# TEST FOR EVALUATING PAINT FILM DISTINCTNESS OF IMAGE
## GM9101P

Figure 1.) These numerical values are used to evaluate the DOI quantitatively.

3.4.2 Readings should be made for the left half of the chart from the left side of the DOI meter and for the right half from the right side of the meter. The same angle and distance of observance as stated in 3.3 applies.

3.4.3 Observe the 80 DOI control standard and determine the pattern in which all circles and their openings are seen clearly and distinctly. Observe the next smaller size pattern and its circle openings. If the openings in 1 pattern are all visible but only a few in the next smaller pattern are visible, then the rating should be that of the entirely visible pattern. If on the other hand at least 50% of the smaller size patterns are visible, then a rating halfway between the 2 patterns should be recorded. For example, if a larger well-distinguished pattern with a rating of 80 is entirely visible and the circles in the next smaller pattern (rating 90) are at least 50% visible, then a rating of 85 should be recorded. If on the other hand only a few of the 90 pattern are visible, then the value would still be 80.

3.4.4 Repeat the above quantitative evaluation on the painted surface of unknown DOI.

**4 VALUE NORMALIZATION.** Different observers, as expected, have different degrees of visual acuity. Normalization of the measurements for all observers using the following technique allows correlation of their readings to a common standard resulting in a more uniform basis for reporting:

(a) Unless otherwise specified, the control standard specimen with a designated value of 80 DOI is used. This is important for the first few readings each day and becomes very important when new operators are put on the job.

(b) The differences which are observed between the control standard and an unknown sample will be added arithmetically to the observed value of the measured sample. In this way, the value of DOI is normalized for all observers.

4.1 Numerical examples of normalization procedure are as follows:

(a) DOI Observations:

| Specimen | Designated DOI | Measured DOI Observers No. 1 | Measured DOI Observers No. 2 |
|---|---|---|---|
| Control Standard | 80 | 70 | 90 |
| Unknown Sample | – | 75 | 95 |

(b) Normalization calculation:

Normalized value = Measured DOI for unknown sample plus $\Delta$ DOI.

where $\Delta$ DOI = Designed DOI for control minus observed DOI for control standard.

(c) Examples from above observations:

Observer No. 1 ................. $75+(80-70)=75+(+10)=85$

Observer No. 2 ................. $95+(80-90)=95+(-10)=85$

**5 GENERAL INFORMATION.** This standard was issued in January 1977. The latest revisions include the following:

| Rev. | Date | Description | Div |
|---|---|---|---|
| B | 4/89 | Editorial for CDROM. | CEMESS. |
| C | 9/90 | Editorial. | PMSC |

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**1 SCOPE.** This procedure provides an instrumental method for evaluating the Distinctness of Image (DOI) of automotive paint film surfaces.

1.1 Evaluation of appearance involves the projection of various size images onto a painted surface. The image forming patterns (Landolt rings) as shown in Figure 1 are projected from a fluorescent lighted box at a specified distance of 100 mm over the sample under examination. By assigning a value of 100 to the smallest set of rings and a value of 90, 80, 70, etc. to the next uniformly increasingly larger rings, a rating scale is obtained which can be used to quantitatively evaluate the DOI of the painted surface.

1.2 Due to differences which exist in visual acuity between different operators, it is essential that a control standard and value normalization always be used to standardize the readings.

**2 EQUIPMENT.**

2.1 Glow Box Model GB 11-8 DOI meter with appropriate legs to provide a distance of 100 mm from the lighted surface to the specimen.

2.2 Image forming photographic patterns (Landolt rings) on mylar film supplied by CPC Materials Development and Testing Laboratory.

2.3 Control standard supplied by CPC Materials Development and Testing Laboratory prepared specifically for this test with an assigned value of 80 DOI.

**3 PROCEDURE.**

3.1 Surface to be measured must be clean and free of oil and dirt.

3.2 Measurements should be made in an area where the general lighting does not exceed 800 lux. This is important since too much light could overpower the light source from the DOI meter which would generally result in lower readings.

3.3 Place the DOI meter so that the smallest Image Forming Patterns will be towards the observer. From either side of the instrument, observe the DOI of the panels at approximately 15 to 30 degrees from normal with the eyes at a distance of 250 to 300 mm from the panel. For first readings, place the 80 standard under the meter. Glancing over both the control standard and sample, allow the operator to qualitatively determine if the sample is better or worse than the control. This provides a qualitative or go or no go reading.

3.4 Quantitative Evaluation of DOI.

3.4.1 Adjacent to each size of image forming patterns is a value indicating a rating of 100, 90, 80, etc, through 10. (See
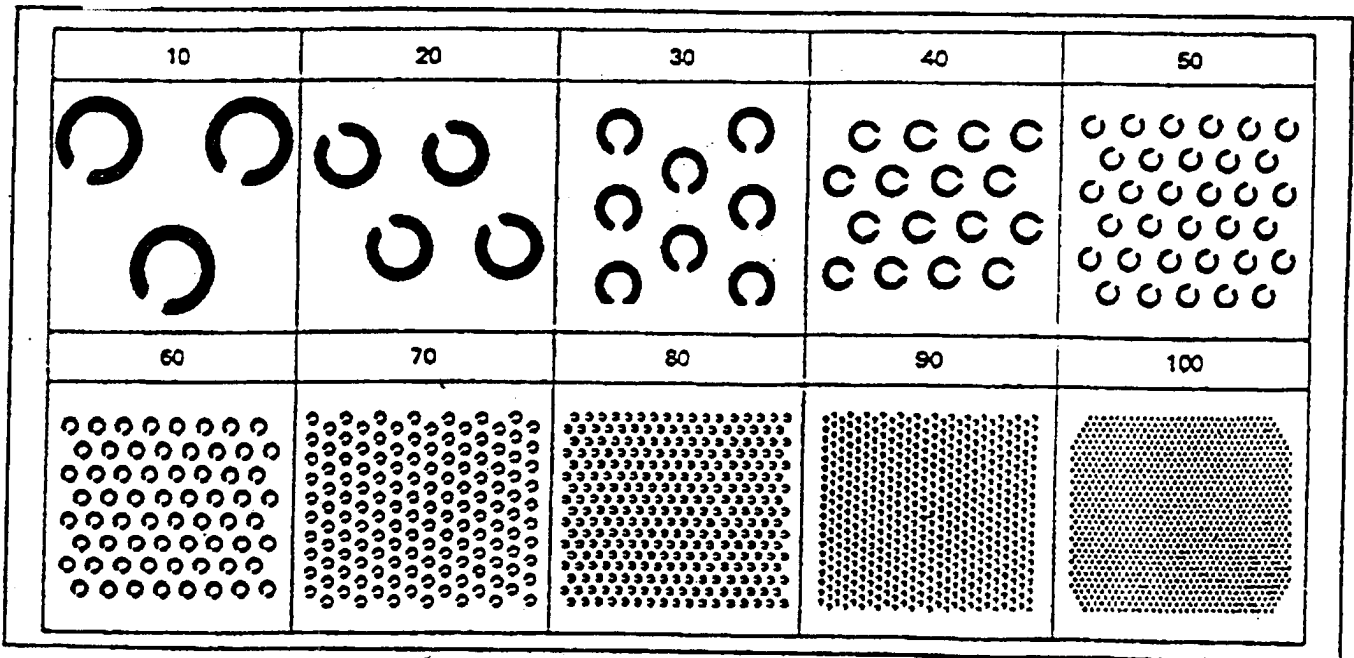


FIGURE 1 – IMAGE FORMING PATTERNS (LANDOLT RINGS)