Laboratory	**Labs & Testing Section, R & D Centre for Bicycle & Sewing Machine, B-38-39, Phase-V, Focal Point, Ludhiana, Punjab**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Certificate Number	**TC-8275**	**Page 1 of 24**	
Validity	**10.01.2019 to 09.01.2021**	**Last Amended on --**	

"In view of the transition for ISO/IEC 17025:2017, the validity of this accreditation certificate will cease on 30.11.2020"

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		CHEMICAL TESTING		
I.	**METALS & ALLOYS**			
1.	**Low Alloy Steel**	Carbon	IS 8811-1998	0.02% to 1.0%
		Sulphur		0.01% to 0.07%
		Phosphorous		0.01% to 0.07%
		Silicon		0.02% to 2.05%
		Manganese		0.10% to 2.0%
		Nickel		0.10% to 3.50%
		Chromium		0.10% to 3.50%
		Molybdenum		0.05% to 1.30%
		Aluminium		0.005% to 0.70%
		Vanadium		0.02% to 0.30%
		Copper		0.02% to 0.50%
		Boron		0.0008% to 0.01%
2.	**Cast Iron** **a) Malleable Cast Iron** **b) Nodular Cast Iron**	Carbon	ASTM E1999-2018	2.0% to 3.8%
		Sulphur		0.03% to 0.16%
		Phosphorous		0.01% to 0.2%
		Silicon		0.5% to 2.8%
		Manganese		0.02% to 1.2%
		Nickel		0.05% to 0.1%
3.	**Stainless Steels**	Carbon	ASTM E1086-2014 IS 9879:2015	0.02% to 0.10%
		Sulphur		0.01% to 0.03%
		Phosphorous		0.025% to 0.03%
		Silicon		0.35% to 1.28%
		Manganese		0.4% to 1.8%
		Nickel		4.5% to 35.5%
		Chromium		11.8% to 24.5%
		Molybdenum		0.15% to 3.0%
		Titanium		0.15% to 0.48%
		Vanadium		0.06% to 0.14%

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
4.	**High Manganese Steel**	Carbon	ASTM E-2209-2013	0.7% to 1.45%
		Manganese		8.8% to 19.5%
		Phosphorous		0.03% to 0.045%
		Sulphur		0.01% to 0.08%
		Silicon		0.25% to 1.41%
		Nickel		0.5% to 1.4%
		Chromium		0.25% to 3.9%
		Molybdenum		0.02% to 2.0%
5.	**Tool Steel**	Carbon	ASTM E1086-2014 IS 9879:2015	0.7% to 1.05%
		Sulphur		0.02% to 0.04%
		Phosphorous		0.025% to 0.045%
		Manganese		0.2% to 0.4%
		Chromium		3.0% to 5.0%
		Vanadium		0.25% to 1.8%
		Molybdenum		0.25% to 9.4%
		Cobalt		0.1% to 10.0%
		Tungsten		2.0% to 20.4%
6.	**Copper Alloys**	Tin	BS EN 15079-2015	0.1% to 10.3%
		Lead		0.2% to 10.6%
		Zinc		0.2% to 38.4%
		Nickel		0.1% to 1.9%
		Phosphorous		0.025% to 0.13%
		Iron		0.05% to 2.0%
		Silicon		0.02% to 0.16%
		Manganese		0.1% to 0.77%
		Aluminum		1.7% to 6.9%
7.	**Aluminium Alloy**	Copper	ASTM E1251-2017	0.05% to 9.9%
		Magnesium		0.06% to 10.3%
		Iron		0.2% to 1.05%
		Silicon		0.1% to 13.3%
		Manganese		0.1% to 0.75%
		Nickel		0.05% to 2.1%
		Zinc		0.05% to 7.55%

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Titanium		0.03% to 0.2%
		Lead		0.06% to 0.22%
		Tin		0.06% to 0.2%

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		MECHANICAL TESTING		
I.	**METALLOGRAPHY TEST**			
1.	**Carbon & alloy steels**	Microstructure Examination	IS 7739(Part V)-1976 (RA2018) ASM Hand Book Volume-9-Metallography & Microstructures(2010)	100/250/500/1000x Qualitative
		Grain Size (Comparison Method)	IS 4748-2009 (RA2017) ASTM-E 112-2013	100x Range ASTM 1 to 10 Qualitative
		Inclusion Rating	IS 4163-2004 (RA2017) ASTM-E 45-05	100x Thin/Heavy A B C D & DS 0.5 to 3.0 Qualitative
		Depth of Decarburized layer	IS 6396-2000 (RA 2018)	100x; Range: 0.01 to 2.5mm
		Case Depth by microscopic method	IS 6416-1988 (RA 2018)	100x Range: 0.01 to 6.0mm
	Cast Irons	Microstructure of Graphite	IS 7754-1975 (RA 2018)	100x Qualitative
	Ferrous & Non-Ferrous metals & alloys	Coating thickness by microscopic method	IS 3203-1982 (RA 2016)	100x; Range:0.005 to 1.0mm
II.	**MECHANICAL PROPERTIES OF METALS**			
1.	**Ferrous & Non Ferrous Metals and alloys**	**Tensile Test**	IS 1608 P-1:2018 ASTM-A-370-2017a	

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		a) Tensile Strength b) Yield Stress c) 0.2% Proof stress d) % Elongation e) % Reduction in Area f) Vickers Hardness g) Rockwell Hardness • HRB • HRC	IS 1501(Pt-1):2013, Cl.7.3 IS 1586(Pt-1):2018	100 to 1500 N/mm² 100 to 1200 N/mm² 100 to 1200 N/mm² 2 to 60 % 2 to 60 % 150-900HV 40 to 100 HRB 20 to 65 HRC
2.	**Steel Fasteners**	Proof Load	IS 1367 PART VI-1994 (RA 2015) ASTM-A-194-2017a	1 to 950 KN
		Proof Load	IS 1367 PART VI-1994 (RA 2015) ASTM-A-194-2017a	1 to 950 KN
	Cycles – Safety Requirements			
	Cycles - Safety requirements for bicycles **- City and trekking bicycles** **- Bicycles for young adult** **- Bicycles for young children** **- Mountain bicycles** **- Racing bicycles**	Maximum Saddle Height	ISO 4210-2-2015 Cl 1.0 ISO 8098-2014 Cl 3.11 IS 10613-2014 Cl 3.5	Distance 1-1000 mm
		Sharp Edges	ISO 4210-2-2015 Cl 4.2 ISO 8098-2014 Cl 4.3 IS 10613-2014 Cl 4.1.1	Visual / Qualitative
		Security of Screws	ISO 4210-2-2015 Cl 4.3.1 ISO 8098-2014 Cl 4.4.1	Visual / Qualitative
		Minimum Failure Torque	ISO 4210-2-2015 Cl 4.3.2 ISO 8098-2014 Cl 4.4.2 IS 10613-2014 Cl 4.3.3	Torque 1-100 Nm

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Folding Bicycle Mechanism	ISO 4210-2-2015 Cl 4.3.3 ISO 8098-2014 Cl 4.4.5	Visual / Qualitative
		Quick Release Devices	ISO 8098-2014 Cl 4.4.3	Visual / Qualitative
		Foot Location Devices	ISO 8098-2014 Cl 4.4.4	Visual / Qualitative
		Protrusions	ISO 4210-2-2015 Cl 4.5 ISO 8098-2014 Cl 4.6 IS 10613-2014 Cl 4.1.2	Visual / Qualitative
		Braking Systems	ISO 4210-2-2015 Cl 4.6.1 ISO 8098-2014 Cl 4.7.1 IS 10613-2014 Cl 4.2.1	Visual / Qualitative
		Brake Lever Position	ISO 4210-2-2015 Cl 4.6.2.1 ISO 8098-2014 Cl 4.7.2.1 IS 10613-2014 Cl 4.2.2.1	Visual / Qualitative
		Brake Lever Grip Dimension	ISO 4210-4-2014 Cl 4.1.1 ISO 8098-2014 Cl 4.7.2.2.2 IS 10613-2014 Cl 4.2.2.2	Distance 0.01 to 1 00 mm
		Brake Levers Position of Applied Force	ISO 8098-2014 Cl 4.7.2.3	Force 0 .1 to 500 N
		Attachment of Brake Assembly & Cable Requirements	ISO 4210-2-2015 Cl 4.6.3 ISO 8098-2014 Cl 4.7.3 IS 10613-2014 Cl 4.2.2.3	Force 0 .1 to 500 N
		Brake Block & Brake Pad Assemblies-Security Test	ISO 4210-4-2014 Cl 4.3 ISO 8098-2014 Cl 4.7.4.2 IS 10613-2014 Cl 4.2.2.4	Force 0.1 to 500 N
		Brake Adjustment	ISO 4210-2-2015	Visual /

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			Cl 4.6.5 ISO 8098-2014 Cl 4.7.5 IS 10613-2014 Cl 4.2.2.5	Qualitative
		Hand Operated Braking System-Strength Test	ISO 4210-4-2014, Cl 4.4 ISO 8098-2014, Cl 4.7.7.2 IS 10613-2014, Cl 4.2.4.1	Force 0.1 to 500 N
		Back Pedal Braking System-Strength Test	ISO 4210-4-2014 Cl 4.5 ISO 8098-2014 Cl 4.7.6 & 4.7.7.4 IS 10613-2014 Cl 4.2.3	Force 0 .1 to 500 N
		Braking performance test (dry/ wet Condition) Road test of a fully assembled bicycle	ISO 4210-4-2014 Cl 4.6.3, 4.6.5 & 4.19 ISO 8098-2014 Cl 4.7.8 IS 10613:2014 Cl 6.3	Braking Distance 1mtr to 50mtr 100N to 1000N
		Smooth Safe Stop Characteristics	ISO 4210-4-2014 Cl 4.6.5.3	Visual / Qualitative
		Handlebar-Dimensions	ISO 4210-2-2015 Cl 4.7.1 ISO 8098-2014 Cl 4.8.1 IS 10613-2014 Cl 4.3.1	Distance 350mm-1000 mm
		Handlebar Grips & Plugs Freezing Test	ISO 4210-5-2014 Cl 4.1.1 ISO 8098-2014 Cl 4.8.2.2	Visual / Qualitative
		Handlebar Grips & Plugs Hot Water Test	ISO 4210-5-2014 Cl 4.1.2 ISO 8098-2014 Cl 4.8.2.3	Visual / Qualitative
		Handlebar Stem-Insertion Depth Mark or Positive Stop	ISO 4210-2-2015 Cl 4.7.3 ISO 8098-2014 Cl 4.8.3	Distance 0.01 to 100 mm

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			IS 10613-2014, Cl 4.3.2	
		Handlebar Stem to Fork Steerer-Clamping Requirements	ISO 4210-2-2015 Cl 4.7.4	Visual / Qualitative
		Steering Stability	ISO 4210-2-2015 Cl 4.7.5 ISO 8098-2014 Cl 4.8.4 IS 10613-2014 Cl 4.3.4	Visual / Qualitative
		Handlebar – stem lateral bending test	ISO 4210-5-2014 Cl 4.2	0.01 to 10mm Permanent Deformation
		Handle – stem assembly lateral bending test	ISO 4210-5-2014 Cl 4.3 ISO 8098-2014 Cl 4.8.5.1	0.01 to 10mm Permanent Deformation
		Handle – stem forward bending test	ISO 4210-5-2014 Cl 4.4 ISO 8098-2014 Cl 4.8.5.2	0.01 to 10mm Permanent Deformation
		Handlebar to handlebar stem torsional security test	ISO 4210-5-2014 Cl 4.5 ISO 8098-2014 Cl 4.8.5.3	Qualitative
		Handlebar stem to fork Steerer torsional security test	ISO 4210-5-2014 Cl 4.6 ISO 8098-2014 Cl 4.8.5.4	Qualitative
		Bar – end to handlebar torsional security test	ISO 4210-5-2014 Cl 4.7	Qualitative
		Aerodynamic extensions to handle bar – Torsional security test	ISO 4210-5-2014 Cl 4.8	Qualitative
		Handlebar and stem assembly fatigue test	ISO 4210-5-2014 Cl 4.9 ISO 8098-2014 Cl 4.8.6 IS 10613-2014 Cl 4.3.6	Qualitative

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Frame & front fork assembly - impact test (falling mass)	ISO 4210-6-2015 Cl 4.1 ISO 8098-2014 Cl 4.9.1 IS 10613-2014 Cl 4.4.1	1 to 60mm Permanent Deformation
		Frame & front fork assembly - impact test (falling frame)	ISO 4210-6-2015, Cl 4.2 ISO 8098-2014 Cl 4.9.2 IS 10613-2014 Cl 4.4.2	1 to 40mm Permanent Deformation
		Frame – fatigue test with pedaling forces	ISO 4210-6-2015 Cl 4.3	Qualitative
		Frame – fatigue test with horizontal forces	ISO 4210-6-2015 Cl 4.4	Qualitative
		Frame – fatigue test with vertical forces	ISO 4210-6-2015 Cl 4.5	Qualitative
		Suspension Fork-Tyre Clearance Test	ISO 4210-6-2015 Cl 5.1	Qualitative
		Suspension Fork-Tensile Test	ISO 4210-6-2015 Cl 5.2	Qualitative
		Front fork static bending test	ISO 4210-6-2015 Cl 5.3	0.01 to 10mm Permanent Deformation
		Front fork rearward impact test	ISO 4210-6-2015 Cl 5.4	1 to 50mm Permanent Deformation
		Front fork bending fatigue test	ISO 4210-6-2015 Cl 5.5 ISO 8098-2014 Cl 4.10.2 IS 10613-2014 Cl 4.5.2	Qualitative
		Fork for hub/ disc brake – static brake torque test	ISO 4210-6-2015 Cl 5.6.2	0.01 to 10mm Permanent Deformation
		Fork for hub/ disc brake – brake mount fatigue test	ISO 4210-6-2015 Cl 5.6.3	Qualitative
		Tensile Test of Non-	ISO 4210-6-2015	Visual /

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Welded Fork	Cl 5.7	Qualitative
		Wheel Tyre Assembly-Concentricity Tolerance & Lateral Tolerance	ISO 4210-7-2014, Cl 4.1 ISO 8098-2014 Cl 4.11.1.2 & .3 IS 10613-2014, Cl 4.6.1.1 IS 10613-2014, Cl 4.6.1.2	Tolerance 0.01 to 2mm
		Wheel/Tyre Assembly-Clearence	ISO 4210-2-2015 Cl 4.10.2 ISO 8098-2014 Cl 4.11.2 IS 10613-2014 Cl 4.6.2	Clearance 0.01 to 20.0mm
		Wheel/ tyre assembly static strength test	ISO 4210-7-2014 Cl 4.2 ISO 8098-2014 Cl 4.11.3	0.01 to 5.0mm Permanent Deformation
		Front/ rear wheel retention test	ISO 4210-7-2014 Cl 4.3 ISO 8098-2014 Cl 4.11.4.2 & .3	Qualitative
		Wheels-Quick Release Devices Operating Features	ISO 4210-2-2015 Cl 4.10.5	Force 0.1 to 500 N
		Tyre Inflation Pressure	ISO 4210-2-2015 Cl 4.11.2 ISO 8098-2014 Cl 4.12.1	Visual /Qualitative
		Front Mudguard-Radial Force Test	ISO 4210-3-2014 Cl 4.2.1 & .2	Force 0 .1 to 200 N
		Pedal-Tread Surface	ISO 4210-2-2015 Cl 4.13.1.1 IS 10613-2014 Cl 4.8.1.1	Visual / Qualitative
		Pedal-Toe Clips	ISO 4210-2-2015 Cl 4.13.1.2	Visual / Qualitative

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Pedal-Ground Clearance	ISO 4210-2-2015 Cl 4.13.2.1 ISO 8098-2014 Cl 4.13.2.1 IS 10613-2014, Cl 4.8.2.1	Visual / Qualitative
		Pedal-Toe Clearance	ISO 4210-2-2015 Cl 4.13.2.2 ISO 8098-2014 Cl 4.13.2.2 IS 10613-2014 Cl 4.8.2.2	Distance 1 to 200 mm
		Pedal/ pedal – spindle assembly - static strength test	ISO 4210-8-2014 Cl 4.1	Qualitative
		Pedal/ pedal – spindle - dynamic durability test	ISO 4210-8-2014 Cl 4.3 ISO 8098-2014 Cl 4.13.4	Qualitative
		Pedal Impact Test	ISO 4210-8-2014, Cl 4.2	Qualitative
		Drive system static strength test	ISO 4210-8-2014 Cl 4.4 ISO 8098-2014 Cl 4.13.5 IS 10613-2014 Cl 4.8.3	Qualitative
		Crank assembly fatigue test	ISO 4210-8-2014 Cl 4.6 ISO 8098-2014 Cl 4.13.6	Qualitative
		Chain Wheel & Belt Drive Protective Device	ISO 4210-2-2015 Cl 4.15.2 & 4.15.3	Distance 0.01 to 100 mm
		Combined Front Gear-Change Guide	ISO 4210-2-2015 Cl 4.15.4	Distance 0.01 to 100 mm
		Saddle & Seat Post-Limiting Dimensions	ISO 4210-2-2015 Cl 4.16.1 ISO 8098-2014 Cl 4.14.1 IS 10613-2014	Distance 1 to 200 mm

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			Cl 4.9.1	
		Seat Post-Insertion Depth Mark or Positive Stop	ISO 4210-2-2015 Cl 4.16.2 ISO 8098-2014 Cl 4.14.2 IS 10613-2014 Cl 4.9.2	Distance 0.01 to 200 mm
		Spoke Protector	ISO 4210-2-2015, Cl 4.17 IS 10613-2014, Cl 4.12	Visual / Qualitative
		Saddle/ seat post security test	ISO 4210-9-2014 Cl 4.2 ISO 8098-2014 Cl 4.14.3	Qualitative
		Saddle - static strength test	ISO 4210-9-2014 Cl 4.3 ISO 8098-2014 Cl 4.14.4	Qualitative
		Saddle and seat post clamp fatigue test	ISO 4210-9-2014 Cl 4.4 ISO 8098-2014 Cl 4.14.5	Qualitative
		Seat post – fatigue test	ISO 4210-9-2014 Cl 4.5.2	Qualitative
		Seat post – static strength test	ISO 4210-9-2014 Cl 4.5.3	Qualitative
		Wiring Harness	ISO 4210-2-2015 Cl 4.20.2 ISO 8098-2014 Cl 4.18.3 IS 10613-2014 Cl 4.13.2	Visual / Qualitative
		Warning Device	ISO 4210-2-2015 Cl 4.21 ISO 8098-2014 Cl 4.19 IS 10613-2014 Cl 4.16	Visual / Qualitative
		Chain Guard	ISO 8098-2014, Cl 4.15	Visual /

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			IS 10613-2014, Cl 4.11	Qualitative
		Stabilizers-Mounting & Dismounting	ISO 8098-2014 Cl 4.16.1	Visual / Qualitative
		Stabilizers-Dimensions	ISO 8098-2014 Cl 4.16.2	Distance 1-300 mm
		Stabilizers-Vertical Load Test	ISO 8098-2014 Cl 4.16.3.2	Permanent Set 1 to 50 mm
		Stabilizers-Longitudinal Load Test	ISO 8098-2014 Cl 4.16.4.2	Permanent Set 1 to 50 mm
	Bicycle Frame, Bicycle Front Fork & Steel tubes	Dimensions Steel tubes for Bicycle frame & Front Fork	IS 623:2008 Cl 4.1 IS 2039 Cl 9.1 & 9.2 IS 2061:2008 Cl 4.0	0.01 to 50 mm
	Bicycle Frame, Front Fork, Mudguard and Cycle Rubber Tubes	Screw Threads	IS 623:2008 Conform to IS 1131, IS 1132, IS 1133 and IS 1134	Visual / Qualitative
		Tests Trueness of Frame	IS 623:2008 Cl 7.1	Visual / Qualitative
		Impact Test on Frame-Fork Assembly (falling mass)	IS 623:2008 Cl 7.2.1 IS 2061:1995 Cl 7.1.4.1	Range 1-40 mm Permanent Deformation
		Frame & front fork assembly - impact test (falling frame and fork asembly)	IS 623:2008 Cl 7.2.2 IS 2061:1995 Cl 7.1.5.1	Qualitative
		Test for finish, Workmanship and Manufacture	IS 623:2008 Cl 5.0, Cl 6.0, Cl 7.3.1 & 7.3.2	Qualitative

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			IS 2061:1995, Cl 5.1, Cl 7.1.3.1 IS 6218:2008 Cl 4.1, 4.2 & 4.3 IS 2415:2015 Cl 6.7.1, 6.7.2, 6.7.3 & 6.7.4	
	Bicycle Frame, Front Fork, Mudguard and Cycle Tyres, Rubber Tubes , Cycle chains, Short-Pitch Transmission Precision Roller and Bush Chains, Attachments And associated Chain Sprockets	Marking	IS 623:2008 Cl 8.0 IS 2061:1995 Cl 8.1 IS 6218:2008 Cl 6.1 IS 2414:2005 Cl 9.1 IS 2415:2015 Cl 7.1, 7.2 & 7.2.1 IS 15511:2004 Cl 4.7 IS 2403:2014 Cl 3.5	Qualitative
	Steel Tubes for Bicycle And Cycle Rickshaws	Tensile strength, Yield strength and % Elongation Properties	IS 2039 (Part 2):1991 Cl 3.2.1	100 to 1500 N/mm² 100 to 1200 N/mm² 2 to 60%
	Bicycle – Front Forks	Drift Expansion Test	IS 2039 (Part 2):1991 Cl 3.2.2	Visual / Qualitative
		Flattening Test	IS 2039 (Part 2):1991 Cl 3.2.2	Visual / Qualitative
		Load test	IS 2061:1995 Cl 7.1.1	0.01 to 10mm Permanent Deformation
		Expansion test	IS 2061:1995 Cl 7.1.2	Visual / Qualitative
	Bicycle –	Tests	IS 6218:2008	Qualitative

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Mudguards		Cl 5.1, 5.2 & 5.3	
	Cold Reduced Low Carbon Steel Sheet and Strip 0.2 – 2.0mm	Tensile test	IS 513:2008 Cl 7.1.1 IS 1608	100 to 1500 N/mm²
		Cupping test	IS 513:2008 Cl 7.2.1 IS 10175 (Part 1)	0.05 to 2.0mm
		Bend Test	IS 513:2008 Cl 7.4.1	Qualitative
	Cycle and Rickshaw Pneumatic Tyres	Types & Designation	IS 2414:2005 Cl 4.1, 4.1.1 & 4.2	Qualitative
		Dimensions	IS 2414:2005 Cl 5.1	Qualitative
		Crown Thickness	IS 2414:2005 Cl 5.2	0.001 to 25 mm
		Requirements	IS 2414:2005 Cl 6.1, 6.2 & 6.3 IS 7133:1985 IS 11573:	Qualitative
		Breaking Load of Bead Wire Joint	IS 2414:2005 Cl 6.4 & 6.4.1 IS 4824:2006	0.0 to 10000N
		Requirements for the rubber compound	IS 2414:2005 Cl 6.5.1 to 6.5.3	1 to 25Mpa
		Adhesion Test	IS 2414:2005 Cl 8.7	10 to 200N
		Tyre Performance Test	IS 2414:2005 Cl 6.7	Qualitative
		Dimensions	IS 2414:2005 Cl 8.1.1, 8.1.2, 8.1.3 & 8.1.4	0.01-200 mm
		Cord Strength	IS 2414:2005, Cl 8.2 IS 4910 (Part 3)	1-200N
		Casing Strength	IS 2414:2015	10-10000N

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Cycle – Rubber Tubes (Moulded / Jointed)	Classification	IS 2415:2015 Cl 4.1	Qualitative
		Designation	IS 2415:2015 Cl 4.2	Qualitative
		Flat length and Flat Width	IS 2415:2015 Cl 5.1	1-1100mm
		Thickness	IS 2415:2015 Cl 5.2 & 5.2.1	0.01-10mm
		Tensile Strength and Elongation at Break	IS 2415:2015 Cl 6.1	1-25Mpa
		Tension Set	IS 2415:2015 Cl 6.2	0.01-200mm
		Ageing Test	IS 2415:2015 Cl 6.3	1-40%
		Joint Adhesion Strength	IS 2415:2015 Cl 6.4.1, 6.4.2 & 6.4.3	1-15000N/m
		Leak Test	IS 2415:2015 Cl 6.5	Qualitative
		Valve Test	IS 2415:2015 Cl 6.5 IS 532:2006	0.01 to 50mm
	Short-Pitch Transmission Precision Roller and Bush Chains, Attachments And associated Chain Sprockets , Cycle Chains	Designation	IS 2403:2014 Cl 3.2 IS 15511:2004 Cl 4.1	Qualitative
		Dimensions	IS 2403:2014 Cl 3.3 IS 15511:2004 Cl 4.2	0.01 to 50mm
		Tensile testing	IS 2403:2014 Cl 3.4.2 IS 15511:2004, Cl 4.3	1 to 12000N
		Preloading	IS 2403:2014, Cl 3.4.3	Qualitative

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			IS 15511:2004, Cl 4.5	
		Length Validation	IS 2403:2014, Cl 3.4.4 IS 15511:2004, Cl 4.6	0.01 to 10mm
		Push-out Force	IS 15511:2004, Cl 4.4	1-2500N
		Determination of Twist	IS 15511:2004, Cl 5.0	Qualitative
		Determination of Lateral deviation	IS 15511:2004, Cl 6.0	Qualitative
		Detection of a Stiff link	IS 15511:2004, Cl 7.0	Qualitative
		Determination of side bow	IS 15511:2004, Cl 8.0	1-150mm
	Household Sewing Machine-General Requirements (Fourth Revision)	Driving Arrangements	IS 1610-2018, Cl.3.0	
		Hand Operated Machine	IS 1610-2018, Cl.3.1 further referred IS 13192-1991, Cl.6.0, Cl.7.0 (7.1 to 7.3), Cl.8.0 (8.1 to 8.11)	5mm to 120mm
		Foot Operated Machine	IS 1610-2018, Cl.3.2	Qualitative
		Motor Driven Sewing Machine	IS 1610-2018, Cl.3.3 (3.3.1.1 to 3.3.1.3)	Qualitative
		Sewing Mechanism	IS 1610-2018, Cl.4	
		Design	IS 1610-2018, Cl.4.1	4mm to 6.5mm
		Reverse Stitch Mechanism	IS 1610-2018, Cl.4.2	Qualitative
		Stich regulator	IS 1610-2018, Cl.4.2.1 Further referred to IS 13872-1993 (RA 1998), Cl.4, Cl.6, Cl.7 (7.1 to 7.3)	5mm to 15mm
		Thread Tension	IS 1610-2018, Cl.4.3	Practical observation, Visual
		Timing	IS 1610-2018, Cl.4.4	Visual / Qualitative
		Fly wheel	IS 1610-2018, Cl.4.5 Further referred to IS 12798-1989, Cl.5.0,Cl.6.0, Cl.7.0 (7.1 to 7.4) Cl7.3 further referred to IS	0.5mm to 160mm

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			1068:1985	
		Bobbin Winder	IS 1610-2018, Cl.4.6 Further referred to IS 13972-1994, CL.5.0,Cl.6.0,Cl.7.0 (7.1 to 7.3),Cl.8.0 (8.1 & 8.2), Cl.9.0 (9.1 to 9.8), Cl.11.0 (11.1 to 11.4)	5mm to 50mm
		Thread Spool Pin	IS 1610-2018, Cl.4.7	Visual / Qualitative
		Lubrication	IS 1610-2018, Cl.6	Visual / Qualitative
		Table/Base/Stand	IS 1610-2018, Cl.7.0	
		Table/Base/Stand	IS 1610-2018, Cl.7.1	Visual / Qualitative
		Wooden Table or base	IS 1610-2018, Cl.7.2 further referred IS 12789-1989 (RA-1998), Cl.3.0, 3.1(a), 3.1(b), 3.1(c), Cl.4.0, 4.1, Cl.5.0 (5.1 to 5.7), 6.0 (a to g) Cl.7.0-fig.3 (7.1,7.2,7.3), Cl.8.0 (a to c), Cl.9.0, Cl.10, Cl.11 (11.1a to 11.1c), Cl.12 (12.1 to 12.4)	0.3mm to 400mm
		Table/Base-Other Material	IS 1610-2018, Cl.7.3	Visual / Qualitative
		Stand	IS 1610-2018, Cl.7.4 further referred IS 12740-1989 (RA-1998) Cl.6.0 (6.1), Cl.7.0 (7.1 to 7.10), Cl.8.0	0.3mm to 400mm
		Workmanship & Finish	IS 1610-2018, Cl.8.0 (8.1 & 8.2)	Visual / Qualitative
		Plating	IS 1610-2018, Cl.8.3 further referred IS 1068 (a,b,c,d,e)	Visual, Coating Thickness Gauge

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Tests	IS 1610-2018, Cl.10.0	
		Accuracy requirements	IS 1610-2018, Cl.10.1 further referred to IS 7491-1989 Cl.2 (2.1 & 2.2)	0.3mm to 10mm
		Sewing Requirements	IS 1610-2018, Cl.10.2 Further referred to IS 7492-1989 Cl.3(3.1) Cl.4(4.1)	0.01mm to 10mm
		Durability requirements	IS 1610-2018, Cl.10.3 further referred to IS 7493-1989 Cl.3(3.1 & 3.2) Cl.4(4.1 & 4.2)	0.01mm to 10mm
		Accessories in Service Box	IS 1610-2018, Cl.11.0, Cl.11.1 (a to h)	Visual / Qualitative
		Marking	IS 1610-2018, Cl.12.0 (12.1 & 12.2)	Visual / Qualitative
	Household Sewing Machine Head- General Requirements	Sewing Mechanism	IS 14769-2000, Cl.3.0	
		Design	IS 14769-2000, Cl.3.1	0.5mm to 100mm
		Reverse Stitch Mechanism	IS 14769-2000, Cl.3.2	Visual
		Stich regulator	IS 14769-2000, Cl.3.2.1 further referred to IS 13872-1993 (RA 1998), Cl.4,Cl.6, Cl.7 (7.1 to 7.3)	5mm to 15mm
		Thread Tension	IS 14769-2000, Cl.3.3	Practical observation, Visual
		Timing	IS 14769-2000, Cl.3.4	Visual / Qualitative
		Fly wheel	IS 14769-2000, Cl.3.5 further referred to IS 12798-1989, Cl.5.0,Cl.6.0, Cl.7.0 (7.1 & 7.4), Cl.7.3 further referred to IS	0.5mm to 160mm

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			1068:1985	
		Bobbin Winder	IS 14769-2000, Cl.3.6 further referred to IS 13972-1994, Cl.5.0, Cl.6.0, Cl.7.0 (7.1 to 7.3), Cl.8.0 (8.1 & 8.2), Cl.9.0 (9.1 to 9.8), Cl.11.0 (11.1 to 11.4)	5mm to 50mm
		Thread Spool Pin	IS 14769-2000, Cl.3.7	Visual / Qualitative
		Other Components	IS 14769-2000, Cl.4, 4.1	Visual / Qualitative
		Lubricant	IS 14769-2000, Cl.5 , 5.1	Visual / Qualitative
		Workmanship & Finish	IS 14769-2000 Cl.6, (6.1 & 6.2)	Visual + Oven (temp. up to 100°C)
		Plating	IS 14769-2000, Cl.6.3 (a,b,c,d,e) further referred to IS 1068	
		Test	IS 14769-2000, Cl.8	
		Accuracy requirements	IS 14769-2000, Cl.8.1 further referred to IS 7491:1989 Cl.2(2.1 & 2.2)	0.01mm to 10mm
		Sewing Requirements	IS 14769-2000, Cl.8.2 further referred to IS 7492 :1989 Cl.3 (3.1) Cl.4 (4.1)	0.01mm to 10mm
		Durability Requirements	IS 14769-2000, Cl.8.3 further referred to IS 7493 : 1989 Cl.3 (3.1 & 3.2) Cl.4 (4.1 & 4.2)	0.01mm to 10mm
		Marking	IS 14769-2000, Cl.9 (9.1)	Visual / Qualitative
		BIS Certification Marking	IS 14769-2000, Cl.9.2	Visual / Qualitative

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	General requirements for light duty sewing machine heads for industrial use	Construction and function	IS 12109-1987, Cl.2 (2.2 to 2.7)	0.5 to 10mm
		Finish	IS 12109-1987, Cl.3 (3.1 & 3.2), IS 3203-1982	Visual / Qualitative
		Sewing Mechanism	IS 12109-1987, Cl.4.0	
		Reverse Stitching	IS 12109-1987, Cl.4.1	Visual / Qualitative
		Stich regulator	IS 12109-1987, Cl.4.2	0.01mm to 50mm
		Balance Wheel	IS 12109-1987, Cl.4.3	Visual / Qualitative
		Thread Tension	IS 12109-1987, Cl.4.4	Visual / Qualitative
		Lubrication	IS 12109-1987, Cl.5	Visual / Qualitative
		Accuracy Requirement	IS 12109-1987, Cl.6 (6.1 & 6.2)	0.02mm to 10mm
		Durability Requirement	IS 12109-1987, Cl.7	0.02mm to 10mm
		Sewing Requirements	IS 12109-1987, Cl.8(8.1 to 8.5)	0.05mm to 10mm
		Accessories	IS 12109-1987, Cl.9	Visual / Qualitative
		Marking	IS 12109-1987, Cl.10 (10.1 & 10.2)	Visual / Qualitative
	Household Zig-Zag Sewing Machine head (Part 1- General requirements)	Sewing Mechanism	IS 15449(Part 1)-2004, Cl.3	
		Design	IS 15449(Part 1)-2004, Cl.3.1	Visual / Qualitative
		Reverse Stitching Mechanism	IS 15449(Part 1)-2004, Cl.3.2	Visual / Qualitative

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Stitch length regulator	IS 15449(Part 1)-2004, Cl.3.2.1	Visual / Qualitative
		Thread Tension and releasing	IS 15449(Part 1)-2004, Cl.3.3	Visual / Qualitative
		Timing	IS 15449(Part 1)-2004, Cl.3.4	Visual / Qualitative
		Flywheel and stop motion screw	IS 15449(Part 1)-2004, Cl 3.5	Visual / Qualitative
		Bobbin Winder	IS 15449(Part 1)-2004, Cl.3.6	Running test
		Spool Pin	IS 15449(Part 1)-2004, Cl.3.7	Visual / Qualitative
		Stitch width selector	IS 15449(Part 1)-2004, Cl.3.8	0.02mm to 10mm
		Needle position selector	IS 15449(Part 1)-2004, Cl.3.9	Visual / Qualitative
		Lubrication	IS 15449(Part 1)-2004, Cl.5	Visual / Qualitative
		Workmanship and Finish	IS 15449(Part 1)-2004, Cl.6 ,(6.1)	Visual / Qualitative
		Painting	IS 15449(Part 1)-2004, Cl.6.2 (a,b,c), Cl.6.3 (a,b,c,d,e,f)	Visual + Oven (temp. up to 100°C)
		Plating	IS 15449(Part 1)-2004, Cl.6.4 (a,b,c), Cl 6.5 & 6.6	Visual / Qualitative
		Plastic Parts	IS 15449(Part 1)-2004, Cl.6.7 (a,b,c,d), Cl.6.8 & 6.9	Visual / Qualitative
		Tests	IS 15449(Part 1)-2004, Cl.8	
		Accuracy requirements	IS 15449(Part 1)-2004, Cl.8.1 Further referred to IS 15449 (Part 2)	0.01mm to 10mm

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			Cl.2 (2.1 & 2.2)	
		Sewing requirements	IS 15449(Part 1)-2004, Cl8.2 further referred to 15449 (Part 3) Cl.3.0, Cl.4.0 (a to j)	0.01mm to 10mm
		Durability Requirements	IS 15449(Part 1)-2004, Cl.8.3 further referred to IS 15449 (Part 4) Cl.3 (3.1 & 3.2), Cl.4	0.01mm to 10mm
		Accessories in service box	IS 15449(Part 1)-2004, Cl.9 (9.1 & 9.1.1)	Visual / Qualitative
		Marking	IS 15449(Part 1)-2004, Cl.10 (10.1 & 10.2)	Visual / Qualitative

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		PHOTOMETRY TESTING		
I.	**GLASSES / MIRRORS**			
1.	**Retro-reflective devices Bicycle Reflectors - Front Reflector (Transparent/ White in Colour) -Side Reflector (Yellow in Colour) -Pedal Reflector (Yellow in Colour) -Rear Reflector (Red in Colour)**	**Physical Requirements**		
		Temperature resistance test	IS/ISO 6742-2-2015, Cl 7.1.2.2	Qualitative
		Impact test	IS/ISO 6742-2-2015, Cl 7.1.2.3	Qualitative
		Moisture resistance test	IS/ISO 6742-2-2015, Cl 7.1.2.4	Qualitative
		Resistance to Fuels	IS/ISO 6742-2-2015, Cl 7.1.2.5	Qualitative
		Resistance to Lubricating oils	IS/ISO 6742-2-2015, Cl 7.1.2.6	Qualitative
		Photometrical requirements	IS/ISO 6742-2-2015, Cl 5	Entrance angle - 50 to +50 ° Observation angle 0°12', 0°20' & 1°30' CIL 2.5 to 2500
		Colorimetric requirements	IS/ISO 6742-2-2015, Cl 6	Qualitative