

PD-23: Reduced Energy and Emissions in Pavement Materials

1-3 points

Goal: Reduce energy use in the production of pavement materials.

Sustainability Linkage

Reducing energy use in the production of pavement materials supports all of the triple bottom line principles by lessening impacts to air quality through reduced emissions and reducing energy consumption.



Affected Triple Bottom Line Principles

Background and Scoring Requirements

Scoring Requirements

Implement one or more of the methods listed below. **Any of the following requirements (Requirements PD-23.1, PD-23.2, or PD-23.3) may earn 3 points, however, this criterion shall not exceed a total of 3 points.**

Requirement PD-23.1

1-3 points. Asphalt Production

Use low-energy material for at least 50 percent of the total projects asphalt material. One of the following scores may meet this requirement:

- **Requirement PD-23.1a**

1-3 points. Warm Mix Asphalt (WMA)

Mixing temperature shall be measured as the temperature of the mixture as it exits the mixing drum (for drum plants) or pugmill (for batch plants). This credit requires a recommended hot mix asphalt (HMA) mixing temperature to be provided by the asphalt binder supplier. This recommended temperature should be as if no WMA technology were to be used. If the recommended mixing temperature is provided as a range, use high end of the range for calculation of the required temperature reduction.

Use the highest point value achieved from only one of the following options:

- **0 points.** Warm Mix Asphalt is not used.
- **1 point.** Use Warm Mix Asphalt. Reduce the mixing temperature of HMA by a minimum of 30°F from that recommended as the mixing temperature by the asphalt binder supplier.
- **2 points.** Use Warm Mix Asphalt. Reduce the mixing temperature of HMA by a minimum of 40°F from that recommended as the mixing temperature by the asphalt binder supplier.
- **3 points.** Use Warm Mix Asphalt. Reduce the mixing temperature of HMA by a minimum of 50°F from that recommended as the mixing temperature by the asphalt binder supplier.

OR

- **Requirement PD-23.1b**

3 points. Asphalt Production Using Energy and Fuel Saving Technologies

Burn recycled oil, waste materials, or natural gas; or use other energy and fuel saving technologies in asphalt production to reduce conventional fuel usage by a minimum of 25 percent. Recycled oils, garbage, or other materials that would otherwise go to waste that are used for burner fuel or any other energy or fuel saving technologies that can be shown to reduce the normal electricity or petroleum fuel usage by 25 percent.

Requirement PD-23.2

3 points. Raw Material – Cement Production

One of the following scores may meet this requirement:

- **Requirement PD-23.2a**

3 points. Cement Production Using ENERGY STAR® Certified Plant

Use an ENERGY STAR® certified cement production plant for cement materials used on the project. To be ENERGY STAR® certified, the plant must score in the top 25 percent based on the [EPA National Energy Performance Energy Rating System](#)¹.

OR

- **Requirement PD-23.2b**

3 points. Cement Production Using Fuel Saving Technologies

Burn recycled oil, waste materials, natural gas, or other fuel saving technologies in cement production to reduce conventional fuel usage by a minimum of 25 percent. Recycled oils, garbage, or other materials that would otherwise go to waste that are used for burner fuel or any other fuel saving technologies that can be shown to reduce the normal petroleum fuel usage by 25 percent.

OR

- **Requirement PD-23.3c**

3 points. Cement Production Using Limestone Additive

Use blended cement using a minimum 3 percent ground limestone addition. Per Advanced Concrete Pavement Technology's (ACPT) [TechBrief: Blended and Performance Cements](#)² the use of 5 percent ground limestone in cement is permitted by ASTM C150 (and AASHTO M 85), which reduces the cement clinker in concrete and ultimately reduces the carbon footprint.

Requirement PD-23.3

3 points. Concrete Production

One of the following scores may meet this requirement:

- **Requirement PD-23.3a**

3 points. Concrete Production in Plant with Demonstrated Reduction in Energy and Carbon Footprint

Concrete shall be supplied from a concrete plant that can demonstrate a carbon footprint and embodied energy 15 percent below the national averages as established in the National Ready Mixed Concrete

Association's (NRMCA) [Sustainable Concrete Plant Guidelines](#)³. Carbon footprint and embodied energy shall be calculated using the [Athena EcoCalculator](#)⁴.

OR

- **Requirement PD-23.3b**

3 points. Concrete Production in NRMCA Sustainable Concrete Plant

Concrete shall be supplied from a concrete plant that is an [NRMCA Certified Sustainable Concrete Plant \(Silver\)](#)⁵.

Resources

Above-Referenced Resources

The following resources are referenced in this criterion and consolidated here:

1. EPA National Energy Performance Energy Rating System, https://www.energystar.gov/ia/business/healthcare/natl_energy_rating_system.pdf
2. Advanced Concrete Pavement Technology (ACPT), TechBrief: Blended and Performance (2011), <http://www.fhwa.dot.gov/pavement/concrete/pubs/hif11025/index.cfm>
3. National Ready Mixed Concrete Association's (NRMCA), Sustainable Concrete Plant Guidelines (2011), <http://www.nrmca.org/sustainability/Certification/SCP%20Guidelines%20Version%201.1.pdf>
4. Athena EcoCalculator, <http://www.athenasmi.org/our-software-data/ecocalculator/>
5. NRMCA Certified Sustainable Concrete Plan (Silver), <http://www.nrmca.org/sustainability/certification/plantcertification.asp>

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Calculations to show at least 50 percent of the total project pavement material meets requirement options 1, 2, 3, or 4.
2. Asphalt or concrete pavement mix designs showing the requirements of options 1 or options 3 were met.
3. Documentation for the cement production facility, asphalt plant, or concrete mixing plant showing the requirements were met.