

# 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

---

<b>Foreword .....</b>	<b>4</b>
<b>Introduction.....</b>	<b>5</b>
<b>1 Scope.....</b>	<b>6</b>
<b>2 Normative references.....</b>	<b>7</b>
<b>3 Terms, definitions and abbreviated terms.....</b>	<b>8</b>
3.1 Terms defined in other standards .....	8
3.2 Terms specific to the present standard .....	8
3.3 Abbreviated terms.....	11
<b>4 Particulate cleanliness monitoring requirements.....</b>	<b>12</b>
4.1 Cleanliness requirement specification overview .....	12
4.2 Cleanliness and contamination control plan .....	12
<b>5 Quantitative method requirements .....</b>	<b>13</b>
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
<b>6</b>	<b>Visual inspection method requirements.....</b>	<b>34</b>
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
<b>7</b>	<b>Quality assurance.....</b>	<b>39</b>
7.1	Records .....	39
7.2	Report.....	39
7.3	Acceptance criteria and nonconformance .....	39
<b>Annex A (normative)</b>	<b>Request for particle contamination monitoring - DRD .....</b>	<b>41</b>
<b>Annex B (normative)</b>	<b>Particulate contamination monitoring procedure (Work proposal) - DRD .....</b>	<b>42</b>
<b>Annex C (normative)</b>	<b>Report on particle contamination monitoring - DRD .....</b>	<b>44</b>
<b>Annex D (normative)</b>	<b>Report on visual inspection - DRD .....</b>	<b>47</b>
<b>Bibliography.....</b>		<b>50</b>
<b>Figures</b>		
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
<b>Tables</b>		
Table 5-1:	Ranges and average areas for a single particle in each range .....	30