

Summary of Specifications


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Note: The delivery of all items will be at NTU Faisalabad campus.

Broad specifications of Garment Manufacturing Equipment

Sr. No.	Equipment	Broad Specifications
9 item 44	Thermal manikin	Average Asian size mannequin body form with removable sweating skin, data acquisition system and software. Variation in body position and movement. Approximately 15 heating zones. Thermally conductive shell preferably carbon epoxy. Sweating system with fluid distribution, a reservoir, fabric skin layer and Conditioning chamber with capability to simulate HOT, COLD, DRY and HUMID environments.
9 item 1	3D Product Design and Simulation Software	The software should be compatible with other related input/output devices (3D body scanner, plotter, cutting machine, digitizer, scanner, etc.). Software licensed, lifetime auto renewal which must be capable of Drafting flat patterns. Designing a clothing product by changing colors, prints, fabric type, and features etc. Creating 3D virtual models of desired size(s). Simulating and adjusting the fit of flat patterns on a 3D virtual models of desired measurements. Grading 2D patterns to get different sizes. Making models, orders and markers for good fabric utilization. Complete hardware to run the software. Online data acquisition system (Minimum: core i7, 16 GB RAM, 1 TB HDD) with 32" LED, wireless keyboard, wireless mouse, 3 shelves stand and chair. Complete set of data cables and power cables. Uninterrupted power supply for smooth data storage with back up of at least 30 minutes. Equipment operational on site. Equipment operational on site. Two years complete warranty of hardware and software
9 item 41	Ultrasonic sewing machine	<ol style="list-style-type: none"> 1. Capable of sewing /sealing /cutting /pressing /embossing of various fabrics, with various options for roller patterns and width, approx. frequency 18-20 KHZ, multi-circuit ultrasonic protection system. Strong ultrasonic power with three adjustable gears (maximum, medium and minimum) to meet requirements of different materials and thickness. 2. Capable of seam sealing with hot air, with automatic temperature control, Compressed air approx. 0.3-0.6MPa, Effective tape width approx. 14-22mm, Roller width: 25.4mm, Approx. temperature: up to 700°C.
9 item 14	Mannequins	<ol style="list-style-type: none"> 1. Soft Flexible Bendable Posable Headless Male/Female Body Mannequin Form in different sizes (8 pcs) 2. Adjustable size (Male/Female) mannequin in different sizes (5 Pcs)


Dr. Abher Rasheed


Dr. M Babar Ramzan


Muntaha Rafique


Mariam Jabbar

(9 Item #45)

Wrinkle Recovery Tester

NTU

Variable Weights 200g, 500g, 1000g, 2000g

For Fabric made from all types of fibres

Hose clamps

Standard

AATCC128, ISO 9867

(9 Item #3)

Yarn Hairness Tester

NTU

Applicable to Multiple yarn type

Yarn test length 1~100m

Test speed 30m/min

hairiness index for 8 length

1mm~8mm

All accessories required to make equipment operational

Standard

FZ/TO1089

(9 Item #2)

Yarn Friction Tester

NTU

Applicable to Multiple yarn type

Friction angle adjustable

Pretension Applicable

Pretension range 0~24CN

Yarn testing speed 20m/min or 110m/min

All accessories required to make equipment operational

Standard

JISL1095 ASTM D3108 ASTM D3412

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Textile Processing Department

Pilot-Scale Nitrogen Dyeing Machine

(Item #51)

No.	Features	Specs
1	Loading Capacity	Up to 20 kg
2	Cylinder Diameter (mm)	1200-1350
3	Cylinder Depth (mm)	480-700
4	Speed (RPM) (Variable)	Up to 200
5	Equipped with Nitrogen kit	
6	Equipped with mist producer to apply chemicals.	
7	Equipped with Ozone generator	

Pilot Ozone Denim Processing System

(Item #4)

No.	Features	Specs
1	Ozone production	30-70 g/h
2	Oxygen production	0.5-0.8 m ³ /h
3	Carrier	Water/Ozone
4	Load Capacity	5 kg -10 kg

Sample Denim Washing/Fading Machine

(Item #5)

No.	Features	Specs
1	Volume	400 litres -700 litres
2	Load Capacity	Up to 20 kg
3	Diameter	700mm – 1200mm
4	Depth	500mm-800mm
5	Rotation Speed (variable)	0-400 rpm
6	Should be equipped with Nanobubble generator.	

Pilot-scale Garment Dyeing Machine

(Item #6)

No.	Features	Specs
1	Volume	170 litres -200 litres
2	Load Capacity	1-6 kg
3	Diameter	700mm – 780mm
4	Depth	400mm-440mm
5	Rotation Speed (variable)	0-450 rpm
7	Should be equipped with color kitchen	

M. P. R.
13/03/19

Hydro-extractor

(item #7)

No.	Features	Specs
1	Volume	30-50 litres
2	Diameter	350-450mm
3	Depth	250-350mm
4	Rotation Speed	1400-1500 rpm
6	Load Capacity	6-10kg

Multi-functional Oven

(item #8)

No.	Features	Specs
1	Temperature	Up to 130 °C
2	Loading Capacity	Up to 10 pieces
3	Heating System	Electric
4	Height (mm)	2200-2400
5	Width (mm)	1000-1100
6	Depth (mm)	1600-1700

Soft Yarn Winder For Dyeing

(item #23)

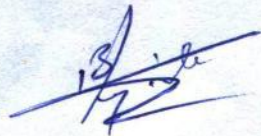
No.	Features	Specs
1	Number of heads	1
2	Speed (m/min)	100-1000
	Adopter type	Tapper (All Angles), Straight Package
3	Traverse for cylindrical bobbins	

M. J. Duff
13/03/19

Item # 9

Slub yarn attachment for Ring spinning

- 1- Device should be appropriate for slub, multi-count and multi-twist yarns.
- 2- Program feeding should be on machine and also through the computer software via USB.
- 3- Latest Computer interface must be included to control slub parameters through computer software.
- 4- Program lines should be minimum 100.
- 5- Minimum thickness of slub : 100%-500%.
- 6- Negative slub option should be included.
- 7- Slub ramp control should be included.
- 8- Slub length: 5mm-3000mm.
- 9- Pause length: 10mm- 3000mm.
- 10- Slub control through servo drive.
- 11- Energy Supply: 220/50 Hz.
- 12- For better process during slub formation on ring spinning, auto leveling on carding machine could be included.
- 13- LCD display for ring and attachment settings.
- 14- Compact Spinning system for 60 Spindles should be included.
- 15- Important accessories related to speeds, package, and environment monitoring could be included.
- 16- Dual core attachment for 120 spindles with all standard accessories must be included.



Item # 10


Specifications

Whole-garment Knitting Machine

Specifications	NTU Specifications
Type	Flat Knitting
Feeds	Yarn carrier 8 and above with bare lycra, inlay, elastic and plating feeding system
Width	40" and above
Gauge	E 6 and above
Attachments	Knit Designing Software, Computer System, Step motor, USB control system, Holding cutter
Techniques	Racking System, Sinker System, Stitch Transfer System, Jacquard with Solenoid, Intarsia Facility.
End Products	Whole Garments, Hats, Mufflers, Neck-ties, Children wear, Leggings, Tanktops, Underwear, Outerwear, Swimwear etc.


1. Dr. Hafsa Jamshaid


2. Mr. Usman Ahmed


3. Mr. Sikander Abbas Basra

Item # 11

Manmade Fiber Spinning Line (Pilot-Scale)


Blow Room Line with Single Carding machinery

ONE (1) Tuft Opening Line and ONE (1) High Production card for Man-made and high performance Fibres with standard accessories and essential parts

Sr No	Machine Name	Specification	Quantity
1	Man-made Fibers opener /Tuft /Bale opener	<ul style="list-style-type: none">Manually feed bale openerFeed Table Length minimum 3.0 meter. Connection with central control systemFilter unit for waste collectionAll standard accessories must be included i.e. pipes, control and command switch to synchronize with next machineWidth of machine should be minimum 1200 mmProduction should be minimum 300 kg/hourFibre length to process maximum 60 mm	1
2	Tuft Opener with mixer	<ul style="list-style-type: none">High performance opener with fully spiked roll, able to process all man-made FibresAdjustable storage for single card mixingAll accessories must be included with control system as per catalogueWorking width should be minimum 1200 mmProduction minimum 300 kg/hrNoise level should be as per ISO-4871 certification	1
3	Condenser	<ul style="list-style-type: none">Frame and Stand, Cage, waste and dust collection systemFilter unit for dust cageDelivery funnel size should be as per catalogue recommendation	1
4	Trunk Feeder	<ul style="list-style-type: none">Widthwise similar with previous machinesConnect with central control system	1
5	Material Transport Fan	<ul style="list-style-type: none">To transport the material to next machine fan should have lesser noise levelDiameters and capacity should be necessarily according to the requirement to run a single Card	1
6	Air separator /Dissipation	<ul style="list-style-type: none">To dissipate the air	1




7	High Production Card	<ul style="list-style-type: none"> • Maximum 120 kg/h sliver production • Chute Feed Mechanism • Exhaust air must be upward • Cylinder speed minimum 400 RPM, adjustable with a frequency converter • System to create negative pressure and waste collection box • Card clothing can process 0.7-7 denier fibers • Area of Cylinder would be in the range 5.2-5.7 m² • Working width of machine in the range 1280-1500mm • Grinding/re-sharpening system must be integrated for cylinder and doffer • Manual grinding stones for doffer, cylinder etc must be included. • Manual cleaning brush for clothing and topset must be included. • Top set should be Clipping free. • Blends of different man-made fibers must be process without good fibers loss • Output sliver weight in the range 4 to 9 Ktex • Can Diameter 24 "x 48 " • Coiler and Can changer will be on the floor. • All the manufacturing must be certified with ISO 9001 Standard • Installed power should be minimum less then 25KW 	1
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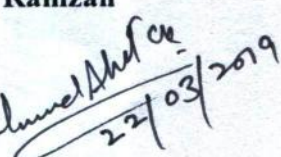
Broad Specifications of Garment Manufacturing Equipment

Sr. No.	Equipment	Broad Specifications
12	Fabric sample GSM sample Cutter	Die cutter with circular sample area of 100cm ² , specimen diameter of 113mm, 4 stainless steel blades, safety lock, 5mm cutting depth, one set of extra blades (QTY = 02) Two
13	Digital Weighing Balance	Range 0.0001-200g digital precision weighing balance with box.
40	Ring /eyelet (Grommet) machine	Fully automatic, fast, Pneumatic, ring/eyelet machine for fabric and leather, including magazines of three different sizes.
42	Folders and Attachments	1.Digital needle thread tension meter 2.Digital bottom thread tension meter 3. Different types of sewing machine folders
43	Digital Thickness Gauge	Digital display, Range of thickness: 0.001-25mm, measuring accuracy: 0.01mm, Min speed of presser foot: 1.5 mm/s, Presser foot area: 100mm ² , 2000mm ² , 2500mm ² , 10000mm ² , Load Weight: 20cN, 100cN, 200cN, 500cN, 2000Cn, Pressing duration: 10s, 30s Standards: ISO5084, ISO 9073, ISO9863, GB 3820, FZ/T 0100


Dr. Abher Rasheed


Muntaha Rafique

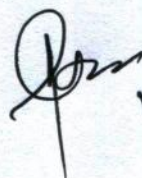

Dr. M Babar Ramzan

For 
Mariam Jabbar

Sum # 15

Optical fiber diameter Analyzer

Properties	Requirement
Measuring Range	4-300 micro
Accuracy	0.1 micro
Power Consumption	<20W
Fiber type	All natural and synthetic including metallic
Result of diameter	Excel or Pdf with mean, SD, histogram and coarse fiber %
results of curvature	Histogram, Mean and SD
Software	Yes (life time free)
Measuring Speed	20,000 fiber snippets/min
Measuring time	< 30 sec
Accessories	
Calibration sample	10 Specimens
PC	compatible with software
Windows	Original windows to avoid software issues
Automatic fiber snippets	NA
Fiber Guillotine	NA
UPS	As per machine requirement
Service and Warranty	3 years free service and warranty

 12/3/14

Item #16

MicroPipets Adjustable

(QTY = 10) Ten

Sr. No	Voloume Range	Testing Volume	Accuracy	Repeatability	Increament	Tips Volume	No. of Tips
1	0.5-10 µl	10	+/-1.0%	+/- 0.8 %	0.1 µl	10 µl	1000
		5	+/- 1.5%	+/- 1.0%			
		1	+/- 2.0 %	+/- 1.5 %			
2	10-100 µl	100	+/- 0.5 %	+/- 0.2 %	1 µl	100 µl	1000
		50	+/- 1.0%	+/- 0.5%			
		10	+/- 2.0 %	+/- 1.0 %			
3	100-1000 µl	1000	+/- 0.6%	+/- 0.2 %	5 µl	1000 µl	1000
		500	+/- 7.0%	+/- 0.25%			
		100	+/- 1.5%	+/- 0.7 %			
4	Tips Providid	1000					

[Signature]
12/3/14

25m # 17

Stereo Microscope	
Specifications	
Type	Manual Zoom
Observation	Brightfield/Darkfield/Flourescence/Simple Polarizing
Zoom Ratio	16:01
Magnifiation Range	0.75x-13.5x (with 0.75/1/2/3/4/5/6/8/10/12/13.5x click stops)
Maximum magnification	270
Maximum FOV	ø59 mm
Maximum NA of	0.3
PC Connectivity	Must be able to connect with computer
Image capturing	Must be able to capture and Store image
Data Acquisition	Must be available
	Image Sensor
	Color CMOS
	Sensor Size1/2.3 inchResolution (max.)4912 x 3684 pixels (4:3), 3840 x 2160 pixels (4K UHD 16:9), 1920 x 1080 pixels (Full HD 16:9)Pixel Size1.25 x 1.25 µmBinning
	2 x 2
	4 x 4
	A/D Converter12 bitsExposure Times22 µs - 1 sLive Frame Rates
	10.5 fps at 4,912 x 3,684 pixels (4:3)
	23.6 fps at 2,456 x 1,842 pixels (4:3)
	45 fps at 1,224 x 920 pixels (4:3)
	14 fps at 4,912 x 2,762 pixels (16:9)
	25 fps at 3,840 x 2,160 pixels (4K UHD 16:9)
	31 fps at 1,920 x 1,080 pixels (Full HD 16:9)
	59 fps at 1,224 x 688 pixels (16:9)
	Cooling SystemPassively cooledExternal Trigger-Data TransferUSB 3.0Partial Readout✓PC control
	Windows 10 64 bit
	Windows 8/8.1 64 bit
	Windows 7 64 bit
	USB 3.0 interface
	4K UHD and Full HD support, 16:9 aspect ratio
	Automatic White Balance (AWB)
	Focus Peaking Manual Focus Assist
	OSIA - Olympus Smart Image Averaging (active noise reduction)
	Fast Live (high frame rate in low light conditions)
	Microsoft Windows 10 (64 bit only)
	Microsoft Windows 8/8.1 (64 bit only)
	Microsoft Windows 7 (64 bit only)
Accessories	
Objective lense	10x,50x, 100x
Eyes Piece	10x, 20x

[Signature]
12/3/19

Multi-Component Melt Spinning Equipment along with Melt Blender (Lab-cum-Pilot-Scale)

Specifications

- Capable to handle variety of polymer types
- Possibility of making different yarn types, e.g., POY, FOY; multifilament, Monofilament
- Capable to produce Mono, Bi and Tri-component filaments (at least bi components)
- Temperature range up to 450°C
- Throughput 0.1 – 6.0 kg/hr (speed around 1000 m/min)
- Fully integrated computer control system
- Option for additive dosing of extruded polymers
- Possibility for making core-sheath, island in sea and side by side multi-component fibers



22/03/2019

Non-Contact Portable Spectrophotometer

The specifications are as under:

Geometry:	45/0° dual illumination
Illumination:	Full spectrum LED
Spectral Engine:	True Dual beam, 31 channel
Spectral Range:	400 - 700 nm
Spectral Interval:	10 nm measured, 10 nm output
Measurement Range:	0-150% reflectance
Calibration Interval:	Once per week or temperature shift > 14° C (25.2° F) (self detected)
Measurement Spot Size:	6 mm (1/4") and 12 mm (1/2")
Measurement Distance:	38 mm (1 1/2") nominal lens to measurement surface
Repeatability:	6 mm 0.035 ΔEab Maximum 12 mm 0.025 ΔEab Maximum (white ceramic tile)
Inter-instrument Agreement:	6 mm 0.15 avg ΔEab (12 BCRA tiles) 12 mm 0.15 avg ΔEab (12BCRA tiles)
Gloss Geometry:	45/0°, 60° Correlated
Gloss Repeatability:	0-10 GU, +/- 0.2 GU, 10-100 GU, +/- 0.6 GU
Gloss Reproducibility:	5-92 GU, 3.0 GU maximum, 1.5 GU average
Operating Temp:	10° - 40°C (50° - 104°F)
Humidity:	0-85% relative non-condensing



Dr. Ali Afzal

Item #20

Technical Specifications: Beam to Beam Sizing

(Beam to beam or yarn to beam)

Careel Capacity for Sizing: 12-16 beams or Spindles

Drying System: Electrical or Steam heated with speed and temperature controlled

Size Cooker: Detachable and temperature Controlled

Spare parts: 01 set

Output: Ready for Sectional Warper with minimum of 2000 mm width (Sectional Warper included)

Item #22

Technical Specifications: Waterjet Loom

Working width: minimum 500-2000 mm

Shedding Type: Positive Cam / Dobby with CAD Designing Software

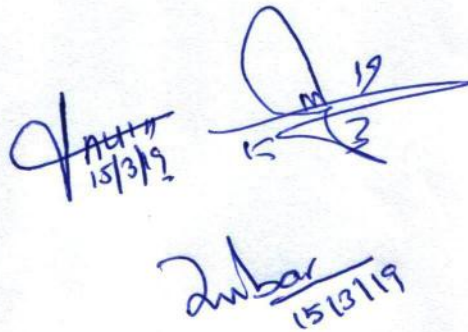
Speed: 500-800 RPM

Weft Insertion: Waterjet

Number of Weft Selectors: minimum 02

No of Heald Frames: minimum 4-8

Let off and Take-up: Electronic

Three handwritten signatures and dates in blue ink. The top left signature is 'J. N. N.' with the date '15/3/19'. The top right signature is a stylized 'M' with the date '15/3/19'. The bottom signature is 'Zulbar' with the date '15/3/19'.

9um # 21

Technical Specifications

Terry/Towel Weaving Machine

Weaving width: 500 mm

Suitable Yarn: Cotton Spun

Shedding type: Electronic Jacquard with minimum 1400 Hooks

Harness mode: one hook /one thread

Weft Insertion: Rigid Rapier

Weft cutter: Mechanical or Pneumatic

Number of Colors: minimum 08

Take-up: Electronic - Independent Stepper Motor Drive

Let-off: Electronic - Independent Stepper Motor Drive

Warp and Weft Stop Motion: Automatic

Controller/Software: PLC based dedicated with pattern editor and diagnostic option

Separate Drawing-In Station: Automatic with 8 Colors and 20 Heald frames

Spare Parts: 01 Set

Additional Beam: 02

15/3/19

15/3

15/3/19

Woven Fabric Jigger Dyeing Machine**(Item #24)**

No.	Features	Specs
1	Fabric width which can be processed	300-500mm
2	Fabric speed	Upto 10m/min (Variable)
3	Timer (Adjustable)	Upto 99 hours
4	Temperature Control	Fully automatic
5	Heating	Electric System with cooling jacket
6	Fabric Tension	Variable
7	Alarm	End of cycle
8	Temperature	Up to 130 °C (Variable)

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13/03/19

Denim Warp Dyeing (Sky Padder)

(Item #25)

No.	Features	Specs
1	Dyes	Indigo and Sulphur
2	Processing Speed/Dwell Time	0.2-5m/min
3	Process speed indication display resolution	0.05-0.1m/min
4	Nip Pressure	Up to 6 bar
5	Temperature Control Accuracy	$\pm 0.5-1.5^{\circ}\text{C}$

[Signature]
13/03/19

Digital Inkjet fabric printing machine

(Item # 26)

No.	Features	Specs
1	Number of installed printing heads:	4
2	Number of installable printing heads:	4
3	Printing width:	1500mm-2000 mm
4	Dryer	Electric
5	Inks to be printed	Reactive, Acid, Pigments, Disperse
6	Substrates (fibers)	<ul style="list-style-type: none"> • Silk • Viscous • Linen • Cotton • Wool • Lyocell • Nylon
7	Substrate Structures	Woven, Knitted, Nonwoven, Towel
8	Drop Size	4-72 pl
9	Resolution (dpi)	600×600
10	Ink flow	Pneumatic controlled
11	PLC based, Servo motor controlled, blanket based	

[Signature]
14/03/19

25 27	Composite Sample Cutter (Metal)	Cutter for precise cutting of carbon fiber composites, FMLs, polymers etc. Computer controlled/programmable Variable speed Screw holder Digital RPM indicator Bed size 300 x 300 mm or more
25 28	Laboratory density meter	Capacity: 200-300 gm Measurement Range: 0.1 to 3.0 g/cm ³ Operating Temperature: 10 - 40 °C Readability: 0.1 mg Repeatability 0.1 mg Response Time: 2-3 sec Automatic Calibration
25 31	Pre-preg line	For prepreg formation for fiber reinforced thermosetting polymers Materials: carbon/epoxy, glass/polyester etc. Creel capacity: 300 or higher Max Width of Prepreg: up to 800 mm or higher Process speed: 0 - 5 m/min or higher Process Temperature: 40 -250 °C Heating Media: Thermal Oil or similar Cooling Media: Water or similar Includes all accessories required for functioning
25 33	Extruder	Twin Screw Extruder Processing capacity 1 kg or lower 20mm diameter of screw, 40 L/D ratio Co-rotating screws Ability to compound Vacuum venting system RPM 1200 or higher Die for water bath and detachable Pelletizer assembly
25 35	LVDT for displacement measurements	For measurement of displacement of thermosetting polymers when subjected to temperature and pressure Materials form: Liquid or Solid Electromechanical type Precision: 0.001 mm Measurement range: 1 micron to 1 cm or higher Sample size: 1 - 10 gram (if liquid)

W. M. 2

(item # 29)

Tribotester

S.No.	Description	Detail
1	Rotational speed	0-500rpm (or more)
2	Plate disc sample holder	115mm diameter
3	Sample size	up to 80mm diameter thickness from 1 to 15mm
4	Maximum normal force	at least 60N, by means of dead weights Standard set of dead weights: 1x1N, 2x 2N, 1x 5N, 1x10N, 2x20N Measurement of frictional force by means of in-built strain gage force transducer
5	Frictional force resolution	$\leq 10\text{mN}$
6	Transparent protective	cover in high resistance polycarbonate with 2 windows for manipulating
7	Software	<p>Direct real -time display of the different testing parameters: friction force, friction coefficient, rotating speed, tangential speed, travelled course, number of cycles, calculated channel(defined by user) values, and signals from external devices (if included):temperatures, electric contact resistance</p> <p>Selection of the control commands. Rotating speed, number of cycles, etc.</p> <p>Testing and acquisition parameters control.</p> <p>Programming of Testing Methods (sequences, parameters) defined by the user, with parameter inputs and including the possibility of generating cyclic tests.</p> <p>Capable of continuous and alternative modes (cyclic linear and rotary),</p> <p>Graphical representation of the testing data</p> <p>Data exportation to Excel</p> <p>Configuration software module to re-configure equipment for additional options or sensors (user accessible).</p> <p>Programmable alarms and limits.</p>

C. M. M.

(item #30)

Three Roll Mills

S.No.	Description	Detail
1	Roller Material	Stainless Steel / Ceramic (Alumina)
2	Diameter of Roller	2.5" (65mm)
3	Length of Roller	5.0" (127mm)
4	Roller Speed Ratio (Fixed)	1:2:4
5	Speed of Roller RPM	Slow Roller 0~108 Middle Roller 0~216 Fast Roller 0~432
6	Power	3/4HP / .55kW
7	Voltage	220V 50 Hz (10% voltage fluctuation allowed)
8	Throughput	0.75-3.75 G/Hr or 6-30 LBS / Hr
9	Safety Features	Emergency pull cord Large mushroom style emergency stop button Easily accessible stop and start buttons VFD enabled slow-speed wash-up operation Nip guard (optional)
10	Features	Stainless steel rollers are precision ground 420J2 stainless steel to prevent rust or erosion. The hardness is rated at HR50-60 for reliable long-life usage. Rolls are cored for either cooling for heating. Manifold, valve, and collection tank are standard. Rollers are ground to 5µm concentricity and 0.5µm surface finish for precise applications

Q m 12

(Item # 32)

Split Hopkinson Pressure Bar

S.No.	Description	Detail
1	Type of test	Dynamic Compression Loading
2	Bar Material	1 AL-7075
3	Bar Diameter	18mm
4	Incident Bar Length	1900mm
5	Transmitter Bar Length	850mm
6	Strike Bar Length Range	100,200,300,400,600 mm
7	Throw-Off Bar Length	1200mm
8	Guide Barrel Length	2600mm
9	Gas Gun Reservoir Volume	25 Liter
10	Gas Gun Reservoir Pressure	2 MPa
11	Approximately System Dimension	Width 600mm Height 1500mm Length 9000mm
12	Computer and Dynamic Signal Acquisition Package	4 Channels
13	Dynamic Strain Amplifier	2 Channels
14	Foil Strain Gage	20pcs

W. M. H. 2

(Item #34)

Composite Hardness Tester

S.No.	Description	Detail
1	Range of Application	Rockwell Plastics/Composite (HR α (Alpha), ISO 2039-2, ASTM D785) Scales: E, L, M, R Ball Indentation Plastics (ISO 2039-1) Rockwell for Soft Metal According to ISO 6508, ASTM E18 Scales: A B C D E F G H K L M N P R S T V W X Y
2	Force Range	Preload 3kg, 10kg For Rockwell 15, 30, 45, 60, 100, 150 kg Rockwell Plastics/Composite 60, 100 kg
2	Loading technology	Closed loop force control
3	Loading control (application, holding, and removal)	Automatic
4	Resolution	0.1
5	Preload setting	with optical and acoustic indication
6	Starting test action	Automatic
7	Power supply	240 V (50- 60 Hz)
8	Accreditation / Quality / Traceability	UKAS / ISO 17025 / UKAS
9	Vertical Space	250mm
10	Horizontal Space	150mm
11	Indenter for Plastics/Composite and Soft Metals	1/2" \varnothing ball (UKAS certified) 1/4" \varnothing ball (UKAS certified) Rockwell Diamond indenter (UKAS certified) 1/16" \varnothing ball (UKAS certified) Ball indenter 1/8" \varnothing (UKAS certified)
12	Anvil	114mm diameter hardened and ground anvil 230mm x 150mm rectangular hardened and ground anvil 6mm diameter spot and vee anvil for 6-30mm diameter specimens
13	Certification	BS EN ISO 6508-2, ASTM E18, UKAS
14	Test Blocks	UKAS Certified according to the following Scales and Hardness Values HRA Hardness Value 56 HRB Hardness Value 92 HRE Hardness Value 100, 90, 75 HRL Hardness Value 123, 120, 118 HRM Hardness Value 118, 112, 107 HRR Hardness Value 126, 123, 112

W. Mair

25m 36	Stable temperature Ceramic Hot Plate	<ul style="list-style-type: none"> • Sensor for medium temperature control • Rpm range from 0 to 1500 rpm • Max temperature of heating plate should be 550 °C • Low temperature stability • Heating Temperature display on LED • Speed display • Heating protection • Maximum Stirring Quantity 10L
25m 37	Digital Dual-Range Mixer	<p>Suitable for a variety of mixing applications</p> <p>Four-blade propeller, stand, clamps</p> <p>Digital display</p> <p>Possibility of adjustment for impeller depth</p> <p>Maintenance-free motor rated for continuous duty</p> <p>Min speed (rpm) 100 or lower</p> <p>Max speed (rpm) 1800 or higher</p> <p>Viscosity (cp) range: 8000-12,000</p> <p>Control using touch panel</p>
25m 38	Micro-sieve	<p>For filtration of particles/microcapsules</p> <p>Membrane Size range: 1 to 150 mm,</p> <p>Membrane Thickness: 0.1 to 5 µm</p> <p>Pore Size range: 0.1 to 100 µm</p> <p>Membrane Material: Ceramic or equivalent</p> <p>Temperature Resistance: -50 to 700°C</p> <p>Inert to organic solvents</p>
25m 39	Ultra-tube disperser	<p>To disperse, stir and homogenize</p> <p>Type: Tube or sonicator</p> <p>Tank Volume max: 16 Liters or more</p> <p>Ultrasound frequency: 30 KHz or higher</p> <p>Speed (rpm) 400-6000</p> <p>Carrying handles</p> <p>Adjustable test duration</p>
25m 50	Compressor	<p>Pressure up to 7 bar or more</p> <p>Power: 0.46 HP</p> <p>Voltage 220v</p>

(Signature)

Item # 47

Dynafil ME+ Universal Filament yarn tester *OR Equivalent*

NTU

Pre-selectable extension

Gauge length between the godets upto 1000 mm;

Electrically heated temperature upto 450 C

Automatic traversing for yarn introduction to the heater

Load cells (1000cN or higher)

Yarn Speed Upto 900m/min

PC System for controlling Test Processes

Pre-tensioning device

Standard

ASTM D5344

Item # 46

Favimat+ROBOT2 Fully Automatic *OR Equivalent*

NTU

Measurement of linear density with the vibration method

Continuously adjustable gauge length

Measuring range up to 220 cN,

Static tensile test

Cyclic load testing,

Creep- and relaxation trials

Linear-density measuring system

W *100*

(item #48)
Con Calorimeter

S.No.	Description	Detail
1	Testing Standards	ASTM E 1354, ASTM E 1474, ASTM E 1550, ASTM E 1740, ASTM D 5484, ASTM D 6113, NFPA 271, NFPA 264, CAN ULC 135, BS 476 part 15, ISO 5660
2	Cone Heater	Tubular heater element (original and spare) rated at 5000 Watts at 230 Volts conically wound to a truncated cone shape producing uniform irradiances of up to 100kW/m ² measured 1 inch below heater face over the 100 mm x 100 mm specimen exposure area. The heater temperature is monitored and controlled by three (3) type K thermocouples and a 3-term PID temperature control.
3	EXHAUST SYSTEM	ALL PARTS Stainless steel construction of combustion area hood, duct, orifice plate, exhaust blower and gas sampling ring probe. Variable speed blower having a nominal flow rate of 0.024 m ³ /s. Thermocouple temperature measurement and calibrated pressure transducer for determining exhaust flow rate.
4	WEIGH SYSTEM	Total range of 6 kg., Accuracy ± 0.01 g., No effects of temperature to weigh system reading, Computerized calibration and scaling.
5	SPECIMEN HOLDERS	3 each, stainless steel construction, Accommodate specimens 100 mm x 100mm x 50 mm thick.
6	SMOKE MEASURING SYSTEM	Main beam and Reference beam (compensation) detectors, Absorptive type (non-film) 0.3 O.D and 0.8 O.D neutral density calibration filters, Computerized calibration and scaling.
7	HEAT RELEASE CALIBRATION	Calibration burner for burning pure methane to calibrate heat release measurement (determine C- factor), Calibrated Mass flow controller used to control gas flow, Computerized automatic adjustment of gas flow to user set energy level
8	HEAT FLUX METER	Computerized procedure for setting exposure irradiance of specimen under test, NIST traceable calibration
9	SOFTWARE	Auto calibration, software is Microsoft (MS) Windows compatible. Fast data acquisition scanning – Collection and recording of test data a minimum rate of 4 scans per second (250 milliseconds per scan, A minimum of 6 analog input channels are made available to the User to store custom scaled data channels, Standard calculations are accomplished using MS Visual Basic for Applications (VBA) macros preprogrammed in Microsoft Excel to present results as formatted reports and graphs, Macros creating reports and graphs to the ASTM 1354 and ISO 5660 Parts 1 and 2 are included with software, preprogrammed formatted reports creating: Non-standard calculations of the data, Specialized or custom reports, Specialized or custom graphs, Test Data may be transferred to any database and SPC programs capable of accepting MS Excel file data.

C. main

Item #49

Multiaxial Weaving Machine

Specifications

- To weave 3D multilayer fabrics
- Machine width: 500 cm or higher
- Yarn type: Filament yarn produced from fiber like Carbon, Kevlar, Glass etc.
- Fabric weight: 500~3000 gms / m²
- Fabric thickness: 20 mm or higher
- Number of layers: upto 20
- Picking system: Rapier picking
- Shedding system: Jacquard (individual control)
- Weft selection: 4
- Yarn tex: 200~2000 tex
- Creel capacity: 1000 or higher
- Power back up for emergency shut down in safe mode
- Real time data acquisition / analysis system (fixed)
- All parts / accessories required to make machine operational on site

