Guide to Good Thermography

Powder Arts are the worldwide distributors of Caslon and Faust Thermography Products. For many years the names Caslon and Faust has been synonymous with quality Thermography and the powders that bear their names are the established leaders in this exciting branch of printing technology. Thermography literally adds a new dimension to the printed image and both company's policy of continual product development has raised the process to new heights of excellence extending its versatility and broadening its appeal.

We at Powder Arts are proud of Thermography and take special pride in the powders we market because the qualities required for good powders are very particular, they should melt and flow at a suitable temperature and have a high degree of flexibility enabling them to flex with the paper. Early thermographers relied on natural resin, which is still used today in the manufacture of crude paints and ordinary furniture polish. Nowadays technology has enabled Caslon and Faust to develop recyclable Thermographic powders from a natural resin extracted from paper during manufacture, this provides the high quality finish, reduces the orange peel effect and combines even melt with sharp edges. All the powders marketed by Powder Arts also undergo an anti-static treatment that facilitates ease of operation and greatly reduces any static problems.

Powder Arts, Caslon and Faust have a staff of experts with over 250 years of combined experience in Thermography and of developing resins universally applied in the industry. Therefore in order to help users understand our products and Thermography more thoroughly we have combined this knowledge into a comprehensive guide – an appreciation of which will enable you to become the complete thermographers.

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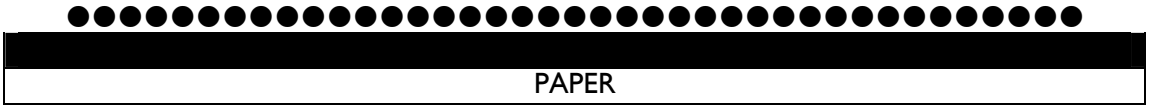
What is Thermography?

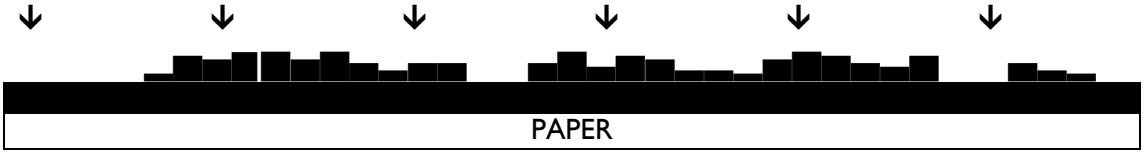
By definition Thermography is the production of raised image prints by the use of heat. To break it down to basic components the process involves covering a wet sticky ink with a thermoplastic powder, heating it until it flows and forms a coating over the ink, then cooling it down so the covering sets. The process is explained in the diagrams below:

WET STICKY INK

THERMOGRAPHIC POWDER STICKING TO THE INK



HEAT MELTING THE POWDER



AFTER COOLING A RAISED IMAGE WITH SHARP EDGES

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The Art of Good Thermography

To obtain good results from your Thermographic machine you must first obtain a high quality image from your printing press. This may sound obvious, but there are certain differences between printing for Thermography and just producing normal flat prints.

Inks

Thermography needs ink that stays 'open' or tacky, in fact sticky would be a better word, so that the powder can adhere to it in sufficient quantity to give a suitable raise and smooth finish. Most Thermography can be produced using standard inks but if necessary the characteristics can be altered by the addition of varnish to achieve the desired 'tack'.

Stock

Generally, most stocks can be Thermographed, but for best results a stock with a good hard surface and low moisture content is ideal. Ink will actually sit on the surface of the paper catching more powder to give a nice high raise. However, as all stocks are not the same, the weight, texture, colour and moisture content of the paper should be taken into consideration.

1. Heavy paper requires more heat to melt the resin
2. Certain textured stocks may require a larger resin for a smooth finish
3. Stocks with too much moisture will have the water boil off under the heaters giving a bubbly or cloudy effect to the raised areas
4. Dark coloured stocks absorb heat faster than light colours
5. Absorbent stocks soak up thin inks too fast leaving nothing for the powder to stick to.

Water/Ink balance

Is an important consideration on offset. Proper control here will keep surplus powder off the sheet. To produce quality work, reduce damping to the minimum but still allow enough ink on the paper to catch sufficient powder for a good raise. Remember you need to run just enough fount to prevent catching up.

Letterpress

Requires a good quantity of ink to be transferred in the very nature of the process, but if the type is banged into the paper the Thermographic powder will have to raise out of the resulting depression and above the surface of the paper to achieve the desired result. Therefore a little more time spent, making ready, will result in a far better finish.

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Thermography machine Adjustments

Powder Flow

The hopper should be adjusted for a good flow of powder, and the heaviness of the flow depends on how heavy the printing is. For small printed areas less powder, and more powder flow for larger printed areas. When filling the hopper do not overfill as it is better to keep adding small amounts of fresh powder during the run to maintain good flow and keep static build up at bay. Ensure the powder blanket is clean and undamaged, set the disc rollers to the thickness of the stock to be Thermographed and adjust the powder flow and suction head to clean the paper without removing the powder layer from the ink.

Vacuum

This should be adjusted so that it does not pull to much powder off the ink. The aim should be to use minimum suction – it is surprising how little vacuum is needed to clean the sheet on most stocks. The efficiency of the suction will be impaired if the dust bag is not kept clean, it should be thoroughly vacuum cleaned or washed once a week.

Heat

When setting the heaters for a good Thermographic finish. It is important to remember that it is the heat in the paper that melts the powder and therefore the thicker the paper the more heat needed to melt the powder. If you have a four-heater unit set the 1st bank of heaters low, the 2nd a little higher, the 3rd higher and the 4th ever higher. This will pre-heat the paper at the first and second heaters and start melting the powder between the 3rd and 4th and then straight out to the cooler.

SETTING UP YOUR HEATERS IN THE CORRECT WAY IS OF VITAL IMPORTANCE IF YOU WANT TOP QUALITY RESULTS

1. Powder should melt at the end of the heating head so there is not too much spread.
2. If the powder melts early in the heating tunnel, it will continue to melt until it gets under the cooler, which will cause it to over-run the type and flatten out.
3. Too much heat can result in bubbles, an irregular finish or pinholes.
4. Paper subjected to intense heat will curl, but long slow heat will not curl the paper so badly. With light weight papers you may think that only two heaters are required, but by using all of them set very low the powder is brought up slowly and with less paper curl.

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Press Adjustments

Impressions

When running Thermography the press must be set up differently than when running conventional offset, where minimum ink and heavy impression is used to push the ink into the paper for fast drying. For Thermography the opposite is required, with more ink and the impression cylinder and blanket cylinder adjusted to obtain a 'kiss' impression so the image will be transferred to the paper with the ink sitting on the surface but not being squeezed into it. Letterpress machines should also be set up to run with a 'kiss' impression. The purpose is to lay the ink on the surface of the paper to catch more powder for a better raise.

Press Speed

The Optimum speed for Thermography is dependent upon graphic design, choice of stock and type of Thermography machine. Press speed must be synchronised with the Thermography machine so the sheets spend maximum time under the hopper and thus collect optimum coverage of powder. This is achieved by ensuring that the sheets entering the Thermography machine have a minimum gap between them. Depending on the Thermography machine, some presses may need to be equipped with an alternate feed attachment ('skipfeed'), or modified by use of a slow down pulley to reduce print speeds. This will allow you to synchronise the press to the Thermography machine so that there is a small gap between sheets without overlapping.

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Problem Solving Guide

PROBLEM	SOLUTION
1. Static Electricity	✓ Run wire to a good earth point. ✓ Run plain paper through the thermo machine to see if powder is sticking to the sheet. If it is, there may be static at press end. Check earthing, put anti-static 'tinsel' across feedboard. ✓ Change powder but only half fill the hopper & keep adding to it. ✓ Clean powder blanket with clean water, wipe and allow suction head to lift moisture into the hopper
2. Powder hangs up in the hopper	✓ Sand down obstructions, and clean inside of cyclone with an anti-static cloth or Kleenayd. If the suction in the cyclone is obstructed friction results and causes static. ✓ Check for static as in Problem 1. ✓ Add a small amount of Wonderflo or Stabiliser to the Powder
3. Finished job appears dull.	✓ Too much heat causes the powder to boil. Reduce heat or increase conveyor speed ✓ Keep additives to a minimum and only use when necessary. ✓ Change powder, if no more available filter through nylon stocking. If powder is old it may be full of paper fluff and dried ink.
4. Sheets 'block' or are sticking together in delivery	✓ Too much heat ✓ Set heaters correctly as described earlier. ✓ Reduce speed and heat to allow more time under the cooler. ✓ Check cooling fan baffles are open to give maximum airflow ✓ Check cooling fan blades for obstructions
5. Tramlines of powder on the sheet	✓ Check sharpness of the suction wheels / discs. Emery cloth the edges until sharp or have re-ground.
6. Uneven image. Finish not smooth.	✓ Adjust heater temperature; A long slow heat gives best results. ✓ Is too much powder removed from image area by excessive suction? Reduce suction strength. ✓ Check powder flow for gaps. Keep hopper over half full. ✓ Add more ink if possible or change ink specification. ✓ Consider adding Thermographic Varnish to increase ink tack. ✓ Is correct grade of powder being used? ✓ Check heat settings and machine speed. ✓ A rippled or crazed effect in the image area could be caused by excessive airflow from the cooler.

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7. A bubble or crater effect on the surface, possibly accompanied by a 'cloud' effect.	✓ Could indicate excessive moisture in the paper stock. To test put the paper through heater section to evaporate moisture and then test by printing and Thermographing the sheet. ✓ There is not enough time for gasses to escape the molten powder film. Lower the heat and slow the conveyor speed.
8. Surplus powder on printed matter.	✓ Could indicate excessive moisture in the paper stock. To test put the paper through heater section to evaporate moisture and then test by printing and Thermographing the sheet. ✓ If an offset press is used, reduce damping to minimum setting before scumming starts. ✓ Check the system e.g. dust bag, suction head setting. ✓ Check that suction motor is rotating the correct way. ✓ Check value seal around rotary value for leeks.
9. Surplus powder on the reverse of the sheets.	✓ Clean the powder blanket using Stabiliser Powder. Do not use solvent-based cleaners. Grease or oil can be removed by a small quantity of white spirit, then dry the blanket by using Stabiliser. ✓ The suction should lift the sheet a little to enable powder to be removed from under the edges of the sheet. Adjust suction head height. ✓ Check and clean the wire mesh conveyor section. If time prevents clearing the wire mesh section, then sprinkle the mesh with cornstarch. This will stick to the mesh and not melt, but it will hold the sheet above the melted powder.
10. Insufficient Raise	✓ Excessive heat will spread and flatten the image area. ✓ A grade of powder is required which will fill any texture and raise the image above the level of the paper. Smooth paper gives the best result. ✓ Was the correct grade of powder used? ✓ If textured paper is used, it may be necessary to use a coarser grade of powder than normal. ✓ If letterpress is used, excess pressure on the paper can create a depressed area
11. Finished Product is too Yellow / Gliitter mixes turn brown	✓ A Huge excess in heat will burn the powder and it will turn yellow and the glitters will turn brown ✓ The varnish or ink under the Thermography will probably turn yellow before the powder does. Slow the conveyors and reduce the heater temperature. ✓ Only use high quality powders. Economy powders are made with a more yellow resin.

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Guillotining Thermographic Work

Ideally, a slitter is the correct way to finish a job with Thermography on it. If this is not possible allow 24 hours before cutting to let the powder cure, use a sharp knife and light clamp pressure. Block the sides of the work to be cut with board to take the clamp pressure and prevent side slippage, cut small lots to prevent scuffing and flattening.

Powder Guidance for Best Results.

Although most printers are familiar with the range of powders available and use the grades best suited to their needs, we are frequently asked for advice on the subject of which powder to use and we do occasionally find a printer is using a grade that is unsuitable for the work being undertaken.

The following notes of guidance may be helpful.

TYPE SIZE	POWDER GRADE
36-72 POINT SOLIDS & LARGE TYPE	Faust Grade 609 Caslon Grade 7 or 9
27-42 POINT SOLIDS & MEDIUM TYPE	Faust Grade 609 or 611 Caslon Grade 11
11-30 POINT GENERAL PURPOSE USE	Faust Grade 611 or 614 Caslon Grade 14
6-14 POINT FINE LINE WORK	Faust Grade 614 or 618 Caslon Grade 18

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