B/B
ocks

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Australian Standard 2089–1977

SHEAVE BLOCKS

(INCLUDING SHIPS' CARGO BLOCKS) OF MAXIMUM LIFT 60 t

[Title allocated by Defence Cataloguing Authority: BLOCK, TACKLE]

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THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL ORGANIZATIONS and departments were officially represented on the committee entrusted with the preparation of this standard:

Associated Chambers of Manufactures of Australia
Australian Chamber of Commerce
Australasian Steamship Owners Federation
Bureau of Steel Manufacturers of Australia
Department of Defence
Department of Labour and Industry N.S.W.
Department of Labour and Industry S.A.
Department of Labour and Industry Tas.
Department of Labour and Industry Vic.
Department of Labour Relations and Consumer Affairs Qld.
Department of Northern Territory
Department of Productivity
Department of the Capital Territory
Department of Transport
Electricity Supply Association of Australia
Master Builders Association of N.S.W.
Metal Trades Industry Association of Australia
Railways of Australia Committee

This standard, prepared by Committee ME/25, Lifting Tackle, was approved on behalf of the Council of the Standards Association of Australia on 16 August 1977, and was published on 31 December 1977.

To keep abreast of progress in industry, Australian standards are regularly reviewed. Suggestions for improvements to published standards, addressed to the head office of the Association, are welcomed.

This standard was issued in draft form for public review as DR 75064.

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AUSTRALIAN STANDARD SPECIFICATION

SHEAVE BLOCKS (INCLUDING SHIPS' CARGO BLOCKS) OF MAXIMUM LIFT 60 t

AS 2089–1977

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PREFACE

This standard was prepared by the Association's Committee on Lifting Tackle as a revision, metrication and consolidation of AS B247—1968, Ships' Cargo Blocks, and AS B298—1971, Pulley Blocks, both of which it accordingly supersedes. In the revision, the opportunity has been taken to align the title of the standard with the new differentiation between sheaves and pulleys as recently agreed by ISO/TC 96—Cranes, Lifting Appliances and Related Excavator Equipment: sheaves control direction, and pulleys transmit mechanical power involving force and speed.

In the preparation of this standard account was taken of the individual British standards on sheave blocks for use with wire and natural fibre and synthetic filament ropes; and the fact that certain applications for sheave blocks have traditionally been considered as requiring specific standards peculiar to that particular use, whilst not being significantly different technically in respect of the requirements of design, manufacture, testing and marking to an extent requiring publication of separate standards.

It was found that a sheave block designed for use with wire rope is, when fitted with appropriate sheaves, completely satisfactory when used with rope of synthetic filament or natural fibre, except that the specified load rating must conform to the load-carrying capacity of the particular rope. Thus the committee concluded that one standard could adequately cover most applications of sheave blocks for use with wire, synthetic filament, and natural fibre ropes, and this standard has therefore been developed along these lines.

The standard applies to hand-operated sheave blocks for use with natural fibre or synthetic filament ropes, and to hand-operated and power-operated sheave blocks for use with wire ropes, where the block is not an integral part of a crane, hoist or similar appliance covered by AS 1418, SAA Crane Code. AS 1418 makes provision for higher rope speeds, larger sheave diameters, and constant heavy duty operation. Where the sheave block is used as a ships' cargo block, certain particular requirements apply and these are covered in Sections 1, 4 and 7 of this standard.

Power-operated sheave blocks for use with natural fibre or synthetic filament ropes have been excluded because the committee did not find sufficient application in Australia to justify the inclusion of specified requirements. The class of sheave block used for light lifting in the building industry and for general materials handling, known as the 'gin block', is also excluded.

The load rating of a sheave block has been based on the rating of the head fitting of the respective sheave block. The maximum load rating of the head fitting may automatically derate the capacity of the type of rope applied to the sheave block, as well as other components contained in the sheave block assembly. This load rating will be related to the number of parts of rope applied to the sheave block and the manner in which the sheave block is rigged. For example, a single sheave block is capable of handling loads of half or two-thirds of the load rating, or the load rating depending on how it

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is rigged. Therefore, particular attention is drawn to the fact that the load imposed on a sheave block can vary according to the position in which it is placed in a purchase or rig and so sheave blocks for that reason need to be selected with great care. The load rating of the sheave block is expressed in kilograms (if less than 1 t) or in tonnes.

In calculating the load rating of a sheave block it appears to be common practice to consider impact loading as being absorbed within the factor of safety applied to the rope. Published data in respect of friction factors appear to require considerable subjective judgement in application, and tables of load ratings of sheave blocks published by block manufacturers, when analysed by sheave diameter, rope diameter and increment of additional load capacity per additional sheave, do not always appear to follow internally consistent rules. The problem is further compounded by variations in and the ratio of sheave and axle pin diameters, type of bearing, rope speed, rope construction, rope and journal lubrication, and the distance between the upper and lower multiple sheave blocks in a purchase and possibly other design requirements. For the purposes of this standard, all reference to friction factors has been excluded, because of the complexity of assessment. They have been considered to be encompassed in the factor of safety together with the impact loading characteristic.

Should any consideration be necessary with respect to friction, reference should be made to AS 1418, SAA Crane Code.

Sheave sizes are expressed in terms of the nominal diameter (outside diameter of the sheave) and are in accordance with current International Organization for Standardization (ISO) recommendations on preferred numbers as set out in SAA MP19, Report on Preferred Numbers and Their Use. The list of preferred sizes has been rationalized to the R10 series of preferred numbers to form a working table of 12 pulley sizes, compared with a full table of 29 sizes. Recommended rope sizes are tabulated against the appropriate sheave size (see Appendix A).

Groove dimensions are tabulated for each sheave size and type of rope. The included angle of flare for sheaves for use with wire rope is 30 degrees, irrespective of whether the sheave is used under conditions of hand or power operation (see Appendix A) for general lifting purposes, or as ships' cargo blocks. The head fitting is usually a standard component and the strength of other parts of the block can be checked by calculation.

The use of the AS Mark by the manufacturer of serial type blocks is recommended as an assurance to the purchaser that the design of the block complies with this standard and that manufacture is carried out under conditions of strict quality control.

Users of sheave blocks which do not comply with this standard are warned against using the blocks in any situation where safety of personnel or equipment is concerned unless they have assured themselves that the load rating incorporates an adequate factor of safety. Users are also warned that the use of sheave blocks with a sheave diameter less than that set down in this standard may lead to excessive rope wear and higher tensile forces in the rope, and may in consequence cause an early failure of the rope.

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