

SPECIAL PACKAGING PAPER DEVELOPMENT - FOR CARTON WHICH WITHSTAND COLD STORAGE AND SEA WORTHY EXPORT



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Abstract :

Special packaging paper development for drastic climate change including humidity, temperature to avoid the carton's failure of compression and dimensional instability. Modern corrugated box has many new end uses which require specially designed features. It serves more than beyond the key purpose of preserving and protecting the products.

There are about 15000 units of corrugated box manufacturers in India. About 80% of paper used for corrugated comprises of less than 20BF however; the trend is shifting towards stronger paper.

The efforts made to develop high BF & controlled Cobb for making special packaging paper to withstand the extreme temperature/humidity variation and make suitable carton for export by sea and for cold storage.

INTRODUCTION

GENUS PAPER AND BOARDS LTD

- A. Capacity: 1,20,000 Tpa
- B. Manufactureing Qualities :
Natural Shades, Golden Yellow, Lg Brown, Moser Baer Shade, Korean Shade, V.T.L, G.T.L, In 18 To 40 Bf.
- C. Raw Material :

NDLKC





And 12 other imported varieties are used.

D. Process:

D.1 PULP MILL: Pulper, Cleaning, Screening, Refining

D.2 PAPER MACHINE:

3 wires of 3860 mm long have 300 mpm speed

1st Press	2nd Press
Diameter - 1150 mm	Diameter - 1650 mm
Nip Load - 250 kg/cm	Nip load - 350 kg/cm

MG, Size press, Drying cylinders, calendar, pope reel.
A 5 ply board made according to following configuration

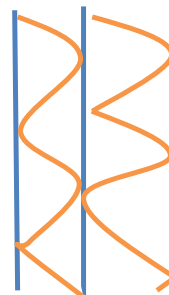
CHAPTER

EXPERIMENT No. -1

A 5 ply board made according to following configuration

FIG- 1 A 5 PLY BOARD

- BOX SIZE = 1m × 1m × 1m
- Weight OF BOX = 6.6kg
- Paper @ 30 RUPEES /KG
- Cost = 198 RUPEES/Box (PAPER ONLY)
- BURSTING STRENGTH OF board = 12.2 Kg/sq cm



	TEST LINER (18BF/180GSM)
	FLUTING (18 BF/140 GSM)

FIG- 1 A 5 PLY BOARD
Table-1A: OPERATING PARAMETERS OF 18 BF

Sr.No.	PARAMETER	UNITS	VALUES
1	FURNISH		90% INDIAN WASTE+10% OCC(IMPORTED)
2	PRESS NIP LOAD		IIND PRESS LOAD 350
3	% DRYNESS		IST PRESS 42 IIND PRESS 50
4	SIZING		90% INDIAN WASTE+10% OCC(IMPORTED)
5	STARCH	Kg/Ton OF PAPER	36.7
6	ALUM	Kg/ TON OF PAPER	3.6
7	SURF SIZE	g/TON OF PAPER	513
4	SIZING		SURFACE
5	STARCH	Kg/Ton OF	36.7

Table-1B: PAPER PROPERTIES

Sr. No.	PROPERTIES	UNIT		
1	BF		18.5	
2	GSM	g/sq.m	140,180	
3	COBB	g/sq.m	TOP	BOTTOM
			40	42
4	MOISTURE	%	7.10	
5	BULK	cc/gm	1.54	
6	POROSITY (GURLEY)	sec	30	

COBB : Table-1C: COBB MATRIX:

Sr.No.	PARAMETER	TOP LAYER	BOTTOM LAYER
1	COBB ₆₀	40	45
2	COBB ₁₂₀	60	70
3	COBB ₁₈₀₀ OF PAPER	90	100
4	COBB ₁₈₀₀ OF CARTON WITH 250 mL WATER	700	900

OBSERVATION : Carton failed at the end user due to very high absorbency of board.

EXPERIMENT No.-2

A 3 ply board made according to following configuration :

FIG-2 A 3 PLY BOARD

- Box size = 1m × 1m × 1m
- Weight of Box = 4.08 KG
- Paper @ 37 RUPEES /KG
- Cost = 151 RUPEES/BOX (PAPER ONLY)
- Bursting Strength Of 3 Ply Board = 13.16 Kg/sq.cm



TEST LINER (28BF/200GSM)
FLUTING (28BF/140 GSM)

Table-2A: MODIFIED PROCESS PARAMETERS OF 28 BF

Sr.No.	PARAMETER	UNIT		
1	FURNISH		TOPLAYER=50%KCB+50%(NDLKC+DLK+OCC(IMPORTED)) BOTTOM LAYER =85% DSOCC +10%DLK+5% SACK KRAFT	
2	PRESS LOAD	Kg/cm	IST PRESS NIP LOAD	IIND PRESS NIP LOAD
			140	350
3	% DRYNESS		IST PRESS	IIND PRESS
			45	50
4	SIZING		Both INTERNAL AND SURFACE	
5	STARCH	Kg/Ton OF PAPER	38	
6	INTERNAL SIZING CHEMICAL		FORTIFIED ROSIN @ 0.5%	
			NON – FERRIC ALUM @ 2%	
7	SURF SIZE	g/Ton OF PAPER	407	

Table-2B: PAPER PROPERTIES

Sr.No.	PROPERTIES	UNIT		
1	BF		28.6	
2	GSM	g/sq.m	180, 200	
3	COBB	g/sq.m	TOP	BOTTOM
			30	32
4	MOISTURE	%	7.10	
5	BULK	cc/gm	1.56	
6	POROSITY(GURLEY)	Sec	32	

COBB : Table-2C : COBB MATRIX

Sr.No.	PARAMETER	TOP LAYER	BOTTOM LAYER
1	COBB ₆₀	30	32
2	COBB ₁₂₀	35	40
3	COBB ₁₈₀₀ OF PAPER	50	55
4	COBB ₁₈₀₀ OF CARTON WITH 250 ml WATER	290	300

OBSERVATION: Acceptable absorbency of carton make suitable for export by sea and for cold storage.

RESULT AND DISCUSSION:

- Cost of 3 ply board is 23.7% less.
- 3 ply board Provide better physical strength properties than a 5 ply board.
- Suitable for temperature variation and humid region due to low Cobb of paper & low absorbency of board & hence remain dimensionally stable.

CONCLUSION:

This case study suggest that 3 ply board of 30-32 cobb is more beneficial than 5 ply board of 40-50 cobb for long time cold storage and climate change such as temperature and humidity etc. And also provide better strength properties such as bursting strength, Compression strength of board.

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