

DIN EN 16602-70-50:2015-05 (E)

Space product assurance - Particles contamination monitoring for spacecraft systems and cleanrooms; English version EN 16602-70-50:2015

Foreword	4
Introduction	5
1 Scope	6
2 Normative references	7
3 Terms, definitions and abbreviated terms	8
3.1 Terms defined in other standards	8
3.2 Terms specific to the present standard	8
3.3 Abbreviated terms.....	11
4 Particulate cleanliness monitoring requirements	12
4.1 Cleanliness requirement specification overview	12
4.2 Cleanliness and contamination control plan	12
5 Quantitative method requirements	13
5.1 Particles sampling from surfaces	13
5.1.1 Tape lift method	13
5.1.2 Direct deposition on silicon wafers	16
5.1.3 Rinsing (direct or indirect)	18
5.2 Volume sampling	21
5.2.1 Particles sampling from filtered liquid samples	21
5.2.2 Particles sampling from filtered gas samples.....	23
5.2.3 Particles sampling with automatic counters	25
5.3 Particles counting with microscope	25
5.3.1 Introduction	25
5.3.2 General requirements	25
5.3.3 Apparatus	26
5.3.4 Method.....	26
5.3.5 Statistical sampling method.....	27
5.3.6 Conversion of particle count to obscuration factor.....	29
5.4 Particle fallout measurement (PFO).....	30
5.4.1 Introduction	30
5.4.2 General requirements	30

5.4.3	Apparatus	30
5.4.4	Cleaning of the sensors	31
5.4.5	Packing of PFO sensors.....	31
5.4.6	Transportation of PFO sensors	31
5.4.7	Exposure of PFO sensors	32
5.4.8	Location of the PFO sensors.....	32
5.4.9	Fixation of the PFO sensors.....	33
6	Visual inspection method requirements.....	34
6.1	Introduction.....	34
6.2	General requirements	34
6.3	Visual inspection of small items	35
6.3.1	Visual inspection of small contamination sensitive items	35
6.3.2	Visual inspection of small non sensitive contamination items	37
6.4	In situ visual inspection of spacecraft.....	38
6.4.1	Introduction	38
6.4.2	Apparatus	38
6.4.3	Method.....	38
7	Quality assurance.....	39
7.1	Records	39
7.2	Report.....	39
7.3	Acceptance criteria and nonconformance	39
Annex A (normative) Request for particle contamination monitoring - DRD		41
Annex B (normative) Particulate contamination monitoring procedure (Work proposal) - DRD		42
Annex C (normative) Report on particle contamination monitoring - DRD		44
Annex D (normative) Report on visual inspection - DRD.....		47
Bibliography.....		50
Figures		
Figure 5-1: Schematic for vacuum filtering apparatus.....		23
Figure 5-2: Gas sampling schematics.....		25
Figure 5-3: Mask example for statistical sampling		28
Tables		
Table 5-1: Ranges and average areas for a single particle in each range		30