

## PRODUCT CRITERIA

Product damage can be any condition which causes the product not to meet its performance specifications. It includes both structural and cosmetic damage which makes the product unacceptable to the customer. It is recommended that the same standards for final inspection during manufacturing be used to determine acceptable levels of cosmetic damage.

### General acceptance criteria are as follows



Product shall be damage-free; no structural damage including no detached, loose, fractured or deformed materials beyond allowable manufacturing tolerances.



Product cosmetic areas shall not be degraded beyond manufacturing or final acceptance criteria.



The product shall meet all functional and manufacturing specifications and tolerances after testing.

## PACKAGING CRITERIA

The packaging purpose is to absorb or modify the energy imparted by the distribution environment and to protect and preserve the product in its original undamaged condition. Some packaging degradation is expected and is acceptable.

### General acceptance criteria are as follows

**01**

Product shall be in its intended position within the primary package.

**06**

Cushioning material shall be intact and in its original position.

**02**

Primary package shall be free of scuffing and scratches visible from 2ft (0.61 m) away or farther.

**07**

Plastic packaging parts shall not be chipped or cracked.

**03**

Primary and master packaging shall be free of any tears and holes.

**08**

Paper based materials shall not delaminate or show any sign of separation.

**04**

Master shipper shall not have permanent buckling or creasing resulting from compression test.

**09**

Labels shall not be peeling, lifting, or bubbling.

**05**

Glue joint shall be attached the entire distance of the joint.

# COLOUR MANAGEMENT & STANDARD

Colour inspection Discrepancies should be to Delta  $\Delta E$  2 and are to be measured with selective setting of colour measurement spots. An additional alarm and discharge criterion is colour consistency of a configurable sharpness and in freely selectable areas.

Colour measuring spots can also compare different areas of the print.

Spectrophotometric color measurement system for CMYK (process colors) and spot colors.

Standard level should be 90 percent or above. Acceptance tolerance level is 85% or above.

Spectral measurement for accurate results. In addition to the polarized density and halftone values for CMYK, the printer obtains unpolarized colorimetric CIE Lab values, the color deviation  $\Delta E$ , and slurring and doubling details. It is also indicated if the required color shade can be produced with the actual ink in the fountain. This eliminates potential complaints even before printing starts.

## PRINTING INSPECTION AND TESTING PROCEDURES

Print rub/scuff resistance/adhesion tests

This practice also can be used to evaluate the relative abrasion resistance of printed inks, coatings, laminates, and substrates.

### Scope

- 1** This practice covers a procedure for determining the abrasion resistance of printed materials using the Sutherland Rub Tester, or its equivalent, equipped with full-width rubber pads and using standardized receptors
- 2** This practice is applicable to labels, folding cartons, corrugated boxes, inserts, circulars, and other packaging materials having applied graphics on a flat substrate.

Application	Surface Condition	Number of Strokes	Note
Sheet feed off-set	Ink	100	The countering surface for the test can be blank paper or the printed image of the adjacent sheet. The double values for stokes indicate a second round of testing for cases in which test pieces show no difference or no rateable impact.
	With oil base varnish	100	
	With water-base coating	500	
	With UV varnish	500+500	
Heatset/Coldset	Ink	200	
UV	UV ink	500	
	With UV Varnish	500	

Analysis is performed visually, using a comparative rating score:

	With varnish or coating	Without varnish (pigmented surface)
5=	No abrasion	No change of color
4=	Little abrasion	Little change of color
3=	Visible abrasion	Visible change of color
2=	Strong abrasion	Strong change of color
1=	Very strong abrasion	Severe change of color

Note: In case of too little differences in result, optical density can be added as assessment criterion.

## REGISTRATION ACCURACY/UNIFORMITY

	Die cutting (critical dimensions)	Printing (graphics & copy)	Spot UV / Varnish	Hot Stamp
Acceptable tolerance	+/- 0.50~1.00mm	+/- 0.20~0.50mm	+/- 0.20~0.50mm	+/- 0.20~0.50mm

Note: Acceptable tolerance might differ, depending on the product types and should be agreed upon with the supplier prior to mass production.

**Colorimetric accuracy/consistency of tones and shades (compared to reference colour samples)**

## RESISTANCE TO FADING (ACCELERATED AGING TEST)

### Paper products:

Many packages and labels fade after a short period of being exposed to light, which may be due to a lack of UV inhibitor used in the ink. We can perform fade resistance tests that will show whether or not your material will fade and how long it will take.

Accelerated color fastness testing can be performed on any wood pulp product like paper labels, card board packaging, wall paper, and other items.

\*ASTM E308-08 "Computing the colors of objects using the CIE system"

### Scope

This test method describes a laboratory procedure for accelerating the aging of printing and writing paper within sealed glass tubes or container through exposure to elevated temperature within an oven near 50 degrees.

This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

# BARCODE SCANNING

Barcode scanning and inspection on packaging should be conducted at the following stages:



Print proofs



First article inspection  
(Press Check)



Mass production  
(before pack out)



Note: Barcode level should be level B or above.

## RAW MATERIAL TESTING (MSDS/REACH/ROHS)

Anvyl's would accept supplier's submission from a qualify lab (third party) testing report regarding to raw material's MSDS, REACH, ROHS and others (within 12 months). If needed to, Anvyl may conduct our own third-party testing, if there are different standards or deviation.

## CLASSIFICATION OF GENERAL COSMETIC DEFECTS FOR PACKAGING

Quality defects may be classified by the purchaser, according to chosen criteria and surfaces, as follows:

Surface	Criteria	Acceptance Levels/Types
<b>A</b>	Areas most prominent to the observer or most likely to be noticed at first glance which may include a top surface adjacent to a front surface	Defect has demerit of less than one point. Appearance of packaging is somewhat impaired, technical functions are not affected.
<b>B</b>	Areas not visible except by special effort by the observer under normal conditions.	Defect has demerits of two to five points. Appearance of packaging is somewhat impaired, technical functions are not affected.
<b>C</b>	Areas normally not seen by observer or those not seen except by disassembly.	Defect has demerits of five or above points. Appearance of packaging is somewhat impaired, technical functions are not affected.

# Procedure - Visual Inspection Method

Viewing distance is "arm's length" or about 24-28 inches (60-70 cm), "waist high" or about 26-30 inches (66-76 cm) from the floor. The viewing area should be well lite, and when judging colors, the use of a Light Booth is recommended. Illumination should be D50 light - cool white fluorescent illumination, without shadow at 115 + 15 foot-candles (1235 + 160 lux).

View the part for a total inspection time of three (3) seconds for "A" surfaces and an additional two (2) seconds for the remainder of the part, using a clean white background.

Parts shall be held with a white cotton glove and only a brief glance should be given to any area.

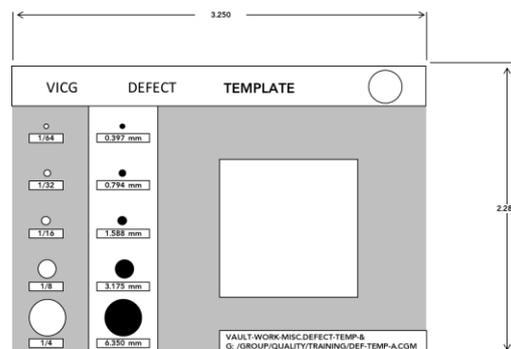
Once a potential defect has been detected, closer examination is allowed to appropriately classify the type and degree of severity per Table 1. Only then can the potential defect in question be considered a defect. If a defect is identified, then the final, installed orientation should be considered in determining pass / fail.

As a standard repeatable method, the Allegion Visual Inspection Light Booth provides the environment for visual inspection and is used for final verification and determination, in the event that further review is needed or in the case of First Article inspection.

Defect	"A" Surface	"B" Surface	"C" Surface	Notes
Dirt, Scratches, Scuffs	Allowed only if not visible after normal cleaning	0 > 0.50" long or 0.10" wide (12.7 mm L x 2.5mm W)  2 < 0.50" long or 0.10" wide in 1 Sq. In (2<12.7mm L x 2.5mm W in 6.5 sq. cm)	Allowed	Defects which are removed by the supplier and are invisible after finishing, may be accepted.
Text punched/ Foil chip	Not Allowed	Allowed if not larger than 1mm or	Allowed if not larger than 2mm	
White, Black dots	Allowed only if not visible after normal cleaning	0.397 > 1.544mm diameter	Allowed 0.397 > 3.175mm diameter	Defects which are removed by the supplier and are invisible after finishing, may be accepted.
Wrinkles	Not Allowed	Qty 2 (Max) per 50 Sq."Area Max Dim: 0.06" Dia. x .010"	Qty 4 (Max) per 50 Sq." Area Max Dim: 0.06" Dia. X .010" DP	

# Procedure - Visual Inspection Method

Mark/Pits	Allowed only if not visible after normal cleaning	Qty 4 (Max) per 50 Sq." Area Max Dim: 0.06" Dia. x .010"	Allowed	
Letters partially missing or smeared	Not Allowed	Allowed only if not visible after normal cleaning	Allowed only if not visible after normal cleaning	
Colour smearing and stains	Not Allowed	Allowed only if not visible after normal cleaning	Allowed only if not visible after normal cleaning	
Print definition/ clarity/ legibility	Not Allowed	95%	No less than 90%	dpi should be over 300 pixel



## Statements of Consideration for Marginal Defects

- ✓ Only a brief glance should be given to any area, it should be no longer than 10 seconds. This is a common violation,
- ✓ especially with those unfamiliar with the intent of this guideline.
- ✓ The function of the component in the final product must always be considered during review of defects.
- ✓ Sound practical judgment and consideration of the customer's perception should be used in evaluation of all defects.
- ✓ Defects may be larger than specified if there is little or no contrast with the surrounding finish making the blemish less noticeable.
- ✓ Defects may be closer together than specified if they are in an area broken by holes or other surface features.
- ✓ Generally, the probability that at least one defect will be detected rapidly increases with the number of defects present.

# PALLET REQUIREMENTS

## Pallet category / type:

- ✓ GMA Class 1 wood pallet - 40" x 48" wood pallet
- ✓ 4-way wooden pallets (fork lift can enter on all four sides)
- ✓ No chipboard pallets
- ✓ No broken pallets

## Height Requirements

- ✓ All palletized shipments cannot exceed 1.6 meters (not included pallet height), with no overhang

## SAMPLING PLAN

- ✓ Sampling plan detailed below shall be used by Anvyl's or its designated inspection service to determine lot acceptability.
- ✓ If the volume of the lot is more than one container, random sample from each container shall be drawn so that it represents the lot.
- ✓ One item of a sample is one unit package which may contain multiple pieces.
- ✓ Visual Inspection shall be performed per ANSI/ASQ Z 1.4, General Level II, with 0.1 AQL for critical defects, 1.0 AQL for major defects and 2.5 for minor defects.

**Table 1 Appearance Inspection Sampling Plan (ANSI/ASQ Z 1.4, General Level II) \*(Ac: Acceptable Re: Reject)**

Lot Quantity	Sample Size	Critical Defect Acceptance Quality Limit 0.1		Major Defect Acceptance Quality Limit 1.0		Minor Defect Acceptance Quality Limit 2.5	
		Ac	Re	Ac	Re	Ac	Re
501-1200	80	0	1	2	3	5	6
1201-3200	125	0	1	3	4	7	8
3201-10000	200	0	1	5	6	10	11
10001-35000	335	0	1	7	8	14	15
35001-150000	500	0	1	10	11	21	22

<b>Defect Grade</b>	<b>4 Target</b>	<b>3 Minor (Acceptable)</b>	<b>2 Major (Marginal)</b>	<b>1 Critical (Unacceptable)</b>
<b>General Description</b>	Zero visual defects. Quality as designed	AQL 4.0 Print registration < ±1/64" per color Colors within ±2.0 ΔE	AQL 1.0 Print registration > ±1/64" per color Colors > ±2.0 ΔE Missing print in copy – major section from one letter, or small section from 2 or more letters	AQL 0.0 – 0.25 per specific defect Missing/unreadable print in health, safety, regulatory or legal copy. Wrong copy.
<b>Consumer Criteria</b>	Meets or exceeds consumer expectations.	Meets or exceeds consumer expectations Not noticeable to consumer Does not negatively affect purchase	May not completely satisfy consumer or customer expectations Not acceptable on an on-going basis	Noticeable and objectionable Does not satisfy Consumer expectations Consumer may not purchase brand again
<b>Manufacturing Action</b>	Maintain quality level Continue to produce and ship	Maintain quality level Monitor and make appropriate Adjustments Continue to produce and ship	Determine root cause and correct immediately. If production must continue to resolve the root cause, produce and ship according to the following: Marginal product may be produced for up to one additional sampling period (1 hr.) while attempting to correct the problem	Determine root cause and correct immediately. Do not continue to produce product for shipment. All production since the last quality check must be placed on Hold, and released by the following procedures, until quality is at least MINOR/ACCEPTABLE.

Defect Grade	4 Target	3 Minor (Acceptable)	2 Major (Marginal)	1 Critical (Unacceptable)
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**Manufacturing Action (cont'd)**

If quality is not at least Minor/Acceptable before the next sampling period, stop production until corrected. Sample production of product on Hold following MIL-STD105D, Single Sampling General Inspection level II, AQL 0.25

Exception – In the case of urgent production needs, production may continue, subject to 100% inspection and sorting, until quality returns to Minor/Acceptable

Sample production of product on Hold following MIL-STD105D, Single Sampling General Inspection level II, AQL 0.25

# RELIABILITY TEST REQUIREMENT

## Plastic bottle:

The plastic bottles as primary packaging must pass common reliability tests as follow. Take 5~8pcs standard samples for each test. If one sample does not meet the Acceptance Levels/Types within the test, it would be regarded as Failure for the test.

	Criteria	AcceptanceLevels/Types
<b>Vacuum Test</b>	Filling enough water to required capacity, matching with cap, put into vacuum chamber and pumping air pressure to -0.06 ~ -0.08Mpa, pressure maintaining 5~6mins.	The cap and bottle neck/screw without water leakage
<b>Inverted Test</b>	Filling enough water to required capacity, matching with cap, invert the bottle and maintain 48H.	The cap and bottle neck/screw without water leakage.
<b>Print Adhesion Test (Printed products)</b>	Use 25mm size 3M 810 adhesive tape to paste on the printed text or pattern (the tape can't wrinkle) and press it to make it close contact with the test surface. After 10 minutes, pull up quickly while the adhesive tape and the printing surface should be in the direction of 45 degrees	Visual inspection of the printed and pattern surface of the product without ink discoloration, printing color does not change; test adhesive tape surface is clean, no residual surface ink and impurities.
<b>Drop Test</b>	Filling enough water to required capacity, matching with cap, drop 3 times from the height of 1~1.2m.	Without cracks on the bottle, no water flows out.
<b>Low Temperature Test</b>	Filling enough water to required capacity, matching with cap, place in the freezer at zero degree Celsius for 24H, require the sample to achieve complete freezing state.	Without rupture, deformation, discoloration

	Criteria	AcceptanceLevels/Types
<b>High Temperature Test</b>	Filling enough water to required capacity, matching with cap, place in the thermostat at 45~48 degree Celsius for 48H	Without rupture, deformation, discoloration.
<b>Pull Test (Flip cap or Covering cap only)</b>	Using the tensimeter to measure the force needed to remove the cover or open the lib.	Meet the spec requirement.

**Note:**

Test standard parameters can be customized using supplier standards or national standard. The reliability test report should be provided for every batch of product.

**Carton Box:**

The secondary packaging(e.g. carton box) should provide basic protection for the main product. The necessary reliability test items depend on specific main product and customer’s demand. Following are the common basic reliability tests and criteria.

	Criteria	AcceptanceLevels/Types
<b>Print Adhesion Test (Printed products)</b>	Use 25mm size 3M 810 adhesive tape to paste on the printed text or pattern (the tape can't wrinkle) and press it to make it close contact with the test surface. After 10 minutes, pull up quickly while the adhesive tape and the printing surface should be in the direction of 45 degrees.	Visual inspection of the printed and pattern surface of the product without ink discoloration, printing color does not change; test adhesive tape surface is clean, no residual surface ink and impurities.
<b>Alcohol resistant test (Printed products)</b>	After thoroughly infiltrating the 15*15mm white clean cloth with 99% pure alcohol, use a certain force (about 1-3Kg) to wipe the text or pattern on the surface around 20 times.	Visually inspect the surface of the printed or the pattern surface without any color blurring and lightening.

	Criteria	Acceptance Levels/Types
<b>Ink Friction Resistance Test (Printed products)</b>	<p>For the sample to be tested, the cut length is 20cm and the width is 8cm. Paper pattern should be the same as that of the contrast paper. Then the contrast paper with length of 19cm and width of 5.1cm should be loaded with 4 pounds of weight. Place the test sample on the tester and set the test parameters. In the absence of clear customer requirements, the standard parameters are set to 4 pounds 43 times per minute and run 400 times.</p> <p>The above tests should be carried out according to different surface process, e.g. four pounds and 100 times for dumb oil process, four pounds and 200 times for semi-gloss and semi-dumb oil process, and four pounds and 400 times for UV oil process.</p>	<ol style="list-style-type: none"> <li>1. OK for slight but not deep scratches on the surface, and no deinking. NG for the surface is severely scratched and deinked after friction.</li> <li>2. To those surface with wear resistant varnish: run 100 times test of 43 times per minute; OK for no deep scratch on the surface of the sample, no decolorization.</li> </ol>
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	Criteria	AcceptanceLevels/Types
<b>Aging Test</b>	High temperature and high humidity: temperature: 600 degrees Celsius, humidity: 90%, test 48H. Low temperature test - 20 degrees Celsius, test 12H or rigorous test 24H. Or according to customer requirements.	The color of the product is not faded, the product has no obvious deformation, and there is no obvious opening or cracking at the adhesive.
<b>Transportation Simulation</b>	Test frequency 100-150 cycles/minute, amplitude 5cm, test time 2 or 4 hours. Or according to customer requirements.	No scratches or damage on the surface
<b>Drop Test</b>	Drop test usually loads products or fillers of equal weight with products according to the requirements of terminal shipment. Drop test methods are free fall of one corner, three edges and six sides. Drop height is determined by the weight of products. It is divided into 90cm, 76cm and 65cm grades.  Weight of packaged goods (lbs)/(kg) drop height (inches)/(cm) 1-20.99lbs/(0.45 9.54kg),30inc/(76.20cm) 21-40.99lbs/(9.55 18.63kg),24inc/(60.96) 41-60.99lbs/(18.64- 27.72kg),18inc/(45.72) 61-100lbs/(27.73- 45.45kg),12inc/(30.48)  Or drop mode according to ISTA 2A requirements.	Meet ISTA 2A standards
<b>Break Test (Corrugated box)</b>	Generally for corrugated boxes and cardboard. Using the burst tester for testing, test 5 groups, take the average result. Test standards according to ISTA 2A requirements.	Meet ISTA 2A standards
<b>Compression test (Corrugated box)</b>	Generally for corrugated boxes, test with a pressure tester, test 5 groups, take the average result. Test standards according to ISTA 2A requirements	Meet ISTA 2A standards

**Note:**

Test standard parameters can be customized using supplier standards or ISTA 2A standards. The reliability test report should be provided for every batch of product