

# RECYCLED PLASTICS IN ASPHALT

## Reviewing engineering and environmental suitability

The U.S. Environmental Protection Agency estimated more than 35 million tons of plastics entered municipal landfills in 2019, but less than 10 percent was recycled.<sup>1</sup> Other sources suggest that annual worldwide plastics production is approximately 400 million tons. To help reduce the amount of waste sent to landfills every year experts examine opportunities to reuse plastic material.

The U.S. Federal Highway Administration's policy on recycling, outlines goals for the use of recycled materials:

1. Recycling and reuse can offer engineering, economic, and environmental benefits.
2. Recycled materials should get first consideration in material selection.



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3. Determination of the use of recycled materials should include an initial review of engineering and environmental suitability.
4. An assessment of economic benefits should follow in the selection process.
5. Restrictions that prohibit the use of recycled materials without technical basis should be removed from specifications.

**Review of engineering and environmental suitability** remains a key part of FHWA policy. This requires evaluation of the long-term performance and the environmental impacts of the recycled material in pavements. A thorough review of the engineering and environmental suitability of plastics in asphalt pavements is needed before undertaking full-scale deployment.

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<sup>1</sup> Environmental Protection Agency, Advancing Sustainable Materials Management: Facts and Figures Report, [https://www.epa.gov/sites/production/files/2019-11/documents/2016\\_and\\_2017\\_facts\\_and\\_figures\\_data\\_tables\\_0.pdf](https://www.epa.gov/sites/production/files/2019-11/documents/2016_and_2017_facts_and_figures_data_tables_0.pdf) (accessed May 1, 2020).

Not all plastics are the same. There are wide varieties of plastic materials, classified by a Resin Identification Coding System. The coding system serves as a tool to assist in sorting the various plastic types during the recycling process. However, recyclability of the plastic itself is not guaranteed as the code simply helps properly classify the waste stream. Only some plastic material codes are compatible with asphalt. The table below shows examples of common plastics used in the U.S.

Currently, asphalt pavement engineers mainly focused on testing type 2 and 4 plastics for performance. Their research yields unclear performance results, with very few long-term performance data available. In addition,

little environmental impact information for plastics in asphalt is available. The research underway seeks to develop new approaches and procedures to utilize plastics in pavements safely and economically, detailing the risks to the health of our workers, the environment and the performance on the nation's key transportation and commerce arteries. A thorough evaluation of new recycling approaches to build smooth, durable, and sustainable highways must be implemented as standard practice.

For more information, you can review [Recycled Plastics in Asphalt Part A: State of the Knowledge](#) or contact [Richard Willis](#), NAPA Vice-President for Engineering, Research, and Technology.

| SYMBOL  | DESCRIPTION  |   |
|---|--|---|
|    | Clear tough plastic such as soft drink, juice and water bottles.   |     |
|   | Common white or colored plastic such as milk containers and shampoo bottles.   |    |
|  | Hard rigid clear plastic such as cordial bottles.  |  |
|  | Soft flexible plastic e.g. squeezable bottles such as sauce bottles.   |  |
|  | Hard but flexible plastic such as microwave ware, takeaway containers, some yogurt /ice cream /jam containers, hinged lunch boxes.   |  |
|  | Rigid, brittle plastic such as small tubs and margarine / butter containers.   |  |
|  | All other plastics, including acrylic and nylon. Examples include some sports drink bottles, sunglasses, large water cooler bottles. |  |

