



FAQ's AND SPECIFICATIONS

Introduction

The idea of building equipment to fight frost was born from a total table grape crop wipe-out in 2012. The farm Hoogland in the Touwsrivier area of the Western Cape, South Africa experienced an ever increasing radiation frost event. This radiation frost (aka black frost) killed the blooming 29ha table grape crop with a single frost event reaching a minimum of -6°C in November of that year.

The farm owners were in a panic state as they needed to find a solution to protect the next season's crop. They consulted their electrical and irrigation specialist to help them find a solution to the frost problem. They installed overhead irrigation to help fight the black frost. This irrigation proved to work to some degree but was a very inefficient and wasteful solution. To successfully fight the frost, they had to maintain a volume of 160m³/h to protect the 14ha section of their crop. The risk of flooding the crop increased with prolonged frost conditions, thus not a long term solution.

A team was assembled to start on a better frost prevention concept. This team consisted of the farmers at Hoogland, electrical and irrigation specialist and a company focussing on agricultural and fruit processing engineering. This team not only needed to design and develop frost fighting equipment but also required to manufacture this equipment in a very short time period. The first three frost prevention fan prototypes were manufactured in winter of 2014. These three fans were installed in August of that year, just before the frost season started.

The three fans successfully fought the frost of 2014 but the coverage of the two 15kW and one 30kW electrically driven cowled 5 blade axial fans was not sufficient for the team. The two 15kW fans covered about 4-5ha. Due to the success of the 2014 season, the three parties decided to form a company, AGI (African Global Industries) Frost Fans was born. The company was registered in 2015 and driven to better their current technology, the team developed the 2nd generation frost prevention fan. This was a 30kW galvanized mild steel 3 blade cowled version, aimed at a 6-7ha coverage.

The 30kW fan proved its worth in the spring of 2015 and 2016 and prevented yet another crop loss, covering the targeted 6-7ha. The problem with this version was that the fan assembly had a mass of 1400kg. This was a real problem for the installation crews and required heavy lifting equipment to install the fans. This inspired AGI to develop yet another improved fan design.

In 2017 the 3rd generation -and most successful- open impeller composite blade fan was rolled out. Covering a massive 9ha on the table grape farm, AGI found the golden egg. Due to the success of the 3rd generation fan, the previous 3 fans was upgraded to the new design, bringing the total to 5 fans being used for research and development at Hoogland. The success of the 3rd generation fan was largely based on the new blade design. The design was outsourced to a company that specialises in the manufacturing of helicopter rotor blades and various military equipment. The final product exceeded everyone's expectation and very little additional development was required.

Marketing of the 3rd generation frost prevention fans started in January 2018.



Models

We have 2 fan models available, a 15kW and 30kW direct drive motor, electrically driven. Rotational speed @ 980rpm.

Mast design

Both models have the advantage of a pivoting mast. Installing our machines is a very easy exercise. We designed a pivot mechanism which allows you to lift the fan with a set of hydraulic cylinders connected to a 12V powerpack. This also enables easy maintenance without hiring expensive cranes or rigging equipment. Our mast is specially designed to accommodate the pivot mechanism thus 2mm thicker than other fans on the market. Our mast components are laser cut and hot dip galvanized after welding.

Blade design

Our blades are designed and manufactured by a company that manufactures military grade components for numerous types of aircraft. The design focussed to achieve maximum reach while limiting the wind speed. The composite fan blade is also light weight and durable.

Design principal

Due to very low mechanical losses (direct drive motor), higher operating rpm's and a unique blade design we were able to achieve the same performance with only 25% of the power used by our competition. The main electrical components used in our fans are all ABB, thus adding to the quality of our fans. The use of ABB motors and variable speed drive (with ramp up function) enables the starting current to be no more than full load current. Also included in our standard frost preventions fans is an automatic brake mechanism. This ensures that the blades do not pick up unnecessary wear and tear. Another reason for our success is due to the electrically driven slew drive that activates with a timer, this means that our fan can pause at predetermined intervals to drive the air even further.

Coverage

Coverage depends on crop type, typography and other environmental factors.

Typical coverage for table grapes and similar crops : 15kW machine @ 6ha and the 30kW machine @ 9ha.

Typical coverage for citrus trees and similar crops : 15kW machine @ 4ha and the 30kW machine @ 7ha.

Efficiency

AGI achieves a mechanical efficiency of 92% due to electrical motor design. The AGI Frost Fan is a market leader when it comes to efficiency, thus contributing to very low running cost. On average we run at 10-20% (depending on electricity costs) of the cost compared to traditional internal combustion engine driven fans.

Service

The service on our machines consists of a straight forward lubrication, checking electrical connections and blade inspection.



Research and development

AGI has been developing the Our R&D farm in the Western Cape of South Africa has experienced numerous frost events, sometimes reaching -4.5°C in spring.

Auto start

The standard fan package comes with a temperature controller fitted on the control panel of the fan. This controller is powered by the solar panel and battery that is also included in the standard fan package. When you set your temperature controller to the desired low temperature, it will trigger the start function on the generator and the fan will start running. As soon as you desired high temperature has been reached, the controller will turn off the generator. With the standard system you are not able to remotely switch on the fan nor see any temperature readings on your phone or computer.

Control & monitoring package

The control & monitoring option enables the user to remotely set you starting temperatures as well as see the temperature (3x thermometers), humidity (1x relative humidity) and wind speed (1x anemometer) readings. Please note that in order for the control & monitoring package to work, you need reliable 2G cellphone reception.

Sound levels

15kW Frost fan :	200m = 54dB
	300m = 52dB
30kW Frost fan :	200m = 58dB
	300m = 53dB

Patent

Patent pending : application no. 2017/05247 ino AGI Frost Fans (Pty) Ltd - For: FROST FAN

Warranty

We supply a 2-year mechanical warranty and 1 year electrical.