

Tracing Paper

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SUMMARY

The article presents the various aspects of tracing paper and its prospect in the Indian Pulp & Paper Industry. A broad cutline has been drawn of both natural and treated types of tracing papers, with Special emphasis on treated paper. It is felt that, with the availability of indigenous raw materials and chemicals, treated tracing paper has a vast scope for its production in the country.

From time immemorial, paper has provided man with a basic material for written communication, perhaps, because no other suitable material was available which could compete with paper for its cheapness. The rapid strides made in the field of science and technology has also made an impact on the paper industry. Today, paper is used not only as a suitable writing material but several varieties of paper catering to different specific requirements are in use all over the world.

The conversion of paper has opened a new horizon and has given scope for further development of the paper industry. Most of the papers, whether functional or of decorative value, fall within the scope of conversion industry. The 'conversion' of paper, generally consists of steps to modify its nature and functional qualities thereby making it suitable for specific end-uses. The pace of development in speciality papers closely follows the development in the field of paper conversion. One of the most important speciality paper is tracing paper. At present, large quantity of tracing paper is imported annually to meet the internal demand of the country.

Tracing paper is defined as a paper with sufficient transparency to allow a design to be traced through for the purpose of reproduction. Transparency is defined as being characteristic of a substance which permits parallel rays of light to pass through it without being scattered. In addition to good transparency the other requirements of tracing paper are good strength and permanency, so

that it may be kept over long period without deterioration or much change in opacity. Moreover the resistance to erasure should also be satisfactory. The function of the paper when viewed by transmitted light should be uniform throughout and it should have ground glass appearance. An acceptable tracing paper is free from all defects which adversely affects its use.

It has been estimated that the demand for tracing paper will go up per annum since this paper is used in a large scale by architects, engineering organisations and design offices.

TYPES :

Tracing papers are generally divided into two broad categories :

CLASSIFICATION :

The major classification of these papers is as follows :

Treated		Natural
Thin	— g.s.m. 50/55	g.s.m. 60/65
Medium	— g.s.m. 70/75	g.s.m. 70/75
Thick	— g.s.m. 85/90	g.s.m. 105/110

TREATED TRACING PAPER :

The manufacture of treated tracing paper is one of the major converting process of the paper industry. The manufacturing process is simple and

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less capital intensive. It is well suited to be undertaken on a small scale.

The base paper and surface sizing composition constitute the primary raw materials. The base paper employed for treated tracing paper should be strong, durable and properly bleached. It should also be flexible enough to ensure satisfactory folding properties. Its structure and formation is also very important because the sheet showing an irregular formation does not absorb the surface sizing composition properly and evenly. It should also be smooth and free from dirt. There should not be any creases in the paper rolls, which should be properly and tightly wound to eliminate the possibilities of wastage. The thickness of the paper should be uniform and within the tolerance limits so as to obtain uniform impregnation of the sheet and prevent irregular tension during the drying operation. The grammage of the base paper used is 50 to 60 gms. per square metre.

The surface sizing composition should be homogenous and free from solid particles so as to give a smooth finish on application to the base paper. It should readily impregnate the base paper and dry quickly, so that while unwinding a roll of treated paper the adjacent layers do not have the tendency to stick to each other.

Treated tracing paper is obtained by impregnating the base paper with a suitable surface sizing composition to render the product transparent and suitable for use with ink or pencil. Saturation of the paper is made with a substance having an index of refraction close to that of the cellulose so that the transparent sheet results. Treated papers are uniform, smooth and offer ideal surface for both pencil and ink work. This paper lies flat on the drawing board. The synthetic resin coating on both sides is moisture repellent and moth-proof. Therefore, treated tracing paper does not cockle, discolour or tear easily. It has got a very high degree of dimensional stability, flexibility, foldability, improved ink receptivity and resistance to erosion during handling. It has also excellent permanency to heat and is essentially non-yellowing when exposed to ultraViolet light sources.

METHOD OF INTEGRATION :

This method is the simplest of all and widely employed for producing several varieties of speciality paper. The process of making treated tracing paper essentially consists of preparing a suitable surface sizing composition, which has optimum solid content and viscosity, and then impregnating the required base paper with this composition. The impregnated paper is dried in the drying chamber to remove the excess solvent. The impregnated rolls

are subsequently slit into proper sizes. Impregnation is done on the off-machine equipment. In order to have uniform distribution of the solution through the sheet, the base paper is dipped into the solution and then passed between two rolls. The refractive index of the solution used for saturation is kept between 1.5 and 1.52.

NATURAL TRACING PAPER

Natural tracing paper is that which has been made transparent by highly beating the desired pulp and then super-calendering the sheet made out of it.

It is manufactured from a high-grade strong bleached sulphite pulp and is given a long wet beating to produce the transparency and close formation. Beating has to be done very carefully in order to achieve the maximum fibrillation without cutting the fibre, so that the paper has a proper double fold, tearing strength and does not become brittle in nature. The digestion conditions have a great influence on the properties of the pulp, especially during beating. Having obtained the suitable pulp, it is necessary to have a plant that will give the required degree of beating, without shortening the fibres unduly, within minimum time and with economy of power. The usual type of beater to be used is basalt filled beaters and the stock has to be maintained at a required consistency. It is preferable to give the pulp a preliminary treatment before the stock is passed to the basalt filled beaters for main treatment. Special care must be taken during bleaching and alkaline washing.

The transparency of paper is effected by different factors in the treatment of pulp. Under identical cooking condition, a hard pulp gives the most opaque sheet while transparent sheet is obtained in the case of soft pulp. The transparency of the sulphite pulp also depends upon the cooking process. A pulp consisting of short fibre is less transparent than the long fibre pulp. Paper subjected to stronger pressure is more transparent.

Natural tracing papers are also sometimes treated to achieve greater transparency to ultra-violet light and to improve see-through for overlay tracing purposes. The increased transparency as a result of transparentizing treatment leads to faster reprint speeds in the reproduction of engineering drawings and other subject matters.

PROPERTY REQUIREMENT :

All tracing papers, whether natural or treated, should be of uniform texture. They should be free from defects like spots, wrinkles and pinholes which interfere with its intended use. The tracing paper should be suitable for pencil or ink lines,

yielding solid lines without slipping, feathering, spreading or smudging. During normal use, surface cracks or abrasion should not be visible on the paper to the extent that such cracks or abrasions can be seen on prints made therefrom.

DEVELOPMENT :

Regional Research Laboratory, Jorhat, has developed a suitable coating composition for making treated tracing paper from indigenously available raw materials and chemicals. The process has been developed on a laboratory scale and has also been tried in Pilot Plant (10 lit/batch) level. The plant trial was found to be successful in a machine plant (22" width). The plant trials confirm the laboratory result that the treated tracing paper can be made by using right type of surface sizing composition and base paper. The paper produced during plant trials has shown satisfactory physical strength properties. To evaluate the samples made during laboratory scale investigation and pilot plant study, drafting test, ageing test and other necessary tests have been carried out and they conform to the ISI specification (IS : 8431-1977).

CONCLUSION :

Development in the field of paper conversion technology reveals a wide scope for the development of speciality paper, especially the treated tracing paper. The natural tracing paper mainly involves controlled beating of sulphite pulp requiring special type of machinery for its production. A

process for making treated tracing paper using indigenous base paper and suitable surface sizing composition seems to be an innovative approach to meet the country's requirements. It may be concluded from the Laboratory study followed by pilot plant trial with a conventional coating machine, that it is feasible to prepare treated tracing paper indigenously.

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