

CONFIRMED
DECEMBER 2007

Guide for

Protection of machine tools intended for use in extreme environmental conditions

UDC 621.9.022:62-7

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Machine, Engineers and Hand Tools Standards Committee (MTE/-) to Technical Committee MTE/1 upon which the following bodies were represented:

- Department of Trade and Industry (Mechanical and Electrical Engineering Division)
- Federation of British Engineers' Tool Manufacturers
- GAMBICA (BEAMA Ltd)
- Health and Safety Executive
- Institution of Production Engineers
- Machine Tool Industry Research Association
- Ministry of Defence
- University of Aston in Birmingham
- Coopted members

This British Standard, having been prepared under the direction of the Machine, Engineers and Hand Tools Standards Committee, was published under the authority of the Board of BSI and comes into effect on 28 November 1986

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The following BSI references relate to the work on this standard:
Committee reference MTE/1
Draft for comment 85/70428 DC

ISBN 0 580 15474 2

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
1 Scope	1
2 Definitions	1
3 Guidance regarding climatic conditions	1
Appendix A Questionnaire	6
Appendix B Types of climate	9
Appendix C Bibliography	10
Table 1 — Guidance for environmental conditions	2
Table 2 — Types of climate by annual extreme values	9
Publications referred to	Inside back cover

Foreword

This British Standard has been prepared under the direction of the Machine, Engineers and Hand Tools Standards Committee and is based on a draft submitted by the Machine Tool Industry Research Association.

It has long been recognized that a machine tool built for use in a temperate area such as the United Kingdom may require some modification before operation in tropical or arctic conditions. It is hoped that this standard will lead to a common approach to environmental conditions that may be encountered.

Some machine tool manufacturers may wish to obtain details of the environmental conditions in which their products are likely to be used by supplying the customer or his representative with a formal request about climatic conditions, electric supply characteristics, altitude, etc. An example of a questionnaire suitable for this purpose is given in Appendix A.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 12, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard provides guidance on the protection of machine tools intended for use in extreme environmental conditions.

Examples of types of climate are given in Appendix B.

A bibliography is included as Appendix C.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this British Standard the following definitions apply.

2.1

working environment

local conditions in the machine shop (which may be air conditioned or heated, etc.) and not the external or “open air” conditions

2.2

non-working environment

- 1) Conditions where the machine is stored at site prior to installation.
- 2) Conditions where the machine is not in use, e.g. overnight shut-down or holiday period.

2.3

atmospheric contamination

contamination by dusts, fumes, vapours, corrosive gases and salt laden moisture or spray

2.4

biological contamination

contamination by insects, rodents, fungi and moulds and bacteria

2.5

shock or vibration

vibration from neighbouring machinery, road and rail traffic, earth tremors and blasting operations

3 Guidance regarding climatic conditions

Guidance regarding the steps to be taken to protect a machine tool in varied climatic conditions is given in Table 1.

NOTE In order to obtain the required information, observe the number(s) in the box formed by the intersection of a vertical column containing the environment factor and a horizontal column containing the machine item category. Then consult the appropriate number reference in the notes which follow Table 1. Repeat as necessary for other environmental factors.

Table 1 — Guidance for environmental conditions

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Item	Non-working environment ^a			Working environment ^a									
		Ambient temperature			Ambient temperature			Humidity		Altitude above 1 000 m	Atmospheric contamination ^a	Biological contamination ^a	Shock or vibration ^a	Electrical interference or radiation
		Below 0 °C	0 °C to 45 °C	Above 45 °C	Below 5 °C	5 °C to 30 °C	Above 30 °C	0 % r.h. to 80 % r.h. no condensation	Above 80 % r.h. or with condensation					
Construction	Materials	1	49	8	11	11	11	49	23	49	49	49	49	43
	Finishes	2	2	2	2	2	2	2	2, 24	49	2, 31	2	49	49
	Foundations	1	49	49	49	49	49	49	49	49	49	49	39	49
Electrical/Electronic	Electrical control gear, wiring, ducting	3	8, 49	8	12	12	12, 18, 19	49	25, 26, 27	30	28, 32	28, 37	40, 41	45
	Electronic and ancillary instrumented systems	49	8, 49	8, 9	13, 14	14	14, 18	49	25, 26, 27	30	28, 32, 33	28, 37	40, 41	44, 45, 46
	Motors	49	49	49	49	49	20	49	28	20	28	28	49	45, 47
Fluid systems	Electrical components	4, 5	4, 8	4, 5	15	49	15	49	27	49	28	28, 37	41	49
	Non-electrical components	4, 5	4, 8	4, 5	15	49	15	49	49	49	49	49	49	49
	Reservoir equipment	4	4	4	16	49	21	49	49	49	34	49	49	49
	Seals and hoses	5	49	5	17	49	17	49	49	49	35	37	49	49
	Fittings and pipework	4	4	4	15	49	15	49	49	49	31	49	42	49
	Hydraulic fluids	6	49	49	6, 16	49	21	49	29	49	49	38	49	49
	Lubricants	7	7	10, 7	15	49	10, 21	49	49	49	34	38	49	48
	Cutting fluids	6	49	49	6	49	22	49	49	49	36	38	49	49
NOTE The numbers in columns 3 to 15 refer to items in the explanatory notes to the table. ^a See clause 2.														