

Technical requirements for the production of vinyl records

1.1 Introduction

Vinyl phonograph records are sound carriers based on mechanical analogue principle. Their sound parameters and dimensions are set by international standards.

Besides regular vinyl records, GZ Digital Media also manufactures *picture-discs*: records with a vinyl core disk on which a graphical label is imprinted on both sides and covered by a transparent sheet bearing the recording.

1.2 Technical requirements for input media

This information is provided in separate document: "Technical requirements for input media".

1.3 Analogue record types available

Vinyl records are divided into different categories of size and revolution speed. Initially there were long-playing (LP) records with a 25-cm (10") or 30-cm (12") diameter and a speed of 33 ⅓ revolutions per minute, and SP and EP records with a 17.5-cm (7") diameter and a 45-rpm speed. Other format combinations were gradually introduced, for instance 30-cm records revolving at 45 rpm for special LP's in which the emphasis is put on sound quality, for special measurement records and for the so-called Maxi-singles in which a short playing time is needed in combination with a high sound quality; or 17.5-cm records revolving at 33 ⅓ rpm, where the recording cannot be made at 45 rpm because of the required playing time.

The recording moulds in use at our plant are produced by the DMM technology. Upon request from customers we can offer recordings on lacquer sheet.

1.3.1 Recording time

The recording time available on vinyl records depends very much on the frequency spectrum, the dynamic range, the width of the stereophonic signal and other characteristics of the recording. The playing time figures which we provide are offered merely as orientation points. If the playing time of the recording of one side of a record does not exceed the figure given in the table, the quality of the recording will usually be limited only by the parameters of the recording device and by the conditions in which the reproduction is carried out. If the playing time exceeds the figure, it may – but will not necessarily – bring about a situation where the recorded signal cannot be fitted into the available recording area under certain available levels of quality. In such a case the level of the recording must be lowered, or an appropriate compromise must be reached.

Orientation figures for vinyl record playing time		
Diameter	33 ⅓ rpm	45 rpm
∅ 17 cm	6,5 – 7,0 min	4,5 – 5,0 min
∅ 25 cm	13,0 – 14,0 min	9,5 – 10,5 min
∅ 30 cm	19,0 – 20,0 min	13,5 - 14,5 min

1.3.2 Available types of analogue carriers

E	∅ 30 cm	33 ⅓ rpm	LP
F	∅ 25 cm	33 ⅓ rpm	LP
H	∅ 17.5 cm	45 rpm	SP
M	∅ 30 cm	45 rpm	Maxi-single
O	∅ 17.5 cm	33 ⅓ rpm	EP
E	∅ 30 cm	33 ⅓ rpm	PICTURE-DISC
F	∅ 25 cm	33 ⅓ rpm	PICTURE-DISC
H	∅ 17.5 cm	45 rpm	PICTURE-DISC
N	∅ 25 cm	45 rpm	Maxi-single

In the offering of 17.5- and 30-cm records, two records weight are available: the “standard” weight and the “heavy” weight. 25-cm records are available only in the “standard” weight.

Diameter	Standard weight	Heavy weight
∅ 17.5 cm	42 ± 7 g	70 ± 10 g *
∅ 30 cm	140 ± 10 g	180 ± 10 a 220 ± 10 g
∅ 25 cm	110 ± 10 g	Not available

*) This record type is manufactured only with a small central hole.

1.3.3 Available colours

Standard vinyl records are manufactured in black. Other colours are available upon request from the customer. The colours are selected using colour samples from the manufacturer, or following the requirements of the customer. In the latter case, a colour sample must be supplied with the order. When manufacturing records in colours other than black, the manufacturer has a right to allow a certain difference in hue due to limitations in dyestuffs technologies for plastics.

Remark:

Coloured vinyl records (and especially non-transparent or fluorescent) may offer an impaired acoustic quality, especially an increase in the acoustic noise in the initial and final grooves of the record and in the transitions between programmes.

1.3.4 Picture-discs

This is a vinyl record with a full-size label on each side; the label is covered by a plastic sheet bearing the grooves of the recording.

Remark:

Picture-discs may offer a lower acoustic quality, especially an increase in the acoustic noise in the initial and final grooves of the record and in the transitions between tracks.

When using standard half-tone printing, a moiré effect will occur on the record as a result of interference effects (between the grooves of the record and the screening of the underlying label); the intensity of this phenomenon depends on the type of the pattern which is printed on the label. This moiré effect may not be eliminated with the technologies used by the manufacturer.

1.3.5 Terminology

Each record bears a compulsory identification number on the final section of each side. This number identifies the medium for which the recording was carried out, and consists in two letters and a row of digits:

The first letter is always “A”.

The second letter is used for identifying the carrier type:

E	∅ 30 cm	33 ⅓ rpm	LP stereo
F	∅ 25 cm	33 ⅓ rpm	LP stereo
H	∅ 17.5 cm	45 rpm	SP stereo
M	∅ 30 cm	45 rpm	Maxi-single
N	∅ 25 cm	45 rpm	Maxi-single
O	∅ 17.5 cm	33 ⅓ rpm	EP stereo
A	∅ 30 cm	33 ⅓ rpm	LP mono
B	∅ 25 cm	33 ⅓ rpm	LP mono
C	∅ 17.5 cm	33 ⅓ rpm	EP mono
D	∅ 17.5 cm	45 rpm	SP mono
G	∅ 17.5 cm	45 rpm	EP mono

The row of digits identifies the sequence number of the master. Side A of the record always bear an odd number, while side B bears an even mould number.

1.4 Labels

The disc itself must bear a label on each side. Phonograph record labels are paper prints which constitute an integral part of analogue phonograph records, and are permanently attached by pressing. A label must be placed on each side of the product, and both labels on a record must have identical dimensions (for instance, it is not possible to use a picture-disc label on one side and a standard label on the other). The label contains publisher's data of the record.

1.4.1 Available labels

Standard labels are manufactured in the following formats:

- a) for discs with a 17.5-cm diameter, labels with a 84-mm outside diameter
- b) for discs with a 30- and 25-cm diameter, labels with a 100-mm outside diameter

PICTURE-DISC labels are offered in the following formats:

- a) for discs with a 17.5-cm diameter, labels with a 168-mm outside diameter
- b) for discs with a 25-cm diameter, labels with a 242-mm outside diameter
- c) for discs with a 30-cm diameter, labels with a 292-mm outside diameter

The text of the label must be placed so as not to spread over the bleed of the label. In all label types the text may not extend closer than 2 mm from the external border of the label and colour of label must be exceed the outside border of the label by at least 3mm. On the labels of all disc formats, the text may not spread over the central part of the label within a 10 mm diameter. On the label of a 17.5-cm disc with a large central hole, the text may not spread over the centre of the label within a 40-mm diameter.

1.4.2 Requirements for source material submitted for label printing

A copy of the artwork must be supplied in compliance with the following criteria:

- 4 colours: 48 l/cm
- Preferred screen ruling:

Cyan	75°
Magenta	45°
Yellow	90°
Black	15°
Black/white	black 45°
Two colours	difference min. 30°
- Film weight: 0.1 mm - fixed-dimensions polyester
- Black: min. image density 3.00
max. density of the transparent film around 0.10

Each film must bear an indication of the colour and register marks. Colour separation of films must be made to allow the image to exceed the outside border of the label by at least 3 mm. If further colours are used, those must be specified in accordance with the PANTONE scale or by a colour sample. The dimensions of the lithography are specified in a drawing (see image 1 and 2 in the "Technical requirements for printed material").

If the source material is submitted electronically, the same rules apply as in the Technical requirements for DTP source materials.

1.4.3 Delivery conditions

Labels are provided by the record manufacturer, i.e. by GZ Digital Media a.s., or by the client upon mutual agreement. Labels supplied by the client must be made of non-tinted and non-coated paper with a density of 120 to 140 g/m². They must be printed using inks that will resist a temperature of 150°C, and the back side must bear orientation marks perpendicular to the orientation of the print. The ink used for the orientation lines must not show through the label. The manufacturer prefers to use labels manufactured at GZ Digital Media a.s.; if the client is providing the labels, the manufacturer does not guarantee homogenous results.

1.5 Packaging

The product is delivered in an inner and an outer package (at the customer's choice) and usually wrapped in groups of 20 (depending on the kind of record and packaging) in hard cardboard boxes. The packaging details are set at the moment of the order. When record sets are ordered, the outer package may be replaced by a boxette containing the set. The outer package is produced by the manufacturer on the basis of material supplied by the customer, or by the customer on the basis of the technical documentation on packages.

1.5.1 Inner package

Records of all dimensions may be wrapped in an inner paper envelope or in a microthene or polyethylene package, which protects the disc from direct friction with the outer package. The inner package may have an opening at the centre.

1.5.2 Outer package

Outer packages are made from white-grey carton with a weight of 280 g/m², and may be plain white or plain black, or be offset-printed in up to 5 colours. The packages are glued from the inside.

1.5.3 Types of outer packages

Packages are manufactured either flat or with a 3-mm spine. In addition, the packages can have one or two openings in the middle. On all types of outer packages, a laminated glossy or non-glossy finish is available.

1.5.4 Wrapping

After packaging, records of all dimensions may be wrapped in a transparent plastic wrapper.

1.6 Package prints

Packages are printed on the basis of material supplied by the customer: either a hard copy lithography or files submitted electronically (see Technical requirements for DTP). The material supplied must keep a minimal bleed of 2 mm over the borders of the package, and for packages with middle openings the text may not spread over the middle area.

1.6.1 Technical requirement for package prints

See the technical conditions for printing at GZ Digital Media a.s. (image no. 3, table 1).

1.7 Trial

Trial and measurement methods in use for phonograph records are regulated by the IEC 98–64 and IEC 98A–72 norms. Labels are checked by visual inspection.

1.8 Technical conditions of use

Records are carriers of sound information and for that reason require correct treatment and use.

- Temperature during the use, storage or shipment of the records must be kept within a 5°C – 35°C range.
- Relative air humidity may not exceed 85%, and there should be no toxic chemical emanations.
- Any mechanical damage or other damage to the recording surface must be prevented, including damages made by inappropriately adjusted playback equipment, unsuitable package, etc.
- Records must be stored in a vertical position and be kept from slanting (except during direct manipulation).

1.9 Manipulation and shipment

- Only reinforced cardboard boxes may be stored in piles of several boxes.
- Records must be shipped in closed shipping environments.

- Records must be shipped in such conditions as will not degrade their quality.
- Records must be packaged in shipment boxes, and the boxes must be placed in a vertical position in piles of 4 boxes at most.
- The boxes must be protected against shocks and movements; no other goods may be placed on the boxes.
- It is the responsibility of the client to verify the state of the product upon its delivery, and to write a report with the shipping agent if any damage is noticed (torn or soiled outer or inner packages or transportation boxes).

1.10 Ordering phonograph records

When an order is placed, the stipulations contained in the present technical requirements are binding, together with further conditions agreed in writing.