

**Provision of Data Regarding Existing Facilities/Laboratory Tests Available At
PCSIR CM&FT Centre, Daska**

S.No	Description of Services/Equipment's	Available Tests/Services in perspective Labs/Workshops.	Test Method/Capabilities
Common Facility Center (CFC), Sialkot			
1.	Emission Spectrometer (OES)	<p>Complete facility for chemical analysis of metals (ferrous and non-ferrous) on Emission spectrometer. Detection of seven elements percentages such as C, Mn, Si, Cr, Ni, P and S in ferrous metals. Ferrous metals including all grades of steels like carbon steel, low alloy steel, stainless steel, and surgical grades (AISI 410,420,304,316 etc), tool steel, high carbon steel and all type of cast Iron.</p> <p>Non-Ferrous metals include aluminum, zinc nickel and copper base alloys etc.</p>	<p>For sample preparation ASTM E1806-18</p> <p>For Low alloys steel ASTM E415-17</p> <p>For stainless steel ASTM E1086-18</p> <p>For cast iron and its types ASTM E1999</p> <p>For aluminum(Al) and its alloys- ASTM E1251-17</p> <p>For copper(Cu), zinc (Zn) and nickel(Ni) base alloys ASTM E1476-04(2014)</p>
Testing and Certification / Metallography Lab			
2.	Mounting Press	Complete facility for metallography/ structure study of metals i.e: sample	ASM Metals Handbook Vol.09

	Grinders Polisher Etchants Metallurgical Microscope	preparation, cutting, mounting, grinding, polishing, etching microscopy/structure study etc.	Metallography and microstructure
3.	Carbon Sulphur Determinator	Carbon-Sulphur determinator (CS) for determination of carbon and sulphur contents in ferrous alloys.	Range of measurement C= .02-6 % S=.002-.240 %
4.	Spectrophotometer	Spectrophotometer for chemical analysis of following ferrous and non ferrous elements: Iron, nickel, chromium, manganese, silicon, phosphorous, copper, sulphur, carbon, molybdenum and aluminum.	Optical system Modified Czerny turner monochromatic using 1200 lines/mm holographic grating blazed in UV. Accommodates photodiode Voltage 110-220 Detector CE7200 2nm WL range CE7200 0.5nm,1nm,2nm, 4nm WL accuracy $\pm 0.5\text{nm}$ WL Reproducibility $\pm 0.1\text{nm}$ WL Calibration automatic as switch on Scan Speed By Keyboard entry 1-4000nm/min Photometric display Digital display
Mechanical Testing Lab			
5.	Tensile Testing Machine	Fully equipped laboratory for testing mechanical properties: tensile strength, compression strength, shear strength, bend testing etc,	Max. Load range 4-1000KN Accuracy load $\pm 1\%$

			<p>Accuracy speed of measurement $\pm 1\%$</p> <p>Max. Ram stroke 250mm</p> <p>Max. tensile space 800mm</p> <p>Upper and lower platen 204*204</p> <p>Platen hardness 50-55 RHC</p> <p>Dimension of load frame 800*1320*2100</p> <p>Computer controlled UTM of 1000ton capacity</p>
6.	Rockwell Testing Machine	Full facility for testing hardness on HRC (0-60), HRB ferrous and non ferrous samples.	<p>Primary test force 98.07N</p> <p>Total test force 588.4N – 1471N</p> <p>Graduation indicator C: 0-100, B: 30130</p> <p>Max. Height of specimen 170mm</p> <p>Depth of throat 135mm</p> <p>Overall dimensions 466*238*630</p> <p>Net Weight 65Kg</p>
7.	Brinell Testing Machine	Full facility for testing hardness BHN ferrous and non ferrous samples.	<p>Model HB 3000B</p> <p>Range of measuring 8-650HBW</p> <p>Test force 1.839, 2.452, 7.355, 9.807, 29.42 KN(187.5, 250, 750, 1000, 3000kgf)</p>

			<p>Max. height of test specimen 230mm</p> <p>Distance between Pressure head center and machine wall 120mm</p> <p>Power supply AC 380V/220v 50/60HZ</p> <p>Dimension 700 x 268x842mm</p> <p>Weight About 210kg</p>
8.	Impact Testing Machine	Facility for impact testing i.e Toughness and resilience.	Impact testing machine for testing & evaluation of impact toughness of metallic material under dynamic load.
Sand Testing Lab			
9.	Sand Testing Equipment i.e universal sand strength machine, moisture teller, shatter index, sand reamer, sieve sand shaker.	Complete equipment for testing molding/core sand properties green strength, dry strength, shear strength, compression strength, grain size, clay contents, moisture contents and permeability etc.	<p>For ramming (AFS 2.in.Dia X 2 in specimen Preparation)</p> <p>AFS-5222-130-S</p> <p>AFS clay content AFS-2110-04-S</p> <p>AFS permeability of green sand AFS-5224-13-S</p> <p>AFS compatibility AFS-2220-00-S</p> <p>Methylene Blue Clay test AFS-2210-00-S</p> <p>Moisture determination of sand testing AFS-2216-00-S</p> <p>Sieve analysis and grain fitness number AFS-1105-12-S,AFS-1106-12-S</p> <p>Tensile strength for chemically bonded sand</p>

			<p>AFS-3301-08-S</p> <p>Wet & dry compression strength for green sand AFS-5202-09-S</p> <p>Wet tensile strength for green sand AFS-2206-12-S</p>
Machining/Production Facility			
Machine Shop -I		Capabilities	speciation's
10.	Conventional Lathe Machines (06)	Complete facility for machining/finishing metal parts/castings on lathe machines.	<p>Highly speed Lathe machine dia 12 inch</p> <p>Horizontal chuck for industrial /educational purpose</p>
11.	Conventional Milling Machines(06)	Complete facility for machining/finishing metal parts/castings on milling machines	Highly speed Horizontal milling machine for industrial /educational purpose
12.	Conventional Drilling Machines (06)	Complete facility for drilling metal parts/castings on drilling machines, etc	<p>Drilling capacity 20mm dia</p> <p>Tapping capacity M16</p> <p>No. of spindle speed 5</p> <p>Range of spindle speed 300-2400rpm</p> <p>Dia of quill 70mm Quill travel 120mm</p> <p>Spindle nose taper Mt3</p> <p>Vertical movement of worktable 750mm</p> <p>Circular table size 350mm</p>

			<p>Height from spindle nose to work piece 1150mm</p> <p>Weight of machine 220kg</p>
Machine Shop –II			
13.	Universal Tool Grinder Machine	Facility to grind/sharp tools, edges etc.	<p>Distance B/w left and right tailstock 650mm</p> <p>Max. work piece dia 250mm</p> <p>Hight of centre 130mm</p> <p>Work table travel by hand 400mm</p> <p>Max. length for cylindrical 270mm</p> <p>Worktable travel pressure 400mm</p> <p>Total power 3.15 Kw</p> <p>Overall dimension 1480*1102*1215</p> <p>Weight 1000kg</p>
14.	Surface Grinding Machine	Facility for planning surfaces of molds dies etc.	<p>Size of worktable 300x1000mm</p> <p>Max. Size of work pie. 300x400x1000mm</p> <p>Max. Weight of work piece 468Kg</p>

			<p>Worktable stroke Max. 1110mm Min 200mm Width of T- slot in worktable 18mm</p> <p>Speed of worktable (steeples)3~27m/min Distance between centre line and worktable Max. 575mm</p> <p>(Breakwater removed) Min 135mm</p> <p>Max. Stroke of grinding head 350mm</p> <p>Vertical motion 400mm</p> <p>Size of grinding wheel Outer dia 350mm</p> <p>Inner dia 127mm</p> <p>Width 40mm</p> <p>Speed of grinding wheel 1440rpm</p> <p>Manual vertical feeding Quantity per scale 0.1mm (0.00025)</p> <p>Quantity per roll 1.29mm (0.51)</p> <p>Transverse of feeding of liquid operated (manually) Continuous feeding speed 0.5~4.5m/min</p> <p>Discontinuous feed level 3~30mm</p>
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15.	CNC EDM	Facility to produce impression on dies, molds etc.	Duty of Sparking cycle 1 – 2000/48 steps Depth Command range +/- 999.999 Low Voltage Current Range 0 - 64A High Voltage Current Range 0.5 – 3.5 Eroding Range 10 – 30Ton/LV GAP Voltage Range 0 – 15 Speed of Auto Range 0 – 15 Jump up Distance Range 1 – 255 steps
16.	CNC Wire cut	Services for cutting metallic parts with precision	Work table dimension 860 * 600mm Work table traveling(x*y) 500 * 630mm Max. Thickness 400mm Max. Taper angle 6° Max. Productivity 100mm ² /min Dia of molybdenum wire 0.1-0.25mm Max. Work piece weight 1200 kgs
Machine Shop –III			
17.	CNC Lathe Machine	Facility to produce round and cylindrical parts through cutting, knurling, grinding, drilling deforming,	X Axis Travel (cross)- 200mm

		facing and turning.	Z Axis Travel (Longitudinal) 265mm Distance between centers 350mm Software Controller Boxford
18.	CNC Milling Machine	Facility to produce broader range of workpiece through face milling and peripheral milling.	X Axis Travel (Longitudinal) 304mm Y Axis Travel (cross) 157mm Z Axis Travel (Vertical) 213mm Tee slots 3x10mm 50mm centers Software Controller Boxford
19.	Band Saw Machine	Services for cutting different metallic and non metallic parts.	Saw wheel dia 700 mm Max. Work 500 mm Max. Saw thickness 250 mm Saw wheel speed 900 Rpm Feeding speed 1.8/3.7/2.8/5.8/4.7 /9.6M/min Main motor 700KW Feeding motor 0.3-0.45 KW Overall dimensions
20.	Circular Saw Machine	Services for cutting different wooden	

		parts.	
Die casting shop			
21.	Cold Chamber Die casting Machine	Complete Facility to die cast aluminum alloys by using hot chamber die casting machine. Such as aluminum hub casting and miscellaneous auto parts	Cold chamber DCC 280 melting capacity 280 ton
22.	Hot Chamber Die casting Machine	Complete facility to die cast zinc alloys, magnesium alloys, copper alloys by using cold chamber die casting machine such as: zinc tap heads and miscellaneous sanitary items.	Hot chamber DC 50 melting capacity 50 ton.
Nonferrous shop			
23.	Pit Furnace	Service for production of non ferrous castings.	100 Kg Crucible Handling
24.	Core Shooter Machine	Services for the production of quality cores uses in sanitary fittings and other miscellaneous casting /parts.	Capacity of shooting head 12 Kg Capacity of sand Hooper 80 L Core box dimension (mm) H* W * L 400*450*350 Table stroke (mm) 300 Basic cycle time 3min Required air quantity 0.5m3 Overall dimension 1650*1354*2178 Net weight 1350

			Kinds of resin suitable for the machine: phenolic resin and spasmolytol which these two kinds are mixed with the scale of 1 to 1 tertiary amine catalyze.
Heat Treatment Shop			
25.	Induction Hardening Machine	Facility for Surface hardening/case hardening for excels and other miscellaneous parts by using Induction hardening machine	<p>Input Voltage 380v</p> <p>Input current 155 A</p> <p>Output current 225A</p> <p>Output power 100Kw</p> <p>Output voltage 450 V</p> <p>Frequency 10-50 KHz</p> <p>Max. Rotary ext. dia 500mm</p> <p>Max. Length of work piece 1020mm</p> <p>Max. weight of work piece 50Kg</p>
26.	Annealing (Muffle)Furnace	Facility for annealing of steel castings.	
Melting and Casting Shop			
27.	Hot Blast (1.0 Ton) and cold blast cupola (0.5 Ton) furnaces	Complete facilities for the production of all types of cast iron by using hot & cold blast Cupola furnace	<p>Melting capacity of Cold blast cupola furnace 0.5 ton/Hr</p> <p>Melting capacity of Hot</p>

			blast cupola furnace 01 ton/Hr
28.	Induction Furnace (10 & 50kg)	Complete facilities for the production of steel alloys.	<p>Input voltage 380V</p> <p>Max. Control power 50Kw</p> <p>Output frequency 2500-3000Hz</p> <p>Rated capacity 0.01MT Temperature 1600°C</p> <p>Melting rate 0.06Mt/hr</p> <p>Power consumption 850KWH/Mt</p> <p>Water consumption 5 Mt/hr</p> <p>Dimension 910*400*560</p> <p>Weight 0.044 MT</p>
	Wax Injection Machine	Facility for production of intricate and precision castings. Jewelry castings and automation parts.	Not Installed
29.	Shell Molding Machine	Facility to produce high quality mold and cores uses in production of auto-parts.	<p>Size of core box 500*490*300</p> <p>Max. Quality of shooting sand 12kg</p> <p>Clamp ejector plate 100-600 mm</p> <p>Max. Clamping pressure 1.9T (0.63MPa)</p>

			Productivity 40 S Operating Pressure 0.63 MPa Power source AC 380V Electrical Power 0.25-0.55 KW Total weight 4.5T
30.	Jolt Squeeze molding machines (02)	Facility to produce high quality mold and cores.	Max. Flask size 500x400mm Size of worktable 560x460mm Working air pressure 0.6mpa Dia. Of air inlet pipe ≥3/4inch Max. Weight lift (0.6 Mpa) 200Kg Competing force (0.6 Mpa)>5000Kg Frequency of shock ~700 times/min Ejection stroke 200mm Squeeze stroke 150m
Shot Blasting shop			
31.	Shot Blasting Machine	Facility for finishing/cleaning castings/ metallic parts by using shots on metal surfaces.	Distance of barrel 1000mm Speed of barrel 3 rpm/min Capacity 0.1m ³

			<p>Max. Load 300kg</p> <p>Max. Piece length 400mm</p> <p>Productivity 600-1500kg</p> <p>Cleaning time 3-20 min (General)</p> <p>Amount of Abrasives 70-80kg</p> <p>Speed of impeller 2300 rpm/min</p> <p>Velocity of shots 60-70m/s</p> <p>Diameter of shots 0.8-1.2mm</p> <p>Overall dimension of machine 2078*2458*1861</p> <p>Weight of machine 3575kg</p>
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32. Facilities for Production:

The following production capacity is available

1. Hot & Cold Die casting
 - i. Aluminum hub castings
 - ii. Zinc Water Tap crowns.

2. Hot & Cold Cupola Furnaces
 - i. Grey iron castings
 - ii. Agricultural implants

3. Induction Furnaces
 - i. Alloys steels

4. Pit furnace
 - i. Non ferrous miscellaneous castings

5. Shell Molding Machines

- i. High quality molds & cores
6. Core Shooter Machine
- i. Production of sanitary fittings cores

33. Other HR Technical Services Offered:

Following technical services are offered

- i. Three Years Diploma in Mechanical Technology (with specialization in cast metals & foundry technology)
- ii. Free PSDF sponsored (3 & 6) month's Short courses.
 - i. Machinist 06 Months
 - ii. CNC Machine Operator 06 Months
 - iii. Auto-CAD/CAM 06 Months
 - iv. Milling Machine Operator 03 Months
 - v. Turner 03 Months
 - vi. CNC Machine Operator 03/06 Months
 - vii. (Milling/MC, Wire cut, EDM)
 - viii. Material Evaluation and Mechanical Testing 03/06 Months
 - ix. Induction Hardening Machine Operator 03/06 Months
 - x. Cupola furnace Operator 03/06 Months
 - xi. Molding & Casting Technology 03/06 Months
 - xii. Core & Mold Technology 03/06 Months
 - xiii. Wax Injection Machine Operator 03/06 Months
 - xiv. Die Casting Machine Operator 03/06 Months
 - xv. Induction Furnace Operator 03/06 Months
 - xvi. 2D & 3D Drafting Using Auto CAD 03 Months
 - xvii. 3D Designing/Modeling Using CATIA 03 Months
 - xviii. TIG/MIG Welding 03 Months
- iii. Paid (03) month's Short course.
 - i. Electrician 03 Months
- iv. Technical consultancy

The center is being offered consultancies to the local industries in the following fields.

 - i. Alloy making and alloy development of ferrous and non ferrous metals.
 - ii. Designing and modification of heat treatment furnaces.
 - iii. Developments of Dies and Molds.
 - iv. Developments of CNC related programs.
 - v. Cupola related issues and melting procedure.
 - vi. Surface hardening of axles and its related issues.
 - vii. Fan industry related Aluminum casting problems and their remedies.