

ISO 15388:2022-10 (E)

Space systems - Contamination and cleanliness control

| Contents | Page |
|----------------------------------------------------------------------|------|
| Foreword | v |
| Introduction | vi |
| 1 Scope | 1 |
| 2 Normative references | 1 |
| 3 Terms, definitions and abbreviated terms | 1 |
| 3.1 Terms and definitions | 1 |
| 3.2 Abbreviated terms | 7 |
| 4 Management | 8 |
| 4.1 Organization | 8 |
| 4.2 Cleanliness requirement specification (CRS) | 8 |
| 4.3 Contamination and cleanliness control plan (CCCP) | 8 |
| 4.4 Interface control document (ICD) | 9 |
| 4.5 Project reviews | 9 |
| 5 Design activities | 9 |
| 5.1 Identification of sensitive hardware | 9 |
| 5.2 Nature of contaminants, their profile and their effects | 9 |
| 5.2.1 General | 9 |
| 5.2.2 Typical contaminants | 9 |
| 5.2.3 Contamination profile | 10 |
| 5.2.4 Effects of contamination on performance | 10 |
| 5.3 Contamination prediction | 10 |
| 5.4 Contamination budget | 10 |
| 5.5 Cleanliness-oriented design | 10 |
| 5.6 Selection of materials and processes | 11 |
| 5.6.1 General | 11 |
| 5.6.2 Outgassing | 11 |
| 5.6.3 Absorbed water vapour | 11 |
| 5.6.4 Offgassing | 12 |
| 5.6.5 Quality control | 12 |
| 6 Biocontamination | 12 |
| 6.1 General | 12 |
| 6.2 Contamination of hardware by microorganisms | 12 |
| 6.3 Sterile hardware | 12 |
| 6.4 Habitable space systems | 13 |
| 6.4.1 Habitable spacecraft | 13 |
| 6.4.2 Offgassing | 13 |
| 6.5 Planetary protection | 13 |
| 6.6 Sample protection | 13 |
| 7 Contamination and cleanliness control for ground operations | 13 |
| 7.1 Training of personnel | 13 |
| 7.2 Cleanroom selection and cleanliness control | 14 |
| 7.2.1 General | 14 |
| 7.2.2 Failure of facilities | 14 |
| 7.2.3 Facility operating procedures | 14 |
| 7.2.4 Additional information | 14 |
| 7.3 Cleanroom garments | 15 |
| 7.3.1 General | 15 |
| 7.3.2 Considerations for garment selection | 15 |

| | | |
|---------------------|---------------------------------------------------------------------------|-----------|
| 7.3.3 | Additional information | 15 |
| 7.4 | Ground support equipment (GSE) | 15 |
| 7.5 | Monitoring cleanliness of flight hardware and its near surroundings | 15 |
| 7.6 | Packaging, storage and transport | 16 |
| 7.6.1 | Packaging | 16 |
| 7.6.2 | Storage | 16 |
| 7.6.3 | Transport | 16 |
| 7.7 | Cleaning of flight hardware | 16 |
| 7.7.1 | General | 16 |
| 7.7.2 | Cleaning procedures | 16 |
| 7.7.3 | Bakeout | 16 |
| 7.7.4 | Contaminant source containment | 17 |
| 7.7.5 | Purging | 17 |
| Annex A | (informative) Material properties — Electronic databases | 18 |
| Annex B | (informative) Contamination analysis | 19 |
| Annex C | (informative) Factors of combined uncertainty | 30 |
| Bibliography | | 31 |