Corrosion Evaluation Legend

Henkel's Accelerated Testing reports use industry standard rating scales. This legend provides detailed information on some of the rating scales used to prepare your report. Where differences exist we have noted them.

Rating standards referenced:
ASTM D1654, GM 9102P,GMW 15282, ASTM D714, ASTM D610,

Any deviations to these published standards are noted in our internal work instructions. Any edge evaluations will be agreed upon. Exceptions to these evaluation techniques will be noted.

Evaluating Corrosion Creepage

Referencing ASTM D 1654 (Measured from scribe to unaffected paint)
Referencing GM 9102P (Measured across scribe from unaffected paint to unaffected paint)
Lab will default to ASTM creepage evaluation methods for ASTM tests, GM creepage evaluation methods for GM tests, etc.
Referencing GMW15282 (Calculated by determining max creep on right and left side of scribe, and adding values together)
Referencing TS H1552G (Measured across scribe from unaffected to unaffected paint, and divide creepage by two)

ASTM	Mean Creepage (mm)	ASTM	Mean Creepage (mm)
10	0.0	5	3.0-5.0
9	0.0-0.5	4	5.0-7.0
8	0.5-1.0	3	7.0-10.0
7	1.0-2.0	2	10.0-13.0
6	2.0-3.0	1	13.0-16.0
		0	16.0+

Referencing TS H1552G

Grade Scale for Corrosion Spots (Blisters and/or Rust)

Corrosion Evaluation	No. of Corrosion Spots (blisters and/or rust spots)
0	0
0.5	1 to 4
1.0	5 to 8
1.5	9 to 12
2.0	13 to 16
2.5	17 to 20
3.0	21 to 24

The Grade evaluation for each sample is determined by adding the max creep value with the corrosion evaluation.
Note: Where more than 24 corrosion spots of ≥0.5mm in diameter exists, it will be reported at >3.

SCALE and DESCRIPTION of BLISTER and RUST GRADES

All field evaluations will reference ASTM methods and will be provided for most tests.

Referencing ASTM D714

ASTM size	Blister Frequency Rating	Approx. # of Blisters*
0-10	F - Few	1-19
	M – Medium	20-249
	MD – Medium Dense	250-400
	D – Dense	400+

Numeric rating decreases as blister size increases, where 10 = NONE.
An actual count is more elaborate than necessary.

Referencing ASTM D610

Rust Grade	Description	Rust Grade	Description
10	0 to<0.01%	5	3%
9	<0.03%	4	10%
8	<0.1%	3	~17%
7	<0.3%	2	~33%
6	<1%	1	~50%
		0	>50%

G= General; S= Spot(s); P= Pinpoint; H= Hybrid

Additional Phrases:
LP = Large Patch; SC = Small Cluster

Physicals Legend

Henkel's Accelerated Testing reports use industry standard rating scales. This legend provides detailed information on some of the rating scales used to prepare your report. Where differences exist we have noted them.

Rating standards referenced:
GM9071P, GMW 14829 and Ford BI 106-01

TAPE ADHESION TESTS

Based on photographic representations, below are numeric estimations

Referencing GM 9071 P

Method A or B	Method B (% remaining including applicable alpha code)	
% Remaining	Delamination Code	Type of Removal
100%	A	Paint removed along knife cut evenly.
>99%	B	Paint removed in the "V" section of the knife cut.
>95%	C	Paint removed in a "Patch not Touching" knife cut.
85-95%	D	Paint removed in a "Patch Touching" knife cut.
65-85%		
35-65%		
<35%		

Referencing GMW14829

Rating	Description
0	The edges of the cuts are completely smooth, none of the squares of the lattice is detached.
1	Detachment of small flakes of the coating at the intersections of the cuts. Across cut area of 5% max is filled.
2	The coating has flaked along the edges and/or at the intersections of the cuts. Across cut area of 15% min.
3	This coating has flaked along the edges of the cuts partly or wholly in large ribbons, and/or it has flaked partly or wholly on different parts of the squares. Across cut area of 15% minimum but 35% maximum is affected.
4	The coating has flaked along the degrees of the cuts in large ribbons and/or some squares have detached partly or wholly. Across cut area of 35% minimum but 65% maximum is affected.
5	A cross-cut area of >65% is affected.

Referencing Ford BI 106-01

Rating	Description	Rating	Description
Grade 0	0% Removed	Grade 5	Approx. 20% removed
Grade 1	Less then 5% removed	Grade 6	Approx. 25% removed
Grade 2	Approx. 5% removed	Grade 7	Approx. 45% removed
Grade 3	Approx. 10% removed	Grade 8	Approx. 60% removed
Grade 4	Approx. 15% removed	Grade 9	Approx. 75% removed
		Grade 10	Approx. 95% removed

Physicals Legend (cont.)

Henkel's Accelerated Testing reports use industry standard rating scales. This legend provides detailed information on some of the rating scales used to prepare your report. Where differences exist we have noted them.

Rating standards referenced:
ASTM D3359, Toyota TSH1503G, ASTM D3363

TAPE ADHESION TESTS

Based on photographic representations, below are numeric estimations

Referencing ASTM D3359

Method A		Method B	
Rating	**Removal of Coating**	**Rating**	**% Removed**
5A	No Peel	5B	0%
4A	Trace Peel	4B	<5%
3A	Jagged Removal (1.6mm)	3B	5-15%
2A	Jagged Removal (3.2mm)	2B	15-35%
1A	Removal of most of "X"	1B	35-65%
0A	Removal beyond "X"	0B	>65%

Referencing Toyota TSH1503G
X Cut Method

Grade	Condition of X-cut
10	No peeling noted at all
8	No peeling noted at the intersection, but slight peeling noted on the legs of the X cut
6	Peeling within 1.5 mm in either direction from the X cut intersection
4	Peeling within 3.0 mm in either direction from the X cut intersection
2	Peeling noted in most portions of the X cut, including the intersection area and the legs
0	Area larger than the X cut peeled away

Referencing Toyota TSH1503G
Cross cut method

Report the number of squares with a 50% or greater loss of adhesion over the total number of squares (ie. 27/100 indicates that 27 squares had a minimum of 50% delamination).

PENCIL HARDNESS

Referencing ASTM D 3363

Softest ... Hardest

6B 5B 4B 3B 2B B HB F H 2H 3H 4H 5H 6H

Physicals Legend (cont.)

Henkel's Accelerated Testing reports use industry standard rating scales. This legend provides detailed information on some of the rating scales used to prepare your report. Where differences exist we have noted them.

Solvent Rub
Referencing GMW15891

Rating	Paint Surface	Paint on Cloth
0	No change	None
1	Slight - barely observable	Trace amount
3	Moderate - readily noticeable	Readily noticeable
5	Severe - very obvious	Saturated with color

Gravelometer Legend

Referencing SAE J400 (Rev. Oct. 2012) Method II

This rating system consists of one or more number-letter combinations. Number rating 10 – 0 indicates the number of chips and letter A – D designates the size of the corresponding chips. Samples are evaluated by performing a visual comparative analysis to the photographic transparencies of photos included within SAE J400. When the report contains multiple results for one sample, the results are in the order of occurrence from lowest rating number assigned to the highest.

For Example: 5B, 6A, 8C

5B, 6A, 8C indicates that there were 25-49 chips in the 1-3 mm diameter range, 10-24 chips in the less than 1 mm diameter range, and 2-4 chips in the 3-6 mm diameter range.

Rating Number	Number of Chips	Rating Number	Number of Chips
10	0	4	50-74
9	1	3	75-99
8	2-4	2	100-149
7	5-9	1	150-250
6	10-24	0	>250
5	25-49		

Rating Letter	Size of Chips
A	<1 mm
B	1 – 3 mm
C	3 – 6 mm
D	>6 mm

NOTE: No attempts will be made to identify at which layer adhesion failures occur. For more specific failure analysis, customers must resubmit to the Henkel Analytical Laboratory for special "failure analysis" of a failure example.

Gravelometer Legend (cont'd.)

Referencing GMW14700

This rating system consists of more than one evaluation. Table 1 is used to determine a diameter rating. Diameter rating is determined by averaging the maximum diameter size of the largest representative chip then dividing the sum of the diameter of the chip both lengthwise and widthwise by two (ie. D1+D2/2). This evaluation is performed on both substrate chips and surface chips.

Panel Rating

Table 1

Failure Mode Rating	**10**	**9+**	**9**	**8**	**7**	**6**	**Poor**
Substrate Chips	No Chips and No Surface Marks	None	≤1.0 mm	NA	>1.0 - 1.5 mm	>1.5 - 2.0 mm	>2.0 mm
Surface Chips		Surface Marks only < 1.0 mm	1.0 mm	>1.0 - 1.5 mm	>1.5 - 2.0 mm	NA	>2.0 mm

The chip frequency is determined for both panel substrate and panel surface based on Table 2.

Chip Frequency

Table 2

Actual Number of Chips	Chip Frequency Rating
0	0
1	1
2	2
3	3
4	4
5	5
6 to 10	Low
11 to 25	Moderate
> 25	High

NOTE: Other than substrate or surface, no attempts will be made to identify at which paint layer adhesion failures occur. For more specific failure analysis, customers must resubmit to the Henkel Analytical Laboratory for special "failure analysis" of a failure example.