

# CALYGRAIN® – test results

CALYGRAIN®, developed by CREALYST-Group, is used to distribute the grain evenly in the silos. At the request of Crealyst, this device was tested by Arvalis, in December 2018 on the grain trade platform of the Boigneville experimental station (91). The objective was to measure the effect of the CALYGRAIN® on the volume of grain loaded and on the efficiency of ventilation.

## 1) Protocol

A round cell 3.85 in diameter and 7 meters high was loaded in two ways: a "bulk" modality, without any grain distribution device, and a "heavy" modality, using the CALYGRAIN®.

The same batch of wheat, of constant mass (45 t), was used for the test.

Each modality was repeated three times. Five parameters were measured on the loaded and ventilated cell: the volume occupied by the grain, the air speed and the static pressure in the ventilation duct, the electric power consumed by the fan and the homogeneity of the air speeds at the top of the pile.

## 2) Effect on the volume of grain loaded

The volume occupied by the grain was less important in the case of loads performed with the CALYGRAIN® (Figure 1). The difference corresponds approximately to the cone that forms above the pile during a bulk change.

Loading with CALYGRAIN® has increased the density by 10% on average.

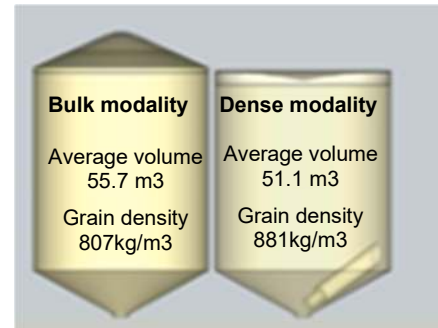


Figure 1 : Cell loaded according to the bulk modality and according to the dense modality.

## 3) Effect of CALYGRAIN® on ventilation parameters

The increase in density obtained with CALYGRAIN® leads to a reduction in the air velocity in the grains and an increase in the static pressure (table 1).

In this test, this had a negligible impact on the cooling time. In addition, the power consumed is less important in the case of a "dense" load.

	Dense modality	Bulk modality
Air speed in the ventilation duct (m/s)	11.9	12.9
Specific flow (m <sup>3</sup> /h/m <sup>3</sup> )	26.3	26.2
Cooling time (one step, specific dose of 1000m <sup>3</sup> /m <sup>3</sup> )	30h 23min	30h 34min
Static pressure (Pa)	724	533
Power consumed (W)	1489	1558

Table 1: ventilation parameters studied during the test.

## 4) Effect of CALYGRAIN® on air circulation within the heap

For bulk loaded cells, the air speeds decrease as one approaches the center; for dense loading, the air speeds are almost identical regardless of the distance from the wall (figure 2).

This homogeneity is the sign that there is no preferential passage of air on the edges of the cells, as it may in a bulk load.

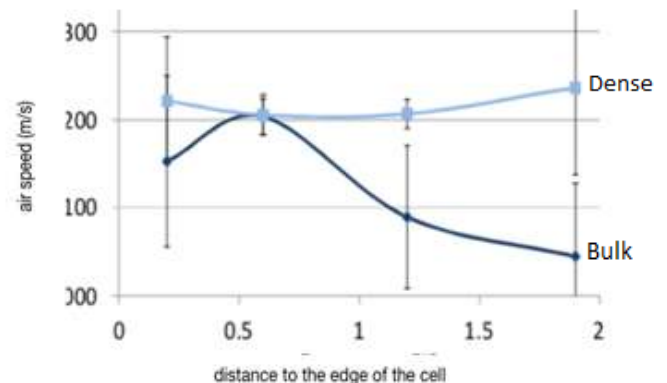


Figure 2: profile of air velocities at the top of the grain heap (the vertical bars represent the standard deviations).