A Winning Performance

TIONA® 125

Millennium Chemicals
A Lyondell Company

TIONA® 125

THE PLASTICS INDUSTRY IS SEEING A CONTINUOUS EVOLUTION of processing technology and materials. New machinery and polymer designs are enabling significant cost savings from faster throughput rates and thinner structures.

These developments mean that for both the producers and users of white and coloured masterbatch, a winning TiO_2 performance requires improved dispersion and processability, increased high temperature stability, and high optical efficiency. Through the use of novel, patented surface treatment technology, Tiona 125 provides this winning performance in the most demanding masterbatches and other non-durable plastics applications.

As a leading supplier of titanium dioxide pigments to the plastics industry, Millennium Chemicals is constantly striving to develop new products which give masterbatch producers and processors a leading edge in the fast-moving world of polymers. Tiona 125 provides a new standard for titanium dioxide products with an exceptional combination of dispersion, high temperature processing stability and opacity.

Performance

The Dispersion Advantage

Modern polymers with superior mechanical properties have enabled significant film downgauging. Thinner films require a higher pigment loading and optimum dispersion to ensure the desired opacity.

Tiona® 125 builds on Millennium's long-standing reputation for products with outstanding dispersion. The patented surface treatment is designed to raise the bar for dispersion performance and to achieve a step-change reduction in screen pack blockage and film defects.

Dramatically reduced screen blockage rates mean longer times between screen changes and reduced downtime. The superior dispersion of Tiona 125 translates into real advantages for the masterbatch users: reduced bubble breakage, easier downgauging, absence of printing problems caused by nibs, and outstanding opacity. All of this adds up to faster processing and higher quality.

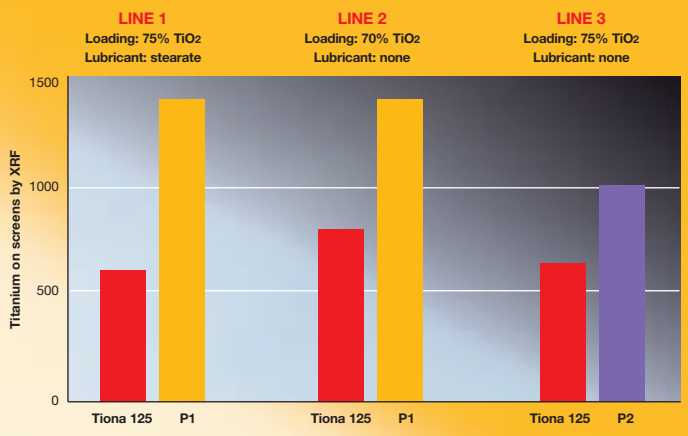
Figure 1 shows the dispersion qualities achieved with three commercial, full-scale, twin-screw compounding machines. The masterbatches were extruded through a fine screen mesh pack, and the amount of undispersed TiO_2 retained on the meshes was measured using X-ray fluorescence (XRF). Tiona 125 provides consistently superior dispersion for each formulation and machine.

This advantage is also demonstrated when masterbatches are made on an internal mixer. Figure 2 demonstrates how the excellent dispersion of Tiona 125 yields low delta P values in a typical pressure build-up dispersion test due to reduced screen pack blockage.

TIONA® 125

Designed for

FIGURE 1
Dispersion Quality:
Commercial Twin-Screw
Extrusion Machines



Exceptional High Temperature Processing Stability

New higher strength polymers are being processed thinner and faster, often at higher processing temperatures. This combination of thinner, faster, hotter and the use of higher pigment levels to opacify the thinner films requires that the TiO_2 pigments provide exceptional, high-temperature processing stability.

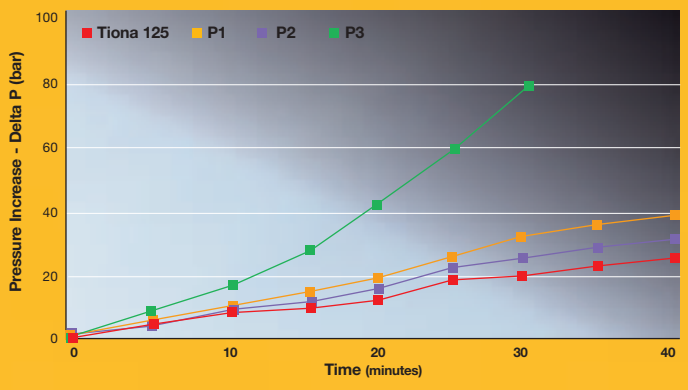
By controlling moisture content, problems of film defects such as lensing or lacing and die lip build-up are avoided. Eliminating the film defects and reducing die build-up rates mean superior value for the processor as extrusion lines are run for longer without interruption. During masterbatch manufacture, loosely bound moisture adsorbed on the TiO_2 surface is largely eliminated. Any remaining moisture still entrained with or "bound" to the pigment may volatilise as the masterbatch is processed at higher temperatures into films or extrusion coatings.

The unique design of Tiona 125 consists of a very high TiO_2 content and the application of an advanced, patented organic compound onto the pigment surface. This design has resulted in exceptionally low "bound" moisture content as measured by a precisely controlled Karl Fischer technique (figure 3). The bound moisture levels correlate closely with lacing and die build-up tendency.

Extensive tests have demonstrated that masterbatch made with Tiona 125 can be used in extrusion coatings at the extreme conditions of 340°C melt temperature and 20% TiO_2 loading with complete freedom from lacing defects. This stability aids problem-free processing and fast throughputs.

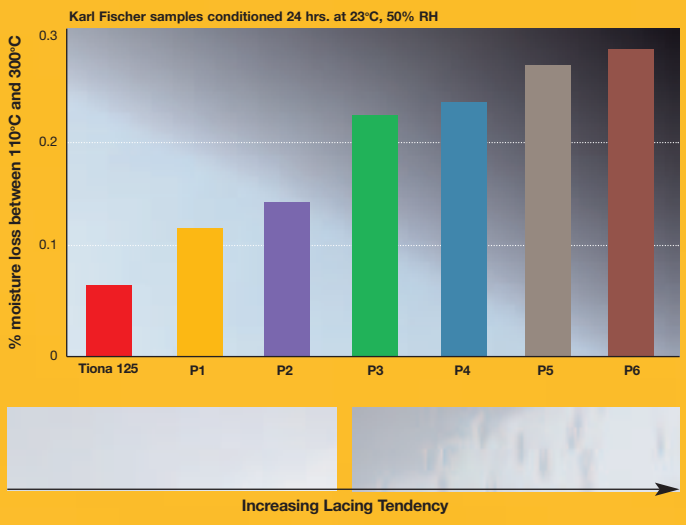
Performance

FIGURE 2
Dispersion Quality:
Banbury Internal Mixer



75% TiO_2 in melt 20 IdPE
Delta P measured with 500 mesh filter screen

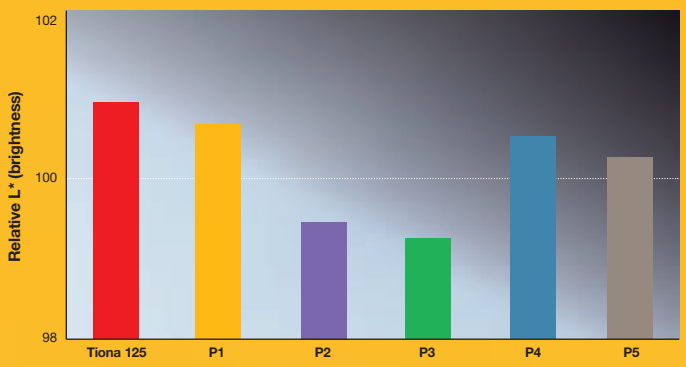
FIGURE 3
Moisture Evolution
At Plastics Processing
Temperatures



Optical Efficiency

Tiona 125 is a fine crystal rutile pigment with mean particle size optimised to ensure the blue-tone characteristics preferred for plastics applications. The particle size distribution is rigorously controlled using sophisticated optical density measurement techniques, and this coupled with the very high TiO_2 content, ensures that Tiona 125 provides high opacity and tinting strength (figure 4). This benefit is especially valuable in film applications where equivalent opacity may be achievable at lower pigmentation levels.

FIGURE 4
Tinting Strength



Features and Benefits

Tiona 125 is a high performance, blue undertone, rutile pigment designed to give unparalleled dispersion, high temperature processing stability and opacity in a wide range of plastics formulations.

- Excellent dispersion and processing
- Outstanding high temperature processing stability
- Blue tint tone and high brightness
- High opacity and tinting strength
- Low moisture content

Applications

Tiona 125 is recommended for evaluation in a wide range of polymers where an outstanding combination of high-temperature performance, optical efficiency, high pigment loading and ease of dispersion is required:

- Masterbatch and compounds
- Polyolefins and styrenics
- Engineering polymers
- Rigid and flexible PVC*
- Blown film
- Cast film
- Extrusion coatings
- Injection and blow moulding

** interior applications that do not require high resistance to weathering and UV radiation.*

Properties

Crystal Form	Rutile
TiO_2 Content	98%
Undertone	Blue
Specific Gravity	4.1
Loss at 105° C	0.15%

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