



COSMETIC REQUIREMENTS

The motorcycles Harley-Davidson manufactures represent a major investment on the part of the buying public. The success of our product depends crucially on its appearance. Our bike owners standards are high, so too are the standards of our internal customers. It is a requirement of all employees as well as our suppliers to produce goods within our current corporate cosmetic standards.

Our cosmetic standards represent a common language and a set of shared expectations about what constitutes acceptable quality at Harley-Davidson today. By acceptable quality, we mean the level of quality we feel represents a realistic balance between stakeholder's expectations, the capabilities of Harley-Davidson's and our suppliers manufacturing processes, and our need to produce motorcycles at a profit. It is important to recognize that our standards represent today's conditions. Continuous improvement is a must. We also recognize that as our technology and the technology of our supplier improves, we can and must improve our quality expectations. Cosmetic issues and concerns have historically caused both Harley-Davidson and its' suppliers problems. Most of these problems can be traced to vague or unknown specifications. While cosmetic issues are to a large degree subjective, Harley-Davidson has incrementally replaced much of this subjectivity with objectivity based on specific requirements.

On the following pages we have included information regarding our:

- Cosmetic Standards Development Process
- Inspection Guidelines
- References

Additional information regarding cosmetic requirements can be found as part of the Production Part Approval Process (PPAP) specifically where use of the Cosmetic Validation Report is discussed. This report is for approval of cosmetic appearance and should be used in conjunction with the part Warrant for obtaining part approval for production.

See *Production Part Approval Process (PPAP)*, Automotive Industries Action Group, (248)358-3003 or contact their internet address at www.aiag.org for additional information.



Cosmetic Standards Development Process

The cosmetic requirements for new parts should be defined during the development process. Both Harley-Davidson and the supplier should be involved in setting the cosmetic standards for the part. All cosmetic standards must be properly documented to ensure consistent understanding of expectations by all stakeholders. The criteria used to establish cosmetic standards are:

- Stakeholders. Expectation of Quality
- Today's Process Technologies / Capabilities
- Total Cost

It is important to note that cosmetic requirements may change during the product life cycle due to changes to any of the criteria listed above. It is expected that the continuous improvement process will help drive our cosmetic requirements to a higher degree of perfection. Any changes to cosmetic requirements will be communicated to suppliers. It is the intention of Harley-Davidson to involve suppliers when revising any cosmetic requirements.

Generally speaking, the cosmetic standard development process can be divided into three basic steps and are further defined below:

1. Define Cosmetic Zones Based on Part Location on Motorcycle
2. Set Cosmetic Zone Standards Based on Surface Finish
3. Define Exceptions to Standards Based on Specific Part Characteristics

Different cosmetics zone considerations may be required for Parts and Accessories .on-theshelf products. This is due to increased visual inspection by the consumer of areas of the part not normally seen or not as visually displayed when mounted on the motorcycle. Examples of these types of parts might be cosmetic covers where the bottom of the part may be zoned as a .B Surface. As mounted on the motorcycle. However, Parts and Accessories may deem the zone as an .A Surface due to the increased visual inspection by the consumer looking at parts on the dealer's shelf. Suppliers are encouraged to raise this issue with their developmental purchasing representative during the product development process. This can minimize future misunderstandings and delays in the product development cycle. At times it may be required to review the cosmetic requirements for an existing part. The process should remain the same as if it were a newly developed part. The criteria utilized remains consistent as well as the specific steps required to set the standard. We may also find it necessary to issue a deviation to the cosmetic standards based on a temporary condition that exists with the part. Temporary deviations are issued when conditions are viewed as not representative of the process or the individual part in the long run. It is the responsibility of the site resident engineer using input from the cosmetic committee to determine whether a deviation may be issued. All temporary deviations issued must be accompanied by a time-bound corrective action plan.



Definition of Cosmetic Zones

The surface of all parts is classified into specific areas to differentiate between the different levels of part visibility on a finished vehicle. These areas are referred to as cosmetic zones. The four basic zones used at Harley-Davidson are defined as A, B, C, and D surfaces. These surfaces are defined below:

"A" Surface: All surfaces that are readily visible from the normal riding position. For example, the **top** of the gas tank, switch housings, and the **top** of the console. In addition, the fairing above the headlight, the top of the tourpak, and the top of the Buell tail section.

"B" Surface: Surfaces that are readily visible during an upright walk-around (approximately 3 - 5 feet from vehicle) as the vehicle sits on the jiffy stand. For example, the sides of the rocker covers, primary covers, and fenders.

"C" Surface: Surfaces that are not readily visible during an upright walk-around (approximately 3 - 5 feet from vehicle) as the vehicle sits on the jiffy stand and surfaces that are visible through designed access. For example, the top of rocker covers, bottom of exhaust pipes, under the gas cap, crankcase under the oil filter, and fender under the flip up seat.

"D" Surface: Surfaces that are completely hidden by other components of the motorcycle. For example, the frame under the gas tank, crankcase and transmission behind the inner primary.

Surface Finish Cosmetic Requirements

Cosmetic requirements will vary dependent upon the surface finish of the part. For example, a chrome-plated component will have different cosmetic expectations and requirements than the powder-painted version of the same component. We need only to look at the three criteria that we listed previously. Stakeholder's expectations of quality vary depending upon the surface finish. Each surface finish is dependent upon separate process technologies and capabilities. Finally, the cost structure and profitability is different for each surface finish. Harley-Davidson's Corporate Cosmetic Committee has defined cosmetic requirements for each surface finish utilized in the production of our motorcycle or in the production of after-market components supplied by Harley-Davidson. It is important to note that the surface finish standards remain the same regardless of the substrate material utilized to produce the part. It is recognized that substrates themselves are dependent upon separate process technologies and process capabilities. Thus different substrates may not produce the same results. Harley-Davidson and the supplier can account for these differences within the third step of the cosmetic standards development process, defining exceptions to the base standard due to part specific issues.



Part Specific Cosmetic Requirements

Every part purchased or produced at Harley-Davidson has specific issues that are relevant to that specific part. Examples of some of these issues are part design, tooling design, or substrate material. It is during this stage of the cosmetic standards development process that these issues can be addressed. Again, we set the individual part cosmetic requirements based on balancing the three criteria listed in each step of this process. We consider our stakeholders expectation of quality. We consider today's process technologies and capabilities associated with the production of the part. And we consider the cost ramifications of different levels of quality. After considering all of the part specific issues against the base criteria, the corporate cosmetic standard for the part's base surface finish is used as a base requirement and exceptions to that standard are developed to cover all of the part specific issues. These exceptions are documented and become the cosmetic requirements for that specific part. Conditions may exist with a particular part that are determined not to be representative to the product or the process. These conditions may be covered under a temporary deviation based upon the discretion of the sites resident engineer with input from the cosmetic committee. Again, all temporary deviations issued must be accompanied by a time-bound corrective action plan.

Inspection Guidelines

Harley-Davidson has recognized that there are many variables that exist while inspecting the quality of a part. To minimize the effect of these variables, Harley-Davidson has incrementally replaced much of this subjectivity of quality inspection with objectivity based on specific requirements. We do however recommend that several specific guidelines be followed. These guidelines should be followed both by our suppliers as well as by our own internal stakeholders.

Training

Personnel must be properly qualified and trained to perform visual inspection. This should include review of the types of discrepancies that can occur and actual inspection of parts under the guidance of an experienced person. Persons inspecting cosmetic parts should be familiar with the following:

- How and where the part will be used
- What areas are exposed to the customer's vision or are hidden by mating parts
- Types of discrepancies that can occur to the part
- Procedures for rejecting parts including segregation of parts and procedures for evaluation and disposition

New personnel may tend to both not consider certain types of discrepancies as well as to over inspect parts. They may strive for better appearance and reject parts that are marginally acceptable. It is important that employees be monitored for consistency in applying standards and inspection methods. Immediate feedback is required to

"calibrate" the person for consistent application of the standard. A review of standards should be conducted with the person after about the first three weeks on the job, and



periodically thereafter. This will provide opportunity to clarify any concerns and to reinforce training. It is also important that periodic audits of the entire process are conducted.

Viewing Procedure

Parts will be viewed as zoned. In other words, the viewing process should have minimal effect on whether a part meets the cosmetic standards or does not meet the standard. Objective standards were set to minimize the reliance on the viewing procedure. The idea surrounding this is that a specific measurable defect exists on the part no matter what viewing procedures exist.

Lighting

Proper lighting conditions must be present within the area where inspection occurs. This will facilitate the inspection process and help ensure that parts are properly measured against the cosmetic standard. We have taken steps to minimize the effect of lighting on the inspections process by making the standards as objective as possible. The idea surrounding this is that a specific measurable defect exists on the part no matter what the type of lighting exists.

Templates & Overlays

Templates and overlays are useful devices for gauging the size of anomalies. Generally they are constructed of clear plastic that can be put over the part to determine such things as the diameter of an anomaly, its length, or spacing (such as number of pinholes in a 1" diameter, holes not closer than 5" apart.) Overlays may also be used to determine positioning relative to part features, such as the seam area of a gasket surface. One way of constructing an overlay or template is to make a drawing of the desired template, then photocopy or laser-print onto the plastic sheet used for overhead transparencies. Harley-Davidson has templates for chrome and painted surfaces. They are available upon request from your purchasing representative.

Physical Samples

Physical samples of parts can be utilized to convey cosmetic zones and/or boundary/limit samples. Parts that are heavy or bulky in nature can convey cosmetic zones through the use of prints or pictures. Physical samples must be approved by Harley-Davidson prior to their use. Samples must be maintained at both the supplier and Harley-Davidson to minimize inconsistencies in the application of the cosmetic standard. Physical samples must be protected from dirt or damage and must be reviewed periodically to ensure that they represent current process capabilities. These physical samples can be useful for training and for resolving discrepancies. They should be made available to personnel at all times.

Material Handling

Material handling of finished surfaces is especially important. Improper material handling of parts with potential non-conformances may produce damage that can distort information that may have provided from examining the parts. Packaging and containerization, protective padding, and shipping must be agreed upon and these procedures followed to ensure surfaces are not degraded.



Confinement of Potential Non-Conforming Parts

Parts suspected of not conforming to cosmetic standards must be confined in an area separate from acceptable parts. These parts should be properly labeled to prevent them from entering the normal flow of acceptable materials. Written procedures should define how rejected material will be reviewed and dispositioned. Rejected material must not be allowed to accumulate and the information gathered should be used as feedback for process improvement.

Documentation and Analysis of Non-Conformances

Suppliers must actively be involved in the use of preventative / corrective action. Further information regarding an acceptable process can be found in the Preventative/Correction Action section found in this manual. Cosmetic discrepancies found should be documented and maintained to aid in the continuous improvement process. The records must contain sufficient information and detail to allow for identification of the major issues and provide for a determination of the root cause of those issues. The documentation will also be used to determine process capabilities. This information may be used in the process of determining future cosmetic requirements for this part as well as others that utilize the same production process.



References:

Books

Appearance Inspection of Finished Surfaces

Thomas G. Cleaver, James C. Michels, Jr., and Lloyd A. Dennis, ASQC Quality Press, 611 East Wisconsin Avenue, Milwaukee, Wisconsin 53203

Spray Paint Defects - Their Cause and Cure

Production Painting - The Process and the Problems

Understanding and Using SPC (A guide for beginners)

Scheneberger, Gerald L., Training Resources Inc., P.O. Box 4658, Flint, MI 48504

Statistical Methods for Quality and Productivity Improvements in Painting Operations

Dr. Donald S. Ermer, Professor of Mechanical Engineering, University of Wisconsin-Madison

Industry Standards Sources

American Die Casting Institute, Inc.

2340 Des Plaines Avenue, Des Plaines, IL 60018

American Electroplaters and Surface Finishers Society

12644 Research Parkway, Orlando, FL 32826 (407)281-6441

American Society for Testing and Materials (ASTM)

1916 Race Street, Philadelphia, PA 19103 (215)299-5400

E284 - "Standard Definitions of Terms Relating to Appearance of Materials"

Association for Finishing Processes for the Society of Manufacturing Engineers

(AFP/SME) See information listed under SME

Federation of Societies for Coatings Technology (FSCT)

492 Norristown Road, Blue Bell, PA 19422 (610)940-0777

"Pictorial Standards of Coatings Defects"

National Association of Metal Finishers

401 N. Michigan Avenue, Chicago, IL 60611 (312)366-6610

Powder Coating Institute

2121 Eisenhower Avenue, Suite 401, Alexandria, VA 22314

Society of Automotive Engineers (SAE)

400 Commonwealth Drive, Warrendale, PA 15096 (412)772-7129

Society of Manufacturing Engineers (SME)

1 SME Drive, P.O. Box 930 Dearborn, MI 48128 (313) 271-1500