Insulating Papers

The Marathwada Khadi Gramodyog Samiti has set up a hand made paper unit at Nanded. This unit has done a great service to the nation by way of finding import substitutes in some speciality papers. One such type is the insulating paper which is imported in large quantities every year. The production of insulating papers is now undertaken at Nanded on a commercial scale. This indigenous paper is handmade and requires skill in manufacture, to match in quality, the machine imported variety.

The paper unit at Nanded is not equipped with a research laboratory to test its products. It was therefore felt that a comparative study of its products with the imported equivalents be carried out at a place where all facilities for testing of paper along with a miniature paper plant would be available.

The Cellulose and Paper branch at the Forest Research Institute, Dehra-Dun, has all these facilities, and the study was carried out there.

The insulating papers generaly are of two types. 1) Press Pahn 2) Lethereid. The two differ

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Ippta, Jan. Feb. & March 1974, Vol. XI No. 1

from each other in their colour and in other physical properties. The two varieties of paper are manufactured and are available in various thicknesses. The thickness of paper is measured in mils. While studying comparative properties, naturally, the samples chosen were of the same thickness and of the same type.

The study involved the determination of physical properties of two equivalent samples, separately, along with their Chemical composition. A sample study of the imported as well as the indigenous press Pahn type will clearly illustrate the usefulness of the project. Tappi testing methods were employed throughout the project. Comparative study of press pahn 7 mils paper : Comparison of Physical properties.

(Average of 4 to 6 observations)

2. Determination of pH of cold extract of Press Pahn 7: A sample each, of imported and indigenous variety was taken, torn into bits and placed in a beaker, (each separately) containing distilled water, at room temperature. The bits were beaten with a glass rod to form pulp. The beating proces helps to extract the coating on paper. The pH of such an extract was recorded with the help of the pH meter, and the results are given below

	Imported	Indigenous
	sample.	sample.
Colour	Yellow	Colourless
pH	6.4	5.9

3. Determination of moisture cotent of Press Pahn 7: A piece of each sample was cut into small bits and in each case the weight of torn bits, kept in a weighing bottle, was recorded before and after

Property		Imported	Indigenous	
a)	Thickness.		7.6 mils	8.3 mils
b)	Tensile strength:	C . D.	35.5	37
	(Lbs/15 mm sheet) M.D.	66	40
c)	Bursting strength			
	Kg/S	q.Cm.	1 60	145
d)	Tearing strength	C. D.	240	240
	· ·	M.D.	240	210
	•		•	

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heating two samples separately, as usual. The moisture content was determined from the decrease in weight of the sample after heating. Average of three such observations of each sample are recorded. From the values obtained as above, the percentage loss in weight for the same weight of sample in each case was calculated.

Sample of Pr-	Percentage loss	
ess Pahn 7	in weigth.	
Imported.	4.161%	
Indigenous.	5.441%	

The difference in the two percentages is 1.280% and the higher percentage loss in the indigenous sample clearly indicates greater retentivity of water, a property which affects the dielectric strength of Insulating papers.

4. Determination of ash content of Press Pahn 7 mils About 5 gms of the sample is weighed accurately in a previously weighed crucible. This is introduced into an electric furnace and kept there for atleast two hours. The ash formed is then weighed along with the crucible. Knowing the weight of the sample and the weight of the ash formed, the percentage weight of ash formed is calculated.

Sample.Ash content.Imported0.4185%Indigenous8.227%

The results clearly show that the ash content of indigenous paper is about 19.65 times more than that of the imported variety. Absence of mineral fillers in the imported variety is indicated.

5. Fibre analysis of both the imported and indigenous Press Pahn 7 mils paper was undertaken to see whether there was any difference in the quality of pulp. Herzberg stain gives a blue colour with wood pulp while rag pulp shows pink.

Dielectric strength of Press Pahn mils paper.

Dielectric strength is measured by the ability of the paper to withstand the passage of electric spark discharge. It can be determined by placing a sample of paper of known thickness, between electrodes and subjecting it to voltage stress until the paper bursts.

Sample Break down voltages, Volts

	Room temp.	130°C
Imported	2360	2400
Indigenous-	1950	2675

The difference in breakdown volttage at two different temperatures should not be normally too great. However the indigenous sample, with a high breakdown voltage at 130°C would be more useful at higher temperature.

The comparative study helped to improve some of the stages in the beating operation to obtain pulp, the lifting of paper and the production of a sheet of uniform thickness.

Acknowledgement

The author expresses his gratitude to the officer-in-charge, cellulose & paper Branch, F.R.I. Dehra Dun for kind permission to carry out the study. He is thankful to other officers and staff members of the branch for valuable guidance and co-operation.

Ippta, Jan., Feb. & March 1974, Vol. XI No. 1