



## SURFACE CLEANLINESS LEVELS RELATING TO PARTICULATE MATTER

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**The residual contamination achieved after cleaning depends upon the selected cleaning method. It is widely regarded as impossible to achieve the MIL-STD limit of 1.56 µg/cm<sup>2</sup> of sodium chloride equivalent contamination, by using a dry cleaning procedure only. However, by using a high pressure (80bar) aqueous cleaning procedure, residual contamination levels of below 1 µg/cm<sup>2</sup> can be consistently achieved.**

### Surface Cleanliness

In order to understand how surface cleanliness levels of sensitive components can be classified, and achieved, it should be understood that only recently has some determined effort been made within international standards and regulatory bodies to categorise and standardise means of measurement, classification of results, and methods of precision cleaning which can be utilised, in order to achieve the desired level of surface cleanliness classification (SCC)

Common Name	SCC	Level of Cleanliness
Rough Cleaning	100	In daylight no particles are perceptible to the naked eye
Fine Cleaning	10	No particles are perceptible under inspection with a magnifying glass (8 x) or using white or UV light under an oblique angle.
Precision Cleaning	1	<1 particle/cm <sup>2</sup> >5µm are perceptible by light optical microscope inspection
Ultrafine Cleaning	0.1	<1 particle/cm <sup>2</sup> >1µm are perceptible by selected measurement and counting techniques

Only very light, dry, particles of relatively large individual diameters can be removed successfully by dry cleaning methods i.e. brushing or a combination of brushing and vacuuming. Interparticulate adhesion limits the effectiveness of dry cleaning where the contamination consists of particles smaller than 10µm, regardless of the quality of the vacuum system utilised.

Wet cleaning decontamination methods and procedures, are able to remove particulate matter, to any specific requirement or specification on a consistently repeatable basis..

*A very simple example of the difference between 'wet' cleaning and 'dry' cleaning is the cleaning of exterior surfaces of automobiles. To attempt to remove particulate matter by simply vacuuming the exterior of the vehicle, would be immediately recognised by most people, as being an exercise in futility.*

The example may seem to be simplistic in relation to the cleaning of electronics, but does illustrate the effectiveness of wet cleaning vs. brushing or vacuuming.