

Questions in the scope of the Request for Tender no. 41/2020/MISCOMAR+ of 13.11.2020

1. How many raw materials / mixtures (different types of pellets) will be provided for the gasification tests? In the description „two types” of miscanthus are mentioned.

Ans: two different raw materials will be provided (defined in the tender as two types of miscanthus), both in pellet form.

2. Will the Buyer allow crushing the pellets prior to gasification to increase the ease of feeding into the reactor?

Ans: The Buyer does not allow any pretreatment of the pellets.

3. In which state of the raw material is the feeding rate range of 3-20 kg/h defined? As received, dry, dry and ash free?

Ans: The feeding rate range is defined in the as received state.

4. The solids collected in the cyclone will consist of a mixture of char, ash from the biomass and particles from the abrasion of the bed material. In the bed material there will be also a small amount of char and ash present. Please indicate where the Buyer wants to take the samples for the ICP analysis, because the abovementioned materials can be fractionated or not. This question is also related to the definition of the char and fly ash used by the Buyer.

Ans: The Buyer refers to char meaning the unconverted biomass (vide point 2a of the tender). By “fly ash” all solid particles (including char and bed fines) carried with the gas out of the gasification reactor are meant. The Buyer assumes that during the correct functioning of the reactor the fly ash will mainly consist of the inorganic fraction, hence the applied terminology. The Buyer plans to collect a sample of char separated from the bed material, as well as a sample of the fly ash separated by the cyclone without additional fractionation. Besides these two samples in the tender one additional sample is included, to be defined on site. For each raw material at least once a sample of the bed material mixed with the bottom ash (i.e. the remainings after the separation of char) will be collected.

5. Will the Buyer provide a micro gas chromatograph to perform the tracer (Ar, He) measurements of the gas flow rate (point 2h of the tender)? In point 3 the Tenderer is obliged to provide an on-line gas analyzer, and these requirements can only be fulfilled by a gas chromatograph (N₂ measurement). Will a periodic measurement, sampling using Tedlar gas bags, supported by continuous measurements by IR analyzers (without a continuous N₂ measurement) be acceptable?

Ans: According to the description in point 2h of the tender, the Buyer will provide the dosing and measuring equipment needed to perform the calculation of the gas flow rate at the outlet of the reactor. The Buyer does not allow to perform the gas analyses mentioned in point 3a by using off-line methods.

6. Please specify which analytical facilities, reagents and laboratory equipment should the Tenderer make available to the Buyer (point 3 of the tender)?

Ans: The analytical facilities of the Tenderer should allow to perform the activities described in point 3a (producer gas analysis) and 3b (analysis of the samples to determine the content of heavy metals) of the tender – here the analytical results are made available by the Tenderer to the Buyer, and not the equipment itself. The reagents to be provided are listed in point 3c, and the laboratory devices in point 3d.

7. To which temperature does the +/-30°C temperature range refer to? Does it refer to one single measurement point, all temperatures in the reactor or perhaps the selected temperatures in the bed?

Ans: The +/-30°C criterion refers to the temperatures stated in point 2d of the tender and applies to all temperatures that have influence on the measurement results, in particular to the temperatures of the bed and the freeboard.

8. The Buyer has stated an upper temperature range at which the experiments should be performed. This parameter strongly influences the release of heavy metals, but also on the possible bed sintering. Specifying two temperature setpoints for the gasification process without insight into the fuel ash characteristics is a significant risk and can lead to unsuccessful experiments or testing the heavy metals release pattern under inadequate conditions. Will the ash composition and the characteristic ash melting temperatures determined for a semi-reducing environment be available to the Buyer? Such characteristics can be determined at our Institute. Should the Tenderer include them in the quotation?

Ans: The elemental composition of the ash is available to the Buyer. The Buyer assessed the risk of bed sintering considering the ash composition, and as the result the Buyer posed a requirement described in point 4b regarding the bed sintering countermeasures.

9. Ad point 4c of the description. To which process gas conditions does the Buyer refer to, mentioning the second volatile heavy metals measurement point “after the gas cleaning stage”: hot gas only dedusted in the cyclone, cold gas, dry, after removing the organics, water? Please provide the detailed geometry of the sampling points.

Ans: The Buyer requires the ability to sample hot gas (temperature above the dew point of water and tar), which was primarily dedusted in a cyclone. The Buyer has designed and will produce gas sampling probes with the outer diameters of ½” and 1”, which will be used depending on the superficial gas velocity at the sampling location. The Buyer requires to be able to insert the probes parallel and countercurrently to the gas flow, e.g. using a T-piece installed on the gas duct (to be provided by the Tenderer). The length of the sampling probes will be confirmed with the Tenderer prior to the start of the experiments. The Buyer allows the installation of the sampling probes on the location where the gas is flowing horizontally or vertically upwards, but does not allow locations where the gas flows downwards. Minimum inner diameter of the gas duct at the sampling location should be 50 mm. The sampling probes will be mounted on flanges (the DN size to be confirmed with the Tenderer prior to the start of the experiments) by means of Swagelok-type fittings. The fittings and the flanges will be supplied by the Buyer, the Tenderer provides the gaskets for the flanges.

10. Ad point 5 of the description. In view of the questions mentioned above please specify the results of the work performed within the scope of the tender. In addition, does these results apply combined to each of the biomass kinds or do they also apply to different process setpoints (i.e. ultimately minimum 1 kg of char from 2 types of biomass – 2 x 1kg; or 4 x 1kg – separately from temperature settings 1 and 2 for biomass 1 and 2).

Ans: The minimum required by the Buyer amounts to 1 kg of char from each type of biomass, thus 2 x 1 kg. The Buyer assumes that the samples will be collected separately after each experiment, therefore the char samples obtained during the tests at different temperature settings should not be mixed. Nonetheless the required minimum amounts to a total mass of 1 kg per type of biomass, as indicated above. By the 100 g mentioned in point 5b a minimum sample collected at the gas cleaning stage (at least 1 high-temperature cyclone, as stated in point 2g) is meant. If the Tenderer has an installation equipped with a e.g. high-temperature filter which will be a part of the process chain, then the Buyer also requires to provide a sample of the material separated by the filter and obtained during the normal regeneration cycles (e.g. shaking the baghouse filters or back-pulsing of the candle filters).