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Graphic technology Post-press Requirements for bound products

1 Scope

This International Standard specifies quality requirements and tolerances of bound products and intermediate components. This standard is applicable to products requiring industrial binding, for example, books, magazines, catalogues and brochures.

4 Process requirements

4.1 General

Post-press production of bound products is carried out in a series of process operations. A typical workflow is shown in Figure 1 and, for each operation, the number of the clause describing it is given in parentheses.

All processes shall be performed in a way that no markings, ink transfer, wrinkles, cracks, etc. occur. There shall be prior information exchange between parties on all aspects of quality of the final product. This includes information on the standardized climatic condition of the region of use.

4.2.2 Cutting accuracy

4.2.2.1 Piles of sheets

A first master edge (usually identifiable by the printed register mark) shall be defined, either parallel or perpendicular to the printed content, and a second master edge shall be defined; the angle between them shall be 90° ± 0,2 °. If the angle between the master edges cannot be guaranteed, the following edge and squareness tolerances shall apply. The dimensions of a cut pile shall be determined by taking the measurement of two sample sheets (one from the top and one from the bottom of the pile). The squareness of the sheet shall be determined by measuring both the horizontal and vertical edges (a_1, a_2, b_1, b_2) and the diagonal lines as shown in Figure 2, where the squareness tolerance is given by the values of $W_1 – W_2$, $H_1 – H_2$ and X – Y. The cutting accuracy for different numbers of folds is given in Table 1.

4.2.2.2 Web-fed cutting

In cutting for web-fed production, the position of the cutting edge and any perforation shall be within 1 mm of the design cutting position.

4.2.2.3 Cutting quality

After any cutting operation and removal of the waste from the cut edges, the material shall match

the desired shape and dimensions and be free from pressure marks, knife marks, ink transfer, breaks and burring due to a blunt cutting instrument.

4.3.3 Folding quality

Folding accuracy shall be measured using reopened unbound signatures. For a correct folding result, limitations to folding variations with respect to folding marks shall be taken into account and the deviation tolerances for different numbers of folds shown in Table 2 shall apply. The grammage of paper shall be determined as described in ISO 536.

4.4.1 Gathering

During gathering, signatures shall be aligned to the leading edge and to the spine with a deviation tolerance of ± 1,5 mm. The correctness of the sequence of signatures shall be checked (either visually by collating marks or automatically by an inspection system). If all of the signatures do not contain the same number of pages, those with a smaller number of pages shall not be placed in the first or last position in the block.

4.4.2 Pasting on endpapers

The fold of each endpaper on the first and last signatures respectively shall have a maximum offset of 2 mm from the innermost fold of the signature (see Figure 3). The adhesive line shall be straight and have a maximum width of 5 mm, clear of ink or varnish. The endpaper shall be aligned with the signature on the head.

4.4.3 Inserting

When other folded sheets or loose inserts need to be inserted into a block, the following criteria shall be observed.

a) The size of any insert shall not be larger than the size of the normal signatures in the end product.

b) Different inserts, for example a single insert, an odd-sized insert or fold-outs, may be glued or sewn into the block by machine or manually.

c) The size of any fold-outs shall be about 2 mm smaller than the final product size, so as to avoid any over-cut in trimming. The four sides of the fold-outs should be parallel to those of the block.

d) Odd-sized inserts shall be placed between full-sized signatures.

4.5.1 Adhesive binding

4.5.1.1 Notch binding

Notches cut into the folds of the gathered signatures shall have the depth and spacing compatible with the paper type and the composition of the adhesive. Usually each notch should go through the folds and may be from 15 mm to 18 mm in length, with a spacing of 3 mm to 5 mm wide.

4.5.1.2 Perfect binding

In perfect binding, the folds of the gathered signatures shall be milled off (If single sheets are being bound, then they can be built up to form the block without the need to grind anything off). Depending on the paper thickness and the number of pages per signature, the depth of milling shall ensure the separation of the block into individual sheets. Notching and roughening may be applied to improve the adhesion. During all these processes the alignment of the signatures shall

be kept. The milling shall be even across the spine. There should be no printing, varnishing or previously applied glue in the area reserved for gluing, which shall also be free of dust.

4.5.1.3 Application of spine and side glue

The coating layer of the adhesive should be bubble-free and uniform with a thickness in accordance with the technical specification of the glue manufacturer. The operating temperature of the adhesive and any other operational requirements shall be in accordance with the technical specification of the glue manufacturer. Any glue penetration of the spine glue should be avoided. The film thickness of the side glue should be kept as low as possible. Excess glue shall not be visible anywhere in the finished product.

4.5.2 Thread sewing

Thread sewing should be used for products of high durability, frequent usage and also for papers with a high basis weight. The thread used shall be stronger than the substrate. The stitches shall be evenly distributed on the spine fold. The stitching holes shall align with the binding edge with a deviation tolerance of ± 0,7 mm. The thread tension should be neither too loose, so as to keep sufficient tightness between the signatures, nor too tight, so as to avoid tearing the paper or causing wrinkles. Any torn thread or missing stitches shall be avoided. Any signature of the thread sewn book block shall be aligned to the head with a tolerance of ± 1,5 mm. For a good bonding of the signatures of a book block, the number of stitching groups should correspond to the spine length, the stitching arrangement in Table 3 is recommended. Staggered stitching should be used to avoid spine build-up, if necessary. The thread sewing process shall be followed by the process of gluing-off the spine. The requirements of 4.5.1.3 apply.

4.5.3 Thread sealing

Thread sealing is carried out following the folding process, where thread staples with a thermoplastic coating shall be pushed from the inside to the outside of the sheet prior to the last fold and then the thread ends shall be laid out backwards and fused to the spine of the sheet by pressure and heat. The staples shall align with the binding edge with a tolerance of ± 0,7 mm. The staple length should be 12 mm, the spacing between the staples should be 38 mm.

4.5.4 Lockstitching

Lockstitching (saddle or side lockstitch) should be used for combining a low number of signatures or sheets with a maximum spine thickness of 8 mm. Although thread is used in these methods, the methods are not described as thread sewing. There should be three to four stitches per 10 mm. For side lockstitching there should be a space of 4 mm ± 1 mm between the binding edge and the stitching line.

4.5.5 Saddle-stitching

Saddle-stitching may be applied to the binding of single-layer blocks. The maximum block thickness is related to the staple format. Blocks stitched with flat staples should have a maximum thickness of 8 mm. Blocks stitched with Omega staples should have a maximum thickness of 6 mm with a loop diameter of 6 mm. The gauge of the wire used for the staples should be dependent upon the block thickness (see Table 4). The distance between each staple (outer staples if there are more than two) and the nearest edge (a) should be equal with a tolerance of ± 3 mm (see Fig. 4). The distance between the two staples (b) should be greater than one third of the height of the product. For the Omega format, the position tolerance should be ± 2 mm and

the Omega staple formation tolerance should be ± 1 mm.

4.5.6 Single sheet binding (spiral, coil, wire-o, comb)

Single sheet binding includes spiral, coil, wire-o and comb binding. During the binding process, the book block shall be punched or drilled with a series of small holes (square or round) along the binding edge and a metal or plastic coil shall be threaded through the holes in spiral binding; a set of double wire loops shall be inserted into the holes in wire-o binding or a plastic comb shall be inserted into the holes in comb binding, so as to hold the cover and the pages together. The holes in the cover shall be in alignment with that in the pages. For a reliable binding result, the specifications of the plastic or wire used should correspond to the thickness of the gathered pages and a side clearance should be maintained to ensure easy opening and to avoid tearing of the paper. Recommended parameters are given in Table 5 and Table 6. The loops of the binding shall be fully closed and not distorted through excess pressure in the closing process. The ends of the plastic or wire shall not protrude from the product.

4.6 Trimming

Trimming with a guillotine or a three-knife trimmer shall avoid marks from the pressing bar and the cutting table. Trimming shall be performed after sufficient drying of the glue. After trimming, the book or book block shall have its spine free of wrinkles, and 90º angles in each of the four corners of both the front and back. The trim size and squareness tolerances shall be ± 0,5 mm for thicknesses up to 30 mm and ± 1 mm for thicknesses greater than 30 mm. For measurement, see Fig. 2 in 4.2.2.1. The dimensions from front to back should be equal with a tolerance of ± 0,5 mm for thicknesses up to 30 mm and ± 1 mm for thicknesses greater than 30 mm.

4.7 Hardcover production

4.7.1 General

Sequence of individual processes may vary according to different manufactural recommendation.

4.7.2 Rounding and backing

Where applicable, book blocks shall be evenly rounded from head to tail and backed to form shoulders on both sides. The height of the shoulders shall be equal to or slightly less than the thickness of the case board. Rounding and backing should be performed on book blocks with a thickness of over 13 mm, or if no rigid spine inlay is used.

4.8 Soft cover production

4.8.1 Size of the cover

The cover material shall extend beyond the applied spine glue and be larger in width and height than the block so that after trimming edges are all flush. If the cover includes flaps, the width of the cover material shall include the width of the flaps.
NOTE: For many cover applications a minimum flap width of 30 mm is recommended.

4.8.2 Weight of the cover

The weight of the cover material should be proportional to the size, thickness and weight of the book block; the thicker the book block, the heavier the cover material. The recommended relationship between thickness of the book block and the cover basis weight is given in Table 8.

5 Binding quality control

5.1 Visual inspection during production

There shall be immediate communication between parties on all irregularities occurring during the manufacturing of bound products. It is recommended to verify the quality attributes, listed in 5.3, within standardized or customized quality assurance measures, as far as possible.

5.2 Sampling

Sampling should be performed on semi and final products. The sampling of final products should be performed according to either ISO 186 or ISO 2859-1.

5.3 Visual inspection of the finished products

The binding quality of final products shall meet the specifications in the job description (see ISO 16762). The following aspects shall be especially taken into account:

Annex A

(normative)

Method to measure degree of warping of finished products

A.1 General

Paper has a certain physical variability and is hydroscopic, any paper based products finished from binding processes shall not be delivered till they have become stable.

To obtain stability, the finished products, after going through all stages of process, shall be stacked in a place at a temperature of 20 ºC ± 5 ºC and a relative humidity between 35 % and 75 % for 24 h. After this handling, the finished products should retain a stable shape and the covers should keep free from warping.