

# APIESSE FEEDER FOR BIOGAS PLANTS

## **A - Description of the Biogas Feeder**

**WEIGHING, MIXING, DOSING, FEEDING** of substrates, organic solids and fluids into a biogas digester

- grass silage
- maize silage
- sugar beets chopped
- whole or processed grain
- water
- molasses
- sewage sludge
- manure
- industrial byproducts

• **Volume – capacity - 68m<sup>3</sup>**

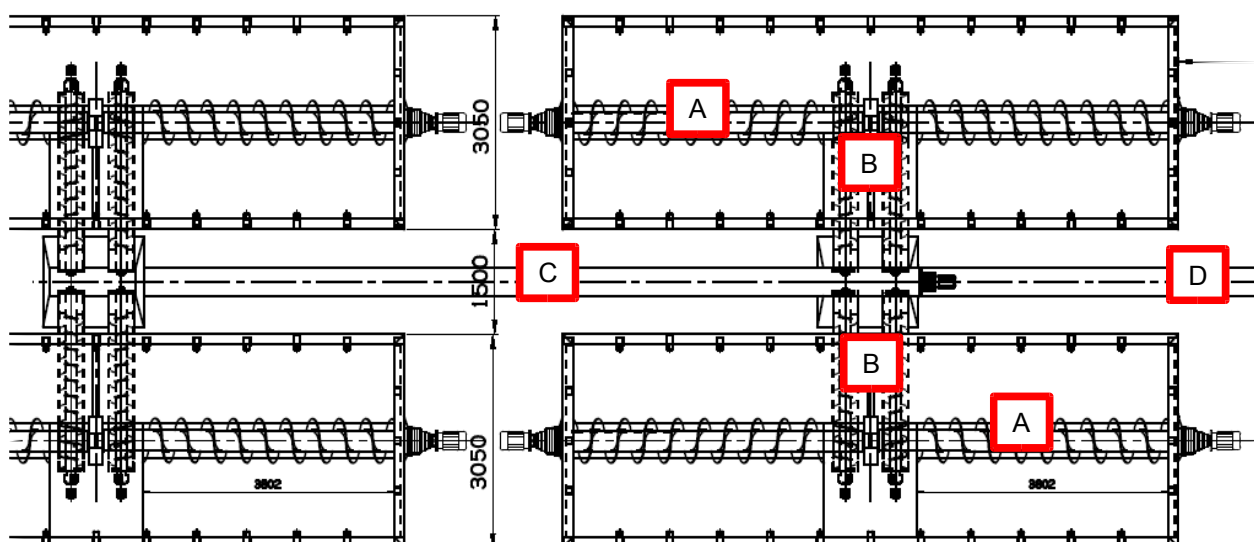
• **Dimensions** - see also drawings. To below dimensions must be added the dimensions of the transmission indicated by the drawing No.2

- Length = 9300 mm
- Width = 3050 mm
- Height = 3504 mm

• **Maximum particle size - 30mm**

• **Configuration and number of units**

Single or multiple in battery formation depending on plant capacity and degree of external mixing of substrates outside the digester



*Drawing No.1 – 280m<sup>3</sup> - Battery of four mixing - dosing - feeding tanks with augers “A”, “B”, “C” and “D”*

### • Tank and augers

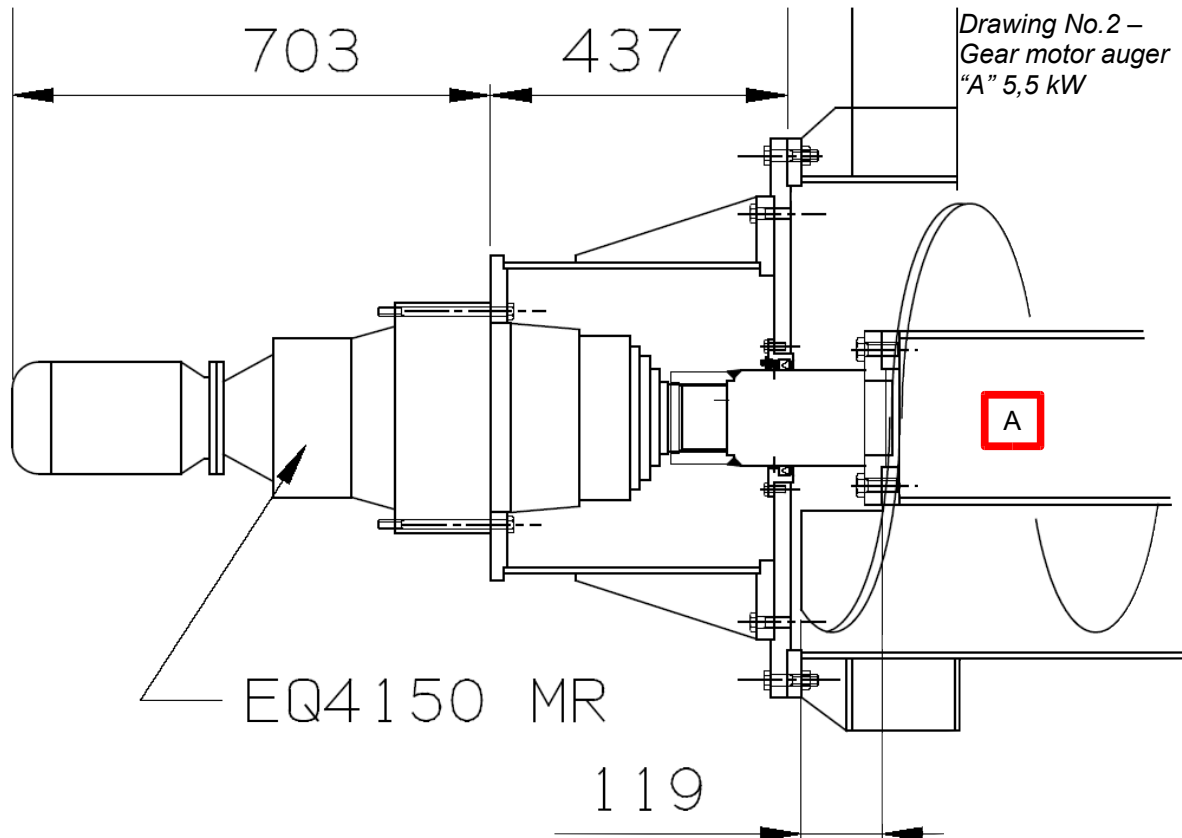
Each tank is equipped with two **dosing/mixing augers "A"** placed lengthwise in the bottom. The two augers are aligned on the same axis of rotation and from the outside they are each independently operated by one 5.5 kW three phase motor

The inner side has a media type "long life" self-lubricating bearing/support for each auger. The two augers in the bottom of the tank turns left and right and booth have the ability to transport the material to the center of the tank

Unloading of the tank will be through the **unloading auger conveyor "B"** which will extract the material discharged by the corresponding auger "A" in the tank bottom. The two horizontal "B" augers operate independently and each have a motor of 3.0 kW

These "B" auger conveyors allow removal of any type of solid or fluid without leakage. The material is then collected in the hopper of the **collecting auger conveyor "C"**, orthogonal to the "B" auger conveyor

The **collecting auger conveyor "C"** mounted in a horizontal manner will lead to a hopper (shared in case of multiple tanks) channeled through the **transporting/feeding auger conveyor "D"** that inclined leads to the hydrolysis tank



### • Power

- "A" - 5,5 kW - mixing/dosing/feeding auger
- "B" - 3.0 kW - Unloading auger conveyor
- "C" - 4.0 kW - Collecting auger conveyor
- "D" - 5.5 kW - Transporting/feeding auger conveyor

### ● **Cover - lid**

The Biogas feeder tank is covered with a dome shaped lid made of metal plates in six sections covered with polyethylene or polycarbonate. The opening of the lid is controlled by a electromechanical sliding mechanisms of the the six sections telescopically to allow loading of the tank with a wheel loader or similar. A security device prevents the operation of any functions of the tank with lid open

### ● **Materials**

Construction – Fe 52 / Fe 360

Wear - Hardox

Contact - AISI 304

### ● **Finish**

All metal painted with RAL color after blasting and two coats of primer

### ● **Predispositions**

The tank is prepared for a digital load cell weighing system

### ● **Documentation**

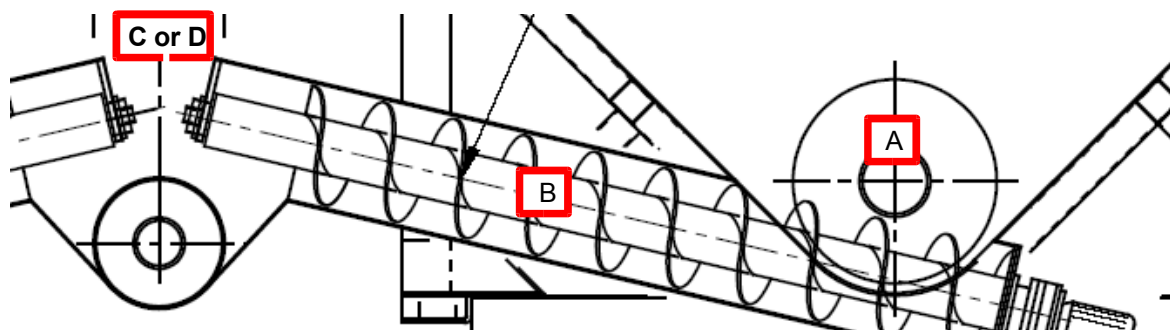
- CE certificate
- Manual
- Declaration of conformity Machinery Directive 98/37 EC at 2 par B

### ● **Technical Data**

- Auger rotation speed - 3 rpm
- Operating temperature - 50 ° C
- Fill rate - 40% in the transport zone
- "Outfalls" 2 x Ø385
- Discharge capacity - 15 m<sup>3</sup> / h
- Rotation by two gear motors 5.5 Kw with service factor 1.6 and axially flange mounted electric motors - IEC100 Std
- 10mm thick auger Ø219 / Ø630 loop with Fe510 and Fe360 in step 400 Sp 12mm
- Continuous welding of tube-side pressure and sometimes opposite
- Intermediate support steel bent bronze bushing "long-life" and pin in the middle temperate area of contact with bushing
- Control head support and referral type MTD G20 series with spherical
- Held with adjustable packing gland felt pressed
- Finish by sanding (grade 2.5) + inorganic zinc primer 40µ + 40µ + Hand polish intermediate RAL enamel finish 50 µ to be defined

### ● **Lubrication**

A programmable automatic greasing system will be provided with the bio-gas feeder



Drawing No.3 – Close view "A", "B" and "C" or "D"

## ***B - Description of the collecting auger conveyor "C"***

Inclined screw conveyor transport, identified as point "C" channel consists of calendered a "U" series with a heavy space between the flanges of the carrier of 7m (approx) tilted 4 ° act to transport silage having specific gravity of 0.7 with a capacity of 7 m<sup>3</sup> / h. This channel is closed lids screwed to the edges of the upper lip. The carrier will begin with a hopper rectangular, hopper in which the confluence of the two carriers "short" the discharge of tanks, as represented by design. The conveyor finished with outlet tube

### **Materials**

- Construction – Fe 52 / Fe 360
- Wear - Hardox
- Contact - AISI 304

### **Finish**

All metal painted with RAL color after blasting and two coats of primer

### **Requirement**

none

### **Documentation**

- CE certificate
- Manual
- Declaration of conformity - Machinery Directive 98/37 EC

### **Specifications of the collecting auger conveyor "C"**

- Rotation speed - 20rpm
- Operating temperature - 50 ° C
- Fill rate - 40% in the transport zone
- Hopper 45 ° with the inlet of about 410x600
- Carrying Capacity - 7 m<sup>3</sup> / h approx
- Outlet tube Ø406
- Rotation by motor 5,5 kW g45 5 / 1' V400 service factor 1.6 mounted commutators torque and electric motor running standards.
- 8mm thick tree auger O139 in Fe510 with Ø385 loop and initial step 280 and 350 in the next Hardox 8mm Sp
- Continuous welding on the auger shaft drive and sometimes opposite
- Intermediate support steel bent bronze bushing "long-life" and pin in the middle temperate area of contact with bushing
- Crate tube Ø406 sp Fe510B 5.5 in two parts rigidly flanged
- Intermediate mounting brackets to be positioned for connection to support system
- Control head support and referral type MTD G20 series with spherical
- Held with adjustable packing gland felt pressed
- No. 1+1 inspection doors placed in the bottom box inlet to access intermediate support
- Rotation sensor control device applied to the tree for reference
- Finish by sanding (grade 2.5) + inorganic zinc primer 40µ + 40µ + hand polish intermediate
- RAL enamel finish 50 µ to be defined

## ***C - Description of the transporting auger conveyor "D"***

Inclined auger conveyor transport, identified as point "D" channel consists of calendered a "U" series with a heavy space between the flanges of the conveyor 6m (approx) tilted 25 ° act to transport silage with a specific gravity of 0.7 with a capacity of 7 m<sup>3</sup> / h  
The values and specifications are identical to what is stated in paragraph "B" with the following difference

- Conveyor Length – approx. 6m
- Installed power - 5.5 kW

## ***D - Power consumption***

Given the complete independence of the mixing tanks / supply and the possibility of operate only one of two augers in the bottom (A)

	<b>Consumption - kW</b>	<b>Note</b>
<b>Auger A</b>	5,5	Not continuous
<b>Auger B</b>	3,0	Not continuous
<b>Auger C</b>	4,0	Not continuous
<b>Auger D</b>	5,5	Not continuous
<b>Central service</b>	?	

## ***E - Controlling***

The PLC controls

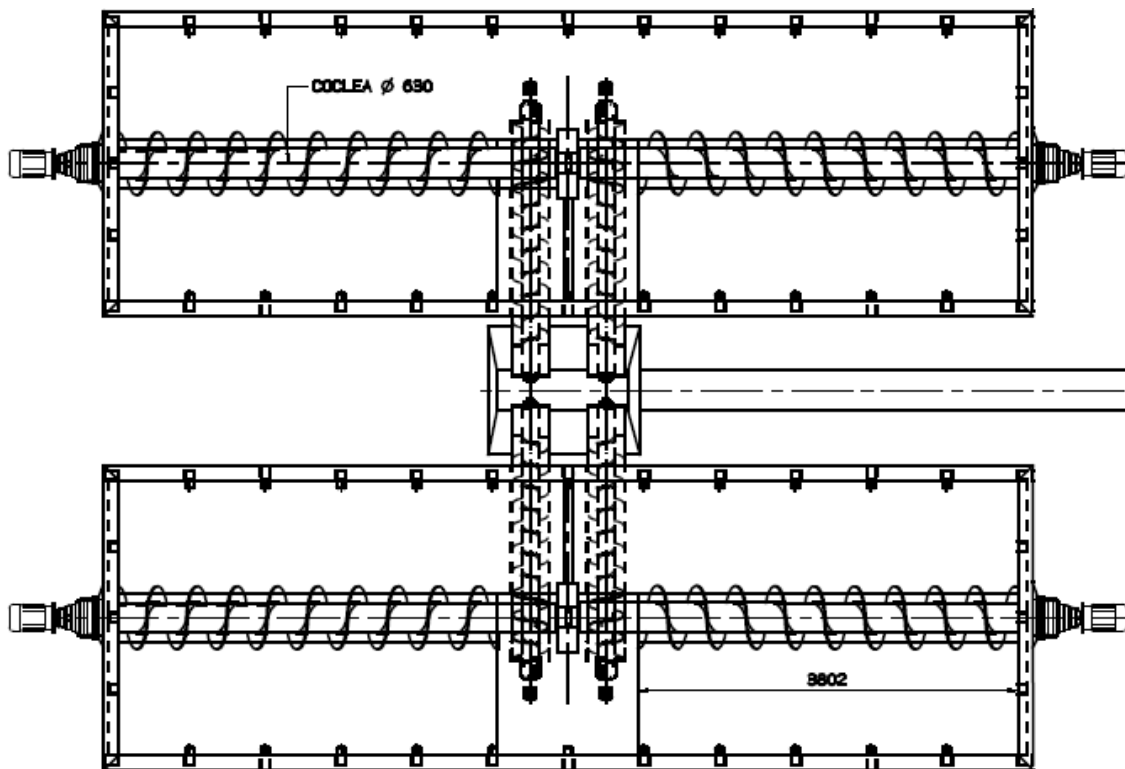
- Rotation – mixing of bottom augers (left) or (right) for xx minutes
- Start of the service unit points a or b under "Additional need" below
- Opening of the vessel gate (left or right)
- Unloading rotating one of the two bottom augers and starting xx seconds after also the orthogonal auger
- Starting the long inclined feeding augers and all the augers that are connected up to the digester
- Verification of the unloaded weight, up the reached predetermined unloading weight to be unloaded
- Closing of the gate
- Stop of the rotation of the bottom augers
- With a delay of x seconds unloading also all the other augers of the chain (in order to empty them)
- Stand by position, with the possibility to open the cover
- All functions can be remote controlled by any suitable PC at the site
- Functions like opening of the lid of the tank can be remote controlled by the wheel loader operator

## ***F - Additional need***

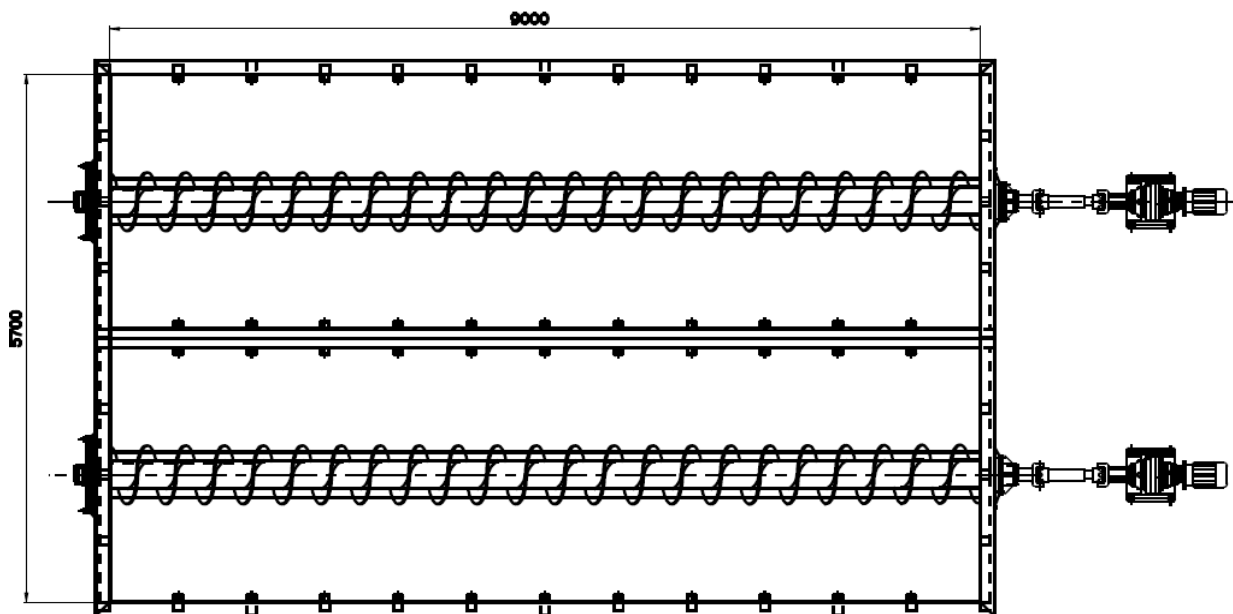
- a) Hydraulic pump if the cover, gates and other services are hydraulically operated
- b) Air compressor if the cover, gates and other services are pneumatically operated

## G - Additional information

In case there are need for specific configurations regarding loading, mixing, dosing and unloading and feeding Claestech/Apiesse can offer feed tables for loading, stationary mixers and rubber belt or auger conveyors in different size and capacity



Drawing No.4 – 140 m<sup>3</sup> twin configuration of Biogas Feeders with unloading and transporting feeding augers



Drawing No.5 -- Dosing unit 140m<sup>3</sup>