C L A I M S

1. Reactor for the preparation of modified bitumen, which reactor comprises a horizontal housing comprising a cylindrical wall and two side walls, wherein a bitumen inlet has been provided at or near one of the side walls of the housing and a bitumen product outlet has been provided at or near the opposite side wall of the housing, wherein a plurality of inlets for the provision of oxygen-containing gas has been provided in the cylindrical wall of the housing between the bitumen inlet and the bitumen product outlet, which reactor is further provided with a mixer arranged inside the housing comprising at least one rotor rotating within at least one stator having a plurality of openings.

2. Reactor for the preparation of modified bitumen as claimed in claim 1, further comprising at least one inlet for the provision of catalyst and/or polymer and/or additives at or near the bitumen inlet or in the cylindrical wall of the housing.

3. Reactor for the preparation of modified bitumen as claimed in claim 1 or 2, further comprising a system for heating at least part of the cylindrical wall of the housing arranged within or outside at least part of the cylindrical wall of the housing.

4. Reactor according to claim 3, wherein the system for heating is a thermostatically controlling means.

5. Reactor according to claim 4, wherein the thermostatically controlling means is a jacket for the circulation of a liquid medium or heat tracing.

6. Reactor according to any one of claims 1-5, wherein the plurality of inlets for oxygen-containing gas amounts to 3 to 10 inlets.

7. Reactor according to any one of claims 1-6, wherein the mixer comprises 3 to 6 rotors arranged on a single rotating shaft and each rotating within a stator having a plurality of openings.

8. Reactor according to any one of claims 1-7, wherein the housing is further provided with baffles running in a direction perpendicular to the side walls.

9. Use of a reactor as claimed in any one of claims 1 to 8 for the purpose of modifying bitumen.

10. Process for the preparation of modified bitumen, which comprises mixing bitumen at elevated temperature and pressure with a modifier in a reactor as claimed in any one of claims 1 to 8.

11. Process for the preparation of modified bitumen as claimed in claim 10, wherein the modifier is an oxygen-containing gas that is provided via a plurality of inlets.

12. Process according to claim 11, wherein the mixing of bitumen with oxygen-containing gas is carried out at a temperature of from 160 to 300 °C and at a pressure of from 2 to 4 bar absolute.

13. Process for the preparation of modified bitumen as claimed in claim 10, wherein the modifier is a polymer or an additive and the reactor is equipped with a thermostatically controlling means.

14. Process for the preparation of modified bitumen as claimed in claim 13, wherein bitumen and modifier are mixed in a pre-mix tank and the mixture is introduced in the reactor through the bitumen inlet.

CLAIMS

1. Reactor for the preparation of modified bitumen, which reactor comprises a horizontal housing comprising a cylindrical wall and two side walls, wherein a bitumen inlet has been provided at or near one of the side walls of the housing and a bitumen product outlet has been provided at or near the opposite side wall of the housing, wherein a plurality of inlets for the provision of oxygen-containing gas has been provided in the cylindrical wall of the housing between the bitumen inlet and the bitumen product outlet, and wherein there is no additional outlet for gaseous products such that the gaseous products leave the reactor via the bitumen product outlet, which reactor is further provided with a mixer arranged inside the housing comprising at least one rotor rotating within at least one stator having a plurality of openings.

2. Reactor for the preparation of modified bitumen as claimed in claim 1, further comprising at least one inlet for the provision of catalyst and/or polymer and/or additives at or near the bitumen inlet or in the cylindrical wall of the housing.

3. Reactor for the preparation of modified bitumen as claimed in claim 1 or 2, further comprising a system for heating at least part of the cylindrical wall of the housing arranged within or outside at least part of the cylindrical wall of the housing.

4. Reactor according to claim 3, wherein the system for heating is a thermostatically controlling means.

5. Reactor according to claim 4, wherein the thermostatically controlling means is a jacket for the circulation of a liquid medium or heat tracing.

6. Reactor according to any one of claims 1-5, wherein the plurality of inlets for oxygen-containing gas amounts to 3 to 10 inlets.

7. Reactor according to any one of claims 1-6, wherein the mixer comprises 3 to 6 rotors arranged on a single rotating shaft and each rotating within a stator having a plurality of openings.

8. Reactor according to any one of claims 1-7, wherein the housing is further provided with baffles running in a direction perpendicular to the side walls.

9. Use of a reactor as claimed in any one of claims 1 to 8 for the purpose of modifying bitumen.

10. Process for the preparation of modified bitumen, which comprises mixing bitumen at elevated temperature and pressure with a modifier in a reactor as claimed in any one of claims 1 to 8.

11. Process for the preparation of modified bitumen as claimed in claim 10, wherein the modifier is an oxygen-containing gas that is provided via a plurality of inlets.

12. Process according to claim 11, wherein the mixing of bitumen with oxygen-containing gas is carried out at a temperature of from 160 to 300°C and at a pressure of from 2 to 4 bar absolute.

13. Process for the preparation of modified bitumen as claimed in claim 10, wherein the modifier is a polymer or an additive and the reactor is equipped with a thermostatically controlling means.

14. Process for the preparation of modified bitumen as claimed in claim 13, wherein bitumen and modifier are mixed in a pre-mix tank and the mixture is introduced in the reactor through the bitumen inlet.

15. Process for the preparation of modified bitumen as claimed in claim 10, wherein less than 10vol% of the reactor is gas space.

16. Modified bitumen produced by the process of any one of claims 10 to 15.