



# Ash Fusion Determinator

EATC17



## Ash Fusion Determinator

- a step towards an improved Ash Fusibility Analysis

When any fuel is burned, an incombustible waste material is produced, commonly known as ash. As the burning process progresses, the temperature of the combustion environment reaches a point where the ash particles start to melt.

This melting occurs because the heat energy breaks down the chemical bonds holding the ash particles together, causing them to transition from a solid state to a liquid state. Once the ash has melted, it begins to undergo a cooling process. As the melted ash cools down, it solidifies and forms clinkers.

Clinkers are hard, stony residues composed of the solidified ash particles, which frequently stick to the inner surfaces of the combustion chamber. Clinker build-up poses challenges for large coal furnaces, often requiring furnace closure for maintenance. Understanding the fusibility properties of coal ash facilitates temperature management to mitigate clinker formation.

The Ash Fusion Temperature serves as an indicator of the point at which the ash undergoes a transition from a solid to a liquid state through melting. This temperature is a crucial parameter in the planning and execution of gasification systems.

## Elite Thermal's Ash Fusion Determinator EATC17 automatically determines four critical temperatures:

- | Initial Deformation Temperature (IDT)
- | Softening Temperature (ST)
- | Hemispherical Temperature (HT)
- | Fluid Temperature (FT)

### EATC17 key features

- | Floor-mount Ash Fusion Determinator.
- | Maximum Furnace Temperature: 1700°C.
- | Types of samples: Coal ash, coke ash, biomass ash, refuse-derived (RDF) ash, and solid biofuel ash.
- | Number of samples: Up to 6 samples simultaneously per batch.
- | Analysis parameters: Fusion points (IDT, ST, HT, and FT) of ash samples.
- | Type of analysis: Automatic or manual.





## Features

- | Precisely controlled high-temperature resistance furnace.
- | Maximum furnace temperature for EATC17: 1700°C.
- | Furnace is capable of operating in both oxidising and reducing atmospheres.
- | Programmable ramp rates for temperature ranges.
- | Up to 6 samples can be analysed simultaneously for each batch.
- | Automatic and continuous recording of images.
- | Grid feature for accurate comparison of sample height and width.
- | Storage of individual sample pictures 1 deg C by 1 deg C.
- | Quick cooling facilitated by low thermal mass insulation allows for the completion of multiple tests within a day.



## High Resolution Integrated Camera

- | A high-resolution camera with a manually adjustable lens mounted on a suitable arm is used to view the samples being tested.
- | This setup allows for easy movement away from the furnace to access the work tube.
- | The video image is sent to a high-end computer system where it is recorded and displayed in a specially created logging program.
- | Accepts specimen shapes in accordance with ASTM, ISO, and DIN standards, including cylinder, pyramid, upright pyramid, and truncated pyramid.



Biomass Ash

RDF Ash

Fly Ash

Petroleum  
Coke Ash

Coal Ash

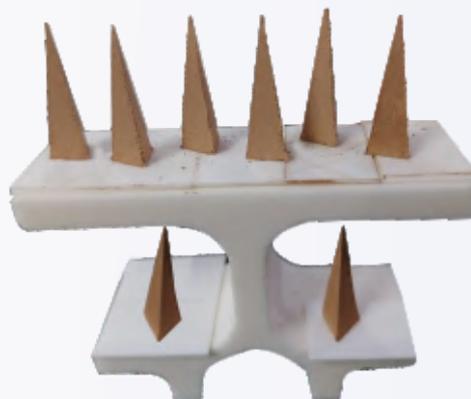
Low ash  
metallurgical coke

## Ordering Information

Item Name	Part Number
EATC16 Manual, Ash Fusion Determinator	EATC16 Manual
EATC16, Ash fusion determinator	EATC16
EATC16plus, Automatic Ash Fusion Determinator	EATC16plus
EATC17, Ash Fusion Determinator	EATC17
Gold Wire, 0.5mm Diameter15mm, Pack of 1	eatc16-509200
Nickel wire, 0.5mm diameter, 15mm, Pack of 1	eatc16-509220
Palladium Wire, 0.5mm Diameter, 15mm, Pack of 1	eatc16-509210
Sample Carrier / Holder, Ceramic, EATC16	eatc16-509305
Alumina Fusion Tray, 38x30x1.5mm, Pack of 100	eatc16-509115
Alumina Fusion Tray, 18x12x0.5mm, Pack of 100	eatc16-509120
Alumina Work Tube:1600 deg C, 76mm (ID) x 675mm length, OBE	a16-76-90-675
Thermocouple, EATC16	eatc16-509220
Ceramic Plug, Front, EATC16	eatc16-509320
Ceramic Plug, Rear, EATC16	eatc16-509321
Lamp, EATC16	eatc16-509420
Mold for Cylinder, EATC16	eatc16-509520
Mold for Pyramid, EATC16	eatc16-509620
Heating Elements, Pack of 6, EATC16	eatc16-509720
O-ring kit for EATC16 / EATC16plus	eatc16-509120

For more details, please check EATC17 technical data sheets.

## Sample holder with Ash Samples



## Test Standards

Ash Material	Test standard	Reducing Gas	Oxidizing Gas
Coal & Coke Ash	ASTM D 1857	CO-CO <sub>2</sub> Ratio: 60% CO - 40+5 % CO <sub>2</sub> , N <sub>2</sub> for purging	Air
Coal & Coke Ash	BS ISO 540	CO-CO <sub>2</sub> Ratio: 55% to 65% CO - 35% to 45% CO <sub>2</sub> , N <sub>2</sub> for purging H <sub>2</sub> - CO <sub>2</sub> Ratio: 45% to 55% H <sub>2</sub> - 45% to 55% CO <sub>2</sub> , N <sub>2</sub> for purging	Air or CO <sub>2</sub>
Fusibility Of Fuel Ash	DIN 51730	CO-CO <sub>2</sub> Ratio: 55% to 65% CO-35% to 45% CO <sub>2</sub> , N <sub>2</sub> for purging H <sub>2</sub> - CO <sub>2</sub> Ratio: 45% to 55% H <sub>2</sub> - 45% to 55% CO <sub>2</sub> , N <sub>2</sub> for purging	Air
RDF Ash	ASTM E953	CO-CO <sub>2</sub> Ratio: 60% CO - 40+/-5 % CO <sub>2</sub> , N <sub>2</sub> for purging	Air or O <sub>2</sub> or CO <sub>2</sub>
Solid Recovered Fuels	CEN/TR 15404:2010	CO-CO <sub>2</sub> Ratio: 55% to 65% CO - 35% to 45% CO <sub>2</sub> , N <sub>2</sub> for purging	Air or CO <sub>2</sub>
Solid Biofuels	ISO 21404	CO-CO <sub>2</sub> Ratio: 55% to 65% CO-35% to 45% CO <sub>2</sub> , N <sub>2</sub> for purging H <sub>2</sub> - CO <sub>2</sub> Ratio: 45% to 55% H <sub>2</sub> - 45% to 55% CO <sub>2</sub> , N <sub>2</sub> for purging	Air or CO <sub>2</sub>

## Technical Specifications

General Specifications	EATC17
Ash Fusibility Determination	Automatic
Fusion Points	IDT (Initial deformation Temperature), ST (Softening/Sphere Temperature), HT (Hemisphere Temperature) & FT (Fluid/Flow Temperature)
Test Method	ASTM D 1857; ASTM E953; BS ISO 540; BS ISO 21404, CEN/TS 15370-1; CEN/TR 15404:2010. DIN 51730; ISO 540; ISO 21404
Capable to Analyse	Cube/Cylinder, Pyramids/Cone, Upright cone/Upright Pyramid and Truncated cone/Truncated Pyramid.
Sample shape identification	Automatic - Cube/Cylinder, Pyramids/Cone, Upright cone/Upright Pyramid and Truncated cone/Truncated Pyramid.
Analysis atmosphere	Oxidizing Atmosphere/Reducing atmosphere
<b>Furnace Specifications</b>	
Temperature range	up to 1700°C
Temperature Ramp Rate	programmable 1°C to 12°C per minute
Temperature precision	±5°C as per standard test methods at 1064°C (99.98% pure gold wire sample melting point)
Number of heating elements	6 nos - High temperature resistance type heating elements
Working tube dimensions	86 x 76 x 675mm
Material of construction of working tube	High grade RCA Alumina work tube
Analysis Time	4 hours typical cycle time (depending ramp rate and temperature range)
<b>Stand by Temperature</b>	
Stand by Temperature	Room Temperature
<b>Ventilation</b>	
Ventilation	Forced air ventilation
Exhaust	Pipe to be vented into a separate fume hood
CO Monitor (Optional on request)	Integrated CO monitor with auditory alarm, Gas flow shut off on alarm. This is factory installed option. Need to order along with main EATC17 Instrument.
<b>Gas requirements</b>	
Gas requirements	Integrated <b>four gas</b> flow meters to enable <b>automatic</b> switching of the gases based on the selected test conditions, such as oxidation or reduction.
<b>Electrical requirements</b>	
	380 – 415 V, 50/60 Hz two phase 25 A
<b>Environmental Conditions</b>	
Operating Condition	15°C to 35°C
Relative Humidity	20% to 80%, non-condensing.
<b>PC specifications</b>	
Required PC Specifications	Processor: i3 or i5, RAM: Minimum 4GB, Memory: 512GB HDD or SSD PCI slots: Minimum 1, PCIe slots: Minimum 1, RS232 Ports: 2 OS: Windows 10 or higher