



AEROSPACE RECOMMENDED PRACTICE

ARP1051™

REV. C

Issued 1968-05
Revised 2012-02
Reaffirmed 2021-09

Superseding ARP1051B

Format, Text, and Numbering System for Preparing Specifications
Covering Civil Aircraft Ground Support Equipment

RATIONALE

ARP1051C has been reaffirmed to comply with the SAE five-year review policy.

FOREWORD

Changes in this revision are format/editorial only.

1. SCOPE

This SAE Aerospace Recommended Practice (ARP) covers all types of ground support equipment required to support civil transport aircraft.

1.1 Purpose

This document establishes an outline guide, with related explanatory information to each heading, for use in the preparation of specifications required for the procurement of ground support equipment.

2. REFERENCES

There are no referenced publications specified herein.

3. GENERAL REQUIREMENTS

3.1 Paper and Printing

Paper should be white in color and of sufficient weight and substance to eliminate show-through when printed on both sides.

3.2 Page Layout

a. Size - Standard 8 1/2 x 11 inches

Oversize 11 x 17 inches

b. Margin Limitations - 1-1/8 inches clear on binding edge; 5/8 inch clear on outside edge; 1 inch clear at top and bottom.

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<https://www.sae.org/standards/content/ARP1051C/>

3.3 Page Numbers and Dates

Each page should bear a page number placed in the lower outside corner of the page. Illustration title and figure number should be placed centrally at the bottom of the page or illustration. Each page should bear a date: either that of the original issue or of the latest revision. On pages requiring folding, the fold should allow the page number to be visible.

3.4 Type Size

The text should be prepared in appropriate size (minimum 10 point) font and figures.

3.5 Identifying Revised Material

Revisions, additions and deletions should be identified by a vertical black line along the left-hand margin of the text or drawing.

3.6 Title Page

Each specification should carry a title page with the minimum information as follows:

Company Name:

Location:

Title:

Specification Number:

Release Date:

Preparation and Approval Blocks:

Revision Number:

The originating company or agency should determine arrangement.

3.7 Table of Contents and Numbering System

Each specification should include a table of contents and numbering system following the title page.

The table of contents and numbering system should be as follows:

1. Scope
2. Applicable Documents
3. Requirements
 - 3.1 Performance
 - 3.2 Operability
 - 3.3 Reliability
 - 3.4 Maintenance Requirements
 - 3.4.1 Maintainability
 - 3.4.2 Maintenance Repair Cycle
 - 3.4.3 Service and Access
 - 3.5 Total Life
 - 3.6 Environmental
 - 3.7 Transportability
 - 3.8 Intended Conditions of Use
 - 3.9 Personnel Safety
 - 3.10 Equipment Safety
 - 3.11 Noise and Vibration
 - 3.12 Equipment Definition
 - 3.12.1 Interface Requirements
 - 3.12.2 Customer Furnished Property List

- 3.12.3 Manuals/Publications
- 3.12.4 Tools and Test Equipment
- 3.12.5 Training
- 3.13 Design and Construction
 - 3.13.1 General Design Features
 - 3.13.2 Materials, Parts, and Processes
 - 3.13.3 Standard and Commercial Parts
 - 3.13.4 Moisture and Fungus Resistance
 - 3.13.5 Corrosion of Metal Parts
 - 3.13.6 Interchangeability and Replaceability
 - 3.13.7 Workmanship
 - 3.13.8 Electromagnetic Interference
 - 3.13.9 Identification and Marking
 - 3.13.10 Storage
 - 3.13.11 Exterior Finish
 - 3.13.12 Human Engineering
- 4. Quality Assurance Provisions
 - 4.1 Preliminary Qualification Tests
 - 4.2 Formal Qualification Tests
 - 4.3 Inspection
 - 4.4 Analyses
 - 4.5 Demonstrations
 - 4.6 Tests
 - 4.7 Reliability Test and Analyses
- 5. Instructions for Shipment
 - 5.1 Preparation for Shipment
 - 5.2 Shipment
- 6. Definitions and Abbreviations
- 7. Notes
- 8. Details for Contractual Negotiations
 - 8.1 Product Support
 - 8.2 Warranty
 - 8.3 Performance Guarantee

3.8 Contents

The specification should contain complete information as suggested by the table of contents and as further defined by Appendix. If certain contents are to be deleted under one of the headings in the table of contents the heading should be shown and the words "Not Applicable" should be inserted after the heading. Do not omit the numbering system.

Example: 3.11 Noise and Vibration - "Not Applicable".

NOTE: This should be done in the table of contents as well as in the text.

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OF COMMITTEE AGE-2, AIR CARGO & AIRCRAFT GROUND EQUIPMENT & SYSTEMS

REAFFIRMED BY SAE COMMITTEE AGE-3, AIRCRAFT GROUND SUPPORT EQUIPMENT COMMITTEE

APPENDIX A – SECTIONS CONTENTS GUIDELINES

A.1 SCOPE

This initial section of the specification should briefly describe the intended general use of the equipment without direct reference to the system or equipment to which it is related. Material included in this section may be descriptive, qualitative and/or quantitative. The primary output or use, as well as the primary input or operator requirements of the equipment, should be included.

A.2 APPLICABLE DOCUMENTS

List (by specific issue where appropriate) those documents (specifications, standards, drawings, bulletins, manuals, ARP's, etc.) which are applicable to paragraphs within other sections of the specification. Within the body of the specification, these documents should be referred to by their basic document number and specific applicable paragraph. In cases of conflict between this specification and the listed documents, this specification should govern.

In relation with 3.8 and 3.9, applicable documents should at least include the legal Health and Safety references, i.e.:

- for equipment intended to be operated in the U.S.: Title 29 CFR, Part 1910 – OSHA requirements,
- for equipment intended to be operated in Europe: EU Council Directive 2006/42/EC of 17 May 2006 on machinery.

A.3 REQUIREMENTS

This section should contain equipment performance definitions and design requirements for the equipment. This section should include functional requirements for the equipment and establish requirements which are measures of this efficiency/effectiveness of the equipment. This section should define the equipment and specify design constraints and standards necessary to assure compatibility of the equipment with existing inventory as appropriate. ARP's, AS's, and AIR's shall be used by reference as applicable.

A.3.1 Performance

This paragraph should specify equipment performance in terms of functional requirements. This paragraph should include requirements which establish the efficiency/effectiveness of the equipment. These requirements should be detailed as necessary to establish limits for design.

A.3.2 Operability

This paragraph should specify performance requirements which are general measures of the equipment's efficiency. This includes such measures as reliability, maintainability, and transportability, as well as ability to operate in the natural environment, human engineering features, and safety features.

A.3.3 Reliability

This paragraph should specify reliability, in quantitative terms, with tolerance for the equipment: e.g., mean time between failure should be ___ hours assuming exponential distribution of times to failure.

A.3.4 Maintenance Requirement

This paragraph and appropriate subparagraphs should specify maintenance features, characteristics, and quantitative requirements for the equipment. Requirements should be stated quantitatively, with tolerance, or otherwise specified in a manner which can be verified by inspection or test. This paragraph should include but not be limited to the following subparagraphs:

A.3.4.1 Maintainability: This paragraph should specify maintainability requirements in quantitative terms, with tolerance: e.g., mean time to repair; maintenance man-hours per operating hour.

A.3.4.2 Maintenance Repair Cycle: This paragraph should specify requirements for maintenance repair cycles for the equipment: e.g., scheduled maintenance every ___ operating hours; overhaul every ___ operating hours.

A.3.4.3 Service and Access: This paragraph should specify requirements for service, such as access doors, built-in tools, self-test capability, inspection windows, test jacks, sealed and life-warranted bearings, expendable plug-ins. It should include requirements such as capability of the equipment to be drained, discharged, snubbed or otherwise secured, and provided with quick disconnects.

A.3.5 Total Life

This paragraph should specify total life requirements for the equipment. It should include requirements for shelf-life as well as operating life and combinations thereof. "Total Life" is defined to be the period from time of delivery of the equipment to the developing activity until its identity is destroyed by classifying it as salvage and/or subjected to cannibalization.

A.3.6 Environment

Standards of natural environment which the equipment is to be operated should be included herein. This paragraph should cover such conditions as wind loading, snowloading, precipitation, ranges in temperature, humidity, atmospheric pressure, and turbulence.

A.3.7 Transportability

Requirements peculiar to transportability should be specified herein. This paragraph would specify restrictions on the maximum dimensions and weight of the equipment as crated for shipment, and should include peculiar or unusual tie-down requirements imposed by specified methods of transportation. Should mobility be a significant feature of this equipment, this paragraph should include the estimated time (in terms of man-hours and/or elapsed time) allocated to prepare this equipment for transport.

A.3.8 Intended Conditions of Use

Requirements for this equipment to preclude or limit hazard to personnel and/or equipment should be specified, including reasonably foreseeable equipment misuse. To the extent practical, these requirements should be imposed by citing established and recognized standards.

A.3.9 Personnel Safety

This paragraph should specify personnel safety limitations peculiar to this equipment because of unusual hazards in its manufacture, test, transport, storage, operation or maintenance which are provided neither by standard industrial and governmental practices and regulations. Such hazards may include flammability limits, susceptibility to accidental explosion, production of noxious or toxic gases, uses of or production of hazardous chemicals, ease of access and exit, emergency exit, etc.

A.3.10 Equipment Safety

This paragraph should specify "fail safe" or emergency operation requirements, including requirements for redundancy, interlocks, emergency and standby circuits, and others intended principally to prevent damage to the equipment.

A.3.11 Noise and Vibration

This paragraph should specify the limiting noise and vibration criteria applicable to the equipment. To the extent that requirements peculiar to noise and vibration are specified in above paragraph 3.8, "Safety" aspects should not be redundantly specified in this paragraph.

A.3.12 Equipment Definition

This paragraph and its subparagraphs should specify the mechanical and functional relationship of the equipment to other equipment/facilities, identify individual components incorporated in the equipment which require individual specifications, and specify requirements for technical manuals, training, tools and test equipment.

- A.3.12.1 Interface Requirements: Either directly or by reference, this paragraph should specify requirements imposed on the design of the equipment because of its relationship to other equipment/facilities. This includes schematic arrangement data which establishes limits for detail design.
- A.3.12.2 Customer-Furnished Property List: This paragraph should list the Customer-Furnished Property which the equipment must be designed to incorporate. This list should identify the property by referring to its nomenclature, specification number, and its part number.
- A.3.12.3 Manuals/Publications: This paragraph should specify the operating, illustrated parts, maintenance and overhaul manuals which will be required for operation, maintenance and overhaul of the equipment including the format specification applicable, i.e., ATA 101.
- A.3.12.4 Tools and Test Equipment: This paragraph should specify design restraints which limit requirements for tools and test equipment.
- A.3.12.5 Training: This paragraph should specify the training requirements for operation, maintenance, and overhaul of the equipment.

A.3.13 Design and Construction

This paragraph should specify design and construction requirements for the equipment. Requirements should be specified in subparagraphs to include, but not be limited to, the following:

- A.3.13.1 General Design Features: This paragraph and appropriate subparagraphs should specify design features and physical characteristics of the equipment, e.g., size, weight, shape, and individual critical dimensions. Requirements specified herein may be descriptive (e.g., "Access panels should not be designed to carry primary structural loads") or expressed in quantitative terms (e.g., "Running gear track should not exceed _____ feet".) Requirements to be specified herein should normally be verifiable by inspection of the equipment. Arrangement drawings, three-view drawings, list drawings, and equivalent engineering documentation may be incorporated in this paragraph either directly or by reference.
- A.3.13.2 Materials and Processes: This paragraph specifies requirements for, or prohibits the use of, individual and/or types of materials and processes.
- A.3.13.3 Standard and Commercial Parts: This paragraph should specify requirements pertinent to the use of standard and commercial parts.
- A.3.13.4 Moisture and Fungus Resistance: This paragraph should specify requirements for moisture and fungus resistant material and parts.
- A.3.13.5 Corrosion of Metal Parts: This paragraph should specify requirements for the use of protective coatings and other corrosion-control requirements.
- A.3.13.6 Interchangeability and Replaceability: This paragraph should specify requirements for components, assemblies and parts of the equipment to be interchangeable and replaceable.
- A.3.13.7 Workmanship: This paragraph should specify the requirements for workmanship incident to fabrication of the equipment. These requirements should be available to the designer so that it will be properly emphasized on drawings and other engineering documentation.