

## **Product Information Leaflet**

### **Diostyl Powder Coatings Range SI 100 & SI 160**

The Diostyl side stripe powder range is specially developed for today's and tomorrow's curing conditions. Our aim, back in the development stage, has been to offer the most economical and robust solution for customers using gas and/or induction heated curing lines.

Developed on the latest technology, the Diostyl powders are made on a unique raw material composition. The composition differs slightly to what is commonly offered. The curing behaviour of our powder side stripes is therefore also slightly different, than you might have been used to, with the traditional powder quality currently available in the market.

Most important advantage is that your lines can be adjusted to decrease the consumption of energy. Diostyl powders are also very suitable for the latest developments in regards to low cost induction lines. Energy savings can also be achieved by temperature adjustments on your current gas heated lines. So you can profit from this advantage on conventional curing lines as well. An energy reduction on gas-heated ovens of 20% has proven to be possible in daily practice.

Both our white SI-100 as the Grey SI-160 range can be cured on gas and induction lines.

### **Gas heated ovens**

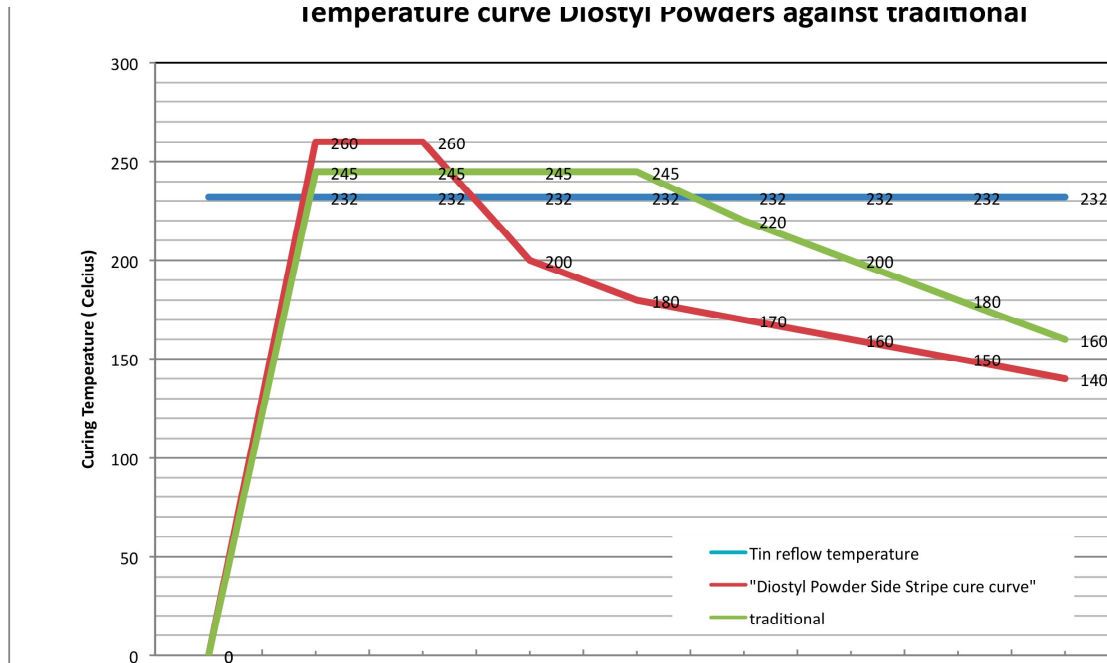
To achieve the best possible cure of the powder the settings on the oven need to be adjusted as closely as possible to the curve in the figure. The aim is to reach temperature above tin melt re-flow as soon as possible, by heating up very fast in the first zone of the oven. Our recommendation is to start heating around 260°C – 265°C. The powders are developed to melt directly and remain to flow, as long as the temperature is above tin re-flow temperature. This means that the last part of the oven is not needed anymore to continue the melt or cure of our powders. In practice this also avoids yellowing of external coatings, as peak metal temperatures (PMT) of 270°C for 2 seconds will not influence the external coatings as much as the standard conditions of about 6 seconds.

Experience has shown that to suppress the discoloration of the external décor, it is better to heat high, but for a short time, than at somewhat lower temperatures for longer times. The time is therefore a more important factor in discoloration than temperature. From the figure it can be seen that the total energy required above tin melt reflow temperature is equal compared to traditional powders. The energy savings come from the last part, where less energy is required (residual temperature).

As cure is only needed at the front, later burning chambers/units can be reduced in temperature or completely shot down.

To achieve the best settings for your lines, our technical people are available to assist.

## Temperature curve Diostyl Powders against traditional



In case you use an external side stripe lacquer, which needs a slow cure, we offer a special clear or coloured liquid side stripes with more than 90% solids. Our Ultra High Solids side stripes are specially developed to overcome the blistering issue often seen with standard liquid side stripes.

### Induction Cured Ovens

The big difference between gas heated ovens and induction heated ovens is the large saving on energy and space. The latest induction cure oven equipment from CanMan for instance, offers both advantages. Especially the energy needed on current induction lines is only a fraction of what was needed years ago.

It is this technology, which has been the basis for the development of our powder range.

### General information / tests

The main reason for quality issues is under-cure of the powder side stripe. Insufficient cure avoids the powder to melt completely and will directly lead to porosity issues. An evenly spread powder application, over the full length of the can, without lumps or other defaults will give you an excellent seam. If the performance of the powder application is correct, you will experience also that the filmweight in most cases can be reduced compared to your current material.

### Tin reflow

The Diostyl side stripe powders are developed to reduce energy and decrease filmweight. This means that the melting process is different, but more efficient than current powders offered in the market. We advice to always check if the seam has reached tin reflow temperature. This can easily be seen on the external of the can. We advice to check tin reflow with an uncoated body on your curing line. An example of tin reflow is shown below. Ideally the tin melt reflow zone stretched  $\pm 5$ mm out, on each side of the powder.



Back side showing tin re-flow



Front with powder seam

### Surface

To check a correct application two things are important.

1. When properly applied, the powder stripe should not show any lumps or other visible defaults. The manual of your equipment should give you all information to achieve this.
2. The width of the side seam should be adjusted to the size of the can. The seam should not have any overspray. Overspray can lead to uneven applied powder and uneven filmweight.
3. The main reasons for porosity are a too low or insufficient applied seam or insufficient temperature (lack of melt flow).

A glossy and smooth surface without pinholes is a good indication for good application and melting.

### Beading and Can Parting

The SI powders of Diostyl have a uniform application field. They can be used for all existing deformation and can parting acts. In general will rapid cooling improves flexibility, as slow cooling improves can-parting properties. Our technicians can give more advice.

### Available Variants

Code	Colour
SI-100	white
SI-140	Clear
SI-160	Grey

The grey SI-160 has a temperature stable pigment composition. Compared to the current available alternatives, the reddish discoloration at elevated temperature is absent.

A special powder side stripe coating can be supplied, which reduces powder consumption significantly. This is achieved by smaller particles ( $d_{99}$  is 40% less) and optimized fluidisation and flow behaviour.

### Composition and Chemical / Food resistance.

The Composition of Diostyls Powder Side Stripe Coatings is based upon very high molecular weight Polyesters. These are neutral in taste and smell. Polyesters give excellent barrier properties and protect the welding area as side stripes coatings perfectly. Against the most common chemicals and solvent the polyesters are resistance. Weakness can be found in case of chlorinated solvents and with strong alkaline solutions. In those exceptional cases a Polyamide powder is the only solution. A pack test should always be carried out to confirm its suitability. The epoxy-free variations include an adhesive with optimised chemical and food resistance properties.

### **Electro-charging**

Epoxy free variations are immediately available, where the adhesive is not polyester. Pure Polyester-based powder side stripes lack sufficient electro-charging. Diostyl epoxy-free powder side stripe coatings show excellent electro-charging and adhesion compared to completely polyester-based benchmarks.

### **Adhesion**

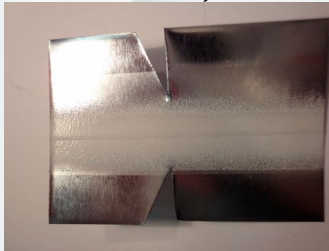
A good adhesion of the powder is key for the mechanical properties and chemical resistance. A well-cured powder side stripe will give a perfect adhesion on the welding area. To check adhesion you can use the knick-break test.

Procedure:

1. Cut out the seam at a width of 4 cm.

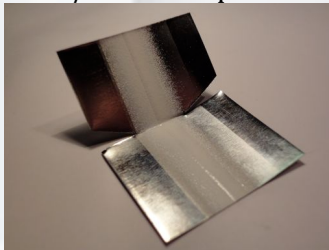


2. Cut out a triangle on both sides of the seam just until the powder edge.

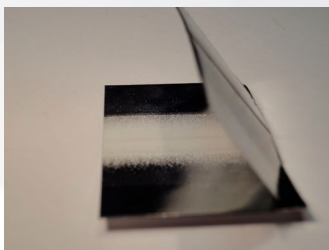


3. Put the sample on a flat surface (table)

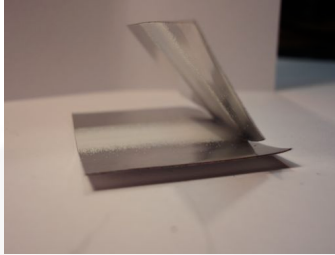
4. Bend one side upward and knick / bend this part of the sample only till an angle of 90°.



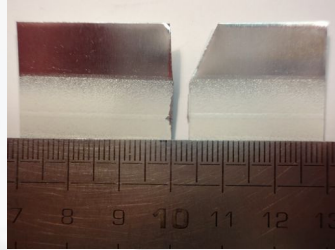
5. Continue bending until you feel that the tinplate is broken but the powder film is still intact.



6. Pull the loose end in an angle of 60° backwards from the surface.



7. Pull the bended part from the horizontal part.  
No more than 2 – 4 mm should be pulled off from the welding area.



### **Storage and in use**

The powder side stripe coatings SI-100 and SI-160 of Diostyl are thermoplastic in nature. This means they soften upon temperature rise. The crystallinity of the powder and its glass temperature transition point protect the powder partly from lumping and caking. However continuous temperatures over 40°C or exposure to direct sunlight must be avoided. The chemical composition will not change during storage, this makes the powder perfectly storage stable. Fast temperature changes can result in pre-charging the powder in the drum a little. During application the drums must always be earthened. Each gram of powder has a surface of 60m<sup>2</sup>. A drum of 100kg has therefore a surface area of 6 million m<sup>2</sup> (± 600 soccer fields!). Humidity will absorb easily therefore. Please keep the lid closed, to avoid water condensating on the powder particles. Keep the application area free from spilled powder. The powder is easily electro-charged, but still overspray can occur in the welding area. Any powder can cause a dust-explosion, so keep a tight cleaning schedule, especially where welding sparks cannot be avoided. Spilled Diostyl powders in small quantities it can be disposed via the normal waste disposal. As they are thermoplastic, high molecular weight in origin and unreactive.

### **Questions?**

In case more information is required, our technicians will be happy to help you. Please contact us at your agent or via [info@diostyl.eu](mailto:info@diostyl.eu).