

APPARATUS FOR THE HOMOGENIZATION OF HEAVY OIL OR RESIN OR BITUMEN BEFORE THE PREPARATION OF THE ASPHALT MIX

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Abstract. *Use of the asphalt mix for road construction or rehabilitation began with succes in 2nd part of 19th century and it has been the cheapest way according to any other material from the market. Since the beggining of the „asphalt era”, the technology has been improving year by year, and today we have very sophisticated mechanization of preparing the mix.*

Keywords: *heavy oil, resin, bitumen, homogenization, asphalt mix.*

To obtain better properties of the adhesive in the future asphalt concrete, it is needed an homogenization process to achieve the highest results.

For the preparation of the asphalt mix, worldwide are mainly used heavy oil, resin or bitumen as the adhesives.

Heavy oil

As defined by the U.S. Geological Survey (USGS), heavy oil is a type of crude oil characterized by an asphaltic, dense, viscous nature and its asphaltene content. It also contains impurities such as waxes and carbon residue that must be removed before being refined.

The formation of heavy oil and bitumen, like other forms of petroleum, originated with plant life millions of years ago. When the plants and small organisms (plankton) that fed on them died off, the sediments containing their remains were buried at the bottom of inland seas. In a highly simplified explanation, over time, the heat and pressure converted the carbohydrates into hydrocarbons.

Resin

Resin is a solid or highly viscous substance of plant or synthetic origin that is typically convertible into polymers. Resins are usually mixtures of organic compounds. Most plant resins are composed of terpenes. Specific components are alpha-pinene, beta-pinene, delta-3 carene, and sabinene, the monocyclic terpenes

limonene and terpinolene, and smaller amounts of the tricyclic sesquiterpenes, longifolene, caryophyllene, and delta-cadinene. Some resins also contain a high proportion of resin acids. Rosins on the other hand are less volatile and consist, inter alia, of diterpenes.

Bitumen

Asphalt, also known as bitumen, is a sticky, black, and highly viscous liquid or semi-solid form of petroleum. It may be found in natural deposits or may be a refined product and is classed as a pitch. Bitumen would not flow through a pipeline efficiently, so it is mixed with diluents to be readied for pipeline transportation as diluted bitumen. Diluents are usually natural gas condensate, naphtha or a mix of other light hydrocarbons. Bitumen is a mixture of heavy oil, sand, clay and water. It is separated from the sand and water in a centrifuge prior to dilution for transportation.

Description of the apparatus

Universal apparatus for the preparation of the uniform blend or emulsion, preferably type - water in oil containing the interconnected systems and the conversion and optimization of hydrodynamic turbulent flow parameters the emulsion components, at least three inputs, of which the inlet for the emulsification in the emulsion and homogenization zone inorganically connected to the tank with an inorganic liquid and located between two inlets for hydrocarbon fluid, associated with a tank for a hydrocarbon liquid, with both said input divide a stream of hydrocarbon fluid, typically in a ratio of 3:2, and systems transformation and optimization of hydrodynamic and turbulent flow parameters hydrocarbon liquid connected with two coaxial conical channels forming zone the liquid hydrocarbon stream output cavitation mechanism, in turn connected to an input of an inorganic component and an emulsion with linear channels for collection and output of the apparatus emulsion.

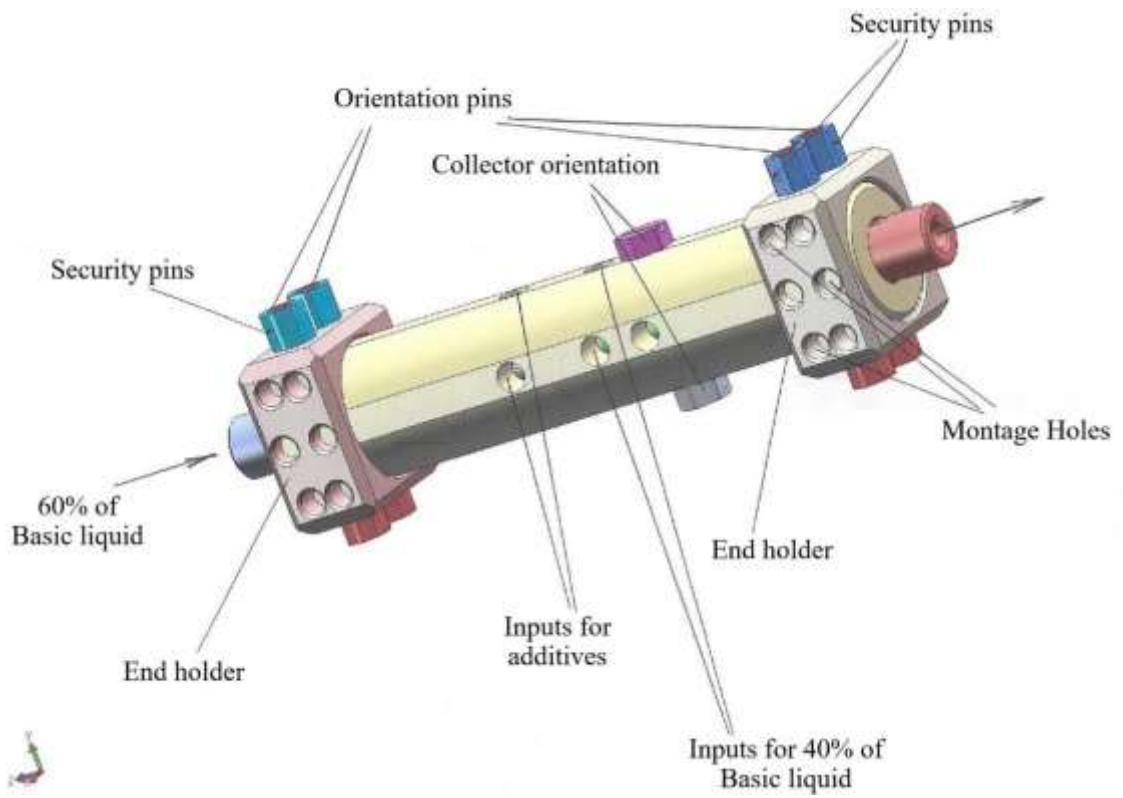


Figure 1. An example of a 3-D model of the apparatus.

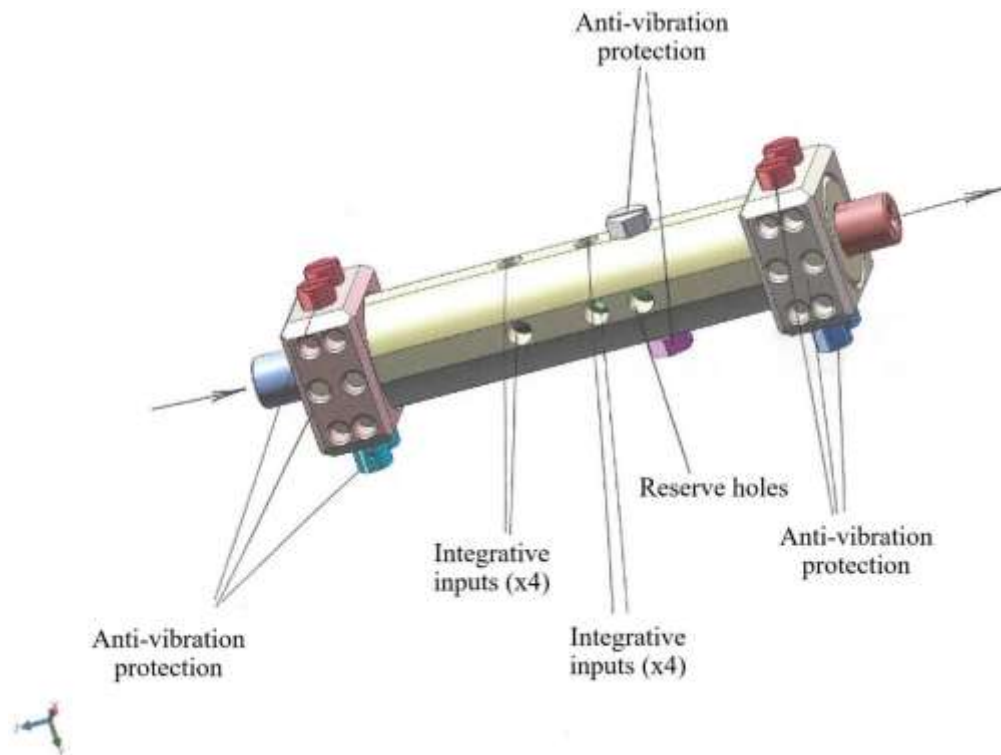


Figure 2. An example of a 3-D model of the apparatus on the opposite view.

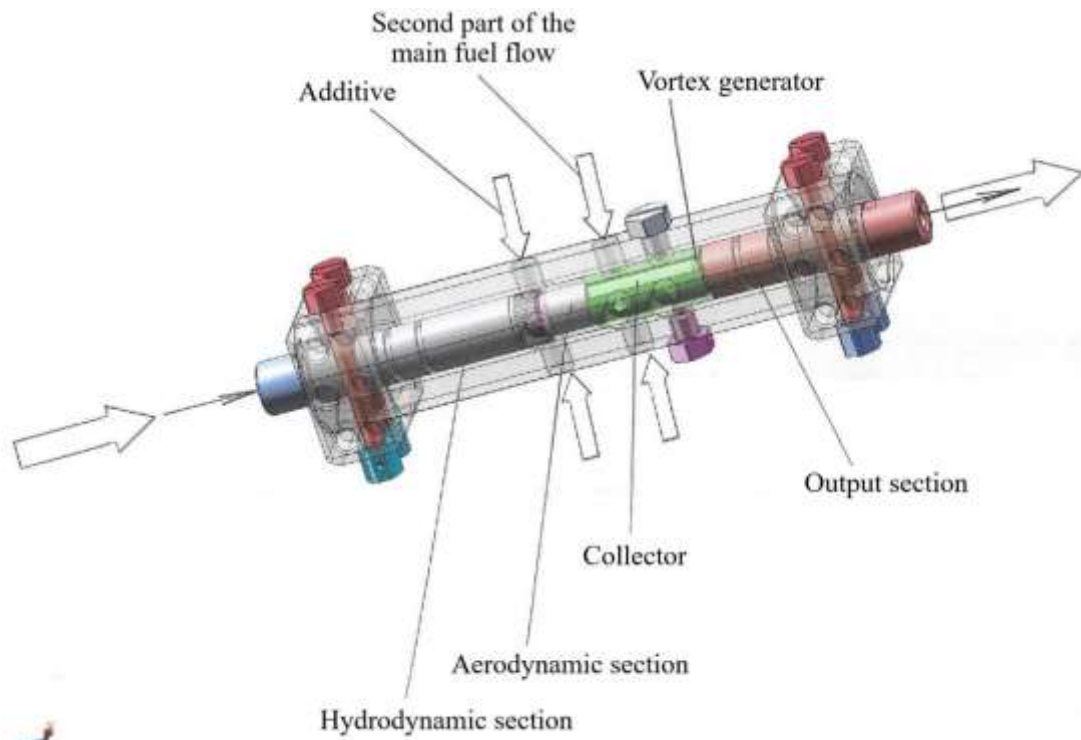


Figure 3. An example of a 3-D model of the apparatus with transparent housing.

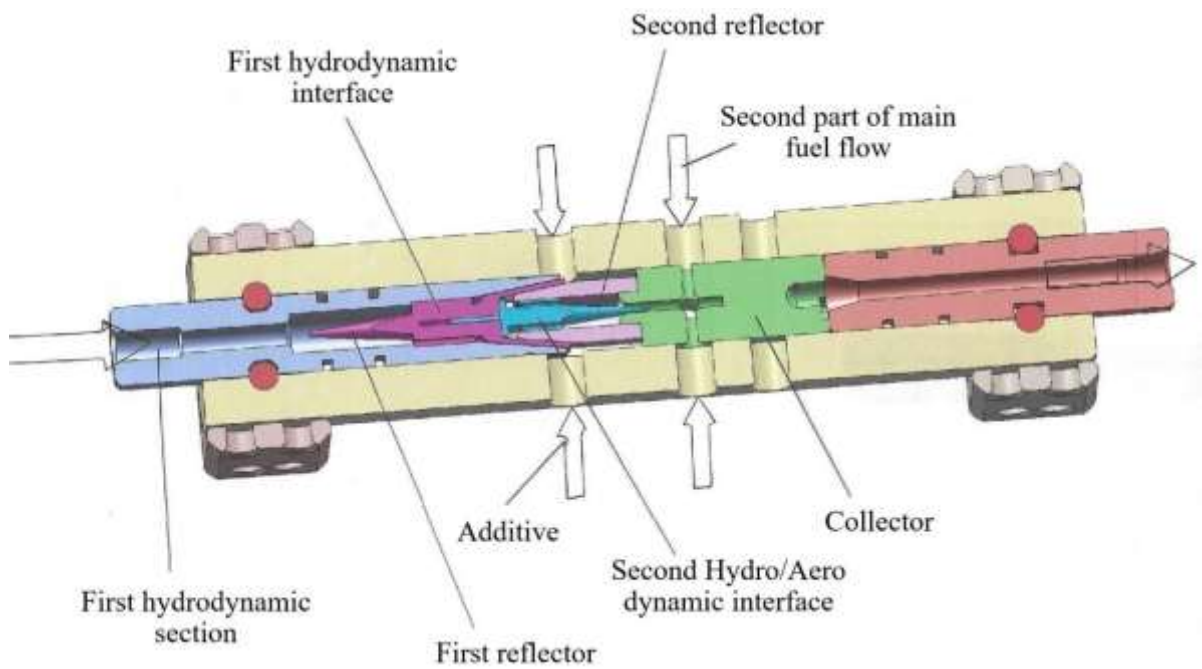


Figure 4. An example of a 3-D model of the apparatus in cross section.

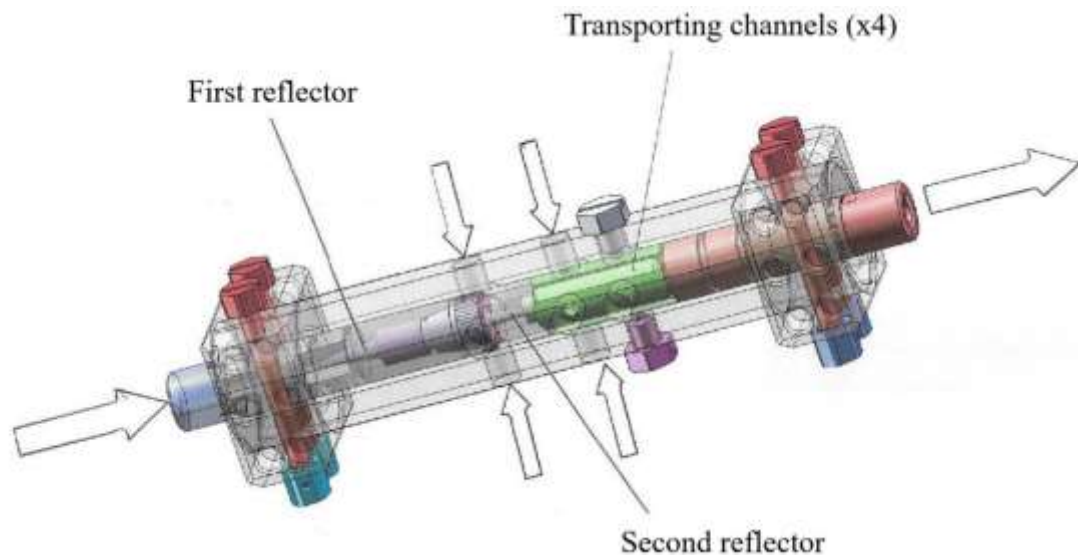


Figure 5. An example of a 3-D model of the apparatus with transparent housing.

In conclusion

The multicomponent liquids solution or emulsion, preferably a fuel emulsion, having a layered encapsulated internal structure effect bulk dynamic regeneration, comprising a base component liquid organic material is generally a hydrocarbon origin, embedded in its three-dimensional symmetrical structure of liquid material, typically a non-hydrocarbon origin, and generally and mainly in the form of at least two-component aqueous compounds characterized by certain geometric relationships between local micro volumes of the base liquid organic material and implemented in its three-dimensional hierarchical structure of inorganic liquid material,

References

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