JAMA Comments on PMP

January 7th, 2003

Unregulated Emissions Group
Emissions & Fuel Efficiency Subcommittee
Japan Automobile Manufacturers Association,Inc.
(JAMA)

1. Summary

1.1 JAMA believes that the emission regulations using with number concentration method is premature and should be continued using with the current method (mass measurement method).

1) There are no findings on health effects of the PM number concentration.

2) The relation between PM number in automobile emission and in ambient air is not clarified..

3) The ongoing research on PM measuring method except for weight measurement is now in the stage of investigating current status of emissions.

1.2 To use the new measuring equipment as the tool for type approval, JAMA believes that it is important to guarantee the accuracy and to establish the calibrating method.

1) In the research conducted by JAMA, the tools (DMA+CPC, ELPI, DC, etc) are not accurate sufficiently.

2) CAST (combustion device to generate particles) shows the stable average diameter (median diameter), but shows the trends toward the decreasing number concentration with time.

2.Study on Calibration

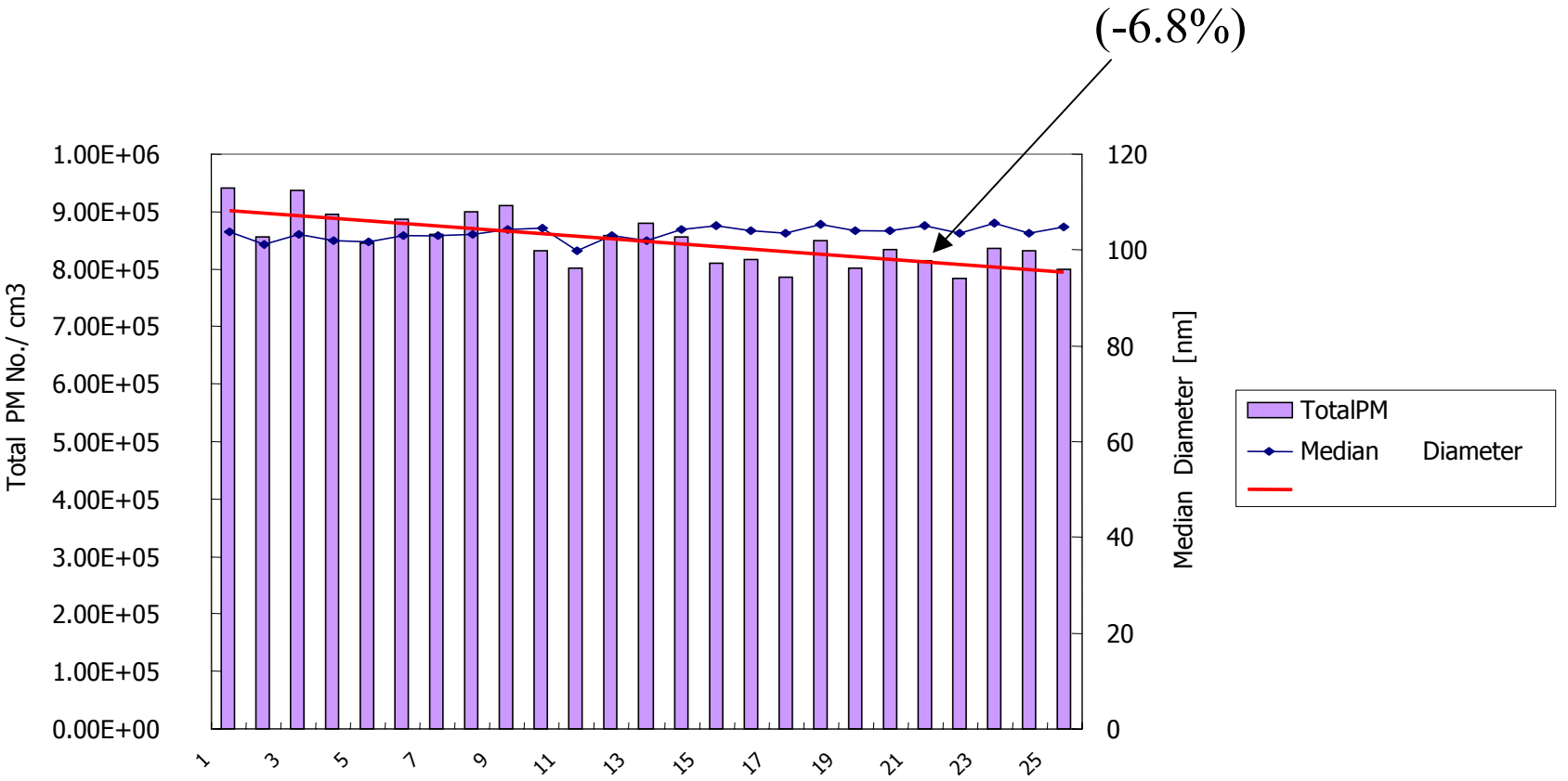
2.1 The reproducibility of a CAST

1) Concerning the reproducibility (shown in Figure 1， 2), although the average diameter (Median Diameter) of CAST is stable, the number concentration has a tendency to decrease with time.

2) The cause investigation and improvement need to be considered.

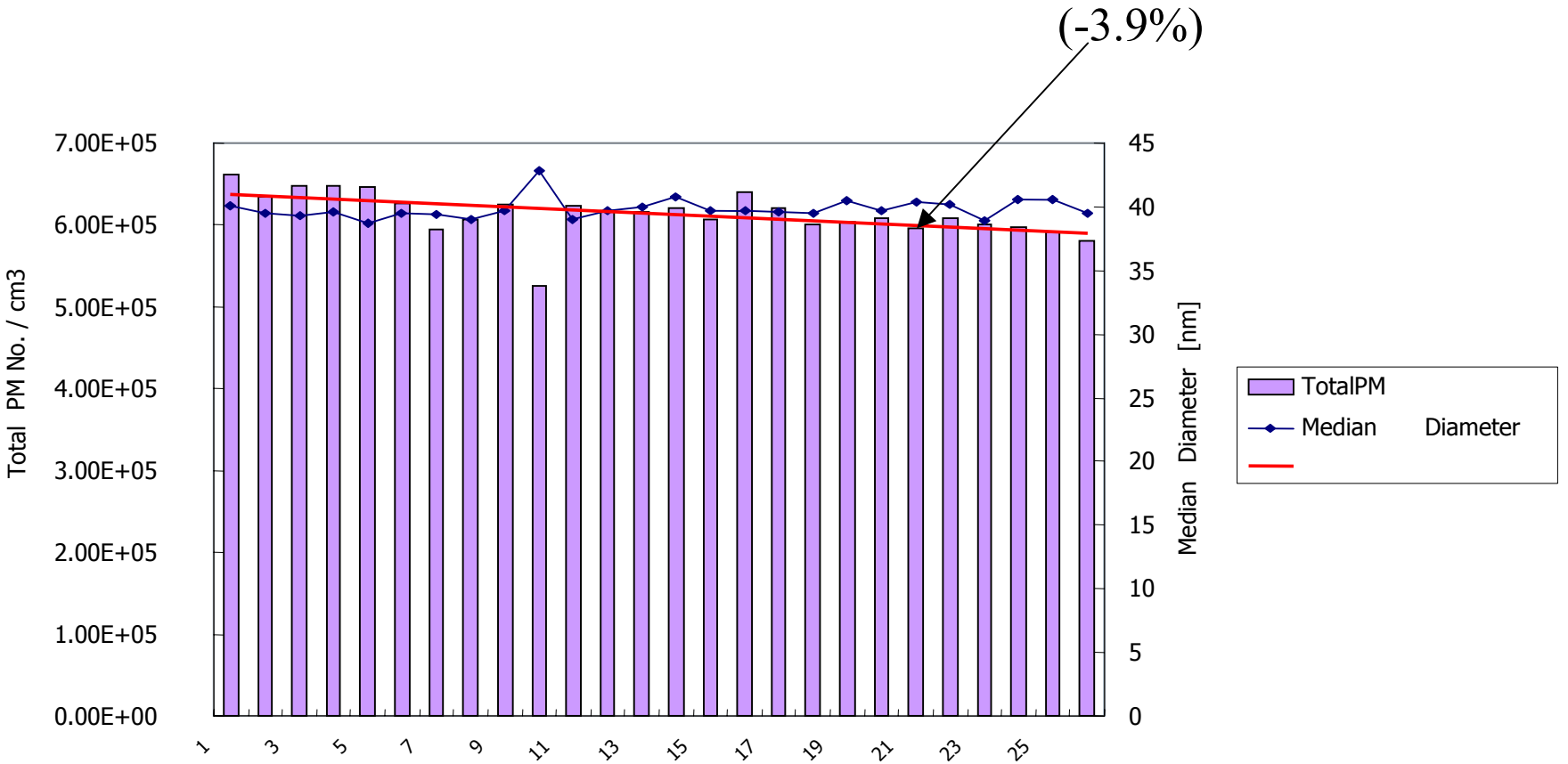
3) JAMA conducted a Correlation tests of simultaneous measurement.

Fig. 1 Repeatability of continuous scans with a CAST (100nm)



Notes) measurement after warming-up

Fig. 2 Repeatability of continuous scans with a CAST (30 nm)



Notes) measurement after warming-up

2. 2. The Correlation Tests of DMA+CPCs, ELPIs, DCs

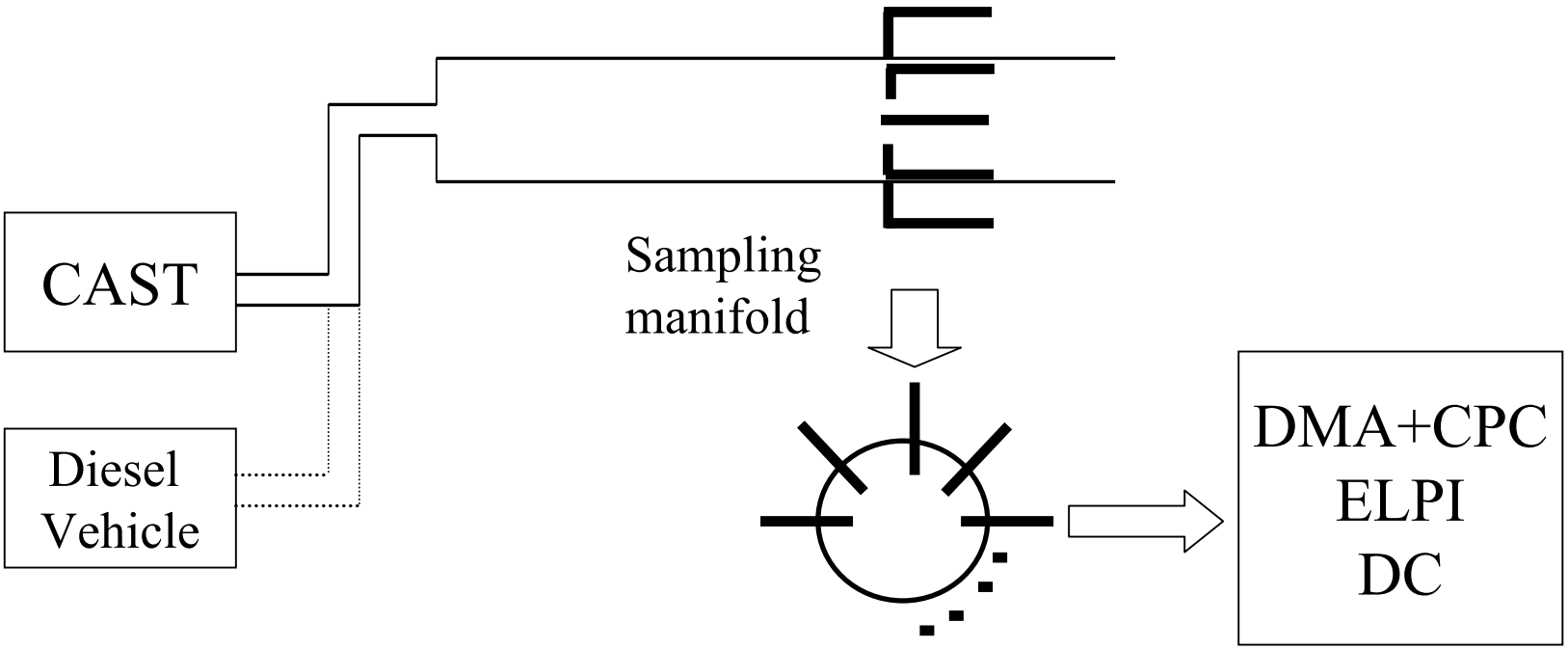
We carried out Correlation tests of simultaneous measurement with the various kinds of equipments using a CAST and a diesel exhaust.

As a result, the measured values of DMA+CPC, ELPI and DC have insufficient accuracy for the regulation in that the standard deviation is large yet (Figure 3 to Figure 5).

From now on the accuracy improvement and the development of calibration methods of the equipments need to be conducted.

Correlation Test Setup

- Simultaneous sampling with the same kind of instruments



Summary of Correlation Tests

- CV values for DMA+CPC, ELPI, DC

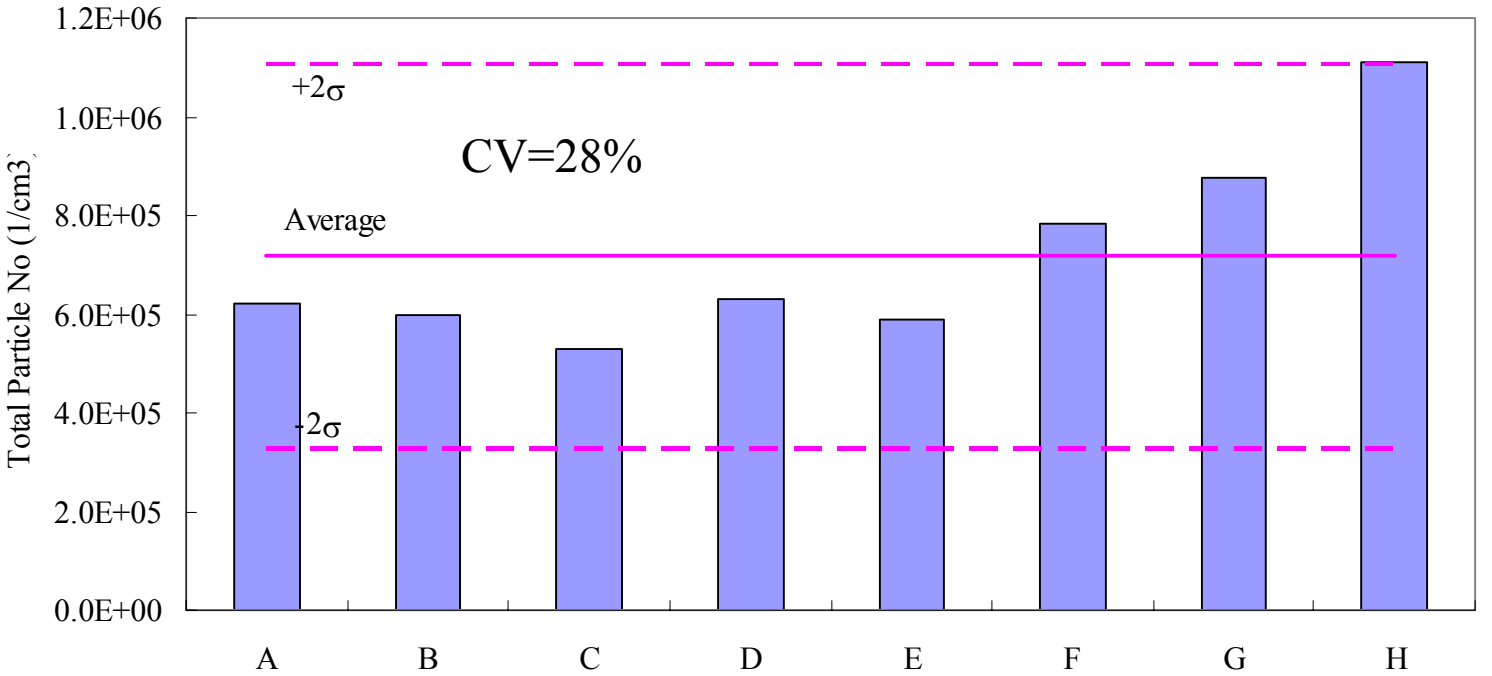
	CAST(1) MP3(100nm)	CAST(2) MP6(30nm)	Diesel Exhaust
ELPI Total Particle Number	40%	28%	23%
DMA+CPC Total Particle Number	28%	19%	27%
DC Total Surface Area	48%	48%	54%

Data from JCAP (Japan Clean Air Program)

Fig.3 ELPIs Total Particle Number with a CAST (30nm)

- Simultaneous measurements of total number of particles from CAST using different ELPIs

ELPI : 5min averaged value, A-G: with filter stage, H: without filter stage
CAST: MP6 (Dp = ca.30nm)



Data from JCAP (Japan Clean Air Program)

Fig.4 DMA+CPC Total Particle Number – CAST (100nm)

- Simultaneous measurements of total number of particles from CAST using different DMA+CPCs

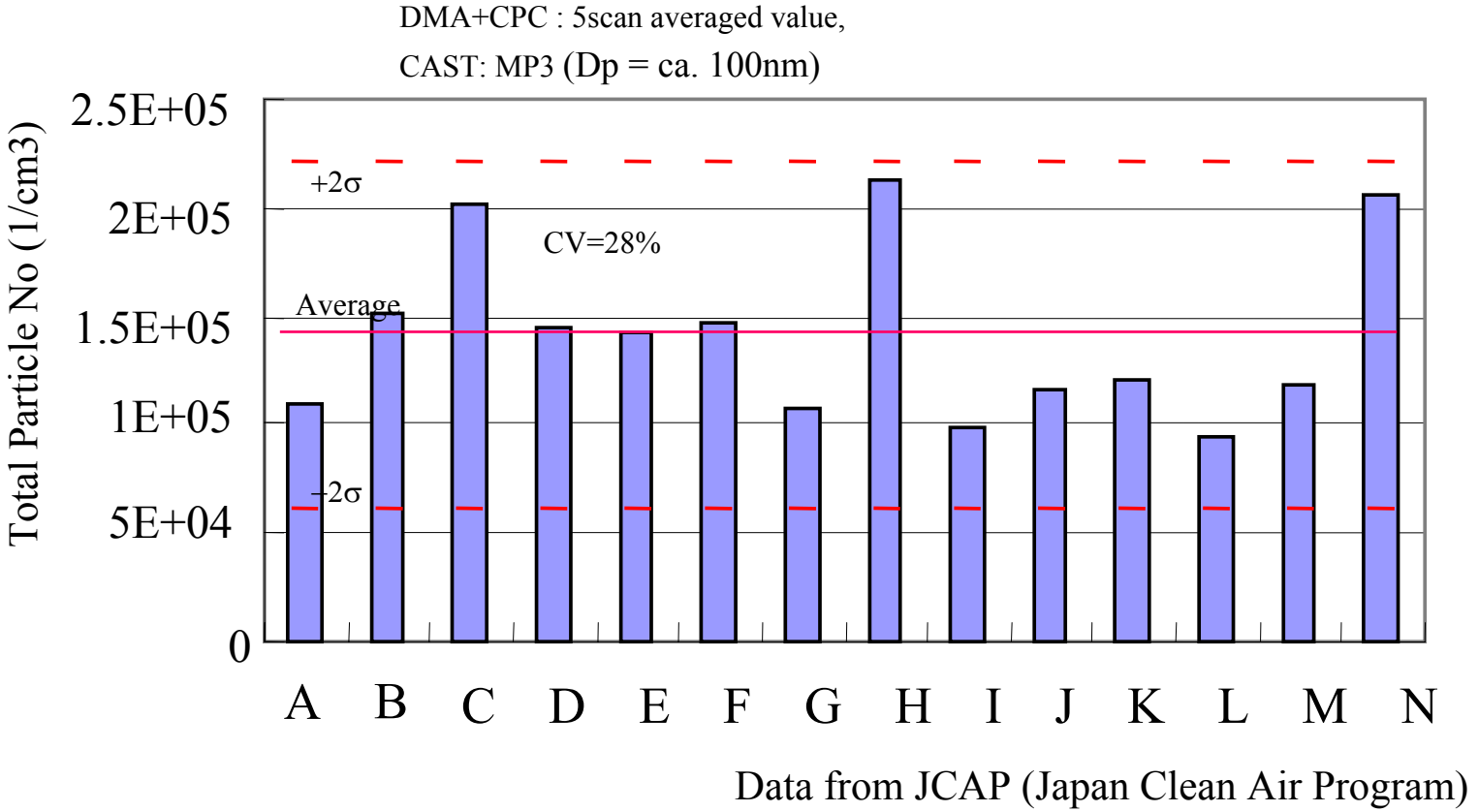
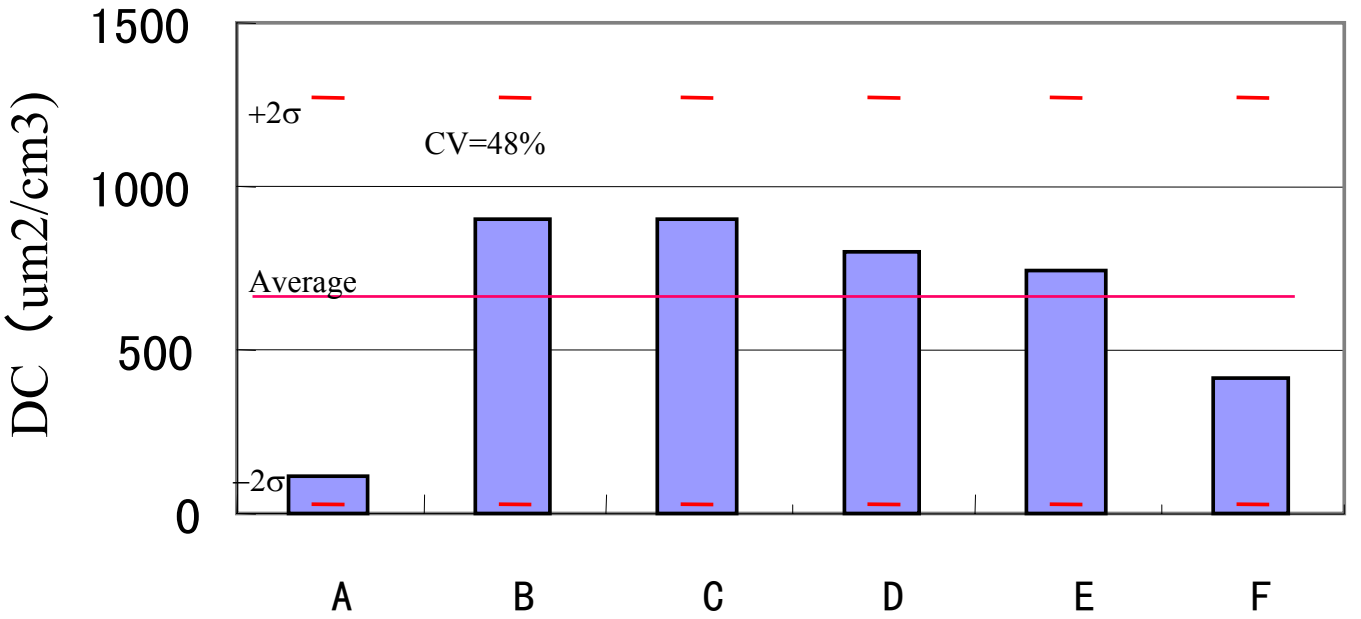


Fig.5 DC Total Particle Surface Area (100nm)

- Simultaneous measurements of total particle surface area from CAST using different DCs

  DC : 5scan averaged value,

  CAST: MP3 (Dp = ca. 100nm)



Data from JCAP (Japan Clean Air Program)