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Standard Terminology of Image Quality in Impact Printing Systems[1]

This standard is issued under the fixed designation F 1125; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This terminology presents a means to accurately describe the quality of impact printed images. This includes an up-to-date glossary and a description of probable causes for specific phenomena that relate to image quality. Illustrations to complement the definitions of copy quality terms are included.

2. Referenced Documents

2.1 *ASTM Standards:*

F 149 Terminology Relating to Optical Character Recognition[2]

F 221 Terminology Relating to Carbon Paper and Inked Ribbon Products and Images Made Therefrom[2]

F 909 Terminology Relating to Printers[2]

3. Significance and Use

3.1 This terminology includes terms developed and approved by impact printing systems manufacturers, supplies manufacturers, and end users to describe most image quality parameters concerning impact printed images.

3.2 This terminology is intended to aid in general communications on impact printer copy quality parameters and provide a partial trouble shooting list, when less than acceptable copy quality is obtained.

4. Descriptions of Terms Specific to This Standard

4.1 *character spread*— amount of change of a character width greater or less than the original character width on the type element, printwheel, or hammer (see Fig. 1).

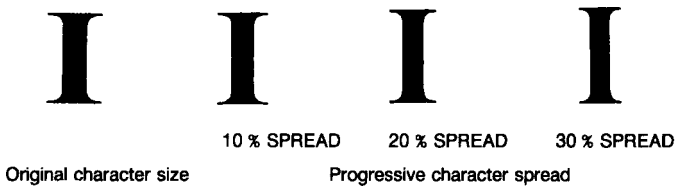
4.2 *correctability*— measure of image removal or cover-up by typing over with correction tapes or tabs (see Fig. 2).

4.3 *edge definition*— degree of waviness along the edge of type characters (see Fig. 3).

4.4 *extraneous ink and spatter*—the presence of ribbon ink where no images should be present. This ink cannot be removed by wiping lightly (see Fig. 4).

4.5 *fill-in*—presence of ribbon ink in an area of a printed character that should be void of ink (see Fig. 5).

4.6 *flaking or bridging*—presence of loose ribbon coating material attached to a character or in nonimage areas which may or may not be removed by lightly wiping. These flakes may also appear in ribbon cartridges and as dirt in the machine being used (see Fig. 6).



NOTE 1—See 4.1 for a description of this term. Probable causes are as follows:

(*1*) Amount of ink on ribbon,
(*2* Ink formulation,
(*3*) Type of ribbon (for example, single strike correctable or multistrike),
(*4*) Type of paper used,
(*5*) Type font used,
(*6*) Condition of the type element, printwheel, or hammer (for example, worn or dirty),
(*7*) Condition of the typewriter platen roll; and
(*8*) Hammer energy used.

FIG. 1 Character Spread

4.7 *over-strike*— a void on a printed character due to striking over the same area of the ribbon as the previous character when using a single strike ribbon (see Fig. 7).

4.8 *smudge*—tendency of a typed image to streak on to adjacent nonimage area when rubbed (see Fig. 8).

NOTE 1—See 4.2 for a description of this term. Probable causes are as follows:

(*1*) Rough, cockle, or heavy laid paper surfaces,
(*2*) Poor lift-off or cover-up material,
(*3*) Excessive hammer energy,
(*4*) Excessive coating on ribbon,
(*5*) Poor machine registration during overprinting with correction tape tab,
(*6*) Paper not in uniform contact with the platen roll,
(*7*) Platen roll needs reconditioning or replacement,
(*8*) Wrong type of correction material for ribbon used,
(*9*) Excessive line spread due to worn printwheel, and
(*10*) Noncorrectable ribbon used.

FIG. 2 Correctability

[1] This guide is under the jurisdiction of ASTM Committee F-5 on Business Copy Products and is the direct responsibility of Subcommittee F05.02 on Inked Ribbons and Carbon Paper.

Current edition approved Dec. 31, 1987. Published February 1988.

[2] *Annual Book of ASTM Standards*, Vol 15.09.

Example of good edge definition or a good reproduction of the character on the element used to create the image.

Moderate edge definition

Poor edge definition

NOTE 1—See 4.3 for a description of this term. Probable causes are as follows:

(*1*) Amount of ink on ribbon,
(*2*) Ink formulation,
(*3*) Type of ribbon (for example, single strike correctable or multistrike),
(*4*) Type of paper used,
(*5*) Type font used, and
(*6*) Worn or damaged printwheel, element, or hammer.

FIG. 3 Edge Definition

4.9 *spalling or hangers*—presence of loose ribbon coating material attached to a character which may be removed by wiping lightly. Smears may result if the loose material is disturbed, especially when encountered on multistrike ribbons (see Fig. 9).

4.10 *visual density*— the relative darkness of impact printed characters as judged by the eye (see Fig. 10).

4.11 *voids or broken characters*—absence of ink within character outline (see Fig. 11).

NOTE 1—Additional terms may be found in Terminology F 149, F 221, and F 909.

5. Interpretation

5.1 The probable cause of obtaining less than acceptable copy quality could be one or more of the defects listed in Section 4, or a cause(s) not currently listed, or both.

Spatter consists of ink spots around the character outline and is a defect most frequently associated with fabric ribbons

Extraneous ink consists of ink spots which may be attached to the character outline or randomly scattered around the character

NOTE 1—See 4.4 for a description of this term. Probably causes are as follows:

(*1*) Worn or damaged element, hammer, or printwheel,
(*2*) Excessive coating on ribbon,
(*3*) Poor ribbon-coating adhesion to base film, and
(*4*) Rough, cockle, or heavy laid paper surfaces.

FIG. 4 Extraneous Ink and Splatter

No fill-in

Examples of various levels of character fill-in

NOTE 1—It is common practice to use the "%'' sign when checking for the fill-in tendency of ribbons. Probable causes are as follows:

(*1*) Worn or damaged element, hammer, or printwheel,
(*2*) Excessive coating on ribbon,
(*3*) Poor ribbon tension control, and
(*4*) Excessive hammer energy.

FIG. 5 Fill-In

This partial filling in between lines of characters is bridging

Flaking is randomly scattered spots usually found in non-image areas around typed characters. One test method is to use a series of lower case" h'' characters

NOTE 1—See 4.6 for a description of this term. Probable causes are as follows:

(*1*) Obstruction in cartridge, ribbon guides, or card guides disturbing coating on ribbon prior to typing,
(*2*) Ribbon despooling prior to use,
(*3*) Poor ribbon coating adhesion to base film,
(*4*) Dirty typewriter,
(*5*) Worn or damaged element, hammer, or printwheel,
(*6*) Ribbon telescoping on supply side,
(*7*) Excessive hammer energy,
(*8*) Ribbon threaded incorrectly, and
(*9*) Poor ribbon tension control.

FIG. 6 Flaking or Bridging

On single strike ribbons, the shape of this void may match the previous character

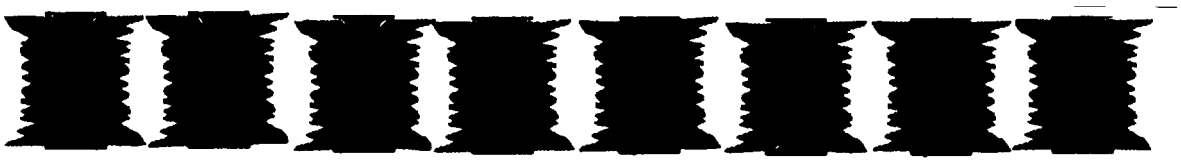
On a multistrike ribbon, part or the entire character may be less dense when overstrike occurs

Total character deletion

NOTE 1—See 4.7 for a description of this term. Probable causes are as follows:

(*1*) Obstruction in cartridge,
(*2*) Ribbon telescoping on supply or take-up side,
(*3*) Poor ribbon tension control (ribbon flip), and
(*4*) Inadequate ribbon drive torque.

FIG. 7 Over-Strike



The level of smear in the nonimage areas is usually evaluated against visual standards or as a light reflectance value obtained with a densitometer

NOTE 1—It is common practice to use the upper case letter "I'' when checking for the smudge tendency of ribbons. See 4.8 for a description of this term. Probable causes are as follows:

(*1*) Amount of ink on ribbon,
(*2*) Ink formulation,
(*3*) Type of ribbon (for example, single strike correctable or multistrike),
(*4*) Type of paper used,
(*5*) Type font used (for example, bold font may smear more),
(*6*) Condition of the type element, printwheel, or hammer,
(*7*) Condition of the typewriter platen roll, and
(*8*) Dirty card guide or paper bail rolls, or both.

FIG. 8 Smudge

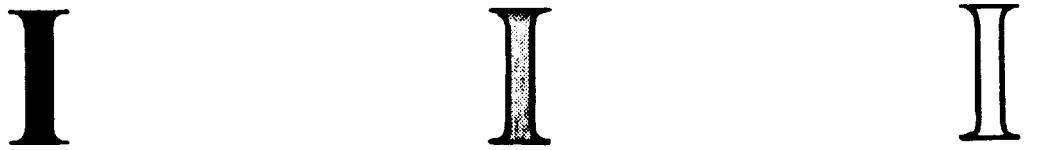
Spalling usually appears as small chunks of ribbon coating at the edge of characters

The most common test to determine the spalling tendency of coated ribbons is to use a series of underscores, then calculate the percent that contain the defect

NOTE 1—These two terms are used interchangeably for the same defect. See 4.9 for a description of these terms. Probable causes are as follows:

(*1*) Poor ribbon coating adhesion to base film,
(*2*) Excessive hammer energy,
(*3*) Mismatch between type font and ribbon,
(*4*) Poor ribbon tension control,
(*5*) Paper not in uniform contact with the platen roll,
(*6*) Platen roll needs reconditioning or replacement, and
(*7*) Defective printwheel.

FIG. 9 Spalling or Hanger



Very dense Less dense Least dense

NOTE 1—See 4.10 for a description of this term. Probable causes are as follows:

(*1*) Amount of ink on ribbon,
(*2*) Ink formulation,
(*3*) Overstriking may make image appear lighter,
(*4*) Type of ribbon (for example, single strike correctable or multistrike),
(*5*) Type of paper used,
(*6*) Type font used (for example, bold type font may appear darker),
(*7*) Condition of the type element, printwheel, or hammer,
(*8*) Condition of the typewriter platen roll, and
(*9*) Hammer energy used, especially with multistrike ribbons.

FIG. 10 Visual Density

Upper case "M'' (No voids) Partial Deletions and Voids Total Image Deletion

NOTE 1—See 4.11 for a description of this term. Probable causes are as follows:

(*1*) Rough, cockle or heavy laid paper surfaces,
(*2*) Insufficient hammer energy,
(*3*) Insufficient coating on ribbon,
(*4*) Ribbon coating too dry,
(*5*) Type font not compatible with the paper, hammer energy, platen, or ribbon (that is, too large), or both,
(*6*) Contaminants on paper surface (that is, wax, fuser oil, or carbonless paper capsules),
(*7*) Damaged or dirty print element, hammer or printwheel,
(*8*) Poor ribbon cartridge tension control,
(*9*) Obstruction in cartridge, ribbon guides, or card guides disturbing coat on ribbon prior to typing,
(*10*) Ribbon threaded incorrectly,
(*11*) Ribbon is folded over,
(*12*) Ribbon is not moving freely,
(*13*) Ribbon cartridge not properly sealed on ribbon deck,
(*14*) Ribbon flip, and
(*15*) Excessive ribbon tension (for example, coating offset).

FIG. 11 Voids or Broken Characters