

EPDs for Sustainable Project Delivery

An Environmental Product Declaration (EPD) is a tool that can demystify the environmental impacts of construction materials.



As State departments of transportation (DOTs) become increasingly conscious of infrastructure's environmental burdens and seek more sustainable strategies, they are looking for measures that accurately reflect the environmental impacts of each alternative. EPDs communicate the greenhouse gas (GHG) emissions of construction materials in a transparent and standardized manner. They provide an opportunity to reduce negative environmental impacts by transforming the project delivery process.

A SIMPLE YET ROBUST ENVIRONMENTAL REPORTING TOOL

The manufacture, transportation, and production of construction materials such as aggregate, asphalt, cement, asphalt mixtures, concrete mixtures, and steel reinforcement generates environmental impacts. An EPD is a transparent, third-party verified report used to communicate those impacts from resource use, energy, and emissions. Type III EPDs are product labels developed in accordance with the International Organization for Standardization (ISO) Standard 14025 (ISO 2006). These EPDs are developed using life-cycle assessment (LCA) methodology, follow the industry consensus, and undergo third-party verification before being published. Agencies can leverage the use of EPDs to support decision-making throughout the project delivery process. Agencies can request EPDs at material installation to establish and develop benchmarks for current designs and projects. This tool will help agencies reduce GHG emissions in their construction projects.

BENEFITS

Sustainable Procurement. EPDs encourage the demand and supply of products that promote the more sustainable use of resources and create less stress on the environment.

Sustainable Design. EPDs provide critical information for use in conceptual- and project-level full LCAs or other types of environmental assessment of alternative design decisions. EPDs allow for meaningful information on environmental performance for construction materials.

Sustainable Asset Management. EPD data can be included in databases used in asset management systems to perform network-level LCAs and identify areas for environmental performance improvement.

STATE OF PRACTICE

While the development of EPDs in the United States has been mainly initiated by the vertical construction industry and material manufacturers, transportation agencies are beginning to require and collect EPDs during project procurement to prepare for implementing EPDs as part of procurement decisions.

State DOT adoption and implementation of procurement using EPDs has steadily increased over the past 5 years. Although the use of EPDs does not necessarily require a legislative mandate, various types of Buy Clean Acts have been enacted in [California](#) (2017), [Colorado](#) (2021), and [Oregon](#) (2022) that require the use of EPDs as part of the procurement process.



Currently, the use of EPDs is not required under title 23, United States Code; however, the Federal government has outlined related efforts through [Executive Order \(EO\) 14057](#). Under the EO, several Federal agencies are advancing activities related to EPDs. The U.S. General Services Administration (GSA) issued its first-ever specifications requiring EPDs for [concrete](#) and [asphalt](#) materials for GSA projects. The recently passed [Inflation Reduction Act](#) authorizes the Environmental Protection Agency to establish two programs for EPDs. One program will award grants and provide technical assistance to support the development, enhanced standardization, and transparency of a uniform approach to measuring and certifying the carbon content of construction materials and products. The second program will set standards for determining which construction materials are carbon efficient and provide for labeling that would certify lower carbon construction materials. Other Federal efforts are being advanced through the [Federal Buy Clean Initiative](#).

An Environmental Product Declaration for Asphalt Mixtures		
PRODUCT DESCRIPTION		
Gradation Type: dense Mix Design Method: superpave Nominal Maximum Aggregate Size: 12.5 mm Performance Grade of Asphalt Binder: PG 58-28 This mix producer categorizes this product as a Hot Mix Asphalt (HMA) asphalt mixture. This asphalt mixture was produced within a temperature range of 150 to 161°C.		
IMPACT CATEGORY	POTENTIAL IMPACT PER METRIC TONNE ASPHALT MIXTURE (PER TON ASPHALT MIXTURE)	
Global warming potential (GWP-100)	71.05 (64.46) kg CO ₂ Equiv.	
Ozone depletion potential (ODP)	9.92e-08 (9.00e-08) kg CFC-11 Equiv.	
Eutrophication potential (EP)	1.24e-02 (1.13e-02) kg N Equiv.	
Acidification potential (AP)	1.72e-01 (1.56e-01) kg SO ₂ Equiv.	
Photochemical ozone creation potential (POCP)	4.51 (4.09) kg O ₃ Equiv.	
DECLARED UNIT: The declared unit is 1 metric tonne (1 short ton) of an asphalt mixture		
PRODUCT INGREDIENTS		
Component	Material	Weight %
Aggregate	Natural Stone	15
Aggregate	Natural Stone	21
Aggregate	Natural Stone	13
Aggregate	Natural Stone	14
Aggregate	Natural Stone	8
RAP	Reclaimed Asphalt Pavement	24
Binder	Unmodified	4

ENVIRONMENTAL IMPACTS	
Declared Product: Description: Exterior 4000 PSI Compressive strength: 4000 PSI at 28 days	
Declared Unit: 1 m ³ of concrete	
Global Warming Potential (kg CO ₂ -eq)	318
Ozone Depletion Potential (kg CFC-11-eq)	7.15E-6
Acidification Potential (kg SO ₂ -eq)	0.95
Eutrophication Potential (kg N-eq)	0.24
Photochemical Ozone Creation Potential (kg O ₃ -eq)	20.7
Abiotic Depletion, non-fossil (kg Sb-eq)	5.82E-5
Abiotic Depletion, fossil (MJ)	658
Total Waste Disposed (kg)	94.2
Consumption of Freshwater (m ³)	2.40
Product Components: natural aggregate (ASTM C33), Portland cement (ASTM C150), fly ash (ASTM C618), batch water (ASTM C1602), admixture (ASTM C494), admixture (ASTM C260)	

Left: Sample information from Asphalt EPD.

Right: Sample information from Concrete EPD.

RESOURCES

[FHWA Sustainable Pavements Program](#)

[FHWA EPD Tech Brief](#)



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