

ProSiebenSat.1 Media SE



Technical Guidelines 2.7

ProSiebenSat.1 Group (D)



Foreword

The purpose of these Guidelines is to ensure that ProSiebenSat.1 Media SE, as well as all companies and minority holdings associated with ProSiebenSat.1 Media SE under §§ 15ff of the German Stock Corporation Act (AktG) („SEVEN.ONE ENTERTAINMENT GROUP“) obtain programme, licence and production materials that meet the highest technical standards and are of the best quality and are able to carry out an automated flow of materials.

This document describes the objective technical standards that must be met by all externally supplied programme elements as well as those produced in-house.

All material that the SEVEN.ONE ENTERTAINMENT GROUP accepts for production, broadcasting and further processing, as well as material that the SEVEN.ONE ENTERTAINMENT GROUP produces itself, must be delivered in an accepted format, along with all necessary metadata and according to the established technical quality requirements.

In terms of their essential technical details, the values specified in these Guidelines meet the recommendations of the European Broadcasting Union (UER/EBU) as well as the cited standards. If an external or internal supplier wishes to deviate from the following Guidelines for good reason, he must negotiate this ahead of time with the client, notify SEVEN.ONE PRODUCTION GMBH thereof as the technical service provider of the SEVEN.ONE ENTERTAINMENT GROUP and clearly mark this fact on the accompanying documents (for the production/license material). Notes on the accompanying documents or in the metadata must be provided even if a production intentionally violates these Guidelines over a longer period of time.

If individual technical standards fail to be observed, and if this causes the quality check conducted by SEVEN.ONE PRODUCTION GMBH to produce a negative result, the contractually agreed and/or statutory legal consequences shall apply (including those stipulated by this Guideline).

Jurisdiction and applicable law

This policy shall be governed by and construed in accordance with German law.

In case of any disputes arising here from, the courts of Munich shall have exclusive jurisdiction and venue.



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1 General technical requirements

The sections below summarise all requirements relating to the quality and condition of the delivered material. In principle, all delivered material must be free of technical errors and be delivered on/in the best available medium/file.

It is required that a complete quality check be run on any delivered material and its medium prior to delivery. If the standards are not met in full, the material automatically fails the technical quality check conducted by SEVEN.ONE PRODUCTION GMBH, and the contractually agreed and/or statutory legal consequences shall apply.

1.1 Video signal level and colour spaces

When producing content, care must be taken to ensure that no impermissible signal level combinations occur, thereby remaining within the legal colour space.

1.1.1 Permissible and valid SD signal levels

In general, digitally generated or digitised vision signals must meet the coding parameters according to ITU-R BT.601.

All delivered video images must meet the current EBU specifications for PAL B/G video without correction. There should not be any invalid signal levels in the content (e.g. super black, illegal colours).

The luminance is limited from -1% to 102%. The colour value should not exceed 102%. Active picture information must extend from line 23 to line 310 in the first field and from line 336 to line 623 in the second field. In addition to the VITC information, there should also be no vertical blanking information.

1.1.2 Permissible and valid HD signal levels

In general, digitally generated or digitised vision signals must meet the coding parameters according to ITU-R BT.709-6. The permissible values for RGB-channels, color components and luminance are 0-700 mV (0&-100%). The signal of color components CbCr must not exceed ± 350 mV.

During down-conversion, all delivered video images must meet the latest EBU specifications for PAL B/G video without correction. There should not be any invalid signal levels in the content (e.g. super black, illegal colours).



1.2 Picture aspect ratio

The picture aspect ratio must be consistently maintained and indicated upon delivery of the material. The possible picture aspect ratios for SD and HD material are defined below. A distinction is made between the actual technical picture size (pixel size) and the displayed screen content (display aspect ratio).

1.2.1 SD picture aspect ratio

We always request the original film aspect ratio. If two versions of identical quality exist, the content with 16:9 display aspect ratio is preferred. The technical size of the active SD picture is 720x576 non-square pixels or 768x576 square pixels; no other sizes will be accepted.

The display aspect ratio of 4:3 source material should not be changed; for example, no "artificial" letterbox formats should be produced.

If the material is an SD 16:9 film production, we will accept only film scanning from the negative/positive with scene-by-scene colour correction as FHA (Full Height Anamorphic).

If it is an SD video production, we will accept only native formats:

- Original 4:3 PAL (625): IMX 50 576i/25 (Field Dominanz 1) 4:3 (ohne Letterbox)
- Original 16:9 PAL (625): IMX 50 576i/25 (Field Dominanz 1) FHA (Full Height Anamorphic)

If material is delivered in unacceptable formats, we may (if possible) convert the material to the programme format for a charge and at the expense of the supplier without prior notice. Other contractual and/or legal claims remain unaffected thereby.

1.2.2 HD picture aspect ratio

The technical size of the active picture is 1920x1080 square pixels; no other sizes will be accepted.

SD productions that were subsequently "up-converted" to HD will not be accepted.

Original HDTV content is accepted in 1080i/25 format and XDCAM HD 4:2:2 codec only.

If material is delivered in unacceptable formats, we may (if possible) convert the material to the programme format for a charge and at the expense of the supplier without prior notice. Other contractual and/or legal claims remain unaffected thereby.

1.2.3 Centre of interest

To ensure that the centre of interest is displayed on the screen, safety margins of 3,5% safe action and 5% safe title (in relation to the transmitted picture) must be maintained on all sides. See EBU R 095 (<https://tech.ebu.ch/publications/r095>).



1.3 Frame rate and field sequence

Only a frame rate of 50 fields (25 fps) will be accepted. Each new frame must begin with Field 1 (see EBU Recommendation R62).

In general, the correct field dominance must be maintained for all equipment involved in a production. For the production of programme material, the time for all editing equipment must be set so that the added and inserted picture material begins with Field 1 of a frame (Field 1 is defined in ITU Report BT 624 for system B, G/PAL).

When recording from a film scanner, the beginning of a new film frame must coincide with the beginning of Field 1 of the TV signal.

The delivered work (clip or movie) must be encoded in 1080i/25 regardless of the camera type, original resolution (ie. UHD), scan rate or scan type (i/p).

1.4 Avoiding flickering pictures

Flickering or twinkling images and certain types of repetitive optical patterns can cause photosensitive epilepsy (PSE) in susceptible viewers and must be avoided. At least nine individual images must be positioned between two sparkling or flashing images, and any regular prominent patterns (such as bars or spirals) that cover large areas of the picture must be avoided.

1.5 General audio requirements

The sound on the medium should not contain noise suppression, pre-equalisation or data reduction. If it does, these changes must be noted in the metadata.

Purely stereophonic productions must be 100% mono-compatible.

All sound tracks must be synchronised precisely with each other and lip-synchronised with the visual content, regardless of the format (mono, stereo, multichannel audio).

All effects that can be heard in the programme sound must be contained in full in the IS (M&E) sound. If the sound is delivered separately, the content must match the visual content and the time code information of both media must be identical. The programme on the separate audio must begin at least one minute before the start of the programme and end at the earliest 30 seconds after the end of the programme. The test tone must have a duration of at least 45 seconds and be at 1 kHz @ -18 dBFS. Based on metadata it must be possible to identify and assign tracks or channels of the content.



1.6 Audio levelling, loudness and normalising

Audio signals must be modulated, measured and normalised according to ITU-R BS. 1770-2/EBU R 128.

1.6.1 Programme loudness and normalising

The programme loudness must be modulated to a target level of -23 LUFS. The permitted deviation from the target level should not exceed +/- 0,5 LU. For programmes that do not permit normalizing to the exact target level, such as live programmes a deviation of +/- 1LU is permitted. A measuring device according to ITU – R BS. 1770 and EBU Tech Doc 3341 must be used for measuring.

1.6.2 Reliable maximum level

The precise maximum peak level for PCM audio is **-2dBTP** (dB True Peak), measured with a measuring device according to ITU-R BS. 1770 and EBU Tech Doc 3341 and 3343. The test tone on media supplied separately must have a duration of at least 45 seconds and be at 1 kHz @ -18 dBFS.

1.6.3 Loudness range

The loudness range permitted for stereo and 5.1 productions is a maximum of 20 LU. A measuring device according to EBU Tech Doc 3342 must be used for measuring.

1.6.4 Programme loudness for short elements (commercials, trailers and sponsor spots)

All levels stated under 1.6.; 1.6.1. through 1.6.3. apply to short elements such as commercials and trailers. However, the following level is permitted (EBU 3343):

Short term loudness to a maximum of -18 LUFS (+5LU).

1.7 Audio tracks for files and media

1.7.1 2-4 tracks for delivery in German language

A1	Stereo	PGM Mix L	or	Mono	PGM Mix
A2	Stereo	PGM Mix R	or	Mono	PGM Mix
A3	Stereo	IT (M&E) L	or	Mono	IT (M&E)
A4	Stereo	IT (M&E) R	or	Mono	IT (M&E)



1.7.2 4-tracks international version delivery

A1	Stereo	PGM Mix L	or	Mono	PGM Mix
A2	Stereo	PGM Mix R	or	Mono	PGM Mix
A3	Stereo	IT (M&E) L	or	Mono	IT (M&E)
A4	Stereo	IT (M&E) R	or	Mono	IT (M&E)

1.7.3 8-track news item master and premaster

		MASTER	PREMASTER
A1	Stereo	PGM Mix L	sync sound
A2	Stereo	PGM Mix R	natural sound
A3	Stereo	Music + SFX L	Music L
A4	Stereo	Music + SFX R	Music R
A5	Stereo	sync sound	silence
A6	Stereo	natural sound	silence
A7	Stereo	clean voice (german)	SFX L
A8	Stereo	translation sync sound*	SFX R

* clean voice (german or silence)

1.7.4 8-track magazine item master and premaster

		MASTER	PREMASTER
A1	Stereo	PGM Mix L	sync sound
A2	Stereo	PGM Mix R	natural sound
A3	Stereo	IT (M&E) L	Music L
A4	Stereo	IT (M&E) R	Music R
A5	Stereo	silence	Music L
A6	Stereo	silence	Music R
A7	Stereo	clean voice (german)	SFX L
A8	Stereo	translation sync sound*	SFX R

* clean voice (german or silence)



1.7.5 8-track for clean feeds (ie. show, sport)

A1	Mono	sync sound
A2	Mono	natural sound
A3	Stereo	music
A4	Stereo	music
A5	Stereo	music or commentator
A6	Stereo	music or commentator
A7	Stereo	SFX
A8	Stereo	SFX

1.7.6 8-track (per language version)

A1	Stereo	PGM Mix L
A2	Stereo	PGM Mix R
A3	L	Left
A4	R	Right
A5	Center	Center
A6	LFE	Subwoofer (Low Frequency enhancement)
A7	LS	Left surround
A8	RS	Right surround

1.8 Synchronisation of foreign-language productions

In the case of speech recordings, not only does the technical quality need to be maintained, but optimum lip synchronisation must also be ensured.

For programmes delivered with German synchronisation, the original-language track (e.g. English), must also be supplied.

If (licensed) programmes in the original language (such as English) are delivered, a complete Dolby 5.1 IS (international sound) mix must also be supplied for the original-language programme. All additional tracks for programmes in the original language, such as backup vocals, voices and laugh tracks, must also be delivered separately. Please note the general requirements in chapter 1.5

1.9 Time code (TC)

All programmes (disc, file, other formats) must be delivered with EBU time codes in 25 frames per second (fps).



If the material is delivered on separate media or in separate files (such as video and audio separately or one programme in different files), the time code on all units must be incremented synchronously or continuously (no duplicate codes).

1.9.1 Longitudinal time code (LTC)

The longitudinal time code (LTC) is a time code that includes all time data for video signals: date, hours, minutes, seconds and frames. The 80-bit time code must comply with the specifications provided in DIN IEC 461 and EBU document Tech. 3097 and be recorded on the track specified for this purpose in the format used.

1.9.2 Time code in the vertical blanking (VITC)

With some recording formats, the VITC makes it possible to read the time code with a frozen image or slow motion. It should be used only in combination with the LTC and must have identical values for a television signal frame. The 80-bit time code must comply with the specifications provided in DIN IEC 461 and EBU document Tech. 3097. Lines 19 + 21/332 + 334 of the vertical blanking must contain the VITC.

1.9.3 Time code in files (MXF OP1a)

The time code information in the MXF-OP1a file must be present in both the file header (material package) and the essence container, and it must be identical in both places.

1.9.4 Time code for the programme beginning

All material delivered to the SEVEN.ONE ENTERTAINMENT GROUP must begin with the time codes TC 00:00:00:00. Exceptions are allowed only for good reason and must be clearly noted in the metadata.

1.9.5 Time code interruptions

1.9.5.1 Programme material

The time code must be incremented continuously. The time code value must only exist once in a content. The time code should never exceed zero, i.e., the time code should not begin i.e. at TC 23:58:00:00.



1.9.5.2 Production material

The timecode must be unique per clip and day of shooting. In multi-camera productions, a scene must have identical timecode on all sources (cameras and audio recordings). A lead time of at least 10 seconds, including the synchro signal, before the first cut is expected to ensure trouble-free use.

1.10 Technical leader

A technical leader is no longer necessary. Programme material (except trailers and advertising) must have a technical lead out of minimal 5 seconds duration. The lead out consists of black and silence.

1.11 Delivery standards

Metadata must be included with each medium and each file so that the media can always be identified. The “VTR card”, and, if possible, file-based metadata as well, must be provided on a medium. For files not delivered on a medium, the metadata must be placed in the file and also in an attached *.XML or *.TXT file. If metadata is uploaded via the FME portal (File-Based Material Exchange), the data must be entered in a form. The media and metadata must always be delivered and/or stored together. Recording media and their playback devices have a limited period of use. Accordingly, all carrier-based workflows must be converted to file-based workflows.

1.11.1 Delivery standards for media devices

The labelling must be identical on the media and media box. The labels must be placed only in the area and size provided for labels on the medium.

In principle, media must be shipped and stored in the containers provided for this purpose by the manufacturer. These containers must also be suitable for archiving.

Each storage medium should contain no more than one programme episode. If a programme is delivered on multiple carriers, the same type of media must be used for each part.

Media containing more than one episode will not be accepted. Exception is collective media for delivering trailers.

1.11.2 Delivery standards for file

Every file that is delivered or transmitted must be free of all types of malware (e.g., viruses, Trojan horses, exploits). The picture content in the files must meet the Technical Guidelines (resolution, coding, colour space). The file name should not contain any special characters or spaces and must not exceed 128 characters.



The file delivery workflow must be clarified in advance with the department or the editorial team and is subject to prior approval by SEVEN.ONE PRODUCTION GMBH. The files must be delivered with a minimum amount of metadata, (e.g., using an upload form, portal or a defined XML schema). Transfer via the FME platform (File-Based Material Exchange) of SEVEN.ONE PRODUCTION GMBH is preferred. A delivery is only valid, when the metadata is accurate and complete.

Additional information can be obtained by writing to „materialcoordination.supervisor@seven.one“.

The necessary metadata is defined in chapter “3. Material identification on delivery”.

If the specifications are not met, no guarantee for trouble-free processing and reproduction of the content is given.

1.12 Quality assurance and documentation

The entire duration of the prepared medium or file must be checked by the supplier. For each transmission-ready material delivered, conformity with the Guidelines must be confirmed in a check report, metadata or on an attachment card (VTR report).

All special features must be noted on the attachment card (VTR report) or in the check report / metadata file, including precise time code details.

Any defects already present in the source material must be clearly stated on the attachment card (“VTR report”) or in the check report / metadata file, including precise time code details, in order to avoid queries.



2 Technical quality check

ProSiebenSat.1 Media SE and its subsidiaries reserve the right to subject received material to an automatic quality check. The main focus of the check is on whether the programme is suitable for broadcasting and further processing and whether it meets the essential quality requirements.

The technical quality check conducted upon feed-in is based on clear parameters that are directly related to the delivery standards described in this document.

ProSiebenSat.1 Media SE reserves the right to reject delivered material, that does not meet the standards described in this document.

All (internal and external) outsourced programmes delivered in the form of files or on media must provide metadata according to the standard format/schema of ProSiebenSat.1 Media SE. The following table in chapter 3.1 defines the minimum set of metadata that must always be delivered/maintained.



3 Material identification on delivery

3.1 Minimum set of metadata for programme material

Field	Field name	VTR Card	File Metadata
Supplier	Licensor	mandatory	mandatory
Season title	Season title	mandatory	mandatory
Original (English) season title	Original season title (US / UK / ...)	optional	optional
Season number	Season number	optional	optional
Start of message (TC-in)	TC at start of programme	mandatory	mandatory
Duration with end credits and textless elements (hh:mm:ss:ff)	Duration with end credits, neutral background and scenes	mandatory	mandatory
Duration without end credits (hh:mm:ss:ff)	Duration without end credits	mandatory	mandatory
Description of audio track formats with assignment of audio and language tracks for each track	Description of audio content with track and channel assignments for each element	mandatory	mandatory
TC-in and duration of all segments (if pgm is multi-segment)	TC start and duration for each programme element, segmented	mandatory	mandatory
TV format and aspect ratio (e.g. 16:9/1:2,20)	Display aspect ratio	mandatory	mandatory
Norm (if SD)	SD TV-Norm (PAL/NTSC/SECAM)	mandatory	mandatory
HD format (1080i/25)	HD format	mandatory	mandatory
Presence of subtitles and language	Language of subtitles, if present	mandatory	mandatory
Presence of neutral backgrounds	Neutral backgrounds present (y/n)	mandatory	mandatory



3.2 Minimum set of metadata for other material

Field	Field name	VTR Card	File Metadata
Category	Category, e.g.. fiction or non fiction (factual)	mandatory	mandatory
Title	Title	mandatory	mandatory
Producer/Supplier	Production company/ programme supplier	mandatory	mandatory
Production date/time	Production date/time	mandatory	mandatory
Display Aspect Ratio	Display Aspect Ratio (e.g. 4:3/16:9/1:1,66/1:1,85/1:2,0/1:2,25)	mandatory	mandatory
TV Standard	SD TV-Norm (PAL/NTSC/SECAM)	mandatory	mandatory
HD format	HD format (e.g. 1080i/25)	mandatory	mandatory
Type of Material	Type of Material (master/clean/raw)	mandatory	mandatory
Start-TC Programme	Start TC Programme (SOM)	mandatory	mandatory
Duration	Duration (DUR) in hh:mm:ss.ff	mandatory	mandatory
Type of Audio	Standard audio (e.g. Mute/Mono/ Stereo/multichannel)	mandatory	mandatory
Use of Audio CH-1	Use of audio CH-1 (e.g. n/a/Atmospherics/ IS/Mix D/MixEN/Music/Atmospherics- L/IS-L/MIX-L/Music-L)	mandatory	mandatory
Use of Audio CH-2	Use of audio CH-2 (e.g. n/a/Atmospherics/ IS/Mix D/MixEN/Music/Atmospherics- L/IS-L/MIX-L/Music-L)	mandatory	mandatory
Use of Audio CH-3	Use of audio CH-3 (e.g. n/a/Atmospherics/ IS/Mix D/MixEN/Music/Atmospherics- L/IS-L/MIX-L/Music-L)	mandatory	mandatory



Field	Field name	VTR Card	File Metadata
Use of Audio CH-4	Use of audio CH-4 (e.g. n/a/Atmospherics/IS/Mix D/MixEN/Music/Atmospherics- L/IS-L/MIX-L/Music-L)	mandatory	mandatory
Used Videocompression	Data reduction used (e.g. DV, IMX50, DNxHD 180, ProRes, MPEG-2 DVD, VC-1)	optional	optional
Material-ID	MID (if known in advance)	optional	optional
Production Number	Production Number	optional	optional
Account number	Cost centre	optional	optional
Type of Production	Type of Production (e.g. in-house, external, contract)	optional	optional
Media ID, if tape from archive	Media-ID, if archive tape	optional	optional
Tapeset Info, (e.g. 2 of 5)	Tape set info (e.g. 2 of 5)		
Suppliers ID/Order ID, if existing	Supplier ID/order number, if available	optional	optional
Description	Description	optional	optional



4 Formats for the delivery of programme material

The SEVEN.ONE ENTERTAINMENT GROUP accepts the formats listed below for the delivery of programme material. A distinction is made between medium and file formats.

Programme material refers to all material that is used for direct broadcasting or is prepared for broadcasting by preparing it for transmission (mastering).

Examples of programme material are:

- Licence material: series or feature films
- Commissioned or in-house productions
- Commercials
- Trailers

This content is accepted by file based transfer only. The upload via SevenOne Media Motivuploader or the FME platform (File-Based Material Exchange) of SEVEN.ONE PRODUCTION GMBH is preferred. Any supplier who wishes to deliver a format that does not meet the specifications of these Technical Guidelines must reach a written agreement with ProSiebenSat.1 Media SE or one of its subsidiaries. This agreement must also be reviewed by SEVEN.ONE PRODUCTION GMBH prior to delivery. The material annexes to the Production Agreement should also be noted.

4.1.1 Storage media devices

Only content in UHD-HDR will be accepted on data carriers. The formatting is Windows compatible (NTFS). The connection type is USB in the currently highest speed class. The UHD-HDR specifications are covered in a separate document.

Delivery of audio material separately from video is only accepted on DVD, if that medium and the content data can be clearly assigned to a video version based on provided metadata and meet the general technical requirements. In principle, the audio sampling rate is 48 kHz.

Accepted media formats:	
Audio*:	DVD (discrete, uncompressed tracks)

No tape-based format is accepted. Unacceptable data carriers: USB hard discs*, USB memory sticks, P2 cards and other mobile IT storage media.

* By special arrangement only.



4.1.2 File formats

The SD exchange format for programme material and mastering is an *.MXF file with IMX codec (50 Mbit/s). HD material can be delivered in the form of an MXF file with XDCAM HD 422 codec with 8 24-bit sound tracks. In principle, the audio sampling rate is 48 kHz. The frame rate is 50 fields. We cannot guarantee fault-free replay of content if different values are used.

Keep in mind the appropriate standards for mapping the compression formats:

- SMPTE 381M: Mapping MPEG streams into the MXF generic container (incl. long GOP)
- SMPTE RDD09: MXF interoperability specification of Sony MPEG long GOP products

BWF (Broadcast Wave Format), WAV, und AIFF (Audio Interchange File Format) is accepted for audio files. Pro Tools sessions for PC in WAV format are also permitted.

Subtitle files are accepted in "STL" format.

All files must be delivered with a minimum set of metadata. The required metadata is described in chapter "3 Material identification on delivery". The metadata must be delivered in the form of XML files; the schema used (e.g. NewsML) must be agreed on ahead of time with SEVEN.ONE PRODUCTION GMBH.

Any other formats delivered will (if possible) be converted to the programme format for a charge.

Separate A/V files (MXF OP atom files) are discouraged.

Format	Filecontainer/codecs/essence
BWF	WAV, AIFF/ PCM / 1, 2 and multi track audio (48kHz)
SD	MXF OP1a/IMX 50 + 8 CH Audio (16 bit)
HD	MXF OP1a/XDCAM HD 4:2:2 50 Mbit + 8 CH Audio (24 bit)



5 Formats for the delivery of production material

In addition to the file and tape formats listed above, we accept the following production formats. Production material refers to all material that is used for further processing and producing new programme material. Examples of production material are:

- All raw material, such as material from shooting
- Agency material (i.e. Reuters)
- User-generated content
- Premaster, master

Any supplier who wishes to deliver a format that does not meet the specifications of these Technical Guidelines must reach a written agreement with ProSiebenSat1 Media SE or one of its subsidiaries. The content of the agreement is also subject to review by ProSiebenSat.1 Produktion GmbH.

5.1.1 Media formats

The SEVEN.ONE ENTERTAINMENT GROUP gives suppliers the choice of a wide range of tape and data media formats for the delivery of production material.

Akzeptierte Träger	
Magazine programmes, documentaries and news:	SD-Karten, CF-cards, SxS-cards, Fast-CF-cards, USB-hard disk*

No tape-based format is accepted.

Portable devices must be formatted in „NTFS“ or „EXFAT“ file system.

In principle, the audio sampling rate is 48 kHz and the sampling-depth is 16 or 24 bits.

The transmission standard is 50 fields per second (1080i/25). The production may be done in progressive scan or in UHD, but the delivered media must be encoded interlaced with 50 fields per second (1080i/25). If formats deviate from these figures, we cannot guarantee that the content will be reproduced without errors.

If unacceptable formats are delivered, we may (if possible) convert the material to the programme format for a charge and at the expense of the supplier without prior notification.

5.1.2 File formats in production

The SEVEN.ONE ENTERTAINMENT GROUP gives suppliers a choice of a wide range of accepted formats for the file based delivery of production material.



The workflow for delivering files must be clarified in advance with the operations department and editorial team involved. Not acceptable but delivered files will (if possible) be converted to the programme format for a charge.

The files must be delivered with a minimum amount of metadata (e.g., using an upload form, portal or a defined XML schema). Transfer via the FME platform (File-Based Material Exchange) of SEVEN.ONE PRODUCTION GMBH is preferred. Additional information can be obtained by writing to „materialcoordination.supervisor@seven.one“.

The necessary metadata is defined in chapter 3. Material identification on delivery.

Format	Filecontainer/Codec/Essence/Norm
SD-Master or Premaster	MXF OP1a / IMX 50 (16:9) + 8 CH Audio (16 Bit) / 576i/25
HD-Master or Premaster	MXF OP1a / XDCAM HD 4:2:2 50Mbit + 2-8 CH Audio (24 Bit) / 1080i/25
Shooting: Camcorder (preferred)	MXF OP1a or QT / XDCAM HD 4:2:2 50Mbit + 2-8 CH Audio (24 Bit) / 1080i/25 or 1080p/25 MXF OP1a / XAVC 4:2:2 114Mbit + 2-8 CH Audio (24 Bit) / 1080p/25 MP4 / AVC 4:2:2 up to 160Mbit + 2-8 CH Audio (24 Bit) / 1080i/25 or 1080p/25
Shooting: DSLR, Consumer, ActionCam, Smartphone (preferred)	MP4 / multiple Codecs 35-50 Mbit/s, 2 CH Audio / AAC (16 Bit) / 720p/25, 1080i/25, 1080p/25, 2140p/25

We cannot guarantee, that the content will be processed rapidly and reproduced without errors, if formats deviate from these figures.

Operational hints:

- The expected frame rate is 25 frames / 50 fields per second
- Multi camera recordings or separate audio recordings must contain the same timecode values for identical scenes, at least a clearly useable synchronous flap.
- The clip duration must exceed 10 seconds.
- Image size, codec, frame rate or scan mode must not change within a media folder.
- MXF OP Atom Files or videos without any audio track are not accepted.
- Please use a specialized camera for slowmotion recordings (i.e. FS7/ F5/ etc).



- DSLRs , Gimbal (DJI) and action cameras (GoPro) record in lower color resolution (4:2:0 in 8Bit), therefore the grading possibilities are degraded.
- Shooting in UHD-1 will be converted to 1080 HD during the ingest process.
- 1080p/50 and 2140p/25 camera files will be converted to 1080i/25 bzw. zu1080p/25 during the ingest process.
- If new camera types or special cameras (e.g. miniature cameras) are to be used, it is advisable to have a 2-3 minute sample file checked for workflow compatibility by the central ingest **before the start of shooting**.

6 Formats for playout and archiving

Die SEVEN.ONE ENTERTAINMENT GROUP defines the media and file formats used for playout and archiving as follows. ProSiebenSat.1 Media SE and its subsidiaries reserve the right to use file-based storage for all delivered material. The SEVEN.ONE ENTERTAINMENT GROUP prefers material to be delivered in one of the playout and archiving formats.

6.1.1 SD storage and playout format

The MXF OP1a file container contains a video stream IMX 50 (D10) SMPTE 386M @ 25i and 8 AES PCM audio streams SMPTE 382M with 16-bit sampling depth.

Please refer to Section “1.7 Track assignment” for a definition of audio tracks.

6.1.2 HD storage and playout formats

The MXF OP1a file container contains a video stream 1080i/25 XDCAM HD 4:2:2 50 Mbit/s and 8 AES PCM audio streams SMPTE 382M with 24-bit sampling depth.

Please refer to Section “1.7 Track assignment” for a definition of audio tracks.

Format	Filecontainer/codec/essence
SD	MXF OP1a / IMX 50 + 8 CH Audio (16 bit)
HD	MXF OP1a / XDCAM HD 4:2:2 + 8 CH Audio (24 bit)
UHD-1	MXF OP1a / AVC-Intra Class 300 + 8 CH Audio (24 Bit)*

* The UHD-HDR specifications are covered in a separate document.



6.1.3 Browsing

ProSiebenSat.1 Media SE and its subsidiaries reserve the right to create a copy of each delivered material at a lower data rate and of lower quality and to make this copy available for viewing by authorised personnel.

7 Delivery formats for material

Programmes can be withdrawn from the archive only under certain circumstances and in defined formats. No other forms of delivery are possible. Programmes can be delivered only by prior arrangement with the relevant department and under consideration of the license conditions. The requesting party must pay the cost thereof in advance.

The delivery of content for non-broadcasting or non-production purposes (such as review copies) are provided with suitable IDs or protection marks before being issued. These include:

- Station logo/brand identification
- Burned-in time code
- Watermark (if available)

7.1.1 Delivery as file (FME)

Programmes can be issued only in the archiving formats (SD/HD):

Medium	Format
File HD	MXF OP1a / XDCAM HD 4:2:2, 50Mbit + 8 CH Audio (24 Bit)
File SD	MXF OP1a / IMX 50 (576i/25) + 8 CH Audio (16 Bit)

7.1.1.1 Metadata

The delivery of metadata must be coordinated with the responsible department. The content of the agreement is also subject to review by SEVEN.ONE PRODUCTION GMBH.



8 Special requirements for production quality

8.1 Studio production

8.1.1 Requirements

To achieve the best possible vision and sound quality, the video, audio and acoustic arrangements must be agreed between those responsible for the direction, production and technical sections before shooting begins, for example in a technical production planning meeting.

For an easy flow of content, it is necessary to follow the format and delivery standards of the previous chapters. The program planning and implementation should be controlled by the editorial system in order to be able to archive all relevant metadata and document the process.

8.1.2 Visual quality

Cameras and lenses must be of transmission quality. Cameras are expected to have a sensor size of 2/3" (never smaller than 1/2").

All shooting and post-production work must be based on digital video component systems.

When shooting, bear in mind that the contrast range must not exceed 40:1, since a picture can only be transmitted in a television system with a limited range of tonal values.

In studio productions, the lighting contrast ratio, i.e. the ratio of key light plus the fill-in light to the fill-in light alone should not exceed 2:1. The reflectance of black picture elements should not be less than 3% and that of white elements not more than 60%. The relatively dark reference white (60% reflectance) is necessary for good gradation in the transmission of skin tones. Whenever possible, each shot should include areas of reference white and reference black amounting to at least 1% of the total picture area.

Too low a brightness difference between the foreground and background (less than 1.5:1) spoils the impression of depth.

Excessive areas of black or condensed highlights must be avoided.

To avoid interference patterns in the television picture, there should be no fine patterns on the scenery or costumes. Fine patterns are, for example, regular stripes or checks with a high degree of contrast.

Shiny objects occupying more than 0.2% of the picture area should be rendered matt in order to avoid over-modulation effects. When self-illuminated objects appear in the shot, care must be taken to remain within the specified maximum contrast range.

Colours must be rendered realistically, particularly where skin tones are concerned.

Colouration must be consistent, particularly between edits and scene transitions.



There should be no visible artefacts or noise effects due to digital conversion and no analogue pictures or compression. Special care must be taken to avoid compression chains, which can result from multiple conversions or coding.

There should be no visible film scratches, spots, flecks of dirt or excessive graininess in the picture. If artistic effects or innovative programme techniques are used that can affect the perceived vision quality, this must be agreed on in advance with the programme client (person responsible for the programme). A record of this agreement must be submitted together with the delivered programme in order to ensure that the programme does not fail the quality check for this reason.

8.1.3 Sound quality

Audio material must have good sound quality and be easy to understand. This means it must be free of distortion, humming, rustling, rattling, cross-talk, hissing, whining, fluctuating synchronism and other interference signals.

There should be no muting (silence) or test tones in the programme. Exceptions (such as removal of adult language) must be documented.

Dialogue must be easy to hear within the overall programme mix (regardless of whether the audio is a mono, stereo, or 5.1 recording); special attention must be paid to background effects and background music. Keep in mind that many viewers have trouble making out programme dialog if it is not distinguished clearly enough from the background sound.

There should be no perceptible lip synchronism errors between the audio dialogue and the video images (unless speech synchronism is involved).

8.2 TV filming and film production

All commissioned programmes in all categories are delivered exclusively in wide-screen format: 16:9 with full height (FHA format). No other wide-screen formats will be accepted. The programme must be shot with a native wide-screen camera and should not be converted from the video recordings of a 4:3 camera.

The entire television film production chain must use a format suitable for 16:9 broadcasting. Wider picture formats are not acceptable for commissioned productions (although they are permitted for licensed programmes that were originally shown in the cinema).

Super-16 film productions are not always acceptable for HD delivery, and any planned use of super-16 for HD production must be agreed on with the programme client and ProSiebenSat.1 Produktion GmbH before production begins.

Television films are produced with 25 frames per second (fps) in a permissible picture size.



The film material must be suitable for television. In particular, the following must be considered:

- Film characteristic curve
- Transmittable density range
- Definition (modulation depth, modulation transfer)
- Signal-to-noise ratio (film grain noise)
- Colour balance

The positive material must be of low contrast and suitable for the TV contrast range.

During film scanning, care must be taken to ensure that the resulting video is free of visible errors such as scratches, stripes, spots and flecks of dirt.

If the film material is available in 24 frames per second, it must be scanned at 25 fps.

In this case, the sound must be synchronous and pitch-corrected with phase stability when delivered.

8.2.1 Neutral background graphics, fonts and sounds

In the case of licensed programmes delivered in the original language (such as English), neutral, textless background graphics must be provided for each graphic/text element in the main programme, including the main title sequence.

The neutral background images must contain all background shots for each graphic or text segment and extend to the next clean transition edit at both ends.

When producing programmes licensed for sale, a neutral, textless background graphic must be provided for each graphic/text element in the main programme, including the main title sequence.

These must be provided at the end of the main programme content, separated by at least 30 seconds of black without sound.

Each neutral background should ideally be preceded by an ID panel that indicates the time code position of the shot within the programme.

The licensor or commissioned producer grants the licensee the right to use fonts, third-party material and sound effects for the creation of own versions. A proof of license is available in written form.



8.3 Outside broadcasts

8.3.1 Video transmission

Video transmissions via the fixed network, satellite or networks like ATM must meet the requirements of FTZ [155 R 157].

Accepted standards are:

Standard	Profile	Bitrate
ETSI	G.703	34 Mbit/s
DVB-MPEG2	4:2:0MP@ML	4-15 Mbit/s
DVB-MPEG2	4:2:2MP@ML	8-45 Mbit/s
MPEG-4 AVC (HD)	MP@L4, HP@L4	Max. 20 Mbit/s
MPEG-2 (HD)	MP@HL, 422@HL	Max. 50 Mbit/s (MP@HL) Max. 90 Mbit/s (422@HL)

The standard selected must be agreed on between the producer and ProSiebenSat.1 Media SE or one of its subsidiaries and is also subject to approval by SEVEN.ONE PRODUCTION GMBH.

8.3.2 Audio transmission

The level of analogue sound signals must be adjusted with the reference tone at -9dB in relation to a line level of +6dBu (100%). The level of digital sound signals must be adjusted with -18dBFS (see 1.6 Audio levelling, loudness and normalising).

The sound channel assignment must be agreed on between the producer and ProSiebenSat.1 Media SE or one of its subsidiaries and is also subject to approval by SEVEN.ONE PRODUCTION GMBH.

Care must be taken to ensure that the sound remains lip-synchronised with the video content, particularly if the audio and video are transmitted through different means.

8.3.3 Dolby digital Live production

For Dolby digital production at the present time, the following requirements and processes are needed for a problem-free production:

- A Dolby-E encoder and a video frame synchronizer are needed on the mobile unit to compensate for encoding delay (40ms).
- The uplink must have a Dolby E-compatible multiplexer.
- Transmission of a continuous data stream over the entire production period, including production breaks, must be ensured.



- Sufficient time for commissioning the transmission link must be provided before the start of production.
- Error-free, synchronous operation is possible only after the link has been commissioned.
- If the data stream is interrupted, the link must be recommissioned.

The Dolby E data stream must contain the metadata defined below.

The sound channel assignment must be agreed on between the producer and ProSiebenSat.1 Media SE or one of its subsidiaries and is also subject to approval by SEVEN.ONE PRODUCTION GMBH.

8.3.4 Live-Stream Contribution over internet

SEVEN.ONE PRODUCTION GMBH provides two ways to deliver live streams:

- Direct live stream push to one of our public ingest URLs
- Live stream push to one of our SEVEN.ONE PRODUCTION GMBH managed URLs hosted at a CDN provider (only RTMP).

The event-based URLs must be clarified in advance with the management office

„booking@seven.one“.

For each event, a test must be performed that simulates the live stream workflow for at least one hour.

The tests for the live-stream workflow must be completed at least three days before the event.

8.3.5 Streaming Protokolle

Die SEVEN.ONE PRODUCTION GMBH offers the possibility to use different streaming protocols for live stream delivery:

- RTMP
- SRT
- RTP (+ FEC)

8.3.6 Encoding guidelines

Streams, that meet these parameters and have been tested, will be accepted.

Video	Bandwidth	Codec
HD 1080p/25	min. 6 Mbit/s, max. 8 Mbit/s	AVC (H.264), Main Profile, Level 4.1
HD 720p/25	min. 4,5 Mbit/s, max. 7 Mbit/s	AVC (H.264), Main Profile, Level 3.1



Audio sample rate	Bandwidth	Codec
44.1 kHz , 48kHz	192 kbit/s	AAC, mindestens 2 Channels (Stereo), übertragungsprotokollabhängig

For technical questions and to run the tests, contact the Control Center (,.hauptschaltraum.muenchen@seven.one).

8.3.7 Encoder

Various encoders were tested. The following manufacturers and models have convinced in the tests with good image quality:

- Intinor Direct Link
- Haivision Makito X
- T21 T9261E

This selection is not exhaustive and is not a prerequisite for a transfer. When using these encoders, a successful implementation is guaranteed rather than completely unknown components.

8.3.8 Post-production

Generally, care should be taken to minimise the number of encoding and decoding processes.

Video sampling should be at 4:4:4 or 4:2:2. Acceptable video compression codecs for HD are XDCAM HD or DNxHD 185x for SD use XDCAM IMX 50.

Offline processing is acceptable under any compression rate, if the video undergoes online processing.

If post-production is carried out in the ADOBE product world, the predefined MediaEncoder profile "ARD-ZDF HDF01a-1.1-Profil" (or corresponding updates thereof) must be used to create standardized MXF files. If necessary, volume normalization and video limiter can be configured and activated.

8.3.9 Noise reduction systems

The resolution of the original material should be excessively impaired by the use of noise reduction systems. Slight graininess is preferable to a flat picture. Excessive detail emphasis should also be avoided. We recommend processing the material carefully scene by scene, which must be logged in the check report or the metadata.



8.3.10 Sound quality

Due to reduced quality caused by cascading effects, no data reduction may be used throughout the entire sound production chain. The use of low-quality MP3 files (data rate less than 128 KBit/s) is also unacceptable.

The sound pick-up and recording must be of a quality that corresponds to current professional studio techniques and be structured, as far as possible, to match the picture content in a meaningful manner. There should be no unintentional change in the acoustic atmosphere, and the mixed sound must be properly balanced throughout.

The original dynamic range must be restricted to the loudness range permitted for stereo and 5.1. A self-contained production must be normalised to a target level of -23 LUFS ("1.6. Audio levelling, loudness and normalisation").

8.3.11 Sound level

Digital recordings are modulated in accordance with ITU Guideline R BS 1770-2 and EBU R 128.

8.3.12 Correlation and collection

In the production of stereophonic programmes, it is very important to make sure that a compatible monophonic version can be provided. This is checked at the mixing station and not at the 90° filter. For the maximum permissible phase difference on replay, the following values stated in ITU-Rec. 408-6 apply:

250 Hz bis 4 kHz	15° (correlation grad $r = +0,96$)
40 Hz	30° (correlation grad $r = +0,86$)
10 kHz	30° (correlation grad $r = +0,86$)

8.3.13 Dolby surround

During the production, surround-sound signals must be checked for sufficient stereophonic and monophonic compatibility. Since surround-sound signals are not identifiable as such, they must be clearly marked as "Surround" on the VTR card and data medium as well as in the metadata.