ASME B29.21-2013
[Revision and Redesignation of ASME B29.21M-1996 (R2003)]

700 Class Chains, Attachments, and Sprocket Teeth for Water and Sewage Treatment Plants

REAFFIRMED 2018

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

ASME B29.21-2013
[Revision and Redesignation of ASME B29.21M-1996 (R2003)]

700 Class Chains, Attachments, and Sprocket Teeth for Water and Sewage Treatment Plants

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers
Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: January 15, 2014

This Standard will be revised when the Society approves the issuance of a new edition.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Periodically certain actions of the ASME B29 Committee may be published as Cases. Cases and interpretations are published on the ASME Web site under the Committee Pages at http://cstools.asme.org/ as they are issued.

Errata to codes and standards may be posted on the ASME Web site under the Committee Pages to provide corrections to incorrectly published items, or to correct typographical or grammatical errors in codes and standards. Such errata shall be used on the date posted.

The Committee Pages can be found at http://cstools.asme.org/. There is an option available to automatically receive an e-mail notification when errata are posted to a particular code or standard. This option can be found on the appropriate Committee Page after selecting "Errata" in the "Publication Information" section.

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

CONTENTS

FOREWORD

Since the development of this Standard in 1975 and the subsequent revisions published in 1981 and 1996, it has been noted that within the marketplace the use of chains made from plastics or stainless steels has become more prevalent. In most cases these chains are derivations of the traditional "700 Class" cast iron or welded steel chains that were the basis of the original Standard. These new products offer system designers alternatives in terms of strength, wear life, corrosion resistance, system weight, ease of maintenance, and cost.

This revision incorporates the following product groups not found in previous editions of the Standard:

- Stainless steel fabricated chains (SS715 and SS709)
- Nonmetallic (plastic) chains (NM720)

Suggestions for improvement of this Standard are welcome. They should be sent to the Secretary, B29 Committee, The American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990.

This revision was approved as an American National Standard on November 26, 2013.

ASME B29 COMMITTEE
Chains, Attachments, and Sprockets for Power Transmission and Conveying

(The following is the roster of the Committee at the time of approval of this Standard.)

STANDARDS COMMITTEE OFFICERS

C. G. Springman, *Chair*
C. J. Gomez, *Secretary*

STANDARDS COMMITTEE PERSONNEL

A. J. Binford, IWIS Drive Systems
R. Brandon, *Alternate,* Diamond Chain Co.
L. Carrier, Consultant
D. W. Egbert, Hitachi Maxco, Ltd.
D. G. Fannin, Emerson Power Transmission
C. J. Gomez, The American Society of Mechanical Engineers
W. C. Hall, Ramsey Products Corp.
D. B. Holcomb, *Alternate,* Ramsey Products Corp.
M. Manickam, Webster Industries
C. A. Norwood, Martin Sprocket & Gear, Inc.
E. Pawlicki, Drives LLC
V. D. Petershack, Consultant
R. A. Reinfried, Conveyor Equipment Manufacturers Association
S. Rhoad, *Alternate,* Webster Industries
K. J. Smith, Ken Smith & Associates
C. G. Springman, Diamond Chain Co.
J. R. Wilbur, *Alternate,* Drives LLC
J. L. Wright, Technical Consultant

Acknowledgements

The committee gratefully acknowledges the following individuals and companies for their contributions to the development of this Standard:

Paul Chen, Polychem Systems — Brentwood Industries, Reading, Pennsylvania
Scott Davies, Viking Chains, Inc., Delta, British Columbia, Canada
Dan Dummett, Allied Locke Industries, Dixon, Illinois
William Selle, Siemens Water Technologies, Waukesha, Wisconsin

CORRESPONDENCE WITH THE B29 COMMITTEE

General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions, and attending Committee meetings. Correspondence should be addressed to:

Secretary, B29 Standards Committee
The American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990
http://go.asme.org/Inquiry

Proposing Revisions. Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

Proposing a Case. Cases may be issued for the purpose of providing alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee Web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the Standard, the paragraph, figure or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the Standard to which the proposed Case applies.

Interpretations. Upon request, the B29 Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the B29 Standards Committee.

The request for interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his/her request in the following format:

Subject:	Cite the applicable paragraph number(s) and the topic of the inquiry.
Edition:	Cite the applicable edition of the Standard for which the interpretation is being requested.
Question:	Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

Attending Committee Meetings. The B29 Standards Committee regularly holds meetings that are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B29 Standards Committee.

700 CLASS CHAINS, ATTACHMENTS, AND SPROCKET TEETH FOR WATER AND SEWAGE TREATMENT PLANTS

1 NOMENCLATURE

1.1 Chain Types

- Cast iron chains
- Welded steel chains
- Stainless steel fabricated chains
- Nonmetallic (plastic) chains

1.1.1 Cast Iron Chains. Cast iron chains consist of a series of identical offset links having barrels to contact the sprocket teeth and pins that articulate in the barrels of links. Radius curves in the sidebars (chain savers), if present, operate on sprocket flanges known as chain-saver rims. The purpose of the chain saver is to provide additional link support to reduce barrel O.D. wear. See Figs. 1 and 2.

Pins are fixed in the sidebar pitch holes by mechanical locks to prevent rotation in the sidebar pitch holes. Pin cotters are stainless steel.

Pin material is medium carbon steel or equivalent at 302 BHN minimum. Cast links, including attachments, are pearlitic malleable iron ASTM A220 Grade 60004 or equivalent at 179 BHN minimum.

1.1.2 Welded Steel Chains. Welded steel chains consist of a series of identical offset links having barrels fixed to the sidebars by welds. Radius curves in the sidebars (chain savers), if present, operate on sprocket flanges known as chain-saver rims. The purpose of the chain saver is to provide additional link support to reduce barrel O.D. wear. See Figs. 3 and 4.

Pins are fixed in the sidebar pitch holes by press fits and mechanical locks to prevent rotation in the sidebar pitch holes. Pin cotters are stainless steel.

Pin material is medium carbon steel or equivalent at 302 BHN minimum. Barrels are medium carbon steel or equivalent at 229 BHN minimum. Sidebars and attachments are medium carbon steel at 229 BHN minimum.

1.1.3 Stainless Steel Fabricated Chains. Stainless steel fabricated chains consist of a series of alternating inside and outside links having barrels to contact the sprocket teeth and pins that articulate in the barrels of links. Radius curves in the sidebars (chain savers) operate on sprocket flanges known as chain-saver rims. The purpose of the chain saver is to provide additional link support to reduce barrel O.D. wear. See Fig. 5.

Pins and bushings are fixed in the sidebar pitch holes by press fit and mechanical locks to prevent rotation in the sidebar pitch holes. Pin cotters are stainless steel.

Pin, barrel, and sidebars are made from martensitic stainless steels with a minimum 11.5% chromium content. Pins and barrels are heat treated for resistance to elongation and barrel wear.

1.1.4 Nonmetallic (Plastic) Chains. Nonmetallic (plastic) chains consist of a series of identical offset links having barrels to contact the sprocket teeth and pins that articulate in the barrels of links. Radius curves in the sidebars (chain savers) operate on sprocket flanges known as chain-saver rims. The purpose of the chain saver is to provide additional link support to reduce barrel O.D. wear. See Fig. 6.

Pins are fixed in the sidebar pitch holes by press fit and/or mechanical locks to prevent rotation in the sidebar pitch holes.

Pins and links are made from a variety of plastic materials and hardness levels, depending on the manufacturer. The contour of the links and method of connecting links together are also unique to each manufacturer. No attempt will be made in this Standard to distinguish performance value of any particular design. Rather, only the dimensions necessary for function on the standard 720S tooth form, attachment bolt hole pattern, proof load, and measuring load will be established.

1.2 Dimensions for Chain Links

1.2.1 Cast and Welded Steel Chains. To assure interchangeability of links and function over the standard tooth form as produced by different manufacturers of chain, standard maximum and minimum dimensions are adopted. They are not actual dimensions used in manufacturing, but limiting dimensions required to assure desired interchangeability.

The following dimensional data can be found in this Standard for cast and welded steel chains:

(a) general chain dimensions, ultimate strengths, proof loads, strand length, and measuring loads (see Table 1 and Fig. 7)

(b) maximum and minimum controlling dimensions for interchangeability (see Table 2 and Fig. 7)

(c) the required maximum clearance dimensions (see Table 3 and Fig. 7)