Specification for

Chart ranges for temperature recording instruments

Co-operating organizations

The Instrument Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:—

Admiralty
Association of Scientific Workers
British Ceramic Research Association
British Clock and Watch Manufacturers Association
British Electrical and Allied Industries Research Association
British Electrical and Allied Manufacturers Association*
British Electricity Authority and Area Boards*
British Industrial Measuring and Control Apparatus Manufacturers Association*
British Iron and Steel Federation*
British Nautical Instrument Trade Association
British Non-Ferrous Metals Federation
British Photographic Manufacturers Association Limited
British Railways, The Railway Executive
British Scientific Instrument Research Association*
Council of British Manufacturers of Petroleum Equipment
Engineering Equipment Users Association*
Gauge and Tool Makers Association
Incorporated Association of Kinematograph Manufacturers Limited
Institute of Physics
Institution of Chemical Engineers
Institution of Electrical Engineers*
Institution of Heating and Ventilating Engineers
Institution of Mechanical Engineers*
Iron and Steel Institute
Meteorological Office
Ministry of Education
Ministry of Health
Ministry of Housing and Local Government
Ministry of Supply*
National Coal Board
National Physical Laboratory*
Oil Companies Materials Committee*
Radio Industry Council
Scientific Instrument Manufacturers Association*
Society of Instrument Technology
Water-Tube Boilermakers Association

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committees entrusted with the preparation of this standard:—

British Coal Utilization Research Association
Gas Council
Institute of Metals
Physical Society
Society of Chemical Industry

This British Standard, having been approved by the Instrument Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 16 April 1952

ISBN 0 580 35608 6

Amendments issued since publication

Amd. No.	Date	Comments

Contents

Foreword

This British Standard, which has been prepared under the aegis of the Instrument Industry Standards Committee, makes recommendations for the temperature ranges of charts used in recording instruments actuated by:

Gas expansion

Mercury-in-steel

Platinum/rhodium v platinum thermocouple

Resistance thermometer

Radiation pyrometer

As the preferred ranges have been compiled from data supplied by many instrument manufacturers their calculation has been achieved by grouping and consolidating the ranges favoured by individual users. Where minor differences in starting point and range were encountered during compilation they were embodied, wherever possible, in one range containing their maximum and minimum temperatures.

It will be readily appreciated that there are in use many preferred ranges which are peculiar to a particular industry or process; these have been included in the ranges specified in this standard. In most cases these special ranges have developed from the need to provide openness of scale at important temperatures and their use requires some special arrangement of the measuring system in order to provide the necessary sensitivity.

Although these chart ranges embrace the whole of the useful temperature scale it is appreciated that not every instrument manufacturer will be in a position to adopt them in their entirety, especially since some of them are for use in conjunction with particular types of measuring systems. Further, the use of the whole of such a comprehensive selection of ranges is unnecessary when instruments are manufactured for a particular section of industry.

The ranges for base metal thermocouples are not classified according to their various types, viz., copper v constantan,[1)] iron v constantan, and nickel/chromium v nickel/aluminium (chromel v alumel and T_1 alloy v T_2 alloy types)[2)] as most ranges have been used up to the individual maximum working temperatures. Due to the different characteristics of the temperature/thermo-electric relationships of the couples, charts of the same temperature range require different spacings according to the thermocouple being used. Hence, the total number of different charts required is considerably greater than the number of chart ranges tabulated.

Suggested preferred ranges for temperature recorders

The suggested preferred ranges for temperature recorders are given in the following tables:—

Table 1 — Even scale recorders (gas expansion, mercury-in-steel, etc.) °C. and °F

Table 2 — Base metal thermocouple recorders °C

Table 3 — Base metal thermocouple recorders °F

Table 4 — Platinum/rhodium v platinum thermocouple recorders °C

Table 5 — Platinum/rhodium v platinum thermocouple recorders °F

Table 6 — Resistance thermometer recorders °C

Table 7 — Resistance thermometer recorders °F

Table 8 — Radiation pyrometer recorders °C.

[1)] *Constantan.* The generally accepted name of an alloy having a nominal composition of approximately 55–60 per cent copper, 45–40 per cent nickel.

[2)] Attention is drawn to the fact that the names chromel, alumel, T_1 alloy and T_2 alloy are proprietary trade names.

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 to iv, pages 1 to 4, 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.

blank

Table 1 — Even scale recorders (gas expansion, mercury-in-steel, etc.) °C. and °F

Starting temperature	Maximum temperature on chart													
– 150							100	150						
– 100					50									
– 50			50		100									
– 30	20		70											
– 20	30		80		130									
– 10		70												
0	50	80	100	110	150	200	250	300	400	500	600	700	800	900	1 000
20			120			220								
50			150		200	250		350						
100					250	300		400	500	600				
150									550					
200						400		500			800		1 000	
300						500				800				
Temp. range	50	80	100	110	150	200	250	300	400	500	600	700	800	900	1 000

Table 2 — Base metal thermocouple recorders °C

Starting temperature	Maximum temperature on chart											
– 200				100								
– 150				150								
– 100		100										
– 50	100	150		250				650				
0		200			400	500	600	700	800		1 000	1 100	1 200
100		300		400	500							
150	300	350										
200		400		500	600	700	800		1 000		1 200		
250			500	550								
300		500		600		800	900			1 200		
400		600				900	1 000		1 200			
500						1 000	1 100					
600				900			1 200	1 300				
700							1 300					
Temp. range	150	200	250	300	400	500	600	700	800	900	1 000	1 100	1 200

NOTE The maximum temperatures are limited by the maximum permissible working temperatures of the base metal.

Table 3 — Base metal thermocouple recorders °F

Starting temperature	Maximum temperature on chart										
– 150	100	150									
– 20											
0	250	300	400	500	750	1 000	1 250	1 500	1 750	2 000	2 500
250	500			750	1 000						
500				1 000		1 500		2 000			
750				1 250					2 500		
Temp. range	250	300	400	500	750	1 000	1 250	1 500	1 750	2 000	2 500

Table 4 — Platinum/rhodium v platinum thermocouple recorders °C

Starting temperature	Maximum temperature on chart									
0				800	1 000		1 200	1 400	1 500	1 600
300			1 000			1 400	1 500			
500	1 000				1 500					
600			1 300							
700		1 300								
800		1 400		1 600						
1 000	1 500									
1 250	1 750									
Temp. range	500	600	700	800	1 000	1 100	1 200	1 400	1 500	1 600

Table 5 — Platinum/rhodium v platinum thermocouple recorders °F

Starting temperature	Maximum temperature on chart		
0	1 000	2 000	3 000

Table 6 — Resistance thermometer recorders °C

Starting temperature	Maximum temperature on chart													
– 200 – 100 – 50 – 20 0 50 100	10	50 100	20	60	50 100 200	20 120	110	150 200	160	0 100 150 200 250 300	100 300 500	400	500	600
Temp. range	30	50	70	80	100	120	130	150	180	200	300	400	500	600

Table 7 — Resistance thermometer recorders °F

Starting temperature	Maximum temperature on chart												
– 150 – 30 – 20 – 10 0 50 100 200 400	70 80 90 100 150 200 300	130 140 150	50 180 200 250 300 400	100 250	150 350 400	400 600 800	550	600 800 1 000	700	800 1 000	900	1 000	1 100
Temp. range	100	150	200	250	300	400	500	600	700	800	900	1 000	1 100

Table 8 — Radiation pyrometer recorders °C

Starting temperature	Maximum temperature on chart					
500 700 800 900 1 000 1 200	1 000	1 400	1 600	1 800	2 000	2 400
Temp. range	500	700	800	900	1 000	1 200

blank

British Standards

The following are available on application:
YEARBOOK
Including subject index and numerical list of British Standards
SECTIONAL LISTS. Gratis
Acoustics (SL 10)
Aerospace materials and components (SL 25)
Automobile (SL 34)
British Standard Handbooks (SL 27)
Building (SL 16)
Chemical engineering (SL 5)
Chemicals, fats, glues, oils, soap, etc. (SL 4)
Cinematography and photography (SL 1)
Coal, coke and colliery requisites (SL 13)
Codes of Practice (SL 8)
Consumer goods (SL 3)
Documentation, including Universal Decimal Classification (SL 35)
Drawing practice (SL 37)
Electrical engineering (SL 26)
Farming, dairying and allied interests (SL 31)
Furniture, bedding and furnishings (SL 11)
Gardening, horticulture and landscape work (SL 41)
Gas and solid fuel and refractories (SL 2)
Glassware, excluding laboratory apparatus (SL 39)
Heating, ventilating and air conditioning (SL 42)
Hospital equipment (SL 18)
Illumination and lighting fittings (SL 14)
Industrial instruments, etc. (SL 17)
Iron and steel (SL 24)
Laboratory apparatus (SL 23)
Leather, plastics, rubber (SL 12)
Local authority purchasing officers' guide (SL 28)
Machine tools (SL 20)
Mechanical engineering (SL 6)
Nomenclature, symbols and abbreviations (SL 29)
Non-ferrous metals (SL 19)
Nuclear energy (SL 36)
Packaging and containers (SL 15)
Paints, varnishes, paint ingredients and colours for paints (SL 9)
Personal safety equipment (SL 30)
Petroleum industry (SL 38)
Printing and stationery, paper and board (SL 22)
Road engineering (SL 32)
Shipbuilding (SL 40)
Textiles and clothing (SL 33)
Welding (SL 7)

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: 020 8996 9000. Fax: 020 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: 020 8996 7111. Fax: 020 8996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: 020 8996 7002. Fax: 020 8996 7001.

Copyright

BSI
389 Chiswick High Road
London
W4 4AL