საქართველოს სტანდარტი

კრიოგენული ჭურჭლები - დიდი ტრანსპორტირებადი ვაკუუმიზოლირებული ჭურჭლები - ნაწილი 1: დიზაინი, დამზადება, პროფილაქტიკა და გამოცდა

> საქართველოს სტანდარტებისა და მეტროლოგიის ეროვნული სააგენტო თბილისი

სსტ ისო 20421-1:2019/2020

საინფორმაციო მონაცემები

- 1 **შემუშავებულია** საქართველოს სტანდარტების და მეტროლოგიის ეროვნული სააგენტოს სტანდარტების დეპარტამენტის მიერ
- 2 დამტკიცებულია და შემოღებულია სამოქმედოდ საქართველოს სტანდარტების და მეტროლოგიის ეროვნული სააგენტოს 2020 წლის 30 აპრილის № 50 განკარგულებით
- **3 მიღებულია გარეკანის თარგმნის მეთოდით** სტანდარტიზაციის საერთაშორისო ორგანიზაციის სტანდარტი ისო 20421-1:2019 ,, კრიოგენული ჭურჭლები დიდი ტრანსპორტირებადი ვაკუუმ-იზოლირებული ჭურჭლები ნაწილი 1: დიზაინი, დამზადება, პროფილაქტიკა და გამოცდა"

4 პირველად

5 რეგისტრირებულია საქართველოს სტანდარტების და მეტროლოგიის ეროვნული სააგენტოს რეესტრში: 2020 წლის 30 აპრილი №268-1.3-017124

დაუშვებელია წინამდებარე სტანდარტის სრული ან ნაწილობრივი კვლავწარმოება, ტირაჟირება და გავრცელება სსიპ საქართველოს სტანდარტებისა და მეტროლოგიის ეროვნული სააგენტოს ნებართვის გარეშე

INTERNATIONAL STANDARD

ISO 20421-1

Second edition 2019-06

Cryogenic vessels — Large transportable vacuum-insulated vessels —

Part 1:

Design, fabrication, inspection and testing

Récipients cryogéniques — Récipients transportables isolés sous vide de grande contenance —

Partie 1: Conception, fabrication, inspection et essais





COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office CP 401 • Ch. de Blandonnet 8 CH-1214 Vernier, Geneva Phone: +41 22 749 01 11 Fax: +41 22 749 09 47 Email: copyright@iso.org Website: www.iso.org

Published in Switzerland

COI	itent		Page				
Fore	word		v				
Intro	oduction	n	vi				
1	Scope	е	1				
2	Norm	native references	1				
3		ns and definitions					
4		bols					
5 6		General requirements Mechanical loads					
	Mecn 6.1						
	6.2	Load during the pressure test					
7	Chem	nical effects					
8		mal conditions					
9		rials					
	9.1	Selection of materials					
	9.2	Inspection documentation	8				
10	Design						
	10.1	Design options					
		10.1.1 General 10.1.2 Design by calculation					
		10.1.3 Design by calculation and pressure strengthening					
		10.1.4 Design of components by calculation supplemented with	h experimental methods 9				
	10.2	Common design requirements	9				
		10.2.1 General					
		10.2.2 Design specification					
		10.2.3 Design loads 10.2.4 Fatigue					
		10.2.5 Corrosion allowance					
		10.2.6 Inspection openings					
		10.2.7 Pressure relief					
		10.2.8 Valves					
		10.2.9 Insulation					
		10.2.10 Degree of filling					
	10.3	10.2.11 Electrical continuity Design by calculation					
	10.3	10.3.1 General					
		10.3.2 Inner vessel					
		10.3.3 Outer jacket					
		10.3.4 Attachments					
		10.3.5 Piping and accessories					
		10.3.6 Calculation formula					
		10.3.7 Calculations for operating loads					
11	Fabrication						
	11.1	General					
	11.2 11.3	CuttingCold forming					
	11.0	11.3.1 Austenitic stainless steel					
		11.3.2 Ferritic steel					
		11.3.3 Aluminium or aluminium alloy	48				
	11.4	Hot forming					
		11.4.1 General	48				

			Austenitic stainless steel			
			Ferritic steel			
	11 5		Aluminium or aluminium alloy			
	11.5	мапита 11.5.1	cturing tolerances			
		11.5.1	Plate alignment			
		11.5.2	Thickness			
		11.5.4	Dished ends			
		11.5.5	Cylinders			
	11.6					
		11.6.1	General			
		11.6.2	Qualification			
			Temporary attachments			
			Welded joints			
	11.7	Non-we	lded joints	54		
12	Inspection and testing					
	12.1		plan			
			General			
			Inspection stages during manufacture of an inner vessel	54		
		12.1.3	Additional inspection stages during manufacture of a large transportable cryogenic vessel	55		
	12.2	Product	ion control test plates			
	12.2	12.2.1	Requirements			
			Extent of testing			
	12.3		structive testing			
			General			
		12.3.2	Extent of examination for surface imperfections	56		
			Extent of examination for inner-vessel weld seams	57		
		12.3.4	Acceptance criteria for surface and volumetric imperfections as classified in ISO 6520-1	57		
	12.4	Rectific	ation			
	12.5		e testing			
13			abelling			
14	Final acceptance test5					
		_				
15		-	ection			
16			on			
Annex	A (info	ormative]	Examples of tank plates	61		
Annex	B (info	ormative]	Elastic stress analysis	64		
Annex	C (nor	mative)	Additional requirements for 9 % Ni steel	72		
Annex	D (noi	mative)	Pressure strengthening of vessels from austenitic stainless steels	74		
			Specific weld details			
Annex	F (nor	mative)	Outer-jacket relief devices	91		
) Base materials			
	-) Components subject to external pressure (pressure on the convex			
71111102			lculation	101		
Annex	I (info	rmative)	Design of openings in cylinders, spheres and cones — Calculation	112		
Annex J (normative) Reference material & equivalent thickness						
Annex	K (nor	mative)	Refrigerated liquefied gases	124		
Biblio	graphy	7		125		

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 220, Cryogenic vessels.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This second edition cancels and replaces the first edition (ISO 20421-1:2006), which has been technically revised. It also incorporates ISO 20421-1:2006/Cor 1:2007. The main changes compared to the previous edition are as follows:

- Subclause <u>12.3</u> has been revised;
- Annex D has been revised;
- Chinese materials have been added in Annex G.

A list of all parts in the ISO 20421 series can be found on the ISO website.

Introduction

This document has been written so that it is suitable to be referenced in the UN Model Regulations [1].

This document does not include the general vehicle requirements, e.g. running gear, brakes, lighting, etc., for which the relevant standards/regulations apply.