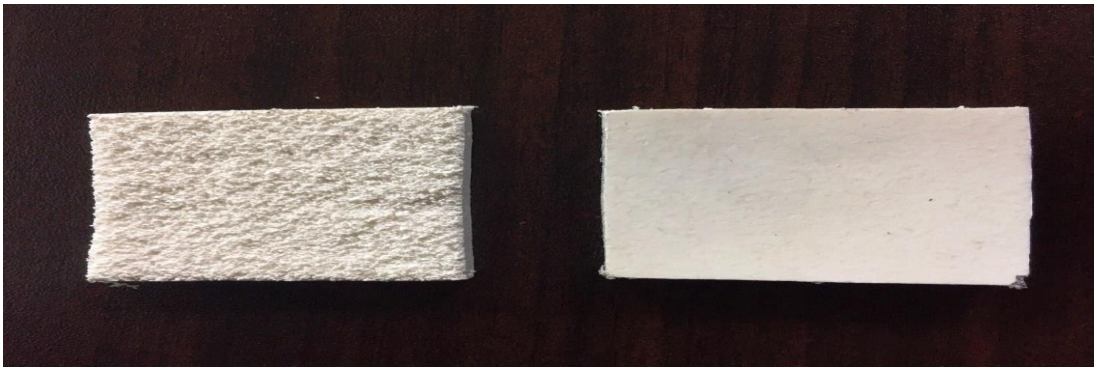
RMPP141
Rotational Molding Processing Guide - USA

OVEN CONDITIONS:

Polypropylene has a higher melting point than polyethylene therefore higher oven temperatures are required to ensure proper sintering of the powder during molding.

The photo below shows the internal surface of a part molded at the same conditions as used to mold LMDPE (oven **480^{0}F) (250^{0}C)**. The internal surface has not been sintered, unmelted powder is evident. By increasing the oven temperature to **570^{0}F (300^{0}C)** a good internal surface was obtained.



As a guideline the recommended oven temperature is 530^{0}F to 570^{0}F. (275 to 300 deg C)

PIAT: (Peak Internal Air Temperature) - an important tool for the molder.

The optimum mechanical properties and best surface finish (internal and external) are realized when the **PIAT is in the range of 437^{0}F to 455^{0}F. (225 to 235 deg C)**

TIME IN OVEN:

The oven time is typically **4 mins / 0.4 inch part thickness** (4 mins / 1mm). It is suggested that this oven time is initially chosen then adjusted accordingly depending on the molded part appearance and properties.

A starting point is to **increase the oven time by 15%** compared with PE for the same shot weight.

When de-molding, if the internal air has a strong smell, the material is probably "overcooked", so reduce the oven time.

MOLD VENTING;

Effective venting is required. It is suggested that the **"Supavent ^{R}"** type products are used.

The use of this type of "automatic" vent increases the internal mold pressure during heating improving the external surface finish. It also minimizes the vacuum during cooling ensuring no parting line "blow Holes".

COOLING TIME:

The cooling time required is similar to that of polyethylene.

RMPP141 crystallizes at a temperature of about 255^0F (125 deg C) which is much higher than LMDPE. Therefore, the part can be removed from the mold at a higher temperature.

Insulated gloves should be worn and care taken when handling parts at these temperatures.

Do not measure mechanical properties until polymer crystallization is complete. It can take two to three days after molding, before optimum surface and mechanical properties are achieved.

OPTIMISING WEIGHT:

Shot weight can be reduced by up to 30% vs C6 LMDPE and still yield satisfactory performance.

This will depend on the attribute you seek to achieve when using **RMPP141** instead of PE. This lower shot weight will result in a thinner wall section, so the total cycle time will be similar to molding of PE.

MOLD RELEASE/ STRESS WHITENING:

Mold release agent is **not normally** required with **RMPP141**. It releases from the mold more readily than PE.

Cleaning the mold of release agent deposits prior to molding **RMPP141** is recommended to minimize "ghosting" of the external surface of the part.

PP is known to "stress whiten" when impacted, particularly when hot. This can generally be removed by applying a flame heat gun lightly for a few seconds to the whitened area. Be careful not to leave the heat in one spot as this will melt the polymer.

It is good practice **not** to hit the molding to remove it from the mold, also avoid dropping it on to the floor.

SHRINKAGE:

RMPP141 shrinkage is typically **1.5%- 2.5%** and around 3.0%-3.5% for PE.

COLORING:

As relatively high oven temperatures are needed to process **RMPP141** this limits the number of pigments that can be used. The pigment chosen must be stable during molding. If the part is for outside use then light stability and weatherability must also be considered.

Although inorganic pigments typically have good heat and weathering characteristics, their poorer chroma and color tint capability, compared with organic pigments, requires higher amounts to be used, however.

To obtain optimum dispersion and mechanical properties, we strongly recommend compounding.

If dry coloring is essential; the recommendation is to use a maximum of 0.5% pigment mixed in a high-speed mixer with a pigment wetting agent (Licocene).

A suggested method is to mix: **30 parts pigment with 70 parts Licocene 6102FG** (this is a metallocene PP wax from Clariant), in a high-speed mixer. This concentrate should then be dispersed at a maximum of 5gms / kg (0.5%) with natural **RMPP141** powder. High pigment concentrations will result in lower mechanical properties, particularly ARM impact.

CONTACT:

If you have any concerns relating to the processing of **RMPP141**, please contact sales@psdrotoworx.com

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