



Project:

# Østfold Avfallssortering IKS - MRF

Title:

## APPENDIX E

# TECHNICAL DOCUMENTATION AND DATA SHEETS

C1		For Contract			
B1	23.09.22	For Tender	LIF	PT	ASE
A1	01.09.22	For Internal control	LIF	PT	PT
Revision	Date	Text	Author	Checked	Approved
Developer's logo:			Contract number:	Version :	Number of pages:
		<small>Entsorgungstechnik Innentechnik und Genehmigungsmanagement</small>	<b>2022_01</b>	<b>B1</b>	<b>Page: 1 of 8</b>

# TABLE OF CONTENT

<b>1</b>	<b>TECHNICAL DOCUMENTATION .....</b>	<b>3</b>
1.1	GENERAL .....	3
1.2	DOCUMENT DELIVERY .....	3
1.2.1	<i>As built</i> .....	3
1.3	METADATA .....	4
1.4	FILE FORMAT .....	5
1.4.1	<i>File name</i> .....	5
1.5	DOCUMENTS FOR OPERATION .....	5
1.6	DOCUMENT FOR MAINTENANCE .....	6
1.7	CHEMICALS .....	7
1.8	EQUIPMENT .....	7
1.9	QA/QC .....	7
<b>2</b>	<b>DATA SHEETS .....</b>	<b>8</b>
<b>3</b>	<b>ATTACHMENTS .....</b>	<b>8</b>

# 1 TECHNICAL DOCUMENTATION

## 1.1 General

The technical documentation is a part of the delivery of Contractor. The delivery is not completed until all documentation is commented and approved by Client.

All calculations, specifications, drawings, test procedures etc. submitted by Contractor or Subcontractors and passed over to Client shall have Contractor's approval clearly marked.

All dimensions appearing in correspondence, design and drawings shall be given in SI-units.

All documents shall be easily traceable to the subject involved and shall contain all requested metadata (see 1.3 for more information about requested metadata). This data shall be presented on the frontpage of the document unless another way is approved by Client.

## 1.2 Document delivery

All documentation will be delivered by Contractor who shall:

- Upload them into client's documentation handling system
- Enter the requested metadata in the system

Documents for review will be given a Client Acceptance Code according to the following logic:

Code 1 – Accepted  
Code 2 – Accepted w/comments  
Code 3 – Rejected  
Code 4 – For Information

Client has got 5 working days to approve or reject a document delivery.

Document delivered after 16.00 GMT +1 is considered as delivered the following working day.

### 1.2.1 As built

When the facility has been completed, a list of all submitted documents showing latest revision shall be provided. This will be considered as-built status of the document deliverables.

The final delivery of as-built documentation shall contain of one digital version and two sets of hardcopies, one in English and one in Norwegian language. The hardcopies shall be made according to Norwegian standards of hole placement and binder.

## 1.3 Metadata

All documents shall be easily traceable and searchable to the subject involved. For this purpose, metadata is used. Metadata required on each document is the following:

- Title
- Document number
- Date
- Revision
- Revision date
- Language
- Project number
- Project name
- AKS
- Document Content Classification code
- Supplier
- Manufacturer (originator company)

### 1.3.1 Document number

All documents get their own number according to the following logic.

Project number + contractor code + DCC code + 3-digit serial number:

- Project number is Client project no (2022\_01)
- Contractor code is supplied by the Client
- DCC code according to client's standard of codes, see chapter 1.3.5

### 1.3.2 Revision

All revisions are indicated by two digits and starts with 01. Revision 00 is to be used for unfinished documents that are sent for previews or similar. A document in revision 00 may never be considered as a valid document.

Revision history shall be included on all documents.

### 1.3.3 Language

All documents in the project shall be provided in English. No other languages will be accepted unless there is a requirement that the document need to be translated to Norwegian. In that case both an English and Norwegian version shall be provided. These two documents shall have identical document number and titles in the corresponding language. The English version is always the master in case of different information.

The documentation that needs to be translated into Norwegian is the operation and maintenance documentation.

Translations shall be made by a person who has Norwegian as first language and sufficient technical competence.

#### **1.3.4 AKS**

All documents in the project shall be tagged with an AKS number. See appendix D5 Plant coding system.

#### **1.3.5 Document content classification code**

All documents shall be classified by content by Contractor and coded correspondingly. The code consists of 3 letters that describe the content of the document. For example, LIS means list and DWG means drawing. A list of valid codes will be provided by Client in conjunction with signing the Contract.

### **1.4 File format**

All documents shall be provided in PDF format. All PDF files shall be searchable and if it got more than 10 pages it must contain a digital index.

Native file format should be provided for a selection of the document deliverables. This is limited to typically lists/overviews (excel) and 3D-model (e.g. STEP/IFC).

#### **1.4.1 File name**

All documents shall be named corresponding to their own document number. Documents translated into Norwegian shall have the suffix \_no.

### **1.5 Documents for Operation**

The operational instructions shall include, but shall not be limited to the following operational situations, depending on each subsystem:

- Operation, including all modes of operation of the different lines
- Capacity variations
- Shut-down
- Standstill
- Preparations for start-up
- Start-up
- Abnormal and emergency situations
- Cleaning

The operational instructions shall include, but shall not be limited, to the following items:

- Technical structure and functioning of the entire plant
- Theoretical background of functioning of the system
- Operational limits for measured values
- Modes of operation to be avoided, if any, and the reason for the restrictions
- Precautions to be taken for normal operation and for operation under abnormal conditions

- Cleaning instruction for all equipment

## 1.6 Document for Maintenance

Contractor shall supply info regarding the plant before commissioning including the following tasks:

- Equipment registers
- Preventive maintenance programs (weekly, monthly, annually etc.)
- Inspection system and plans
- Test programs
- Repairs including work descriptions
- Determining the numbers of spare parts and materials
- Procurement of special tools

The equipment record (in format specified by the Client) shall contain:

- Contact addresses of the Contractors, Subcontractors and Manufacturers
- Complete technical data on each identifiable process equipment (valve, pump, motor etc.) including equipment code.
- Data of ATEX-areas and objects
- Spare parts list, spare parts recommendation with technical data filled in are required for each machinery and equipment.
- Documents / drawings:
  - List of documents (summary list on all documents e.g. drawings, schemes, instructions separately on each machinery/ equipment)
  - Ware & Spare parts list including part number
  - Assembly drawings including exploded view and list of parts with part number and main data on dimensions and materials
  - Assembly drawings on fragile and wearing parts including main data on dimensions and materials
  - Drawings, measurement and inspection charts (including data on dimensions with tolerance limits), and installation instructions and documents needed for complete dismounting, control and mounting work.

Data on maintenance shall be provided separately for mechanical, electrical and instrumentation maintenance. Process plant shall export operating hours for each electrical motor (tag) to a future maintenance program for planning of preventive maintenance. Data exchange to be decided during detail design phase. The following data shall be included:

- Criteria for maintenance
- Objects of maintenance
- Intervals between maintenance
- Maintenance time (man-hours)
- Required measures (including data on necessary special tools, spare parts and materials, three alternatives for lubricants, Shell, Esso and Mobil)
- Inspection programs
- List of the required special tools

- Detailed instructions for installation and use including necessary drawings on the device to be delivered.

Data on preventive maintenance shall be included together with inventory records.

## **1.7 Chemicals**

To be allowed to bring chemicals to the working site the Contractor need:

- A written approval at least 5 days before the chemicals arrive
- Provide safety data sheets in connection with the application for a permit
- Bring an own copy of the safety data sheets

## **1.8 Equipment**

When delivering equipment, the Contractor shall provide instructions for unloading and handling the equipment at least 10 working days before the equipment arrives at site. This also applies if the Contractor himself doing all the handling.

## **1.9 QA/QC**

Reference is made to appendix D2 Quality Plan.

## 2 DATA SHEETS

For each machinery and equipment included in the scope of work, the enclosed Excel datasheet must be completed by the Supplier.

The listed equipment should be presented with appropriate descriptions with design drawings, brochures, etc.:

- Structural Steel, Platforms for Maintenance and Walkways
- Shredder (example)
- Process equipment 2 (Supplier to complete in enclosed Excel sheet)
- Process equipment 3 (Supplier to complete in enclosed Excel sheet)
- Process equipment 4 (Supplier to complete in enclosed Excel sheet)
- Process equipment x (Supplier to complete in enclosed Excel sheet)
- Process equipment x (Supplier to complete in enclosed Excel sheet)

*Supplier shall establish a format and fill in with information for sieves, NIR units, bunkers, balers, container station, compacting stations with containers etc. The information shall give all main data for the equipment, refer datasheet shredder in the enclosed Excel sheet*

In addition to the above, data for the following equipment shall be completed, refer Attachment 1:

- Dedusting Plant/Filters
- Compressor Plant
- Conveyors
- Power Consumptions
- Electrical equipment
- CMS equipment
- Personnel / cleaning hours

## 3 ATTACHMENTS

Attachment 1: Datasheets – Excel template (basis)



## Appendix E Data sheets - Content



E 2. 1	Structural Steel, Platforms for Maintenance and Walkways
E 2. 2	Shredder
E 2. 3	Dedusting Plant/Filters
E 2. 4	Compressor Plant
E 2. 5	Conveyors
E 2. 6	Power Consumptions
E 2. 7	Electrical equipment
E 2. 8	CMS equipment
E 2. 9	Personnel / cleaning hours

Supplier shall establish a format and fill in with information for sieves, NIR units, bunkers, balers, container station, compacting stations with containers etc. The information shall give all main data for the equipment, refer datasheet shredder in this Excel sheet

## Appendix E 2.1 Structural Steel, Platforms for Maintenance and Walkways



Name	Units	To be filled out by Supplier	Comments
Navn	Enhet		
<b>Structural steel, platforms for maintenance and walkways</b>			
<b>Structural steel</b>			
Weight	[kg]		
<b>Supports onto building floor</b>			
Number of main supports for structural steel	[nos]		
Number of supports for machinery/equipment	[nos]		
<b>Platforms for maintenance and walkways</b>			
Load min 2,5 kN/m <sup>2</sup>	[kN/m <sup>2</sup> ]		
Number of levels	[nos]		
Footprint on level 1 = +__m	[m <sup>2</sup> ]		
Footprint on level 2 = +__m	[m <sup>2</sup> ]		
Footprint on level 3 = +__m	[m <sup>2</sup> ]		
Footprint on level 4 = +__m	[m <sup>2</sup> ]		
Footprint on level 5 = +__m	[m <sup>2</sup> ]		
Footprint on level 6 = +__m	[m <sup>2</sup> ]		
Footprint on level 7 = +__m	[m <sup>2</sup> ]		
Footprint on level 8 = +__m	[m <sup>2</sup> ]		
Footprint on level 9 = +__m	[m <sup>2</sup> ]		
Total footprint	[m <sup>2</sup> ]		
Total weight	[kg]		
<b>Stairs</b>			
Number(s)	[nos]		
Overall length	[m]		
Footprint	[m <sup>2</sup> ]		
Weight	[kg]		

## Appendix E 2.2 Shredder



Name	Units	To be filled out by Supplier	Comments
<b>Shredder</b>			
Code-Nos.:			
<b>Manufacturer</b>			
Type			
hydraulic drive / direct elctr. drive			
Dimension (L x W x H)	[m x m x m]		
Hopper capacity usable	[m <sup>3</sup> ]		
Conveyor width output	[mm]		
Maximum capacity plastics in bales	[t / h]		
Maximum capacity loss plastics	[t / h]		
Grainsize:			
Max. size output	[mm]		
Average size output	[mm]		
Number of rotor(s)	[pcs.]		
Length of rotor(s):	[m]		
Diameter of rotor(s):	[m]		
Total quantity of cutting knives (rotor)	[pcs.]		
Dimensions of cutting knives	[mm]		
Quantity of usable cutting edges per knife	[pcs.]		
Life time in operation rotor knifs	[hr]		
Life time in operation startor knifs	[hr]		
Lifetime of a cutting edge in tons	[ton]		
Perforated screen	[yes / no]		
Perforation (size)	[mm]		
Screen bars	[yes / no]		
Adjustable screen bar	[yes / no]		
Max. distance of screen bars	[mm]		
Min. distance of screen bars	[mm]		
Time to adjust screen bars	[min]		
No. of screen bars	[pcs.]		
Dimensions of screen bars	[mm]		
Lifetime of screen bar in tons	[ton]		
Frequency Converter	[yes / no]		
Revolutions of rotor min.	[rpm]		
Revolutions of rotor max.	[rpm]		
Reverse operation at overload	[yes / no]		
Automatic discharge of rejects	[yes / no]		
Manufacturer of drives			
Installed power	[kW]		
electr. Power in idle operation	[kW]		
Total Weight	[kg]		
Sound pressure level in 1 m dist., empty	[dB (A)]		
No. of switchboard cabinets / total size	pcs		
Total size (H x W x D) in mm	[mm]		
Type of PLC			
Interface to superior PLC of CMS			

## Appendix E 2.3-1 Dedusting Plant



Name	Units	To be filled out by Supplier	Comments
<b>De-dusting system</b>			
Code-No.			
<b>Manufacturer</b>			
Footprint overall system (L x W)	[m x m]		
<b>Filter system #1 and# 2</b>			
Exhaust air flow	[m <sup>3</sup> / h]		
Residual dust content (must be < 3mg/m <sup>3</sup> )	[mg / m <sup>3</sup> ]		
Housing material	-		
Insulation material	-		
Insulation thickness	[mm]		
Heating dust screw	[yes / no]		
Electrical heater housing installed power	[kW]		
Rupture discs	[yes / no]		
Differential Pressure control filter	[yes / no]		
Filter surface	[m <sup>2</sup> ]		
Filter surface load	[m <sup>3</sup> / m <sup>2</sup> ]		
Number of filter elements	[nos.]		
Material of filter bag			
Diameter filterbag			
Lenght filterbag			
Compressed air supply	[Nm <sup>3</sup> / h]		
Pressure compressed air	[bar]		
Sound pressure level < 85 dB(A)	[dB(A) at 1m]		
Footprint filter system (L x W)	[m x m]		
Height	[m]		
Weight	[kg]		
Max. load of filter (during operation)	[kg]		
<b>Ventilator</b>			
Volume flow rate	[Nm <sup>3</sup> / h]		
Compression	[Pa]		
Operating pressure absolute	[Pa]		
Efficiency	[%]		
Frequency Converter	[yes / no]		
Installed power	[kW]		
Manufacturer of drives			
Sound pressure level < 85 dB(A)	[dB(A) at 1m]		
Sound protection hood/duct	[yes / no]		
Weight	[kg]		
Manufacturer			
Type			
No. of switchboard cabinets / total size			
Total size (H x W x D) in mm	[mm]		
Manufacturer of PLC			
Type of PLC			
Interface to superior PLC of CMS			
<b>Ductwork de dusting</b>			
Flow Measurement	[yes / no]		
Material			
<b>Give thickness from the different DN for example:</b>			
Duct thickness <224mm dia	[mm]		
Duct thickness 224-350 mm dia	[mm]		
Duct thickness 350-500 mm dia	[mm]		
Duct thickness 500-800 mm dia	[mm]		
Duct thickness >800mm dia	[mm]		

**Appendix E 2.3-2 Dedusting Plant**



<b>Ductwork ventilation system fresh air</b>			
Material			
<i>Give thickness from the different DN for example:</i>			
Duct thickness <224mm dia	[mm]		
Duct thickness 224-350 mm dia	[mm]		
Duct thickness 350-500 mm dia	[mm]		
Duct thickness 500-800 mm dia	[mm]		
<b>Chimney</b>			
With mesurement platform	[yes / no]		
With outlet hood on top	[yes / no]		
Chimney height	[m]		
Chimney diameter	[mm]		
Speet outlet	[m/s]		
Chimney materail			
Chimney with lightning protection	[yes / no]		
Sound pressure level < 85 dB(A)	[dB(A) at 1m]		
<b>Aspiration ports / AKS no. of equipment (to be specified by Suppler)</b>	<b>[Nm³/h]</b>		<b>Remark</b>
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			
<b>Summary</b>	<b>0</b>		

## Appendix E 2.4-1 Compressor Plant



Name	Units	To be filled out by Supplier	comments
<b>Pressurized air station</b>			
Code-No.			
Manufacturer			
Compressed air quality	ISO	summer class 3.4.2 / winter class 3.2.2	
Nominal operating pressure	[bar]		
Volum flow max. Sorting Line	[m <sup>3</sup> /min]		
Total continues rating in operation	[m <sup>3</sup> /min]		
Number of Compressors	[nos.]		
specific electrical power, total system	[kW/m <sup>3</sup> ]		
specific electrical power, after compressor system, winter operation	[kW/m <sup>3</sup> ]		
specific electrical power, after compressor system, summer operation	[kW/m <sup>3</sup> ]		
<b>Compressor Type 1</b>			
Number of Compressors type 1	[nos.]		
Type			
Frequency Converter	[yes/no]		
Capacity (if with FC from - to)	[m <sup>3</sup> /min]		
Installed power	[kW]		
With internal dryer (3°C)	[yes/no]		
Heat exchanger (oil/water) building	[yes/no]		
Heat quantity avarage	[kW]		
Heat quantity max.	[kW]		
Water temper. exchanger in / out	[ °]		45°C - 75°C (80°C)
Sound pressure level	[dB (A)]		
<b>Compressor Type 2</b>			
Number of Compressors type 2	[nos.]		
Type			
Frequency Converter	[yes/no]		
Capacity (if with FC from - to)	[m <sup>3</sup> /min]		
Installed power	[kW]		
With internal dryer (3°C)	[yes/no]		
Heat exchanger (oil/water) building	[yes/no]		
Heat quantity	[kW]		
Water temper. exchanger in / out	[ °]		45°C - 75°C (80°C)
Sound pressure level	[dB (A)]		
<b>Compressor Type 3</b>			
Number of Compressors type 3	[nos.]		
Type			
Frequency Converter	[yes/no]		
Capacity (if with FC from - to)	[m <sup>3</sup> /min]		
Installed power	[kW]		
With internal dryer (3°C)	[yes/no]		
Heat exchanger (oil/water) building	[yes/no]		
Heat quantity	[kW]		
Water temper. exchanger in / out	[ °]		45°C - 75°C (80°C)
Sound pressure level	[dB (A)]		

## Appendix E 2.4-2 Compressor Plant



Name	Units	To be filled out by Supplier	comments
<b>Compressed air conditioning buffering</b>			
<b>Drying unit (summer mode class 4)</b>			
Number of air drying units	[nos.]		
Manufacturer			
Function			
Type			
Capacity	[m <sup>3</sup> /min]		
Design ambient temperature compr. Room	[°C]		
Installed power	[kW]		
Sound pressure level	[dB (A)]		
<b>Drying unit (winter mode; class 2)</b>			
<b>Adsorption tryer</b>			
Number of air drying units	[nos.]		
Manufacturer			
Function (cold- / warm regenerating)			
Type			
Design ambient temperature compr. room	[°C]		
Capacity drying	[l/sec]		
scavenging air average	[l/sec]		
scavenging air average	[%]		
used power	[W]		
Installed power	[kW]		
Sound pressure level	[dB (A)]		
<b>Cooling system compressors</b>			
<u>Water cooling system</u>			
Chiller installation at roof			
chiller cooling capacity	[kW]		
Weight in operation to roof	[kg]		
Sound pressure level chiller	[dB (A)]		
Pump station 100% redundat	[yes/no]		
Recirculation pump water	[kW]		
<u>Air cooling system</u>			
Air supply for cooling compressor 1	[m <sup>3</sup> / h]		
Hot air from compressor unit 1	[m <sup>3</sup> / h]		
Sound pressure level outside wall	[dB (A)]		
Air supply for cooling compressor 2	[m <sup>3</sup> / h]		
Hot air from compressor unit 2	[m <sup>3</sup> / h]		
Sound pressure level outside wall	[dB (A)]		
Air supply for cooling compressor 3	[m <sup>3</sup> / h]		
Hot air from compressor unit 3	[m <sup>3</sup> / h]		
Sound pressure level outside wall	[dB (A)]		
<b>air vessel</b>			
Number of air vessel	[nos.]		
Air vessel volume compressor room	[m <sup>3</sup> ]		
Air vessel volume sorting plant	[m <sup>3</sup> ]		
Air vessel volume sorting plant	[m <sup>3</sup> ]		
Total air vessel volume	[m <sup>3</sup> ]		







## Appendix E 2.6 Power Consumptions



### Power consumptions

Power consumptions for one operational year, 1 shift (capacity 40 t/h waste - 60.000 t/y)

			<b>Comments</b>
Operational hours per year	1500 h		
<u>Power consumption - basic delivery</u>	[kWh]		
Infeed and screening			incl shredder
Polymer sorting line			
Magnets/Eddy Currents			
De-dusting plant			
Compressor plant			
Container compressing station			
Bunker system			
Baler			
Other units and consumers			
<b>Summary - basic delivery</b>	<b>0</b>		Total yearly consumption

<u>Power consumption - Options</u>	[kWh]		
Option A - Paper sorting (NIR+conveyors+bunker+compressor etc)			
Option B - Fines sorting (Screen+NIR+conveyors+compressor etc)			
Option C - Baling of source separated paper. (conveyors)			
Option D - Odour reduction (Heating, fan (pressure drop) etc.)			
<b>Summary - Options</b>	<b>0</b>		

## Appendix E 2.7-1 Electrical Equipment (Appendix A7)



		To be filled out by Supplier			
Chapter	Item	Manufacturer	Type	Quantity	Technical Data
6	Frequency Converters up to ..... kW				
	Frequency Converters up to ..... kW				
	Frequency Converters up to ..... kW				
	Frequency Converters up to ..... kW				
	<i>(Add line if necessary)</i>				
10	Switchboard Cabinets				
	Cabinet Lighting				
	Cabinet Cooling				
	Local Cabinets for remote I/O and displays				
	Local Terminal Boxes				
	Labelling System				
	Power Meter				
	Main Switch up to ..... A				
	Main Switch up to ..... A				
	Main Switch up to ..... A				
	<i>(Add line if necessary)</i>				
	Busbar System 400 V				
	Main Switch up to ... A (Machine Groups)				
	Main Switch up to ... A (Machine Groups)				
	Main Switch up to ... A (Machine Groups)				
	<i>(Add line if necessary)</i>				
	Miniature Circuit Breakers (MCB)				
	Transformer 230 V AC (Control Power)				
	Transformer 400 V (Control Power)				
	Control Power Supply 230 V AC				
	Control Power Supply 24 V DC				
	Emergency Stop Controller(s)				
	Motor Starters simple drive up to ... kW				
	Motor Starters simple drive up to ... kW				
	Motor Starters simple drive up to ... kW				
	<i>(Add line if necessary)</i>				
	Motor Starters reversing drive up to ... kW				
	Motor Starters reversing drive up to ... kW				
	Motor Starters reversing drive up to ... kW				
	<i>(Add line if necessary)</i>				
	Softstarter up to ... kW				
	Softstarter up to ... kW				
Softstarter up to ... kW					
<i>(Add line if necessary)</i>					
Contactors up to ... kW					
Contactors up to ... kW					
Contactors up to ... kW					
<i>(Add line if necessary)</i>					
Solid State Relays up to ... kW					
Solid State Relays up to ... kW					
Solid State Relays up to ... kW					
<i>(Add line if necessary)</i>					
Thermal Relays up to ... kW					
Thermal Relays up to ... kW					
Thermal Relays up to ... kW					
<i>(Add line if necessary)</i>					
Coupling Relays					
Terminal Strips					
<i>(Additional Devices, if any)</i>					
<i>(Additional Devices, if any)</i>					
13.2	Cable Ladders				
	Cable Trays				

## Appendix E 2.7-2 Electrical Equipment (Appendix A7)



		To be filled out by Supplier			
Chapter	Item	Manufacturer	Type	Quantity	Technical Data
13.3	Cables for Power Supply				
	Installation Cables				
	Motor Cables Standard				
	Motor Cables for FC Drives				
	Control Cables				
	Instrumentation Cables				
	Labelling System for Cables				
13.5	Emergency Stop Switches (Mushroom)				
	Emergency Stop Switches (Ripcord)				
	Limit Switches (Mechanical)				
	Limit Switches (contact-free)				
	Speed Sensing Switches				
	Misalignment Switches				
	Level Sensors (ultrasonic)				
	Level Sensors (other type)				
	Weighing Devices (Belt Weigher)				
	Weighing Devices (Bunkers)				
	Pressure Sensors (analogue)				
	Pressure Switches				
	Flow Sensors				
	Pushbutton Control Panels				
	Local Maintenance Switches up to ... kW				
	Local Maintenance Switches up to ... kW				
Local Maintenance Switches up to ... kW					
<i>(Add line if necessary)</i>					
<i>(Additional Devices, if any)</i>					
<i>(Additional Devices, if any)</i>					
<i>(Additional Devices, if any)</i>					

Detailed listing of technical data and descriptions shall be submitted separately, if the space in the column is not sufficient enough!

## Appendix E 2.8 Control and Monitoring System (Appendix A8)



Chapter	Item	To be filled out by Supplier			
		Manufacturer	Type	Quantity	Technical Data
5.1	Main PLC				
	Remote I/O Modules				
	Fieldbus System(s)				
	<i>(Add line if necessary)</i>				
6.2	Operator Station (Server)				
	24" Flat Screen Monitor				
	Network Switch for Ind. Ethernet (Manager)				
	Network Switch for Ind. Ethernet (Standard)				
	Colour Laser Printer A4				
	Network Closet				
	UPS Device				
	HMI and SCADA Software				
	Operating System Server				
	Archiving Software (Longtime / Shorttime)				
	<i>(Additional Software)</i>				
	<i>(Additional Software)</i>				
	<i>(Additional Software)</i>				
6.3	Engineering Workstation				
	32" Flat Screen Monitor				
	Operating System Engineering Workstation				
	Remote Access Software				
	Maintenance Software HMI and SCADA				
	Maintenance Software PLCs				
	<i>(Additional Software)</i>				
<i>(Additional Software)</i>					
6.4	Local Operator Panel				
6.5	Mobile Operator Panel				
	WiFi Router				
7	CCTV IP Camera (Fixed Type)				
	CCTV IP Camera (PTZ Type)				
	Digital Recorder or PC for Video Surveillance				
	65" Flat Screen Monitor				
	PoE Ethernet Network Switch				
	Monitoring Software				

Detailed listing of technical data and descriptions shall be submitted separately, if the space in the column is not sufficient enough!

# Appendix E 2.9 Personnel



Name		To be filled out by Supplier	Comments
<b>Plant Manager</b>			
<b>Operating</b>			
control room (operator)	[nos.]		
loader	[nos.]		
other	[nos.]		
cleaner	[nos.]		
<b>Maintenance</b>			
electrical	[nos.]		
automation	[nos.]		
mechanical	[nos.]		
<b>Cleaning time</b>			
example		0,5 h/day with 4 workers	
sorting plant daily	person / hr		
sorting plant weekly	person / hr		