# **Standard**



BNQ 3221-500/2017

Grates, Covers, Frames, Catch Basin Traps and Valve Boxes — Grey-Iron and Ductile-Iron Castings for Civil Engineering Work — Characteristics and Test Methods





## BNQ 3221-500/2017

Grates, Covers, Frames, Catch Basin Traps and Valve Boxes — Grey-Iron and Ductile-Iron Castings for Civil Engineering Work — Characteristics and Test Methods

Grilles, tampons, cadres, trappes de puisard et bouches à clé — Moulages en fonte grise ou en fonte ductile pour travaux de génie civil — Caractéristiques et méthodes d'essai

**ICS**: 23.040.99; 77.140.01



#### REQUEST FOR INFORMATION AND PURCHASE

Any request for information or purchase of this document may be sent to the Bureau de normalisation du Québec (BNQ) at 333, rue Franquet, Québec, Québec G1P 4C7

[telephone: 418-652-2238, ext. 2437 or 1-800-386-5114; fax: 418-652-2292;

E-mail: bnqinfo@bnq.qc.ca; Web Site: www.bnq.qc.ca].

#### **REVISION OF BNQ DOCUMENTS**

Collaboration from BNQ document users is essential in keeping our documents up to date. Therefore, any suggestion aimed at improving their contents will be appreciated. We ask you to send us your suggestions or comments on the form at the end of this document.

#### FIRST ENGLISH EDITION — 2017-03-23

This document is published in both French and English. In case of incompatibility, the French version prevails.

This English translation is based on the third edition of the original French document.

The systematic review of this document to determine if it has to be modified, revised, reaffirmed or withdrawn will be initiated no later than end of February 2022.

The electronic or printed version of this document is for personal use only. Distribution to third parties, partners or clients, as well as saving, distribution or use on a computer network is forbidden without written agreement from the BNQ.

Only purchasers duly registered with BNQ Customer Service will receive document updates. Notifications and the catalogue may be consulted at all times on the BNQ Web site [www.bnq.qc.ca] to verify if a more recent version of a document exists or if amendments or errata have been published.

If a registered purchaser wishes to continue to receive updates, the purchaser must inform BNQ Customer Service of any change of address as soon as possible.

© BNQ, 2017

All rights reserved. Unless otherwise specified, no part of this document may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilming, without written permission from the BNQ.



# **NOTICE**

#### UNDERSTANDING OF THE NOTION OF EDITION

It is important to note that this edition implicitly includes all amendments and errata that might be published separately at a later date. It is the responsibility of the users of this document to verify whether any amendments or errata exist.

#### INTERPRETATION

The verb **shall** is used to express a requirement (mandatory) in order to comply with this document.

The verb **should**, or the equivalent expressions **it is recommended that** and **ought to**, is used to indicate a useful, but not mandatory, suggestion or to indicate the most appropriate means of complying with this document.

Except for notes presented as **normative notes**, which set out mandatory requirements and which appear in the lower portion of figures and tables only, all other **notes** are **informative** (non-mandatory) and provide useful information intended to facilitate understanding or clarify the intent of a requirement or to add clarification or further details.

Normative annexes provide additional requirements (mandatory) in order to comply with this document.

**Informative annexes** provide additional (non-mandatory) information intended to assist in the understanding or use of elements of this document or to clarify its implementation. They contain no mandatory requirements for the purposes of compliance with this document.

#### DISCLAIMER OF RESPONSIBILITY

This document was developed as a reference document for voluntary use. It is the user's responsibility to verify whether the application of this document is mandatory under the applicable legislation or regulations or whether trade regulations or market conditions stipulate its use in, for example, technical regulations, inspection plans originating from regulatory authorities and certification programs. It is also the responsibility of the users to consider limitations and restrictions specified in the Purpose and Scope and to judge the suitability of this document for the user's purposes.

#### MARKING AND LABELLING REQUIREMENTS

This document may contain requirements for marking and/or labelling. In this event, in addition to meeting such requirements, it is also the responsibility of the suppliers of products to comply with the applicable national, provincial or territorial laws and regulations of the jurisdictions in which the products are distributed.



#### **FOREWORD**

This document was prepared by a Standards Development Committee, whose members were:

**Suppliers** 

BARIL, Robert Poly-Expert Distribution

BOIS, Frédéric EJ

BORGIA, Philippe Fonderie Laroche

LAMPRON, Jean-François Sigma

LESSARD, Josée Fonderie Laperle (subsidiary of Bibby-Ste-Croix)

THÉORÊT, Richard Les Produits Sinoco

Users

DUCHESNEAU, Guillaume Ville de Québec

GAGNÉ, Claude Association des ingénieurs municipaux du

Québec (AIMQ)

GINGRAS, Jean Corporation des officiers municipaux en bâtiment

et en environnement du Québec (COMBEQ)

LANDRY, Marc Ville de Sherbrooke

General interest

BERNIER-ROY, Marie Centre d'expertise et de recherche en

infrastructures urbaines (CERIU)

PHARAND, Jacques Ville de Montréal

RAMIREZ-ORTEGA, Marjorie Ministère des Transports, de la Mobilité durable

et de l'Électrification des transports



#### Coordination

ALLARD, Sylvain\* (Standards Developer) Bureau de normalisation du Québec (BNQ)

ROBITAILLE, Mélanie Bureau de normalisation du Québec (BNQ)

(Standards Developer)

The collaboration of the following people is also worthy of mention:

COUILLARD, Claude Ville de Québec

GARDON, Paul Bureau de normalisation du Québec (BNQ)

McDONALD, Patrick\* EJ

ST-ONGE, Alain\* Poly-Expert Distribution

\* At the time of publication of this standard, the aforementioned person no longer worked for this organization.



# **SOMMAIRE**

				Page
1	PURI	POSE ANI	O SCOPE	1
2	NOR	MATIVE I	REFERENCES	1
3	DEFI	DEFINITIONS		
4	GENI	ERAL REC	QUIREMENTS	3
	4.1 4.2		RAL APPEARANCE	3
	1.2	4.2.1 4.2.2	General	3 4
	4.3 RESISTANCE			
		4.3.1 4.3.2 4.3.3	Tensile strength Load resistance Permanent-deformation resistance	4 4 4
5	SPECIFIC REQUIREMENTS			
3	5.1 DIMENSIONAL CHARACTERISTICS, TOLERANCES AN MINIMUM MASSES			
		5.1.1	Circular grates and covers with a nominal diameter of 572 mm, adjustable frames and tapered guide frames	4
		5.1.2	Circular bicycle-proof grates with a nominal diameter of 750 mm, adjustable frames and tapered guide frames	5
		5.1.3	Circular covers with a nominal diameter of 775 mm, adjustable frames and tapered guide frames	5
		5.1.4	Circular covers with a nominal diameter of 775 mm and fixed frames	6
		5.1.5	Rectangular self-lock grates and rectangular self-lock grates with high catchment capacity with nominal dimensions of 352 mm by 581 mm, adjustable frames with snowplow-	6
		5.1.6	proof edges and tapered guide frames  Rectangular grates with nominal dimensions of 355 mm by	
		5.1.7	610 mm and fixed frames  Rectangular grates with nominal dimensions of 455 mm by 915 mm and fixed frames	7 7



		5.1.8 5.1.9	Catch basin traps with a nominal width of 250 mm Catch basin traps with a nominal width of 280 mm	8 8
		5.1.10	Catch basin traps with a nominal width of 400 mm	8
		5.1.11	Valve boxes	8
		5.1.12	Frame risers	8
6	SAMP	LING		9
	6.1 6.2		ENS FOR TENSILE STRENGTH TESTS FOR LOAD-RESISTANCE TESTS	9 9
7	TEST	METHOD	os	9
	7.1 7.2		E-STRENGTH TEST RESISTANCE TEST	9 9
8	MARK	ING		10
FIGUF	RE 1 —	:	IENSIONAL CHARACTERISTICS AND TOLERANCES OF GRATES AND COVERS WITH A NOMINAL DIAMETER OF 572 mm, ADJUSTABLE FRAMES AND TAPERED GUIDE FRAMES	11
FIGUF	RE 2 —	]	IENSIONAL CHARACTERISTICS AND TOLERANCES OF BICYCLE-PROOF GRATES WITH A NOMINAL DIAMETER OF 750 mm, ADJUSTABLE FRAMES AND TAPERED GUIDE FRAMES	13
FIGUF	RE 3 —	,	IENSIONAL CHARACTERISTICS AND TOLERANCES OF CIRCULAR COVERS WITH A NOMINAL DIAMETER OF 775 mm, ADJUSTABLE FRAMES AND TAPERED GUIDE FRAMES	15
FIGUF	RE 4 —	(	IENSIONAL CHARACTERISTICS AND TOLERANCES OF CIRCULAR COVERS WITH A NOMINAL DIAMETER OF 775 mm AND FIXED FRAMES	17
FIGUF	RE 5 —	] [ (	TENSIONAL CHARACTERISTICS AND TOLERANCES OF RECTANGULAR SELF-LOCKING GRATES AND RECTANGULAR SELF-LOCKING GRATES WITH HIGH CATCHMENT CAPACITY WITH NOMINAL DIMENSIONS OF 352 mm BY 581 mm, ADJUSTABLE FRAMES WITH SNOWPLOW-PROOF EDGES AND TAPERED GUIDE FRAMES	19
FIGUF	RE 6 —	]	IENSIONAL CHARACTERISTICS AND TOLERANCES OF RECTANGULAR GRATES WITH NOMINAL DIMENSIONS OF 355 mm BY 610 mm AND FIXED FRAMES	21
FIGUE	RE 7 —	]	IENSIONAL CHARACTERISTICS AND TOLERANCES OF RECTANGULAR GRATES WITH NOMINAL DIMENSIONS OF 455 mm BY 915 mm AND FIXED FRAMES	23



FIGURE 8 —	DIMENSIONAL CHARACTERISTICS OF CATCH BASIN TRAPS WITH A NOMINAL WIDTH OF 250 mm	25
FIGURE 9 —	DIMENSIONAL CHARACTERISTICS OF CATCH BASIN TRAPS WITH A NOMINAL WIDTH OF 280 mm	26
FIGURE 10 —	DIMENSIONAL CHARACTERISTICS OF CATCH BASIN TRAPS WITH A NOMINAL WIDTH OF 400 mm	27
FIGURE 11 —	DIMENSIONAL CHARACTERISTICS AND TOLERANCES OF THE VARIOUS PARTS OF A TYPE-1 VALVE BOX	28
FIGURE 12 —	DIMENSIONAL CHARACTERISTICS AND TOLERANCES OF THE VARIOUS PARTS OF A TYPE-2 VALVE BOX	30
FIGURE 13 —	ISOMETRIC VIEWS OF CIRCULAR AND RECTANGULAR FRAME RISERS	32
FIGURE 14 —	LOAD TEST BENCH FOR RECTANGULAR GRATES AND FRAMES	33
FIGURE 15 —	LOAD TEST BENCH FOR CIRCULAR GRATES, COVERS AND FRAMES	34
ANNEX A —	INFORMATIVE REFERENCES	35



# GRATES, COVERS, FRAMES, CATCH BASIN TRAPS AND VALVE BOXES — GREY-IRON AND DUCTILE-IRON CASTINGS FOR CIVIL ENGINEERING WORK — CHARACTERISTICS AND TEST METHODS

### 1 PURPOSE AND SCOPE

This standard specifies the physical, mechanical and dimensional characteristics of grey-iron or ductile-iron grates, covers, frames, catch basin traps and valve boxes manufactured by casting.

These parts are primarily installed on manholes, catch basins and valve chambers of municipal sewer networks as well as on the valves of drinking water distribution lines.

This document was developed to serve as a reference for conformity assessment activities of specific products.

NOTE — Conformity assessment is defined as the systematic examination of the extent to which a product fulfils specified requirements.

#### 2 NORMATIVE REFERENCES

The references below (including any amendment or errata) are normative references, and are therefore considered mandatory. They are essential to the understanding and use of this document, and are cited in appropriate places in the text.

NOTE — This document also cites informative references that are of a non-mandatory nature. A list of these references is provided in the appendix.

It should be noted that a non-dated normative reference refers to the latest edition of the reference in question.

ASTM International [www.astm.org]

ASTM A48/A48M

Standard Specification for Gray Iron Castings.