

# **NO PLACE FOR HIPSTERS WHEN THE SUBSTANCE BEHIND A PRETTY FAÇADE IS REQUIRED**

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## **ABSTRACT**

In contrast to the Hipster projected or “posed” image based solely upon appearance in lieu of substance, a company’s brand-image projected by paints & coatings requires performance derived from consistently sound chemistry and manufacturing. The protective paints and coatings on the façade of commercial buildings are a significant aspect of the image associated with the owner organization. A coating with chemical functionality and consistent performance is required in order for the façade to remain an asset and not become a liability. In other words, the “substance” of the coating material itself is critical. The posed image of a hipster, that lacks actual substance, won’t cut it. Let’s assume that, due to good foresight the coating chosen to convey your image was selected based on a proven track record and tested performance. But what assurance do you have that the coating materials actually supplied to the project are the products that were tested when the original selection was made?

Although a relatively common practice in the industrial coatings arena, the concept of baseline characterization of coatings is yet to be widely implemented in the commercial building field. Some organizations already exist that address the need for standard performance evaluations of industrial and commercial coatings. A brief synopsis of applicable performance evaluations developed by organizations in the industrial and commercial sectors is provided as background. The concept of baseline characterization of coatings coinciding with performance evaluations will be described with specific examples of applicability in the commercial coatings field.

### **Learning Outcomes:**

1. List available performance evaluations in both industrial and commercial sectors
2. Recognize specific performance characteristic test methods of coatings for industry applications
3. Identify the variables affecting the performance data
4. Identify the correlation between brand image and coating performance
5. Identify the impact of baseline compositional testing with regard to coating performance

## **BACKGROUND**

There are organizations within the industrial sector that have combined requirements for baseline characterization and performance evaluations that can be used to assess whether materials delivered to the project site are consistent with the pre-qualified products.

## Organizations and Associated Performance Test Programs: Industrial and Commercial Sectors

Prior to 1995, state department of transportation (DOT) material testing laboratories individually tested coatings and coating systems and generated a Qualified Products List (QPL). During the mid 1990's twelve northeastern states formed a consortium known as the North East Protective Coating Committee (NEPCOAT). A Project Panel under the National Transportation Product Evaluation Program (NTPEP) for Structural Steel Coating Systems was developed in 1999<sup>1</sup>, which subsequently published AASHTO R31 specification, "Evaluation of Protective Coating Systems for Structural Steel". The current program (revised in 2009) recognizes the quality and financial benefits associated with establishing a standardized testing protocol performed by independent testing laboratory. The coating manufacturers pay one time for testing a coating system and potentially gain access to multiple state's QPLs. All testing is performed according to industry standard test methods (e.g., ASTM), and pre-approved laboratory standard operating procedures (SOPs). The State agencies can have confidence that data is representative, and generated without bias since the laboratory contract is with AASHTO, not the coating manufacturer.

The submission of coating products for evaluation is initiated by the coating manufacturer, who completes a product evaluation form on a secure database (DataMine 2.0) and submits payment to AASHTO. AASHTO then notifies the pre-approved laboratory of the submission. The laboratory coordinates acquisition of coating materials, conducts compositional analysis on each product and its individual components, prepares and coats test panels, performs physical and accelerated weathering/corrosion testing, and enters data into the DataMine 2.0 for review by Lead State & the coating manufacturer<sup>2</sup>.

The compositional analyses include:

- Infrared Spectroscopy
- VOC Content
- Exempt Solvent Analysis
- Toxic Metal Content (total Pb, Cr, Cd)
- Heavy Metal Content (TCLP)
- Epoxide & Amine Values
- Isocyanate content
- HALS
- Weight solids, %
- Pigment content, %
- Metallic zinc content (dry film and in zinc powder)
- Volume solids, %
- Density
- Viscosity-Stormer Krebs
- Viscosity-Brookfield
- Pot Life (via viscosity)
- Sag resistance
- Dry-to-touch/Dry-to-handle

The performance testing includes:

- Slip Coefficient and Tension Creep Testing of the Primer
- 5000-Hour ASTM B117 Salt Fog Exposure
- 15-336 Hour (5040 hours) ASTM D5894 Cyclic Weathering Exposure
- Tensile (pull-off) adhesion per ASTM D4541, Annex A4 (pneumatic tester)
- Thermal (freeze/thaw/immersion) cycling (30 – 24-hour cycles)

NEPCOAT is an affiliation of northeast states, Connecticut, Massachusetts, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont for the purpose of developing acceptance/testing criteria of protective coating for use on highway bridge steel. Data is generated according to the AASHTO R-31 specification and is compared to the pre-established acceptance criteria established by NEPCOAT. NTPEP oversees the consolidated testing processes, which is beneficial for both manufacturers and owners alike. Under NTPEP oversight, states have access to test data but without acceptance recommendations. States must establish their own acceptance criteria (i.e., NEPCOAT), based on the performance data that is most critical to them. For the owner, the test data provides a basis to establish a qualified products list without unnecessary repetition of testing, and provide a basis for verifying production lots at the jobsite. The appendix to AASHTO R-31 recommends that the Owner perform product verification testing to determine if the coatings supplied to a project are the same quality as the materials originally submitted and tested for acceptance. The NEPCOAT criteria<sup>3</sup> for product verification testing includes allowable variances from AASHTO R-31 test data for each product on the QPL:

Total solids (% by mass)  $\pm 5$  %  
Pigment (% by mass  $\pm 5$  %  
Mass per volume (g/L)  $\pm 2$  %  
Viscosity (Stormer)  $\pm 8$  %

The tolerance is applied to the values in DataMine 2.0, which represent the test results that were populated when the products were tested according to AASHTO R-31. Numerous member state agencies utilize the available test data to select coating systems and to verify that the individual products/components mobilized on-site are compositionally the same products/components that were tested for performance.

Within the commercial sector of the paint and coatings industry, The Master Painters Institute (MPI) (formed in 1996) oversees qualification testing of commercially available coating materials from industry suppliers to determine if products meet MPI's performance standards and are candidates to be listed on MPI's Approved Products Lists. Manufacturers submit product data and samples for testing according to MPI designed test protocols and standards. If they meet all the requirements, they are included on the list. The MPI gathers the stake holders for commercial and architectural coatings for buildings and the built environment: the specifier, contractor, and facility owner, along with retailers and resellers.<sup>4</sup>

### Applicability of Baseline Characterization Testing in the Commercial Coatings Arena

Paint products are formulated and produced with numerous variety of raw materials or ingredients. The amount and quality of those ingredients have an impact on the ultimate performance of the product. The performance of the coating can be significantly impacted by the formulation science but also the quality and consistency of the raw materials and manufacturing processes. The resin is the binder in the paint formulation. This is the portion of the coating that, in effect, holds all the other parts together and provides adhesion to the surface. Arguably this is recognized as one of the most important ingredients in paint. However, the other ingredients, if poorly manufactured or processed can negate any advantage that a high performance resin provides. The Master Painter's Institute has taken the approach that the formulation of the product itself is of lesser consequence than the performance properties<sup>5</sup>. For this reason, products submitted by manufacturers for inclusion in the MPI Approved Products List are subjected to a battery of performance and durability tests to verify quality. Once a product has passed the battery of performance tests there is presumption that it will provide installed performance consistent with the standard.

The caveat is that you can presume product performance as long as you are certain that the product provided on site is compositionally the same as the product that was performance tested. Baseline compositional testing of the product conducted in conjunction with performance testing provides a means for determining if the product shipped to the site and what was originally tested are one-in-the-same.

The Naval Facilities Engineering Service Center (NFESC) has developed a cross reference list matching Federal and Military standard specifications with specifications developed by. The list is intended to be used by field personnel and contractors in selecting commercial "off-the-shelf" coatings for Navy Architectural and Industrial Maintenance projects as specified using the Naval Facilities Engineering Command Generic Guide Specification for painting and coating architectural structures including light industrial applications. Therefore baseline compositional testing combined with performance testing provides the reassurance that formulation revisions, manufacturing process changes, or changes of raw material suppliers have not resulted in a variable performing product.

### Illustration of the Value of Baseline Characterization Testing

A coating material with MPI designation that cross-referenced to MIL-DTL-24441/20B (SH) Type III was performing inconsistently in like service environments. The retained samples of three batches were comparatively tested and compared to the coating systems applied. The applied coatings were consistent with each other when compared using infrared spectroscopy. However, the analysis of retains of batch samples suggested a significant material difference of one of the batches compared to the two others. Additional testing of the applied coating system as well as the batch retains, to specifically analyze entrapped solvent revealed a manufacturing error of one of the materials, which included a solvent not compatible with MIL-DTL-24441/20B (SH) Type III. The solvent is acceptable for Type IV and was traced to a batch of Type IV material that was mislabeled as Type III. Had baseline characterization been performed in conjunction with performance testing and compared to batch testing of the material delivered on-site, the error would have been caught prior to product application and subsequent performance issues. A summary of the volatiles detected in the various samples is shown in the table below.

**Summary Table – Volatiles Detected**

<b>Chemical</b>	<b>Type 3 (control)</b>	<b>Type 4 (control)</b>	<b>Retain #1</b>	<b>Retain #2</b>	<b>Retain #3</b>	<b>Field Sample #1</b>	<b>Field Sample #2</b>	<b>Field Sample #3</b>
Butanol	✓	✓	✓	✓	✓	✓	✓	✓
Toluene		✓		✓			✓	
Phenol	✓	✓	✓	✓	✓	✓	✓	✓
Benzyl Alcohol		✓		✓			✓	
Tertbutyl Phenol		✓		✓			✓	
Benzofuran	✓	✓	✓	✓	✓	✓	✓	✓

Educational Facilities

Educational facilities are a component of the commercial building sector with public prominence. The high level of visibility stems from the frequency of visits upon which the condition of these facilities are easily noticed and catch the attention of students, parents, and public officials. Therefore, educational facilities require a clean well-kept appearance that is also aesthetically pleasing.



The performance of the coating significantly impacts the appearance and perception of the educational organization in the public's view. A recent issue of *Durability and Design* featured an article entitled, "The Case Of... Image Is Everything - Premature Coating Failure On School Roofs." The article clearly describes the impact that the facility appearance can have on public perception and branding.

Premature coating problems on the standing seam roofs of two schools were an eye-sore for the community and an issue for the school board that was in the midst of improving the school's image. Embarrassed that the school roof, which had been installed only four years earlier, was so unsightly, the Board hired an independent investigator to determine the cause of the peeling and disbonding roof coating<sup>6</sup> (see Figure 1). The article describes the site investigation, the forensic laboratory analysis, and the scientific explanation of what ultimately caused the coating to detach from the roof. The coating system failed because the primer that was applied was not the appropriate material for the service environment. The coated roof panel product that was selected based upon performance data was not the product provided and installed at the school. Had baseline characterization testing been performed on the product that correlated with the performance data, the owner could have compared the product delivered to the jobsite with the baseline characterization data and could have rejected the product based upon the differences. Installation and subsequent failure of the product with the incorrect primer could have been avoided.



**Figure 1: Adhesive tape was applied and removed without any knife cutting. The underside of the tape is on the right, and the area of detached coating is on the left.**



The outward expression of a brand – including its name, trademark, communications, and visual appearance – is brand identity. Because the identity is determined by the brand owner, it reflects how the owner *wants* the consumer to perceive the brand – and by extension the branded company, organization, product or service. The focus of brand identity is authentic qualities – real characteristics of the value and brand.<sup>7</sup> The perception of a brand is highly influenced by its visual presentation. For instance, a do-it yourself (DIY) remodeling and property maintenance operation appears to be poorly maintained because the exterior paint is falling off and the coated roof is dirty and faded. If the potential clients are facility managers, property rehabilitation designers, or if they work in the coating industry, they are more likely to become clients of a business with a façade that is protected with paint systems that are performing than at a place of business that can't seem to keep their facilities maintained.





In today's marketplace as during a recession, people crave comfort and familiarity. They want to go someplace they recognize, know what they will pay and know what they will get. A strong brand identity brings with it a level of trust.

### SUMMARY

What does the visual appearance of the coatings on your facility say about your organization? Does the performance of those coatings portray you as a high value, well managed, well maintained, dedicated and professional operation? Or contrarily, are you misconstrued as a cheap short term solution, here today/gone tomorrow and unprofessional? At the end of the day, a strong brand image adds value to your company, commands higher prices, attracts and retains better employees and perhaps most importantly, adds to your bottom line.

Careful selection and proper installation of coating systems that have a proven track record and tested performance can help to convey the brand identity that you desire. Requiring baseline characterization of candidate coating materials subjected to performance evaluations is added insurance that materials supplied to the job are consistent with the materials that performed well during qualification testing. Baseline compositional analysis in conjunction with performance qualification testing limits the exposure associated with poor coating performance caused by installing something other than what you paid for.

- (1) National Transportation Product Evaluation Program, <<http://www.ntpep.org>>.
- (2) William D. Corbett, KTA-Tator, Inc., "AASHTO National Transportation Product Evaluation Program for Bridge Coating Systems," International Bridge Conference Presentation, June 2011
- (3) North East Protective Coating Committee, <<http://www.nepcoat.org>>.



- (4) Masters Painters Institute, <<http://www.paintinfo.com>>.
- (5) Masters Painters Institute, <<http://www.mpi.net>>.
- (6) Cynthia L. O'Malley, "The Case of ... Image is Everything, Premature Coating Failure on School Roofs," Durability and Design Journal, Sept/Oct 2012.
- (7) Chiasson Consultants, Inc., <<http://www.chiassonconsultants.com>>.