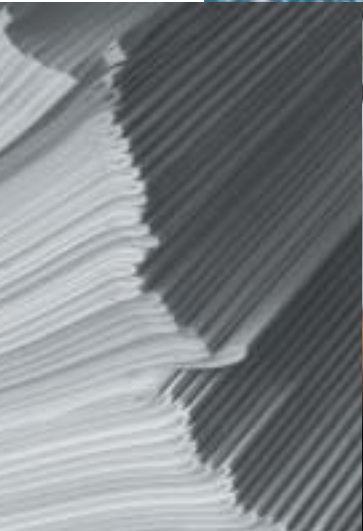
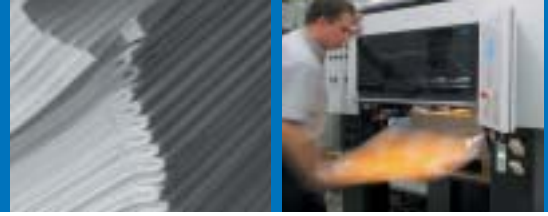




Anti Set-off Powders for the Printing Industry



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Function

As a rule oxidatively drying printing inks are used in sheet-fed offset printing. They need a certain time for drying. There is a risk of setting-off on the next printed sheet because of the wet, sticky printing ink – or even worse – the blocking of the sheet pile.

In order to minimize the danger, anti set-off powders are used. Each printed sheet is sprayed after the ink application. The powder is used for producing a minimum distance between the piled sheets. This way, any direct contact between the freshly applied ink and the bottom side is prevented. In addition the air cushion that was created will support the drying process of the oxidatively drying printing ink.

Material

There are a number of powder types that are different as to their origin, surface characteristics, grain size and purity. Anti set-off powders as a rule are composed of mineral and vegetable raw materials.

Mineral raw materials such as calcium carbonate are of a hard, edged nature with a comparably high degree of purity. This characteristic will offer the advantage of little dust content, however, will result in a decreased abrasion resistance in the printing and finishing processes. The much dreaded “sandpaper effect” will result.



Anti set-off powder made of mineral raw material

In the past years an increasing number of anti set-off powders made of starch raw materials, such as our *Wirbelwind* gained acceptance. These powders are in most cases composed of starch from potatoes, maize, wheat, rice or cassava.



Anti set-off powder made of vegetable raw material

They are of a smooth and rounded off type. In addition, they can slightly adapt to the surface structure of the printing sheet and will even slightly dissolve under the influence of the wet printing ink. The disturbing “sandpaper effect” is reduced to a great extent.

The problem with the reduced purity respectively the comparably high degree of dust is optimized by a special production method. *Wirbelwind* falls below all limiting values which were fixed in a trade agreement concerning anti set-off powders.

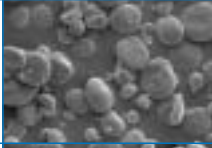
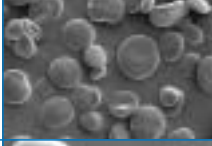

In addition to the described grain material, additives are incorporated in *Wirbelwind* that will facilitate the production process. Among them are drying agents or flowing agents, for instance, which will improve the spraying image and the distribution on the printing sheet.

Characteristics of *Wirbelwind*

- Can be used in all printing presses and common powder sprayers (both, air and electrostatic).
- Adjusted for free flowing. The optimum flowing behaviour will ensure a minimum spraying with high radius of action.
- Harmless to health and can be used for food packages.
- The smoothly rounded and smooth form of *Wirbelwind* will prevent any sandpaper effect.
- Also suitable for varnishing and laminating jobs.
- Insensitive to air moisture as not hydroscopic.
- Can be supplied with different grain sizes.

WIRBELWIND



			median	calendared and machine-coated papers and boards	original art paper	smooth boards	rough or embossed boards
Wirbelwind 8161 "fine"		1000 V 10 mm 500 X 20 µm	19 µm	up to 170 g	up to 200 g		
Wirbelwind 8162 "medium"		1000 V 10 mm 500 X 20 µm	21 µm	150 – 200 g	180 – 250 g	up to 250 g	
Wirbelwind 8163 "coarse"		1000 V 10 mm 500 X 20 µm	42 µm		200 – 400 g	250 – 500 g	150 – 400 g

Grain Sizes

Depending on the surface structure and area weight of the printing substrate, different grain sizes are used. *Wirbelwind* will be produced in a special process in three different grain sizes (fine, medium and coarse).

The table answers our recommendations for using *Wirbelwind*.

Notes for Application

Wirbelwind can be used in all common powder sprayers. There are a number of technical solutions which will optimize the process of spraying. However, none of them will offer the safety ensured by personal attention.

Professional instinct and permanent control of the spraying process are necessary for a correct metering and adjustment of the powder sprayer. The desired effect of the powder depends on the thickness of the ink layer, the nature of the surface and the grammage of the substrate. In general the dose should be kept low for reasons of processing technology and protection of labour. In case of any doubt concerning the grain size, you should rather take the stronger grain size.

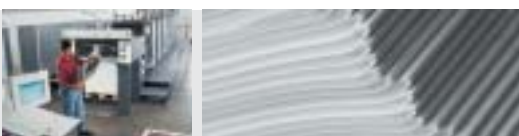
In order to diminish the risk of setting-off, we recommend working with Under Colour Removal (UCR). In Under Colour Removal the chromatic composition of four-colour sets for colour process printing is varied. Part of the neutral colour share, which was formed by the in each case same shares of the three colours Cyan, Magenta and Yellow of the CMYK-colour system, is replaced by black. This way the thickness of the ink layer will be reduced.

In some cases further additives are added to the printing inks that, for instance, will prevent any picking or will improve the gloss. These additives have the effect that the thickness of the ink layer will have to be increased in order to reach the desired ink density. As a consequence the drying of the ink film will take longer and it will have an increased stickiness.

If necessary we recommend producing smaller stacks in order to avoid any set-off by a smaller weight of the pile.

Depending on the absorption and drying behaviour of the printing ink about 24 hours will pass with coated papers till the ink layer will have been thoroughly dried. When printing uncoated papers about twice this time is needed.

As a rule uncoated papers need a smaller quantity of anti set-off powder than coated papers, and the smoothness is an important factor.



Classification of Anti Set-Off Powders

Classification		Average value of the grain sizes (Median)		Volume percent of the grain size under 10µm	
		Limiting value	Wirbelwind	Limiting value	Wirbelwind
Fine	Wirbelwind 8161	< 20µm	19,4	10%	9,20%
Medium	Wirbelwind 8162	20 - 40µm	21,2	7,50%	4,20%
Coarse	Wirbelwind 8163	> 40 µm	42,1	5%	1,40%

80 Vol% of the total particles have to be between a half and the one and a half-fold of the median.

Substances detrimental to health and any other substances with not acceptable risks for health must not be contained in anti set-off powders.

Trade Agreement

Normally anti set-off powders are no hazardous materials according to the chemical law. Our *Wirbelwind* is completely harmless to health, too, and can be used for food packages.

Since September 2001 new limiting values for the general dust in the air at the working place have been in force in Germany. Measurements of dust in the air of the German Accident Prevention & Insurance Association for Printing and Paper Processing in sheet-fed offset printing companies showed that the limiting value is kept to in general. When large quantities of powder with a high share of fine grains are used without any suction plant, the limiting values might be exceeded in some individual cases and there might be a harmful effect for health when these dusts are inhaled.

The trade agreement is to ensure the use of anti set-off powders with little dust in the field of sheet-fed offset printing. The German Accident Prevention & Insurance Association for Printing and Paper Processing together with suppliers of anti set-off powders, builders of sheet-fed offset presses and powder sprayers, the Bundesverband Druck und Medien (Federal Association of Printing and Media), the united service trade union Ver.di as well as the FOGRA Forschungsgesellschaft Druck e.V. (Research Association Printing e.V.) developed criteria according to which anti set-off powders can be judged.

The basis for the judgement is the laying-down of a measuring process for determining the grain size distribution and median (average value of the grain size distribution). This way an objective, reproducible and comparable classification of the powder is ensured.

Wirbelwind fulfils all specified criteria and has been tested within the scope of the Trade Agreement for the following machines and devices:
Heidelberger Druckmaschinen AG,
Koenig & Bauer AG Planeta,
MAN Druckmaschinen AG,
Grafix GmbH,
Weko GmbH & Co. KG.