

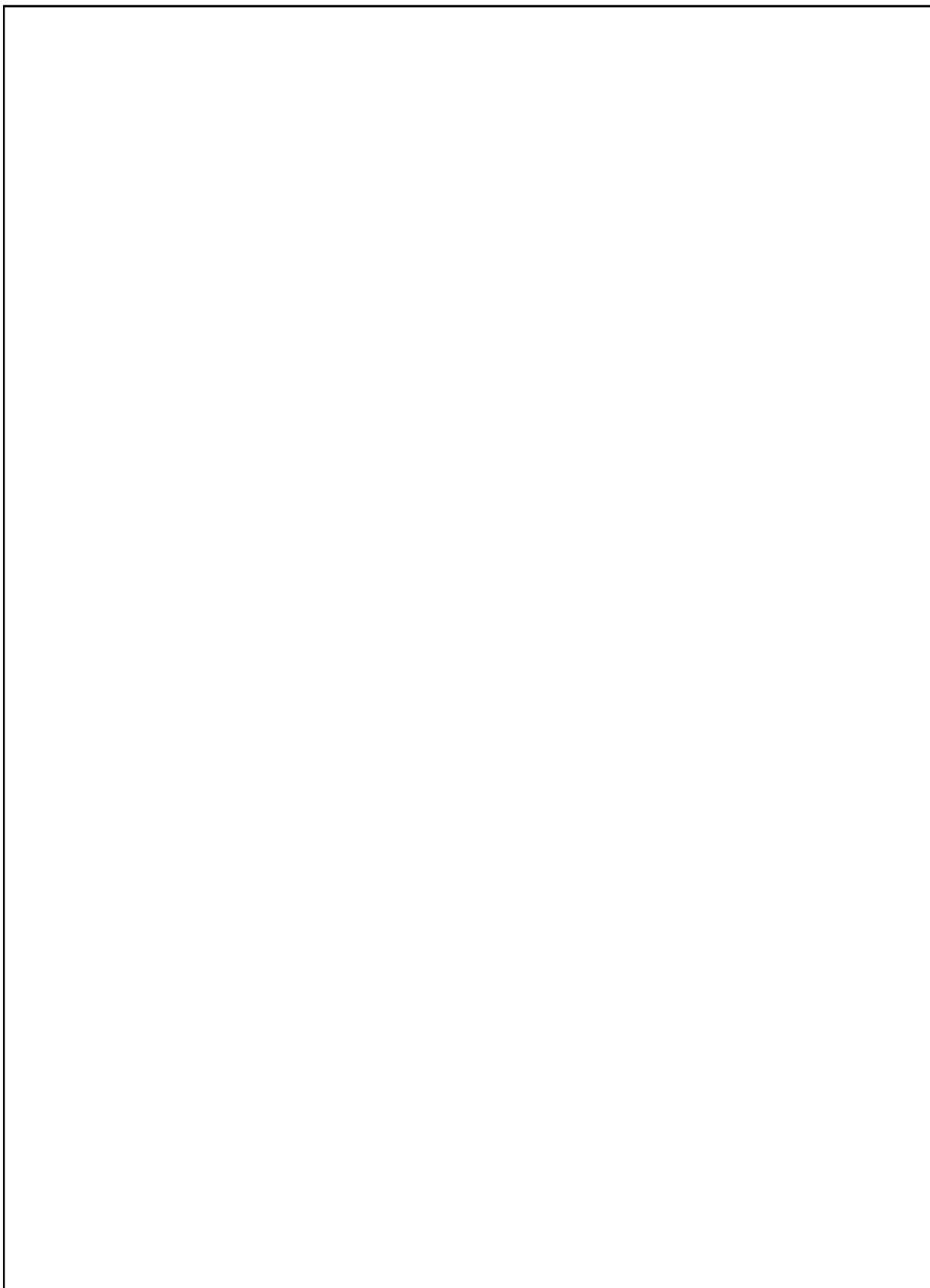
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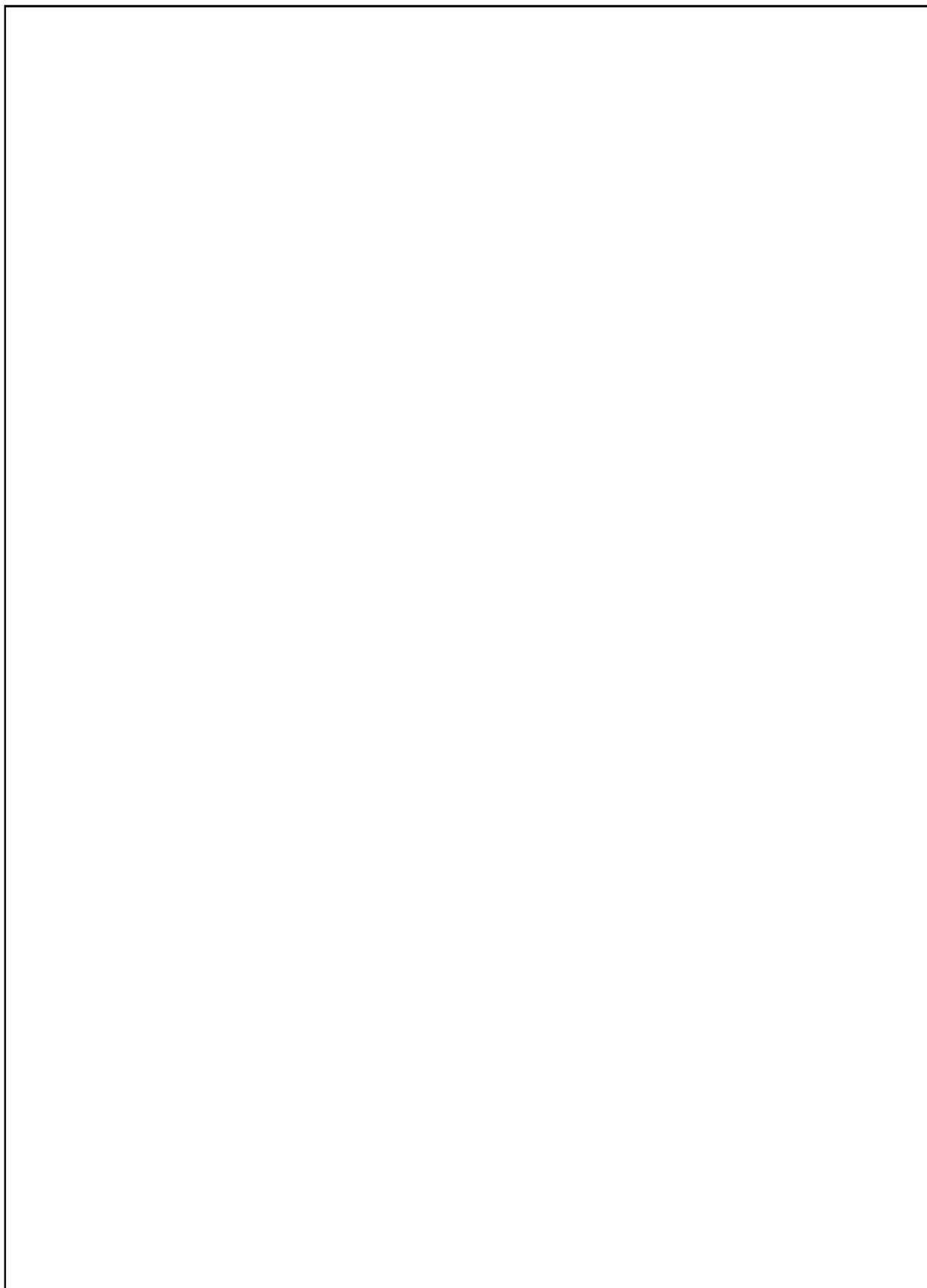


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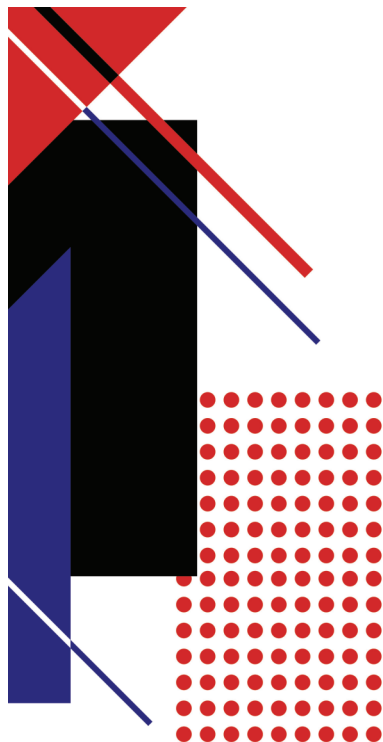
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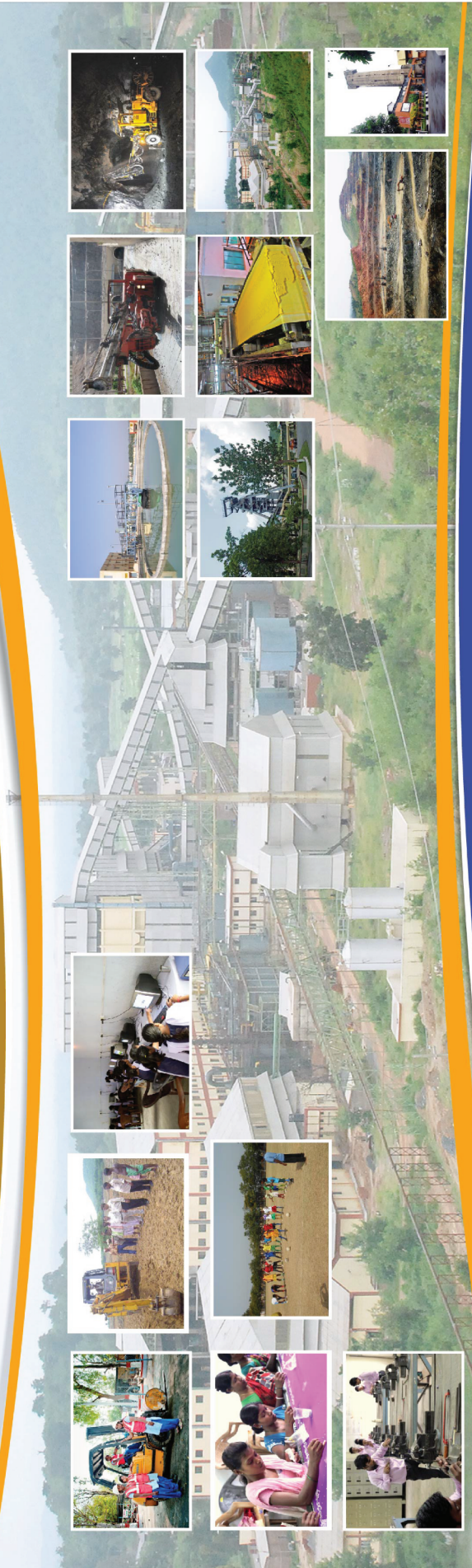
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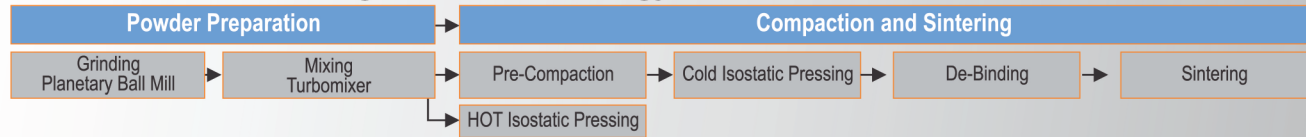
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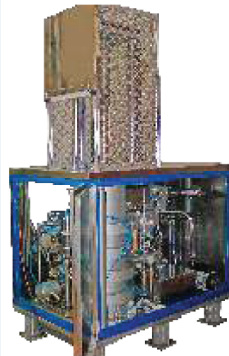
### Spark Plasma Sintering Machine



**Technology:**  
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**Application:**  
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### Cold Isostatic Press



INSMART CIP installed at LASTEC, Delhi  
Capacity: 100mm dia x 450mm height



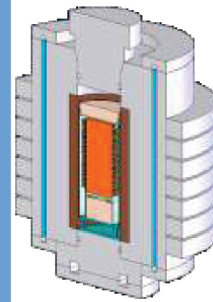
INSMART CIP installed at NML, Jamshedpur  
Capacity: 75mm dia x 150mm height

Generates pressure of upto 6000 bar in a pressure vessel for compaction of powders to get high density near net shape for manufacturing of complex 3D shapes through powder metallurgy route pressurizing fluid in water



INSMART CIP installed at BARC, Mumbai  
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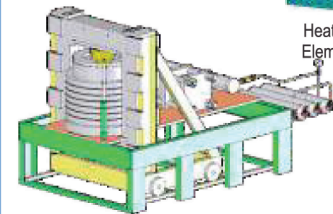
### Hot Isostatic Press



High Pressure High Temperature Chamber



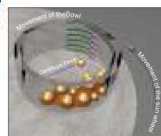
Heating Element



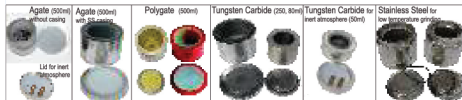
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Analytical department at JNARDDC is engaged in a broad spectrum of services such as Sample Testing, Characterization and Research & Development. The activities are mainly focused on Mineral, Metal and Material Chemistry, Applied Analytical Chemistry, Coal Chemistry, Rare Earths (Res), Industrial Waste Management, Geopolymer Chemistry and Nano-materials. The department is fully equipped with state-of-the-art analytical instrumentations for testing and characterization of ores, minerals, metals, polymetallic, rock, soil and sediments, rare earth elements, coal and other miscellaneous samples as per National and International Standards. Our expert and proficiency are in use for developing tailored analytical methods for both qualitative and quantitative analysis as well as to perform method validation for specific testing applications.

The chemical testing and coal testing laboratories are ISO 17025:2017 accredited by the National Accreditation Board for Testing and Calibration Laboratories (NABL), New Delhi for testing Bauxite, Limestone, Iron ore, Chromite ore, Coal and Aluminium alloys.

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### Elemental Analysis

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ICP-Optical Emission Spectrometer (ICP-AES)  
ICP-Mass Spectrometer (ICP-MS)  
UV-Visible spectrophotometer  
Flame photometer

### Thermal Analysis

Simultaneous Thermogravimetric analyzer (TGADTA)  
Differential Scanning Calorimeter (DSC)

### Research & Development

Characterization  
Beneficiation  
Analytical Techniques  
Process & Product Development  
Value Addition of Mine / Industrial Wastes  
Geopolymer & 3D printing  
Rare Earths Extraction  
Nano Technology

### Classical Wet Analysis

Calorimetry  
Titrimetry  
Gravimetry

### Microscopy Analysis

Scanning Electron Microscopy (SEM)  
Paired with Energy Dispersive Spectroscopy

### Coal Characterization

Proximate Analysis  
Gross Calorific Values  
Carbon Sulphur Analysis

### Other Testing Facilities

Laser Particle Size Analyzer  
Mercury Porosity Meter  
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TCLP/STLC Testing for Hazardous Waste



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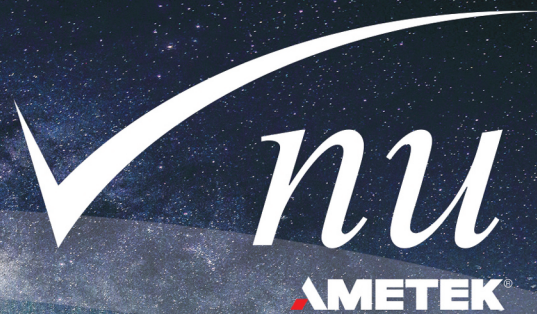


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