SSI 28 for rice and white corn

1 THE CASE

The customer, a traditional family-based Italian farm, requires a dryer to dry **500 tons of paddy rice and 200 tons of white corn of own production** in order to independently manage the phases of: * drying / * storage / * sale of the grains at the most favorable time. The rice paddy arrives directly from the field and must be cleaned and dried very quickly, latest within 15 hours of collection. The moisture content of the paddy rice at harvest is typically **23-25%, and must be reduced to values of 13-14%** for minimizing microbial activity and fermentation. Similar moisture levels are considered for corn, as well.

In order to return the investment more quickly, the customer is looking for the opportunity to **provide drying services to other farmers**. For this reason, **the mobile dryer, equipped with wheels**, will allow him to move easily from one location to another.

2 CONCEPTS OF RICE AND CORN DRYING

It is known that the **paddy rice requires a careful and delicate drying treatment** in order to avoid cracking or breakage of the cores, thus reducing the commercial value. Based on this, the dryer will be equipped with perforated sheets with a **1.5mm hole and with the "rice kit",** a set of solutions designed for optimizing the drying process.
Two other important and determining factors for a good drying of rice are: the temperature of the grain and duration of heat exposure. In detail, the temperature of the **drying air should not exceed 35 - 38°C**, should this occur and for a prolonged period of time, the grains may break due to thermal stress lowering the quality of the output.

Corn can be dried from any moisture content to be brought to a moisture level which is safe for storage.
In order to obtain the best results, **it is recommended that the drying operation is carried out with moisture levels not higher than 30%**. The drying air temperature must be calibrated in accordance with the purpose of the corn after drying. For white corn stored for sale, **the drying air temperature normally used is 110°C**.

3 THE SOLUTION

After a productivity assessment, in agreement with the customer, the **MECMAR SSI 28/230 T2** dryer is identified, as the model best matching the needs of size, mobility / transportability, and productivity.

Figura 1: Dryer mod. SSI 28/230 T2 with heat exchanger while drying rice.

The reinforced frame, large wheels, the combustion chamber which is more powerful compared to other models of similar capacity but lower series are characteristics particularly appreciated by the customer.

The heat exchanger with an heating power of **800 000kCal** has the potential to dry any type of grain. **The heat exchanger will not limit the air drying temperatures** and, with an efficiency between 85 and 95%, it is the ideal solution for the treatment of grain for human food industry, since the product of the combustion do not come in contact with the cereal.

The dimensions of this dryer equipped with heat exchanger boiler are shown in Figure 2 (in working position on the left and transport on the right).

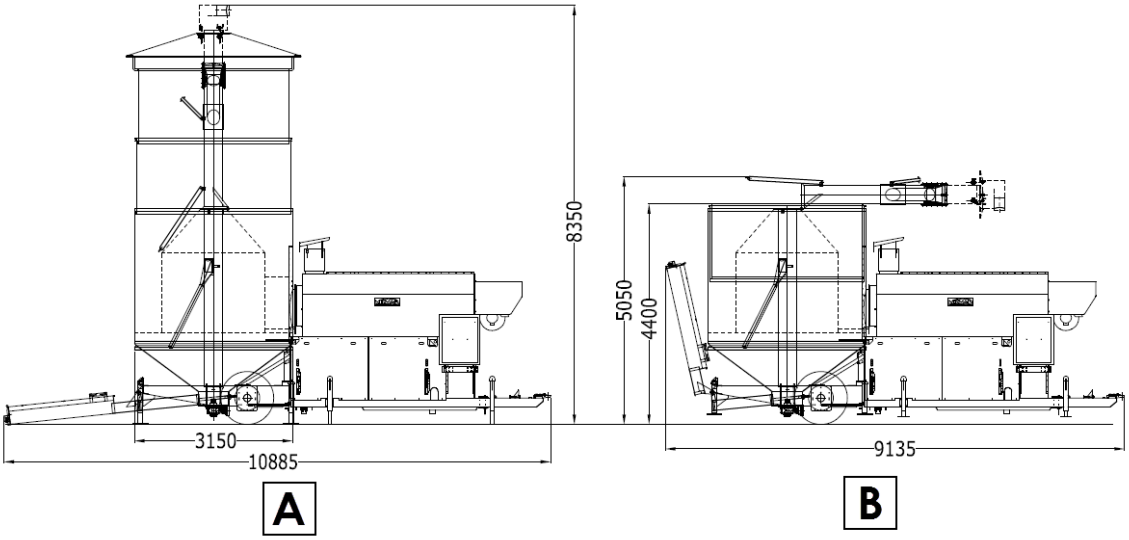

Figura 2: Dryer mod. SSI 28/230 T2 with heat exchanger: A in working position, B in transport position.

In order to easily move the dryer in different locations, and taking into account the low electricity available at the farm site, a tractor driven (min 100hp) dryer is selected as good option.
For the same reason, **diesel fuel** is selected as option for the burner system. **The dryer is equipped with a 1000l tank able to guarantee good autonomy in terms of drying time**. This solution also allows to minimize the costs of installation and fuel management, for example with respect to gas.
The dryer will also be delivered with the following extra equipment:

- **Plastic roof** (removable), for better working outdoors even in **adverse weather conditions.**
- **Dust aspiration system** connected to the top of the central tube for better cleaning the grains to be dried. A bag connected to the cyclone, will allow to collect dust particles and manage them separately with consequent protection of the surrounding environment.

Figura 3: Paddy rice loaded inside the dryer soon after harvest.