

AEROSPACE RECOMMENDED PRACTICE

SAE ARP1870

REV. A

Issued 1987-01 Reaffirmed 1999-04 Stabilized 2012-08

Superseding ARP1870

Aerospace Systems Electrical Bonding and Grounding for Electromagnetic Compatibility and Safety

RATIONALE

The document is still a valid standard which may benefit from a future update. The basic technology described in the document is still valid. The subcommittee designated to update the document is not currently active, so stabilization of the document is the best approach until such time as a committee can be established to open a WIP.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE AE-4, Electromagnetic Environmental Effects (E3) Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2012 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)

Tel: +1 724-776-4970 (outside USA) Fax: 724-776-0790

Email: CustomerService@sae.org

SAE WEB ADDRESS: http://www.sae.org

SAE values your input. To provide feedback on this Technical Report, please visit http://www.sae.org/technical/standards/ARP1870A

TABLE OF CONTENTS

SCO)PE	4
	Purpose	4
REF	ERENCE DOCUMENTS	4
DEF	INITIONS	5
02.1		
	Electrical Bonding	6
.1	Bond Effectiveness	6
.2	Precedence	6
	Grounding	7
	Earthing of Aircraft and Ground Services	7
	Design Requirements	7
.1	Direct Electrical Bonds	9
.2	Indirect Electrical Bonds	9
	Bonding Straps	10
.1	· ·	
.2	· · · · · · · · · · · · · · · · · · ·	
	- •	
	Intermetallic Contact	12
	REF DEF GEN .1 .2	REFERENCE DOCUMENTS DEFINITIONS GENERAL BONDING AND GROUNDING GUIDANCE Electrical Bonding 1 Bond Effectiveness 2 Precedence Grounding Earthing of Aircraft and Ground Services. Design Requirements Types of Electrical Bonds 1 Direct Electrical Bonds 2 Indirect Electrical Bonds Bonding Straps 1 Characteristics of Individual Bonding Straps 2 Characteristics of Bonding Strap Installations Bonding Jumpers Bonding Metal and Finish Selection

TABLE OF CONTENTS (Continued)

5. DE1	TAIL REQUIREMENTS	13
5.1	Aluminum Surface Preparation	13
5.2	Magnesium Alloy Surface Preparation	
5.3	Steel Surface Preparation	
5.4	Structural Metallic Parts	
5.5	Refinishing	
5.6	Conductive Paste	
5.7	Electrical Bonding Methods	
5.8	Bonding Antenna Installations	
5.8.1	Impedance	
5.8.2	Bonding Resistance	
5.8.3	Return Path	
5.8.3.1	Alternate Return Path	
5.8.4	Lightning Paths	
5.9	Electrical Grounding	
5.9.1	Methods of Grounding or Bonding	
5.9.2	Cross-Sectional Consideration	
5.10	Lightning Bonding Considerations	
5.11	Composite Bonding	18
5.12	Nonmetallic Parts	18
5.13	Measuring Bond Resistance/Reactance	19
5.13.1	Shock and Fire Safety	19
6. QU/	ALITY ASSURANCE PROVISIONS	20
6.1	In-Progress Inspection	20
6.2	Final Inspection	
6.3	Inspection Responsibility	
6.4	Inspector Certification	
TABLE	Direct Current Resistance Limits for Electrical Bonding	21
TABLE		
TABLE		
CHADT		
CHART	1 Fault Current Versus Maximum Allowed Resistance for Bonding Between Equipment and Structure	24