



Opteon™

**Terra Viva Group Enhances
Sustainability
in Flower Cultivation with
Opteon™ XP40**



Chemours™

TerraViva

Innovation and Sustainability

Terra Viva Group is a benchmark in the Brazilian agricultural sector, recognized for its innovation, sustainability, and excellence in the production of flowers, plants, and food. With over 60 years of history, the company has built a solid reputation as a market leader, operating its products in the states of São Paulo and Minas Gerais supplying supermarkets, garden centers, and cooperatives both nationally and internationally.

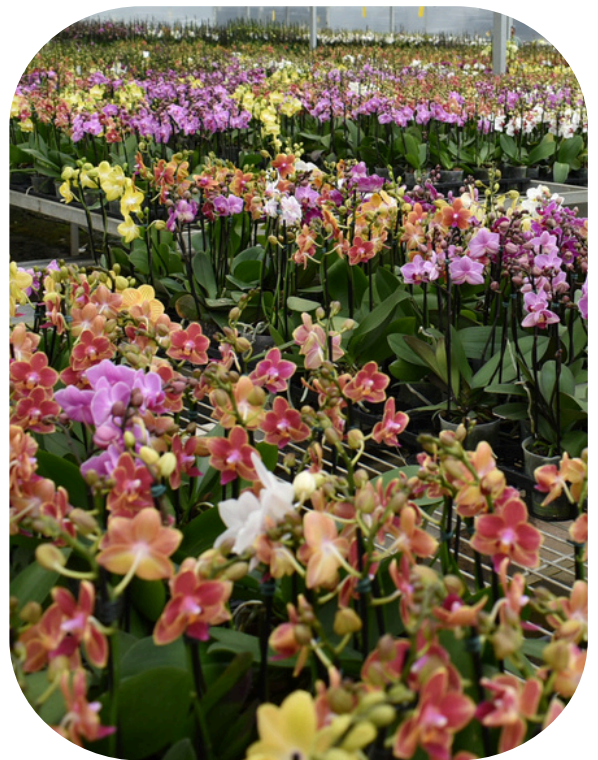
Headquartered in Holambra, São Paulo, one of Latin America's leading flower-producing regions, Terra Viva Group stands out for its orchid production, combining advanced cultivation techniques with tradition, technology, and sustainability. At one of its farms in Holambra, the company, in collaboration with L. Monte and Chemours, selected the Opteon™ XP40 (R-449A) refrigerant to provide cooling for a greenhouse dedicated to the production of Phalaenopsis orchids.

Objective

Temperature control is crucial for the cultivation and flowering of Phalaenopsis orchids. To achieve the best growing conditions for these orchids, daytime temperatures should be around 77°F, while nighttime temperatures should be maintained at 60.8°F. Due to climate change, with more frequent heatwaves and an increase in the average daily temperature, it became necessary to adopt an additional efficient cooling system to ensure proper temperature regulation.

"In our cultivation process, if the temperature of 60.8°F is not reached during the nighttime, it is not possible for the orchids to bloom; therefore, temperature control directly impacts our production."

Eldo Soares de Oliveira,
Production Manager and Agricultural Technician, Terra Viva
Group (24 years of experience)



Aligned with its sustainability goals and international agreements, including the Montreal Protocol and the Kigali Amendment, Terra Viva Group aimed to avoid using refrigerants with ozone depletion potential (ODP) or high global warming potential (GWP), such as R-22 and R-404A, which have traditionally been used in these applications. At the same time, complex and high-maintenance solutions were also ruled out in favor of a simple refrigeration system that required the same level of technical expertise as traditional systems.

The objective of the project was to select a simple refrigeration system that operates with a non-toxic, non-flammable refrigerant with low global warming potential. For this reason, Opteon™ XP40 was chosen.



Sustainability in Practice

With low GWP and high energy efficiency, Opteon™ XP40 reduces emissions and promotes more sustainable operations.



Excellence and Technology

By adopting Opteon™ XP40, Terra Viva strengthens its leadership in sustainability and maximizes greenhouse productivity.

Project

The project involved creating a refrigeration system to cover a total area of 40,000m² (430,556.417 sq feet), maintaining temperatures around 77°F during the day and lowering them to 60.8°F at night. The solution developed by L. Monte in partnership with Chemours was the use of Opteon™ XP40 in a direct expansion system, featuring three Bock semi-hermetic compressors with automation systems for condensation control and Danfoss frequency inverters. This system supports a thermal load of 175,000 kcal/h, with an evaporation temperature of 41°F and a condensation temperature of 107.2°F, along with a remote operation monitoring system.



"The initial options pointed to R-22 or R-404A, but the decision was reversed in favor of Opteon™ XP40 due to Terra Viva Group's commitment to environmental responsibility. By using a low-GWP refrigerant in its facilities, the company not only contributes to sustainability but also benefits from lower energy consumption."

- Amaral Gurgel, Director of L. Monte.

Opteon™ XP40 (R-449A) is an HFO-based refrigerant designed to minimize environmental impact. It does not deplete the ozone layer and has a global warming potential (GWP) that is 27% lower than R-22 and 67% lower than R-404A. With an ASHRAE A1 safety classification, it is both non-toxic and non-flammable. Additionally, Opteon™ XP40 is fully compatible with existing compressors, condensers, evaporators, expansion valves, and synthetic polyol ester (POE) lubricating oil commonly used with R-22, R-404A, and R-507. This makes it a clear choice for its environmental benefits, safety, and seamless integration with existing equipment.

Results

Before the installation of this system, the greenhouse took approximately six hours to reduce its internal temperature from 75.2°F to 60.8°F. This slow temperature drop directly impacted crop productivity and flowering. After the project was implemented and the equipment using Opteon™ XP40 was installed, the same temperature reduction was achieved in just an hour and twenty minutes.

"To meet the production of over 2 million orchids per year, our mission is to make them bloom every week, not just once a year as happens in nature. This large-scale operation, with the adoption of the new system, will ensure the reliability of my production while we operate sustainably"

- Eldo

In addition to the increase in operational efficiency, the adoption of Opteon™ XP40 has led to a reduction in both direct and indirect emissions from the refrigeration systems, says the customer. From a maintenance perspective, it can be maintained in the same way as traditional systems using R-22 and R-404A, as it is non-flammable and operates at similar pressures.

Looking ahead, Terra Viva Group is committed to expanding the use of Opteon™ XP40 across its greenhouses, further solidifying its dedication to sustainable practices and environmental responsibility. By adopting innovative solutions like Opteon™ XP40, the company continues to set a benchmark for eco-conscious operations in the agricultural industry.



Eldo Soares de Oliveira, Production Manager and Agricultural Technician, Terra Viva Group

Discover how Opteon™ refrigerants can transform your operations and help achieve your sustainability goals

Contact us today to learn more about advancing your business with environmentally responsible solutions

Learn More

For more information on the Opteon™ family of refrigerants, or other refrigerants products, visit opteon.com or call (800) 235-7882

The information contained here is provided free of charge and based on technical data that Chemours believes to be reliable. It is intended for use by technically knowledgeable persons at their own risk. Because the terms of use are outside of our control, Chemours makes no warranties, express or implied, and assumes no liability for any use of this information. Nothing contained herein shall be taken as a license to operate under, or a recommendation to infringe, any patents or patent applications. ©2025 The Chemours Company FC, LLC. Opteon™ and any associated logos are trademarks or copyrights of The Chemours Company FC, LLC. Chemours and the Chemours logo are trademarks of The Chemours™ Company.