



# Nanoparticle Management





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# Goals | Values | Visions

Matter Engineering is a world leading provider in the field of nanoparticle measurement. Primarily specializing in workable and realistic analysis of nanoparticles and various particle generator devices we are able to offer measuring devices as well as full range service of ultimate perfection.

Although we were founded in 2001. We unify an over 50 year experience in design of instruments and nanoparticle research.

Close cooperation with leading institutions – such as ETH Zurich – advance our high demand on excellence.

From coal-fired power plant up to automotive industry:  
For all matters of efficient measurement and generation of nanoparticles, Matter Engineering is your partner.

## meViPR

meViPR is a complete, PMP-compliant particle counting system for future type approval of passenger cars. It is especially designed for the needs of the automotive industry, has a compact, rugged design, and is easy to operate.



### Preliminary Technical Specifications

<b>Sampling, Dilution</b>	With rotating disk diluter type Matter Engineering MD19-2E
<b>Dilution ratio</b>	Adjustable Range 1:15 ... 1:3000
<b>Hot dilution</b>	Heated dilution block and dilution air
<b>Heating temperatures</b>	80/120/150° C adjustable
<b>Mechanical set up</b>	Dilution on separate exhaust probe for connection to sampling probe
<b>Air supply part Specification</b>	With air supply Matter Engineering Type ASET-15
<b>Air Supply primary dilution</b>	1.5 normative liter per minute
<b>Secondary dilution factor</b>	1 - 11
<b>Thermal Conditioner part</b>	With Evaporation tube Matter Engineering Type ASET-15
<b>Heating temperature</b>	Ambient – 400° C/752° F
<b>Particulate Measurement</b>	
<b>Number concentration</b>	By CPC, any model with RS 232 serial interface
<b>Accuracy, size range, response time Resolution</b>	Depending on CPC model
<b>System control</b>	With digital control unit type Matter Engineering CU1-ET
<b>Functionality</b>	Control of dilution, thermal conditioning and sensor Measurement with real time data recording of connected analog and serial signals. Logging speed adjustable up to 2 data sets per second
<b>Software</b>	Standard software will be available for legal transient and constant load tests on vehicles and combustion engines
<b>Remote PC-operation</b>	Ethernet communication (TCP/IT)
<b>Additional measuring signals</b>	5 free analog inputs can be used to connect additional sensors and signals
<b>Mechanical set up</b>	All 19"-modules mounted in mobile 19" cabinet or rack
<b>Dimensions</b>	Standard type 55 (84 HP) x 30 (6U)x 60 cm (without pump & CPC)
<b>Weight</b>	Standard type 60 kg
<b>Supply voltage</b>	90 – 260 V AC, 50/60 Hz, power consumption max. 300 VA (without pump & CPC)

## PMP-compliant particle counting system

# meViPR

With Euro “5plus” to come in 2011, the European Commission will introduce new particle emission limits, based on the number concentration of solid particles. The instrumentation and protocol needed for this measuring task was developed in the UN Particle Measurement Programme, PMP.

meViPR represents a measuring system which is designed to be fully PMP-compliant. It is the latest generation of equipment based on the famous “Golden Instrument” – reference during the crucial phase of PMP – and uses the award-winning, patented “Volatile Particle Removal” technology, while more advanced in terms of operation, automation and ease of use.

It consists of several modules: a coarse particle pre-classifier; a volatile particle remover (VPR); a condensation particle counter (CPC); and a data acquisition unit for data recording and remote control. The VPR itself ensures that only solid particles arrive at the CPC, by means of two independent dilution stages with an evaporation tube in between. The data acquisition unit is designed to communicate with a dedicated PC and is prepared for

additional analog signal input and output in up to five independent channels, e.g. trigger and measuring signals from test benches or additional sensors.

meViPR supports automotive engineers in many other applications beyond type approval. Due to its versatile hardware design, it offers the flexibility needed in automotive research and development environment. meViPR is compact and easy to transport between locations; special configurations can be used in mobile applications. The same piece of equipment can be connected to a full-flow CVS tunnel or directly to the tailpipe of an engine under test, simply following the daily changing needs without further hardware adjustment. Absolute emission measurement is just one option – relative measurement, e.g. when characterising filters or other exhaust aftertreatment systems, is just a switch away.

meViPR – your test bench mechanics will like it, your service technicians out in the field can’t go without, and your development engineers will love it!



## meDiSC

Diffusion Size Classifier.  
A new generation aerosol measurement instrument which provides particle number and size information. It is portable, robust and easy to use.

### Preliminary Technical Specifications

<b>Number concentration</b>	3·10 <sup>3</sup> ... 1·10 <sup>6</sup> #/cm <sup>3</sup> (depends on particle size and sampling time constants)
<b>Particle size range</b>	Measures 20 ... 200 nm
<b>Correlations</b>	Operated in parallel to an SMPS system and sampled with 3 different aerosols
<b>Calibration</b>	Using SMPS recommended every 1-2 years
<b>Communication</b>	Bluetooth USB
<b>Data storage</b>	PC SD/MMC Memory card
<b>Battery life</b>	Approximately 8 hours
<b>Dimensions (in cm)</b>	34.2W x 26.3D x 9.8H
<b>Weight</b>	Approx 5.5 kg
<b>Sample flow</b>	Approx 1.5 l/min
<b>Accessories</b>	USB cable for data transfer Power adapter, including car plug and charger for battery. Software for PC running Windows XP Essential spare parts DiSC is supplied in a portable carry bag with shoulder strap. The unit can be used with a removable SD/MMC Memory Card for full portability

## Diffusion Size Classifier

# meDiSC

- 2 s resolution time
- measures number and size simultaneously
- weighs 5.5 kg
- battery life approx 8 hrs
- measures 20 ... 200 nm
- suited for field studies
- no technical experience necessary to operate

Many aerosol instruments are large, heavy, fragile and expensive. DiSC was designed to avoid these characteristics with the aim to offer an instrument suitable for field measurements where accuracy and size distribution are not critical elements. It is the first of its kind on the market.

DiSC is a modification of the well known diffusion charger (DC). Aerosol is charged and then passes through 3 measurement stages.

In the diffusion stage, smaller particles are deposited by diffusion while passing through a series of stainless steel grids.

In the induction stage, aerosol passes through unobstructed.

During a rapid concentration change, a current is induced in both this stage and in the diffusion stage and is corrected for.

Lastly, the filter stage consists of particles being collected on a filter.

Sensitive current amplifiers measure the 3 currents (induction, diffusion and filter) and their signals are digitalized.

A data analysis software calculates number and size and sends this via Bluetooth or USB to a PC or can be saved directly onto an SD/MMC memory card.

DiSC is approximately as large as two laptop computers placed on top of each other.

The portability of DiSC requires minimal set-up fuss and allows the ease of carrying DiSC in the field, for example, ambient air studies of aerosol number concentrations in urban areas.



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