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Annex 6 to the Notice of initiation of the PMC
REQUIREMENTS FOR GUARANTEED PARAMETERS

(Unofficial translation)

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Legend

The values of the parameters marked ... shall be completed by the Bidder/Contractor in the bid submitted for the tender. **NOT TO BE FILLED IN UNDER PTK**.
Failure to achieve the values so understated shall be grounds for the application of a Contractual Penalty to be specified in the Contract.
Failure to achieve the values so understated may be grounds for non-acceptance of the Work and/or for withdrawal from the Contract under the terms and conditions specified in the Contract.

1 Guaranted parameter line K3

1.1 Incineration of mixed municipal waste

Guaranteed values:

Parameter		Unit	Limit value	Guaranteed value
(i)	Continuous heat input of the firebox	MW_t		45,8
(ii)	Minimum stable heat input of the firebox	MW_t		≤ 32.1
(iii)	Flue gas residence time at a temperature of at least 850°C over the entire range of the combustion power diagram (after the last air inlet)	second	≥ 2	
(iv)	Unburned in slag and grate slump over the entire range of the combustion power diagram; related to dry matter as loss by annealing	wt.%	≤ 4	≤ 3

1.2 Cleaning the burn ín

Guaranteed flue gas outlet values:

Pollutant		Unit	Period for determination	Limit value	Guaranteed value
(v)	Particulate pollutants (PM)	mg/Nm^3	Daily average	< 5	< 4
(vi)	Organic carbon (TOC/TVOC)	mg/Nm^3	Daily average	< 10	≤ 8
(vii)	Hydrogen chloride (HCl)	mg/Nm^3	Daily average	< 6	< 5
(viii)	Hydrogen fluoride (HF)	mg/Nm^3	Daily average	< 1	< 0,8
(ix)	Sulphur dioxide $(SO)_2$	mg/Nm^3	Daily average	< 30	≤ 24
(x)	Carbon monoxide (CO)	mg/Nm^3	Daily average	≤ 30	≤ 24
(xi)	Nitrogen oxides (NOx as $NO)_2$	mg/Nm^3	Daily average	≤ 80	≤ 64

(xii)	Cadmium, Thalium (Cd + Tl)	mg/Nm^3	Average over the sampling period	< 0,02	≤ 0,015
(xiii)	Mercury and its compounds (Hg)	mg/Nm^3	Daily average or Average over the sampling period	<0,02	≤ 0,015
(xiv)	Sb+As+Pb+Cr+Co+Cu+ Mn+Ni+V and their compounds	mg/Nm^3	Average over the sampling period	< 0,3	≤ 0,25
(xv)	PCDDS/PCDFS	ng/Nm^3 TEQ	Average over the sampling period	< 0,04	≤ 0,032
(xvi)	PCBs	ng/Nm^3 TEQ	Average over the sampling period	< 0,06	≤ 0,05
(xvii)	Ammonia (NH)$_3$	mg/Nm^3	Daily average	≤ 5	≤ 4

1.3 Steam Production

Guaranteed value:

Parameter		**Unit**	**Limit value**	**Note**
(i)	Nominal superheated steam temperature at the outlet of boiler K3	°C	400	max. oscillation ± 5°C

1.4 Boiler thermal efficiency

Guaranteed value:

Parameter		**Unit**	**Limit value**	**Guaranteed value**
(i)	Boiler thermal efficiency for the design - nominal point ,,N,,	%	not< as 80	≥.....

1.5 Consumption of operating materials

Conditions for proving

- evaluated during a 5-day period of operation of the K3 line

Guaranteed values:

Parameter		Unit	Guaranteed value
(i)	Specific consumption of $Ca(OH)_2$	kg/h	≤ value according to the consumption chart .....
(ii)	Specific consumption of activated carbon	kg/h	≤.....
(iii)	Ammonia water (NH_4 OH) 25%	kg/h	≤.....
(iv)	Sodium hydroxide (NaOH) 50%	kg/h	≤.....
(v)	Process water consumption for cooling and flue gas treatment	m/h^3	≤.....

1.6 Continuous operation time of boiler K3

The term 'continuous boiler operation time' means the time between two scheduled shutdowns during which the boiler can be operated at the continuous heat input of the firebox.

Conditions for proving

- the evaluation of the boiler's continuous operation time starts on the day of the provisional acceptance of the K3 line
- the continuous operating time of the boiler does not include downtime for repair of the equipment or downtime for reasons other than downtime of the equipment for cleaning
- the period of continuous operation of the boiler is considered to be terminated if the boiler has to be shut down due to fouling of the heat exchange surfaces, i.e. when the flue gas temperature in front of the last superheater exceeds 650 °C and/or the flue gas temperature at the boiler outlet exceeds 230 °C and/or the pressure loss at the boiler exceeds..... kPa. The 24-hour mean value on the measurements shall be calculated.

Guaranteed value:

Parameter		Unit	Limit value	Guaranteed value
(i)	Continuous boiler running time	hours	not < than 7900	≥.....

2 Guaranteed parameters K2 line

2.1 Incineration of mixed municipal waste

Guaranteed values:

	Parameter	Unit	Limit value	Guaranteed value
(i)	Continuous heat input of the firebox	MW_t		27,5
(ii)	Flue gas residence time at a temperature of at least 850°C over the entire range of the combustion power diagram (after the last air inlet)	second	≥ 2	
(iii)	Unburned in slag and grate slump over the entire range of the combustion power diagram; related to dry matter as loss by annealing	wt.%	≤ 5	

2.2 Flue gas cleaning

Guaranteed flue gas outlet values:

Pollutant		Unit	Period for determination	Limit value	Guaranteed value
(i)	Particulate pollutants (PM)	mg/Nm^3	Daily average	< 5	< 4
(ii)	Organic carbon (TOC/TVOC)	mg/Nm^3	Daily average	< 10	≤ 8
(iii)	Hydrogen chloride (HCl)	mg/Nm^3	Daily average	< 6	< 5
(iv)	Hydrogen fluoride (HF)	mg/Nm^3	Daily average	< 1	< 0,8
(v)	Sulphur dioxide (SO_2)	mg/Nm^3	Daily average	< 30	≤ 24
(vi)	Carbon monoxide (CO)	mg/Nm^3	Daily average	≤ 30	≤ 24
(vii)	Nitrogen oxides (NOx as NO_2)	mg/Nm^3	Daily average	≤ 80	≤ 64
(viii)	Cadmium, Thalium (Cd + Tl)	mg/Nm^3	Average over the sampling period	< 0,02	≤ 0,015

(ix)	Mercury and its compounds (Hg)	mg/Nm^3	Daily average or Average over the sampling period	<0,02	≤ 0,015
(x)	Sb+As+Pb+Cr+Co+Cu+ Mn+Ni+V and their compounds	mg/Nm^3	Average over the sampling period	< 0,3	≤ 0,25
(xi)	PCDDS/PCDFS	ng/Nm^3 TEQ	Average over the sampling period	< 0,04	≤ 0,032
(xii)	PCBs	ng/Nm^3 TEQ	Average over the sampling period	< 0,06	≤ 0,05
(xiii)	Ammonia (NH)$_3$	mg/Nm^3	Daily average	≤ 5	≤ 4

2.3 Consumption of operating materials

Conditions for proving

- evaluated during a 5-day period of operation of the K2 line

Guaranteed values:

Parameter		Unit	Guaranteed value
(i)	Specific consumption of $Ca(OH)_2$	kg/h	≤ value according to the consumption chart .....
(ii)	Specific consumption of activated carbon	kg/h	≤.....
(iii)	Ammonia water (NH_4 OH) 25%	kg/h	≤.....
(iv)	Sodium hydroxide (NaOH) 50%	kg/h	≤.....
(v)	Process water consumption for cooling and flue gas treatment	m /h^3	≤.....

3 Guaranteed boiler parameters k1

3.1 Incineration of mixed municipal waste

Guaranteed values:

Parameter		Unit	Limit value	Guaranteed value
(i)	Continuous heat input of the firebox	MW_t		27,5
(ii)	Flue gas residence time at a temperature of at least 850°C over the entire range of the combustion power diagram (after the last air inlet)	second	≥ 2	
(iii)	Unburned in slag and grate slump over the entire range of the combustion power diagram; related to dry matter as loss by annealing	wt.%	≤ 5	

4 Use of energy contained in mixed municipal waste to produce electricity and heat

Conditions for proving

- test duration for each operating condition of at least 8 hours
- the amount of steam supplied from the boilers to TG 2:

  (a) 54 t/h

  (b) rated steam outputs K3 + K2 =.....t/h

    - rated steam output of boiler K3 = ...t/h
    - rated steam output of boiler K2 (K1) = ...t/h
- the rated steam output of the boiler is the steam output at the design-nominal point ,,N,, of the combustion power diagram
- in the scope of test 'A' and in the scope of test 'B', the guarantee measurement will be performed and assessed only for one of the steam delivery options (a) or (b)
- parameter values will be verified for the following two operating states:
  - **Operating state 1** - TG 2 in full condensing operation (steam extraction only for own consumption), no heat is supplied to the hot water pipeline
  - **Operating status 2**
    - **4.2.a)** - TG 2 in off-take operation, max. heat supply to the hot pipe ..... MW_t at a mains water temperature gradient of 105 / 50°C in the hot water pipeline.
    - **4.2.b)** -TG 2 in off-take operation, max. heat supply to the hot pipe 40 MW_t at the temperature gradient of the network water in the hot pipe 105 / 50°C.

Guaranteed values:

Operating status 1

Parameter		Unit	Guaranteed value
4.1.a)	Electrical power at the generator terminals (steam quantity to TG 2 - 54 t/h)	MW_{el}	≥ .....
4.1.b)	Electrical power at the generator terminals (steam quantity for TG 2 - .....t/h)	MW_{el}	≥ .....

Operating status 2

Parameter		Unit	Guaranteed value
4.2.a)	Electrical power at the generator terminals (steam quantity to TG 2 - 54 t/h and heat supply to the hot water pipeline .....MW)$_t$	MW_{el}	≥ .....
4.2.b)	Electrical power at the generator terminals (steam quantity to TG 2 - ....t/h and heat supply to the hot pipe 40MW)$_t$	MW_{el}	≥ .....

Parameter		Unit	Limit value
5.3.b)	Gross electrical efficiency at full condensing operation TG 2 (steam quantity for TG 2 - .....t/h)	%	≥25

5 Air cooled condenser

Conditions of proof:

- the air-cooled condenser test shall be carried out for operating condition 1 according to Chapter 4
- reference ambient air temperature +26°C

- atmospheric pressure reference value of 101,32 kPa
- if the ambient air parameters are different from the design point during the guarantee measurements, correction curves are used to evaluate the guarantee value

Guaranteed value:

Parameter		Unit	Guaranteed Value
(i)	Pressure at the turbine outlet flange	kPa abs	≤ 10,0

6 Availability

Availability of a part of the Work means the relative period of time during which the part of the Work in question is capable of operating at its rated performance and rated parameters.

The availability of a part of the Work per year is given by the relationship:

$$D = \frac{100 * t_p}{t_c} \quad [\%]$$

Where:

D.....availability *of* part of the Work per year [%]

t_p .....total time for the evaluation period during which a portion of the Work is operational or ready for immediate startup [in hours]

t_c .....max. possible pool of operating time of the Work for the evaluation period (8760 hours)

Conditions of proof:

- the period of continuous operation of the boiler shall be evaluated by the Customer with the Contractor's participation on the basis of operating records during the warranty period of the parts of the Work in question
- tp does not include the time from the moment of shutdown of the equipment (the subject part of the Work) due to equipment failure or accident, or the time when the equipment is unable to meet the defined parameters
- tp includes time(s)
- equipment downtime parts of the Works start-up from downtime
- caused by external influences or force majeure
- caused by improper operation (failure to follow operating procedures)
- caused by equipment failure outside the scope of the Workin question
- arising from a decision or reasons on the part of the Customer
- the period of planned shutdown of the OLO Waste to Energy Plant line(s). This period will be a maximum of 28 days/year

Guaranteed values:

Parameters for parts of the Work		Unit	Limit value	Guaranteed value
(i)	Line 3 availability	%	94	≥ .....
(ii)	Line 2 availability	%	96	≥ .....
(iii)	Availability of TG 2, exchanger station and air-cooled condenser	%	96	≥ .....

7 Dust emissions from silos

Emissions will be demonstrated under the following conditions:

- When filling the silo from the tanker truck (e.g. Ca(OH)2 silo, activated carbon)
- When filling the silo with reaction residues from flue gas cleaning and ash from the boiler

Guaranteed value:

Parameter		Unit	Limit value
(i)	Dust emissions to air from solids	mg/m^3	< 5

8 Acoustic noise k

Conditions of proof:

- The noise level will be measured at the rated output of the Energy Recovery Facility
- Application and compliance:
- Act No. 124/2006 Coll. on Health and Safety at Work, as amended
- Act No. 355/2007 Coll. on the protection, promotion and development of public health, as amended
- Decree of the Ministry of Health of the Slovak Republic No. 549/2007 Coll., establishing permissible values of noise, infrasound and vibration and on the requirements for the objectification of noise, infrasound and vibration in the environment, as amended by Decree of the Ministry of Health of the Slovak Republic No. 237/2009 Coll.
- Slovak Government Regulation No. 115/2006 Coll. on minimum health and safety requirements for the protection of employees against risks related to noise exposure, as amended by Slovak Government Regulation No. 555/2006 Coll.

Guaranteed values:

Parameter	Limit value	Note

(i)	The Contractor shall ensure that the existing noise levels in the protected outdoor area are not impaired due to the impact of the delivered Work, both during daytime and nighttime hours when the Waste to Energy Facility is fully operational	Permissible values for the outdoor noise determinants according to Decree No. 549/2007 Coll.	These noise levels will be verified in the protected outdoor area at points determined by the approving governmen t authorities
(ii)	Sound pressure level of indoor equipment (in buildings)	< 85 dB(A)	
(iii)	Sound pressure level of equipment in outdoor areas (outside enclosed buildings)	< ..... dB(A)	
(iv)	Sound pressure level of the air-cooled condenser	80 dB(A)	1.5 m above the roof, 1 m from the outline