

407 ASPHALTIC CONCRETE FRICTION COURSE (ACFC)

Asphaltic Concrete (AC) and Asphaltic Concrete Friction Course (ACFC) serve very different purposes in the pavement structural section. AC gives the roadway strength to carry wheel loads and it can be used as a base course, or for leveling. ACFC is used as the final riding surface on high speed roadways where superior skid resistance is needed (such as rural highways and interstates). ACFC thickness is typically ½ to ¾ inch (12 to 19 millimeters). ACFC is never used as a leveling or base course since it should never be overlaid. ACFC mixes are open graded which means the mineral aggregate is all approximately the same size with very little fines. This type of mix produces a porous surface that not only provides excellent skid resistance but improved drainage as well.

ACFC is more inspection intensive than other AC operations. It is almost entirely a “materials and method” type specification requiring both the Inspectors and Project Supervisor to closely monitor the plant and paving operations, and to also know and enforce each parameter of the specifications thoroughly.

For the sake of brevity, many inspection procedures can be found in the “Asphalt Concrete” section of this manual. This subsection of the manual contains additional inspection procedures and contract administration requirements for specification 407. There are important differences.

1. ACFC mix properties are different than AC, including the aggregate gradations, asphalt content, abrasion, percent of limestone in the aggregate, and specific gravity.
2. A higher percent of fractured coarse aggregate particles (crushed faces) is specified for ACFC and there is a flakiness index requirement.
3. Acceptance of the ACFC mix is based on grading and asphalt content as with AC, but there are no requirements for voids, stability, or flow.
4. The requirement that the mix be free flowing and homogeneous is reinforced by the citing of special measures that the Contractor may have to take to assure these characteristics.
5. There are ACFC placement date restrictions and surface temperature requirements.
6. Paving machine grade control devices are limited to short and long skis . Longitudinal pavement joints are permitted only at the centerline between adjacent lanes.
7. There is no ACFC compaction density requirement.
8. ACFC mixing, placement, and compaction temperatures are lower than AC. This is important to be able to place a mix with the higher amount of voids as intended.
9. ADOT develops the mix design based on the aggregate and asphalt cement samples provided by the Contractor. There are time constraints placed on the Department for producing the mix design. The Resident Engineer is responsible for ensuring that the time periods for reviewing and verifying a mix design by the Department are strictly followed unless different arrangements are made in writing with the Contractor. Therefore, it is important that the Resident Engineer check with the acceptance lab to ensure that they can complete the verification testing within the prescribed time.

Occasionally, the Contractor requests referee testing on a mix design that has failed verification testing. Only labs approved by ADOT's Materials Section can be used for referee testing. The acceptance lab will keep a split of the sampled materials used in the verification testing for use by the referee lab.

Compaction devices are limited to steel wheel compactors. Vibratory steel wheel compactors may be used in the static mode as long as the weight requirements are met. Because ACFC is porous and placed in thin lifts, it cools quickly (which is the reason for the surface temperature requirements). The rollers need to stay close behind the laydown machine, especially when the air is cool or when there is a wind.

The binder will separate from the aggregate when ACFC is stored for long periods of time in hot storage silos, or when the haul distance is long and the weather is hot. Typically, the asphalt will drain down resulting in a leaner mix at the top and richer mix at the bottom. When placed, this segregated mix will result in rich spots on the surface. Inspectors need to be alert for this condition and ensure it does not become a chronic problem.

It is important for the Inspector to control the spread. ACFC is an expensive material and should be used prudently (not in turn-outs or guard rail areas for example).