impressed by vQm

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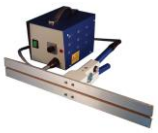
Rice CO_2 treatment in FIBC with Quadro Liner

Why?

- ✓ Eradicate infestations
- ✓ Avoid re-infestation
- ✓ Avoid chemicals
- ✓ 100% insect mortality (all development stages)
- ✓ Preserve rice quality
- ✓ Moisture protection during transit
- ✓ Approved for organic rice



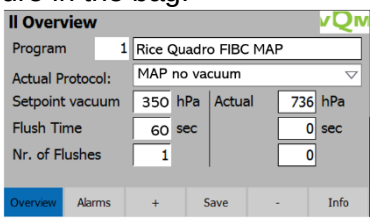
What do you need?

- ✓ vQm High Speed Unit
- ✓ vQm Quadro FIBC with hermetic liner *(form-stable, 7-layer barrier liner)*
- ✓ An air mover *(to blow up the FIBC)*
- ✓ Impulse sealer
- ✓ CO_2 needle sensor
- ✓ CO_2 supply @ 6 - 8 bar *(contact your local gas supplier – Linde Gas is preferred supplier of vQm)*

How does it work?

- ✓ Blow up the bag with the air mover and fill the Quadro FIBC (105x105x120cm)
- ✓ Seal the top spout of the Quadro liner with the impulse sealer.
- ✓ Select the protocol "*MAP no vacuum*" on the vQm unit. Set vacuum level and flush time* for CO_2 injection until there is ambient pressure in the bag.

** The vacuum level and flush time depend on the CO_2 level that you wish to achieve. Most common vacuum setting is 350-450 hpa, with flush time between 60 – 120 seconds (depending on rice type, filling volume, gas pressure, hose length)*



- ✓ Save these setting as a default program, under unique name (e.g. 1000kg Brown Rice High CO_2).
- ✓ Press "Start" and connect the head of the vQm unit to the valve inside the bag. The unit will automatically vacuum the bag to the desired level and flush back CO_2
- ✓ Disconnect the head and close the valve. This procedure can take anywhere between 2 to 5 minutes, depending on the set vacuum level.

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✓ Measure the CO_2 concentration inside the bag after **24-36** hours and register the concentration in each bag.

Important: Immediate measuring after filling is not useful!

- The CO2 that is injected is cold and will 'drop' to the bottom of the bag; only after the CO_2 has reached the same temperature as the rice, a homogeneous CO_2 concentration is reached
- The rice absorbs a significant amount of CO_2 during the first 24 hours. The absorption rate varies among rice type & processing.

✓ Monitor and log the CO_2 concentration during storage or before sending out. The concentration should only gradually decline over time. If the bag is well sealed and not damaged, the concentration inside will follow a similar decline in all bags, under the same conditions (see below graph). In case a bag has a suspiciously low CO_2 concentration, analyse the potential cause (leakage, bad sealing or lack of CO_2 pressure)

In the example below the rice is exposed to more than 35% CO_2 for over 40 days, starting at 60% at 18°C and 70% Rh. The decline of CO_2 will go quicker under high humidity (Rh) and high temperature conditions, than under dry and cold temperatures.