

APPENDICES

Appendix – I

CCI SW550 Mini warpers

CCI single end warping machine

The CCI SW550 Mini warpers was designed for the sampling loom. The machine can produce warp beams for short run featuring fixed lengths and different colours to work with SL8900 Evergreen. It uses a computerized independent PC based controller featuring built-in design editing software for easier operation.

The SW550 Mini Warper uses a computerized yarn guiding device as well. With this feature, the warp is placed precisely across the width of the warper to guarantee that it is wound correctly in position on the drum.

Technical Specifications:

Working width	20 inches (508 mm) maximum
Warping length	3.6 m
Color Change	Shifting movements controlled by computer. Color changed manually through alerts from computer.
Yarn Breaks	Equipped with yarn break detecting device, machine stops when yarn breaks
Designing	Built-in SEdit2 design and editing software.

Appendix – II

CCI Evergreen Rapier Machine

The CCI Evergreen Rapier Machine is a multifunctional machine producing a variety of woven samples, including industrial fabrics, upholstery, and apparel. Apart from below mentioned specifications positive electronically controlled warp let-off, independently controlled by servo-motor beat-up, weft breaking detecting device etc.

Technical Specifications:

Weaving Width	20 inches (508mm) maximum
Speed	75 ppm maximum (with reference to fabric width of 20 inches) / 85 ppm maximum (with reference to fabric width of 10 inches)
Controller	PC Based Industrial PC / Windows Embedded operating system
Fabric Take-up	Electronically controlled. Weft density can be changed freely within the same weave.
Warp Let-off	Positive electronically controlled. Digital display of warp tension. Optional second beam assembly available.
Shedding	Computerized controller. 20 heald frames driven pneumatically by air cylinders. (1st & 2nd heald frames are for leno and selvedge). Optional up to maximum 24 heald frames.
Drawing-In	Heald frames can be separated from the loom for heald and reeds drawing-in
Beat- up	Computer controlled driven independently by servomotor. Suitable for heavy fabrics. Positions and quantity of beat up could be adjusted.
Weft Insertion	Single rapier weft insertion driven by servomotor. Speed could be controlled independently through the computer. Insertion can be adjusted for 10 or 20 inches.
Weft Breaks	Equipped with weft break detecting device. Loom stops when weft breaks.
Design	Built-in SEdit2 design and editing software.

Appendix – III

Density measurement

Sample code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Density (g/cc)
CC1	1.3209	1.3129	1.3649	1.3389	1.3369	1.3349
CC2	1.3149	1.3065	1.3585	1.3325	1.3305	1.3285
CC3	1.3188	1.3108	1.3628	1.3368	1.3348	1.3328
CC4	1.3158	1.3078	1.3598	1.3338	1.3318	1.3298
CC5	1.3262	1.3182	1.3702	1.3442	1.3422	1.3402
CH1	1.1218	1.1138	1.1658	1.1398	1.1375	1.1358
CH2	1.2044	1.1964	1.2484	1.224	1.2204	1.2184
CH3	1.2431	1.2351	1.2871	1.2611	1.2591	1.2571
KH1	1.1082	1.1002	1.1522	1.1262	1.1242	1.1222
CK	1.1108	1.1028	1.1548	1.1288	1.1268	1.1248
Resin	1.219	1.211	1.263	1.237	1.235	1.233

Sample calculations

For sample CC1

Tare weight of specific gravity bottle = 19.5274 g

Gross weight of specimen = 34.0926 g

Gross weight of water = 30.4383

Net weight of water = 30.4383 - 19.5274 = 10.9109 g

Net weight of specimen = 34.0926 - 19.5274 = 14.5652 g

Specific gravity = 14.5652 / 10.9109 = 1.3349

Appendix – IV

Fibre volume fraction

Sr. No.	layer 1	layer 2	layer 3	layer 4	thickness of layer	fibre volume fraction
	g_1	g_2	g_3	g_4	t_c	$V_f(\%)$
						Equation 3.16
CC1	0.0385	0.0385	0.0385	0.0385	1.92	44.31
CC2	0.0385	0.0385	0.0385	0.0385	2.07	41.10
CC3	0.0385	0.0385	0.0385	0.0385	1.85	45.99
CC4	0.0385	0.0385	0.0385	0.0385	1.82	46.74
CC5	0.0385	0.0385	0.0385	0.0385	1.84	46.24
CH1	0.0400	0.0400	0.0400	0.0400	1.86	68.03
CH2	0.0416	0.0416	0.0416	0.0416	2.26	58.34
CH3	0.0292	0.0292	0.0292	0.0292	2.35	39.39
KH1	0.0159	0.0159	0.0159	0.0159	1.95	28.14
CK	0.0159	0.0159	0.0400	0.0400	2.2	41.23

Appendix - V

TENSILE TEST MACHINE (Universal Testing Machine)

Equipment Name	TENSILE TEST MACHINE (Universal Testing Machine)
Make/Model	TINIUS OLSEN/L-Series H50KL
Specifications Capacity	H50KL (5000kg)
Construction	Solid steel crosshead with sheet steel panelling with precision ball screw
Travel & Stiffness	Maximum crosshead travel excluding grips is 1100 mm
Distance between columns	405 mm
Frame stiffness	100KN/mm at normal load points
Force Meas.	Load cell availability: -50 KN, 5 KN
Extension Meas.	Resolution 0.001 mm
Speed Control	2 Default test speeds (0.001 to 500 mm/min) 1 default job speed (0.001 to 500 mm/min)

Appendix - VI

FLEXURAL TEST MACHINE (Universal Testing Machine)

Equipment Name	FLEXURAL TEST MACHINE (Universal Testing Machine)
Maximum capacity	30 kN
Load Measurement	By load cell
Least count for load	3 N
Accuracy of load	for 30KN load cell +1% from 0.6 kN to 30kN
Displacement measurement	Rotary Encoders
Least count for displacement	1 micron
Maximum Traverse of crosshead	1000 mm
Maximum working width	400 mm
Traverse speeds	0.5 to 500 mm/min
Electric motor	A.C servo with feed back
Controller for the motor	A.C servo with feed back
Power supply	1ph,230V,50Hz, A.C