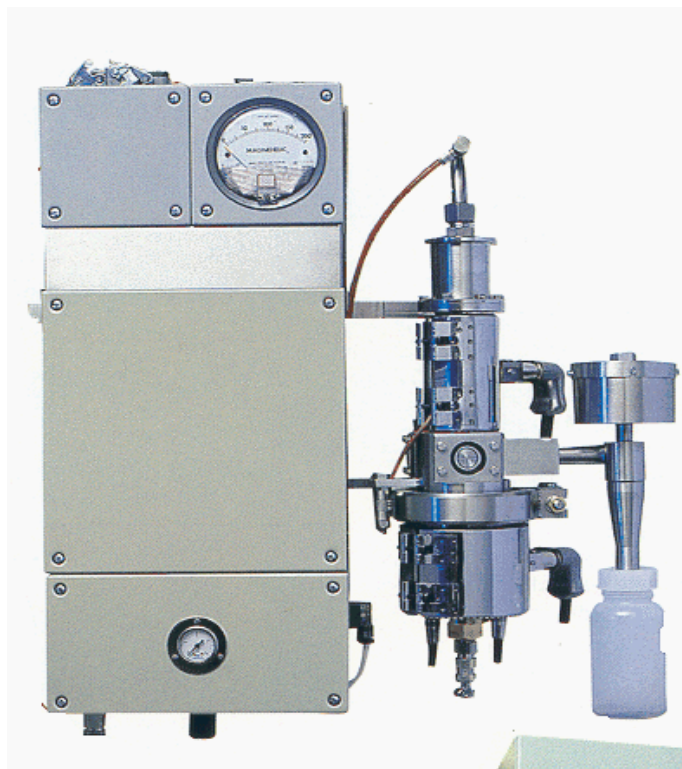


# RCA 2000 RESIDUAL CARBON ANALYSER

**OPTIMUM CONTROL OF COMBUSTION PROCESS & MILL PERFORMANCE**



### The RCA 2000 system

The patented Residual Carbon Analyser **RCA 2000** has proven its importance to the plant personnel when performing their daily routines. The RCA 2000 provides the operators with vital real time information about the combustion efficiency through continuous monitoring of the unburnt carbon content in the fly-ash.

The RCA 2000 is a very reliable and low maintenance on-line monitoring instrument which to a great extent reduces the need for performing the labour intensive laboratory analysis.

#### Benefits

The RCA 2000 will assist coal fired power plants by improving their operation in the following three areas:

- Combustion efficiency
- Coal mill performance
- Production of high quality fly-ash for sale

#### Combustion Efficiency

The RCA 2000 measures the value of unburnt carbon in the fly-ash. This value will be measured every 3 to 15 minutes depending on the load of the boiler.

Through a constant control of these on-line measurements the operator can quickly make the necessary adjustments to the combustion process thus securing a more complete combustion of the coal and thereby reduce the environmental impact and the amount of fuel needed.

#### Coal Mill Performance

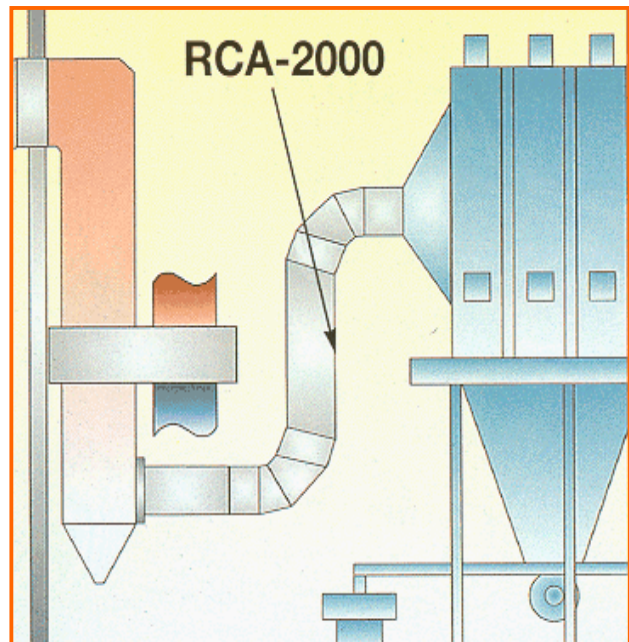
Any increase in the amount of unburnt carbon in the fly-ash is immediately observed by the operator and makes it possible to advise on control and adjustment of the coal mills.

The increased carbon content could indicate that the mill performance has decreased, i.e. particle size has gone up and adjustments of the mills are needed.

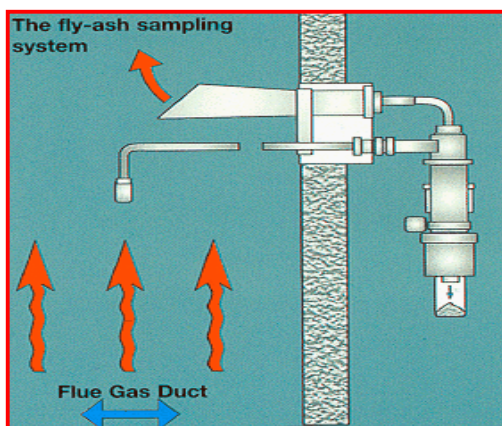
On the other hand a constant value of unburnt carbon shows that no adjustments are needed and makes it possible for the power plant to operate for longer periods without adjustments.

#### Production of high quality fly-ash for sale

The power plant will be able to sell more of its fly-ash if it can keep the amount of unburnt carbon lower than what is required by users of fly-ash, hence earn more money through sale and lower the cost of depositing fly-ash.



The RCA 2000 installed in flue gas duct before the electrostatic precipitator.

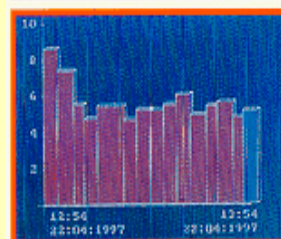


#### The Ash Sampler

The sampling of fly-ash is done by utilizing the difference between the pressure inside the flue gas duct and outside. An ejector is installed in the flue gas duct and pulls the flue gas through the sampling pipe to the cyclone where the fly-ash is separated from the flue gas.

#### The Transducer

The collected sample of fly-ash is subjected to a special light and the reflection is a measure of the amount of unburnt carbon in the sample. The signals from the reflection are processed in a microprocessor and sent to the control unit for further processing.

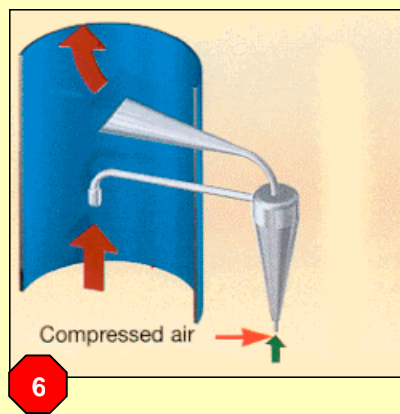
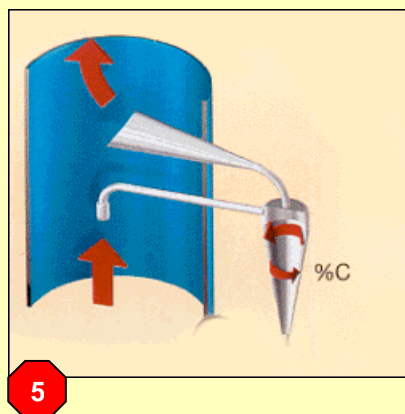
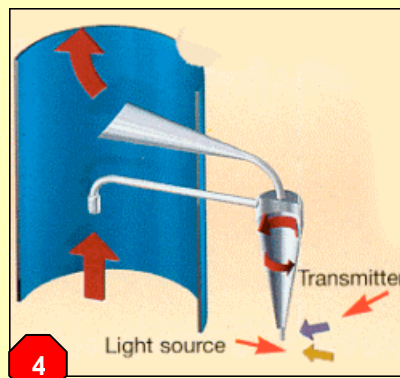
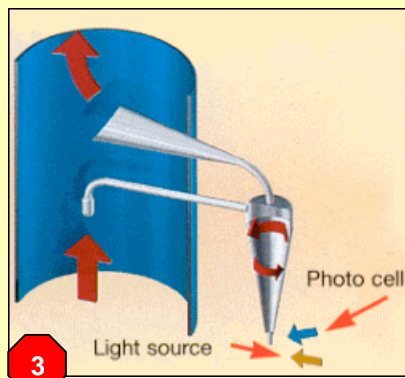
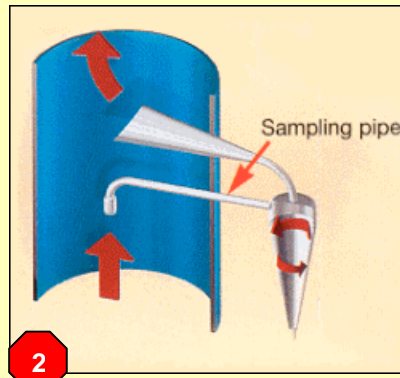
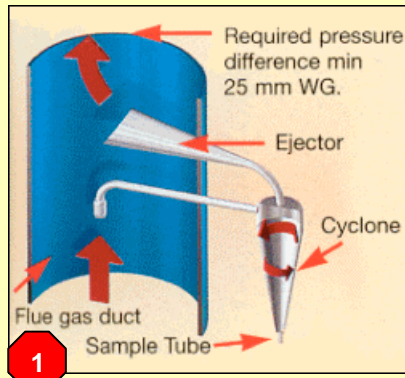


#### The Control Unit

The control unit undertakes the processing of the transducer signals and controls all function of the individual RCA components. An operator's control panel with display is located on the control cabinet front, which provides possibilities for made selection and error messages as well as it shows the selected measuring results.

## Working Principle of the RCA-2000

The RCA-2000 continuously analyses the carbon content in fly-ash through the following steps:



1. Part of the flue gas is extracted isokinetically by the sampling pipe using the pressure difference generated by the ejector.

2. The fly-ash is separated from the flue gas in the cyclone. Clean gas flows back to the flue gas duct through the ejector.

3. The fly-ash is collected in the measuring unit. When full, the measurement of the sample is executed.

4. The result is processed by a microprocessor and sent to the control unit.

5. The result, i.e. amount of residual carbon, is shown on the display and can be sent to the control room for remote indication.

6. The instrument is emptied and cleaned using compressed air which blows the fly-ash sample back into the flue gas duct. The sample can also be collected in a sample bottle for laboratory analysis.

A new measuring cycle starts automatically.

#### Technical Data for RCA 2000

Power supply:	230V/50Hz, opt. 115V/60Hz, 400 W	
Air supply:	Dry clean compressed air, Minimum 6 bar (85psi)	
Measurement range:	0-20% carbon in weight	
Accuracy:	+/- 0,5% between 2% and 7% residual carbon	
Measurement output:	4-20mA, isolated current loop, 4mA=0%, 20mA=20% carbon	
Dimensions: (WxHxD):	Sampling unit:	800x760x230 mm
	Control cabinet:	600x750x350 mm
Weight:	Sampling unit:	35 kg
	Control unit:	40 kg



The RCA 2000 units are tested prior to delivery and for continuous R&D matters.



The transducer

#### The Company and its product line

**M&W Asketeknik** is an internationally working engineering company specialized in the design, manufacturing and supply of analysing and sampling systems for optimizing processes and controlling by-products in coal-fired power plants and other utility boilers. Several hundred units are successfully analysing and monitoring combustion processes in power stations world-wide.

#### M&W Asketeknik's product line

- Pulverized Fuel Sampler (PFS)
- Dustless Connection (DC)
- Dirty Air Pitot (DAP)
- Automatic Coal Flow Monitor (ACFM)
- Automatic Trimming Damper (ATD)
- Automatic Dust Sampler (ADS)
- Residual Carbon Analyser (RCA)
- Fly-Ash Sampler (FAS)
- Raw Coal Sampling Systems (RCS)



#### M&W ASKETEKNIK APS



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