



Application instruction

Highly polymer modified bitumen according to EN 14023

(product operating manual in accordance with CPR 305/2011 art.11 para.6)

1. Types of product

Instruction covers all types of highly polymer modified bitumens according to EN 14023 produced by PKN ORLEN S.A.

2. Transport

Products should be transported in a liquid state at an elevated temperature ensuring pumpability. General rules of transport safety should comply with the requirements of ADR.

3. Storage of highly polymer modified bitumens (PMB HiMA)

The products should be stored in appropriate tanks, equipped with a heating installation and a mixing installation (recommended). Tanks should be equipped with temperature control apparatus and appropriate sampling connectors according to EN 58.

Due to the special properties of ORBITON HiMA bitumens, direct consumption of the binder is recommended immediately after its delivery to the asphalt mixing plant, without unnecessary time storage in the tank.

In the case of ORBITON HiMA bitumens, the manufacturer defines the following ranges temperature in the tank at the asphalt mixing plant:

- temperature below 160°C - storage 3-7 days
- temperature 160÷175°C - recommended temperature, storage up to 3 days (asphalt mixture production temperature)
- temperature above 175°C - temperature where there is a risk of deterioration of properties of the product.

Highly polymer modified bitumen ORBITON HiMA can be delivered at the asphalt mixing plant at temperatures above 175°C, as a result of the refinery's production proces. In such a situation, after unloading the bitumen to the storage tank, the heating in it should be turned off and the bitumen temperature should be brought to recommended.

3.1. Short-term storage at high temperature (up to 3 days)

- recommended bitumen storage temperature: 160÷175°C
- guaranteed shelf life of bitumen for asphalt mixture production: 3 days*

*It is recommended to use the binder directly after its delivery, without unnecessary storage in the tank.

If the mixing plant is equipped with tanks with agitators, bitumen should be periodically mixed in the tank. Additionally circulation can also be used.

The storage of highly polymer modified bitumen ORBITON HiMA at excessively high temperatures (above 175°C) may lead to a gradual increase in viscosity, limiting the possibilities of its use.



3.2. Long-term storage (3-7 days)

Storage for 3 - 7 days is possible on condition that the temperature is reduced below 160°C. Recommended storage temperature 145÷160°C.

After bitumen reheating to the asphalt mixture production temperature, the bitumen should be homogenized by mixing in the tank. It is recommended that the tank is equipped with an agitator. In the absence of agitated tanks, periodic product circulation between the tanks is recommended.

It is not recommended to cool highly polymer modified bitumen ORBITON HiMA to the ambient temperature and warm it up again.

Highly modified bitumens should not be stored for more than 7 days, regardless of the temperature.

4. Product samples

a) The procedure for handling bitumen test specimens is specified in the EN 12594 standard.

b) Heating of samples in the laboratory according to the standard procedure:

- the container cannot be tightly closed,
- in any case, samples should not be heated in a temperature exceeding 175°C,
- temperature and heating time:

| The size of the sample in the container | ORBITON 25/55-80 HiMA | ORBITON 45/80-80 HiMA | ORBITON 65/105-80 HiMA |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| | [°C] | [°C] | [°C] |
| containers of the volume of less than 1 litre, - sample heating time max. 2 hours | max. 175 | max. 175 | max. 170 |
| containers of the volume of 1–2 litres, - sample heating time max. 3 hours | max. 175 | max. 175 | max. 170 |
| containers of the volume of 2–3 litres, - sample heating time max. 3.5 hours | max. 175 | max. 175 | max. 170 |
| containers of the volume of 3–5 litres, - sample heating time max. 4 hours | max. 175 | max. 175 | max. 170 |
| Container of the volume of more than 5 liters, - sample heating time max. 8 hours | max. 165 for 6 hours, for the last 2 hours the temperature increased to max. 175 | max. 160 for 6 hours, for the last 2 hours the temperature increased to max. 175 | max. 155 for 6 hours, for the last 2 hours the temperature increased to max. 170 |
| | It is recommended to periodically mix the sample until it is liquefied | | |

c) After heating the samples in the containers, homogenize them by mixing, taking care not to introduce air bubbles into the sample. The maximum mixing (homogenization) time is 10 minutes.

d) When specimens of bituminous binders are intended for testing their properties, it is recommended, in accordance with the rules specified in EN 12594 p. 7.1, that after the sample is heated and homogenized, the material should be poured through a heated metal sieve with mesh # 0.5 mm, in order to eliminate possible contamination affecting the test results.

5. Production temperatures of mineral asphalt mixture

| Highly polymer modified bitumen ORBITON HiMA according to EN 14023: 2010 | Compaction temperature of samples during type testing ^{1) 2) 3) 4)} | Bitumen temperature in the tank at the mixing plant for the production of asphalt mixture | Temperature of the asphalt mixture immediately after pouring out of the mixer ⁴⁾ | Initial temperature of the asphalt mixture during compaction ⁴⁾ |
|--------------------------------------------------------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| | [°C] | [°C] | [°C] | [°C] |
| 25/55-80 HiMA | 145÷155 | 170÷175 | 170÷180 | >160 |
| 45/80-80 HiMA | 145÷155 | 170÷175 | 170÷180 | >160 |
| 65/105-80 HiMA | 145÷155 | 165÷175 | 170÷180 | >155 |

¹⁾ The temperatures recommended by the manufacturer may be changed in the case of other Contractor's experiences.

²⁾ The given ranges of compaction temperature of samples in the laboratory should be used depending on the expected conditions during the paving of the asphalt mixture - lower values of the compaction temperature of samples should be used in the case of construction works carried out in the period of low air temperature and for thin layers of pavement, higher values of the compaction temperature of the samples should be used in other conditions.

³⁾ Compaction of samples from coarse-grained mixtures and paved in thick technological layers, with high heat capacity - requires the determination of the individual concentration temperature of samples in the laboratory on the basis of previous experience and expected paving conditions.

⁴⁾ The given technological temperatures apply to hot rolled mixtures (AC, SMA, BBTM, PA, etc.). For the mastic asphalt mix, process temperatures should be used based on the mix workability test in the laboratory.

Note: Highly polymer modified bitumens from different manufacturers and bitumens of different types of the same manufacturer should not be mixed

6. Safety information

Information data sheets prepared in accordance with EU Regulation No. 453/2010 are available on the website <http://www.ornen-asfalt.pl/PL/InformacjeTechniczne/Strony/Karty-charakterystyki.aspx>

7. Unit preparing the Instruction

PKN ORLEN S.A.
Quality, Benchmark and Catalogues Department