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**INTERNATIONAL STANDARD**



**4759 / III**

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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**Tolerances for fasteners —  
Part III : Washers for metric bolts, screws and nuts with  
thread diameters from 1 up to and including 150 mm —  
Product grades A and C**

**iTeh STANDARD PREVIEW**

*Tolérances pour les éléments de fixation —*

*Partie III : Rondelles pour boulons, vis et écrous métriques de diamètre de filetage de 1 à 150 mm inclus —*

*Classes de produit A et C*

[ISO 4759-3:1977](https://standards.iteh.ai/catalog/standards/sist/9bc3c0e0-1e58-4ceb-abf0-3c960a63d500/iso-4759-3-1977)

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**UDC 621.887 : 621.753**

**Ref. No. ISO 4759/III-1977 (E)**

**Descriptors :** fasteners, washers (spacers), specifications, dimensional tolerances.

Price based on 3 pages

## FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 4759/III was developed by Technical Committee ISO/TC 2, *Fasteners*, and was circulated to the member bodies in April 1976.

It has been approved by the member bodies of the following countries :

Australia	India	Poland
Belgium	Ireland	Romania
Canada	Italy	South Africa, Rep. of
Czechoslovakia	Japan	Spain
Denmark	Korea, Rep. of	Sweden
Finland	Mexico	Switzerland
France	Netherlands	Turkey
Germany	Norway	United Kingdom
Hungary	Philippines	U.S.S.R.

The member body of the following country expressed disapproval of the document on technical grounds :

U.S.A.



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AMENDMENT SLIP  
Published 1977-10-01

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION · МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ · ORGANISATION INTERNATIONALE DE NORMALISATION

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**MODIFICATION TO FOREWORD** (*Inside front cover*)

The ISO member body for Brazil has now expressed its approval of this International Standard. Brazil should therefore be included in the list of countries whose member bodies have approved the document.

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# Tolerances for fasteners – Part III : Washers for metric bolts, screws and nuts with thread diameters from 1 up to and including 150 mm – Product grades A and C

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## 1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the selection of tolerances for use in the preparation of ISO product standards for washers for bolts, screws and nuts with thread diameters from 1 up to and including 150 mm and product grades A and C.

Deviations from the tolerances in this International Standard are permitted in product standards only for valid technical reasons.

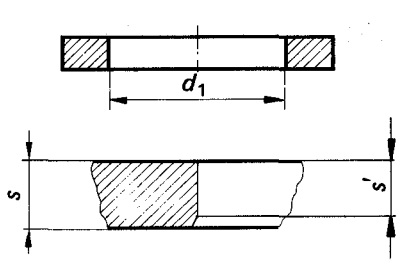
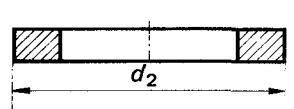
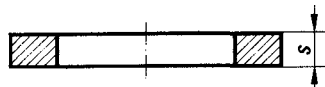
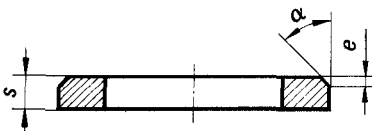
It is recommended that these tolerances should also be used for non-standardized washers.

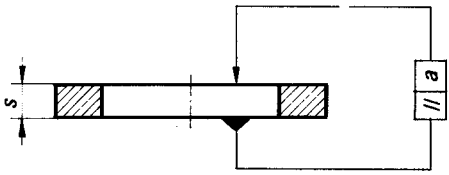
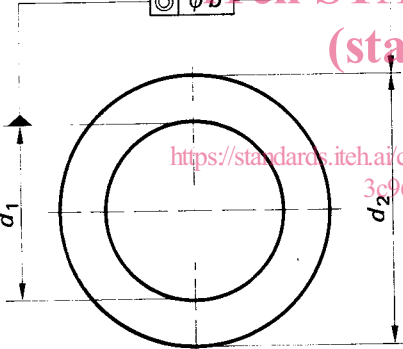

In cases where the maximum material principle according to ISO 1101/II is appropriate to certain features of certain products in these ISO products standards, other tolerances may be applicable.

NOTE – The product grades refer to the quality of the product and to the size of the tolerances where grade A is the most precise and grade C is the least precise (see also ISO 4759/I).

2 REQUIRED CHARACTERISTICS

The tolerances for the product grades A and C are given in the table.

Feature	Tolerances			
	Product grade A		Product grade C	
<p>2.1 Tolerance level</p> <p>2.2 Clearance holes</p> 	Close		Wide	
	s mm	d <sub>1</sub> tol.	s mm	d <sub>1</sub> tol.
	≤ 4	H13	≤ 4	H14
	> 4	H14	> 4	H15
	s mm	s' min.	s mm	s' min.
	≤ 4	0,5 s <sub>nom.</sub>	≤ 4	0,5 s <sub>nom.</sub>
	> 4	0,3 s <sub>nom.</sub>	> 4	0,3 s <sub>nom.</sub>
<p>2.3 Outside diameter</p> 	s mm	d <sub>2</sub> tol.	d <sub>2</sub> tol.	
	≤ 4	h14	h16	
	> 4	h15		
<p>2.4 Thickness</p> 	s mm	tol. mm	s mm	tol. mm
	≤ 0,5	± 0,05		
	> 0,5 ≤ 1	± 0,1	≤ 1	± 0,2
	> 1 ≤ 2,5	± 0,2	> 1 ≤ 2,5	± 0,3
	> 2,5 ≤ 4	± 0,3	> 2,5 ≤ 4	± 0,6
	> 4 ≤ 6	± 0,6	> 4 ≤ 6	± 1
	> 6 ≤ 10	± 1	> 6 ≤ 10	± 1,2
	> 10 ≤ 20	± 1,2	> 10 ≤ 20	± 1,6
<p>2.5 Chamfer</p> 	<p><math>\alpha \approx 30</math> to <math>45^\circ</math></p> <p><math>e_{min.} = 0,25 s</math></p> <p><math>e_{max.} = 0,5 s</math></p>			

Feature	Tolerances			
	Product grade A		Product grade C	
<p><b>2.6 Tolerances for form and position</b></p> <p><b>2.6.1 Parallelism</b></p>  <p>NOTE – The tolerance for parallelism is valid if the washer is in flat position.</p>	<p><i>s</i> mm</p>	<p><i>a</i> mm</p>	<p><i>s</i> mm</p>	<p><i>a</i> mm</p>
	<p>≤ 0,5</p> <p>&gt; 0,5 ≤ 1</p> <p>&gt; 1 ≤ 2,5</p> <p>&gt; 2,5 ≤ 4</p> <p>&gt; 4 ≤ 6</p> <p>&gt; 6 ≤ 10</p> <p>&gt; 10 ≤ 20</p>	<p>0,025</p> <p>0,05</p> <p>0,1</p> <p>0,15</p> <p>0,2</p> <p>0,3</p> <p>0,4</p>	<p>≤ 1</p> <p>&gt; 1 ≤ 2,5</p> <p>&gt; 2,5 ≤ 4</p> <p>&gt; 4 ≤ 6</p> <p>&gt; 6 ≤ 10</p> <p>&gt; 10 ≤ 20</p>	<p>0,2</p> <p>0,2</p> <p>0,3</p> <p>0,5</p> <p>0,6</p> <p>1</p>
<p><b>2.6.2 Concentricity (coaxiality)</b></p>  <p>NOTE – Tolerance <i>b</i> based on dimension <i>d</i><sub>2</sub>.</p>	<p><i>d</i><sub>2</sub> mm</p>	<p><i>b</i></p>	<p><i>d</i><sub>2</sub> mm</p>	<p><i>b</i></p>
	<p>≤ 50</p> <p>&gt; 50</p>	<p>2 IT12</p> <p>2 IT13</p>	<p>≤ 50</p> <p>&gt; 50</p>	<p>2 IT15</p> <p>2 IT16</p>
<p><b>2.6.3 Flatness</b></p>  <p>NOTE – Tolerance <i>c</i> always independent of thickness tolerance for <i>s</i>.</p>	<p><i>s</i> mm</p>	<p><i>c</i><sup>1)</sup> mm</p>	<p><i>s</i> mm</p>	<p><i>c</i><sup>1)</sup> mm</p>
	<p>≤ 0,5</p> <p>&gt; 0,5 ≤ 1</p> <p>&gt; 1 ≤ 2,5</p> <p>&gt; 2,5 ≤ 4</p> <p>&gt; 4 ≤ 6</p> <p>&gt; 6 ≤ 10</p> <p>&gt; 10 ≤ 20</p>	<p>0,1</p> <p>0,15</p> <p>0,2</p> <p>0,3</p> <p>0,4</p> <p>0,6</p> <p>1</p>	<p>≤ 1</p> <p>&gt; 1 ≤ 2,5</p> <p>&gt; 2,5 ≤ 4</p> <p>&gt; 4 ≤ 6</p> <p>&gt; 6 ≤ 10</p> <p>&gt; 10 ≤ 20</p>	<p>0,25</p> <p>0,5</p> <p>0,8</p> <p>1,2</p> <p>1,8</p> <p>3</p>

1) For washers made from stainless steel the maximum permissible unflatness is 2 *c*.