



ASPHALT PAVEMENTS

With the **MCA Advantage**, you get a partner and advisor who will consult with you about designs, specifications, technical services, processes and material selection. By developing innovative, custom-designed products that offer additional benefits, such as peak performance in unique conditions, improved field performance, greater environmental and health benefits, the **MCA Advantage** provides significant long-term cost savings, resulting in lower “total cost of ownership.”

HOT MIX ASPHALT

While all of McAsphalt’s asphalt products are created to meet or exceed all engineering criteria, we also develop modified products that can be custom-designed to offer additional benefits, such as peak performance in unique conditions, improved field performance, greater environmental and health benefits, and more cost effectiveness throughout the pavement’s lifecycle. The hot mix can be manufactured using only virgin aggregates and asphalt cement (PGAC) or in combination with recycled asphalt pavement (RAP) or recycled asphalt shingles (RAS).

Aggregates

Aggregates for hot mix are normally required to be hard, tough, durable, properly graded, cubical, low porosity and to have clean rough surfaces. Aggregates are usually classified by size as coarse, fine and mineral fillers.

The RAP can be millings or crushed chunks that have been screened to the appropriate sizes. The RAP can be fractionated into several coarse fractions as well as fine RAP. The RAS can be either tear offs from newly manufactured shingles or aged shingles removed from the roofs after years of service life.

Asphalt Cement

McAsphalt’s custom-designed asphalt cements can be engineered to enhance specific design criteria, to help meet your unique needs. As part of the **MCA Advantage**, our experts can consult with you to address questions about mix design, specifications, technical services and the selection of materials to ensure you develop the requirements that best address your pavement conditions—saving you the cost and inconvenience of premature maintenance and repairs.

The customized asphalt cements can be designed to mitigate issues such as pavement deformation, low temperature thermal cracking, fatigue resistance, moisture susceptibility and aging. These asphalt cements can optimize your RAP and RAS designs as well as virgin mixes.



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Design

Let McAsphalt's expert design engineers help you design the HMA mix for your infrastructure investment—it's all part of how we deliver the **MCA Advantage**.

HMA consists of two basic ingredients: aggregate and asphalt binder. HMA mix design is the process of determining what aggregate to use, what asphalt binder to use and what the optimum combination of these two ingredients ought to be. HMA mix designs should be designed to achieve the following properties: resistance to deformation, fatigue resistance, resistance to low temperature cracking, durability, resistance to moisture susceptibility, skid resistance and be workable. There are several different methods used to go about this process, of which the Marshall and Superpave methods are the most common.

When designing hot mixes there are certain recommendations that should be followed to achieve the above mentioned properties:

Mix Ingredient	Base	Surface
Minimum PGAC	4.7	5.0
Maximum RAP	40	20
Maximum RAS - Alone	3.0	3.0
In combo with RAP % RAP	20.0	10.0
% RAS	2.5	1.5

A rough rule of thumb to follow with regards to RAP and RAS are that in base mixes no more than 40% of the virgin asphalt cement should be replaced by using recycled products and in the surface mix no more than 20% should be substituted. The pavement performance from using MCA customized solutions can be enhanced through the use of compaction aids, improved cold weather paving aids, increase hauling distances and improved longitudinal joint construction. The use of recycled asphalt pavement (RAP) and recycled asphalt shingles (RAS) can be utilized without performance loss as long as the mix is designed properly. Also mix performance tests (rutting, moisture susceptibility, PGAC testing etc.) should be done before and after placement to ensure what you asked for is what you got.

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HMA Manufacturing

When manufacturing hot mix the design should be followed and trial batches produced to ensure all specification requirements are met and that the particular plant is capable of manufacturing the material. The PGAC supplier' s recommended temperature values should be followed for both mixing and compaction. To optimize the use of RAP the RAP should be fractionated and crushed to the best size for the job. Different types of RAP should be separated and tested regularly to ensure the properties are not changing. The RAS should be separated between tear offs and aged roof shingles as there properties can be quite different.

HMA Construction

To ensure that the finished HMA pavement will perform throughout its service life the pavement has to placed properly and meet all the specification requirements. The attached check list will help to achieve the desired result.

- Pavers should be checked and kept in good condition – size and number available
- Rollers should be in good working order – right size and number for the job
- Hauling trucks should be well maintained – size and number right for the job. Tarps?
- Distributer truck for tack coat calibrated – nozzles uniform and angled properly
- Tools and equipment meet requirements
- Personnel well trained and safety oriented
- All Inspectors are knowledgeable

Placing and compaction the asphalt mix is a culmination of the effort to ensure the design is right, the specifications are correct and met, the mixes are tested and meet the requirements and the mix has been manufactured to specification. If placement and compaction are not properly accomplished, all of the earlier efforts and costs have been wasted.