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Special Features of Plastic Film Greenhouse Covers to Improve Growing Conditions[®]

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Important features of advanced plastic films that optimise greenhouse growing conditions are presented:

a) **Thermic effect:** thermic films have attracted attention for their ability to reduce heat loss at night. Film manufacturing technology and new additives can now provide superior clear (9% infra-red transmission) and diffusing (5% infra-red transmission) thermic films offering improved heat retention capacity.

b) **Optical properties:** light transmission can be tailored to suit the specific crop, growing season, area, and grower's expectations. A synopsis of the most important light manipulation effects is given.

c) **Anti-mist effect:** some manufacturers' and independent trials indicated that anti-drip, anti-mist films not only controlled the development of undesirable mist formation under certain conditions, but halved the number of fungicide applications required for adequate disease control, compared with standard film or standard anti-drip film.

d) **Cooling effect:** recently developed three-layer silver and bubble films counter excessive heat development in greenhouses.

INTRODUCTION

The plastics industry has developed polythene films with a range of features to help growers control crop environments. It is possible to combine several characteristics in a single film so selecting the right material for specific crops is increasingly important for growers.

Most commercial films are highly transparent to photosynthetically active radiation (PAR), unless designed for particular purposes. Optimum crop growth is achieved by allowing the right wavelengths to reach the plants and for that light to be uniformly distributed in the greenhouse. Water condensation can be controlled by using anti-drip films, but more recently anti-mist films offer further advantages.

Year-round production means a good film should retain heat in the greenhouse as much as possible in cold weather, while reducing excessive heat build up in warmer weather.

THERMIC EFFECTS

Additives and polymers are used in the formulation of films that reduce long-wave infra-red radiation (IR) transmission from beneath the film, to prevent heat loss from a greenhouse.

A standard film with no additives will absorb up to 55% of the IR radiation. Thermic films are formulated to block radiation transmission at infra-red wavelengths so that thermic clear and thermic diffusing films are available that transmit as little as 18% and 15% IR, respectively, at a typical thickness of 180–200 microns.

Increasing the amount of standard additives to further improve the thermic effect leads to unacceptable side-effects — unacceptable creep behaviour of the film or reduced light transmission.