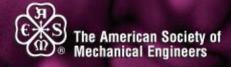
This is a free page sample. Access the full version online.

ASME B89.7.3.1-2001

GUIDELINES FOR DECISION RULES: CONSIDERING MEASUREMENT UNCERTAINTY IN DETERMINING CONFORMANCE TO SPECIFICATIONS

AN AMERICAN NATIONAL STANDARD





AN AMERICAN NATIONAL STANDARD

GUIDELINES FOR DECISION RULES: CONSIDERING MEASUREMENT UNCERTAINTY IN DETERMINING CONFORMANCE TO SPECIFICATIONS

ASME B89.7.3.1-2001

Date of Issuance: March 18, 2002

This Standard will be revised when the Society approves the issuance of a new edition. There will be no addenda issued to this edition.

ASME will issue written replies to inquiries concerning interpretation of technical aspects of this Standard.

ASME is the registered trademark of The American Society of Mechanical Engineers.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not "approve," "rate," or "endorse" any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor assume any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

No part of this document may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

The American Society of Mechanical Engineers Three Park Avenue, New York, NY 10016-5990

Copyright © 2002 by THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS All Rights Reserved Printed in U.S.A.

CONTENTS

		d	iv				
		tee Roster	vi				
Correspondence With the B89 Committee							
Ab	stract	· · · · · · · · · · · · · · · · · · ·	viii				
1	Sco	ppe	1				
2	Def	initions	1				
3	Red	quirements for Decision Rules	2				
	3.1	Zone Identification	2				
	3.2	Decision Outcome	2				
	3.3	Repeated Measurements	2				
	3.4	Data Rejection	2				
4	Acc	ceptance and Rejection Zones in Decision Rules	3				
	4.1	Simple Acceptance and Rejection Using a N:1 Decision Rule	3				
	4.2	Stringent Acceptance and Relaxed Rejection Using a Z% Guard Band	4				
	4.3	Stringent Rejection and Relaxed Acceptance Using a Z% Guard Band	4				
	4.4	Decision Rules With a Transition Zone	5				
5	Exa	Examples of Decision Rules					
	5.1		5				
	5.2		6				
	5.3		6				
	5.4		6				
Fiç	jures	3					
	1	An Example of Guard Bands Used for Creating a Binary Decision Rule					
		With Stringent Acceptance and Relaxed Rejection Zones	3				
	2	An Example of Simple Acceptance and Rejection Using a 4:1 Ratio	3				
	3	Stringent Acceptance and Relaxed Rejection Examples	4				
	4	Symmetric Two-Sided Relaxed Acceptance and Stringent Rejection	5				
	5	Stringent Acceptance, Simple Rejection, and a Transition Zone Example					
		Using Symmetric Two-Sided Guard Banding	5				
No	nma	indatory Appendices					
	A	Application of Decision Rules in the Customer-Supplier Relationship	7				
	В	Repeated Measurement	8				
	C	Outlier Measurement Results	9				
	D	Special Issues of Decision Rules for Instrumentation	10				
	E	Determination of Guard Band Limits	12				
	F	A Discussion of ISO 14253-1	13				
	G	References	14				

FOREWORD

The intent of these guidelines is to facilitate the development of understanding between suppliers and customers regarding measurement uncertainty in the decision to accept or to reject a product. Metrologists are continuously faced with the task of making decisions in the presence of measurement uncertainty. To formalize this task, procedures known as decision rules have been developed. A decision rule is a prescription for the acceptance or rejection of products based on the measurement result of a characteristic of the product, the permissible variation associated with that characteristic, and the uncertainty of the measurement result. For workpieces, the permissible variation is commonly called the tolerance; for instruments it is often given by the specification limits or maximum permissible error (MPE). The terminology of ISO 14253-1 has been adopted and the permitted variation of a product's characteristic is referred to as the specification zone. This document is intended to provide guidance on decision rules and their implementation.

A related document, ASME B89.7.2-1999, Dimensional Measurement Planning, specifies requirements for preparation and approval of dimensional measurement plans and for the use of approved plans in making dimensional measurements. The dimensional measurement plan must contain or reference all information for making measurements, including specification of a decision rule. ASME B89.7.3.1 serves as a resource to the dimensional measurement planner by providing terminology and specifying the requirements for decision rules for use in dimensional measurement plans.

The Guide to the Expression of Uncertainty in Measurement, (GUM), NCSL Z540-2-1997 provides a unified means of evaluating and expressing the uncertainty of a measurement result; consequently the calculational details of evaluating the uncertainty of a measurement result will not be discussed. Unless otherwise stated, the term "measurement uncertainty" will be used to mean the expanded uncertainty, U, with a coverage factor of two, which is the most common coverage factor used nationally and internationally.

Although all traceable measurement results include an uncertainty statement not all measurement results involve decision rules. (See ISO International Vocabulary of Basic and General Terms in Metrology.) Many calibrations, particularly at National Measurement Institutes (NMIs), typically state a description of the measurement, its result, and its uncertainty; decision rules are not involved since there are no specifications. Most products, however, have stated specifications and a decision must be reached regarding the product's characteristic relative to its stated specifications.

The decision rule in use should be well documented to prevent ambiguity in the acceptance or rejection of product. The selection of a particular decision rule is ultimately a business decision; some of the factors to be considered are outlined in nonmandatory Appendices A and D.

The concept of a decision rule has a long history and over the years has developed many variations including "gauge maker's rule," "test accuracy ratio (TAR)," "test uncertainty ratio (TUR)," "four-to-one rule," "gauging ratio," "guard bands," "gauging limit," and many more. Most of these terms were defined before the development of the GUM and hence concepts such as "accuracy" or "uncertainty" were nebulously defined. One of the motivations of these guidelines is to explicitly define the decision rule concept and have some well-documented decision rules that can be referenced. Consequently, these guidelines have encapsulated some of the commonly used procedures and their specifically-named decision rules.



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

Product Page

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