STELLARFLEX FR®

FUEL-RESISTANT ASPHALT MIX

SCOPE

Exposure of asphalt pavements to fuel spills and oil leaks often results in excessive softening of the asphalt cement binder in a surface mix. This translates to premature surface defects such as rutting and ravelling. There are a number of surfacing options available (e.g. coal tar sealers) to protect surfaces, but such options often only last two to three years before developing severe cracking and losing their intended purpose. Alternatively, **STELLARFLEX Fuel-Resistant® Hot Mix Asphalt (FR HMA)** can be used to protect a pavement structure from the harmful effects of fuel and oil spills as well as the effects of de-icing salts and chemicals. **STELLARFLEX FR® HMA** also provides a skid-resistant surface while maintaining superior resistance to traffic and environmental loads at different in-service temperatures.

STELLARFLEX FR® is a registered Trademark of Associated Asphalt Marketing, LLC. Canadian Patent Pending.

DEFINITIONS

STELLARFLEX FR® HMA is a specialty asphalt mixture formulated to be resistant to the effects of fuel spills, oil leaks, and de-icing chemicals. It is tailored to meet specific volumetric and performance criteria for a wide range of applications including

- airport pavements (runways, taxiways, de-icing stations);
- heavily-loaded pavements with high volumes and slow truck traffic;
- fuelling/gas stations and fuel storage tank areas;
- truck and bus stops; and
- seaports or commercial loading/off-loading areas.

MATERIALS

STELLARFLEX Fuel-Resistant® Performance Graded Asphalt Cements (FR PGAC) are engineered to resist the effect of light hydrocarbon fractions such as fuels and lubricants that soften and dissolve regular PGAC asphalts due to their chemical compatibility. In addition to fuel resistance, the **STELLARFLEX FR® PGAC** also provides against distresses such as rutting at higher pavement temperatures, fatigue cracking at intermediate temperatures, and thermal cracking at lower pavement temperatures. **STELLARFLEX FR® PGAC** contains specialty modifiers and additives that enhance mix handling during production and provide better field workability at lower temperatures when compared to traditional HMA. These improved characteristics are all achieved while simultaneously meeting the targeted mix density.

AGGREGATE BLEND

The aggregate blend should consist of 100% crushed coarse and fine sources meeting a set of standardized physical properties to ensure the long-term durability and strength of the asphalt mixture.

DESIGN CRITERIA

The design of **STELLARFLEX FR®** includes the following steps:

- the custom selection and formulation of STELLARFLEX FR® PGAC to meet the PG grade intended for adequate climate and traffic;
- aggregate selection and blending;
- designing a mix to meet the volumetric requirements of either Superpave or Marshall methods;
- and fuel-resistance testing via a 24-hour kerosene soak test.

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RECOMMENDED PERFORMANCE GUIDELINES

STELLARFLEX FR® HMA can be designed to meet different specifications and performance criteria. The P-601 specification shown below and developed by the Federal Aviation Administration (FAA) is the most advanced specification for airports.

TEST	SPECIFICATION	
	Min	Max
Gradation and PGAC		
12.5 mm	100	…
9.5 mm	90	100
4.75 mm	58	78
2.36 mm	40	60
0.075 mm	3	6
AC Content (%)	5	8
Volumetric and Performance Requirements		
Marshall Stability (N)	9,567	-
Air Voids (%)	2.30	2.70
Voids in Mineral Aggregate, VMA (%)	14.0	-
24-hour Mass Loss After Jet Fuel Immersion (%)	-	1.15
Asphalt Pavement Analyzer Rut Depth (mm) at 64°and 100 psi hose pressure	-	5.0

RECOMMENDED QUALITY CONTROL PLAN

A **STELLARFLEX FR® HMA** quality control plan should provide guidance and advice on the proper production, lay-down, and compaction while offering continuous technical support during construction. The quality control plan will ensure that

- the **STELLARFLEX FR® PGAC** is formulated to meet the specified requirements and is shipped at the correct temperature;
- the **STELLARFLEX FR® HMA** is produced at the recommended temperature;
- the appropriate lay-down equipment is utilized for each project;
- the substrate is prepared adequately to receive the mix; and
- the proper mix compaction is used to achieve the target density.