

CARBITAL™ 110S IN POLYPROPYLENE

Carbital™ 110S is a high whiteness calcium carbonate derived from pure Italian Marble. It is milled to below 10 micrometre and coated with stearic acid.

Advantages in polypropylene are:

- Exceptional colour
- Good toughness
- Good weathering
- High gloss

Calcium carbonate fillers are used in polypropylene to achieve good balance of rigidity and impact strength. Traditionally, fine ground chalks were used, but in aesthetic applications these are increasingly being replaced by the whiter limestone and marble based products.

Carbital™ 110S a fine ground Italian marble, will ensure the optimum optical properties of the polypropylene compound are achieved while retaining a good balance of mechanical properties normally found with a fine ground calcium carbonate.

In Figure 1, the key benefit of using a filler based on pure Carrara marble is demonstrated, when the colour of 40% filled PP homopolymer compounds containing calcium carbonate from different sources are compared. The Italian marble, Carbital 110S, gives the highest whiteness and a significantly lower yellowness than the other calcium carbonates. No titanium dioxide was included in these formulations.

FIGURE 1: EFFECT OF CALCIUM CARBONATE TYPE ON MECHANICAL PROPERTIES

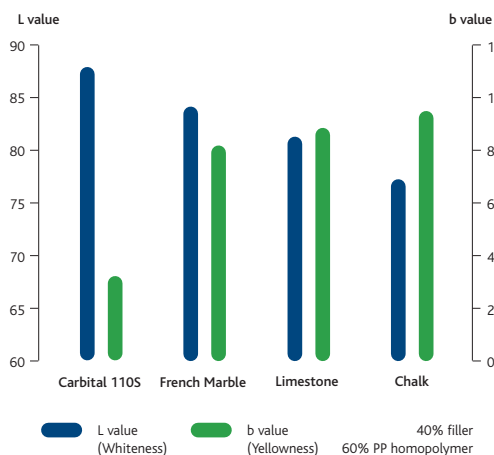
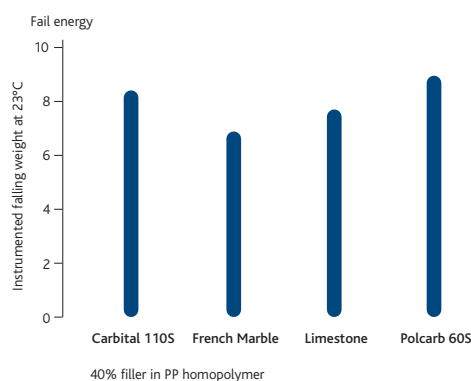


TABLE 1: CARBITAL 110S IN POLYPROPYLENE REDUCTION IN TITANIUM DIOXIDE

	TiO ₂ addition (%)	L	b
Limestone	3	93.1	2.1
Carbital 110S	3	94.3	1.3
Carbital 110S	2	93.5	1.8
Carbital 110S	1	92.1	2.5

In a commercial garden furniture formulation with 40% filler, replacing a widely used fine French limestone with Carbital™ 110S leads to an improved whiteness and yellowness. This is shown in Table 1 where Carbital™ 110S yields approximately one unit higher whiteness and one unit lower yellowness in formulations where 3% Titanium dioxide is present. In fact, when using Carbital™ 110S, the level of TiO₂ may be reduced by up to 50% and still achieves the same colour as that obtained with the limestone based filler.

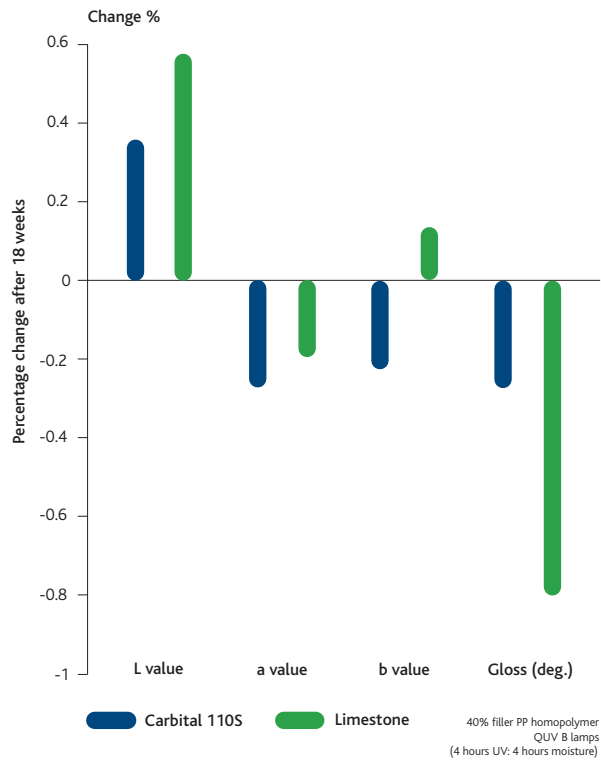
FIGURE 2 - EFFECT OF CALCIUM CARBONATE TYPE ON IMPACT STRENGTH



The low number of coarse particles (Carbital™ 110S contains 98.5% below 10 micrometre) ensures that the optimum mechanical properties are achieved in highly filled PP homopolymer. The falling weight impact strength for Carbital™ 110S is compared with three competitive calcium carbonate fillers in Figure 2. The benefit of excluding the coarse particles from Carbital™ 110S is clearly demonstrated.

For outdoor applications, particularly garden furniture, the weatherability of polypropylene compounds is important. Poor quality, impure calcium carbonate filler can adversely affect this property. Therefore, generally only fine, relatively pure products are used. In Figure 3, Carbital™ 110S is shown to perform favourably with a fine competitive limestone product in respect to key properties after 18 weeks exposure in a QUV weatherometer.

FIGURE 3 - EFFECT OF CARBITAL 110S ON THE WEATHERING OF POLYPROPYLENE



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