LPG mobile dryer

1 THE CASE

A Polish company produces poultry feed purchasing dried grains and corn, in different periods of the year, from local producers. However the material is often low quality due to improper storage or drying not perfectly carried out. And of course buying the product outside of the harvesting season is also much more expensive.

They recently purchased a new Mecmar **S 34/255 T dryer with LPG-fired air vein burner.** This allowed the company to purchase wheat and corn from producers during the harvesting season and to autonomously dry and stock it. The **procurement costs of the grain** immediately reduced considerably, and thanks to the use of the dryer with gas burner, gave them a product without impurities.

This makes **the feed produced healthier, gives it better quality and safer for animals while lowering production costs.**

Figure 1 – Mecmar S34 dryer with air vein burner installed by Agripak in Poland.

2 ADVANTAGES OF LPG

LPG (Liquefied Petroleum Gas) is a mixture of hydrocarbons, mainly including propane and butane.
When these two mixed gases are pressurised, they quickly pass to the liquid state, allowing LPG to be easily introduced into pressurised cylinders or tanks. It is therefore easy to transport. Just think that **LPG in the liquid state takes up 270 times less volume than in its gaseous state**.

Like natural gas, **LPG combustion is eco friendly** as the amount of pollutants and of greenhouse gases released into the atmosphere during combustion is less than other fuels. To give one example, LPG combustion produces approximately 25% less CO_2 than diesel oil combustion and approximately 50% less CO_2 than carbon combustion. Since LPG especially comes from the production of natural gas, **it is also non-toxic and does not harm the soil**, water and groundwater in case of leakage.

Considering the heat produced, we can affirm that **LPG has a higher calorific value** when compared to other fuels. To put it simply, we can state that the flame generated by LPG is hotter, which means greater efficiency for the burner. Without going into greater detail, a cubic meter of natural gas produces 9500kCal while LPG develops approximately 11500 kCal per kilogram. Keeping in mind that a litre of LPG weighs a bit less than a half kilo, we can affirm that **0.75 kg of LPG supplies the same amount of energy as that produced by a cubic meter of natural gas.**

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Table 1 – Comparison of calorific values of different types of fuels

Fuel	calorific value	
Diesel oil	10300	kCal/kg
Natural gas	9500	kCal/m3
LPG (in liquid state)	6000	kCal/l
Pellets	4600	kCal/kg
Wood chips	2250	kCal/kg

To make an economical assessment of an LPG system, in addition to the price of the fuel, we also have to take into account other **costs relative to the system** such as the cost to purchase and install the tank, **routine maintenance expenses** and **any financing** reserved for the installation and use of combustion systems more eco friendly than previous traditional systems which were more pollutant.

3 MECMAR LPG BURNER

The dryers which incorporate the **air vein burner designed, developed and built at** Mecmar differ from most solutions on the market mainly due to the supply of this type of burner which comes directly from the LPG tank in the liquid state. This **first of all considerably simplifies the system** to be implemented respect to traditional systems where the gas-fired burner only operates with LPG in the gaseous state.

In a traditional system (Figure 2), the heating system consists of: tank, pressure relief valves, vaporisation, gas train, gas burner (mounted on the dryer). Components supplied by different suppliers, each of which must be referred to both in the installation stage and in the subsequent stages of use and maintenance of each component, adding up the expenses.

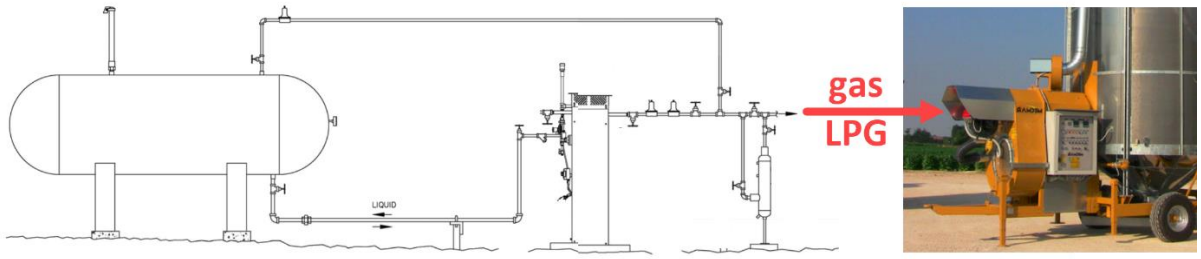

Figure 2 – Traditional diagram of an LPG system connected to a gas burner in gaseous state.

In the Mecmar system with LPG-fired air vein burner (Figure 3), the system is reduced to simply two elements: the tank, some safety devices and the air vein burner, with an extremely reduced layout both for installation and management/maintenance of the system.

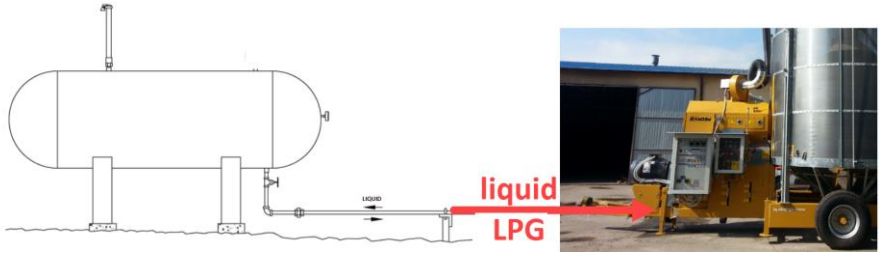

Figure 3 – Diagram of LPG system in the liquid state connected to MECMAR air vein burner

Briefly, here are some elements which distinguish the **air vein burner**:

- **First quality materials** to guarantee reliability in use
- **Safety redundancy** with constant monitoring of the flame, working pressures and temperatures

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- **Leak control** by means of an air analyser which, if an alarm is triggered, blocks operation of the burner in safe conditions
- **Inspection porthole**
- **Different adjustments** to manage the calorific value produced.

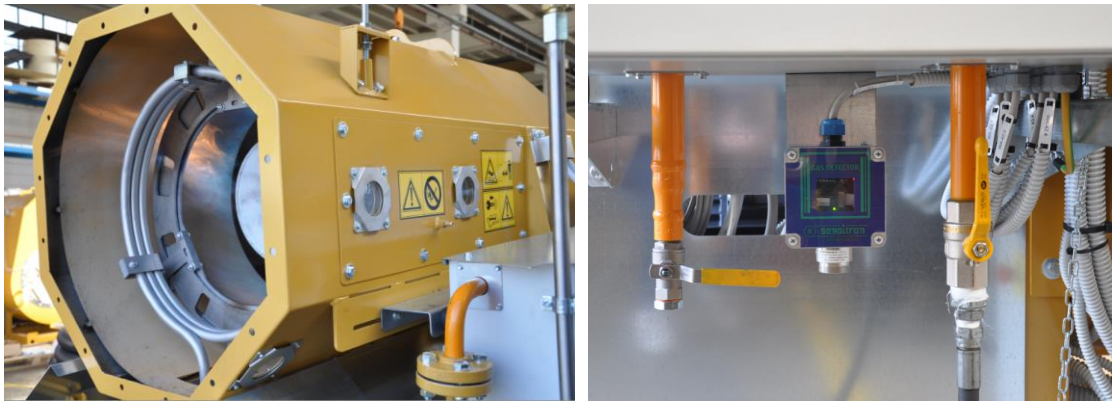

Figure 4 – On the left: detail of operation of the air vein burner - on the right: detail of the shut-off valves and electronic gas leak analyser.

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