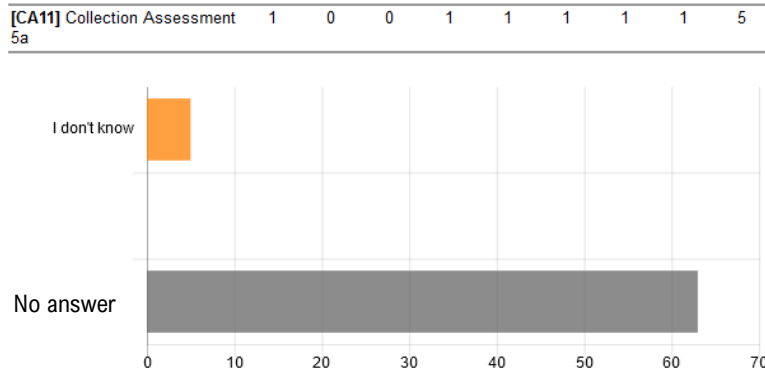




PR Problems

PR001 Do you have significant problems with the vinegar syndrome / acetate degradation?

Fig.29

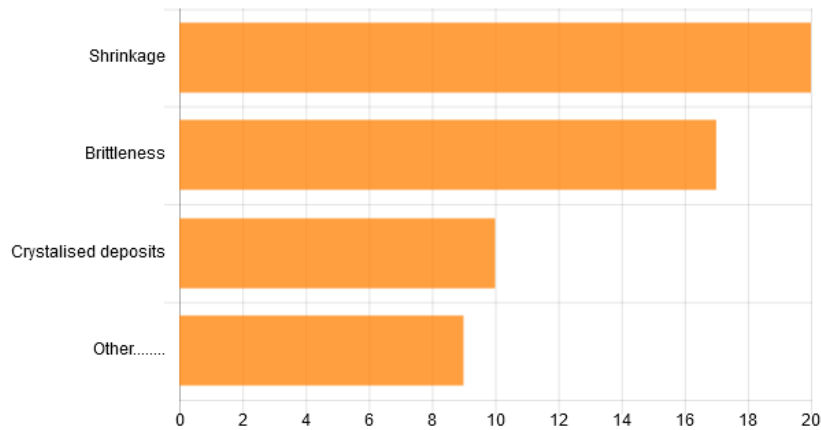


VA=35

63% of the respondents did not answer this question, the others answered with I don't know, but in the following question the majority of the respondents was able to indicate the major problems related to their collection:

PR002 If yes, please indicate major problems:

Fig.30



VA=47

31% of the respondents indicate shrinkage as the major problem, followed by brittleness (26%), crystallised deposits (15%) and other (14%).





Other problems were described as:

- Colour fading, films melted
- Concerning the problem of crystallised deposits, we have started working on the collection of magnetic tapes not long ago. Instantaneously we have been doing the research on the methods of preservation and conservation of these kind of materials.
- Films are rippled and warped and cause problems when digitised (focus, image sharpness)
- So far the films can be digitalized well although we have measured pH values below 4.6 at approx. 20% of the collection. I think we are at a critical point and conservation measures should be taken as soon as possible.
- Stickiness, loss of image, at advanced stage no reproduction possible (digital/analogue)
- These deteriorations lead to the situation where the sound is not readable anymore on SepMags.
- base deformed - image discolored
- on setting VS smell
- undulations, acidic smell

PR003 What measures do you take to deal with deteriorating / vinegar syndrome films?

27 respondents provided an answer to this question.

The answers can be classified concerning the following fields:

Nr.	Comment
Separation and storage optimization	
72	separate from other collections and keep area ventilated and cool
106	moving deteriorated reels into another room
132	sub-zero storage
193	Separating them from the non-affected material.
213	special storage and copying and scanning
226	The vinegar syndrome in our film collection happens rarely, we separate these materials from others and preserve as needed.
228	freezing, - special storage, - preservation film on film or digitalization
239	Optimize Storage
246	No specific. Several we separate the material.
249	Separation and digitization
255	Separating (and replacing the print by a new one)
279	In nitrates, a regular monitoring, and accelerate the restoration project, along with the first freezing tests. In acetates, these affected materials have been at Barcelona's own high humidity and temperatures, in some cases for more than 50 years; since they have been given an environment of low temperatures and humidity plus air renewal, the collection has stabilised. If we detect that the acetate collection worsens, we plan to freeze it. In the most serious cases, we hermetically bag each material with a silica gel bag.





Monitoring

- 91 visual and smell
- 106 At the moment: Condition reports, monitoring (AD-strips), moving deteriorated reels into another room. In the future: Moving the whole collection into new vaults (with climate control).
- 114 1. All film copies are tested for vinegar syndrome (Danchek Test Strip). 2. As part of a project (10/2017 to 09/2019), part of the collection will be digitised, so that at least the content is (initially) secured. 3. For the physical copies, also for the non-digitized part of the collection, no measures have yet been taken. However, we are in the planning stage and want to have developed a preservation strategy for the physical copies by the end of 2019 at the latest and then implement it promptly.
- 135 So far, we have not taken any action, we are currently evaluating the state of conservation of the collection.

Copying to analogue/ Digitisation

- 86 we try to prioritize copying, as far as funds allow.
- 212 Digitisation in the context of substance preservation
- 213 special storage and copying and scanning
- 227 we put those titles in the list for digital scanning/re-mastering/restoring

Selection

- 185 checking whether unique
- 215 strict selection (destruction of superfluous) - segregation
Aiming at: reducing RH, packing in vapour tight and storing in -5 vault
- 326 Mainly preserve de Portuguese movies

Special (chemical) treatment

- 118 We treat the vinegar film with rehydration and de-shrinking process then duplicate or scan them as fast as possible.
- 131 Using molecular sieve, separate from other copies, regularly rewinding, special look of air humidity
- 231 Due to lack of funding, all we can do is clean the film and the can with denatured alcohol, then set the film, very loosely wound, into a larger can – if we have an empty one – and isolate it from the other films by putting it into a room where we store all problematic cases
- 351 Regular rewinding films for ventilation, acidic gas absorption by molecular sieve, freezing of actively deteriorating films, accord high priority to digitise films with unsatisfactory conditions.

Combined strategies:

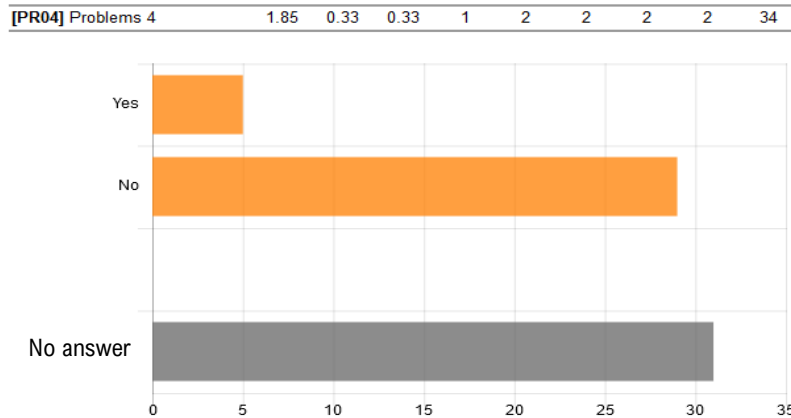
See several answers above.





PR004 Do you use molecular sieves (packages with adsorbent or desiccants) in your film cans?

Fig.31

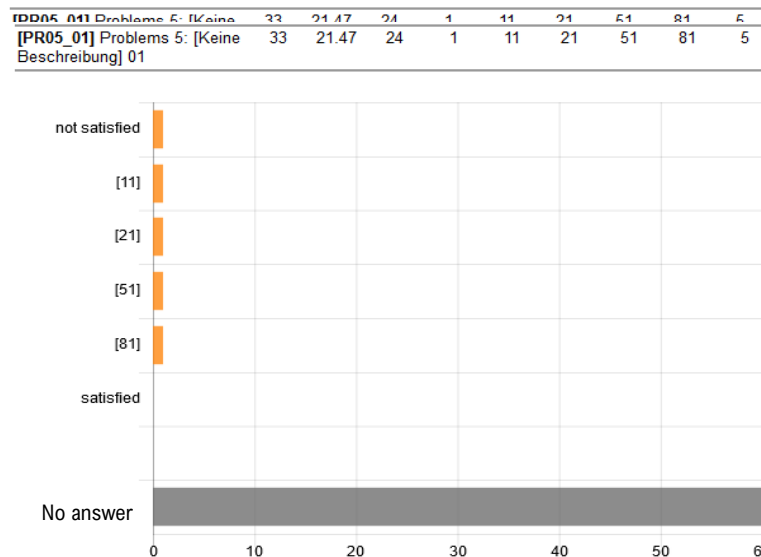


VA=34

The majority of the respondents did not answer this question (48%). Of the 34 valid answers, the majority does not use molecular sieves / packages with adsorbents or desiccants in their film cans (85%), while 15% are using them.

PR005 How satisfied are you with the results of using molecular sieves?

Fig.32



VA=5

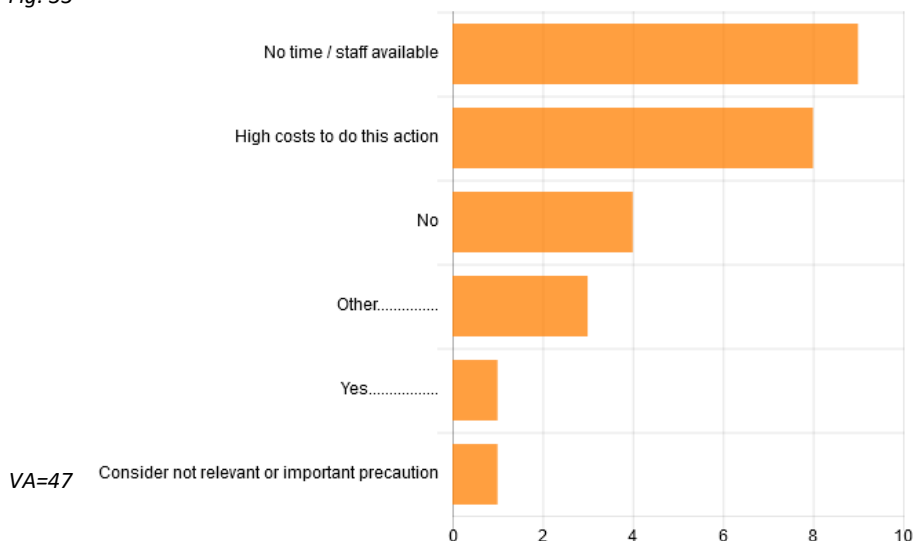
Only five participants answered this question, ranking on a scale in 5 steps between non satisfied and satisfied. No one indicated the results of using molecular sieves as satisfying, one person definitely is not satisfied, while the others are ranking in the lower to medium range of satisfaction.





PR_06 Did you indicate problems with using molecular sieves?

Fig. 33



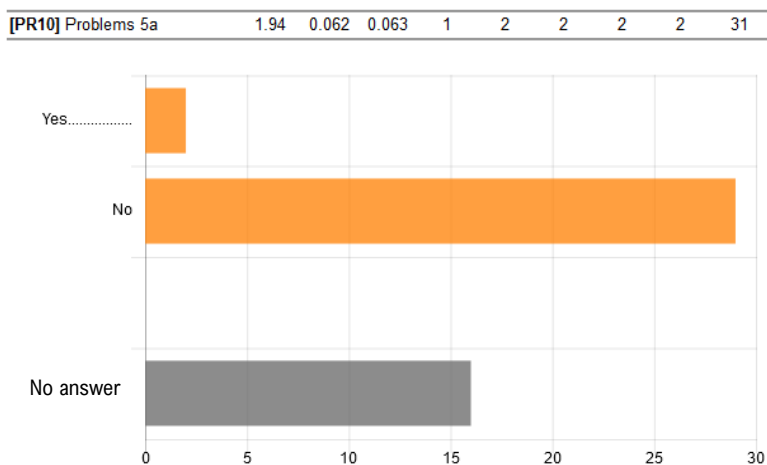
47 participants answered this question, whereof the majority indicated problems with no time/staff available (19%) or high costs (17%). 9% see no problem in using molecular sieves and only one person considered this as not relevant or not important precaution.

As other problems, the following arguments were mentioned:

- We all work unpaid; I am the only person capable to check on the collection's condition
- too expensive, no money available

PR_10 Do you use chemical products (e.g. camphor) as preservatives/ stabilizers?

Fig.34





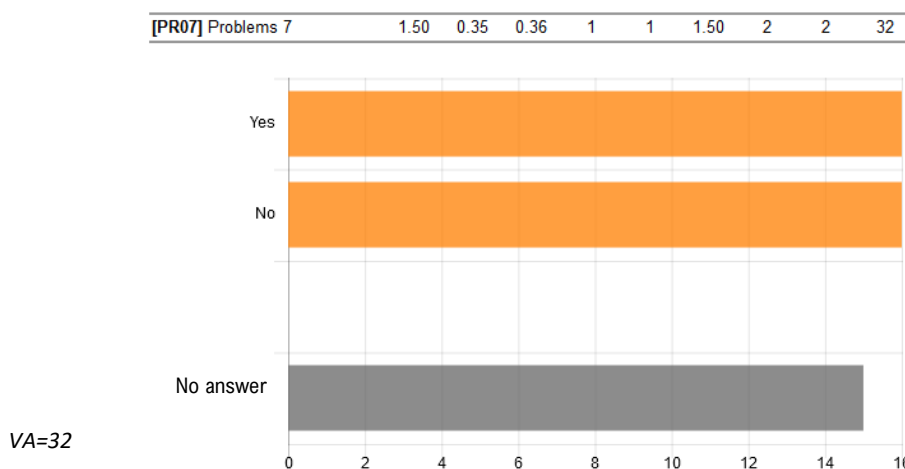
31 persons answered this question, whereof the majority of 94% does not use chemical products as preservatives/ stabilisers, only 6% answered that they use chemical products within the film cans. Two respondent answered, that they cannot afford to buy chemicals as it is too expensive.

PR_11 Are you satisfied with the results of using chemical products as preservatives/ stabilizers?

There was no answer given to this question.

PR_07 Do you have problems with mold/fungus?

Fig.35



32 persons answered this question, whereof 50% have problems, while 50% do not have problems with fungus growth on film materials. 15 respondents did not give an answer to this question.

PR_08 If yes, how do you treat molded film reels?

Respondents outlined the following treatments, reaching from simply separating the items, to elaborated cleaning processes:

Nr.	Comment
72	remove them asap
86	we wash them if funds are available
106	We clean manually (microfiber towel soaked into ethanol) and RTI cleaning machine (using HFE).
107	store in a separate dry and cold location
118	We use re-developing process to treat film with mould.



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- 131 carefully rewinding under usage of cleaning liquid
- 132 Vacuum cleaning and cleaning machine if needed
- 193 Wear mask, clean off with alcohol, e.g. Ethanol, Isopropyl or use perchlorethylene (if available, and if archivists are familiar with full range of necessary safety precautions).
- 202 Actually we don't need active treatment because we have less than 5% of our film stock moderately affected with mould or fungus
- 213 chemical cleaning and special treatment with ultrasonic cleaner (perchlorethylene)
- 215 clearly mark contaminated cans, acclimatize films to under 50% RH, surface clean (vacuum cleaner with HEPA filter / swab with alcohol), when film needs to leave facility: clean with ultra-sonic cleaner
- 226 We remove it by using wet procedures in the chemical laboratory. We have been working this way from the 60. in cooperation with the University.
- 227 wiping film manually using ethanol
- 228 We don't. We preserve them in a special cell. And below 60 HR, the mold won't develop anymore. For restoration, we use wetgate for these collections
- 231 Due to lack of funding, all we can do is clean the film and the can with denatured alcohol, then set the film, very loosely wound, into a larger can – if we have an empty one – and isolate it from the other films by putting it into a room where we store all problematic cases

PR_09 Are you satisfied with this technique?

Of 16 valid answers, 2 persons (12%) indicated that they are satisfied with this technique. Other comments were given, the majority is not happy with the actual treatment process against mold:

Nr.	Comment
86	Reliable washing is more and more difficult to find
106	Not completely satisfied, since usually it's not possible to get rid of the mold 100%.
118	We are satisfied and so is the client.
131	It's ok, but far away from perfect
193	It is slow and cumbersome, and not satisfyingly safe.
215	not entirely but have no funds to apply other
226	Yes, we do not need any changes
227	No, because sometime the dirty cloth may scratch the film, but is the only way we can remove mold from film



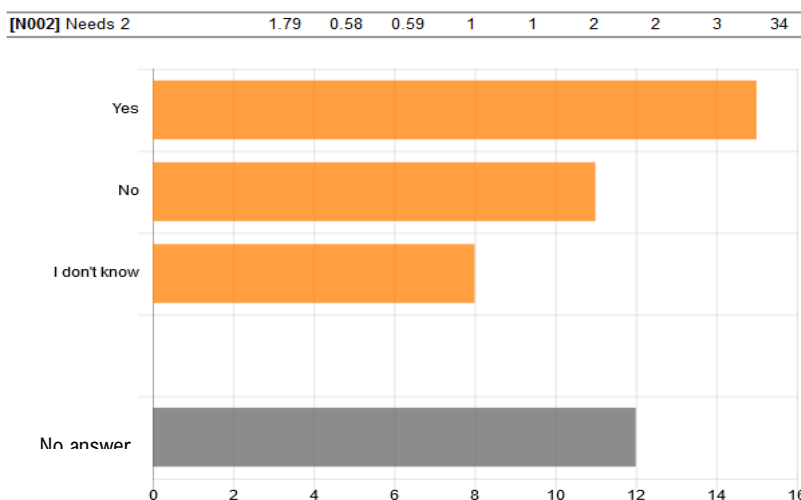


- 231 No, of course not. In fact, we are despairing about the horrific storage conditions. For 20 years on end I have told the relevant politicians time and again about the urgent necessity to preserve our regional film heritage, but they have kept refusing to spend anything.
- 246 No, but its the only one, we can use.
- 279 It's efficient enough.
- 351 Not satisfied because most of the mould stains cannot be removed.

N Needs

N_02 Do you think the boxes now in use in your archive are actively contributing to the conservation of your film collections?

Fig.36



VA=34

34 persons answered this question, thereof 44% agree that the boxes are actively contributing to the preservation of the film collection, whereas 32% don't think so, and 24% don't know. 33 persons did not give an answer to this question.

The following comments were given to this question:

Nr.	Comment
72	keep Ph near neutral
91	Only plastic ones. The same for the next question. We prefer plastic storage
104	We do not use boxes for nitrate film. Only metal film cans.
106	There is a need for more ventilation, especially for nitrate and acetate on SepMags.

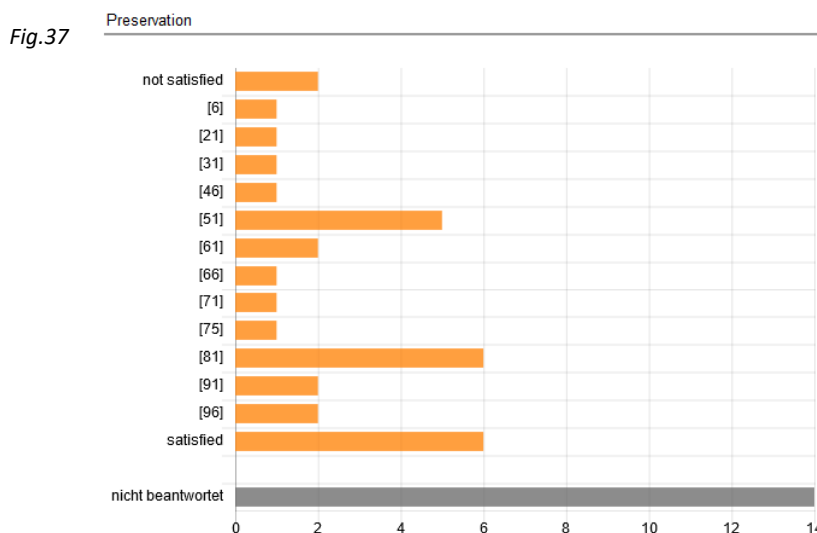




- 132 PP boxes are fine, as they are inert. Most important is storage temperature and relative humidity
- 135 Some of the film cans are very difficult to open, so air circulation can hardly be guaranteed. The cardboard boxes are all made of acidic material, which has a negative influence on the air quality.
- 193 Cans are not routinely replaced when the films enter the archive, therefore many different sizes and materials. We prefer to keep the genuine information on the original packages, i.e. vintage labels.
- 231 For the archive, this is not a matter of Yes/No/I don't know. We get no funding at all and have to subsist on a minimal range of services we render to the film/TV industry. We cannot afford measurement tools, analytical tools and repair material to properly assess positive or negative effects. As a significant part of our collection has to be kept against our better judgement in the delivery cardboard boxes, plastic cans or rusty iron-based metal cans we are forced to keep using, we are daily faced with the fact that all these boxes / cans are actually detrimental to the films. Whether our aluminium cans are actively contributing to the conservation of the collection is thus a luxury question for archives with a fixed annual budget.
- 179 We invest a lot of money in the replacement of plastic and ventilated cans, understanding that combined with low temperatures and humidity, in addition to air renewal, is, for now, the best option to ensure long-term conservation.

N_03 How satisfied are you with your boxes/ containers concerning the following functionalities:

Preservation:

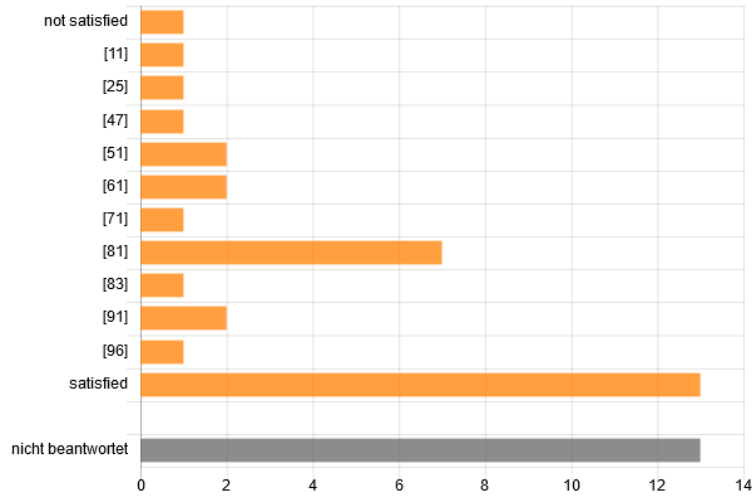


VA=32



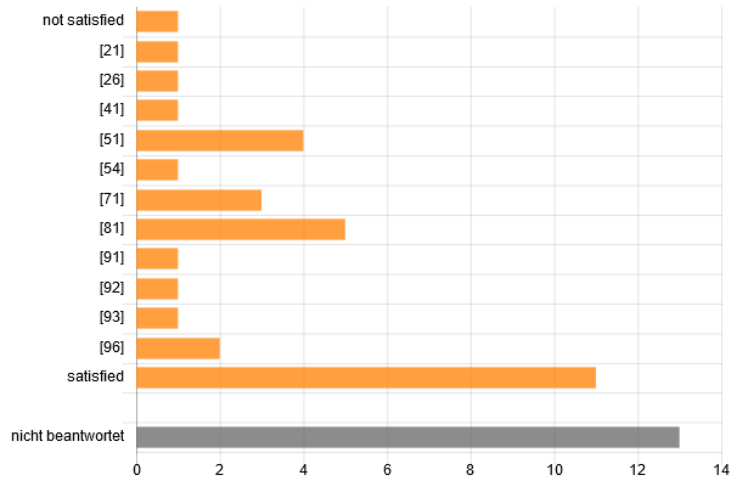
Protection:

[N003_02] Needs 3: Protection	79.39	9.47	9.62	1	71	83	101	101	33
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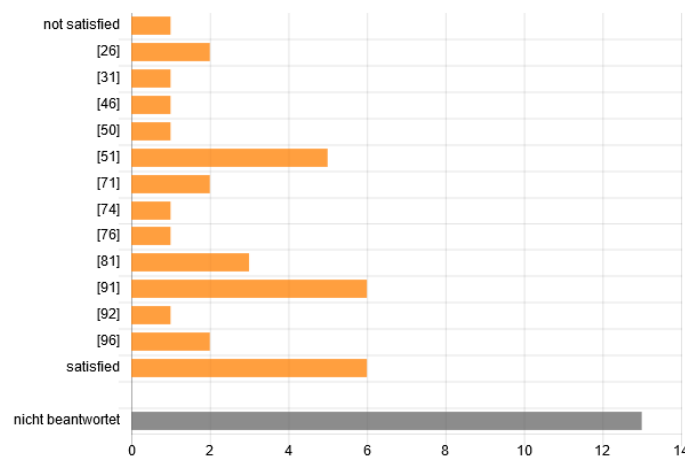
Stability:

[N003_03] Needs 3: Stability	77.09	2.77	2.81	1	54	81	101	101	33
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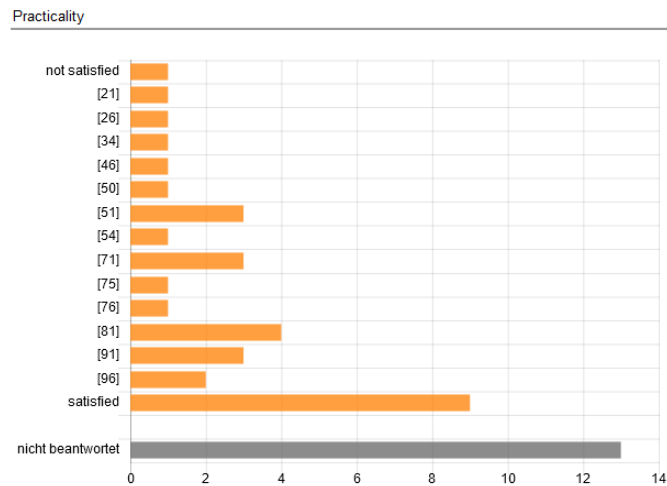
Functionality

Functionality



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Practicality



N001 What is your most urgent need for the preservation of your film/ magnetic tape collection?

Nr.	Comment
48	Digitalisation ;-)
132	Digitization
135	Digitizing, repackaging and cold storage
212	Digital substance preservation
213	copying and scanning degradatet tapes inflicted by vinegar and degradation
228	Active preservation - digitalisation
249	personnel and financial resources for digitization
279	Transfer it as soon as possible to another system.
72	more money to provie better storage conditions
86	Lack of time, labor, and money
91	they are in good conditions.
106	Low temperature vaults and good ventilation.
107	conservation and appropriate packaging
185	better storage



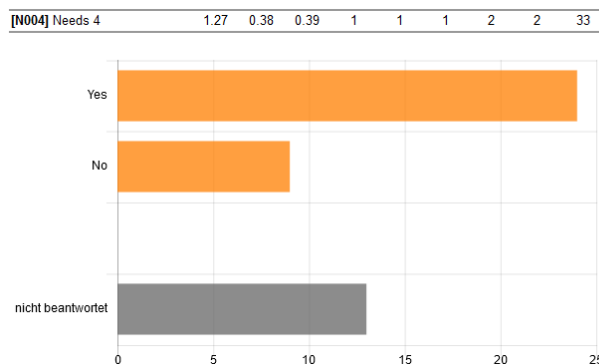
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- 223 better storage
- 236 better storage and packaging
- 193 This goes for both magnetic tape and film collection: colder storage around 4° Celsius, more stable humidity control at around 40 RH. It would be desirable to store at least a part of the collection below zero for safe guarding our master elements for truly long periods of time, of course with proper controlled procedures for freezing and thawing films.
- 215 Workforce to select tapes to be migrated
Funds to migrate
Workforce to process files after migration
- 231 Funding, of course.
- 255 Time
- 351 The need is not urgent as the collection and the machines for playback are kept in good conditions.

N004 Do you think the projected NEMOSINE packages could improve the preservation management of your collections?

Fig.38



VA=33

Nr.	Comment
86	Regular inspection is indispensable
131	I assume it would much, much too expensive in buying NEMOSINE packages. Additional we have not per technical of personal infrastructure to use fancy shit like sensors in the box and our storage is not suitable for ventilated boxes



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- 132 Good products are already on the market. To compete the cost should be (much) lower than the current boxes, for a similar product
- 185 More urgent needs
- 212 Most of our collection is in an acceptable condition in a controlled climate environment. The efforts and costs of repackaging all films into new cans does not appear to be in an acceptable proportion to the expected improvement.
- 215 Does not seem realistic for nitrate films: we need to change our nitrate cans often when decomp sets on, would be way too costly.
It looks possibly interesting for a very small acetate film collection, but I don't see how you can make it cost-effective for a large collection. See research IPI Bigourdan on enclosures: for large scale operations macro-environment is more cost-effective.
- 226 We are happy with our methods and tools of the preservation
- 231 Contrary to the big film archives we have never had a chance to even test NEMOSINE packages, thus there is no way for us to decide on this question. For the SFA, anything in terms of new and proper cans or other packages would be a vast improvement.

N006 Please leave your general comment, expectations and ideas concerning NEMOSINE packages:

Nr.	Comment
48	Good luck!
72	major concern is lack of money available in the cultural heritage sector in both public and private sectors which prevent any form of investment
118	It's hard to image the final product at this stage. I think it's a good idea but I cannot help wondering about the cost of such sophisticated design for something that is so simple as a film can.
131	Speak more with smaller private archives. It's great to improve the archival quality in elite archives, but a huge amount of movie gems is only existing in small and privat archives, and there is much more need to get better equipment and know how for a qualified storage than by big players. So please leave your ivory tower with FIAF-archives and such partners and open your mind and eyes also for smaller institutions.
135	The NEMOSINE packaging concept could be a very interesting solution for our film collection!
193	The NEMOSINE package should provide reliable, low maintenance, easy to use sensor technology to monitor the condition / rate of chemical deterioration of the film roll in each package, enable controlled rate of adsorbtion of acetic acids (and other detrimental deterioration byproducts?) so as not to harm / further destabilize the molecular structure of films conserved in the package. The film quantity and state of decay, i.e. the rate/quantity of decay by-products released, should be matched with the adsorption rate or pull of the foam.



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- It must be guaranteed, that NEMOSINE packages without maintenance are not more harmful to the material than traditional film cans.
- 199 I hope that the project helps improve and give precision to the conservation of film materials
- 212 It is already difficult for archives to acquire film cans due to the lack of supply. It seems logical that new film cans should be developed that meet archival requirements and remain affordable.
- 213 we expect that with NEMOSINE project better material preservation (cans) ,will emerge, and more concentrated founding on long term preservation for film materials Will emerge
- 215 As for small collections: I don't see how a can could be more effective in terms of costs-quality than acclimatization+double-packaging+freezing in house-hold freezer (see research on the subject). Having moisture adsorbers built in a can without exact monitoring of balance between weight of film / moisture in film / moisture in atmosphere / weight of adsorber seems like a recipe for drying out films (see problems occurring with indiscriminate use of dessicants).
- 227 The archive is the sole custodian of our countries film heritage. Sadly, it's a cinema that is completely unknown to the world, while it holds secrets to a turbulent culture. Due to our countries severe isolation during the Cold War, much of our practice deserves to be studied and our cinematic tradition known to the world. Yet, all our history is locked on old film cans and we have knowledge that doesn't meet today's requirements nor the responsibilities with that come with being the only institution that must preserve our whole country's film legacy. Our budget doesn't meet our needs and our films are dying. We are very interested to be part of your project and together to be able to set new standards for the preservation of our precious film heritage. By utilising the latest sensor technology we can be able to monitor the decomposition processes as we try to find long term solutions on how to save our rich film heritage. It is our mission and goal to increase the life cycle of our films and all other audiovisual objects, for we have faith that further study and recognition of our film legacy will be an added value to the tapestry of European and world cinema. We hope to be selected and take this journey together as we have done successfully in the past with our initiative. We wish you all the best in your worth while endeavor!
- 228 I wish to have an overview of the project before starting making comments. Aside the preservation new possibilities the price, if affordable, would be very relevant.
- 231 We cannot comment on NEMOSINE packages. Prior to receiving the link to this questionnaire (suddenly sent to us by the DIF some 14 days ago) which took me two unpaid hours to fill in, our small regional archive never had a chance to even timely hear about the existence, qualities and availability of NEMOSINE packages nor has the archive been given a chance to test them prior to having been asked to answer the questionnaire. Our vital problem is not a matter bad or good packaging but rather the non-existence of funding for our work and the overall preservation of our collection.





- 245 In general, I think it is worse to make researches and get improvements as much as possible. Technology standards are always developing further and this should also be incorporated and used with respect to film heritage. I need to point out further: this questionnaire was filled out without the support of an archivist.
- 279 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.
- 351 We hope NEMOSINE could be offered at a discounted price for the archives at tropical or sub-tropical regions because film deterioration problem is serious in those archives.





Conclusions and Summary:

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.⁴

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:**⁵ 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
 - Improve vaults and climatization

⁴ 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.

⁵ 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.





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. ⁶ Respondents 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.

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.

⁶ 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.





- 7.3. 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.
 - 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.⁷

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 Reilly and his conclusion in favor of the conditioned vaults.⁸ And beyond this, other

⁷ Non of the archives has mentioned that proper conservation conditions (40% RH and 5° Celsius, air exchange) help avoid mould problems.

⁸ 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.imagepermanenceinstitute.org/webfm_send/307



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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. COMMENTS & 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.

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



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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.

