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Interconversion of freeness

Scope

Drainage of water through a pulp pad is affected by many factors such as fiber flexibility, amount of fibrillation, fiber length, and amount of debris present. Because the relative importance of these factors varies in the different methods for measuring freeness or drainage, there is no conversion table which will apply to all pulps.

The following tables are based on the results of 1500 measurements for freeness and drainage made on 50 samples of stock. These 50 samples consist of 10 samples of stone groundwood, four samples of refiner groundwood, and 36 samples obtained by beating five types of bleached chemical wood pulp for various lengths of time. Both hardwood and softwood pulps were used.

Introduction

When freeness measurements made on two types of testers are plotted against each other, a smooth curve is obtained if the samples represent various beating times for a given pulp. If a different pulp is used, a different curve is obtained. The values given in Table 1 represent the range of values which could be expected from pulps of the type used in this study. Although unbleached pulps were not included in the study, it is thought that they also would fall within the ranges given.

Safety precautions

Not applicable.

Keywords

Freeness, Canadian Standard freeness, Schopper Reigler freeness, Drainage, Williams freeness, Drainage factor

Additional information

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Additional information about relationships with other freeness testers can be found in “Pulp and Paper Chemistry and Chemical Technology,” Vol. II, 2nd Ed., James P. Casey, (Interscience: New York), 1960, P. 611-617.

Table 1. Conversion of Canadian standard freeness.

<i>Canadian Standard cm³ (3 g)</i>	<i>Schopper Reigler units (2 g)</i>	<i>Williams Precision s (3 g)</i>	<i>Drainage Factor</i>
Bleached Chemical Wood Pulp			
700	10-13	7-14	0.7-1.5
650	11-15	10-20	0.8-2.0
600	13-18	14-28	1.0-2.5
550	14-20	17-35	1.3-3.3
500	16-23	20-50	1.7-4.5
450	17-25	25-65	2.2-6.0
400	20-30	35-80	3-8
350	22-35	45-100	4-10
300	27-40	55-130	5-13
250	32-48	75-170	7-16
200	38-54	100-225	10-22
150	45-62	140-295	14-30
100		225-415	20-40
Mechanical Pulp			
200	46-53	155-200	14-22
175	48-55	180-225	15-24
150	51-59	210-250	16-27
125	54-62	250-300	17-35
100	57-65	300-360	18-45
75	61-70	360-460	20-55
50	66-75	450-650	25-80
25	74-81	800-1400	30-150

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