Pro Industrial Pre-Catalyzed Waterbased Epoxy EPD Action Plan:

Introduction:

This shall serve as the action plan eligible for credit under LEED v4.1 (BPDO credit - Option 2) for the optimization of the environmental footprint of the PRO INDUSTRIAL PRE-CATALYZED WATERBASED EPOXY Product line (see Table 1 below), manufactured by The Sherwin-Williams Company. Sherwin-Williams has a comprehensive Life Cycle Assessment (LCA) program that it utilizes to benchmark and optimize the environmental footprint of its products. It began publishing externally-validated Environmental Product Declarations (EPDs) in 2015 and now offers EPDs across dozens of product lines. For more information about Sherwin-Williams, please visit: www.sherwin-williams.com.

Table 1: Eligible Product Series

Pro Industrial Pre-Catalyzed Waterbased Epoxy Base Type	SW REX Series
Flat, Deep, Ultra Deep	K45

Overview of the LCA/EPD:

To ensure that this optimization process is as accurate as possible, the following information about the LCA/EPD will be considered and is disclosed below. The full EPD is available here. This ensures that any enhancement of the product is because of an actual improvement in the LCIA results to the best of Sherwin-Williams' knowledge. Additionally, the both the original and updated formulations shall be assessed using the same version of the LCA software and LCI databases to ensure consistency. Per LEED requirements, any claimed improvement must clearly be linked to a specific formulation and/or supply chain improvement as opposed to an LCI update. However, limitations in LCA still exist and these are further discussed in the limitations section.

Table 2: Key EPD/LCA Assumptions

Key Assumption	Starting Value/Outcome
LCA Framework/PCR	ACA PCR – Architectural Coatings
LCA Software	GaBi – Most Recent Version
Primary Impact Drivers	Titanium Dioxide, Resin, Transportation, Manufacturing
Product Lifetime	15 years
Product Opacity	4 mils for ≥ 97% opacity
Product Performance (per PCR)	High Quality
Total Transportation Distance	Approx. 1197 Miles
Manufacturing Energy Needed	0.16 MJ/kg product

Table 3: Baseline EPD LCIA Results

LCIA Impact Category	Starting Value[1]
Global Warming Potential	0.87-1.95 kg CO2e
Acidification Potential	0.15-0.26 kg SO2e
Eutrophication Potential	9.37E-04-1.08E-03 kg N e
Ozone Depletion Potential	3.01E-08-4.76E-08 kg CFC-11e
Smog Formation Potential	0.17-0.20 kg O3e

Dominance Analysis and Targeted Reduction:

For the PRO INDUSTRIAL PRE-CATALYZED WATERBASED EPOXY Product Line, 85% of the overall impact (an average of all impact categories) and 81% of the carbon footprint was due to the raw materials selection. In terms of specific raw material impacts, titanium dioxide and the primary resin were responsible for the largest contributions to the impact results across all impact categories. Areas such as transportation and manufacturing often had smaller impacts relative to the raw materials (14%), although represented a larger portion of the carbon footprint (18%).

Given the relevance of the raw materials in the overall footprint of the product, the areas of focus will be raw material substitution and/or enhancement of product performance. Since carbon footprint is the primary focus for LEED EPD optimization, it shall be the principal improvement target for Sherwin-Williams, although burden shifting will still be avoided whenever possible. This product will be assessed to see if material substitutions may be possible without compromising performance or if performance can be improved (i.e. longer lifetime or achieving better coverage) without significantly increasing environmental footprint. Additionally, supply chain enhancements (transportation distance, electricity consumption) will be considered as well.

It is important to note that any subsequent improvements of a formula shall only be compared against the same base type. For example, an improvement of a flat formulation shall only be compared against the baseline flat EPD results and not against any other base type to ensure consistency.

Strategy:

Sherwin-Williams has internal processes for assessing product performance using specific ASTM test methods and the environmental footprint using LCA. Tools have been developed to allow formulations to be assessed early in the development process to ensure burden shifting does not occur.

Limitations:

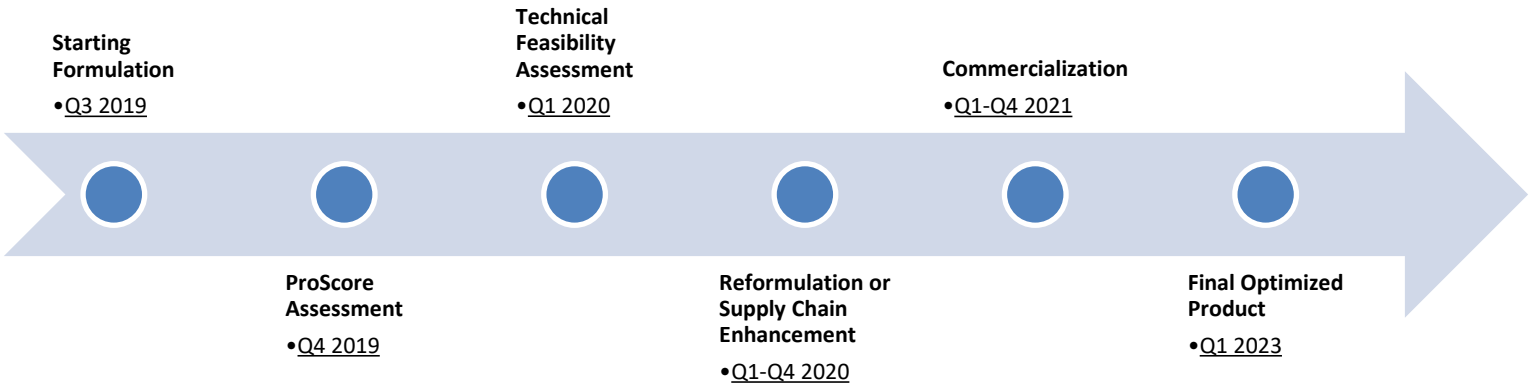
[1]The reported values represent the best and worst case results from the baseline EPD. Any claimed improvement shall utilize the same product base/sheen type. For example, a semi-gloss cannot be compared to a flat, deep, etc. for purposes of showing an improvement.

It is important to consider the limitations of LCA when reviewing an EPD, this action plan, or any optimized EPD as a result of an action plan. EPDs currently are limited to midpoint LCA indicators, meaning that they only consider potential impacts as opposed to specifically determining environmental damage at a specific site or region. Additionally, LCA does not have a measure of true uncertainty and its results are changing constantly.

Sherwin-Williams will use the best available data and resources when conducting its assessments and will ensure that any Optimized EPD meets the relevant ISO comparability requirements. However, any LCAs or EPDs shall not be used as a comparative assertion or overall superiority claim per ISO requirements.

Timeline:

The estimated timeline for this optimization is shown in the figure below. If at any point it becomes clear that an optimization is not possible because of technical limitations, this action plan shall be taken down by Sherwin-Williams or the Program Operator. Additionally, if any significant delays occur, the timeline shall be updated to reflect this. The Program Operator shall check to see if the timeline is on target at least once per year.



The information contained in this action plan is accurate to the best of Sherwin-Williams' knowledge at the time of writing and will be appropriately revised if it becomes outdated or is no longer applicable.

Steve Revnew
Senior Vice President – Product Development
sustainability@sherwin.com