

Leneta - for Quality, Selection, Service

How to place an order:

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Credit Terms:

Net 30 days with approved credit.

Welcome to the Sixth Edition of the Leneta Company catalog of paint test charts, ink test sheets, test equipment and supplies.

What you'll find

Inside, you'll find sections devoted to each of our product lines, with descriptive and packaging information for each product. There's also an appendix that's packed with useful information such as ASTM Standards, U.S.-to-metric conversions and various film property equations.

Leneta - The Industry Standard

Since 1956, the Leneta name has been synonymous with high-quality test charts for the paint and coatings industry. As we've continued to evolve with the industry we serve, we've developed a unique combination of Quality, Selection and Service that's kept us the Standard in our field.

Quality

Leneta charts are characterized by their imperviousness, wettability, adhesion, surface levelness and uniformity. They are produced from high quality, non-fluorescent paper, free of optical brighteners that may affect color measurements. The same uncompromising commitment to quality is brought to every product we offer.

Selection

Leneta produces the broadest line of test charts in the industry, along with an important selection of test equipment. From standard products like opacity and spreading rate charts, to specialty products like glass substrates and sag test blades, you'll find a unique selection in the Leneta Catalog.

Service

As the paint industry's oldest and foremost supplier of paint test charts, we have the knowledge and experience to help our customers select the most appropriate chart for their test applications. Worldwide representatives ensure prompt, reliable delivery.

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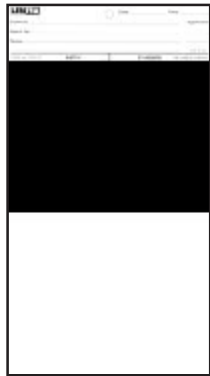
* Represents additional letters and/or numbers to identify two or more related products.

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Opacity Charts

The term “Opacity Chart”, as used in this catalog, refers to charts on which the test pattern is a simple combination of black and white areas, large enough for wide aperture reflectance instruments, as well as for visual opacity and color observations. Leneta opacity charts comply with all test methods specifying charts of such design.



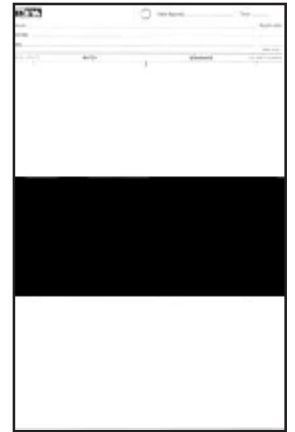
Form 2A
5-1/2 x 10 in
140 x 254 mm



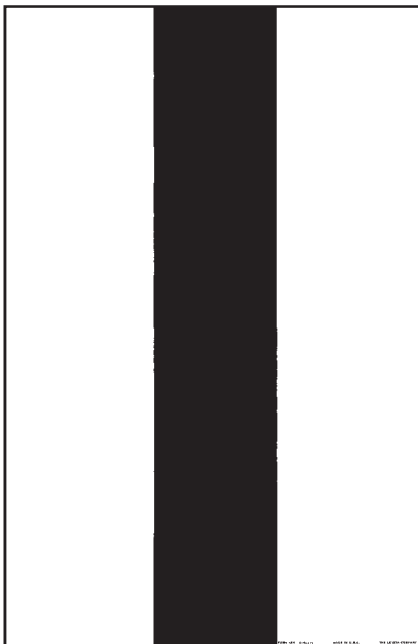
Form 2C
7-5/8 x 10-1/4 in
194 x 260 mm



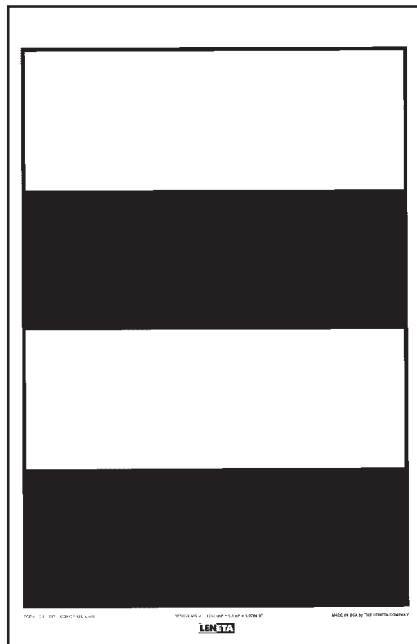
Form 5C
7-5/8 x 10-1/4 in
194 x 260 mm



Form 3B
7-5/8 x 11-3/8 in
194 x 289 mm



Form 15H
11-1/4 x 17-1/4 in
286 x 438 mm

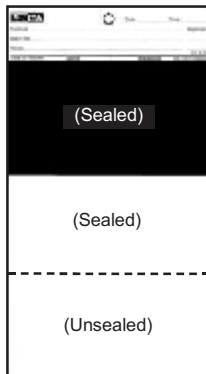


Form 14H
11-1/4 x 17-1/4 in
286 x 438 mm
Design Area = 1.076 ft² = 0.1 m² = 1000 cm²

PACKAGING

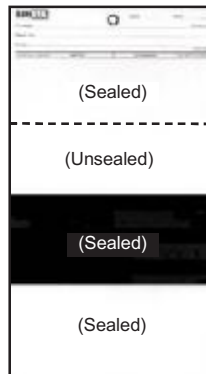
Form No.	Box Quantity	Boxes per Case	Box Weight
2A	250	6	6 lb
2C	250	4	9 lb
3B	250	4	9 lb
5C	250	4	9 lb
14H	125	4	11 lb
15H	125	4	11 lb

Penopac and Penetration Charts



Form 1A

5-1/2 x 10 in
140 x 254 mm

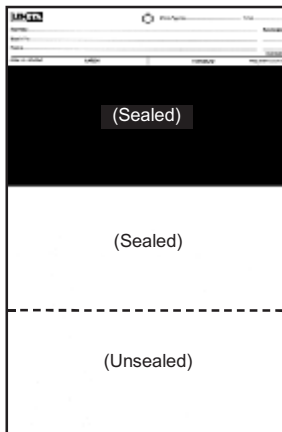


Form 18A

5-1/2 x 10 in
140 x 254 mm

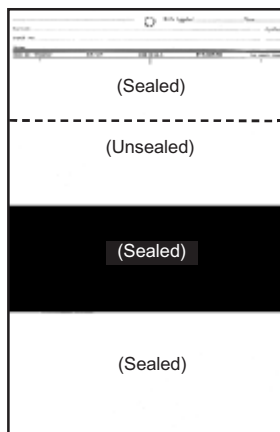
Penopac Charts

These combine the test areas and functions of a *penetration* and an *opacity* chart. They can be considered as universal test charts for research, development and quality control. The choices offered in size and design are responsive to individual laboratory needs and preferences. Form 19BR includes an unsealed black area, but is otherwise equivalent in functionality.



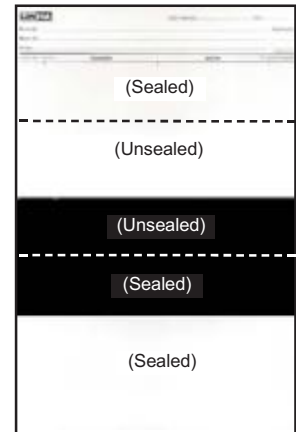
Form 1B

7-5/8 x 11-3/8 in
194 x 289 mm



Form 18B

7-5/8 x 11-3/8 in
194 x 289 mm

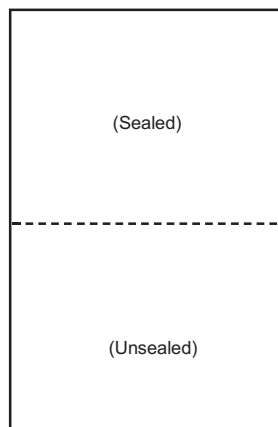


Form 19BR

7-5/8 x 11-3/8 in
194 x 289 mm

Penetration Chart

An important characteristic of architectural finishes is the ability to maintain a uniform appearance on surfaces of varying porosity. This ability, of which *gloss* and *color uniformity* are specific aspects, is referred to as *penetration resistance*. The adjacent sealed/unsealed areas of Leneta Form HB present severe conditions of varying porosity for testing penetration resistance. In addition to qualitative visual observations, photometric measurements on the two areas provide objective numerical values.



Form HB

7-5/8 x 11-3/8 in
194 x 289 mm

Packaging

Form No.	Box Quantity	Boxes per Case	Box Weight
1A	250	6	6 lb
1B	250	4	9 lb
18A	250	6	6 lb
18B	250	4	9 lb
19BR	250	4	9 lb
HB	250	4	9 lb

Display Charts / Spreading Rate Charts

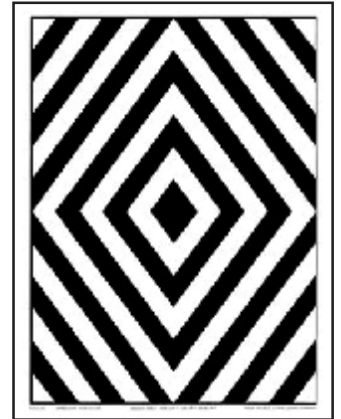
These charts employ time-tested diagonally striped patterns, having a strong visual impact that emphasizes variations in film opacity. They are therefore frequently used for hiding power display purposes, by means of drawdowns or brushouts. Gray stripes in Form 8H-GW provide reduced substrate contrast for use with low hiding power coatings. Spreading Rate Charts (Forms 8H and 8H-GW) are accurately 0.1 square meters (approximately one square foot) in area, and are used in brushout hiding tests at specified spreading rates as described in ASTM Method D 344.



Form 8A
5-1/2 x 10 in
140 x 254 mm
Design Area = 275 cm²



Form 8B
7-5/8 x 11-3/8 in
194 x 289 mm
Design Area = 425 cm²



Form 8K
8-5/8 x 11-1/4 in
219 x 285 mm
Design Area = 500 cm²

Spreading Rate Charts

Design Area = 1.076 ft² (1000 cm²)



Form 8H
11-1/4 x 17-1/4 in
286 x 438 mm



Form 8H-GW
11-1/4 x 17-1/4 in
286 x 438 mm

PACKAGING

Form No.	Box Quantity	Boxes per Case	Box Weight
8A	250	6	6 lb
8B	250	4	9 lb
8H	125	4	11 lb
8H-GW	125	4	11 lb
8K	250	4	11 lb

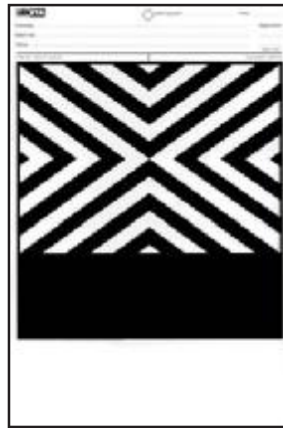
Opacity-Display Charts / Spreading Rate Charts

Charts of this type combine the large, unbroken areas that are characteristic of Opacity Charts, with the striped design of a Display Chart. The larger areas permit wide aperture photometric measurements and visual color comparisons, while the striped area is uniquely effective for hiding power comparison and display. Spreading Rate Charts (Forms 12H and 13H) are accurately 0.1 square meters (approximately one square foot) in area, and are designed for brushout application at specified spreading rates.



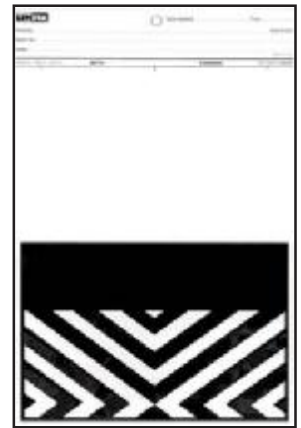
Form 9A

5-1/2 x 10 in
140 x 254 mm



Form 9B

7-5/8 x 11-3/8 in
194 x 289 mm



Form 21B

7-5/8 x 11-3/8 in
194 x 289 mm

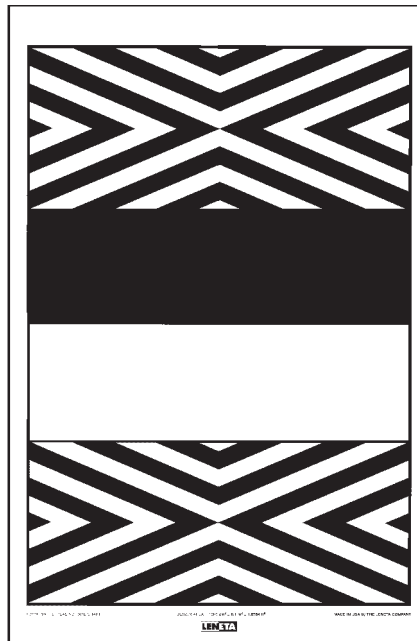
Spreading Rate Charts

Design Area = 1.076 ft² (1000 cm²)



Form 12H

11-1/4 x 17-1/4 in
286 x 438 mm



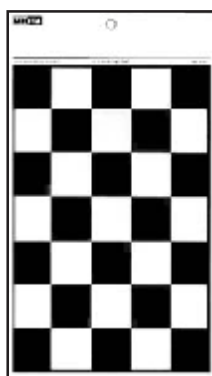
Form 13H

11-1/4 x 17-1/4 in
286 x 438 mm

Form No.	Packaging		
	Box Quantity	Boxes per Case	Box Weight
9A	250	6	6 lb
9B	250	4	9 lb
12H	125	4	11 lb
13H	125	4	11 lb
21B	250	4	9 lb

Checkerboard Charts / Spreading Rate Charts

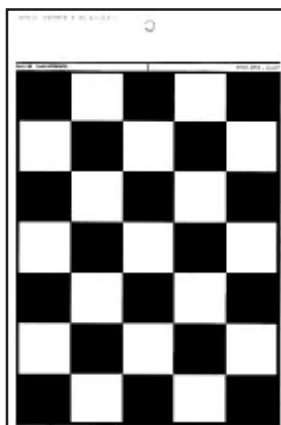
One of the earliest hiding power test surfaces was linoleum with a black and white checkerboard pattern. This was soon replaced by sealed paperboard charts of which Forms 10H and 10H-BG Spreading Rate Charts are typical examples. Designed for brushout tests at specified spreading rates, such as in ASTM Method D 344 and Canadian 1-GP-71, they are also used for drawdown applications like their smaller counterparts, Forms 10A and 10B. Black and gray squares in Form 10H-BG provide reduced contrast for testing coatings with lower hiding power.



Form 10A

5-1/2 x 10 in
140 x 254 mm

Design Area = 275 cm²



Form 10B

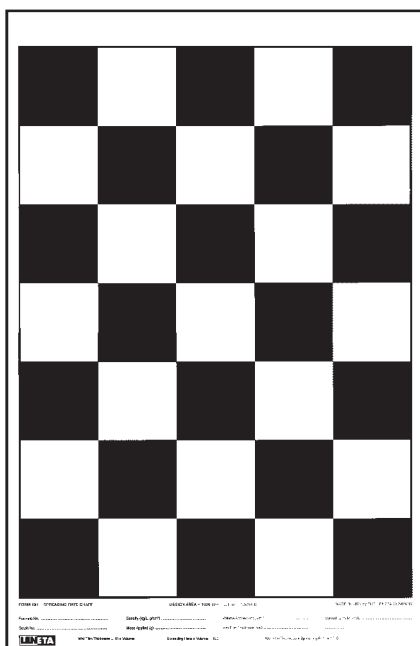
7-5/8 x 11-3/8 in
194 x 289 mm

Design Area = 425 cm²

Packaging			
Form No.	Box Quantity	Boxes per Case	Box Weight
10A	250	6	6 lb
10B	250	4	9 lb
10H	125	4	11 lb
10H-BG	125	4	11 lb

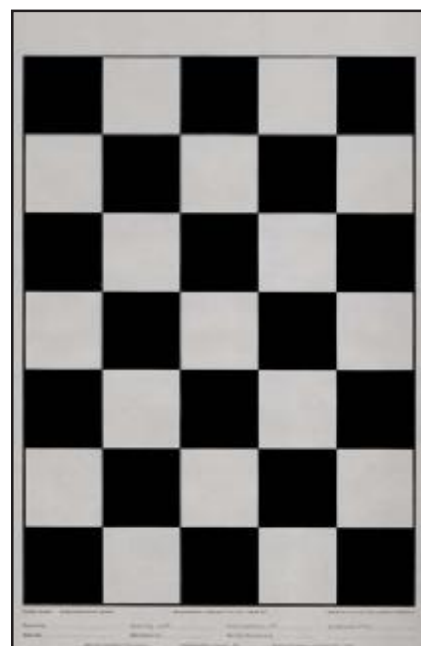
Spreading Rate Charts

Design Area = 1.076 ft² (1000 cm²)



Form 10H

11-1/4 x 17-1/4 in
286 x 438 mm



Form 10H-BG

11-1/4 x 17-1/4 in
286 x 438 mm

Revised 2010 11 19

Brushout Cards / Duplex Applicator Charts

Plain White Cards / Plain White Charts / Plain Black Chart

Brushout Cards

Nominal Thickness: 20 mils (0.5 mm)

Designed for informal brushout applications, the paper stock is thicker than regular chart paper to give greater rigidity for more convenient handling. They are also used widely for drawdowns and colorimetric measurements.

Form No.	Box Quantity	Boxes per Case	Box Weight
2DX	500	4	7 lb
5DX	500	4	7 lb
5DX-GW	500	4	7 lb
WDX	500	4	7 lb



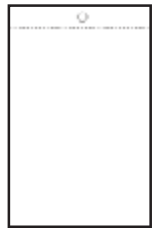
Form 2DX
Black & White



Form 5DX
Black & White



Form 5DX-GW
Gray & White



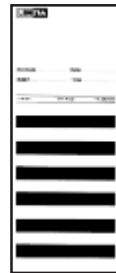
Form WDX
Plain White

Size: 3-7/8 x 6 inches (98 x 152 mm)

Duplex Applicator Charts

Originally made to be used with the "Duplex Applicator", an instrument designed for rapid production of side-by-side drawdowns, they now serve mostly as generic paint test charts.

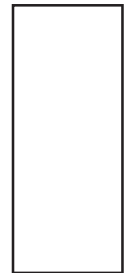
Form No.	Charts per Box	Boxes per Case	Box Weight
6F6	500	6	5 lb
6F4	500	6	5 lb
WF	500	6	5 lb



Form 6F6



Form 6F4



Form WF

Size: 3 x 7-1/4 inches (76 x 184 mm)

Plain White Cards

Nominal Thickness: 20 mils (0.5 mm)

Plain White Charts

Nominal Thickness: 14 mils (0.36 mm)

Plain Black Charts

Nominal Thickness: 14 mils (0.36 mm)

Form No.	Size Inches	Size Millimeters	Box Quantity	Boxes Per Case	Weight Per Box
*WBX	7-5/8 x 11-1/4	194 x 286	125	4	7 lb
*WDX	3-7/8 x 6	98 x 152	500	4	7 lb
WKX	8-5/8 x 11-1/4	219 x 286	125	4	8 lb
WHX	11-1/4 x 17-1/4	286 x 438	75	4	10 lb
*WA	5-1/2 x 10	140 x 254	250	6	6 lb
*WB	7-5/8 x 11-1/4	194 x 286	250	4	10 lb
*WD	3-7/8 x 6	98 x 152	1000	4	10 lb
WF	3 x 7-1/4	76 x 184	500	6	5 lb
WG	3 x 5-1/2	76 x 140	1000	4	8 lb
WH	11-1/4 x 17-1/4	286 x 438	125	4	11 lb
WK	8-5/8 x 11-1/4	219 x 286	250	4	11 lb
WM	5-1/2 x 11-1/4	140 x 286	250	6	6 lb
BK	8-5/8 x 11	219 x 279	250	4	11 lb
BH	11-1/4 x 17-1/4	279 x 438	125	4	11 lb
**B-3	5-5/8 x 32	143 x 813	200	--	18 lb

* Indicates convenience hole at top.

** Specified for Dupont Paintbrush Evaluation Test
Special sizes available upon request.

Unsealed Test Charts

For Test Applications
of Clear Coatings
and Stains

Unsealed (semi-porous)
surface simulates
wood or unsealed
wallboard.



Form N2C

7-5/8 x 10-1/4 in
194 x 260 mm



Form N2A

5-1/2 x 10 in
140 x 254 mm



Form N9A

5-1/2 x 10 in
140 x 254 mm

ALSO: FORM NWK, Plain white -- Size: 8-5/8 x 11-1/16 in (219 x 281 mm)

Wax and Polish
Test Chart

Super-Smooth
Jet Black
Very Dull, Matte Finish



Form WP-1

5-1/2 x 10 in
140 x 254 mm

PACKAGING

Form No.	Box Quantity	Boxes per Case	Box Weight
N2C	250	4	9 lb
N2A	250	6	6 lb
N9A	250	6	6 lb
NWK	250	4	11 lb
WP-1	250	6	6 lb

Release Charts

For rapid and precise hiding power measurements

These charts have a unique surface which is readily wetted by waterborne or solventborne paints, but from which the dried film can easily* be stripped with adhesive tape. The stripping feature permits the dry film weight on a measured area to be determined precisely by weighing on an analytical balance before and after film removal. The spreading rate (H) and wet film thickness (T) can then be calculated from the following simple relationships:

$$H(m^2/L) = \frac{A(cm^2) \cdot N \cdot D (kg/L)}{10 M(g)}$$

$$H(ft^2/gal) = 40.746H(m^2/L)$$

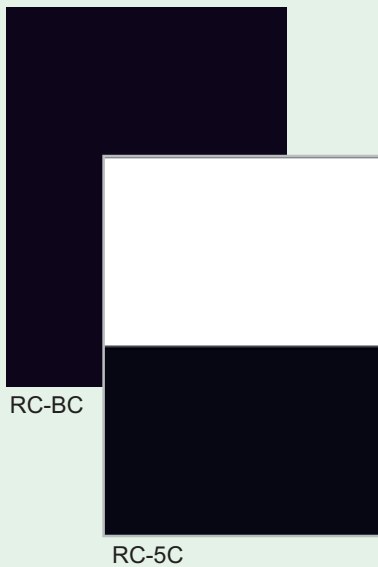
$$H(ft^2/gal) \times T (mils) = 1604.2$$

where:

- H = spreading rate (m²/L), (ft²/gal).
- T = wet film thickness (μm), (mils)
- A = test area (cm²)
- D = paint density (kg/L)
- M = dry film weight (g)
- N = non-volatile fraction by weight of the applied paint

This procedure represents a break-through in reduced time for precise measurement of spreading rate (or wet film thickness) in the determination of hiding power.

* Not so easily as to produce undamaged free films. For that purpose use Form RP-1K release paper described on page 20.



Form	Color	Dimensions	Box Quantity	Boxes Per Case	Weight Per Box
RC-5C	Black & White	7-5/8 x 10-1/4 in 194 x 260 mm	250	4	9 lb
RC-BC	All Black	7-5/8 x 10-1/4 in 194 x 260 mm	250	4	9 lb

Gray Scale Charts

For Visual Hiding Power Ratings

Large-Area Roller or Brush Application



Form CU-1M Test Area 6 ft² (5574 cm²) 24 x 37-1/4 in (610 x 946 mm)
Conforms with ASTM D5150, Hiding Power of Architectural Paints Applied by Roller

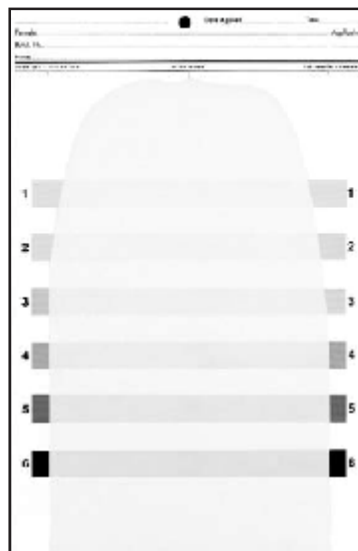
These are sealed paint test charts with six stripes on a white field, ranging in shade from very light gray to black. The stripes are numbered 1 to 6, representing uniform steps of increasing contrast. The hiding power of the applied coatings is rated as the number of the darkest stripe that is completely (or almost completely) obscured, at a specified thickness or spreading rate. Form CU-1M is used for more practical large-area brush or roller applications as in ASTM D 5150. Applications on Form 24B are with a drawdown blade. See Appendix, Page 33 for gray scale values.

Drawdown Application



Form 24B

7-5/8 x 11-3/8 in
194 x 289 mm



**Typical Drawdown Test
on Form 24B**

PACKAGING

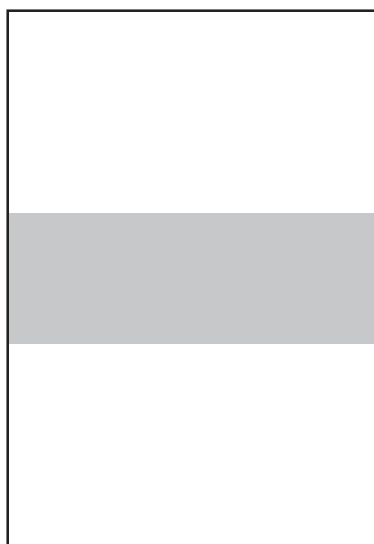
Form No.	Box Quantity	Boxes per Case	Box Weight
24B	250	4	9 lb
CU-1M	100	1	47 lb

Wall-Matte Charts

Large-area matte finish test surfaces for practical laboratory application testing of wall paints

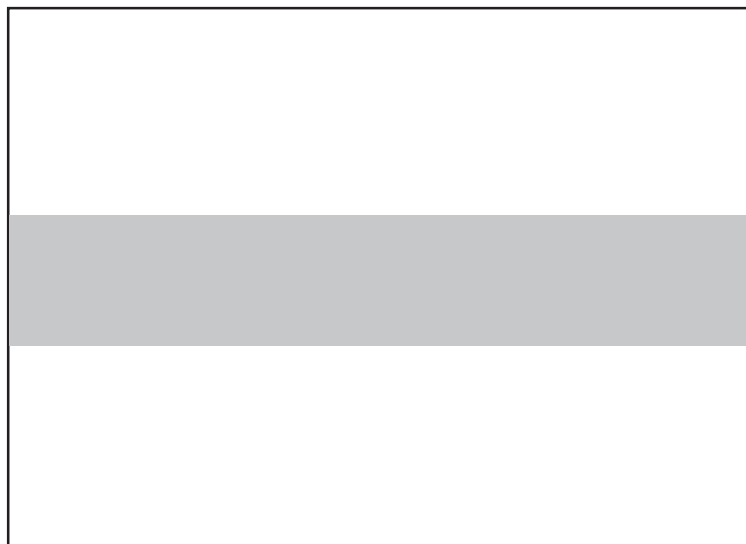
These charts are coated with a flat finish similar in texture and “tooth” to a typical trade sales flat wall paint. Paints can be applied by brush or roller with assurance that there will be no surface “skid” during application. The surface is well sealed so that both waterborne and solventborne coatings can be applied with no penetration of vehicle into the substrate.

Wall-Matte Charts are an effective replacement for previously available Kem-Glo Test Paper and superior to that product in imperviousness and paper rigidity.



Form 26-1M

20 x 28 in
508 x 711 mm
Area: 3.9 ft² (0.36 m²)



Form 26-2M

28 x 40 in
711 x 1046 mm
Area: 7.8 ft² (0.72 m²)

Physical Data

Thickness: 14 mils (300μm) approx.
Reflectance: White 83±3%, Gray 46±3%
60° Gloss: 2 approx.
85° Gloss: 2 approx.

Packaging

Form No.	Box Quantity	Box Weight
26-1M	125	34 lb
26-2M	100	55 lb

Spray Strips

Hiding Power Charts for OEM Coatings

These are used by industrial coatings laboratories, principally those involved with the automotive industry, to measure the hiding power of spraying enamels. The chart is attached to a steel panel and the test coating sprayed to produce a “wedge” varying from thin at one end to thick at the other. After drying, a location on the chart of adequate visual hiding or 0.98 contrast ratio is determined, and the film thickness measured electronically on the steel panel adjacent to that location. Conversely, a location of specified thickness is determined on the steel panel and the Contrast Ratio measured adjacent to that location.



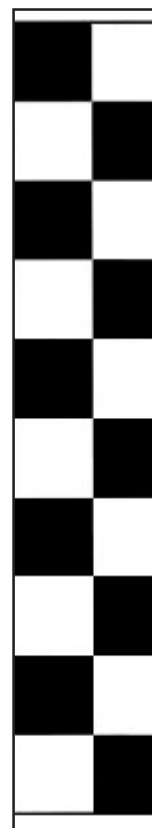
Form S71
Black & White



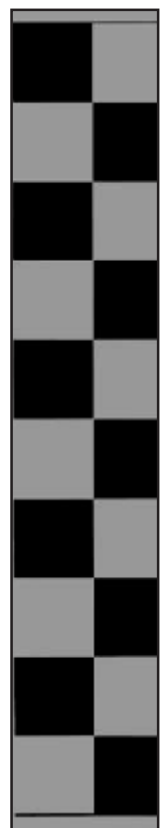
Form S71-BG
Black & Gray

also
Form S71-RG
Red & Gray

Size
2 x 11 inches
51 x 279 mm



Form S72
Black & White



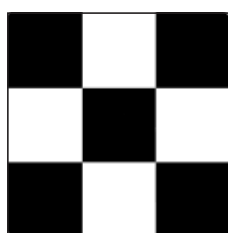
Form S72-BG
Black & Gray

PACKAGING: 500 per box — 4 boxes per case — box wt. 5 lb

Spray Monitors

Self-Adhering Hiding Power Labels

These are pressure sensitive labels with a hiding power test pattern and a sealed, solvent-resistant surface. They are used primarily with metal panels on which the uniform surface provides no visual clue as to the thickness of an applied paint film. When placed on such a surface, the Monitor presents a contrasting feature by which to observe the hiding during spray application, thereby facilitating film thickness control. It adheres firmly, whether air-dried or baked, to present a permanent visual record of film opacity. The longer Monitors, M71 and M72, permit wedge application, with thickness and hiding power determination, as described with Spray Strips (see page 14).

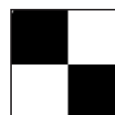


Form M33
Black & White

Size
2 x 2 in
51 x 51 mm

**ALSO
AVAILABLE**

Red & Gray
Form M12-RG
Form M33-RG



Form M12
Black & White

Size
1 x 1 in
25 x 25 mm



Form M12-BG
Black & Gray

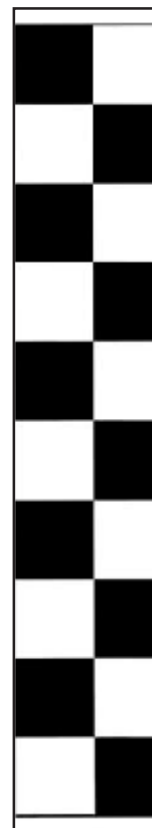


Form M71
Black & White

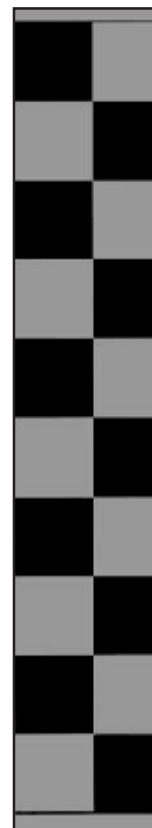


Form M71-BG
Black & Gray

Size
2 x 11 in
51 x 279 mm



Form M72
Black & White



Form M72-BG
Black & Gray

PACKAGING:	M12	2000 per box	4 boxes per case	box wt. 2 lb
	M33	500 per box	4 boxes per case	box wt. 2 lb
	M71, 72	500 per box	4 boxes per case	box wt. 6 lb

Printing Ink Drawdown Sheets



Available in seven different grades of paper, these sheets provide a variety of substrates for testing ink qualities. They are also useful for testing other coating because of their range in absorbency and texture.

Sheet Size: 5 x 7-5/8 in (127 x 194 mm)

Paper: Unwatermarked, non-fluorescent
except as noted below

Ink: Jet black. Non-bleeding

Padding: 100 sheets per pad

Packaging: 1000 sheets (10 pads) per box⁵

Paper Description¹ and Form Number Identification

Form Number	3NT-1	3NT-21	3NT-31	3NT-34	3NT-4	3NT-5	3NT-8	3NT-9 ⁴
Paper Type	Vellum Opaque	Translucent Bond ² with/OB ⁵	Coated Book with/OB ⁵	Coated Book	Regular Bond	Unbleached Kraft	Web Offset Coated	Box Laminate
Shade	Neutral White	Neutral White	Neutral White		Neutral White	Brown	Neutral White	Mottled White
Basis Weight ³	60 lb	15 lb	80 lb		20 lb	40 lb	45 lb	125 lb
Grammage (g/m ²)	89	56	118		75	65	67	203
Caliper (mils)	5.0	2.5	3.7		3.9	4.0	2.5	10.0
Caliper (µm)	127	64	94		99	102	64	254
Density (g/cm ³)	0.70	0.89	1.26		0.76	0.64	1.05	0.80
Boxes per case	5	6	6		6	5	6	4
Box weight (lb)	6	4	8		5	5	5	3

- Notes:
1. Indicated weights, densities and calipers are nominal and/or approximate.
 2. This paper is absorbent despite the high level of transparency
 3. Ream of 500 basis sheets.
 4. This is a laminate of white on brown kraft paper, representative of white corrugated box surfaces, and showing a typical mottled appearance. 500 sheets/box, unpadded.
 5. "OB" means Optical Brighteners

Clear Polyester Overlay Sheets

Same Size as Printing Ink Drawdown Sheets

Form No.	Thickness	Box Quantity	Boxes Per Case	Box Weight
P300-4NT	4 mil (100 µm)	250	4	3 lb
P300-7NT	7 mil (178 µm)	250	4	4 lb

See Page 19 for the complete range of available sizes and thicknesses.

Leneta Paper-Testing Inks

For Evaluating Mottle, Holdout and Porosity
of Coated and Uncoated Papers

Item No. TK-11 : High Penetration for Coated Papers

Item No. TK-21: Low Penetration for Uncoated Papers

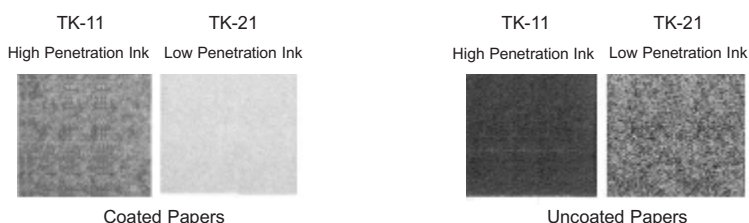


TK-11



TK-21

These testing inks provide a simple and rapid way of monitoring batch-to-batch variations in paper structure and porosity. Inks of both high and low penetrations are required because the penetration quality of the ink must be appropriate to the holdout of the paper surface being tested. Coated papers, being relatively high in holdout, require a high penetration ink to obtain a sufficiently strong color and mottle pattern. Uncoated papers, being low in holdout, require a low penetration ink to avoid excessively strong color that would overwhelm any mottle or holdout distinctions. Examples of test patterns obtained using the two inks, demonstrating their specialized nature, are as follows:



Test Procedure: Spread the ink on the paper to be tested using a spatula or drawdown applicator (see TK-100 Applicator below). After one minute remove the ink by first scraping off most of it with a straight edge, then wiping away the remainder carefully with a clean paper towel. The resultant test pattern is characterized visually for mottle and porosity. To obtain an instrumental value for porosity, measure the CIE-Y reflectances, or the densitometer values, of the stained and unstained areas, then calculate:

$$\frac{\text{Porosity Index (Holdout)}}{100} = \frac{Y_{\text{unstained}} - Y_{\text{stained}}}{Y_{\text{unstained}}} = \frac{10^{\Delta D} - 1}{10^{\Delta D}}$$

Where D = densitometer value and $\Delta D = D_{\text{stained}} - D_{\text{unstained}}$

PACKAGING

TK-11	118 mL	(227 grams -- 1/2 lb) per jar
TK-21	118 mL	(151 grams -- 1/3 lb) per jar
8 jars per case		



TK-100

Item No. TK-100: Applicator for Paper-Testing Inks

Constructed of aluminum, this low cost applicator is designed specially for use with Leneta Testing Inks. One edge has a 10 mil (250 μ m) clearance and applies a 3 inch (75 mm) wide film. The opposite edge can be used as a convenient scraper.

Dimensions: 5 in x 2 in x 1/8 in (127 mm x 51 mm x 3 mm)

Special Substrates

Wood Panels - Birch: This type of hardwood is light in color with an attractive grain, making it particularly suitable for color matching and demonstration of stains.

Birch Plywood - 5/32 in (4 mm) thick

Form No.	Size inches	Size mm	Box Quantity	Boxes Per Case	Weight Per Box
R1A R7A	5-1/2 x 10	140 x 254	50	4	11lb
R1D R7D	3-1/2 x 6	89 x 152	100	4	9 lb

Available on Request:

R1-TA Designed for Taber Abraser: Size 4 x 4 in (100 x 100 mm) with 1/4 inch (0.6 mm) diameter center hole.
Simulates hardwood flooring.

R1-W For use in weatherometers: Size 3 x 6 in (75 x 150 mm) .

Birch Veneer - 1/32 in (0.7 mm) thick

This is real wood laminated to paper.

Form No.	Size inches	Size mm	Box Quantity	Boxes Per Case	Weight Per Box
R7A	5-1/2 x 10	140 x 254	100	4	5 lb
R7D	3 x 6	76 x 152	100	4	2 lb

Upson Board - Fiberboard Panels

Fiberboard panels, 3/16 inch thick, provide a surface appropriate for test applications of wall paint.

Form No.	Size inches	Size mm	Box Quantity	Weight Per Box
R6-612	6 x 12	152 x 305	150	40 lb
R6-912	9 x 12	229 x 305	100	40 lb
R6-1218	12 x 18	305 x 457	50	40 lb
R6-1224	12 x 24	305 x 610	40	44 lb

Special Substrates - Continued

P300-1K
P300-2K

P300-4C
P300-7C

P300-4NT
P300-7NT

P300-4G
P300-7G

Clear Polyester

This clear film can be used as a substrate for the application of a coating and viewed for transmitted appearance properties including color, gloss and transparency, or placed over a black and white background for evaluation of hiding power. In addition, it is used as an overlay to protect a drawdown after drying, without obscuring visibility.

Form No.	Thickness		Size		Box Quantity	Boxes Per Case	Weight Per Box
	mils	µm	inches	mm			
P300-1K	1	25	8-1/2 x 11	216 x 279	125	4	1 lb
P300-2K	2	50	8-1/2 x 11	216 x 279	125	4	1 lb
P300-4C	4	100	7-5/8 x 10-1/4	194 x 260	125	4	3 lb
P300-4G	4	100	3 x 5-1/2	76 x 140	250	4	2 lb
P300-4NT	4	100	5 x 7-5/8	127 x 194	250	4	3 lb
P300-7C	7	175	7-5/8 x 10-1/4	194 x 260	125	4	4 lb
P300-7G	7	175	3 x 5-1/2	76 x 140	250	4	2 lb
P300-7NT	7	175	5 x 7-5/8	127 x 194	250	4	4 lb

If you would like a size other than those shown above, please contact us for a quote

AAX-1P
AAX-2N

AGX-1P
AGX-2N

Alu-Cards - Aluminum foil laminated to paperboard panels

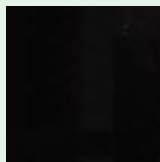
These are low cost metallic substrates to replace expensive solid metal panels when the primary interest is in appearance. The test surface has a high metallic luster. The cards are 18 mils (0.46 mm) thick and have a 1/4 inch (6.4 mm) diameter hole punched in one end. In addition to lower cost, a major advantage over regular metal panels is that they are much lighter in weight and therefore more conveniently stored. See page 27 for Spray Stand and Adapters used in spray applications on these panels.

Form No.		Size		Box Quantity	Boxes Per Case	Weight Per Box
		inches	mm			
AAX-1P	Primed ¹	5-1/2 x 10	140 x 254	125	6	5 lb
AAX-2N	Unprimed ²	5-1/2 x 10	140 x 254	125	6	5 lb
AGX-1P	Primed ¹	3 x 5-1/2	76 x 140	500	6	6 lb
AGX-2N	Unprimed ²	3 x 5-1/2	76 x 140	500	6	6 lb

1. Clear organic primer for improved adhesion.

2. Foil both sides for minimum bake distortion. Bright side is conductive.

Glass Substrates



GB-2A



GB-2B

Blacklite Glass Panels** - Approximately 0.25 inch (6mm) thick

Black glass is used in widely referenced high-precision ASTM Method D 2805, and related hiding power test methods. After measuring the reflectance R_0 of the dry film, a defined area is scraped from the glass and weighed to obtain the spreading rate or original wet film thickness. R_∞ of the paint film is obtained from a separate test application. The hiding power is then calculated from the appropriate Kubelka-Munk equations found in the ASTM method.

Black glass panels are used in U.S. Federal Test Method 141-4122 and CGSB Method 1-GP-71-14.7 for measuring hiding power. The latter method also provides for direct wet film thickness measurements using a Pfund or Interchemical type of wet film thickness gage, as described in ASTM Method D 1212.

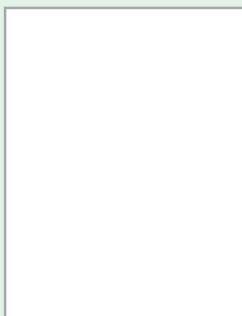
These methods depend on the unique hardness and levelness characteristics of glass substrates. Leneta black glass is much superior in levelness to previously available striated types.

	Black Unstriated - Blacklite	Size	Box Quantity	Weight Per Box
Item No.	GB-2A	8 x 8 in 200 x 200 mm	1	2 lb
Item No.	GB-2B	8 x 12 in 200 x 300 mm	1	3 lb

**** Blacklite:** Refers to the Leneta type of black glass

NOTE: Although visually not as opaque as true Carrara Glass, Blacklite Glass has a transmission of less than 1%, making it an adequate substitute for Carrara Glass.

Release Paper



RP-1K

Release Paper - For preparing free films of organic coatings

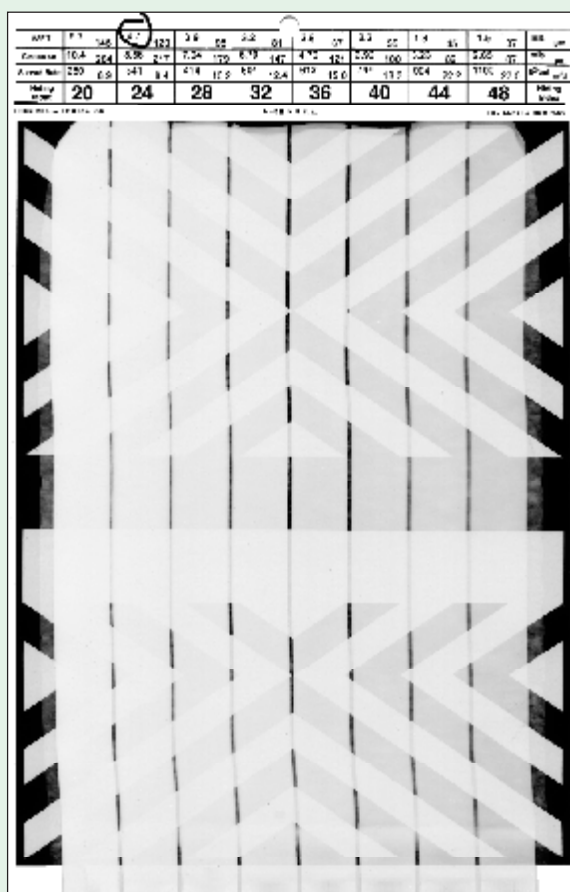
This paper is sealed on both sides, one side glossy and the other matte. The glossy side has a silicone finish with balanced release, to avoid excessive crawling of solventborne or waterborne coatings, while permitting easy stripping of dried films. It is recommended in ASTM D 4708 "Standard Practice for Preparation of Uniform Free Films of Organic Coatings" and can be used to prepare test films for ASTM D 2370 "Tensile Strength of Organic Coatings", ASTM D 1653 "Water Vapor Transmission of Organic Coatings Films", and other free-film test methods.

Form No.	Size	Thickness	Box Quantity	Boxes Per Case	Weight Per Box
RP-1K	8-5/8 x 11-1/4 in 219 x 286 mm	5 mil 127 μ m	250	4	8 lb

The TG19 Locator™

Item TG19: A Geometric-Sequence Multi-Notch Applicator, designed for rapid visual hiding power measurements. Conforms with ASTM Method D 5007, Wet-to-Dry Hiding Change.

Description: This unique drawdown blade applies a series of stripes with thicknesses in equal percentage steps, to permit single-drawdown exploration of the widest practicable application range. In addition to the hiding level of the coating, it also facilitates examination of the effect of film thickness on drying speed and surface uniformity, allowing a quick characterization of the essential features of the coating. The individual stripes are identified by "INDEX" numbers (20 to 48) engraved on the instrument, and also printed on the Form 23B Logicator Chart designed for use with this applicator. The Index Numbers are in equal numerical steps corresponding to increments of approximately 20% in notch clearance, film thickness and spreading rate, as shown in the following table:



Form 23B Logicator Chart -Typical Drawdown
Chart Size: 7-5/8 x 11-3/8 in (194 x 289 mm)
Stripe Width: 0.7in (17.8 mm) Overall Film Width: 6 in (152 mm)

	INDEX NUMBER							
	20	24	28	32	36	40	44	48
	WET FILM THICKNESS (W.F.T.)*							
mils	5.7	4.7	3.9	3.2	2.6	2.2	1.8	1.5
µm	145	120	98	81	67	55	45	37
	NOTCH CLEARANCE							
mils	10.40	8.56	7.04	5.79	4.76	3.92	3.23	2.65
µm	264	217	179	147	121	100	82	67
	SPREADING RATE*							
ft ² /gal	280	341	414	504	612	744	904	1100
m ² /L	6.9	8.4	10.2	12.4	15	18	22	27

* Based on W.F.T. = 55% of Notch Clearance

Test Procedure: After the applied coating has dried, the operator locates the critical stripe, visually or photometrically, and encircles the parameter of interest, as illustrated. It is generally accepted that the hiding power end-point is not *total* visual extinction, but a degree of contrast just short of complete hiding, corresponding to a photometric contrast ratio of 0.98.

ASTM D 5007: In this standard, the hiding power of the wet film and then of the dry film are observed visually, and the percentage increase or decrease is reported.

PACKAGING			
Item	Box Quantity	Boxes Per Case	Box Weight
TG19	1	--	1 lb
23B	250	4	9 lb

Leneta Scrub Test Panels

Form P121-10N

Black Plastic-Vinyl Chloride/Acetate Copolymer

Smooth Matte Surface - Plasticizer Free

Thickness: 10 mils (0.25 mm) - Size: 6-1/2 x 17 in (165 x 432 mm)

Used in ASTM D 2486, ASTM D 4213, ISO 11918 and Other Scrub Test Methods



Form P121-10N

In a typical scrub test, the coating is applied to the Leneta Scrub Test Panel at a specified film thickness, allowed to dry, then subjected to scrubbing with a straight-line scrub tester. In ASTM D 2486, a 10 mil shim is inserted under the panel to accelerate failure and thereby reduce testing time. The scrub resistance is the number of scrub cycles required to remove the coating to a specified end point.

Alternatively, the loss in weight is determined after a specified number of scrub cycles as a measure of scrub resistance, with calculation of equivalent loss in film thickness.



Fig. 1 Typical Failure Using Shim per D2486, Method A.



Fig. 2 Typical Failure Without Shim

The above photographs show actual tests of latex flat paints. Note that the films have worn down to a feather edge, with no sign of adhesion failure

ALSO AVAILABLE: WHITE SCRUB TEST PANELS - FORM P122-10N

Used with dark colored paints for contrast. Same physical properties as Form P121-10N.

PACKAGING: 100 per box, 5 boxes per case.

Leneta Calibration Scrub Test Panels

Form P121-A

Poor Scrub Resistance

* 80 cycles-to-failure

Form P121-C

Good Scrub Resistance

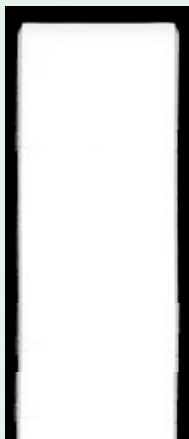
* 400 cycles-to-failure

* Typical Values per ASTM D2486, Method A

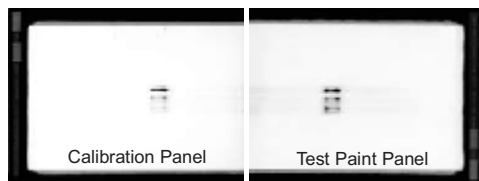
These are standard panels prepared by applying white emulsion paints on black scrub test panels. The films are indefinitely stable and the panels of each type essentially identical. They are used as controls in the measurement of scrub resistance, to obtain *Calibration Ratings* that normalize the wide variations often encountered for undefined reasons, among laboratories using the same scrub method. The *Calibration Rating* is the performance of the test paint panel expressed as a percentage relative to that of the selected Calibration Panel. Thus:

$$\% \text{ Calibration Rating} = \frac{\text{Test Panel Cycles-to Failure}}{\text{Calibration Panel Cycles-to-Failure}} \times 100^{**}$$

** The letter indicating the calibration panel type is appended to the calibration rating, e.g. 125A, 65C, 95C etc.



Form P121-A & C



The figure to the left illustrates simultaneous side-by-side scrubbing of half-panels to maximize correlation, analogous to ASTM D 2486, Method B.

NOTE: See also ASTM D 4213 "Weight Loss Method" whereby:

$$\text{Calibration Rating} = \frac{\text{Calibration Panel Weight Loss}}{\text{Test Panel Weight Loss}} \times 100$$

PACKAGING: 3 per box, 4 boxes per case.

Leneta- ASTM Scrub and Staining Media

Leneta-ASTM Scrub Media

Non-Abrasive Type Item No. SC-1

Used in ASTM Method D3450,
Test for Washability Properties.



SC-1

Abrasive Type Item No. SC-2

Used in ASTM Method D2486, D4213 and D3450,
Scrub Resistance and Washability Tests.



SC-2

These are aqueous dispersions of detergent, cellulosic thickener and preservative, made in conformance with and approved for use in the indicated ASTM methods. The abrasive type contains ground silica for accelerated erosion. The two compounds are representative of the detergent and abrasive character of commercial cleaning products. Because of the variable nature of their ingredients, Leneta Company provides media adjusted and tested to assure batch-to-batch uniformity. Each container is fully identified by batch number and shipping date. The contents of unopened containers are guaranteed standard in performance for a year, which is highly conservative on the basis of observed package stability.

Supplied in pint (473 mL) jars, sufficient for about 40 tests.

Weight per jar: 2 lb, 8 jars per case

Leneta-ASTM Staining Media

Pigmented Type Item No. ST-1

Used in ASTM Method D 3450,
Test for Washability Properties



ST-1

Penetrating Dye Type Item No. ST-31

Recommended for ASTM Method D 3258,
Test for Stain Resistance and Porosity



ST-31

This is a finely ground dispersion of high jet carbon black in a blend of mineral oil and odorless mineral spirits. It is specified in ASTM D3450 to meet the laboratory requirement for a reproducible composition of matter, representative in a general way of soilants encountered in the field.

This is a proprietary composition of pigment and dark-colored dye dispersed in an organic liquid vehicle. When applied and then removed from a paint film, the intensity of the resultant stain indicates the degree of film porosity. ST-31 is more effective than other media recommended for this purpose.

Both media have perfect package stability and are manufactured and control tested to assure batch-to-batch uniformity. Their usefulness extends not only to ASTM tests, but to any soil and stain removal test procedure.

Supplied in 4 fl.oz. (118 mL) cans or jars.

Weight per jar: 1/2 lb, 4 jars per case

Leneta Anti-Sag Meter

USED IN ASTM D4400, TEST METHOD FOR SAG RESISTANCE OF PAINTS

This is a drawdown blade with a series of notches of successively higher clearance. The notch clearance is related to the degree of sagging and provides a numerical value referred to as the Anti-Sag Index. The higher the Anti-Sag Index the better the sag resistance of the coating. The development of this instrument and its versatility for control and research have been described in published reports.^{1,2} The Anti-Sag Meter is called for in ASTM³ and Federal⁴ test methods and is essential equipment in paint laboratories in the U.S.A. and throughout the world. Fig. 2 shows a typical test obtained with this applicator. See Appendix (page 35) for test method details.

1. Official Digest (JCT), October 1962
2. Official Digest (JCT), January 1964
3. ASTM Method D 4400
4. U.S. Fed, No. 141 Method 4494



Fig.1 - The Medium Range Anti-Sag Meter

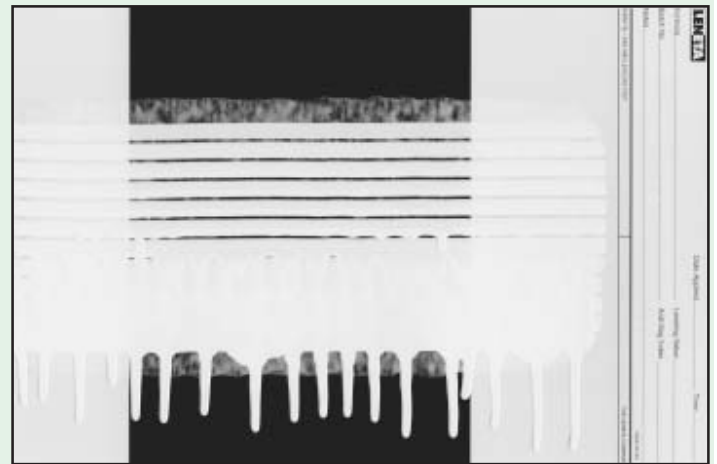


Fig. 2 - Typical Test Pattern
This test was made with the Medium Range Anti-Sag Meter.
The test surface is a Form 7B Sag & Leveling Chart.

Anti-Sag Meters Available From Stock

Item No.	Range	For Coating Type:	Notch Clearances *											
ASM-1	Standard	Solventborne Architectural	mils	3	4	5	6	7	8	9	10	11	12	
			µm	78	100	125	150	175	200	225	250	275	300	
ASM-2	Low	Industrial O.E.M. Coatings	mils	1	1.5	2	2.5	3	3.5	5	4.5	5	5.5	6
			µm	25	38	50	63	75	88	100	113	125	138	150
ASM-3	High	High Build Coatings	mils	14	15	18	20	25	30	35	40	45	50	60
			µm	350	400	450	500	625	750	875	1000	1125	1250	1500
ASM-4	Medium	Waterborne Architectural	mils	4	6	8	10	12	14	16	18	20	22	24
			µm	100	150	200	250	300	350	400	450	500	550	600

* Mils are exact. Wet film thickness is about half of the clearance.

Sag and Leveling Test Chart

This form was designed for use with the Leneta Anti-Sag Meter and finds additional use with the Leneta Leveling Test Blade (see page 25). Its special characteristic is the provision of an applicator path with a considerable length of black in the middle. Thus by making test observations only over the black area, there is automatic compliance with instructions to ignore the leading and trailing edges of the drawdown. See the Appendix (page 35).

PACKAGING				
Form No.	Size	Box Quantity	Boxes Per Case	Weight Per Box
7B	7-5/8 x 11-3/8 in.(194 x 289 mm)	250	4	9 lb.

Leneta Leveling Test Blade and Standards

Used in ASTM D 4062, Test for Leveling of Paints

Leneta Leveling Test Blade

Item No. LTB-2



Fig. 1 The Leneta Leveling Test Blade

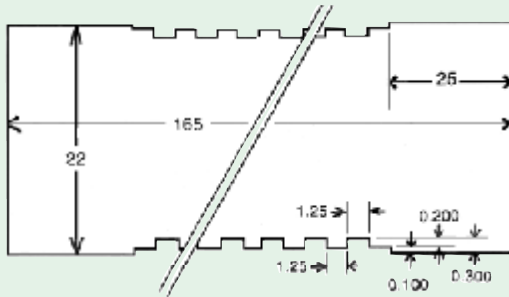


Fig. 2 Details from the engineering drawing. Dimensions are in millimeters. Plastic arms are illustrated in Fig. 1 above.

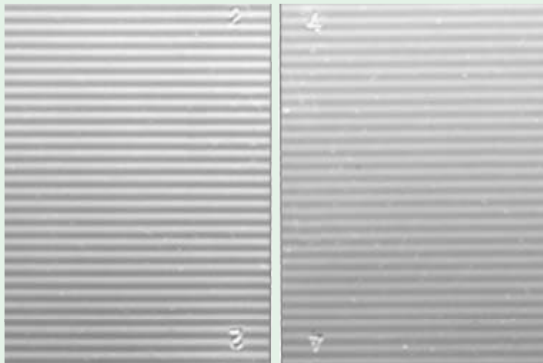


Fig. 3 Drawdown Levelness Standards under oblique light, as described in ASTM D 4062.

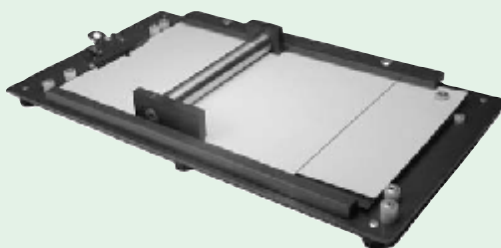


Fig. 4 Application with the Leneta Leveling Test Blade. Illustrates use of Drawdown Plate and Catch-Papers.

This is a threaded stainless steel rod that functions as a grooved doctor blade at any part of its circumference. It produces a film with parallel ridges and valleys in simulation of brush marks. Critical dimensions are indicated in the diagram. Plastic arms in conjunction with straight-edge guides assure rectilinear drawdown movement (see DP-2 Leveling Test Drawdown Plate below). Advantages over brushout application tests are speed, reproducibility, and a regular surface pattern that facilitates evaluation. The leveling of films applied in this manner correlates well with brushout leveling.

The diagram shows alternating clearances of 300 and 100 μm (12 and 4 mils), to apply alternate stripes of 150 and 50 μm (6 and 2 mils) thickness. Thus the mean wet film thickness of the test drawdown will be about 100 μm (4 mils), corresponding to a spreading rate of 10 m^2/L (400 ft^2/gal).

The detailed method is described in the Appendix, Page 35.

Leneta Drawdown Levelness Standards

Item No. LS-2

These are 3-dimensional true scale replicas of drawdowns made with the Leneta Leveling Test Blade, using a series of nine paints ranging from extremely poor to good leveling. The primary standards are durable metal plates from which replicas are pressed in the form of 3 x 5 in (75 x 125 mm) white vinyl panels. They are numbered 1 through 9 from poorest to best leveling. Perfect leveling is 10 and poorer than 1 is zero. Evaluation of drawdowns prepared with the Leneta Leveling Test Blade is readily accomplished by visual comparison in oblique light. The number of the matching standard is the Leveling Value of the paint. Further information with regard to the significance of these values is provided in the Appendix, Page 35.

Leveling Test Drawdown Plate

Item No. DP-2

This drawdown plate was designed for use with the Leneta Leveling Test Blade in ASTM Method D 4062. Its construction features include edge guides, to assure that straight parallel stripes are obtained from the rapid blade movement called for in the test method. It also includes peg stops that automatically terminate the blade movement in the correct location at completion of the drawdown.

"Catch-Papers"

Form CP-2

These are thin lacquered sheets, size 3 x 7-1/4 in, for catching surplus paint at the end of the drawdown. This form was designed specifically for use with the Leveling Test Drawdown Plate, being cut to size and hole punched accurately for that purpose.

Packaging: 1000 sheets/box

Metopac™ (Metal) Panels

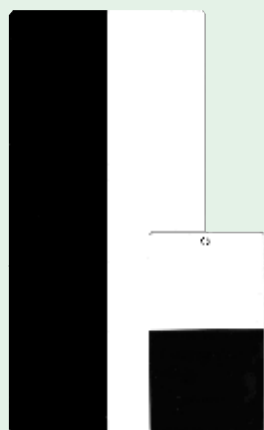
Painted Steel Panels for Measuring the Hiding Power of Powder Coatings and Industrial Enamels

Black Surface: Solvent resistant, Non-bleeding, Reflectance - 1% maximum*

White Surface: Solvent Resistant, Color Retentive, Reflectance - 80% minimum*

* Measured using ASTM Method E 1347

T12M



T12G

Form No.	Color	Area**	Size	Box Quantity	Boxes Per Case	Weight Per Box
T12G	Black & White	100 cm ²	3 x 5-3/16 inch 76 x 132 mm	125	4	8 lb
T12M	Black & White	368 cm ²	5-3/16 x 11 inch 132 x 279 mm	50	4	4 lb

**Allowing for 1/4 inch (6mm hole.)

Major uses include:

ASTM Method D 6441 -- *Measuring the Hiding Power of Powder Coatings* -- A wedge shape film is applied on a T12G or T12M panel. Points of specified film thickness are located over the black and white areas, reflectances are measured and the mean contrast ratio at that film thickness is calculated. Alternatively, several black/white pairs of equal-thickness points at various film thicknesses are located, and the calculated contrast ratio plotted graphically against the film thickness to obtain the film thickness at a contrast ratio of 0.98. In this method the reflectance is measured with a small diameter aperture (e.g. 4 mm), and the film thickness with an electronic film thickness gage.

Powder Coatings Institute Method -- In this method the film thickness is determined directly on a T12G panel at 0.98 Contrast Ratio. Alternatively, the Contrast Ratio is determined at a specified film thickness. Reflectance and film thickness instrumentation are as in ASTM D 6441.

ASTM Method D 2805 -- *Hiding Power of Paints by Reflectometry* --

The film is applied uniformly over a panel. The filmweight and reflectance R_0 are determined on the black area, and the reflectivity R_∞ of the coating determined using the black and white areas. The gravimetric spreading rate at 0.98 Contrast Ratio is then calculated using Kubelka-Munk equations. Conversion to volumetric spreading rate or to film thickness is readily accomplished.

Metal Panel Accessories



Item SS-1 Magnetic Spray Stand

Laboratory spray stands are often unsteady devices, thickly coated with overspray. The Leneta Magnetic Spray Stand provides stability, tidiness, and general convenience. Its design is simple: two small but powerful pot magnets are mounted at one end of a curved steel rod. The other end of the rod is screwed into a heavy steel base. Overall height is approximately 13 inches. Steel panels 6 x 12 inches and larger are held firmly during spraying and then easily removed. The magnets remain clean, being protected from overspray by the panel. Other parts of the device are readily cleaned by soaking in paint remover or caustic solution.

Item No.	Box Quantity	Weight Per Box
SS-1	1	11 lb

Alu-Card Adapter

The magnetic spray stand can be used with Alu-Cards (see page 19) or other non-magnetic panels by employing one of the steel adapters designed for that purpose. It provides a small peg from which the Alu-Card hangs, steadied by side arms to prevent the card from blowing off in the spray stream. It is available in two sizes, corresponding to the standard sizes in which Alu-Cards are supplied.

Item	Use With	Packaging	
		Size	
		Inches	Millimeters
AD-1	Size A Cards	5-1/2 x 10	140 x 254
AD-2	Size G Cards	3 x 5-1/2	76 x 140

Applicators - Blade Type

Also referred to as "Drawdown Bars" or "Doctor Blades", they apply a wet film thickness approximately half their gap clearance. They are essential laboratory equipment for making uniform and reproducible applications on Leneta Charts and other surfaces.

Trade Sales Applicators ("U"-Shape)

Each of these instruments has a 6 mil and an 8 mil gap clearance, laying down wet film thicknesses of approximately 3 and 4 mils, respectively. These are the thicknesses most often recommended for the testing of solventborne and waterborne architectural coatings, hence their characterization by Leneta as "Trade Sales" applicators. The film widths of 4 and 6 inches take advantage of the most popular Leneta test chart widths of 5-1/2 and 7-5/8 inches. Their "U"-shape structure retains a substantial volume of test coating to assure completeness of drawdowns.

AT-686



Item	Film Width	Gap Clearances (mils)	Wet Film Thickness (mils)	Spreading Rate (ft ² /gal)
AT-684	4 in	6	3	535
		8	4	400
AT-686	6 in	6	3	535
		8	4	400

AD-710

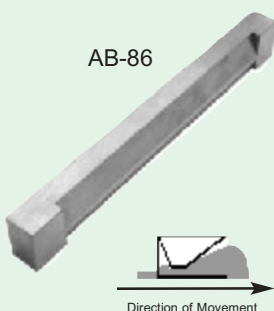


Dow Film Caster

This Applicator was originally designed for latex paint scrub test procedures on a 6-1/2 x 17 in. glass surface, in which a 3-1/2 mil thick test coat is applied over a 5 mil primer. Although the use of primed glass in tests of this type has been largely discontinued, the applicator continues to be widely used for its individual clearances.

Item	Film Width (inches)	Gap Clearance (mils)	Wet Film Thickness (mils)	Spreading Rate (ft ² /gal)
AD-710	5-1/4	7	3-1/2	460
	5-1/2	10	5	320

AB-86



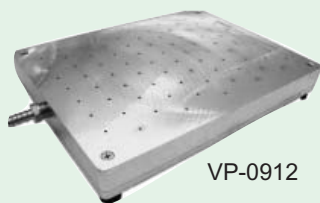
Bird® Applicators

Bird Applicators are specified by their film width and the approximate wet film thickness they are intended to apply. The latter value is engraved at one end of the applicator. To calculate the approximate spreading rate in square feet per gallon, divide 1604 by the indicated wet film thickness.

Film Width	Wet Film Thickness*			
	2 mils	3 mils	4 mils	6 mils
2 in	AB-42	AB-62	AB-82	---
3 in	AB-43	AB-63	AB-83	---
3.5 in	AB-435	AB-635	AB-835	AB-1235
6 in	AB-46	AB-66	AB-86	AB-1206

* Approximately half the gap clearance.

Vacuum Plate



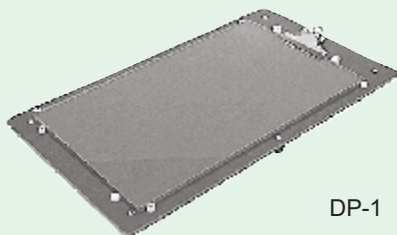
Vacuum Plate - perforated

This is a flat, perforated aluminum plate, with a 9 x 12 inch surface, on which hiding power charts and other flexible surfaces may be placed and held flat during application of coatings. The surface is large enough to accommodate all Leneta chart sizes up to 8-5/8 x 11-1/4 inches. A vacuum pump or source of laboratory vacuum is required.

Item	Size	Weight
VP-0912	9 x 12 x 2 in 227 x 305 x 51 mm	6 lb

Leneta Drawdown Plates

Leneta drawdown plates consist of a glass clipboard set firmly on a phenolic plastic panel and mounted on rubber bumpers to prevent sliding while in use. The drawdown surface is 6 mm (1/4 inch) thick polished glass, equal in planarity to fine mirror glass. A steel clip holds the test chart or panel steady while the drawdown is made. These devices provide economical and convenient means for making drawdowns of uniform film thickness. They are easy to use, easy to keep clean, and extremely helpful in every paint and coatings laboratory.



DP-1

Item DP-1 Leneta Drawdown Plate - Regular

For general use with Leneta Charts and panels
Glass Surface: 9 x 15 in (230 x 380 mm)



DP-3

Item DP-3 Leneta Scrub Test Drawdown Plate

For drawdowns on Leneta Scrub Test Panels, size 6-1/2 x 17 inches.
Glass surface: 7 x 20 in (178 x 508 mm)

Information on Leneta Scrub Test Panels can be found on page 22.

Adjustable Straight Edges

These devices are designed for mounting on Leneta Drawdown Plates as guides to assure rectilinear movement of the applicator. Lateral position is adjustable to accommodate various applicator widths.



Drawdown procedure using straight-edge and catch-paper.

Item	For Use On
SE-1	DP-1 Standard Drawdown Plate
SE-3	DP-3 Scrub Test Drawdown Plate

Form CP-1 Catch-Papers

These are thin, sealed papers that are placed under the bottom edge of a chart or panel to catch the surplus paint at the completion of a drawdown. The sealed surface facilitates clean-up.

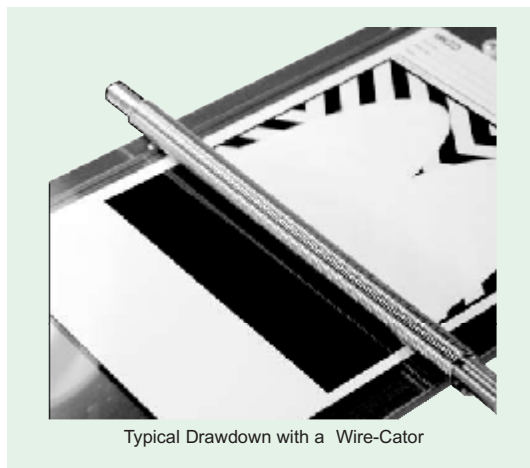
Form	Size	Packaging		
		Box Quantity	Boxes Per Case	Weight Per Box
CP-1	3 x 8-1/2 in 75 x 215 mm	1000	4	4 lb

Leneta Wire-Cators™

Used to Apply Controlled Film Thickness Drawdowns of Liquid Coatings

Also known as: Wire-Bar Applicators, Mayer Rods

General Description: Wire-Wound Rods



Typical Drawdown with a Wire-Cator



Set of 12 Wire-Cators on Bench Stand

Characteristics of Leneta Wire-Cators

1. Wire Diameters: 2.5-75 mils (0.064-1.9 mm), provides wet film thicknesses: 0.18-6 mils (4.5-150 μm)
2. Length of winding: 10 inches (254 mm). Sufficiently long to coat most standard size panels and charts.
3. Length of rod: 12 inches (305 mm). Provides an inch (25 mm) clear for grasping at each end.
4. Diameter of rod: 1/2 inch (12.7 mm). Thick enough to provide essentially perfect rigidity.
5. Composition: All stainless steel. No rust or corrosion, even with waterborne coatings. Non-magnetic, permits use with steel panels on a magnetic chuck.

Wire-Cators Available from Stock

Catalog Item No.	Wire Diameter		Film Thickness**		Catalog Item No.	Wire Diameter		Film Thickness**		Catalog Item No.	Wire Diameter		Film Thickness	
	mils*	mm	mils	μm		mils*	mm	mils	μm		mils*	mm	mils	μm
WC-2.5	2.5	0.064	0.18	4.5	● WC-22	22	0.56	1.5	38	WC-44	44	1.12	3.3	84
● WC-3	3	0.075	0.2	5	WC-24	24	0.61	1.7	42	WC-46	46	1.17	3.5	89
● WC-4	4	0.10	0.3	8	WC-26	26	0.66	1.8	47	WC-48	48	1.22	3.7	93
● WC-6	6	0.15	0.4	10	● WC-28	28	0.71	2.0	50	WC-50	50	1.27	3.8	98
● WC-8	8	0.20	0.5	13	WC-30	30	0.76	2.2	55	● WC-52	52	1.32	4.0	102
● WC-10	10	0.25	0.65	16	WC-32	32	0.81	2.3	59	WC-55	55	1.40	4.2	107
● WC-12	12	0.30	0.8	20	● WC-34	34	0.86	2.5	63	WC-60	60	1.52	4.5	114
WC-14	14	0.36	0.95	24	WC-36	36	0.91	2.7	68	WC-65	65	1.65	5.0	127
● WC-16	16	0.41	1.1	28	WC-38	38	0.97	2.8	72	WC-70	70	1.78	5.5	139
WC-18	18	0.46	1.25	32	● WC-40	40	1.02	3.0	75	WC-75	75	1.91	6.0	152
WC-20	20	0.51	1.4	35	WC-42	42	1.07	3.2	81					

* Exact

** Approximate

● Included in standard set of 12 Wire-Cators referred to below.

Item No. WC-212: Standard Set of 12 Wire-Cators and Bench Stand

Non-Stick Inter-Leaf Papers

Leneta Inter-Leaf Papers are thin, specially treated, non-stick sheets that protect your test chart applications from being marred by the effects of residual tack.

When stacking, shipping or storing test charts, insert Leneta Inter-Leaf Papers between the charts.

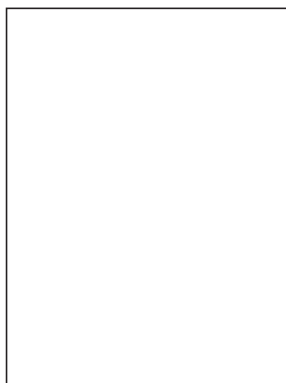
Available from stock - packed 1000 sheets per box - in the following standard Leneta Chart sizes:

Size A



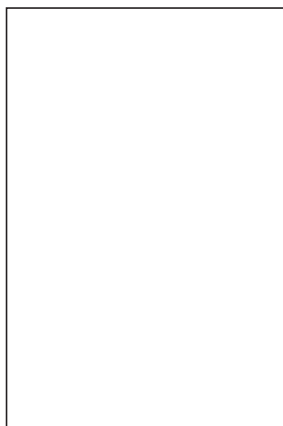
Form IP-1A
5-1/2 x 10 in
140 x 254 mm

Size C



Form IP-1C
7-5/8 x 10-1/4 in
194 x 260 mm

Size B



Form IP-1B
7-5/8 x 11-1/4 in
194 x 286 mm

Size K



Form IP-1K
8-5/8 x 11-1/4 in
219 x 286 mm

Paint-Out Starter Kit Item PSK-1

Low cost, entry level kit for making commercial quality drawdowns. Designed for facilities such as paint stores and small labs, where experience with uniform film application is minimal. This kit provides all items needed to make paint-outs at practical film thicknesses, for samples or for testing. The kit includes the following individual items:

- Item DP-4** Drawdown Plate, aluminum, 9 x 14-1/2 inches, for providing a smooth level support surface.
- Form WB** Sealed, white drawdown charts, 7-5/8 x 11-1/4 in, box of 250, as a standardized surface, impervious to waterborne or solventborne paints.
- Form CP-PSK** Catch-Papers, 3 x 8-1/2 in, pad of 250 sheets, to be placed under the bottom edge of the drawdown chart to catch the excess paint at the completion of a drawdown.
- Item WC-46** Wire-Cator™ Applicator, 12 in long, 1/2 in diameter, wire wound rod, for applying a uniform coating of about 3-1/2 mils wet film thickness, equivalent to about 450 square feet per gallon, appropriate for both solventborne and waterborne paints.



Appendix

Contents

1. Characteristics of charts and cards
2. CIE-Y Reflectance of grays
3. U.S. - Metric Conversions
4. Spreading Rate and Film Thickness
5. Equations for Spreading Rate Charts
6. Film Constants
7. Porosity by Saturant Absorption
8. Basic Hiding Power Methods
9. Kubelka-Monk (K-M) Equations
10. Sag Resistance Method (D 4400)
11. Leveling Test Method (D 4062)
12. Pre-Shear Equipment
13. Leneta in ASTM Methods

1. Characteristics of Charts and Cards

Liquid seal: Applied to one side only; solvent resistant; non-migrating.

Black areas: Printed one side only; non-bleeding, reflectance 1% max.¹ (< 2% on non-sealed charts.)

Sealed White areas:

Color retentive; non-fluorescent
Reflectance¹⁴ Charts: 80 - 83%
Cards: 80% min

Thickness²: Charts - 14 mils (0.35 mm)
Cards - 20 mils (0.5 mm)

Weightage ² :	Poundage	Grammage
	lb/Mft ²	g/m ²
Charts:	63	308
Cards:	74	361

Hole Punching³:

One hole - 1/4 inch (6 mm) diameter
Two holes - 3/8 in (9.5 mm) diameter,
4-1/4 in (108 mm) between centers.

¹ Measured per ASTM E 1347, 0/45° geometry

² Approximate

³ Indicated by illustrations or in the text.

⁴ Special higher brightness (87-89%) available on request: Forms 2A-H, 3B-H, 5C-H, 1B-H, WB-H

2. CIE-Y Reflectances of Grays

Form	G%
5DX-GW	46±3
8H-GW	46±3
10H-BG	34±3
M *	31±3
S *	31±3
26-1M, 26-2M	46±3
24B, CU-1M: Stripes	

#1	76 approx.
#2	73 approx.
#3	65 approx.
#4	45 approx.
#5	24 approx.
#6	4 approx.

* Represents additional letters and/or numbers to identify two or more related products.

3. U.S. - Metric Conversions

Length: 1 in = 2.54 cm = 25.4 mm
1 mil = 25.4µm
1 mm = 39.37 mils
1 ft = 30.48 cm = 0.3048 m

Area: 1 in² = 6.4516 cm²
1 ft² = 929.0304 cm²
1 m² = 10.76391 ft²

Volume: cc ~ cm³ ~ mL; L ~ dm³
1 in³ = 16.387064 mL
1 ft³ = 28.3168 L
= 7.48052 gal
1 gal = 231 in³ = 128 fl oz
= 3785.412 mL
1 fl oz = 29.5735 mL

1 gal (Imperial)
= 1.20095 gal (U.S.)

Weight: 1 lb = 453.59237 g
1 av oz = 28.3495 g

Density: 8.3454 lb/gal = 1 g/mL = 1 kg/L

Spreading Rate:
40.746 ft²/gal = 1 m²/L
4.8824 ft²/lb = 1 m²/kg

Weightage (Weight/Area):
Poundage (lb/Mft²) x 4.8824 =
Grammage (g/m²)

Temperature:
°F = 1.8 x °C + 32
°C = 5/9 (°F - 32)

4. Spreading Rate and Film Thickness*

4.1 Metric Units

- a) H(m²/L) x T(µm) = 1000
- b) H(m²/L) x t(µm) = 1000 ND/d
- c) H(m²/kg) x T(µm) = 1000/D(kg/L)
- d) H(m²/kg) x t(µm) = 1000N/d(kg/L)

4.2 U.S. Units

- a) H(ft²/gal) x T(mil) = 1604.2
- b) H(ft²/gal) x t(mil) = 1604.2ND/d
- c) H(ft²/lb) x T(mil) = 1604.2/D(lb/gal)
- d) H(ft²/lb) x t(mil) = 1604.2N/d(lb/gal)

4.3 Dry vs Wet Film Thickness

- a) ND = N_vd
- b) t = N_vT
- c) td = NTD

Where:

H = spreading rate (whole paint)
T = wet film thickness
t = dry film thickness
D = whole paint density
d = dry film density
N = non-volatile fraction by weight
N_v = non-volatile fraction by volume

* non-porous films

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5. Equations for Use With Leneta Spreading Rate Charts

Laboratory operations in grams and mL.
Test area is 1000 cm² (1.0764 ft²).

5.1 Metric Units

- a) V(mL) = T(µm) ÷ 10
- b) V(mL) = 100 ÷ H(m²/L)
- c) M(g) = T(µm) x D(g/mL) ÷ 10
- d) M(g) = 100 D(g/mL) ÷ H(m²/L)
- e) **M(g) = V(mL) x D(g/mL)****

5.2 Mixed Units

- a) V(mL) = T(mils) x 2.54
- b) V(mL) = 4074.6 ÷ H(ft²/gal)
- c) M(g) = 488 x D(lb/gal) ÷ H(ft²/gal)

** valid for any test area.

Where: T = wet film thickness
V = volume applied
H = spreading rate
M = weight applied
D = paint density

6. Film Constants by Direct Measurement

$$N_v = 1 - \frac{D}{D_v} (1 - N)$$

$$D_N = \frac{D_v ND}{D_v + ND - 1}$$

$$D_B = \frac{w}{t}$$

$$P = \frac{D_N - D_B}{D_N}$$

Where:

D = wet density (g/cm³)
N = non-volatile fraction by weight
D_v = density of volatiles (g/cm³)
solventborne = 0.78
waterborne = 1.00

w = dry grammage (g/m²)
t = dry film thickness (µm)

N_v = non-volatile fraction by volume
D_N = dry displacement density (g/cm³)
D_B = dry bulk density (g/cm³)
P = film porosity (voids/bulk)

7. Porosity by Saturant Absorption

$$P = \frac{QD_N}{QD_N + D_S}$$

$$P = \frac{Q}{Q + R}$$

Where:

D_N = dry displacement density (g/cm³)
D_S = saturant density (g/cm³)
Q = saturant weight/film weight
R = D_S / D_N

Appendix (continued)

8. Basic Hiding Power Methods

8.1 Definitions - Hiding Power is defined as the Spreading Rate required for full hiding over a standard black and white substrate. The latter is specified in coatings technology to have CIE-Y reflectances of 0.01 (1%) max. and 0.80 (80%) respectively. Sometimes substrates with other shades or color combinations are employed.

When a film is applied uniformly over a black & white substrate, the ratio of the CIE-Y reflectance over the black area to that over the white area is its Contrast Ratio. Contrast Ratio is the photometric measure and statement of the film Opacity or Hiding.

Full hiding for visual observations means *just short of* total extinction of contrast. Photometrically it is defined as 0.98 Contrast Ratio.

8.2 General Procedure - The objective is to determine the spreading rate at a specified level of dry film opacity, as perceived visually or corresponding to a specified contrast ratio: $C = R_0/R_{0.80}$. The basic experimental procedure is to apply a uniform film on a suitable test substrate, to observe its opacity either visually or photometrically, and to determine its spreading rate. Since it is not possible to apply a film with precision at a predetermined dry opacity, several such applications need to be made over a range of spreading rates and their results plotted graphically. The spreading rate is then taken from the graph at the specified Contrast Ratio.

Conversely, the Contrast Ratio can be determined on the same graph, at a specified Spreading Rate or Film Thickness.

8.3 Spreading Rate (or Film Thickness) Determination - In both visual and photometric hiding power methods, the procedures for observing film opacity are well defined and can be performed with dispatch. The experimental task that is most demanding on the operator's time and ingenuity is to determine the spreading rate or film thickness of the applied coating with good precision. Although gages are available for measuring wet and dry film thickness directly, it is more accurate to determine the weight of dry paint film on a measured test area and then to calcu-

late the spreading rate or film thickness from one of the following equations:

$$H(\text{m}^2/\text{L}) = \frac{1000}{T(\mu\text{m})} = \frac{A(\text{cm}^2) \cdot N \cdot D(\text{kg/L})}{10M(\text{g})} \quad (1)$$

$$H(\text{m}^2/\text{kg}) = \frac{1000N}{t(\mu\text{m}) \cdot d(\text{kg/L})} = \frac{A(\text{cm}^2) \cdot N}{10M(\text{g})} \quad (2)$$

where: H = spreading rate
T = wet film thickness
t = dry film thickness
A = test area
N = non-volatile fraction by weight
D = paint density
d = dry film density
M = dry film weight

Metric values thus calculated can be converted to U.S. common units via the following relationships:

$$H(\text{ft}^2/\text{gal}) = 40.746 H(\text{m}^2/\text{L}) \quad (3)$$

$$H(\text{ft}^2/\text{lb}) = 4.8824 H(\text{m}^2/\text{kg}) \quad (4)$$

$$T(\mu\text{m}) = 25.4 T(\text{mils}) \quad (5)$$

$$D(\text{lb/gal}) = 8.3454 D(\text{kg/L}) \quad (6)$$

Powder coatings are usually considered to be volatile-free, and their dry film and powder displacement densities (d and D) equal. In that case Equation 2 becomes:

$$H(\text{m}^2/\text{kg}) = \frac{1000}{t(\mu\text{m}) \cdot D(\text{kg/L})} = \frac{A(\text{cm}^2)}{10M(\text{g})} \quad (7)$$

This less rigorous equation avoids the need to determine d or N.

9. Kubelka-Monk (K-M) Equations

9.1 ASTM D 2805

Using equations derived from K-M theory, it is possible to calculate the contrast ratio of a coating at one spreading rate (or film thickness) from measurements made at another. On that basis several easy and accurate hiding power test methods have been developed, one being the widely referenced ASTM D 2805. The equations are complex, requiring computer solutions, but the experimental measurements are minimal. Consult the ASTM method for full details.

9.2 Calculations of R_∞ , Reflectivity

This basic optical property of a coating is defined as "the reflectance of a film thick enough to be completely opaque". Few coatings applied at normal film thickness hide completely. Kubelka-Monk theory provides equations for calculating R_∞ from measurements on non-opaque films applied uniformly on black and white hiding power charts, as follows:

$$a = \frac{1}{2} \left(R_w + \frac{R_0 + W - R_w}{WR_0} \right)$$

$$R_\infty = a \cdot (a^2 - 1)^{1/2}$$

Where:

R_0 = reflectance over black substrate

W = white substrate reflectance

R_w = reflectance over white substrate

9.3 White Substrate Variation

For hiding power control purposes, coatings are applied on a black & white substrate at a standard film thickness, reflectances R_0 and R_w are measured, and the Contrast Ratio R_0/R_w calculated. With non-opaque films, variations in white substrate reflectance can affect the measured value of R_w , and therefore the contrast ratio hiding power criterion. The following Kubelka-Monk equation provides a solution to this problem, thus:

$$R_w - R_G = \frac{(W - G)(R_w - R_0)}{W(1 - GR_0)}$$

Where:

R_0 , W, R_w are as stated above.

G = alternate white substrate reflectance

R_G = reflectance over alternate white substrate

Note: G could be higher or lower than W

Appendix (continued)

10. Leneta Anti-Sag Meter ASTM Method D 4400

A. Equipment

- (1) The Anti-Sag Meter, Page 24
- (2) Adjustable Straight Edge, Item SE-1
- (3) Drawdown Plate-Regular, Item DP-1
- (4) Drawdown Charts *

Form 7B Black and white, for light colored paints.

Form WB plain white, for dark colored paints.

- (5) Catch-Papers, Form CP-1
- (6) Pre-shear equipment, Page 36

* With the Low Range Anti-Sag Meter, a flat glass surface is preferred.

B. Preparation of Coating

- (1) Stir well and adjust to 23°C (73.5°F)
- (2) Pre-shear in accordance with one of the methods described on Page 36, and test immediately thereafter.

C. Application of Coating

- (1) Attach the straight-edge to the drawdown plate in a suitable position.
- (2) Place a test chart on the drawdown plate under the clip.
- (3) Place the Anti-Sag Meter on the chart adjacent to the clip, with its open side toward the operator and its shoulder against the straight-edge.
- (4) Position the Catch-Paper.
- (5) Place a suitable quantity (8 - 10 mL) of pre-sheared paint directly in front of the blade, and drawdown uniformly at about 6 inches (150 mm) per second.
- (6) Promptly fasten the drawdown to a vertical surface, with stripes horizontal like rungs in a standing ladder, left edge (thinnest stripe) at the top, and allow to dry in that position.

D. Rating the Drawdown

- (1) Note the notch numbers marked on the Anti-Sag Meter and identify the corresponding stripes accordingly.
- (2) Ignore the leading and trailing edges, and observe only the central 5-1/2 inches (150 mm) of blade path, corresponding to the black area of Form 7B.
- (3) The lowest (thickest) stripe that does not touch the one below itself is referred to as the index stripe, and its notch number is the Anti-Sag Index of the paint.
- (4) For a more precise Anti-Sag Index, add to the index stripe number the product of the post-index clearance step and the fractional degree to which it has failed to merge with the next lower stripe.

The fraction is estimated in accordance with the following table:

Degree of Merger	Fraction Unmerged
Complete	0
Somewhat more than half	0.25
Approximately half	0.50
Somewhat less than half	0.75

E. Practical Interpretation of Ratings

This is empirical and strongly subjective. It should be emphasized that the Anti-Sag Index is not a wet film thickness; it is the clearance of the index groove expressed in mils, and as such, approximately twice the wet film thickness of the index stripe with emphasis on approximate. Neither the Anti-Sag Index nor the estimated corresponding wet film thickness is to be construed as calling for a specific thickness in practice. It is solely a numerical comparator and acquires practical significance only on the basis of experience. When a coating is perceived as having optimum sag resistance by actual application, the Anti-Sag Index is then measured and thereafter becomes the sag control value for that particular formulation.

The correct Anti-Sag Index for one product might be quite different than for another. Latex paints, for example, would normally have much higher index values than solventborne coatings. The following qualitative judgements were based on observations of a series of trade sales type alkyd gloss enamels, and are given here as examples only. They are not to be considered as definitive.

Anti-Sag Index	Sag Resistance
3	Very Poor
4	Poor
5	Poor-Fair
6	Fair
7	Fair-Good
8	Good
10	Very Good
12	Excellent

The above indices cover the range of the Standard Anti-Sag Meter, but many coatings require lower or higher index measurements. These requirements are met with Low, Medium, and High Range instruments, making it possible to measure Anti-Sag Index values from 1 to 60. See Page 24 for range descriptions.

11. Leveling Test Procedure ASTM Method D 4062

A. Equipment

- (1) The Leneta Leveling Test Blade, LTB-2
- (2) Drawdown Levelness Standards, LS-2
- (3) Leveling Test Drawdown Plate, DP-2
- (4) Drawdown Charts
Form WB, for light colored paints
Form 7B for dark colored paints
- (5) Catch-Papers, Form CP-2
- (6) Pre-shear equipment, Page 36

B. Preparation of Coating

- (1) Stir thoroughly and adjust to 23°C (73°F).
- (2) Strain and adjust viscosity if necessary.
- (3) Pre-shear in accordance with one of the methods described on Page 36 and test immediately thereafter.

C. Application of Coating

- (1) Position a Catch-Paper on the drawdown plate.
- (2) Place a chart on the drawdown plate against the left guide.
- (3) Place the test blade at the top of the chart with its long arm against the left guide and toward the operator.
- (4) Place 8-10 mL of pre-sheared coating in front of the blade and drawdown rapidly at a uniform rate of approximately 60 cm (2 ft) per second.
- (5) Allow to dry in a horizontal position at 23°C (73°F).

D. Rating the Drawdown

- (1) After drying, cut out a 3 x 5 inch (75 x 125 mm) section, with striations parallel to the long edge.
- (2) Compare with Leneta Levelness Standards under suitable oblique light.
- (3) The number of the matching standard is the Leneta Drawdown Leveling Value. Rate perfect leveling as 10 and less than 1 as 0.

E. Practical Significance of Numerical Values.

This is based on subjective evaluations. The following table represents the collective judgement of an experienced laboratory group:

Drawdown Value	Brushout Leveling
1	Very Poor
2	Very Poor
3	Poor
4	Poor
5	Poor-Fair
6	Poor-Fair
7	Fair
8	Fair-Good
9	Good

Appendix (continued)

12. Pre-Shear Equipment

Practical methods for applying coatings develop high shear rates and stresses that strongly influence the degree of sagging and leveling. Since drawdown blades for measuring these characteristics develop relatively low rates of shear, they require that coatings be "Pre-Sheared" to simulate practical application.

This can be accomplished by rapid mechanical mixing or by forcing the liquid through a suitable hypodermic syringe and needle. In general the former is advisable with solvent type and the latter with aqueous coatings. Following is a description of specific equipment and procedures that have been found satisfactory in connection with ASTM Method D 4400 on Sag Resistance and ASTM Method D 4062 on Leveling.

1. Solvent Coatings -

Pre-Shear by Rapid Mixing

A. Equipment:

- (1) Power mixer.
- (2) **Item PS-1**, Circular paddle, 48 mm diameter,
- (3) **Item PS-2**, Mixing Can, 52 mm diameter,

B. Procedure:

- (1) Stir coating thoroughly. Strain if necessary.
- (2) Fill the mixing can approximately half.
- (3) Attach the mixing paddle to the rotary mixer.
- (4) Position paddle about 1/4 in (6mm) from bottom of can.
- (5) Mix 1 minute then promptly place about 8 mL of paint in front of the drawdown blade.

2. Aqueous Coatings -

Pre-Shear with Syringe and Needle

A. Equipment:

- (1) **Item PS-3**, 10 mL Luer-Lok plastic syringe,
- (2) **Item PS-5**, 15 gauge Luer-Lok blunt syringe needle, 1.4 mm I.D., 38 mm long,
- (3) **Item PS-6**, Vinyl tubing, 1/8 in (3.2 mm) I.D.,

B. Procedure:

- (1) Stir coating thoroughly. Strain if necessary.

- (2) Cut a 2 in (50 mm) length of tubing and attach to syringe.
- (3) Press the syringe plunger firmly to expel air. Dip the end of the extension tube into the coating, pump slightly to expel remaining air, then withdraw 8 mL of coating.
- (4) Remove extension tubing and attach a syringe needle.
- (5) Eject the contents of the syringe in front of the applicator speedily, employing steady and strong pressure.

The PS-8 Pre-Shear Sample Kit includes the following:

1 each	Item PS-1	Paddle
1 each	Item PS-2	Mixing Can
1 each	Item PS-3	Syringe
10 each	Item PS-5	Syringe Needle
10 feet	Item PS-6	Vinyl Tubing

13. Leneta Products Used in ASTM Standards

(Note: Numbers in bold are Leneta Form or Part numbers. Numbers in parenthesis are the pages where that product can be found.)

Note: * Represents additional letters or numbers to identify two or more related products.)

D 344 Relative Hiding Power of Paints by Visual Evaluation of Brushouts

ASTM Volume 06.01

Product Code: **8H(6), 10H(8)**

D 1653 Water Vapor Transmission of Organic Coating Films

ASTM Volume 06.01

Product Code: **NWK(10), RP-1K(20)**

D 2370 Tensile Properties of Organic Coatings

ASTM Volume 06.01

Product Code: **RP-1K(20)**

D 2486 Scrub Resistance of Wall Paints

ASTM Volume 06.02

Product Code: **P121-10N(22), SC-2(23)**

D 2805 Hiding Power of Paints by Reflectometry

ASTM Volume 06.01

Product Code: **GB-2A or B(20)**

D 3258 Porosity of Paint Films

ASTM Volume 06.02

Product Code: **ST-31(23)**

D 3450 Washability Properties of Interior Architectural Coatings

ASTM Volume 06.02

Product Code: **P121-10N(22), SC-1(23), ST-1(23)**

D 3928 Evaluation of Gloss or Sheen Uniformity

ASTM Volume 06.02

Product Code: **R6-1224(18)**

D 4062 Leveling of Paints by Draw-Down Method

ASTM Volume 06.02

Product Code: **WB(9), CP-2(24), LTB-2(25), DP-2(25), LS-2(25), 7B(25)**

D 4147 Applying Coil Coatings Using a Wire-Wound Drawdown Bar

ASTM Volume 06.02

Product Code: **WC-*(31)**

D 4213 Scrub Resistance of Paints by Abrasion Weight Loss

ASTM Volume 06.02

Product Code: **P121-10N(22), SC-1(23)**

D 4400 Sag Resistance of Paints Using a Multinotch Applicator

ASTM Volume 06.02

Product Code: **WB(9), WM(9), ASM-*(24), 7B(24), CP-1(25), SE-1(30), DP-1(30)**

D 4708 Preparation of Uniform Free Films of Organic Coatings

ASTM Volume 06.01

Product Code: **RP-1K(20)**

D 4828 Practical Washability of Organic Coatings

ASTM Volume 06.02

Product Code: **P121-10N(22)**

D 4941 Drawdowns of Artist's Paste Paints

ASTM Volume 06.02

Product Code: **2A(4), 2C(4)**

D 4946 Blocking Resistance of Architectural Paints

ASTM Volume 06.02

Product Code: **WB(9)**

D 5007 Wet-to-Dry Hiding Change

ASTM Volume 06.02

Product Code: **TG19(21), 23B(21)**

D 5068 Preparation of Paint Brushes for Evaluation

ASTM Volume 06.02

Product Code: **8H(6)**

D 5150 Hiding Power of Architectural Paints Applied by Roller

ASTM Volume 06.02

Product Code: **CU-1M(12)**

D 6441 Hiding Power of Powder Coatings

ASTM Volume 06.02

Product Code: **T12G(26), T12M(26)**

D 7377 Water Wash-Off of Traffic Paints

ASTM Volume 06.02

Product Code: **P121-10N(22)**

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