CM-020P - UHD-HDR 1000 nit TIFF Rec 2020 PQ Archival Master file - HDR-10

NBCUniversal
Operations & Technology
TECHNICAL OPERATIONS

Version 3.0: Format Spec Sheet #CM-020P

UHD/HDR 1000 nit TIFF Rec 2020 PQ Archival Master for HDR-10

1.0 FILE DELIVERY SPECIFICATIONS
2.0 QUALITY CONTROL
3.0 APPROVED 4K/2K DIGITAL FILE COLOR CORRECTION VENDORS
4.0 FILENAMING SCHEMA
5.0 ARCHIVAL DATA TAPE FORMATS
6.0 TAPE LABELING
7.0 DELIVERY INSTRUCTIONS
- 7.1 DELIVERY NOTIFICATION
- 7.2 PACKING SLIP and CHECKSUM / HASH (MD5)
- 7.3 APPROVED EXTERNAL HARD DRIVES FOR MEDIA TRANSPORT

8.0 DOCUMENT HISTORY

This spec sheet is specific to UHD/HDR mastering in accordance with HDR-10 Mastering. For other types of HDR or SDR mastering, please refer to their respective spec sheets.

The TIFF files in this specification should be created as an output from the Mastering color correction session. They should not be created any other way without first speaking with your NBCUniversal representative.

1.0 FILE DELIVERY SPECIFICATIONS

The following elements are required for the UHD/HDR 1000 nit Master

1. A final color-corrected file sequence mastered at 1000 nit peak luminance
    a. Files should be delivered in the following format:
        - 1000 nit
        - 16 Bit TIFF
        - UHD resolution 3840x2160 (matted if necessary)
        - PQ transfer function
        - **Rec. 2020** container (with mastering monitor in this setting)
        - Limited to P3 Primaries (from color session or with approved LUT / not to exceed P3– if using a LUT please speak with NBCU technical staff)
        - D65 white point
        - Full range
    b. Final color corrected file sequence to be delivered in a frame rate of 23.98
2. OLED monitors must be set in accordance to the specifics outlined below.
3. Delivery of Static Metadata (Max FALL / Max CLL) Information should be provided as data fields in a spreadsheet (format shown below). For MaxFALL and MaxCLL, please use a value of 99.9% of the data. This will allow for outlier peaks not to alter the total movie values.
    a. Delivery of 6 values required – 4 are typically the same.
        - Max FALL (this will change per movie/TV title)
        - Max CLL (this will change per movie/TV title)
        - White Level peak (1000 nit)
        - Black level of mastering monitor (.001,.002 or .005 nit are typical)
        - Transfer function (PQ)
        - Primaries (P3)
    b. NBCUniversal can perform the Max FALL/CLL and gamut limit calculations from Tiff files should you need. If not, Colorfront Transkoder and MTI Cortex have been approved for this functionality. Please see below for the specifics to set up Colorfront Transkoder and/or MTI Cortex.
    c. All calculations should be on **the program content only**. Do not include bars, slate, or textless when performing these calculations

Colorfront Settings for Max FALL/CLL and P3 Gamut Check

You **must use Colorfront 2020 Release version 47652** and beyond:	
	1. Load footage/create a timeline and save 2. Use the following hotkeys to set the following settings: **Tab**, then **QC**

a. Gamut Tolerance: “0.04”
b. Gamut Warning – Set to “P3”
c. High Precision Gamut – Set to “On”
d. Gamut Warning Tolerance: “0.04”
e. Brightness Tolerance: “0.0”
f. Brightness Frame Tolerance: “0.1”

3. Press **Tab** to save preferences
4. Press **P** to go to the deliverable page
5. Add a “Frame Light Levels Deliverables” under “Others”
6. Ensure you’ve turned “PDF” on
7. Ensure that you have properly selected the appropriate aspect ratio/framing for the calculation area.
8. Use **CTRL** + **R** to start the render

Cortex (MTI) Settings for Max FALL/CLL

Please use appropriate timecode and crop settings to only specify content without mattes (region of interest) and from first frame of picture to last frame of picture, no slates, countdowns etc.

d. Metadata Layout Sample from NBCUniversal generated data:

FILENAME:	Apollo13_Job_105314
SMPTE ST.2086 METADATA:	

• PRIMARIES STANDARD:	P3
• WHITE POINT:	D65
• LUMINANCE MIN:	0.001
• LUMINANCE MAX	1000
MaxFALL/MaxCLL METADATA:	
• MaxCLL:	1000
• MaxFALL:	293

ASPECT RATIOS / LINE COUNT

1. 16x9 (1.78:1) Full Frame – May be created either by Pan and Scan process (if original film elements are 2.0:1 or greater), or by sizing Super 35 and 1.85 spherical elements to accommodate the 1.78:1 aspect ratio of the UHD master.
2. For all aspect ratio line counts (first/last), please reference Spec CM-001C
3. If the original intended aspect ratio is 1.85:1, the 16x9 Full Frame archival master file should be sized to accommodate the 1.85:1 matte in the transcode, cloning, or down-conversion process**.** Universal will **not** accept any line variance from those stated in spec CM-001C for the first and last line of the active picture. Matte lines should not fluctuate within the feature. If delivering a theatrical version and an extended or unrated version, then matte lines must be consistent between versions.
4. 16x9 Letterbox (2.0:1, 2.35:1, etc.) – Letterbox versions are to be consistent with theatrical exhibition aspect ratios. Matte settings should be set according to spec CM-001C. Universal will **not** accept any line variance from those stated in spec CM-001C for the first and last line of the active picture. Matte lines should not fluctuate within the feature. If delivering a theatrical version and an extended or unrated version, then matte lines must be consistent between versions.
5. 4x3 (1.33:1) within 16x9 – The 4x3 image contained within the 16x9 aspect ratio of HD should be determined by applying a 4x3 reticule to the center of the 16x9 video raster.

   Please speak with your NBCUniversal Representative to discuss if a 4x3 delivery is required. If applicable:

   a. All Super 35 and 1.85:1 spherical elements should be sized to accommodate the 4x3 raster reticule. This will ensure that 4x3 full-frame down conversions will receive the full intended film image during the conversion process.

b. When adapting an anamorphic or cinemascope film element (eg. 2.35:1 aspect ratio), all Pan and Scan decisions should be made using the 4x3 safe action reticule as displayed by the UHD monitor.
c. When side matting the 4x3 Digital File master, ensure that the side matte is narrower than the 4x3 raster reticule, as displayed on the UHD monitor, giving approximately 1.35 of picture information.

6. Full-Aperture (if applicable) – The original, full-aperture from the digital files or film scan should be color-corrected and delivered as one of the following (per P.O.) HD 1920x1080 (full aperture), 2k 2048x1556 (full aperture), or 4k 4096x3112 (full aperture) TIFF files

Reel format:

All content should be delivered in reels (R1, R2, R3, etc., or R1AB, R2AB, etc.). If Reels are 1A and 1B, etc., then 1A would be hour 1 and 1B would be hour 2, etc. Do not edit pictures together from reel to reel. Include all head and tail leaders.

Head Format: Include all Head Leader timing frames in the scanning/formatting. If an incomplete or '**START PICTURE**' frame is not available, **DO NOT** punch the element. Locate the First Frame of Action at each hour and start the scanning/formatting of 192 Frames for 35mm prior to the first frame of action.

Tail Format: Include all Tail Leader frames in the scans/formatting.

In Summary, Each Reel should start with the "First Frame of Action" at the top of the hour. The "8-second Academy Leader" should start 192 frames before. Examples below in 24-frame Non-Drop time code.

The equivalent Frame counts to timecode for the "8 Second Academy" leader are as follows:

R1 = 86208 = 00:59:52:00

R2 = 172608 = 01:59:52:00

R3 = 259008 = 02:59:52:00

R4 = 345408 = 03:59:52:00

R5 = 431808 = 04:59:52:00

R6 = 518208 = 05:59:52:00

R7 = 604608 = 06:59:52:00

R8 = 691008 = 07:59:52:00

R9 = 777408 = 08:59:52:00

R10 = 863808 = 09:59:52:00

The equivalent Frame counts to timecode for “First Frame of Action” to the top of the hour are as follows:

R1 = 86400 = 01:00:00:00

R2 = 172800 = 02:00:00:00

R3 = 259200 = 03:00:00:00

R4 = 345600 = 04:00:00:00

R5 = 432000 = 05:00:00:00

R6 = 518400 = 06:00:00:00

R7 = 604800 = 07:00:00:00

R8 = 691200 = 08:00:00:00

R9 = 777600 = 09:00:00:00

R10 = 864000 = 10:00:00:00

OLED and non-OLED Monitor Set-Up Requirement

NBCUniversal – Content Management – Mastering Team has adopted a requirement that **all OLED** color monitoring be set up with the **“Judd Modification, Modified Target, or Offset”** D65 white point. These settings shall **apply to all** Color Grading, QC, and **any other OLED monitoring** of either High Dynamic Range or Standard Dynamic Range content, when viewed on a professional or consumer OLED monitor.

NOTE ON MONITOR CALIBRATION*:*

1. All OLED (Organic Light-Emitting Diode) monitors, High Dynamic Range or Standard Dynamic Range, must be set to a D65 white point with the “Judd Modification, Modified Target or Offset” applied. The standard X, Y values are listed below for reference.
    a. For BVM X300, BVM E-250/250 A
        - X=0.3067
        - Y=0.3180
    b. For PVM X550
        - X=0.3047
        - Y=0.3170
2. Other types of flat monitors (non-OLED) and/or CRT’s are required to be set to a standard D65 white point based on the CIE 1931 standard.

a. X=0.3047

b. Y=0.3170

3. Please refer to the specific OLED monitor manufacturer's recommendation for correctly applying the “Judd Modification, Modified Target, or Offset”. The Sony specifications for various white points are listed below for reference, should a different white point be needed:

All but PVM X550		*CIE 1931 Coordinates*	*Judd Corrected*	
x	y	x	y	
D93	0.2831	0.2971	0.2771	0.2861
D65	0.3127	0.3290	0.3067	0.3180
D61	0.3198	0.3360	0.3138	0.3250
D55	0.3324	0.3474	0.3264	0.3364
DCI White	0.3140	0.3510	0.3080	0.3400

For PVM X550		*CIE 1931 Coordinates*	*Judd Corrected*	
x	y	x	y	
D93	0.2831	0.2971	0.2751	0.2851
D65	0.3127	0.3290	0.3047	0.3170
D61	0.3198	0.3360	0.3118	0.3240
D55	0.3324	0.3474	0.3244	0.3354
DCI White	0.3140	0.3510	0.3060	0.3390

2.0 QUALITY CONTROL

Vendors are expected to apply the same level of quality control to file deliverables that they would to any archival deliverable.

All deliverables must be checked for errors or defects, as well as to ensure compliance with the specification in both an electronic format and as a hard copy, with each deliverable.

NBCUniversal's Content Management team will QC vendor files to ensure ongoing compliance with the standards and specifications listed above. In the event the file(s) and/or LTO tape(s) fail this random QC, NBCUniversal (GMO/CM) reserves the right to charge the vendor to QC any or all of the file(s) and/or LTO tapes from the vendor whose quality may be reasonably and fairly called into question.

3.0 APPROVED 4K/2K DIGITAL FILE COLOR CORRECTION VENDORS

Approved Equipment Manufacturers

In order to maintain quality and interoperability, NBCUniversal's Content Management team has developed a list of vendors who have demonstrated conformance to our specification and the quality levels that NBCU /CM requires when creating an Archival Master. The current approved vendor and products are in no order of preference:

- BLACK MAGIC – RESOLVE (Current version 17.x and beyond)
- FILMLIGHT – BASELIGHT
- DIGITAL VISION – NUCODA – (Version 2021.1.010 and beyond)

Prior to use, NBCUniversal Content Management must approve any color corrector not on this list.

Vendor Certification

Since NBCUniversal Content Management realizes that not all Suppliers will want to use the same vendor(s), an NBCU Vendor Certification Test Plan is available. Suppliers or manufacturers who would like to have other equipment or uncertified vendors certified for the creation of NBCU Archival File Masters will need to complete the Certification Test Plan and submit the results to NBCUniversal for verification. New vendors will be added to the approved list as they are certified, and the list will be published periodically or available upon request at any time.

To request the Archival Master Certification Test Plan, please contact:

- Harvey Landy, Director – Advanced Media Technology
- NBCUniversal (818) 777-2858 | Harvey.Landy@nbcuni.com

4.0 FILENAMING SCHEMA

Directory file

The directory file name should be **TIFFDIR** in upper case characters as shown. Subdirectory paths should follow this order:

jobName/reelNumber/resolution/colorSpace/# of frames/

For example:

JAWS/R1/HIRES/3656x2664/

NOTE: *Resolution is the number of pixels per line, 'x', number of lines per frame.*

Subsets of the above path (i.e., job name, reel number, additional descriptors, and resolution) are allowed. This chopping of the tree should be done as far down the directory tree as possible to make it easier for NBCUniversal to integrate into our file systems.

Image files

Each file name must be less than or equal to 32 characters in length. Each image file name generated should adhere to the following form:

reelNumber_frameNumber.tif For example:

JAWS/R1/HIRES/3656x2664/R1_000001.tif

NOTE: *Job name, additional descriptors, and resolution should be* ***left out*** *of the file name, but not the path.*

Frame number should be **SIX** characters in length and is followed by a .tif extension. File names **should not** contain more than one period. The use of one "." ensures that a name parser can determine the file type if a type other than TIFF is contained on the LTO tape (if applicable) and makes compatibility between differing operating systems easier to attain, spaces or any special characters.

Frame numbers in the image file name are relative to 24P SMPTE Timecode

Reel format:

All content should be delivered in reels (R1, R2, R3, etc., or R1AB, R2AB, etc.). If Reels are 1A and 1B etc., then 1A would be hour 1 and 1B would be hour 2 etc. Do not edit picture together from reel to reel. Include all head and tail leader.

Head Format: Include all Head Leader timing frames in the scanning/formatting. If incomplete or '**START PICTURE**' frame is not available, **DO NOT** punch the element. Locate First Frame of Action at each hour and start the scanning/formatting 192 Frames for 35mm prior to first frame of action.

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R4 = 345600 = 04:00:00:00

R5 = 432000 = 05:00:00:00

R6 = 518400 = 06:00:00:00

R7 = 604800 = 07:00:00:00

R8 = 691200 = 08:00:00:00

R9 = 777600 = 09:00:00:00

R10 = 864000 = 10:00:00:00

5.0 ARCHIVAL DATA TAPE FORMATS

The preferred delivery method for **all** content is digital delivery. To be onboarded, please contact your NBCU Content Management Representative. LTO and Hard drives are only accepted by first speaking with your NBCU Content Management Representative and obtaining authorization.

If Applicable:

4K/2K HDR data masters written and delivered to LTO tape must **comply with SMPTE RP 189-1996 specification standards, utilizing TAR file format** (ANSI/IEEEE 1003.1-1990, Section 10, Data Interchange Format) to ensure data file compatibility is platform agnostic.

*Note: Any file exceeding 2GB in size must be written using the POSIX style of TAR.

Tapes must be generated by using a TAR utility or by an application capable of producing TAR-compatible files. **One reel per LTO tape, which equals one film reel.**

Files must be signed off by Content Management prior to deletion from vendor storage.

Each File on the tape is a TAR volume, i.e., wrapped with a tar header block at the beginning and a TAR EOF at the end of the file.

Approved Data Tapes:

- LTO-6
- LTO-7
- LTO-8

TIFF File Organization on LTO

The method for organizing data files on tape using TAR, described below, is optimized for TIFF and supports efficient pseudorandom access to any data contained on a tape, minimizing the need for large hard-drive storage when the entire content of the tape isn't needed.

TAR header blocks are used to create a header for each file on the LTO. In addition, file marks are used as delimiters between files. TAR utility or other equivalent tape management software allows the user to create TAR header blocks and file marks.

Physical Layout

The recommended layout listed below is not required as long as the device can support search/skip operations.

- File 1 LFM - - Long File Mark
- File 2 LFM...
- File N LFM (EOR) - - End of Recording

- LEOT - - Logical End Of Tape
- PEOT - - Physical End of Tape

Long file marks are required at the end of the TAR file to support appending files to partially filled tapes. They also serve to provide pseudo-random access to sequential tape-based devices to implement, search, and skip.

TAR Volume

TAR Volume layout is as follows:

- TAR Header (512 bytes)
- File Content
- TAR EOF (1024 bytes of zeroes)

Each file on the tape is a TAR volume, i.e., wrapped with a tar header block at the beginning and a TAR EOF at the end, except for use of the frame grouping factor, and is followed by a file mark.

When reading/writing TAR files, the blocking factors must be configured for an 8k block size. Doing so provides adequate data transfer throughout rates and is supported by most tape devices.

The directory file should always be blocked at 16 so that most machines can at least read it.

Logical File Layout

The Logical File layout is as follows:

- File 1 LFM
- File 2 LFM...
- File N LFM
- Directory file LFM
- EOR...
- LEOT...
- PEOT

There will be a directory file at the end of each, describing the content of the tape.

Appending Files to a Tape

When appending files to a tape, the below procedure must be followed:

1. Position the directory file;
2. Back up to the beginning of the directory file;
3. Read and save the directory file;

4. Back up to the beginning of the directory file
5. Start writing the tape

If the above procedure is followed, the “appending” process will be transparent. The new directory file will appear after all the files on the tape as if the tape was written at the same time.

Note: When appending to a tape, please ensure that any affected comment lines are updated appropriately (e.g., Total Size)

Directory File Format

The directory file takes the form:

- TAR Header:
  - Comment line(s)
  - File1name-size-data/time
  - File2name-size-data/time
  - Filename-size-data/time
  - TIFFDIR-size-date/time (this is the directory file)
- TAR EOF

The content of the directory file are human-readable ASCII. TAR header and TAR EOF are not; these get stripped off during the “deTARing” process.

Filename Entry Format

Each file entry in the directory file must have the following format:

- Filename -- name of the film (in alphanumeric order)
- Size – size of the file in bytes (numeric)
- Date/time – the creation date and time of the file (same format used in ANSI/SMPTE 268M e.g. YYYY:MM:DD:HH:MM:SS:LTZ)
- Additional user information – this field is optional. Additional information the user finds valuable can be included in a directory.

For ease of reading, each file field entry in the directory structure is separated by white space and is line-feed terminated. The line feed character must be hex 0A (decimal 10).

Note: DOS terminates lines with a carriage return/line feed (CR/LF) par (hex 0D followed by hex 0A). Mac terminates lines with a carriage return (CR – hex0D). To be compatible with the about procedures, DOS and Mac systems must convert these characters and pairs to line feeds. If unable to properly terminate a line, make a note on the tape label as to what was done.

Non-printing characters are not allowed except for the end-of-line terminator. The following defines the maximum size for each field:

Field	Recommended Maximum Size (characters)	Absolute Maximum Size (characters)
Name	46	100
Size	10	10
Data/Time	23	23
User Specification Info	255	255

To ensure ease of readability, no directory entry should exceed 80 characters in length. A directory entry shall **NEVER EXCEED** 255 characters.

Comment Line Format and Conventions Comment lines:

- May be interspersed freely in the directory file
- Will appear at the beginning of the directory file before the first-listed file as they typically apply to all of the following files
- Are entirely optional

Comment Line Syntax

- Comment lines always start with a '#' character in the first position on a character line, followed by human-readable characters.
- Embedding nonprinting characters is not allowed.
- Comment fields are terminated with a line feed, in the same way as all other directory file entries.

Comment Line – Reserved Words and Meanings

The following words and word sequences are reserved and should not appear directly after the comment line character ('#') unless they are meant to be a reserved comment line word:

- Project_Name...
- Job_Name...
- Blocking_Factor...
- Frame_Grouping_Factor...

- Total_Size...
- Tape xxx of YYYY...

Lines using reserved comment line words should also be noted on the tape label (see tape label).

Naming Convention

- Directory File
  - The directory filename is TIFFDIR (always in upper case characters as shown).
- Image Files
  - Each filename must be less than or equal to 100 characters in length. This is a constraint of TAR. Each image filename generated is of the form:
  - <jobName><scene><elementName><resolution><abbrevframeNumbe>.tif
    - Example: jaws4096x3112mw000001.tif
  - Subsets of the about path are allowed, meaning jobName, scene, elementName and resolution can be left out of the filename. This chopping of the tree should be done as far down the directory tree as possible to make it easier for the receiver to integrate the files into the file system.
  - The first frame in a sequence is numbered (e.g., 000001) unless some later edition forces negative or zero frame numbers.
  - Resolution is the number of pixels per line, “x”, number of lines per frame. Abbrev is up to two characters long, followed by a six-character frame number. .tif extension concludes this filename.
  - **NO NAMES** should contain more than one “.” Character. This is so a name parser can determine the file type if other than .tif is contained on the tape. It also makes compatibility between different operating systems easier to attain.

Negative Sequence Numbers

- In the event a subsequent work creates frames, which occur before frame 1, zero or negative frame number are allowed.
- To accommodate negative frame number (typically indicated with an “_”), the abbrev field should be limited to one character.
- Note: A minimally compliant reader need recognize only positive sequence number. This exception case should be noted on the tape label

6.0 TAPE LABELING

If Applicable:

A LTO tape shall have a label attached to the outside of the tape reel or shell. The label should note any exceptional information.

A LTO tape store TIFF TAR'd files will have as a minimum on the tape label the following:

- TIFF TAR format
- "Tape x of y" – where x and y are the tape and the total number of associated tapes to form a tape sequence number
- Other help information included in the directory file as a comment line should be noted.
  - For example:
    - Block factors for the tape if it is different from the directory file, project name, and job name
    - Number of frames

In case something on the tape does not conform to this practice (e.g. end-of-line terminator), this should be noted on the tape label such as: "End-of-line is Mac style"

7.0 DELIVERY INSTRUCTIONS

Preferred delivery method for **all** pre-release content is digital delivery. To be onboarded, please contact your NBCU Content Management Representative. Hard drives are only accepted by first speaking with your NBCU Content Management Representative and obtaining authorization.

7.1 DELIVERY NOTIFICATION

The NBCU purchase order creator will need to be email notified when a file order has been fulfilled by the vendor and has been shipped. This notification should include the following:

- PO Number
- Hard Drive or LTO tape Barcodes
- If delivering via Faspex, please rename the folder you are sending to indicate the appropriate details of the files.
  - Example R1_Jaws_3840_2160_Rec2020_Theatrical.
  - Please do not send just as R1, especially if there are multiple versions (texted, textless, theatrical, etc).

7.2 PACKING SLIP and CHECKSUM / HASH (MD5)

A packing slip is required for the delivery of each external hard drive. The packing slip will need to include the following:

- PO Number
- Hard Drive or LTO tape Barcodes

MD5 Checksum/Hash (**to be included on all digital and physical deliveries**)

An MD5 file is a checksum file used to verify the integrity of the files delivered. It stores a checksum, which is a value created from an algorithm based on the number of bits in the file.

Checksum filename example: R1.md5

- R1.md5 - should be formatted with Checksum then relative path.

Example of contents in R1.md5

79e010e2de79d7da92205f1a4be59d99 R1/3840x2160/REC2020_PQ_1000nit/R1_085800.tif

21edb795a9124b5e5c5d58eaef114f7d R1/3840x2160/REC2020_PQ_1000nit/R1_085801.tif

89f56a6965a2d8549f87a7dab3e373d2 R1/3840x2160/REC2020_PQ_1000nit/R1_085802.tif

74259dd091d3464b84a40a0ab230b7e1 R1/3840x2160/REC2020_PQ_1000nit/R1_085803.tif

eab6963d9846991bb9746347f501c623 R1/3840x2160/REC2020_PQ_1000nit/R1_085804.tif

468eb9ed06887293dc394767caa40aea R1/3840x2160/REC2020_PQ_1000nit/R1_085805.tif

0c6bc1711759ffab9ed6027592e98b41 R1/3840x2160/REC2020_PQ_1000nit/R1_085806.tif

42ed5b9e74553812e74b974961ddd127 R1/3840x2160/REC2020_PQ_1000nit/R1_085807.tif

a0fa88ee8b4b2c6477f09ee1afe38c64 R1/3840x2160/REC2020_PQ_1000nit/R1_085808.tif

****Reminder: the preferred delivery method for **all** pre-release content is digital delivery. To be onboarded, please contact your NBCU Content Management Representative. Hard drives are only accepted by first speaking with your NBCU Content Management Representative and obtaining authorization.****

7.3 APPROVED EXTERNAL HARD DRIVES FOR MEDIA TRANSPORT

All vendors are expected to provide their own external hard drives to transport the digital files outlined in this document. (**Exception**: Content is pre-release / pre-theatrical / pre-DVD, in which case NBCU will provide a secure drive – contact your Content Management representative for specifics)

NBCU has the following requirements for the external hard drives:

- The drives should be free from any viruses, malware, spyware, Trojans, or any other malicious code that could damage, destroy, or compromise the integrity of NBCU equipment.
- The drives should be provided in a hard plastic case suitable to protect them from the normal wear and tear of transportation.
- Appropriate interface cables (e.g., USB, eSATA) and power cables should be included with the drive.
- Due to the large file sizes of the content in question, NBCU requires that all external hard drives used for media transport have a USB 3.x, USB 2.x, or eSATA interface for backwards compatibility. Please note that content delivered on a device without a USB or eSATA interface may be rejected and returned to the vendor.

Hard Drives should be shipped to:

West Coast Quality Control

100 Universal City Plaza, Building 1440 - 17th Floor, Universal City, CA 91608

ATTN: Nathen Coyle or Jason LaMotte

****Please confirm ATTN with your Content Management Coordinator before sending

Once NBCU staff removes the content from the drive, it will be erased and returned to the vendor within a reasonable period of time for the delivery of subsequent deliverables.

8.0 DOCUMENT HISTORY

Version #	Date	Revised by	Reason for Change
3.0	10/07/2025	Henry Thompson	Migrated to Confluence
2.2	11/12/2024	Harvey Landy	Added Fall / CLL calculation range and corrected luminance min in sample values
2.1	09/22/2022	Harvey Landy	Revised reel numbering to the first frame of action at the hour. Added Nucoda to the approved CC list.
2.0	06/11/2022	Harvey Landy	Created version 2.0 Document

1.9	12/18/2021	Harvey Landy	Added MD5 to section 7.2. Added Cortex to Max Fall/Cll Modified Gamut Tolerance in Colorfront Max Fall/Cll settings
1.8	06/28/2021	Harvey Landy	Added Precision Gamut setting to Color Front setup section
1.7	01/25/2021	Harvey Landy	Removed line count specific numbers and changed to reference spec CM-001C. Added P3 Gamut warning settings in Colorfront section.
1.6	10/12/2020	Harvey Landy	Revised Naming Convention in TAR section to match section 4.0
1.5	09/11/2020	Harvey Landy	Added Gamut Warning Tolerance value in CF Max Fall/CLL settings
1.4	02/10/2020	Harvey Landy	Added Hard Drive Delivery location/attn information.
1.3	11/16/2019	Harvey Landy	Added digital delivery as the preferred method.
1.2	02/15/2019	Harvey Landy	Added aspect ratio and line count section
1.1	01/09/2019	Harvey Landy	Added LTFS for LTO archive and date in footnote.
1.0	09/24/2018	Harvey Landy	Document Creation