



**HIDROMATIC**  
water treatment & management

Registered and administrative office  
HIDROMATIC s.r.l.  
Via C. Della Chiesa, 278 - 41126 MODENA  
Tel. 059-358130 - Fax: 059-820260  
P.I. 02530830369  
Internet: [www.hidromatic.it](http://www.hidromatic.it)  
E-mail: [info@hidromatic.it](mailto:info@hidromatic.it)



# **PROPOSAL FOR A WASTE WATER TREATMENT PLANT FOR SUDANESE TANNERIES**

**TECHNICAL AND COMMERCIAL PROPOSAL  
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**HIDROMATIC SRL**

Via C. della Chiesa, 278 – 41100 - Modena – Italy



**HIDROMATIC**  
water treatment & management

Registered and administrative office  
HIDROMATIC s.r.l.  
Via C. Della Chiesa, 278 - 41126 MODENA  
Tel. 053-333139 - Fax. 053-320256  
P.I. 02530830369  
Intefnet: [www.hidromatic.it](http://www.hidromatic.it)  
E-mail: [info@hidromatic.it](mailto:info@hidromatic.it)



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## 1. SCOPE OF SUPPLY

Scope of this work is the process design, construction, supply of mechanical and electrical equipment, installation at site, supervision, commissioning, start-up of the following items:

- SANITARY WATER TREATMENT PACKAGE
  - 24 hours/day and 7 days/week continuously operation
  - Q: start up production 610 mc/day future 700 mc/day
  - Inlet water quality: waste water discharged to Tannery industries
  - Water discharge treated: directly to the river

## 2. DESIGN CLARIFICATION

- Our technician visited a few local Tannery industries.
- The manufactured goods are very different between the industries.
- The volume of water used in the tanneries is quite different from one tannery to another one: up to 10 times more.
- The salinity is in average very high: is mandatory to dilute the waste water inlet in order to eliminate the pollutant.
- The water treatment process is efficient and effective only if the total salinity is in the correct range.

## 3. TECHNICAL DEVIATION – FURTHER INFORMATION

Our technical proposal has been developed in order to achieve the best performances with the minimum utilities' consumption and the high reliability process.

Technical design will follow the indications received with the following clarifications:

- Civil works and concrete basins of any kind: not in this scope
- Concrete surface treatments, preparation, paintings: not in this scope

No other main technical deviation has been foreseen for this project.

## 4. APPLICABLE STANDARDS

- centrifugal and submersible pumps      manufacturer standard ISO
- blowers      manufacturer standard ISO
- dosing pumps      electronic, membrane, 110V/230V
- ATEX area      not classified
- Piping standards      ISO
- the basins are covered and the equipment are installed inside a covered area



## 5. PROJECT DATA and GUARANTEED PERFORMANCES

### 5.1. WASTE FEED WATER CHARACTERISTICS AND DESIGN DATA

Parameter	Unit	Value average
Design flow-rate	mc/day	610 (in future up to 700)
Hourly flow-rate	mc/h	50 (in future up to 60)
Peak hourly flow-rate	mc/h	55 (in future up to 65)
Hourly flow-rate	mc/h	25.5 (in future up to 29.2)
Ambient Temperature	°C	0 + 45
Water temperature	°C	+15/+25
Water dilution expected	%	500
Hourly flow-rate biologic	mc/h	127.5 (in future up to 146)
BOD5 concentration	mg/l	1500
COD concentration	mg/l	4000
TSS concentration	mg/l	800
Total ammonia NH4 concentration	mg/l NH4	30
Total Nitrates concentration	mg/l NO3	5
Water temperature	°C	+18/ +25
Fat, oil, grease	mg/l	200
Phosphate	mg/l PO4-P	10
Fe	mg/l	≤2.0
Cr total	mg/l	<50-100
Ni	mg/l	10-20
Chloride Cl	mg/l	<1000
Sulphites S2 (including H2S)	mg/l	100
Surfactants	mg/l	<20
Sulphates SO4	mg/l	< 50

### 5.2. TREATED WATER (GUARANTEED PARAMETERS)

Parameter	Unit	Expected
TSS	mg/l	<60
BOD5	mg/l	<40
COD	mg/l	<125
pH	-	6.0-9.0
Total ammonia NH4 concentration	mg/l NH4	30
Total Nitrates concentration	mg/l NO3	45
Fat, oil, grease	mg/l	5
Cr total	mg/l	<0.5
Surfactants	mg/l	10





Some changes in inlet water quality may occur. In such case HIDROMATIC reserves the right to change the design of this system and advice for any extra-cost.

## 6. UTILITIES

The following utilities (OUT OF SCOPE) are required:

### 6.1. ELECTRICAL POWER

Feed Power for motors >1.0KW	380V, 3 phases, 50 Hz
Feed Power for motors/instruments <1.0KW	220V, 1 phase, 50Hz

### 6.2. CHEMICALS:

Polyelectrolyte powder cationic	100%
Polyelectrolyte powder anionic	100%
Nutrients P	solution, liquid, 30%
Coagulant	commercial solution
Caustic Soda	commercial solution, 30%
hydrochloric acid	commercial solution, 33%
sodium bisulfite	commercial solution, 30%

## 7. DESIGN CRITERIA

The system is designed according to the following philosophy:

- Constant quality and quantity of the Product within the specific
- High flexibility of the system
- Low water consumption
- Low chemicals consumption
- Low electricity consumption
- Maximum pre-assembly in our workshop
- Minimization of supervision and maintenance
- Secure and automated system



## 8. GENERAL PHILOSOPHY AND DESIGN CRITERIA

- **1x100% Pre-WWTP / Pre-WWTP package (DAF system) which is composed by the following sub-items:**
  - 2x100% Submersible pumps
  - 1x100% coarse bar screening
  - 1x100% DAF
- **1x100% Chemical-physical plant which is composed by:**
  - 1x100% CR reduction basin
  - 1x100% reaction basin
  - 1x100% lamellar decanter basin
  - 2x100% sludge pumps
- **1x100% Equalization basin which is composed by:**
  - 1x100% equalization basin with air diffusion
  - 2x100% air blower for equalization
  - 2x100% biological system feed pump
- **1x100% WWTP which is composed by the following items:**
  - 1x100% denitrification basin in concrete with mixer
  - 1x100% oxidation basin in concrete with air diffusion
  - 3x100% oxidation air blower
  - 1x100% sedimentation basin
  - 2x100% sludge recirculation pump
  - 2x100% mix liquor recirculation pump
  - 2x100% sodium hypochlorite dosing system
  - 2x100% Coagulant dosing system
  - 2x100% Caustic Soda dosing system
  - 2x100% hydrochloric acid dosing system
  - 2x100% sodium bisulfite dosing system
  - 2x100% Polyelectrolyte dosing system
  - 2x100% Nutrients dosing system
  - 1x100% storage tank treated water
  - 1x100% electric board w/ PLC
  - 1x100% Dehydration system

### 8.1. UNIT CONTROL PANEL – ELECTRIC BOARD – PLC

- Electric board and PLC/UCP are in this scope and will be installed on skid edge.
- PLC: Siemens S-1500 series + display touch-screen color 10".
- The area is considered a safe area, not ATEX compliant.
- UCP will be ready for client's DCS supervision (serial link).
- Electrical interconnections among different items and local PLC are in this scope.
- SCADA system is controlling by PC with WINCC software and Video 21" and connected to PLC panel with net-work PROFIBUS





## 9. PLANT DESCRIPTION

The plant is composed by the following equipment.

### 9.1. WASTE WATER PUMPS

Quantity	2X100%
Type	submersible centrifugal, impeller for dirty waters
Capacity	65 mc/h
Head	15 m.c.w.
Installed power	5.5 KW
Material	cast on iron

Equipped with:

- Manual valves and don't return valves
- Pressure gauge on delivery
- n°1 analogic electromagnetic flow-meter DN100
- n°1 analogic electromagnetic flow-meter DN100 for dilution water

### 9.2. ROTARY DRUM BAR SCREEN

Quantity	1x100%
Type	coarse bar screen
Max inlet flow	75 mc/h
Dimensions	0.60 x 1.3 x H1.4(m)
Material	stainless steel AISI 316
Cleaning	automatic self-cleaning
Clear spacing	3 mm

Completed with:

- tank water treated in SS AISI 304 , motor-reducer

### 9.3. DAF SYSTEM

#### Basis of design:

Flow-rate	30 mc/h (design)
Volume suggested	140 mc

#### Basin characteristics:

Quantity	1x100%
Type	underground, flat bottom, flat top
Material	reinforced concrete
Dimension	4 x 12 m H 3 m



**Scrape DAF system:**

Type	scrape
Materials (body/membrane)	SS AISI 316/EPDM
Number of scrapes	10
Power	1.0 KW
Supply	380VAC 50Hz

Completed with:

- Manual valves and don't return valves

**Instrumentation:**

- n.1 Radar level indicators (analogic signal)

**9.4. AIR BLOWERS (DAF BASIN)**

Quantity	2X100%
Type	lobes blower
Power	5 KW
Supply	380VAC 50Hz
Flow rate	120 Nmc/h
Head	600 mbar
Protection	IP55
Material	cast-iron

Equipped with:

- connecting pipes
- filter, overpressure valves, sound-proof box, silencer
- interception valves, flanges, fittings, clamps, everything necessary for correct operation

One blower is stand-by for the two basins.

**9.5. CHROMIUM REDUCTION BASIN UNIT**

The unit is composed by the following equipment/items:

Quantity	1x100%
Type	mixer
Power	4,5 KW
Supply	380VAC 50Hz
Material	SS AISI 304
Coating	LEAVINT BAYER





**Correction basin**

Quantity 1X100%  
Dimensions 4 x 4 m H 2.5 m  
Basin coating with PVC liner

Equipped with:

- n.1 Ph meter indicator (analogic signal)
- n.1 Redox meter indicator (analogic signal)

**9.6. PH CORECTION BASIN UNIT**

The unit is composed by the following equipment/items:

Quantity 1x100%  
Type mixer  
Power 4,5 KW  
Supply 380VAC 50Hz  
Material SS AISI 304  
Coating LEAVINT BAYER

**Correction basin**

Quantity 1X100%  
Dimensions 4 x 4 m H 2.5 m  
Basin coating with PVC liner

Equipped with:

- n.1 Ph meter indicator (analogic signal)

**9.7. DECANTER UNIT**

The unit is composed by the following equipment/items:

Quantity 1x100%  
Type lamellar pack  
Material HDPE black

**Sedimentation basin**

Quantity 1X100%  
Dimensions 2 x 4 m H 4.5 m  
Basin coating with PVC.liner



### **Sludge Section (DAF and chemicals plant)**

Quantity	(2X100%)
Type	mono screw pumps for sludge
Capacity	10 mc/h
Head	5 bar
Installed power	5.5 KW
Material	EPDM/SS AISI 304

#### **Equipped with:**

- Manual Valves on suction and delivery
- Pressure gauge on delivery
- n°1 analogic electromagnetic flow-meter DN50
- n°1 analogic pressure transmitter 0-10 bar

## **9.8. EQUALIZATION BASIN**

### **Basis of design:**

Flow-rate	30 mc/h (design)
Retention time	24 h
Volume suggested	720 mc

### **Basin characteristics:**

Quantity	1x100%
Type	underground, flat bottom, flat top
Material	reinforced concrete

### **Mixer system:**

Type	submersible mixer
Materials (body/membrane)	cast iron /SS AISI 316
Number of mixer	2
Power	5,5 KW
Supply	380VAC 50Hz

### **Completed with:**

- Manual valves and don't return valves
- lifting system SS AISI304
- dilution automatic system

### **Instrumentation:**

- n.1 Radar level indicators (analogic signal)
- n.1 Conductivity meter indicators (analogic signal)
- n.1 flow-meter (analogic signal)





### 9.9. AIR BLOWERS (AERATION BASIN)

Quantity	2X100%
Type	lobes blower
Power	18 KW
Supply	380VAC 50Hz
Flow rate	450 Nmc/h
Head	600 mbar
Protection	IP55
Material	cast-iron

Equipped with:

- connecting pipes
- filter, overpressure valves, sound-proof box, silencer
- interception valves, flanges, fittings, clamps, everything necessary for correct operation

One blower is stand-by for the two basins.

### 9.10. WASTE WATER PUMPS TO WWTP

Quantity	2X100%
Type	submersible centrifugal, impeller for dirty waters
Capacity	150 mc/h
Head	10-m.c.w.
Installed power	5.5 KW
Material	cast on iron

Equipped with:

- Manual valves and don't return valves
- Pressure gauge on delivery
- n°1 analogic electromagnetic flow-meter DN125

### 9.11. DENITRIFICATION

**Basis of design:**

Flow-rate	130 mc/h (design) ; 146 mc/h (peak)
Type of process	activated sludge oxidation <b>HIDROMATIC HBR©</b>
Basin volume	400 mc



**Basin characteristics:**

Quantity	1x100%
Type	rectangular, flat bottom
Capacity	400 mc
Material	concrete
Side water depth	H=5.0 m
Dimensions	10.0mx8.0mxH5.5m

Completed with:

- overflow pipe, drain, vent, all accessories for maintenance and operation

**Mixer system:**

Type	submersible mixer
Materials (body/membrane)	cast iron /SS AISI 316
Number of mixer	2
Power	5,5 KW
Supply	380VAC 50Hz

Completed with:

- Manual valves and don't return valves
- lifting system SS AISI304

**Instrumentation:**

- n.1 Radar level indicators (analogic signal)
- n.1 Redox meter indicators (analogic signal)
- n.1 AIT indicators for NH<sub>4</sub>/NO<sub>3</sub> (analogic signal)
- n.1 AIT indicators for sludge concentration (analogic signal)

**9.12. BIOLOGICAL OXYDATION / NITRIFICATION**

**Basis of design:**

Flow-rate	130 mc/h (design) ; 146 mc/h (peak)
Type of process	activated sludge oxidation <b>HIDROMATIC HBR®</b>
Basin volume	3500 mc

**Basin characteristics:**

Quantity	1x100%
Type	rectangular, flat bottom
Capacity	3500 mc
Material	concrete
Side water depth	H=5.0 m
Dimensions	28.0mx25.0mxH5.5m

Completed with:

- overflow pipe, drain, vent, all accessories for maintenance and operation





### 9.13. AIR BLOWERS

Quantity	3X50%
Type	lobes blower
Power	45 KW
Supply	380VAC 50Hz
Flow rate	2500 Nmc/h
Head	600 mbar
Protection	IP55
Material	cast-iron

Equipped with:

- connecting pipes
- filter, overpressure valves, sound-proof box, silencer
- interception valves, flanges, fittings, clamps, everything necessary for correct operation
- inverter to management the flow-rate in the oxidation basin
- soundproofing cabin each blowers

One blower is stand-by.

#### Aeration system:

Type	air diffusers
Air flow-rate	5000 Nmc/h
Air flow-rate per diffuser	8 Nmc/h
Number of diffusers	625
Materials (body/membrane)	PVC/EPDM

Completed with:

- drop-legs, manifolds, headers in PVC
- guide and supports in AISI304
- fixed joints, expansion joints in SBR/neoprene
- piping in PP /SS AISI 304

#### Instrumentation:

- n.1 oxygen analyzer/transmitter (analogic signal 4-20mA)
- n.1 sludge concentration/transmitter (analogic signal 4-20mA)
- n.1 temperature probe/transmitter (analogic signal 4-20mA)
- n.1 AIT indicators for NH<sub>4</sub>/NO<sub>3</sub> (analogic signal)



#### 9.14. MIX-LIQUOR RECIRCULATION PUMP

Number of pumps:	2x100%
Type:	centrifugal, submersible
Material:	C.I.
Flow:	50 mc/h (design);
Pressure:	1.0 bar
Power:	2.5 KW
Supply	380V – 50Hz

Completed with:

- check and interception valves on delivery of each pump
- pressure gauges (delivery)
- lifting devices (chain + accessories for pump maintenance)
- N°1 electromagnetic flow – meter

#### 9.15. CIRCULAR DECANTATOR

**Basis of design:**

Flow-rate	130 mc/h (design) ; 146 mc/h (peak)
Type of process	* sludge biologic sedimentation <b>HIDROMATIC HIDROFLUS®</b>
Basin volume	150 mc
Decantation basin surface	200 m <sup>2</sup>

**Basin characteristics:**

Quantity	1x100%
Type	circular, inclined bottom
Capacity	550 mc
Material	concrete
Side water depth	H=2,75 m
Dimensions	Ø16.0mxH3.5m

Completed with:

- overflow pipe, drain, vent, all accessories for maintenance and operation
- N°1 channel in SS AISI 304 with Thomson profile height adjustable





### 9.16. SLUDGE RECIRCULATION PUMP

Number of pumps:	2x100%
Type:	centrifugal, submersible
Material:	C.I. casted iron
Flow:	150 mc/h (design);
Pressure:	1,0 bar
Power:	5.5 KW
Supply	380V – 50Hz

Completed with:

- check and interception valves on delivery of each pump
- pressure gauges (delivery)
- lifting devices (chain + accessories for pump maintenance)
- n.1 Automatic on/off valve for sludge excess discharge
- N°1 radar level transmitter
- N°1 electromagnetic flow – meter

### 9.17. SLUDGE THICKENER – AEROBIC DIGESTOR

**Basis of design:**

Design	1x50%
Sludge flow-rate	37.6 mc/day
Sludge concentration (IN)	10 KgSS/mc (1%)
Retention time	5 days
Basin volume	62.7 mc
Basin height	4.0 m
Sludge concentration. (OUT) expected	30 KgSS/mc (3%)
Sludge flow-rate (OUT) expected	12.5 mc/day

**Basin characteristics:**

Quantity	1x100%
Type	static, conical bottom
Capacity	85.5 mc
Dimensions	3.85x3.75XH6.00m
Material	RC
Cylindrical height	4.0 m
Bottom slope	60°

Completed with:

- cylindrical distributor, peripheral overflow channel, outlet pipe
- stairs, platforms, ladders in HDGCS (where necessary)
- N°1 radar level transmitter



### 9.18. CENTRIFUGE DEWATERING SYSTEM

Number:	1x100%
Type:	centrifuge
Material (body/rotor/stator):	CI/AISI304
Flow:	4.0 mc/h
Power:	7.5+0.75 KW
Supply	380V – 50Hz

Completed with:

- check and interception valves on delivery
- progressive cavity feed pumps
- variable speed gear (manual)
- dosing and solution-prepared Polyelectrolyta System

### 9.19. SODIUM HYPOCHLORITE DOSING SYSTEM

**Storage tank:**

Quantity	1x100%
Type	Cylindrical, vertical, flat bottom
Capacity	100 Lt
Diameter	460 mm
Height	775 mm
Material	HDPE
Design pressure	atm
Design temperature	amb

Completed with:

- overflow pipe, drain, vent, inlet/outlet nozzles, isolation valves, level connection
- valve and interconnecting piping
- No.1 level indicator

**Dosing pump**

Type	membrane
Quantity	2x100%
Regulation field	0 - 100% adjustable strokes
Flow Rate	0-2 l/h
Head	8 bar
Supply	127/220VAC – 60Hz
Power	0.05 KW
Material	PP/PTFE

Equipped with:

- inlet/outlet valves, safety valve, suction filter, interconnection pipelines





## 9.20. COAGULANT DOSING SYSTEM

### Storage tank:

Quantity	1x100%
Type	Cylindrical, vertical, flat bottom
Capacity	500 Lt
Diameter	1350 mm
Height	1500 mm
Material	HDPE
Design pressure	atm
Design temperature	amb

### Completed with:

- overflow pipe, drain, vent, inlet/outlet nozzles, isolation valves, level connection
- valve and interconnecting piping
- No.2 level indicator (LL/L level)

### Dosing pump

Type	membrane
Quantity	2x100%
Regulation field	0 - 100% adjustable strokes
Flow Rate	0-50 l/h
Head	6 bar
Supply	380VAC – 50Hz
Power	0.25 KW
Material	PP/PTFE

### Equipped with:

- inlet/outlet valves, safety valve, suction filter, interconnection pipelines

## 9.21. SODIUM BISULFITE 30% DOSING SYSTEM

### Storage tank:

Quantity	1x100%
Type	Cylindrical, vertical, flat bottom
Capacity	500 Lt
Diameter	1350 mm
Height	1500 mm
Material	HDPE
Design pressure	atm
Design temperature	amb



Completed with:

- overflow pipe, drain, vent, inlet/outlet nozzles, isolation valves, level connection
- valve and interconnecting piping
- No.2 level indicator (LL/L level)

**Dosing pump**

Type	piston
Quantity	2x100%
Regulation field	0 - 100% adjustable strokes
Flow Rate	0-50 l/h
Head	6 bar
Supply	380VAC – 50Hz
Power	0.25 KW
Material	PVC/PTFE

Equipped with:

- inlet/outlet valves, safety valve, suction filter, interconnection pipelines

**9.22. HYDROCHLORIDIC ACID 33% DOSING SYSTEM**

**Storage tank:**

Quantity	1x100%
Type	Cylindrical, vertical, flat bottom
Capacity	500 Lt
Diameter	1350 mm
Height	1500 mm
Material	HDPE
Design pressure	atm
Design temperature	amb

Completed with:

- overflow pipe, drain, vent, inlet/outlet nozzles, isolation valves, level connection
- valve and interconnecting piping
- No.2 level indicator (LL/L level)

**Dosing pump**

Type	piston
Quantity	2x100%
Regulation field	0 - 100% adjustable strokes
Flow Rate	0-50 l/h
Head	6 bar





Supply	380VAC – 50Hz
Power	0.25 KW
Material	PVC/PTFE

Equipped with:

- inlet/outlet valves, safety valve, suction filter, interconnection pipelines

### 9.23. POLYELECTROLYTE ANIONIC SOLUTION DOSING SYSTEM

**Storage tank:**

Quantity	1x100%
Type	Cylindrical, vertical, flat bottom
Capacity	1000 Lt
Dimension	1.5x0.5xH1.2 m
The basin is divided in	two tank
Material	HDPE
Design pressure	atm
Design temperature	amb

Completed with:

- overflow pipe, drain, vent, inlet/outlet nozzles, isolation valves, level connection
- valve and interconnecting piping
- No.3 level indicator (HH/LL/L level)
- No.2 stirrers for the two chamber
- No. 1 screw dosing system of the polyelectrolyte powder 0,18 kw - 2 kg/h

**Dosing pump**

Type	piston
Quantity	2x100%
Regulation field	0 - 100% adjustable strokes
Flow Rate	0-220 l/h
Head	6 bar
Supply	380VAC – 50Hz
Power	0.25 KW
Material	SS AISI 316/PTFE

Equipped with:

- inlet/outlet valves, safety valve, suction filter, interconnection pipelines



## 9.24. POLYELECTROLYTE CATIONIC SOLUTION DOSING SYSTEM

### Storage tank:

Quantity	1x100%
Type	Cylindrical, vertical, flat bottom
Capacity	1000 Lt
Dimension	1.5x0.5xH1.2 m
The basin is divided in	two tank
Material	HDPE
Design pressure	atm
Design temperature	amb

### Completed with:

- overflow pipe, drain, vent, inlet/outlet nozzles, isolation valves, level connection
- valve and interconnecting piping
- No.3 level indicator (HH/LL/L level)
- No.2 stirrers for the two chamber
- No. 1 screw dosing system of the polyelectrolyte powder 0,18 kw - 2 kg/h

### Dosing pump (DAF and Sludge dehydration system)

Type	piston
Quantity	4x100%
Regulation field	0 - 100% adjustable strokes
Flow Rate	0-220 l/h
Head	6 bar
Supply	380VAC – 50Hz
Power	0.25 KW
Material	SS AISI 316/PTFE

### Equipped with:

- inlet/outlet valves, safety valve, suction filter, interconnection pipelines

## 9.25. NUTRIENTS FOR BIOLOGIC PLANT DOSING SYSTEM

### Storage tank:

Quantity	1x100%
Type	Cylindrical, vertical, flat bottom
Capacity	500 Lt
Diameter	1350 mm
Height	1500 mm
Material	HDPE
Design pressure	atm
Design temperature	amb





Completed with:

- overflow pipe, drain, vent, inlet/outlet nozzles, isolation valves, level connection
- valve and interconnecting piping
- No.2 level indicator (LL/L level)

**Dosing pump**

Type	piston
Quantity	2x100%
Regulation field	0 - 100% adjustable strokes
Flow Rate	0-50 l/h
Head	6 bar
Supply	380VAC – 50Hz
Power	0.25 KW
Material	PP/PTFE

Equipped with:

- inlet/outlet valves, safety valve, suction filter, interconnection pipelines

## 9.26. PLC, UNIT CONTROL PANEL AND AUTOMATION

The whole control of the Plant is entrusted by local PLC.

For a detailed description of the items in this scope see paragraph 8.1.

**Main alarms list, with remote signal**

- reagent tank (low level)
- chemical dosing default
- pump trip

**Automation description:**

The touch-panel screen with keyboard is composed by different pages representing each system unit:

- Main Menu Page
- Storage basin
- Chemical reaction section
- Biological plant HBR



- Dehydration section
- Active alarms and historical alarms

Each page has a specific loop for parameter setting by operator.

Instrument values are continuously visualized in the correspondent page.

Every single page with settable data is protected by password.

SCADA system is view and management on PC connected with network company, in order to supervision the WWTP in the OM office and remote.

## 9.27. TECHNICAL ROOM

Electric panel, chemicals storage tank, pumps, blowers and electrical panel will be installed inside office isolated defined technical room. The PC SCADA can be installed in the OM office.

Dimensions: 10x20 m H 4m

## 10. HYDRAULIC-PNEUMATIC-ELECTRICAL CONNECTIONS

### 10.1. HYDRAULIC CONNECTIONS

Inter-connecting between different packages/units is comprised.

HIDROMATIC will supply water pipelines among pre-assembled skids (or inside the container) within the boundary limits of the package, following the proposed material scheme:

- Treatment area: SS AISI 304 PN10 ISO standard
- Chemicals area: PVC – PE flexible pipes

### 10.2. PNEUMATIC CONNECTIONS

Inter-connecting air pipelines among pre-assembled skids (or inside the container) and from/to battery limits:

- All areas: RILSAN PIPE





### 10.3. ELECTRICAL CONNECTIONS

HIDROMATIC will supply all electrical connection between on-filed instrumentation and local PLC.

### 10.4. ENGINEERING BASE AND DETAILS

HIDROMATIC will supply all engineering document base and details, civil lay-out and section.

## 11. BATTERY LIMITS

The following materials / services / devices / utilities are not included:

- Connections to client's DCS system
- Disposal of all solid and liquid waste from the system
- Connections between the equipment and discharge facilities from the BL
- Civil Works of any kind
- Concrete platform
- Foundation Calculation
- Materials and interconnections external items
- Everything not clearly stated in plant description.

The following materials / services / devices / utilities will have a separate quotation:

- spare parts for 2 years operation
- technical supervision for erection on site
- technical supervision for start-up, pre-commissioning, commissioning, PT
- technical supervision for training

## 12. SPARE PARTS

SPARE PARTS FOR COMMISSIONING AND START-UP ARE COMPRISED AND WILL BE DETAILED FURTHER.



# HIDROMATIC

water treatment & management

Registered and administrative office

HIDROMATIC s.r.l.

Via C. Della Chiesa, 279 - 41126 MODENA

Tel. 059 303159 - Fax. 059-820256

P.I. 02530830369

Internet: [www.hidromatic.it](http://www.hidromatic.it)

E-mail: [info@hidromatic.it](mailto:info@hidromatic.it)



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## 13. MAIN VENDORS' LIST

### DESCRIPTION

SKIDS AND METALLIC STRUCTURES  
SUBMERSIBLES PUMPS  
CENTRIFUGAL PUMPS  
DOSING PUMPS  
BLOWERS  
VALVES  
HDPE TANKS  
AIR DIFFUSERS  
INSTRUMENTATION  
PRESSURE GAUGES  
PLC

### COMPANY

HIDROMATIC  
CAPRARI, FAGIOLATI  
CAPRARI, LOWARA  
DOSEURO, EMEC  
MAPRO, MAPNER  
FIP, INTERAPP  
ASTRO SERBATOI  
SIDA  
CHEMITEC, ENDRESS+HAUSER  
NUOVA FIMA  
SIEMENS





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HIDROMATIC s.r.l.  
Via C. Della Chiesa, 276 - 41126 MODENA  
Tel. 059-333138 - Fax. 059-820256  
P.I. 02530830369  
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#### 14. EXAMPLE'S PICTURES

HERE BELOW SOME PICTURES AS EXEMPLES OF WWTP MANUFACTURED AND COMMISSIONED BY HIDROMATIC



*Figure 1*



*Figure 2*





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water treatment & management

Registered and administrative office

HIDROMATIC s.r.l.

Via G. Della Chiesa, 276 - 41126 MODENA

Tel. 059-838430 - Fax. 059-820266

P.I. 02530830369

Internet: [www.hidromatic.it](http://www.hidromatic.it)

E-mail: [info@hidromatic.it](mailto:info@hidromatic.it)



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Figure 3



Figure 4





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Registered and administrative office  
HIDROMATIC s.r.l.

Via C. Della Chiesa, 276 - 41126 MODENA

Tel. 059-833139 - Fax. 059-820256

P.I. 02530830369

\*Internet: [www.hidromatic.it](http://www.hidromatic.it)

E-mail: [info@hidromatic.it](mailto:info@hidromatic.it)



Figure 5



Figure 6





**HIDROMATIC**  
water treatment & management

Registered and administrative office  
HIDROMATIC s.r.l.  
Via C. Della Chiesa, 273 - 41126 MODENA  
Tel. 059-820266 - Fax. 059-820266  
P.I. 02530830369  
Internet: [www.hidromatic.it](http://www.hidromatic.it)  
E-mail: [info@hidromatic.it](mailto:info@hidromatic.it)



## 15. ECONOMIC OFFER

### ELECTRO-MECHANICAL AND CIVIL WORKS' TURNKEY ECONOMIC OFFER

**TOTAL NET PRICE (LUMP-SUM) for ELECTRO-MECHANICAL WORKS Item 8-12  
(five-millions two hundred seventy thousand US dollar only) .....5,270,000 USD**

<b>CONDITIONS</b>	
Offer valid until	31/12/2019
Transport	DDU KHARTOUM - SUDAN
Packing	Included
Engineering Delivery	3 months
Delivery	6 months
Payment	100% LC irrevocable and confirmed
Mechanic guaranty	24 months after delivery
Performance guaranty ,	3% with performance bond expire after 12 months delivery
Erection and assembly on site	Included
Civil work	Included as budgetary value
Basic and detailed engineering	Included
Start-up, commissioning	Included
Training	Included 1 month
<b>NOT INCLUDED</b>	Everything not clearly stated in this offer. Chemicals Net-work pipes from/to the city Electric power supply 400 V – 50 Hz

#### BY ORDER ACCEPTANCE:

CLIENT:

HIDROMATIC:

\_\_\_\_\_  
Stamp and signature of Client

\_\_\_\_\_  
Sales Director