In addition to the “EMIA-Pro/Expert” series of high-frequency induction furnace type analyzers, the “EMIA-Step” tubular electric resistance heating furnace analyzer has just been added to our Carbon/Sulfur Analyzer lineup. Determination of free/combined carbon and sulfur is made possible thanks to the precise temperature-controllable furnace, enabling programmed temperature increases along the analysis. HORIBA’s original NDIR technology allows for accurate and sensitive quantitative analysis of trace amount of carbon and sulfur.

1. **Enables temperature control starting at a low temperature range**

EMIA-Step provides good temperature stability from low to high temperatures. This broadens the application range to samples containing substances that are easily decomposed and burned at low temperatures.

   ![Temperature rise control from 300 °C to 900 °C](image)

   You can easily see the decomposition combustion of organic matter and inorganic matter respectively.

2. **New dust-filter provides easy maintenance capability**

EMIA-Step adopted the proven dust-filter mechanism in the high frequency induction heating models. The filter unit collects the dust generated by combustion at high temperature. This prevents the dust from adhering to piping after the combustion furnace, and reduces adsorption of CO₂ and SO₂ gases by dust. This mechanism makes highly accurate and sensitive analyses possible.

![Schematic of tubular electric resistance heating furnace](image)

3. **User-friendly software navigation functions facilitate the operation**

   - **Analysis Navigation**
     Recommends the best measurement flow and analysis conditions based on our experience.

   - **Troubleshooting Navigation**
     Pinpoints the location automatically, and notifies the operator with the recovery procedure when any fault occurs.

   - **Maintenance Navigation**
     Daily maintenance menus are listed and the videos and photos of the maintenance procedures are displayed.
Because the EMIA series can analyze trace amounts of carbon and sulfur with high accuracy, it is widely used for R&D and quality control in various fields such as:

### Chemicals
- Catalyst
- Rubber
- Carbon black
- Ceramics

### Minerals
- Coke
- Limestone
- Coal

### Resin materials
- FRP (Fiber-Reinforced Plastic)
- Film
- Pellet

### Steel
- Automotive steel plates
- Building materials

### Electronic materials
- Solder
- Li-ion batteries
- MLCC (Multi-Layer Ceramic Capacitor)
- Copper
- Nickel
- Alumina

### Non-ferrous alloys
- Copper
- Nickel
- Alumina

### Applications

- Non-ferrous alloys
  - Copper
  - Nickel
  - Alumina
- Chemicals
  - Catalysts
  - Rubbers
  - Carbon blacks
- Minerals
  - Coke
  - Limestone
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- Resin materials
  - FRP (Fiber-Reinforced Plastic)
  - Films
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  - Automotive steels
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  - MLCC (Multi-Layer Ceramic Capacitors)
- Non-ferrous alloys
  - Copper
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### Compliant standards

<table>
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<tr>
<th>ASTM</th>
<th>Material to be analyzed</th>
<th>Title</th>
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<th>Sulfur</th>
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<tr>
<td>E1019</td>
<td>Steel, iron, nickel, cobalt alloys</td>
<td>Standard Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Fusion Techniques</td>
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<tr>
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<td>Standard Test Methods for Chemical Analysis of Refined Nickel</td>
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<td>E1941</td>
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<tr>
<td>E1915</td>
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<td>Standard Test Method for Analysis of Metal Bearing Ores and Related Materials for Carbon, Sulfur, and Acid-Base Characteristics</td>
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<tr>
<td>D1552</td>
<td>Oil and petroleum</td>
<td>Standard Test Method for Sulfur in Petroleum Products by High Temperature Combustion and Infrared (IR) Detection or Thermal Conductivity Detection (TCD)</td>
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<td>D4239</td>
<td>Coal and coke</td>
<td>Standard Test Method for Sulfur in the Analysis Sample of Coal and Coke Using High-Temperature Tube Furnace Combustion</td>
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<tr>
<td>D5016</td>
<td>Coal and coke combustion residues</td>
<td>Standard Test Method for Total Sulfur in Coal and Coke Combustion Residues Using a High-Temperature Tube Furnace Combustion Method with Infrared Absorption</td>
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<tr>
<td>D6119</td>
<td>Carbon black</td>
<td>Standard Test Methods for Carbon Black—Sulfur Content</td>
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</tbody>
</table>

### Specifications

- Detection method: NDIR (Non-Dispersive InfraRed)
- Required sample amount: 1.00 ± 0.10 g
- Minimum reading: 0.000001% (m/m) for both Carbon and Sulfur
- **Carbon**
  - Measurement range: 0.0003 ~ 6.0% (m/m)
  - Accuracy (Repeatability): ± 0.0015% (m/m) or RSD ± 0.75%
- **Sulfur**
  - Measurement range: 0.0004 ~ 1.0% (m/m)
  - Accuracy (Repeatability): ± 0.00020% (m/m) or RSD ± 2.00%

### Dimensions (unit: mm)

- Combustion unit: 443 × 725 × 710 mm
- Measurement unit: 271 × 725 × 710 mm
- Mass:
  - Combustion unit: 77 kg
  - Measurement unit: 53 kg
- Power: 200/220/240 V, 5 kVA (excluding peripheral devices)
- Carrier gas:
  - Oxygen: Purity 99.5%, Pressure: 0.30 ~ 0.33 MPa
  - Nitrogen: Purity 99.5%, Pressure: 0.35 ~ 0.38 MPa

*Dry air excluding moisture and oil content can be used as the operation gas only for the standard model*

- Data processing and operation: PC with Windows® 10
- User interface: Touch panel/Keyboard/Mouse

**Maintenance area**

Please ask your sales engineer for more detailed application notes from HORIBA.