

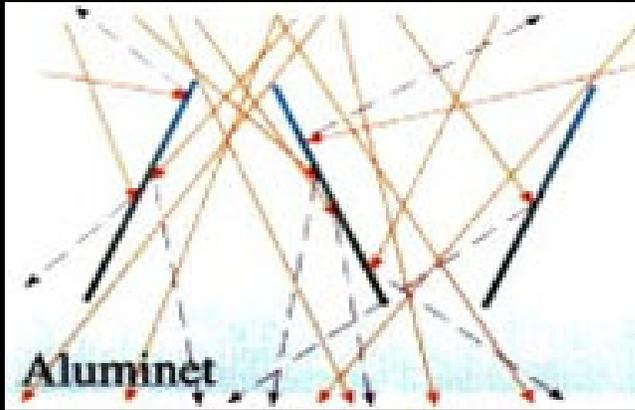


GARTNER CALLAWAY
SUSTAINABILITY COMPANY LTD

Open Air Suspension Greenhouse

Designed To Grow Almost Anything

An open air suspension greenhouse gives a whole new meaning to greenhouse cultivation. It is a truly sustainable way of growing in tropical regions where plants are protected from negative impacts of the sun's rays, pests and receive full ventilation during the growing process. These greenhouses are perfect for outdoor growers and outdoor hydroponic equipment. A special covering called Aluminet is used to cover either the top of the greenhouse structure alone or cover the greenhouse completely providing diffused light and adequate ventilation.



ALUMINET reduces heat load in the greenhouse and because of the highly reflective nature of Aluminet, radiation is reflected away from the net.

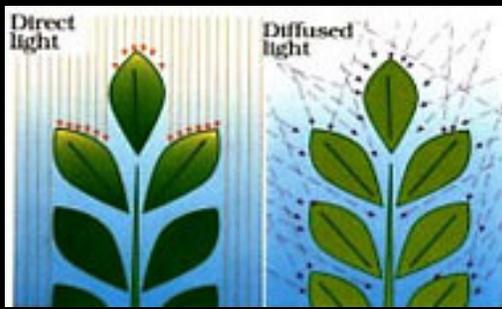
In situations where the heat load is pushing the ventilation to its limits, actual temperature differences will occur, with the ALUMINET being cooler

ALUMINET works as a thermal blanket. All warm objects become cooler by giving off longwave, infrared (heat) radiation. At night, the warm earth surface cools as it gives off infrared radiation. On clear nights, this radiation is lost into space. On cloudy nights, some of this radiation is reflected back to the earth by the clouds, maintaining a warmer temperature than would occur on a clear night (under otherwise similar conditions). Within the greenhouse, this same process is going on. The plants and floor give off invisible heat radiation at night.

ALUMINET, when installed as a thermal blanket/shade cloth, reflects this radiation back to the plants maintaining warmer leaf temperatures. This decreases condensation on the leaves as well as helps to maintain warmer air temperature within the canopy. Because the net is open weave, air does pass through the net. While this tempers the thermal benefits to some degree (compared to a solid screen), this has distinct advantages, particularly with naturally ventilated houses. First, the open weave of ALUMINET allows better movement of hot air to roof vents when used as shade during the day, and second, it allows moisture to pass through to the peak of the house, maintaining lower humidity near the plants.

Aluminet provides frost protection and is effective in reflecting longwave (heat) radiation back to the plants at night.

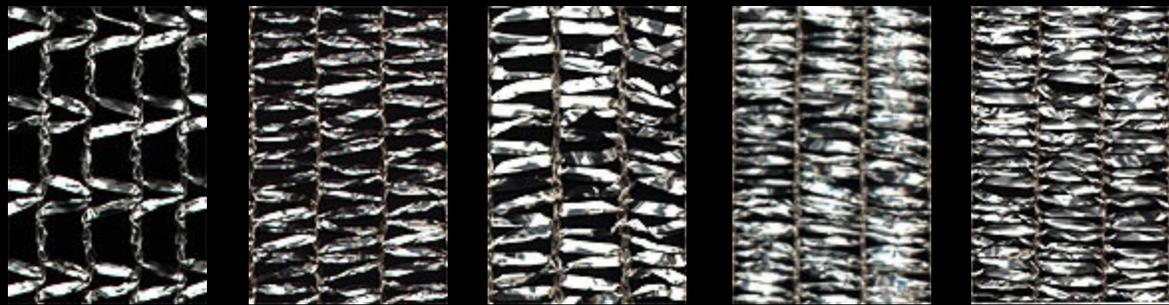




ALUMINET provides for more diffused light in the plant canopy. With black shade cloth, the net will absorb rays of light coming from low angles. Because ALUMINET is reflective, it will allow much of this low angle, (diffused) light to pass through the net into the canopy.

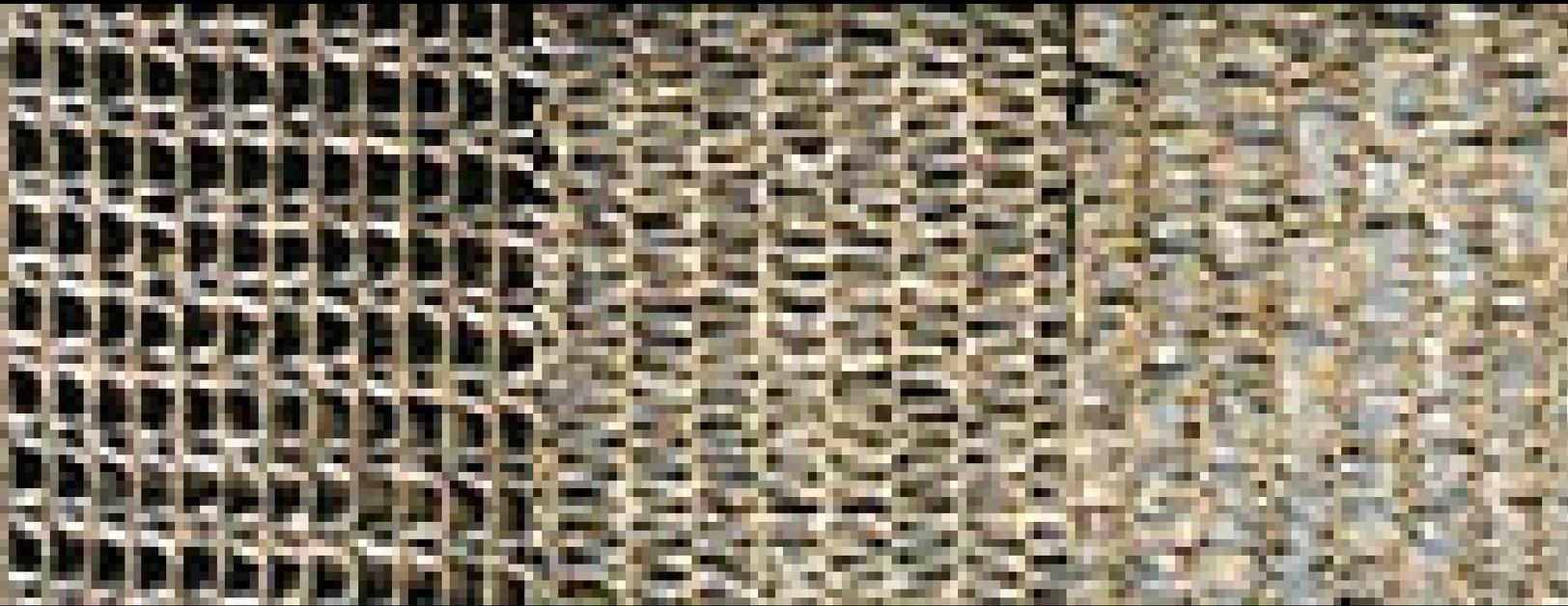
In permanent installations, this can allow for more light into the canopy during the low light periods in early morning or late afternoon. While the benefits of diffused light have been minimally documented, personal testimonies suggest many benefits including:

- Higher yield, especially in tall canopy crops. With direct light, the upper leaves get excess light and the lower leaves are in shade. With diffused light, the light is spread more evenly throughout the canopy. In a greenhouse tomato study in Israel, a 6-7% increase in tomato yield (11,574 kg vs. 10,866 kg for one manufacturer and 9972 kg vs. 9094 kg for a second manufacturer) was seen for films with diffusive agents (comparisons include the same films with and without the diffusive additives).
- More diffused light will minimize shadows within the greenhouse, giving more constant light throughout the greenhouse.
- Diffuse light gives more light into the lower canopy, which may stimulate branching.



SHADE	30%	40%	50%	60%	70%
WEIGHT (OZ/SQFT)	1.97	1.86	2.01	2.53	2.57
LIGHT REFLECTION%	34	40	43	45	55
ENERGY SAVINGS%	N/A	15	20	40	50
SURFACE COVER%	40	50	60	70	80
BALL BURST STRENGTH(KG/Cm2)	3.9	3.6	3.7	4.3	4.7

Notice the blue and bronze coloring in the strands of Aluminet. The blue is reflected from the sky above while the bronze is reflected from the fabric beneath it. Because the strands are twisted, Aluminet will reflect diffused light from many directions.





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17 Bashorun R.I. Okunsanya Avenue
Off Emeka Nweze Street
Lekki Phase 1, Lagos
+234 9098587332, +234 8185811939
info@gartnercallaway.com
sales@gartnercallaway.com
www.gartnercallaway.com