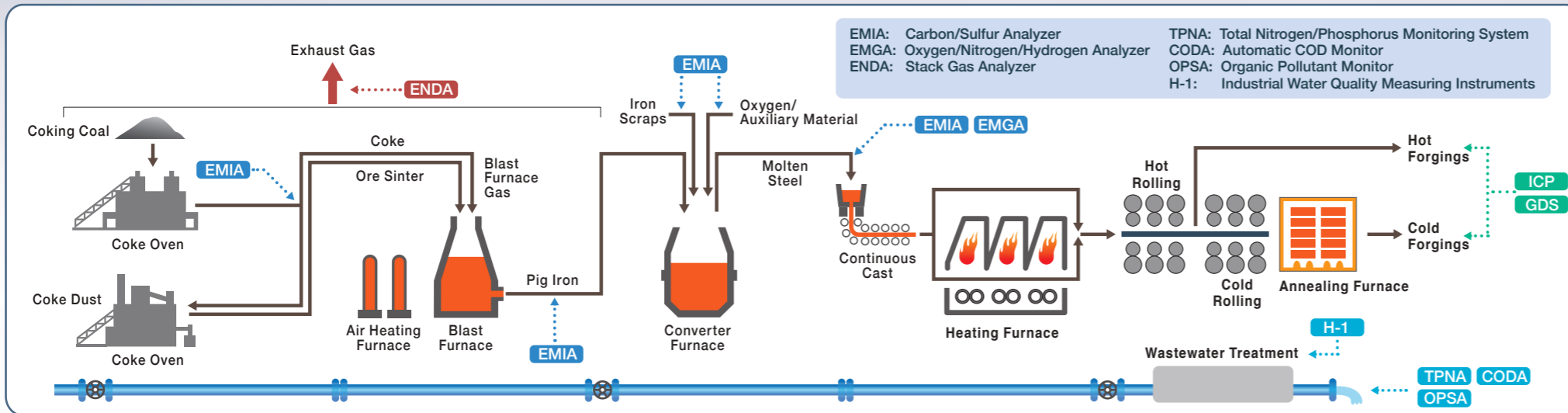


# STEEL

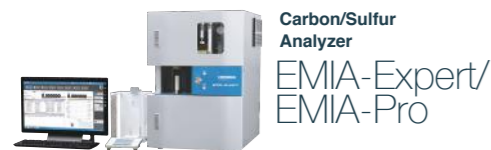
Solid Solution with High Reliability and Precision for the Steel Industry



## HORIBA products for steel industry

Process	Material	Instrument	Purpose of measurement
Raw Material	Coke	EMIA	Measurement of carbon and sulfur concentration of coke. Carbon is related for quality of coke. Sulfur is related for impact of environment.
	Iron ore	XRF, ICP, EMIA/EMGA	Confirm the quality of iron ore.
	Steel scrap	EMIA/EMGA	Confirm the steel type of scrap.
Steel Manufacturing Process	Pig iron, Molten steel	ICP, EMIA/EMGA	Confirm the quality of pig iron and molten steel.
	Slag	XRF, ICP	The composition of slag is confirmed by an elemental analyzer. Also the composition of slag used for feedback to control of steel manufacturing process.
	Exhaust gas	ENDA	Continuous monitoring for stack gas.
	Wastewater	TPNA, CODA, OPSA, H-1	Continuous monitoring for wastewater.
	Hot Forgings / Cold Forgings	ICP, GDS	
Products, R&D	General iron and steel	XRF, EMIA/EMGA, ICP, Raman	Composition analysis for quality control, research and development of iron and steel. The Raman spectrometer is used to analyze compound form of iron and steel. (Ex. The analysis of corrosion mechanism)
	Surface treated steel	GDS, XRF, Raman	Analysis of surface treated steel, corrosion and etc.

### Carbon/Sulfur and Oxygen/Nitrogen/Hydrogen Analysis



**Carbon/Sulfur Analyzer**  
EMIA-Expert/EMIA-Pro

Simultaneous Carbon & Sulfur elemental analyzer with high accuracy and repeatability for cutting-edge technologies in R&D, as well as quality control in the market of steel, new materials, catalyst, etc.

[Measurement sample] Carbon and Sulfur included in steel, non-ferrous metal, alloy, ceramic, electronic materials, etc  
 [Method] Non-dispersive Infrared detector (NDIR) for Carbon and Sulfur

#### Application

Sample	JSS150-18	JSS155-16
Element	C	S
	0.495%(m/m)	0.0051%(m/m)
1	0.504	0.0049
2	0.504	0.0050
3	0.502	0.0051
4	0.501	0.0050
5	0.502	0.0052
Average	0.502	0.0050
STD(%)	0.001	0.0001
RSD(%)	0.28	1.79



**Oxygen/Nitrogen/Hydrogen Analyzer**  
EMGA series

Simultaneous Oxygen, Nitrogen & Hydrogen elemental analyzer with high accuracy and repeatability for cutting-edge technologies in R&D, as well as quality control in the market of steel, non-ferrous metal, new materials, catalyst, etc.

[Measurement sample] Oxygen, Nitrogen and Hydrogen included in steel, non-ferrous metal, alloy and electronic materials  
 [Method] Non-dispersive Infrared detector (NDIR) for Oxygen and Hydrogen, Thermal Conductivity Detector (TCD) for Nitrogen

#### Application

Sample	JSS GS-6b	JSS366-8	JSS-GS-1d
Element	O	N	H
	0.00034%(m/m)	0.00075%(m/m)	0.00016%(m/m)
1	0.000362	0.000772	0.000160
2	0.000357	0.000774	0.000160
3	0.000366	0.000751	0.000162
4	0.000367	0.000769	0.000156
5	0.000361	0.000725	0.000163
Average	0.000363	0.000758	0.000160
STD(%)	0.000043	0.000021	0.000003
RSD(%)	11.86	2.72	1.69

### Particle Characterization

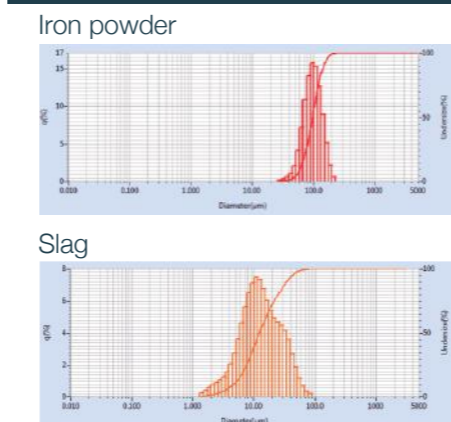


**Laser Scattering Particle Size Distribution Analyzer**  
Partica LA-960V2

The system is known for the dynamic wide measurement range performance assurance and world-wide user-accepted quality.

[Method] Mie Scattering Theory  
 [Measurement range] 0.01 μm to 5000 μm  
 [Measurement time] 1 minute from dispersion liquid filling to measurement and rinse.

#### Application



### X-ray Fluorescence Analysis

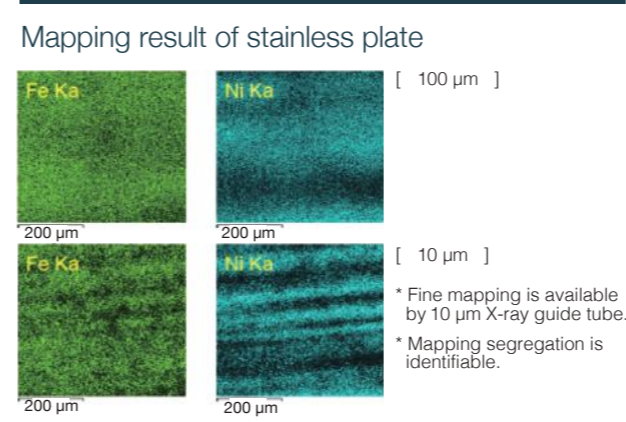


**X-ray Analytical Microscope**  
XGT-9000

High sensitivity and new imaging technology of XGT-9000 enable us to realize speedy analysis such as foreign materials, elemental composition and etc...

[Detectable elements] Na (11) - U (92)  
 [Maximum sample size] 300 x 250 x 40 mm [W x D x H]  
 [Maximum mapping area] 100 x 100 mm  
 [Sample chamber] Dual vacuum mode; Full vacuum/Localized vacuum/Atmosphere

#### Application



### GD-OES (Glow Discharge Optical Emission Spectrometry)



**Glow Discharge Optical Emission Spectrometer**  
GD-Profiler2

Fast, depth profile analysis of elements, including the gases nitrogen, oxygen, chlorine and hydrogen. Perfect for evaluation of hydrogen embrittlement and corrosion of steel.

[Element range] H (1) - U (92)  
 [Sputtering rate] 1 μm/min  
 [Sputtering area] Standard; 4 mm (Option; 1,2,7 mm)  
 [Element number] Standard; 20 ch, Maximum; 45ch

#### Application

