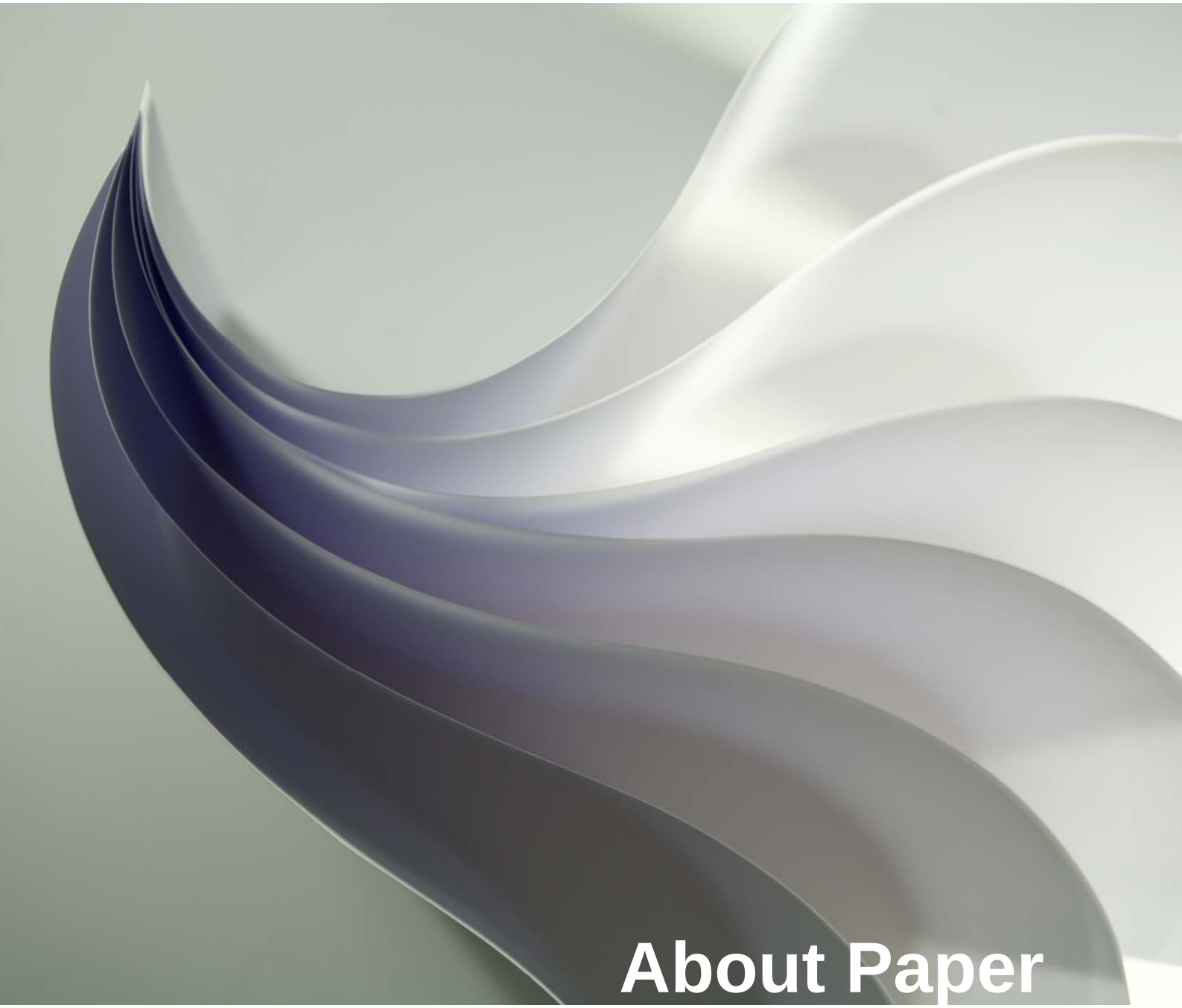

# About Paper

## Cast coated paper

# Cast Coated Paper

**Table of contents**

# Cast Coated Paper

## 1. Definition of cast coated

Cast coated paper can be defined as coated paper preferably on one side with gloss achieved by applying heat via a chrome plating cylinder.

Sometimes, high gloss paper can also be two-sided, although this market is considerably more limited. The method of achieving the two-sided product depends on the manufacturer. Some stick two one-sided products back-to-back while others coat both sides. In our case, we have stopped manufacturing this product since it is not commercially interesting.

The main characteristics of this product are:

- Completely smooth and mirror-like gloss surface, far superior than conventional coated paper.
- Higher specific volume than 1/s coated paper and ink receptive when printed.
- Rought texture on the back.
- Suitable for any printing and labelling system.

**The glossy finish is achieved without needing to apply pressure such as in the case of coated paper, in which the gloss is achieved via calender pressure. This means that high gloss paper has a rough texture on the back and a greater specific volume.**

## 2. Types of cast coating systems

The cast coated manufacturing system has three different production methods:

- Dry system
- Gel system
- Wet system

The diagram below shows the three systems, as well as the one we use at our factory, which is a wet system with some amendments. We will then describe each of them in turn.

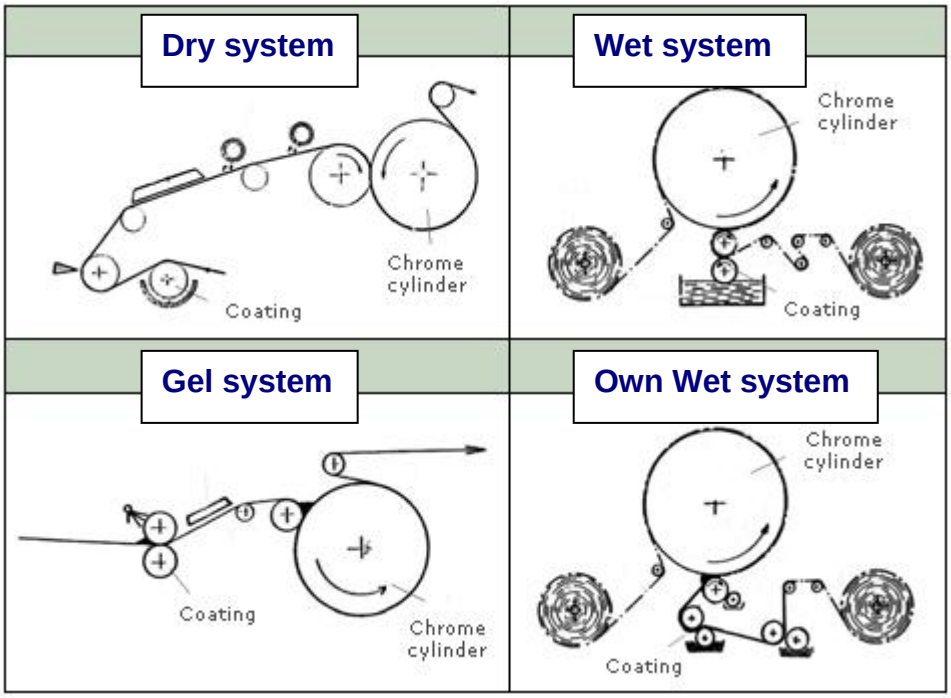


Fig. 1: Cast coated manufacturing systems.

### 2.1. Dry system

In the dry system, the base paper is coated by controlling the layer of coating using an air knife, and then submitting it to a drying process. The paper is then remoistened using steam ramps before it enters the chrome plating cylinder, which is where the high gloss is achieved.

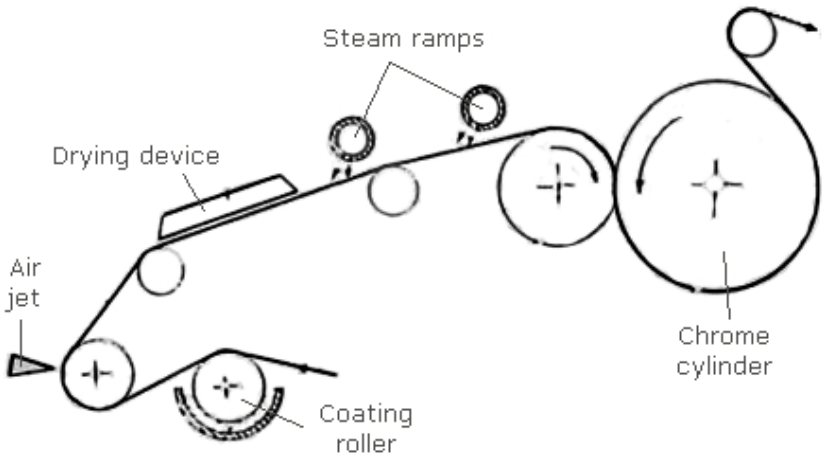


Fig. 2: Dry high gloss manufacturing system.

**The dry cast coated production system is also known as the Warren system.**

### 2.2. Gel system

The gel cast coated manufacturing system is an intermediate system between the dry and the wet systems. In this case, the paper is coated via a roller system and then subjected to a predrying process before it enters the chrome plating cylinder where it achieves its gloss.

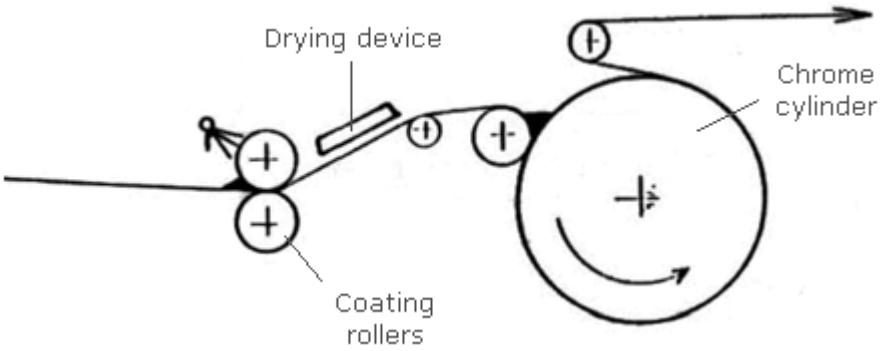


Fig. 3: Gel high gloss manufacturing system.

### *2.3. Wet system*

The wet system consists of the paper being coated via a roller system and then entering the chrome plating system while it is still completely wet. Here it is dried and the gloss is achieved at the same time.

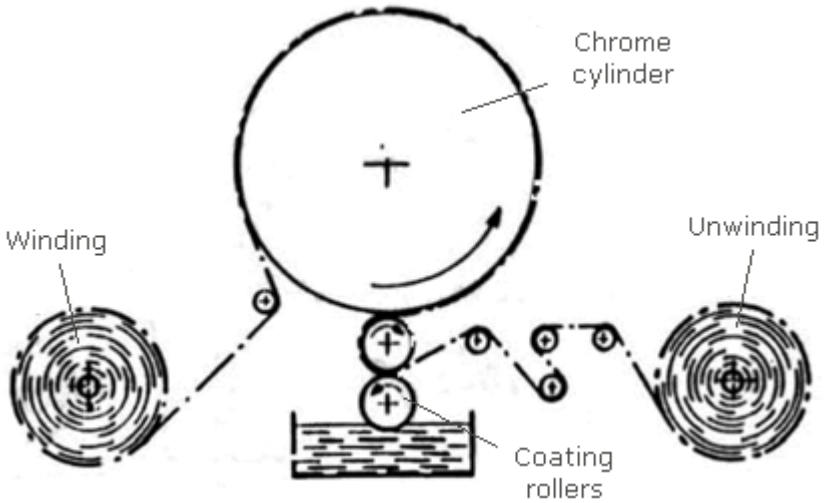


Fig. 4: Wet high gloss manufacturing system.

Figure 5 shows how the paper is dried and the gloss achieved at the same time. As you can see, the cylinder applies heat to the coating layer and, since the paper is pressed against the cylinder, so that the water can evaporate it must pass through the base (paper). Therefore, a base paper with high porosity is required to allow the water to escape easily.

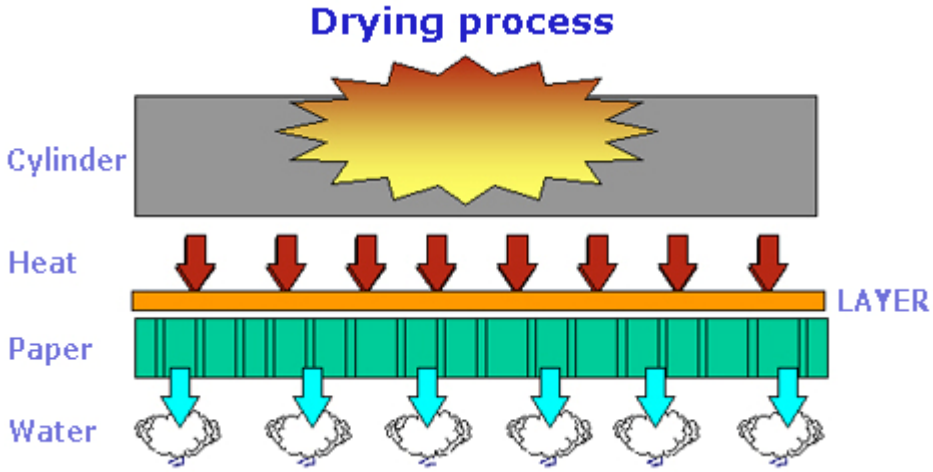


Fig. 5: Drying the paper and achieving its gloss.

**The wet high gloss production system is also known as the Champion system.**

In the case of our company, the method used is slightly different to the conventional wet system, as shown in figure 6. In this case, when the base paper is in the coating machine it is firstly subjected to an aqueous treatment aimed at conditioning the paper slightly, and then the coating is applied using an applicator. Next, the chroming roller adjusts the coating layer to remove any excess.

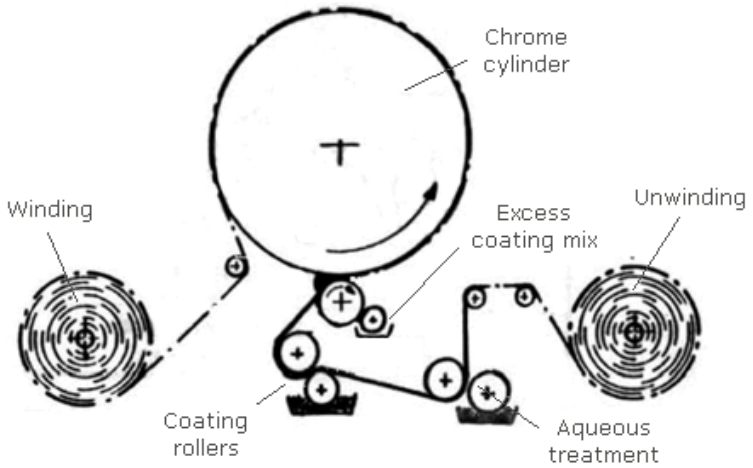


Fig. 6: Wet high gloss manufacturing system used at our company.

## 3. Product conditioning

As a result of passing through the chrome plating cylinder, the cast coated paper is excessively dry. Therefore, before it enters the rolling machine it must pass through a climatic or conditioning chamber where low pressure steam is applied to restore the required humidity and thus be able to print it without curl-up problems.

The conditioning chambers can be varied depending on the product's end use. For example, in the case of labels, the product's flatness is critical, hence the climatic chamber is larger and conditions the paper better, which will enter and leave this chamber several times. The figure below shows a diagram of a seven-pass chamber, which is given this name because the paper enters and leaves it seven times in total.

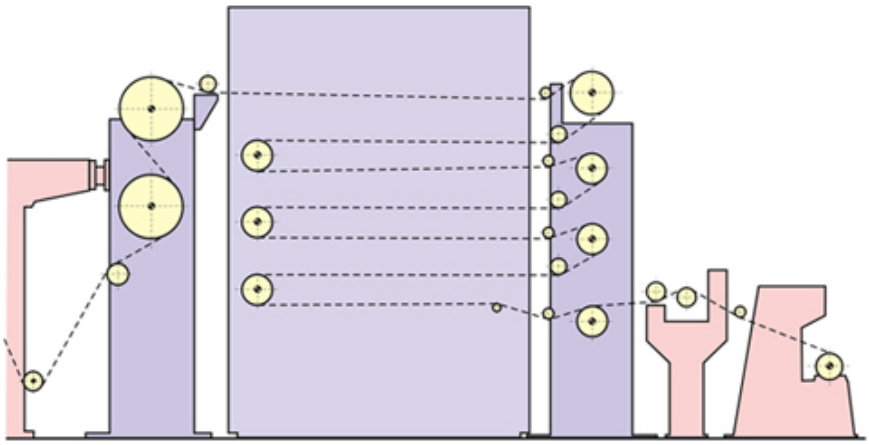

Fig. 7: Seven-pass conditioning chamber.

**Due to the conditioning chamber, the typical curl-up characteristic of one-side (1s) coated paper can be avoided.**

## 4. Raw materials

As we have seen, cast coated paper consists of two parts:

- The **base paper:** the paper on which the coating layer is applied.
- The **coating layer:** it is preferably applied on one side of the paper (although sometimes on both sides) and is formed by a paste containing the appropriate components.

Some of the characteristics of these components are given below.

### 4.1. Coating composition

The composition of the coating layer used in cast coated paper is slightly different to conventional coatings, for example:

- The pigment used will be mostly kaolin, while in coated paper calcium carbonate is mainly used.
- The paper will also include high levels of binder, as well as thickeners, starch as a co-binder and mould release agents.
- The weight of the coating layers is heavy, ranging from 18 to 35 g/m$^2$.
- Viscosity measured at 100 rpm is over 2,500 cps (centipoises), i.e. quite high.

### 4.2. Base paper characteristics

In order for cast coated paper to be properly manufactured and finished, the base paper must fulfil special characteristics in order to achieve an even, problem-free finish. With this in mind, we are going to highlight the general conditions that base paper must meet in order to be valid for use in cast coated paper:

- Suitable weight, humidity, calibre and smoothness.
- It must not contain superficial flaws, bumps and pin holes.
- Ability to allow water vapour to evaporate in order to dry as quickly as possible.
- Good sticking quality and no transparency.
- Good strength and internal cohesion.
- Good dimensional stability (DHT).
- Nonreactive paper, without curl-up tendency.
- Ability to stick to the high gloss layer.

These would be general characteristics for base paper. As regards the manufacturing of labels for bottles that can be recycled**,** i.e., WS, other important aspects need to be added to the above, such as:

- High level of opacity when wet and greater cohesion.
- Sufficient wet-strength to withstand the labelling process using wet bottles and in the soda recovery unit.

As regards base paper for self-adhesive cast coated labels**,** both normal ones and WS, it must have enough traction-strength and tear-strength to withstand the matrix stripping and die-cast treatments that are typical for this end use.

## 5. Types of cast coated paper

Within the cast coated paper market there are different products. We will describe the main characteristics of the most common ones below, as well as their end uses.

- **Labels for non-recyclable bottles (Eurokote Label S).** They must have an even, smooth glossy finish, rub-strength in the labelling assemblies, suitability for embossing and good flattening capacity.
  The end uses of this product will be labels for all kinds of food products, cosmetics, etc.

Fig. 8: Use of S cast coated paper.

- **Labels for recyclable bottles (Eurokote Label WS).** Apart from the above characteristics, this type of product must be wet-strength so that the bottles can be recycled without the labels breaking and allowing these to be removed in the washing unit avoiding possible contamination of the latter. Sometimes it can also be used to label products that, although the bottles cannot be recycled, can be placed in fridges or ice buckets, stored in damp environments, or used in wet labelling assemblies.
  The end uses will therefore be for products that are packed in bottles that need to be recycled or stored in damp environments.

Fig. 9: Use of WS cast coated paper.

- **Cast coated paper for self-adhesive labels.** This product is used for self-adhesive label manufacturers and, as we have mentioned, it has greater traction strength than standard paper so that it can withstand the matrix stripping that occurs in coil printing machines. It can also be implemented as WS when it is going to be used in labels for bottles that can be recycled.

- **Packaging (Eurokote 1/s).** Apart from having good printing characteristics, this product must also be suitable for folding. It is used in packaging for cosmetics, pharmaceutical products, clothes, etc.

- **Cast coated folding boxboard.** A conventional folding boxboard with cast coating used for packaging. It is being used less and less frequently

- **Colours.** Cast coated paper in various colours, usually manufactured in the 250 g/m$^2$ format, although sometimes also in 90 g/m$^2$, which is used in the packaging and labelling markets. The colours can be achieved by either colouring the coating or using a rotogravure printing treatment after the product has been manufactured. Torraspapel does not manufacture this product, but products by other manufacturers can be found.


Fig. 10: Use of colour cast coated paper.

# Cast Coated Paper

## Summary

| | |
|---|---|
| **Cast coated paper** | It is a paper coated preferably on one side (sometimes on both) that has a high level of gloss achieved through heat using a chrome plating cylinder. |
| **Manufacturing systems** | Cast coated paper can be made using three different systems:<br>▪ **Dry system** (or Warren system). The paper is coated controlling the layer with an air knife, then it is dried, remoistened and finally the gloss is applied in the chrome plating cylinder.<br>▪ **Gel system.** The paper is coated using a roller system, then it is dried and finally placed in the chrome plating cylinder to apply the gloss.<br>▪ **Wet system** (or Champion system). The layer is applied to the paper using a roller system. This is then placed wet in the chrome plating cylinder where it is dried and the gloss is achieved at the same time. |
| **Paper conditioning** | The cast coated paper is dried excessively when it is placed in the chrome plating cylinder, which means that it requires a conditioning process to restore the humidity required for proper printing. This takes place in a climatic chamber in which low pressure steam is applied. |
| **Raw materials** | Cast coated paper contains many layers of coating in which kaolin is mainly used, as well as a large amount of binder, thickeners, starch and mould release agents.<br><br>The base paper must also fulfil special characteristics, especially if it is going to be used for bottles than can be recycled or cast coated self-adhesive labels. |
| **Type of cast coated paper** | There are various types of cast coated paper, for example, that used for labels on non-recyclable bottles, labels on recyclable bottles (WS), packaging, cast coated folding boxboard and cast coated colour paper.<br><br>It is mainly used for labels (especially self-adhesive labels), although it is still used in heavy weight formats for packaging, |

folders, menus, etc.

**TORRASPAPEL, S.A. - Llull, 331 - 08019 Barcelona**