Operating & Maintenance Instructions Fluidised Baths 150, 150R, 300 & 360

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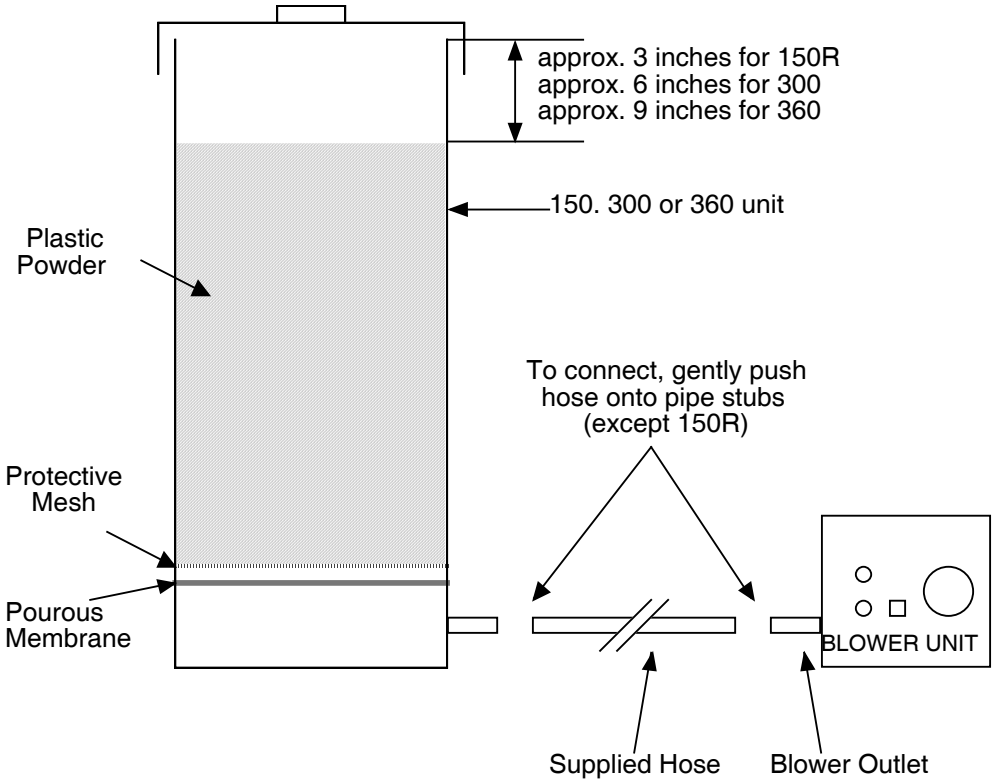

Figure 1 Dip Coating Unit Setup

300

To use the Model 120 Blower Suction Unit with the Model 300 Fluidised Bath, connect the outlet of the Blower Unit (side pipe stub) to the inlet of the Fluidised Bath using one of the hoses supplied with both units. No clips are necessary as the hoses are a gentle push fit and will not become detached during normal use. Fill the Fluidised Bath with suitable plastic powder allowing a minimum of 150mm (6") clear at the top for the powder to rise when the blower is operating. Set blower control to zero, plug in and switch on. Gradually increase blower speed until the powder is seen to rise and adjust so that sufficient air is passing to keep powder fluid but not to blow out of the top of the tank. When the blower is operating, the tank lid should be removed but replaced immediately after use to keep the contents clean. When changing the type or colour of powder, it is important that all traces of previous powder are removed using a vacuum cleaner and applying particular attention to the porous membrane in the bottom of the bath. Ensure that the protective mesh is lowered into the fluidised bath to protect the porous membrane from hot items.

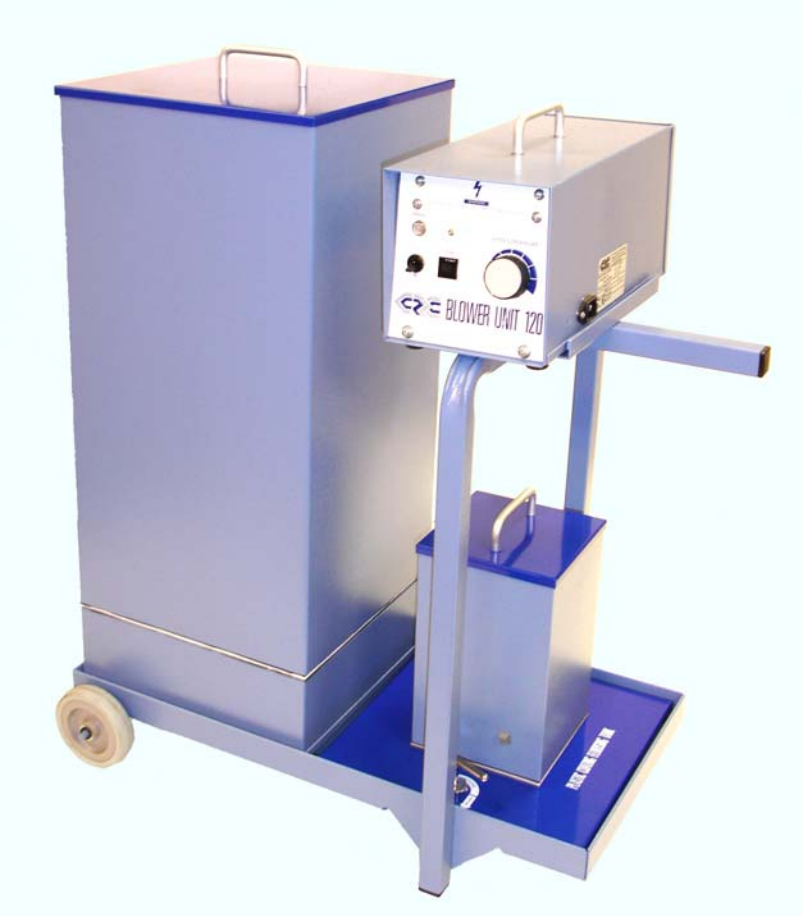

Figure 2 300 with 120 blower unit

150

Introduced to enable use of nylon and similar expensive powders without the prohibitive cost which would be involved if filling a 50 litre (M300) tank. The other option is to use the smaller tank for an alternative colour of Low Density Polyethylene which can be purchased in smaller quantities than that required for the 50 litre tank. Having a capacity of only 5 litres the unit operates on the same principles and will fluidise any of the powders in general use.
Mounting of the tank is straight forward by following the in structions on the legend plates adjacent to the cam clamping handles. The Model 150 Fluidised Bath must be used in conjunction with an existing Model 300, or alternatively a separate plenum box can be purchased to allow independent operation. Do not overtighten the cam clamp handles, light pressure is all that is required to create the necessary air seal. In operation, always switch on the blower unit with the speed control knob set to zero, the amount of flow required to operate the Model 150 is considerably less than a Model 300 and in operation the lower tank will become slightly pressurised before fluidisation of the upper tank takes place. There is no need to remove powder from the main tank prior to using the Model 150. Ensure that the protective mesh is lowered into the fluidised bath to protect the porous membrane from hot items.

150R

The 150R can be operated from either a 120 Blower Unit or a Vacuum Forming Machine pressure outlet. Connect to a 120 using the p ipe stub supplied with each unit. Connect to a vacuum forming machine using the length of 8mm OD nylon tube supplied. Note the method of operation of the 8mm pipe fittings - to insert a pipe push in fully, to release push in collar around pipe and remove. (See fig 4).

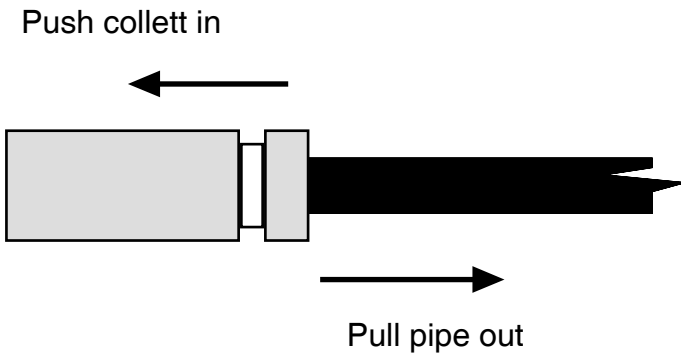

Figure 4

Fill the Fluidised Bath with suitable powder leaving 75mm (3") at the top to allow the powder to rise when fluidised. Turn the flow control knob on the front of the Fluidised Bath clockwise until resistance is felt. Switch on the pump (vacuum former) or the blower unit (leaving at a low setting). Gradually turn the flow control knob anticlockwise, until the powder is fluidised but not blowing out of the tank. When operating remove the tank lid, however it should be replaced when not in use to prevent contamination of the powder. Ensure that the protective mesh is lowered into the fluidised bath to protect the porous membrane from hot items.

360

The Model 360 Fluidised Bath is designed as a freestanding unit for use in conjunction with a Model 120 Blower Unit. To connect the 120, position it on the shelf provided on the right hand side of the fluidised bath. Connect the outlet of the Blower Unit (side pipe stub) to the inlet stub of the Fluidised Bath, using the length of hose supplied. No clips are necessary as the hoses are a gentle push fit and will not become detached during normal use. Ensure that the protective mesh is lowered into the fluidised bath to protect the porous membrane from hot items.

Fill the Fluidised Bath with suitable thermoplastic powder (normally polyethylene or nylon), leaving at least 225mm (9") at the top to allow the powder to rise when fluidised. Switch on the blower unit (leaving at a low setting). Gradually increase the blower unit speed until the powder is fluidised but not blowing out of the tank. When operating remove the tank lid, however it should be replaced when not in use to prevent contamination of the powder.

Dip Coating Powders

Always keep powders dry and free from contamination. Damp powder (most thermoplastics are hygroscopic) will cause the grains to cling together and result in poor fluidisation. Contamination by different colours or powder types will produce a "speckled" effect on the finished component. This effect can, sometimes, be quite attractive even if achieved by accident. As the powder becomes fluid it will rise and occupy approximately 10-20% more volume, tanks should not, therefore, be completely filled.

The following data on two of the common powders in general use may be helpful:-

	Polyethylene (LD)	Nylon
Density (Static)	.40Kg/Litre	.55Kg/Litre
Density (Fluidised)	.325Kg/Litre	.49Kg/Litre
Max. working temperature	60°C	100°C
Coating temperature	300-400°C	280-350°C
Post Heat Temp.(if required)	170°C	165°C
Coating thickness	0.30 - 0.90mm	0.20-0.75mm

Typical weight of powder for a 200 litre tank (360)
= (Vol - 20%) x Density (static)
= (200 x 0.80) x 0.4 (LDPE)
= 64kg

Typical weight of powder for a 50 litre tank (300)
= (Vol - 20%) x Density (static)
= (50 x 0.80) x 0.4 (LDPE)
= 16kg

Typical weight of powder for a 5 litre tank (150 / 150R)
= (Vol - 20%) x Density (static)
= (5 x 0.80) x 0.4 (LDPE)
= 1.6kg

N.B. When changing the type or colour of the powder in any fluidised bath, it is important that all traces of the previous powder are removed using a vacuum cleaner, paying particular attention to the porous membrane at the bottom of the bath.

Coating Technique

Workpiece temperatures for plastic coating are critical to within + or - 20°C for the easier materials, but for good results using the more difficult powders, temperature control may become critical to within + or - 5°C. Whilst satisfactory results can be obtained using hot plates, high temperature gas fired ovens and blow torches, consistent and reliable results can only be guaranteed using a temperature controlled oven capable of attaining 400°C. Whilst it is accepted that the majority of coating plastics fuse at temperatures well below this figure, allowance must be made for heat losses in transfer from oven to the fluidised bath and absorption of work heat by the coating powder upon contact and also further loss of workpiece heat during the flow period of up to 60-90 seconds after coating.

Exact temperature required will be dependent upon the mass of the metal component to be coated. Thin sheet metal will lose temperature quickly, but a substantial component made from 1/2 " diameter bar will hold sufficient heat for the complete process if heated to just 20-30°C above plastic melting point. Exact temperatures at which the oven should be set for each component must be established by trial and error and often a balance obtained between the two. The following temperatures are quoted for guidance:-

16SWG Wire Mesh	400°C
22SWG Sheet	380°C
18SWG Sheet	350°C
10mm diameter Bar	300°C

Where a single component comprises two or three different gauges of material, it will be difficult to find a common temperature at which complete flow will occur. The thinner sections will have an "orange peel" effect and the heavier sections may be overheated and discoloured. The solution is to pick up powder at the highest temperature possible without discolouration and then "post heat" to create flow at a setting equal to the flow temperature of the material. (LDPP and Nylon about 165 - 170°C).