



National Standards Authority of Ireland

STANDARD

I.S. EN 14607-5-1:2004

ICS 49.140

National Standards
Authority of Ireland
Dublin 9
Ireland

Tel: (01) 807 3800
Fax: (01) 807 3838

SPACE ENGINEERING - MECHANICAL - PART

5-1: LIQUID AND ELECTRIC

PROPELLION FOR SPACECRAFT

This Irish Standard was published under the authority of the National Standards Authority of Ireland and comes into effect on:

October 26, 2004

NO COPYING WITHOUT NSAI
PERMISSION EXCEPT AS
PERMITTED BY COPYRIGHT
LAW

© NSAI 2004

Price Code R

Údarás um Chaighdeán Náisiúnta na hÉireann

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 14607-5-1

August 2004

ICS 49.140

English version

**Space engineering - Mechanical - Part 5-1: Liquid and electric
propulsion for spacecraft**

Assurance produits des projets spatiaux - Mécanique -
Partie 5-1: Propulsion liquide et électrique pour engins
spatiaux

Raumfahrttechnik - Mechanik - Teil 5-1: Antrieb

This European Standard was approved by CEN on 27 June 2003.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

	page
Foreword.....	5
1 Scope	6
2 Normative references	6
3 Terms and definitions, abbreviated terms and symbols	7
3.1 Terms and definitions	7
3.2 Definition of masses.....	11
3.3 Abbreviated terms	13
3.4 Symbols	14
4 Propulsion engineering activities	15
4.1 Overview	15
4.1.1 Characteristics of propulsion systems	15
4.1.2 Structure of requirements.....	15
4.2 Generic.....	16
4.2.1 Introduction	16
4.2.2 General.....	16
4.2.3 Standards	16
4.2.4 Quality system	16
4.2.5 Design	16
4.2.6 Materials	16
4.2.7 Maximum expected operating pressure (MEOP).....	16
4.2.8 Documentation.....	17
5 Liquid propulsion systems for spacecraft	17
5.1 General.....	17
5.2 Functional.....	18
5.2.1 Mission.....	18
5.2.2 Functions.....	18
5.3 Constraints	19
5.3.1 Accelerations	19
5.3.2 Pressure vessels and pressurized components	19
5.3.3 Induced and environmental temperatures	19
5.3.4 Thruster surroundings	19
5.3.5 Thruster arrangement	19
5.4 Interfaces	19
5.5 Configurational	20
5.5.1 General.....	20
5.5.2 Selection	21
5.5.3 Sizing	22
5.5.4 Development	23
5.5.5 External contaminants	23
5.5.6 Internal contaminants	23
5.5.7 Explosion risk	24
5.5.8 Components guidelines	24
5.5.9 Mass imbalance	25
5.5.10 Ground support equipment (GSE)	26
5.5.11 Filters	26
5.5.12 Draining	27
5.5.13 Blow-down ratio	27
5.5.14 Pyrotechnic devices	27
5.5.15 Pressure vessels.....	27
5.5.16 Propellant tanks	27
5.5.17 Thrusters	28
5.5.18 Thrust-vector control (TVC).....	29

5.5.19	Monitoring	30
5.6	Verification	30
5.6.1	General.....	30
5.6.2	Verification by analysis.....	30
5.6.3	Verification by test.....	33
5.6.4	Data exchange for models	36
5.7	Quality factors.....	36
5.7.1	Reliability.....	36
5.7.2	Production and manufacturing process	37
5.8	Operation and disposal.....	37
5.8.1	General.....	37
5.8.2	Operations on ground.....	37
5.8.3	Tank operation	37
5.8.4	Disposal	38
5.9	Support.....	38
6	Electric propulsion systems for spacecraft.....	38
6.1	General.....	38
6.2	Functional.....	39
6.2.1	Mission.....	39
6.2.2	Functions.....	39
6.2.3	Performances.....	40
6.3	Constraints.....	41
6.3.1	General.....	41
6.3.2	High frequency current loops	41
6.3.3	Plume effects	41
6.3.4	Thermal fluxes	42
6.3.5	Electromagnetic compatibility	42
6.3.6	Electric charging.....	42
6.4	Interfaces	42
6.4.1	Interface with the spacecraft	42
6.4.2	Interface with the power bus	42
6.5	Configurational	43
6.5.1	General.....	43
6.5.2	Selection	44
6.5.3	Sizing	45
6.5.4	Design development.....	45
6.5.5	Components guidelines	46
6.5.6	Thrusters	46
6.5.7	Thrust-vector control	48
6.5.8	Propellant management assembly	48
6.5.9	Propellant tanks	49
6.5.10	Blow-down ratio	50
6.5.11	Pressure vessels	50
6.5.12	Pwer supply, control and processing subsystem.....	50
6.5.13	Monitoring	51
6.5.14	Pyrotechnic devices	51
6.5.15	Ground support equipment (GSE)	51
6.5.16	Contaminants	52
6.5.17	Electrical design	52
6.6	Physical	53
6.6.1	Materials	53
6.6.2	Mass imbalance	53
6.7	Verification	54
6.7.1	General.....	54
6.7.2	Verification by analysis.....	54
6.7.3	Verification by test.....	55
6.7.4	Data exchange for models	56
6.8	Quality factors.....	57
6.8.1	Reliability.....	57
6.8.2	Production and manufacturing	57
6.9	Operation and disposal.....	57

EN 14607-5-1:2004 (E)

6.10 Support	57
Annex A (informative) Standards for propellants, pressurants, simulants and cleaning agents	58
A.1 Rational	58
A.2 Propellants	58
A.2.1 Storable propellants	58
A.2.2 Solid propellants	58
A.2.3 Liquid	58
A.2.4 Gas	59
A.3 Pressurants	59
A.4 Simulants	60
A.5 Cleaning agents	60
Bibliography	61

Figures

Figure 1 — Definition of propulsion-related masses	12
--	----

Tables

Table 1 — Terms used for project documents	17
--	----

Table 2 — Component failure modes	25
---	----



This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- Looking for additional Standards? Visit Intertek Inform Infostore
- Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation