



|               |               |
|---------------|---------------|
| Canada        | Groupe        |
| Communication | Communication |
| Group         | Canada        |

Printing  
Services

Services  
d'imprimerie

---

# Quality Levels for Printing 1993



Public Works and  
Government Services Canada

Travaux publics et  
Services gouvernementaux Canada

Canada

**Catalogue No. P35-25/5-1994  
ISBN 0-660-59099-9**

**Replaces 1988 issue  
© Public Works and Government Services Canada  
Re-edited December 1993**

# TABLE OF CONTENTS

|  | PAGE |
|--|------|
| 1. INTRODUCTION .....                                  | 1    |
| 2. GUIDE TO THE CATEGORIES .....                       | 2    |
| 3. DETAIL REQUIREMENTS.....                            | 3    |
| 4. GENERAL ATTRIBUTES.....                             | 4    |
| 4.1 Protective Varnish or Coating .....                | 4    |
| 4.2 Moiré.....   | 4    |
| 4.3 Drilling .....                                     | 4    |
| 4.4 Image Graininess .....                             | 4    |
| 4.5 Halftone Mottle .....                              | 4    |
| 4.6 Covers and Cover Coatings.....                     | 4    |
| 5. EVALUATION METHODS .....                            | 4    |
| 5.1 Solids (Black).....                                | 4    |
| 5.2 Solids (Colour).....                               | 4    |
| 5.3 Colour Match .....                                 | 5    |
| 5.4 Ink Gloss .....                                    | 5    |
| 5.5 Register .....                                     | 5    |
| 5.6 Hickies .....                                      | 5    |
| 5.7 Skew.....  | 6    |
| 5.8 Folding .....                                      | 6    |
| 5.9 Trim .....   | 6    |
| 5.10 Drilling .....                                    | 6    |
| 5.11 Halftone Reproduction.....                        | 6    |
| 5.12 Extraneous Marks .....                            | 7    |
| 5.13 Rub-Resistance of Printed Image.....              | 7    |
| 5.14 Image Positioning.....                            | 7    |
| 5.15 Type Print Contrast Signal (PCS), Black Type..... | 7    |
| 5.16 Stroke Width.....                                 | 7    |
| 5.17 Plugging.....                                     | 7    |
| 5.18 Doubling.....                                     | 7    |
| 5.19 Voids .....                                       | 7    |



# **1** INTRODUCTION

*Quality Levels for Printing 1993* have been developed by the Canada Communication Group (CCG), Public Works and Government Services Canada (PWGSC). It is the intent of this document to provide a means of specifying, between purchaser and supplier, the quality requirements of finished printed work.

It is inherent that the quality of components supplied must enable the production of the desired quality level of the finished work to be achieved.

It is possible that attributes of a particular job can be specified in more than one quality level range (i.e. folding tolerance—"Prestige", print quality—"Informational").

For quality at the three lower levels the examples shown in the "Guide to the Categories" section can give you a good bench-mark and normal good production practice and attention to platemaking, make ready, ink flow and proper plant and equipment housekeeping will generally ensure that these quality levels are achieved.

For the two highest quality levels, the same good production practice will assist in the achievement of the quality attributes but extra care and attention is critical in each succeeding higher level. When estimating for a job at the Library or Prestige Quality Levels the printer must allow not just for doing the work at lowest cost, but must also ensure that the production methods to be used are consistent with the production of exceptionally good quality work. When a customer asks for Library or Prestige Quality, a quality which is above the ordinary is expected—if the quality requested is not received, a reprint or a financial adjustment will be necessary.

The tabular data shown in these levels were developed from reviewing a large number of finished jobs produced by a variety of commercial printers. All of the quality requirements can be attained and are quite normal in many printing houses, but some of them require attention to detail beyond that which is normal in a few plants.

For the two higher quality levels, there is an established audit procedure for evaluating printed products submitted by potential suppliers to establish their quality capability, which may result in suppliers being placed on one or both quality source lists for Prestige or Library.

Until suppliers are placed on these source lists, CCG will not accept bids for Prestige or Library Quality printing.

It is incumbent on the contractor to supply printing which conforms to good workmanship, sound trade practices, satisfactory materials and consistency throughout the job. These requirements apply to all quality attributes whether or not they are specifically mentioned in this document.

Questions concerning a specific contract should be directed to the contracting officer named on the contract.

Please direct any comments, proposed revisions or requests for further copies of this publication to:

Quality Assurance Unit  
Canada Communication Group  
45 Sacré-Cœur Blvd., Room A-3406  
Hull, Quebec  
K1A 0S7

(819) 997-3550 — 956-1488 — 956-5989



## **2** GUIDE TO THE CATEGORIES

| <b>Category</b>      | <b>Synonyms</b>                                 | <b>Typical of Category</b>   |
|----------------------|---|--|
| <b>PRESTIGE</b>      | <b>TOP QUALITY</b>                              | Engraved invitation cards<br>Deluxe bound books<br>"Prestige" stationery (Cabinet Minister's)<br>Limited-series lithographs  |
| <b>LIBRARY</b>       | <b>PROFESSIONAL GRADE</b>                       | Library books<br>Maps (Multi-colour)<br>Professional journals  |
| <b>INFORMATIONAL</b> | <b>COMMERCIAL QUALITY<br/>PUBLICATION GRADE</b> | Magazines ("Glossy")<br>Advertising literature<br>Technical reports with illustrations<br>Catalogues (1 to 4 colours)<br>Departmental annual reports<br>Press releases |
| <b>OFFICE</b>        | <b>STATIONERY GRADE</b>                         | Departmental stationery<br>Forms and memos<br>Internal publications<br>Management reports<br>Phone directories   |
| <b>UTILITY</b>       | <b>BASIC QUALITY<br/>DUPLICATOR QUALITY</b>     | Circulars<br>Xerographic copies<br>Copy from computer print-outs<br>Direct mail flyers<br>Form letters from typed copy<br>Newspapers                                   |



# 3 DETAIL REQUIREMENTS

The test procedures are fully described in the "Evaluation Methods" section.

| Quality Parameters and Specifications   | Prestige                 | Library                  | Informational            | Office                   | Utility                  |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <b>Solids (Black)</b>   |                          |                          |                          |                          |                          |
| Density by visual filter  |                          |                          |                          |                          |                          |
| (a) Uncoated paper, average density must not be less than...  | 1.10                     | 1.10                     | 1.0                      | 0.8                      | 0.6                      |
| (b) Coated paper, average density must not be less than.....  | 1.30                     | 1.30                     | 1.20                     | N/A                      | N/A                      |
| (c) Density range within a solid or between adjacent solids must not exceed.....                    | 0.05                     | 0.10                     | 0.10                     | 0.15                     | 0.20                     |
| (d) Density variation throughout the run must not exceed ...  | ± 0.05                   | ± 0.10                   | ± 0.10                   | ± 0.15                   | ± 0.25                   |
| <b>Solids (Colour)</b>  |                          |                          |                          |                          |                          |
| Test as directed  |                          |                          |                          |                          |                          |
| Run variance shall not exceed.....  | 0%                       | 0%                       | 2.5%                     | N/A                      | N/A                      |
| <b>Colour Match (Single "Spot" Colour)</b>  |                          |                          |                          |                          |                          |
| Test as directed  |                          |                          |                          |                          |                          |
| The total colour difference (Delta E) between the specified and printed colour must not exceed..... | 2.0                      | 3.0                      | 4.0                      | N/A                      | N/A                      |
| <b>Ink Gloss</b>  |                          |                          |                          |                          |                          |
| Minimum gloss (when specified) .....  | 85%                      | 80%                      | 75%                      | N/A                      | N/A                      |
| <b>Register</b>   |                          |                          |                          |                          |                          |
| Misregister shall not exceed.....   | .05 mm<br>(0.002 in.)    | .075 mm<br>(0.003 in.)   | .100 mm<br>(0.004 in.)   | .250 mm<br>(0.010 in.)   | N/A                      |
| <b>Illicities, Spots and Lint</b>   |                          |                          |                          |                          |                          |
| (a) Maximum permitted count in any one area.....  | 1                        | 5                        | 15                       | 25                       | 55                       |
| (b) Maximum average count per publication.....  | 1                        | 2                        | 5                        | 10                       | 15                       |
| <b>Skewness of Image</b>  |                          |                          |                          |                          |                          |
| Maximum displacement of image axis shall not exceed.....  | .760 mm<br>(0.030 in.)   | .760 mm<br>(0.030 in.)   | 1.50 mm<br>(0.060 in.)   | 3.20 mm<br>(0.125 in.)   | 6.40 mm<br>(0.250 in.)   |
| <b>Folding - One, two or three folds</b>  |                          |                          |                          |                          |                          |
| Folds shall not be out of specified position by more than.....                                      | .250 mm<br>(± 0.010 in.) | .500 mm<br>(± 0.020 in.) | .760 mm<br>(± 0.030 in.) | 1.50 mm<br>(± 0.060 in.) | 3.20 mm<br>(± 0.125 in.) |
| <b>Folding - More than three folds</b>  |                          |                          |                          |                          |                          |
| Folds shall not be out of specified position by more than.....                                      | .760 mm<br>(± 0.030 in.) | .760 mm<br>(± 0.030 in.) | .760 mm<br>(± 0.030 in.) | 1.50 mm<br>(± 0.060 in.) | 3.20 mm<br>(± 0.125 in.) |
| <b>Trim</b>   |                          |                          |                          |                          |                          |
| All work shall be trimmed to specified size.....  | .250 mm<br>(± 0.010 in.) | .500 mm<br>(± 0.020 in.) | .760 mm<br>(± 0.030 in.) | 1.50 mm<br>(± 0.060 in.) | 3.20 mm<br>(± 0.125 in.) |
| <b>Drilling</b>   |                          |                          |                          |                          |                          |
| All drilled holes shall be positioned as specified.....   | .40 mm<br>(± 0.015 in.)  | .40 mm<br>(± 0.015 in.)  | .40 mm.<br>(± 0.015 in.) | .40 mm<br>(± 0.015 in.)  | .40 mm<br>(± 0.015 in.)  |
| <b>Halftone Reproduction</b>  |                          |                          |                          |                          |                          |
| The tone reproduction gradient must be within the specified range of the ideal gradient .....       |                          |                          |                          |                          |                          |
|   | ± 10%                    | ± 10%                    | ± 15%                    | ± 25%                    | N/A                      |
| <b>Extraneous Markings (Scumming or Set-off)</b>  |                          |                          |                          |                          |                          |
| Maximum acceptable background density.....  | 0.02                     | 0.03                     | 0.04                     | 0.06                     | 0.10                     |
| (NB: extraneous lines, specks, scratches etc. will be assessed visually)                            |                          |                          |                          |                          |                          |
| <b>Rub-resistance of Printed Image</b>  |                          |                          |                          |                          |                          |
| Maximum acceptable density of rub-off smear.....  | 0.0                      | 0.03                     | 0.03                     | 0.04                     | 0.06                     |
| <b>Image Positioning</b>  |                          |                          |                          |                          |                          |
| All images shall be positioned as specified .....   | .125 mm<br>(± 0.005 in.) | .250 mm<br>(± 0.010 in.) | .760 mm<br>(± 0.030 in.) | 1.50 mm<br>(± 0.060 in.) | 3.20 mm<br>(± 0.125 in.) |
| <b>THE FOLLOWING PARAMETERS CONCERN TYPE MATTER</b>   |                          |                          |                          |                          |                          |
| <b>Type Print Contrast Signal (PCS), Black Type</b>   |                          |                          |                          |                          |                          |
| (a) Uncoated paper, minimum acceptable PCS.....   | 0.85                     | 0.825                    | 0.80                     | 0.70                     | 0.60                     |
| (b) Coated paper, minimum acceptable PCS.....   | 0.90                     | 0.85                     | 0.80                     | N/A                      | N/A                      |
| (c) Maximum acceptable variation .....  | ± 0.02                   | ± 0.03                   | ± 0.05                   | ± 0.10                   | ± 0.15                   |
| <b>Stroke Width</b>   |                          |                          |                          |                          |                          |
| <b>Percentage of Original Character Size</b>  |                          |                          |                          |                          |                          |
| (a) Acceptable range of printed character size.....   | 95% to<br>105%           | 90% to<br>110%           | 85% to<br>115%           | 75% to<br>115%           | 50% to<br>150%           |
| (b) Maximum variation allowed.....  | 5%                       | 5%                       | 5%                       | 10%                      | 15%                      |
| <b>Plugging</b>   |                          |                          |                          |                          |                          |
| Maximum percent plugging allowable.....   | 0%                       | 0%                       | 10%                      | 25%                      | 50%                      |
| <b>Doubling and Slur</b>  |                          |                          |                          |                          |                          |
| Maximum percent of doubling or slur allowable.....  | 0%                       | 0%                       | 5%                       | 10%                      | 25%                      |
| <b>Type Voids (Broken Type etc.)</b>  |                          |                          |                          |                          |                          |
| (a) Maximum permitted count in any one area.....  | 2                        | 2                        | 5                        | 15                       | 50                       |
| (b) Maximum average count per publication.....  | 1                        | 1                        | 3                        | 10                       | 25                       |



## **4** GENERAL ATTRIBUTES

### **4.1 Protective Varnish or Coating**

Where applied, press varnish or coating shall prevent any rub-off of the printed image and if so specified the coated surface should have an even, high gloss finish.

### **4.2 Moiré**

Halftone screens shall be angled so that no moiré effect is visible in the final print.

### **4.3 Drilling**

All drilled holes shall be completely clear and not have torn edges.

### **4.4 Image Graininess**

In addition to the density specifications previously listed, halftones, solids and type shall not have a rough and grainy appearance.

### **4.5 Halftone Mottle**

Halftones shall not have a blotchy appearance such as caused by poor dot reproduction.

### **4.6 Covers and Cover Coatings**

The covers of all publications shall be free of all physical and cosmetic defect such as dog-eared corner scuffs, scratches and dirt. Covers that have been plastic laminated shall have the laminate in contact with the cover material over 100% of the surface. The laminated cover shall be free of air bubbles and other defects and is to have a life expectancy equivalent to the intended life span of the book.

## **5** EVALUATION METHODS

### **5.1 Solids (Black)**

With a MacBeth 1155 SPI or equivalent reflection densitometer set on the visual filter, measure the density of solid printed areas throughout the publication job lot. Where solid areas are of substantial size, four measurements within the area shall be made and the measurements averaged to find the *average density (X)*.

The *density range* shall be calculated by subtracting the minimum density from the maximum density measured within one solid area or in adjacent solids.

The average densities (X) are then averaged to find the overall average density (X). The difference between the overall average density and each individual average density is the *density variation*, which shall not exceed the specifications as listed in the detail requirements.

### **5.2 Solids (Colour)**

With a reflection densitometer set on the correct densitometer filter, measure the density of solid printed colour areas throughout the publication job lot.



The density run variation of any printed solid colour shall not differ from the specified colour by more than the tolerance levels listed in the detail requirements.

### 5.3 Colour Match

This test procedure is for use only with solid spot colour and not for tints or process colour. Measurements are made using a CIE response, three filter, colourimeter with a D65 illuminate. The contractors are responsible to always update their PMS Colour Formula Guide. In the event of a disagreement, CCG will verify the printing using the latest edition as published by Pantone Inc. Measurements are made on samples of the printed solid and on an approved colour swatch. The measured results are expressed in CIE LAB coordinates: L\*, a\*, b\*. The total colour difference between the printed and specified colour is calculated from the following formula:

$$\Delta E, \text{ or total colour difference} = \sqrt{\Delta L^2 + \Delta a^2 + \Delta b^2} \text{ where } \Delta L, \Delta a \text{ and } \Delta b \text{ are the measured differences between } L^*, a^* \text{ and } b^* \text{ values for the actual and specified colour samples.}$$

**NOTE:**

While the printer may not have the required equipment to make these measurements it is still possible to achieve an acceptable colour match with the aid of a colour reflection densitometer.

### 5.4 Ink Gloss

The 75° gloss is measured by a Hunterlab D16 Multipurpose glossmeter (or equivalent instrument) in accordance with TAPPI standard procedure T480-0S72.

### 5.5 Register

Misregister is recorded as the linear displacement of any colour in any direction, relative to the other colour.

### 5.6 Hickies

A representative area of print 10 cm × 10 cm square is selected. (This is conveniently done by cutting a 10 cm × 10 cm square from board, and placing the opening over the print to be tested.) The total number of hickies within this area is counted, and weighted according to the size of hicky as follows:

| *Size of hicky (approx.)    | Weighting |
|-----------------------------|-----------|
| Very small; 0.5 mm or less  | 1         |
| Noticeable; 0.5 to 1 mm     | 2         |
| Large; 1 to 3 mm            | 3         |
| Very Large; 3 mm or greater | 6         |

The total hicky rating is calculated as follows:

|                           |     |
|---------------------------|-----|
| (very small hickies)      | × 1 |
| Plus (noticeable hickies) | × 2 |
| Plus (large hickies)      | × 3 |
| Plus (very large hickies) | × 6 |
| = Hicky count per area.   |     |





The maximum hicky count observed in the work is recorded, along with an average hicky count calculated from random areas throughout the work.

**\*NOTE:**

Approximate hicky size can be rapidly assessed, and with adequate accuracy, by means of a low-powered magnifying glass (5 to 10×) with measuring reticle.

### 5.7 Skew

Skew is the angular displacement of the image axis (horizontal or vertical) from its intended alignment. Draw a straight line that represents the actual axis of the printed image. With a line of type this is best done by drawing a line along the base of the characters. From one end of this line extend another line that is parallel to the intended axis or parallel to the top of the page. If any skew exists, these two lines will not be identical but will be displaced from each other. If this is the case, measure the linear displacement at a distance of 12 cm from where these two lines join. This displacement shall not exceed the specification.

### 5.8 Folding

Mispositioning of a fold is recorded as the linear displacement of actual from specified positioning, plus skew displacement (if any).

### 5.9 Trim

Long or short trim is recorded as the difference between specified and actual size of the trimmed work. A plus sign may be used to denote oversize work, and a minus sign for undersize.

### 5.10 Drilling

The mispositioning of a drilled hole is recorded as the linear displacement of the centre of the actual hole from the specified centre.

### 5.11 Halftone Reproduction

(a) *From a continuous-tone original*

The criteria for acceptable halftone quality is a straight line when the tone reproduction curve is plotted on RIT Tone Reproduction graph paper, Type 2.

With the densitometer zeroed on the brightest highlight in the original, select several areas that represent the entire tonal range and measure the densities of these spots. Now, with the densitometer zeroed on an area of unprinted paper find the corresponding spots on the printed halftone and measure the densities. On the graph paper plot the densities from the original against the densities of the print. Draw the best straight line through these plotted points, which will represent the actual tone reproduction. Now draw another straight line from the highest plotted density point to the origin of the graph paper. This line represents the ideal tone reproduction. The gradient of the actual tone reproduction line shall not deviate from the gradient of the ideal tone reproduction line by more than the specified percentages.



**(b) From supplied halftone film**

The criteria and procedures are the same as in part (a), with one additional step. From the halftone film produce a positive non-glossy photographic contact print which can then be measured in the same manner as the original in part (a).

**5.12 Extraneous Marks**

Lines, spots, smears or other extraneous (background) markings are assessed visually. Generalized extraneous marking, covering a large area, (e.g. scumming, tinting) are assessed in terms of average reflection density of the affected area.

**5.13 Rub-Resistance of Printed Image**

A representative sample of the print is placed on a Sutherland rub-tester (or equivalent instrument) and given 25 rubs at a pressure of 1 psi against an unmarked sample of stock similar to that on which the print is made. Density readings are then made on the rub-off smear, having pre-zeroed the densitometer on an unmarked sample of the rubbing stock. An average density is calculated for the rub-off smear.

**5.14 Image Positioning**

Image displacement is recorded as the linear distance between specified and actual image positioning, where most of the press sheet is in register, but some is out of position.

**5.15 Type Print Contrast Signal (PCS), Black Type**

The type print contrast signal, i.e. density, is measured with a microdensitometer, such as the McBeth PCM II Optical Comparator (Filter A) or similar instrument. Measurements are made on type throughout the job lot and the average PCS is calculated. The PCS of any area shall not vary from the average PCS by more than the specified amounts.

**5.16 Stroke Width**

The width of any part of a printed type character is measured and expressed as a percentage of the width of the same character on the original copy. The variation of stroke width is the difference between the maximum and minimum percentage values found on a page or sheet.

**5.17 Plugging**

This normally occurs with characters having an enclosed area such as the letters *a*, *e* and *o*. The degree of plugging is measured using a magnifier with a measuring reticle and expressed as the percentage of the open area that has been filled in.

**5.18 Doubling**

The secondary, or ghost, image adjacent to the primary character is measured with a magnifier having a measuring reticle and is expressed as a percentage of the primary image.

**5.19 Voids**

A representative area of printed type 8.5 cm wide by 10 lines deep is selected. The total number of voids within this area is counted and weighted according to the size of the void as follows:



## QUALITY LEVELS FOR PRINTING 1993

| Size of Void                               | Weighting |
|--|-----------|
| 0.002 to 0.004 in.                         | 1         |
| greater than 0.004 but less than 0.006 in. | 3         |
| 0.006 in. or greater*                      | 10        |

Multiply each void by its corresponding weighting factor and then sum the total count. The total void count as well as the average void count calculated from randomly chosen areas throughout the job shall not exceed the specifications.

---

\* Any void that causes a character to be indistinguishable will be unacceptable.