**TECHNICAL PROPOSAL**

Designation and description of test method:

**ASTM D 2425** **Standard Test Method for Hydrocarbon Types in Middle Distillates by Mass Spectrometry**

In view of the qualification and technical requirements provided by the Buyer, the Supplier shall fill in the below tables:

**Qualification and technical requirements applicable to laboratory equipment**

*Table 1*

| **Item No** | **Criterion** | **Requirement [specify]** | **Information provided by Supplier** |
| --- | --- | --- | --- |
| 1. | Qualification of Supplier’s employees | Provide documented information that the Supplier's employees or those of its subcontractors have been properly trained to commission the respective equipment. |  |
| 2. | Suitability of equipment for tests according to specified test method ***ASTM D 2425*** *Standard Test Method for Hydrocarbon Types in Middle Distillates by Mass Spectrometry.*  The manufacturer's certificate shall confirm the compliance of the instrument with the specified standard. | Submit manufacturer's technical documentation or certificate proving that equipment is suitable for tests according to the said test method. |  |
| 3. | Deadline for commissioning | The term for commissioning the equipment is max 60 days. |  |
| 4. | Warranty terms and conditions | Not less than 12 months; provide the terms and conditions for after-sales service for warranty periods longer than 12 months. |  |
| 5. | Supplier's response time during the warranty period. | Response time (arrival at the Refinery if there is no other way of fixing faults) during the warranty period is max 72 hours. |  |
| 6. | Submit equipment safe operation manual (document) in the English/Lithuanian language (preferably in Lithuanian). | Undertake to present the safe operation manual (document) in the English/Lithuanian language (preferably in Lithuanian) together with the supplied equipment. |  |
| 7. | Pre-commissioning/commissioning and training to be provided after the delivery of the equipment. | Undertake to perform pre-commissioning/commissioning and training after the delivery of the equipment. |  |
| 8. | Transfer of information relating to maintenance and repair of equipment to the equipment maintenance technicians of the QA/QC Center after the expiry of the warranty period. | Undertake to submit the information related to maintenance and repair of equipment to the equipment maintenance technicians of the QA/QC Center after the expiry of the warranty period. |  |

**Special technical requirements applicable to equipment**

*Table 2*

| **Item No** | **Characteristics** | **Limit values, UoM [indicated]** | **Limit values, UoM (to be specified by Supplier)** |
| --- | --- | --- | --- |
| 1. | **Equipment type:** | | |
| Automatic | GC-MS equipment containing:  - automated sample injection system;  - autosampler;  - a chromatograph with a chromatographic column capable of separating saturated and aromatic hydrocarbons  - column thermostat;  - Accelerator Mass Spectrometer with quadrupole, scanning range 50-300 AMU  - reducers for gas connection with pressure gauges, tubes;  - electronic gas flow control system;  - management and data processing software;  - other auxiliaries not mentioned but required for performing tests in accordance with ASTM D2425.  GC-MS is designed to identify the types of hydrocarbons present in conventional and synthetic hydrocarbons with a boiling range from 160 °C to 343 °C. Samples with an average paraffin carbon number from C12 to C18 can be analyzed. The following types of hydrocarbons are identified: paraffins, cycloparaffins, dicycloparaffins, tricycloparaffins, alkylbenzenes, indanes or tetralins, CnH2n-10 (indenes, etc.), naphthalenes, CnH2n-14 (acenaphthynes, etc.), CnH2n-16 (acenaphthalenes, etc.) and tricyclic aromatic hydrocarbons.  The sample is separated into saturated and aromatic hydrocarbon fractions by chromatography, and each fraction is analyzed using a mass spectrometer. |  |
| Semi-automatic | x |  |
| Manual | x |  |
| **Equipment manufacturer, model** | x |  |
| 2. | Software | Software that automatically controls the test procedure, with a standard program for processing the data and calculating the final result. |  |
| 3. | Measuring range, accuracy | Report each type of carbohydrate to the nearest 0.1% by weight. |  |
| 4. | **Sample injection system:** | | |
| Automatic | - automatic sample injection system with autosampler for up to 5-10 samples;  - syringes for automatic sample dosing (0.2–0.5 µl);  - autosampler vials (1-2 ml) with caps and seals. |  |
| A separate system | x |  |
| Manual | x |  |
| 5. | Heating/cooling system | x |  |
| 6. | **Connection to other equipment, auxiliaries:** | | |
| Computer | yes |  |
| Keyboard | yes |  |
| Printer | yes |  |
| Computer network via LAN | yes |  |
| Other [specify] | Connection to gas supply lines, new printers, keyboards, computer, connection to any laboratory information management system. |  |
| 7. | **Auxiliaries:** | | |
| Rotameter | x |  |
| Spec. set for calibration | Calibrant: perfluorotributylamine (PFTBA) of such masses as 69, 131, 219, 414, and 502 must have a certificate confirming its mass. |  |
| Filter | Gas filters. |  |
| Other [specify] | x |  |
| 8. | **Calibration and verification:** | | |
| At QA/QC Center | Calibration and verification using CRM. |  |
| Manufacturer’s calibration and CRM verification certificates | x |  |
| 9. | A set of spares sufficient for 12 months. | - A set of graphite ferrules for the column;  - Spare chromatographic column -1 pc.;  - Syringes, 2 pcs.;  - A set of gaskets;  - Vials with caps and closures (gaskets), 50 pcs.;  - Other spares not mentioned but needed for the period of 12 months. |  |
| 10. | Computer | x |  |
| 11. | Printer | x |  |
| 12. | Certified reference material | CRM covering components in the measurement range, with a certificate.  Preference will be given to CRM producers that meet ISO 17034 requirements. |  |
| 13. | **Gas cylinder required (purity class):** | | |
| He | HQ high pressure reducer with pressure gauges:  HP-300bar, LP-25bar, connection to gas cylinder, ‘Swagelok’ - 6mm outlet, with line closing and venting taps -1 pc, also a low pressure reducer with a pressure gauge: HP-40bar, LP-10bar, ‘Swagelok’ inlet- 6mm, ‘Swagelok’ outlet - 1/8, with a tap for line closing - 1 pcs. Tubes for connecting gas from the low pressure reducer to the equipment. Other means needed to connect He gas supply. |  |
| O2 | x |  |
| H2 | x |  |
| Nitrogen | x |  |
| Ar | x |  |
| 14. | **Sampling equipment for:** | | |
| Liquefied petroleum gas | x |  |
| Liquids | x |  |
| Refining gas | x |  |
| Other [specify] | x |  |
| 15. | **Equipment for preparation of test samples:** | | |
| Homogenizer | x |  |
| Shaker | x |  |
| Other [specify] | x |  |
| 16. | **Balance:** | | |
| Micro-analytical | x |  |
| Analytical | x |  |
| Technical | x |  |
| Other [specify] | x |  |
| 17. | **Dimensions:** | | |
| Height | x |  |
| Width | x |  |
| Length | x |  |
| 18. | Other [specify] | The report of the results must comply with the requirements of ASTM D2425 in terms of precision, units of measurement, etc., and may contain more information than required by the standards. |  |

**General information on the offered equipment**

*Table 3*

|  |  |
| --- | --- |
| **Information required** | **Information provided by Supplier** |
| Name/model of equipment |  |
| Information about the manufacturer, country of origin, language of the user manuals, passport |  |
| Confirmation that the equipment complies with the requested test method; additional test methods that the offered equipment complies with. |  |
| A summary of the technical/operational characteristics, highlighting the advantages of the offered equipment. |  |

**Detailed description of the equipment set, additional equipment and auxiliaries.**

**(to be specified by Supplier)**

*Table 4*

|  |  |
| --- | --- |
| **Description** | **Quantity, units** |
|  |  |
|  |  |
|  |  |

**Recommended set of spares and consumables for 1 year**

**(to be specified by Supplier)**

*Table 5*

|  |  |
| --- | --- |
| **Description** | **Quantity, units** |
|  |  |
|  |  |