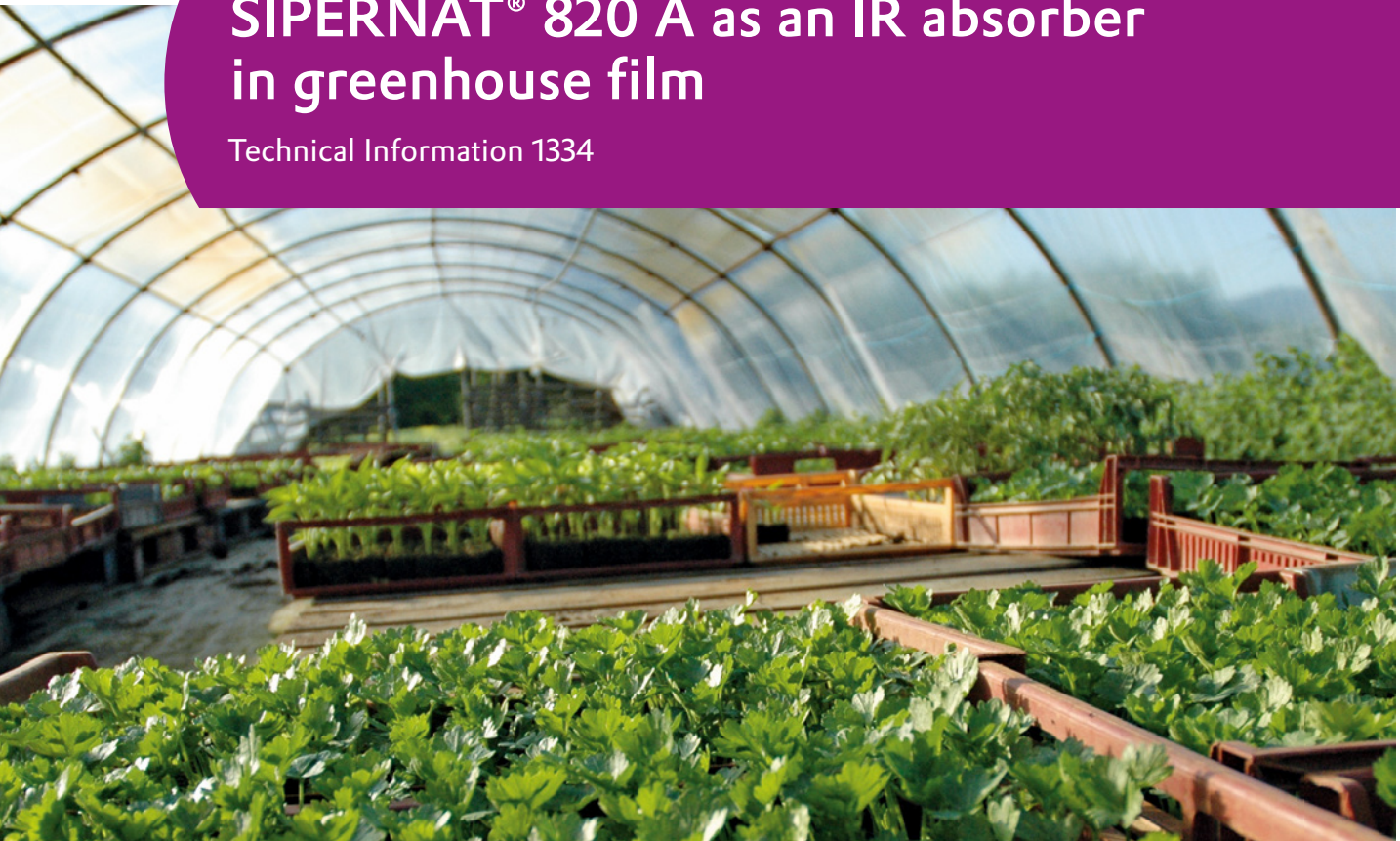


SIPERNAT® 820 A as an IR absorber in greenhouse film

Technical Information 1334



Greenhouse film has become an indispensable material in modern agriculture because it creates an optimum climate for crop growth and hence additional yields from out-of-season production. Through the use of additives, specific film properties can be selectively improved, for example, reduced IR radiation transmission. As a result, the heat generated by a greenhouse can be stored more efficiently and the loss due to thermal radiation can be reduced considerably.

The addition of SIPERNAT® 820 A is an effective and low-cost way of improving the thermal barrier properties of polyethylene films. SIPERNAT® 820 A is a very fine-particled synthetic aluminium silicate. Typical concentrations used in greenhouse films range from approx. 3 % to 7 % by weight.

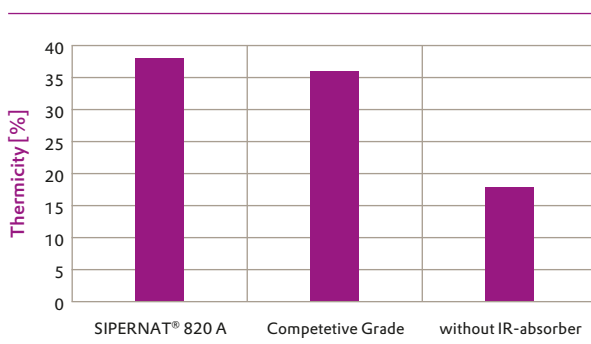
Properties of SIPERNAT® 820 A in greenhouse film:

- High heat retention in the greenhouse (high thermicity)
- High light transmission
- High purity and hence minimal interaction with UV stabilisers
- Additional potential application: carrier for other additives (e.g. anti-drop)
- Simple integration via master batch

SIPERNAT® 820 A absorbs the thermal radiation hitting the polyethylene film and thus allows a higher temperature inside the greenhouse.

The level of IR efficiency (thermicity) was determined in accordance with the standard EN 13206.

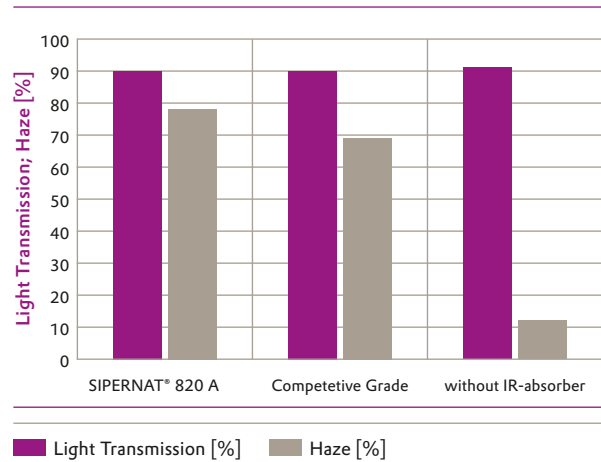
Figure 1
Thermicity of PE-film containing 3 % SIPERNAT® 820 A



The light transmission of the polyethylene film remains virtually unchanged by the use of SIPERNAT® 820 A. By scattering the light on silicate particles the haze of the film increases to a certain extent. The light-diffusing effect of the film can also be a desirable side effect, depending on the field of application and climatic conditions.

The optical data was determined in accordance with DIN 5036, Part 3.

Figure 2
Light Transmission and Haze of PE-film containing 3 % SIPERNAT® 820 A



Figures 3 and 4 show the physical principles for increasing the transparency of polyethylene films by the use of SIPERNAT® 820 A. As can be seen from transmission curves, the aluminium silicate features a highly pronounced absorption band in the wavelength range of approx. 1000 to 1300 cm⁻¹.

The measurement of the Thermicity according to standard EN 13206 includes the wave numbers ranging from 770 cm⁻¹ to 1430 cm⁻¹, which corresponds to the emission range of thermal energy radiated from the earth's surface.

Figure 3
PE-film without IR-Absorber

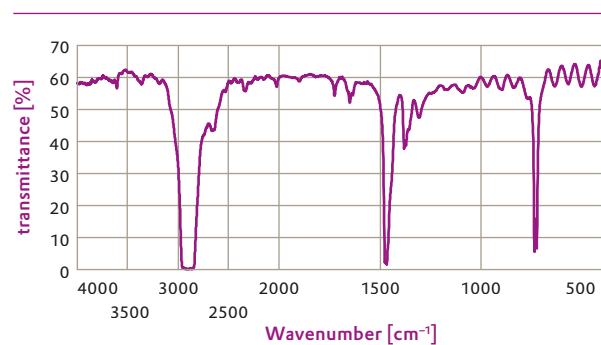
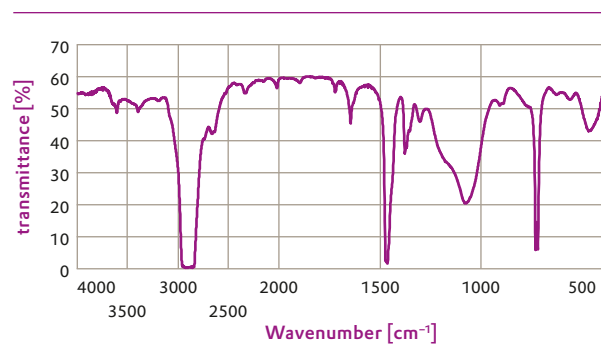


Figure 4
PE-film with 3 % SIPERNAT® 820 A



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