
AccuVote-OS

Ballot Specifications



Revision 2.0
February 24, 2003



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Ballot Specifications

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Part number: 733-0112



Document History

Document Number	Date	Remarks
	Sept 16, 2002	Reformatted document.
DPPL2009	February 24, 2003	ISP: Updated content. TT: Updated copyright. Minor format edits.



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1. Ballot Specifications

1.1. Scope

This document states the specifications for the printing and cutting of ballots to be used with the Diebold Election Systems Accu-Vote ES-2000/AccuVote-OS Ballot Processing Unit.

1.2. General

This document supersedes all previous revisions of the ballot specification.

1.2.1. Assumptions

This specification assumes that the ballot layout has been created by either the Diebold Election Systems Vote Tally System (VTS) Software or the Diebold Election Systems GEMS Software which generates the Postscript Level 2 language file necessary for ballot printing.

For this specification, the release level of the VTS Software/AccuVote-OS firmware must be at least Release 1.92 Patch 11. Any GEMS Software general release can be used with this specification.

1.2.2. Included tables and figures

- Table 1: Ballot size and tolerances
- Table 2: Ballot Background Color Selections (PANTONE® PMS Solid Colors Uncoated)
- Figure 1: Ballot Template Cut Mark Layout (not to scale)
- Figure 2: Restricted Zone Ballot Layout (not to scale)

1.3. Ballot Characteristics

1.3.1. Materials

The ballot shall be constructed with **Index** card stock. No embossed or printed patterns or smudges shall be present. The ballot stock is NOT to be "pre-scored" for folds prior to press printing. See section 1.8 for ballot scoring specifications.

1.3.2. Basis Weight

The weight of the paper stock should be 90 lb. (Index), but this is just a guideline parameter and not a specification. The specification for the physical thickness of the paper (see section 1.3.3) shall supersede any basis weight factors.



1.3.3. Physical Dimensions

The physical ballot size and tolerances are as follows:

Table 1: Ballot size and tolerances

Width	8.500 in. + 0.030 in. - 0.020 in.
Length	11.000 in. + 0.060 in. - 0.000 in.
	14.000 in. + 0.060 in. - 0.000 in.
	17.000 in. + 0.060 in. - 0.000 in.
	18.000 in. + 0.060 in. - 0.000 in.
Thickness (Caliper)	0.0070 in. to 0.0085 in. ± 0.0005 in.

NOTE: Thickness dimensions are in ten thousandths of an inch precision, NOT one thousandths of an inch.

1.3.4. Ballot Cutting

The cutting of the ballot must be kept within the printed “cut tolerance marks” as shown in Figure 1 on page 14. These marks are 0.030 in. (approximately 1/32 in.) wide by 0.125 in. (1/8 in.) long. They specify the four corners of the ballot **on both sides**. When the ballot is cut to its proper size, a small portion of these marks (approx. 0.010 in.) **MUST** still be present on all four corners of the ballot’s edges **on both sides of the ballot**. Accurate front to back registration of the printed image will improve the vendor’s ability to meet the ballot cutting specifications.

1.3.5. Ballot Curl

The curl of the ballot shall be measured from a flat reference surface. The maximum allowable curl of the ballot measured from the flat surface to the most protruding point of curl on the ballot is **0.050 in.** This dimension applies to the ballot in both face up and face down orientations.

1.4. Printing

In the restricted zones of the ballot layout, only allowable background colors (see section 1.4.1) and black non-reflective ink (see section 1.4.2) will be used for printing as specified by each of the restricted zone descriptions (see section 1.5). Outside of the restricted zones, any color, ink, or watermark pattern may be used. Printed inks on the ballot must be completely dry prior to processing the ballot through the optical scanning device.

1.4.1. Background Colors

The allowable background colors are listed in Table 2 (see section 1.11). They are defined by the PANTONE® Color Management System (PMS). The selections in Table 2 are taken from the **PANTONE® Color Selector 1000 / Uncoated** book. Please refer to this table when specifying background colors.

1.4.1.1. Restrictions

The following describes the background color restrictions for any particular ballot. For each ballot, the background color in all of the restricted zones in the ballot layout must be of the same uniform color and density. The background color for the restricted zones must be selected from Table 2. In the restricted zones, only one of the available colors in Table 2 can be used per ballot. Outside of the restricted zones,



any color or watermark pattern can be used. Please see section 1.5 for the specifications of the restricted zones of the ballot.

1.4.1.2. Color Matching Tolerances

In the restricted zones, the color selection must be printed within a tolerance match of "**4 (delta) e**". It is recommended that the vendor use a reflective densitometer to check that the color is within specified tolerances prior to producing the ballots and that, throughout the production run, samples are periodically checked against the standard PANTONE® PMS color swatch.

1.4.2. Black Ink

Black ink is used to print critical data elements such as the timing marks, diagnostic marks, and ballot ID marks. Black ink can also be used to print the voting position ovals. Black ink shall have a maximum reflectance of 5% at 620 nanometer wavelength (visible light) and at 940 nanometer wavelength (infra-red light). Ink normally containing a significant amount of black carbon in its formula should be able to meet this requirement, but it is recommended that the vendor use a reflective densitometer to check that the color is within specified tolerances prior to producing the ballots.

NOTE: Reflectance measurements are referenced to 100% absolute white (i.e., not paper white.)

1.5. Restricted Zones and Critical Marks

The layout of the ballot contains restricted zones where specifications must be held within the tolerances. Deviations from the specifications can affect the accuracy of the scanning of the ballot. The following subsections individually describe the restricted zones. For visual reference, see Figure 2 on page 15.

1.5.1. Calibration Zones

The calibration zones are the areas on the top and bottom of both sides of the ballot. This equates to four zones. Each calibration zone is defined as the following area:

[0.260 in. from the cut edge of the ballot], by [the full width of the ballot (8.5 in.)]. See Figure 2 on page 15.

1.5.1.1. Text and Watermarks

No text or watermark patterns can be printed in any of these four zones.

1.5.1.2. Background Color

The background of the calibration zones must be uniform in color and density and must match the background color and density of the other restricted zones. See section 1.4.1 for color restrictions.

1.5.1.3. Marks

No black ink (see section 1.4.2) is to be used in any of the calibration zones. No marks, text, or smudges can exist in the calibration zones except for portions of the cut tolerance marks (see section 1.3.4).



1.5.2. Timing Mark Zones

The timing marks are the black rectangular marks (0.191 in wide by 0.063 in. height) that run along both sides of the ballot, front and back. This equates to four zones. The timing marks are spaced apart 0.250 in. on their centers. Each timing mark zone is defined as the following area:

[the full length of the ballot (8 in., 14 in., 17 in. or 18 in.) minus the calibration zones (top and bottom)], by [0.125 in., from the center of each timing mark column, to either side of the timing mark column]. See Figure 2 on page 15.

1.5.2.1. Text and Watermarks

No text or watermark patterns can be printed in any of these four zones.

1.5.2.2. Background Color

The background of the timing mark zones must be uniform in the background color and density and must match the background color and density of the calibration zones. See section 1.4.1 for color restrictions.

1.5.2.3. Marks

Black ink (see section 1.4.2) is to be used to create the timing marks. The printed marks are to have sharp edged boundaries and are to be of uniform density. No marks, text, or smudges can exist in between the individual timing marks or above and below each timing mark column.

1.5.3. ID Mark Zones and Diagnostic Mark Zones

The **ID marks** are the black rectangular marks (0.191 in. wide by 0.063 in. height) that run across the bottom of the ballot, front and back. The presence or absence of ID marks is different for each ballot style. The **diagnostic marks** are the black rectangular marks (0.191 in. wide by 0.063 in. height) that run across the top of the ballot, front and back. This full row of diagnostic marks is always the same for every ballot style. This equates to four zones. Each of these zones is defined as the following area:

[between the timing mark zones on each face of the ballot], by [0.092 in. above and below the center of each row of ID marks and diagnostic marks]. See Figure 2 on page 15.

1.5.3.1. Text and Watermarks

No text or watermark patterns can be printed in any of these four zones.

1.5.3.2. Background Color

The background of the ID mark and diagnostic mark zones must be uniform in the color and density and must match the background color and density of the calibration zones. See section 1.4.1 for color restrictions.

1.5.3.3. Marks

Black ink (see section 1.4.2) is to be used to create the ID marks and diagnostic marks. The printed marks are to have sharp edged boundaries and are to be of uniform density. No marks, text, or smudges can exist in between the individual ID marks or in the 0.060 in. margin above and below each ID mark row and diagnostic mark row.

NOTE: The ballot identification text at the bottom of the ballot must be no closer than 0.060 in. to the ID mark row (see section 1.6.2).



1.5.4. Voting Position Zones

The voting position ovals are the marks that outline the data area to be filled in by the voter. Although the voting positions usually follow a column configuration, each voting position can be considered its own zone defined as the following area:

[0.125 in. to either side of the center of each oval], by [0.100 in. above and below the center of each oval]. See Figure 2 on page 15.

1.5.4.1. Text and Watermarks

No text or watermark patterns can be printed in any of the voting position zones.

1.5.4.2. Background Color

The background of the voting position zones must be uniform in the color and density and must match the background color and density of the calibration zones. See section 1.4.1 for color restrictions.

1.5.4.3. Marks

The printed ovals are to have sharp edged boundaries and are to be of uniform density. Other than the oval line, no marks, text, or smudges can exist inside each voting position zone.

1.5.4.3.1. Thin Oval Lines

Any visible color (with sufficient contrast relative to the background color), including black ink (see section 1.4.2) can be used to create the voting position ovals to a line thickness not to exceed 0.003 in.

1.5.4.3.2. Thick Oval Lines

Pantone colors 032U or 130U can be used, **on a white color background only**, to create the voting position ovals to a line thickness not to exceed 0.032 in.

1.6. Non-Restricted Zones and Non-Critical Marks

1.6.1. Non-Restricted Zones

Any area(s) NOT listed or described in section 1.5 are considered non-restricted zones. The background of these non-restricted zones can be any color or halftone. Any type of text, marks, and/or watermark patterns can be placed in these zones.

1.6.2. Ballot Identification Text

Ballot identification text that can optionally be placed below the ID marks on the front and back of the ballot bottom must be positioned as shown in Figure 2 on page 15. The bottom of the text must not penetrate the calibration zone and the top of the text must be no closer than 0.060 in. to the ID marks. The height of the text must be no greater than 0.100 in (typically an 8 point font). The text can be printed in any color, including black ink (see section 1.4.2).

1.6.3. General Text

General text (e.g., headers, footers, candidate and race names) can be printed in any color or halftone, including black ink (see section 1.4.2), or any font size as long as the text does not penetrate any of the restricted zones listed in section 1.5.



1.6.4. Watermarks Patterns and Color Striping

Watermark patterns and color striping can be printed in any color or halftone as long as the watermark pattern and/or color striping does not penetrate any of the restricted zones listed in section 1.5.

1.7. Printed Image Registration

The front to back printed image registration will be within tolerances as long as the specifications for the ballot cutting (cut tolerance marks) have been met (see section 1.3.4) and the physical dimensions (see section 1.3.3) have been met.

1.8. Folds and Ballot Scoring

Scoring for folded ballots must occur in between timing marks. Scoring cannot occur anywhere on the timing marks. The scoring must align with the equal and opposite side of the ballot. For example, if the score was to start in between the 10th and 11th timing mark on the left side of the ballot, the score must then end in between the 10th and 11th timing mark on the right side of the ballot. This alignment must also occur on the reverse side of the ballot. Accurate printed image registration and ballot cutting will improve the vendor's ability to meet the specifications for ballot scoring.

NOTE: The location of score lines on the template is for convenience. Scores should be placed on the ballot to accommodate local envelope sizes. It should be noted that the fewer folds on the ballot, the better. Additionally, ballots may NOT be press printed on "pre-scored" ballot stock.

1.9. Perforations and Stubs

Perforations for stubs can only exist on the top or bottom edge of the ballot. The line of perforations must be perpendicular to the side edges of the ballot (i.e., they cannot be skewed.) Perforations for creating a stub at one end of the ballot must not compromise the Ballot Length Dimensions (see section 1.3.3) when the ballot is separated from the stub nor can it compromise the calibration zone specifications (see section 1.5.1.) For visual reference, see Figure 1 on page 14.

Ballots must be separated from any stubs prior to processing the ballot through the optical scanning device. The perforations will have such characteristics that they do not create any debris after the ballot is separated from the stub. After a ballot is separated from the stub, the remaining perforation edge on the ballot will not have any material remaining that could fold over or otherwise cause interference with the processing of the ballot through the optical scanning device.

1.10. Labels and Adhesive Materials

No labels or other adhesive materials shall be placed on the ballots.



1.11. Ballot Background Color Selections

The following table describes allowable ballot background color selections. They are defined by the PANTONE® Color Management System (PMS). The selections in Table 2 are taken from the PANTONE® Color Selector 1000 / Uncoated book.

In the left column, the name listed is a general category description of the colors. In the right column is the PMS color specification and an interpreted description of each PANTONE® color swatch under fluorescent lighting (D50 illuminant). Any interpreted color descriptions containing two color names (e.g. GREEN/YELLOW) indicate the major color component on the left and the minor color component on the right.

Table 2: Allowable PANTONE® ballot background color selections

Color	PMS Specification	Color description
Blue	PMS 656 U	BLUE
Brown	PMS 720 U	BROWN
	PMS 4685 U	BROWN
	PMS 726 U	BROWN
	PMS 157 U	BROWN/ORANGE
	PMS 475 U	BROWN/ORANGE
	PMS 474 U	BROWN/ORANGE
	PMS 482 U	BROWN/VIOLET
Buff	PMS 4755 U	BROWN/VIOLET
	PMS 1205 U	BUFF
	PMS 1215 U	BUFF
	PMS 607 U	BUFF
	PMS 614 U	BUFF
	PMS 719 U	BUFF/BROWN
	PMS 461 U	BUFF/BROWN
	PMS 460 U	BUFF/BROWN
	PMS 615 U	BUFF/GREEN
	PMS 129 U	BUFF/ORANGE
	PMS 127 U	BUFF/YELLOW
	PMS 128 U	BUFF/YELLOW
	PMS 608 U	BUFF/YELLOW
PMS 609 U	BUFF/YELLOW	
Green	PMS 5807 U	GREEN
	PMS 5803 U	GREEN
	PMS 5665 U	GREEN



Color	PMS Specification	Color description
(Green continued)	PMS 580 U	GREEN
	PMS 5875 U	GREEN/BROWN
	PMS 5865 U	GREEN/BROWN
	PMS 587 U	GREEN/YELLOW
	PMS 586 U	GREEN/YELLOW
	PMS 387 U	GREEN/YELLOW
	PMS 380 U	GREEN/YELLOW
	PMS 585 U	GREEN/YELLOW
	PMS 393 U	GREEN/YELLOW
	PMS 394 U	GREEN/YELLOW
	PMS 386 U	GREEN/YELLOW
	PMS 379 U	GREEN/YELLOW
	PMS 395 U	GREEN/YELLOW
Orange	PMS 804 U 2X	ORANGE
	PMS 811 U	ORANGE
	PMS 134 U	ORANGE
	PMS 1225 U	ORANGE
	PMS 1355 U	ORANGE
	PMS 135 U	ORANGE
	PMS 136 U	ORANGE
	PMS 148 U	ORANGE
	PMS 149 U	ORANGE
	PMS 1235 U	ORANGE
	PMS 1345 U	ORANGE
	PMS 1365 U	ORANGE
	PMS 1485 U	ORANGE
	PMS 1495 U	ORANGE
	PMS 123 U	ORANGE
	PMS 137 U	ORANGE
	PMS 150 U	ORANGE
	PMS 1375 U	ORANGE
	PMS 1505 U	ORANGE
	PMS 1585 U	ORANGE
PMS 151 U	ORANGE	



Color	PMS Specification	Color description
(Orange continued)	PMS 116 U 2X	ORANGE
	PMS 130 U	ORANGE
	PMS 165 U	ORANGE
	PMS Orange 021 U	ORANGE
	PMS 714 U	ORANGE
	PMS 715 U	ORANGE
	PMS 141 U	ORANGE/BROWN
	PMS 142 U	ORANGE/BROWN
	PMS 143 U	ORANGE/BROWN
	PMS 144 U	ORANGE/BROWN
	PMS 130 U 2X	ORANGE/BROWN
	PMS 155 U	ORANGE/BUFF
	PMS 156 U	ORANGE/BUFF
Pink	PMS 806 U	PINK
	PMS 182 U	PINK
	PMS 176 U	PINK
	PMS 1765 U	PINK
	PMS 189 U	PINK
	PMS 196 U	PINK
	PMS 203 U	PINK
	PMS 705 U	PINK
	PMS 1767 U	PINK
	PMS 1775 U	PINK
	PMS 183 U	PINK
	PMS 197 U	PINK
	PMS 1895 U	PINK
	PMS 190 U	PINK
	PMS 210 U	PINK
	PMS 230 U	PINK
	PMS 706 U	PINK
	PMS 1905 U	PINK
	PMS 204 U	PINK
	PMS 211 U	PINK
PMS 670 U	PINK	



Color	PMS Specification	Color description
(Pink continued)	PMS 231 U	PINK
	PMS 707 U	PINK
	PMS 698 U	PINK
	PMS 671 U	PINK
	PMS 699 U	PINK
	PMS 813 U	PINK
	PMS 672 U	PINK
	PMS 691 U	PINK
	PMS 496 U	PINK
	PMS 700 U	PINK
	PMS 5035 U	PINK
Red	PMS 805 U 2X	RED
	PMS 811 U 2X	RED
	PMS 805 U	RED
	PMS 812 U	RED
	PMS 177 U	RED
	PMS 489 U	RED
	PMS 488 U	RED
	PMS 1777 U	RED
	PMS 1785 U	RED
	PMS 178 U	RED
	PMS 184 U	RED
	PMS 191 U	RED
	PMS 487 U	RED
	PMS 486 U	RED
	PMS 1787 U	RED
	PMS 1788 U	RED
	PMS 165 U 2X	RED
	PMS Warm Red U	RED
	PMS 708 U	RED
	PMS 709 U	RED
PMS 171 U	RED/ORANGE	
PMS 1655 U	RED/ORANGE	
Salmon	PMS 1555 U	SALMON



Color	PMS Specification	Color description
(Salmon continued)	PMS 1565 U	SALMON
	PMS 162 U	SALMON
	PMS 169 U	SALMON
	PMS 1575 U	SALMON
	PMS 1625 U	SALMON
	PMS 1635 U	SALMON
	PMS 163 U	SALMON
	PMS 170 U	SALMON
	PMS 1645 U	SALMON
	PMS 712 U	SALMON
	PMS 713 U	SALMON
	PMS 164 U	SALMON/ORANGE
Violet	PMS 217 U	VIOLET
	PMS 2365 U	VIOLET
	PMS 223 U	VIOLET
	PMS 218 U	VIOLET
	PMS 224 U	VIOLET
	PMS 236 U	VIOLET
	PMS 677 U	VIOLET
	PMS 678 U	VIOLET
	PMS 684 U	VIOLET
	PMS 517 U	VIOLET
	PMS 5175 U	VIOLET
	PMS 531 U	VIOLET
	PMS 685 U	VIOLET
Yellow	PMS 803 U 2X	YELLOW
	PMS 803 U	YELLOW
	PMS 106 U	YELLOW
	PMS 114 U	YELLOW
	PMS 102 U	YELLOW
	PMS 107 U	YELLOW
	PMS 108 U	YELLOW
	PMS 109 U	YELLOW
	PMS 113 U	YELLOW



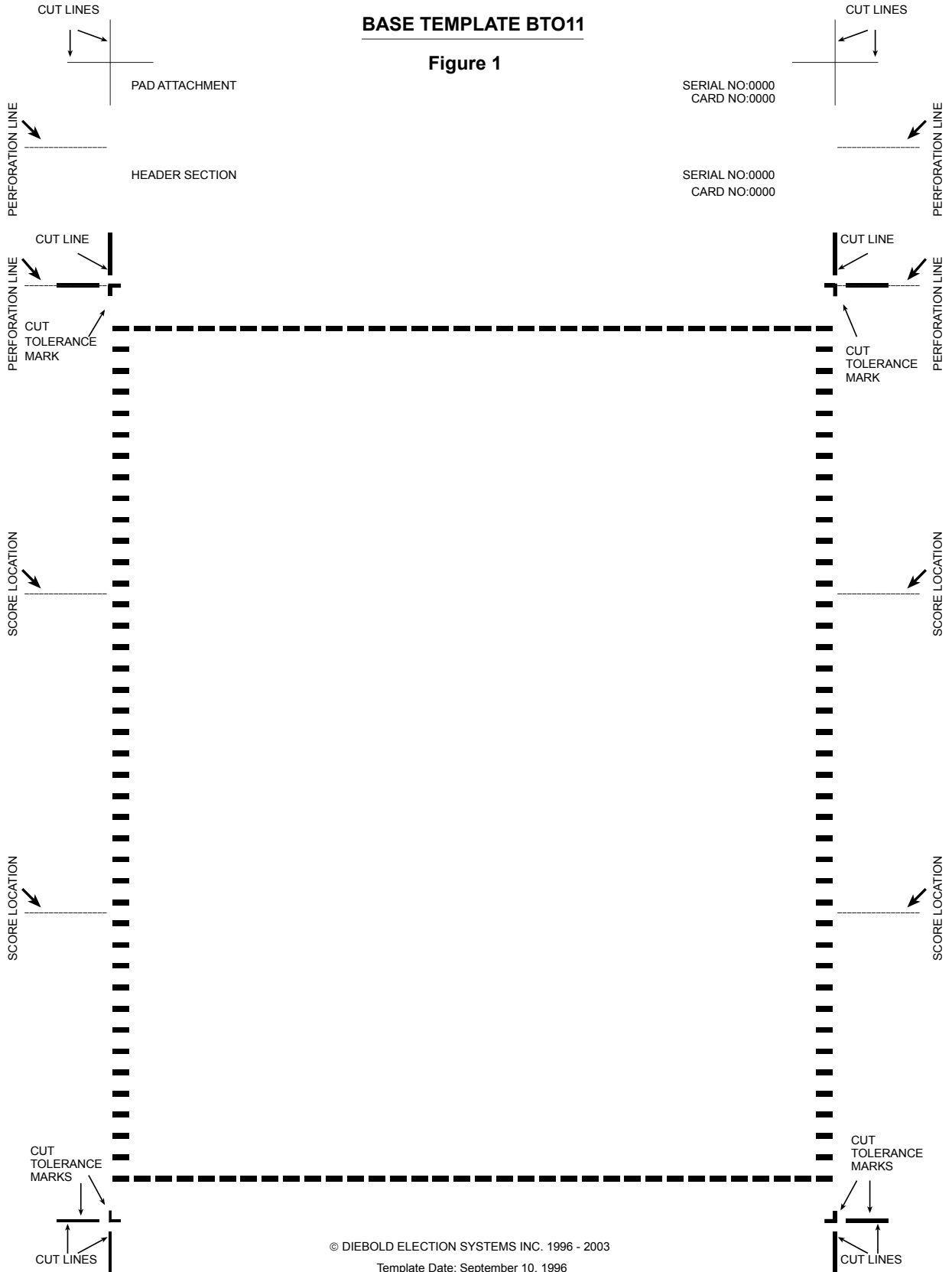
Color	PMS Specification	Color description
(Yellow continued)	PMS 120 U	YELLOW
	PMS 121 U	YELLOW
	PMS 100 U	YELLOW
	PMS 101 U	YELLOW
	PMS 115 U	YELLOW
	PMS Yellow U	YELLOW
	PMS Yellow 012 U	YELLOW
	PMS 600 U	YELLOW
	PMS Process Yellow U	YELLOW
	PMS Yellow U 2X	YELLOW
	PMS 601 U	YELLOW
	PMS 3935 U	YELLOW
	PMS 602 U	YELLOW
	PMS 3945 U	YELLOW
	PMS 603 U	YELLOW
	PMS 3955 U	YELLOW
	PMS 604 U	YELLOW
	PMS 810 U	YELLOW/ORANGE
	PMS 122 U	YELLOW/ORANGE
	PMS 116 U	YELLOW/ORANGE



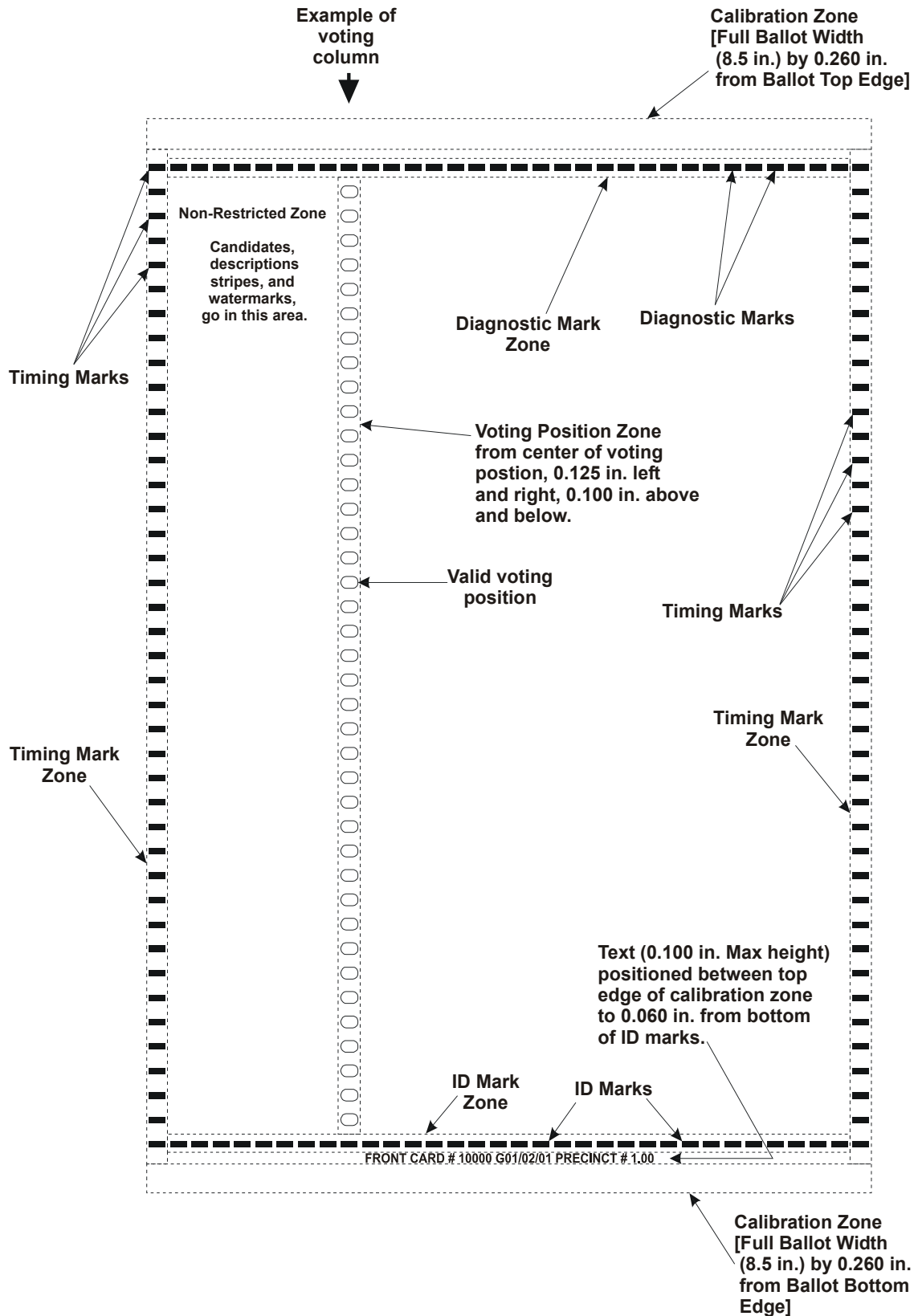
Ballot Specifications

BASE TEMPLATE BTO11

Figure 1



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RESTRICTED ZONE BALLOT LAYOUT

Figure 2