

# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 965-3

ISO/TC 1

Secretariat: SAC

Voting begins on:  
2020-09-22

Voting terminates on:  
2020-12-15

---

---

### ISO general purpose metric screw threads — Tolerances — Part 3: Limit deviations for screw threads

ICS: 21.040.10

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[ISO/DIS 965-3](#)

<https://standards.iteh.ai/catalog/standards/sist/eff68b8-48e0-4d64-a70d-d06b228f6494/iso-dis-965-3>

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

This document is circulated as received from the committee secretariat.



Reference number  
ISO/DIS 965-3:2020(E)

© ISO 2020

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[ISO/DIS 965-3](https://standards.iteh.ai/catalog/standards/sist/eff68b8-48e0-4d64-a70d-d06b228f6494/iso-dis-965-3)

<https://standards.iteh.ai/catalog/standards/sist/eff68b8-48e0-4d64-a70d-d06b228f6494/iso-dis-965-3>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2020

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  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
Foreword .....	iv
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>1</b>
<b>3 Terms and definitions .....</b>	<b>1</b>
<b>4 Limit deviations .....</b>	<b>1</b>
<b>Bibliography .....</b>	<b>26</b>

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO/DIS 965-3](https://standards.iteh.ai/catalog/standards/sist/eff68b8-48e0-4d64-a70d-d06b228f6494/iso-dis-965-3)

<https://standards.iteh.ai/catalog/standards/sist/eff68b8-48e0-4d64-a70d-d06b228f6494/iso-dis-965-3>

## 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](http://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](http://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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 1, *Screw threads*.

This fourth edition cancels and replaces the third edition (ISO 965-3:1998), which has been technically revised.

The main changes compared to the previous edition are as follows:

- In Title of this document “constructional” has been deleted.
- In [Clause 1](#) (Scope) the third paragraph has been added.
- In [Clause 4](#) (Limit deviations) the phrase “basic profiles” has been replaced by “basic profile and fundamental deviation” (first paragraph of ISO 965-3:1998; second paragraph of ISO 965-3:2020).
- In [Clause 4](#) and [Table 1](#) (Limit deviations) the deviation formula and values for the minor diameter of external threads have been deleted.
- In [Table 1](#) (Limit deviations) four tolerance classes (4 g, 5 g4 g, 8e and 9e8e) have been added.

A list of all parts in the ISO 965 series can be found on the ISO website.

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](http://www.iso.org/members.html).

# ISO general purpose metric screw threads — Tolerances —

## Part 3: Limit deviations for screw threads

### 1 Scope

This part of document specifies limit deviations for pitch and crest diameters for ISO general purpose metric screw threads (M) conforming to ISO 261 having basic profile in accordance with ISO 68-1.

The limit deviations specified are derived from the fundamental deviations and tolerances specified in ISO 965-1.

This part of document is applicable to ISO general purpose metric screw threads with the recommended tolerance classes.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 5408, *Screw threads — Vocabulary*

ISO/DIS 965-3

### 3 Terms and definitions

<https://standards.iteh.ai/catalog/standards/sist/eeff68b8-48e0-4d64-a70d-d06b228f6494/iso-dis-965-3>

For the purposes of this part of document, the terms and definitions given in ISO 5408 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 4 Limit deviations

Limit deviations are given in [Table 1](#).

For internal threads as well as external threads, the actual root contour shall not in any point transgress the basic profile and fundamental deviation.

For coated threads, the tolerances apply to the parts before coating, unless otherwise stated. After coating the actual thread profile shall not in any point transgress the maximum material limits for position H or h respectively.

NOTE These provisions are intended for thin coatings, for example those obtained by electroplating.

Table 1 — Limit deviations

Basic major diameter		Pitch mm	Internal thread					External thread				
over mm	up to mm		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter	
				<i>ES</i>	<i>EI</i>	<i>ES</i>	<i>EI</i>		<i>es</i>	<i>ei</i>	<i>es</i>	<i>ei</i>
$\mu\text{m}$	$\mu\text{m}$			$\mu\text{m}$	$\mu\text{m}$	$\mu\text{m}$	$\mu\text{m}$		$\mu\text{m}$	$\mu\text{m}$	$\mu\text{m}$	$\mu\text{m}$
0,99	1,4	0,2	-	-	-	-	-	3h4h	0	-24	0	-36
			-	-	-	-	-	4g	-17	-47	-17	-53
			4H	40	0	38	0	4h	0	-30	0	-36
			-	-	-	-	-	5g4g	-17	-55	-17	-53
			5G	-	-	-	-	5g6g	-17	-55	-17	-73
			5H	-	-	-	-	5h4h	0	-38	0	-36
			-	-	-	-	-	5h6h	0	-38	0	-56
			-	-	-	-	-	6e	-	-	-	-
			-	-	-	-	-	6f	-	-	-	-
			6G	-	-	-	-	6g	-17	-65	-17	-73
			6H	-	-	-	-	6h	0	-48	0	-56
			-	-	-	-	-	7e6e	-	-	-	-
			7G	-	-	-	-	7g6g	-	-	-	-
			7H	-	-	-	-	7h6h	-	-	-	-
			-	-	-	-	-	8e	-	-	-	-
			8G	-	-	-	-	8g	-	-	-	-
8H	-	-	-	-	9e8e	-	-	-	-			
0,99	1,4	0,25	-	-	-	-	-	3h4h	0	-26	0	-42
			-	-	-	-	-	4g	-18	-52	-18	-60
			4H	45	0	45	0	4h	0	-34	0	-42
			-	-	-	-	-	5g4g	-18	-60	-18	-60
			5G	74	18	74	18	5g6g	-18	-60	-18	-85
			5H	56	0	56	0	5h4h	0	-42	0	-42
			-	-	-	-	-	5h6h	0	-42	0	-67
			-	-	-	-	-	6e	-	-	-	-
			-	-	-	-	-	6f	-	-	-	-
			6G	-	-	-	-	6g	-18	-71	-18	-85
			6H	-	-	-	-	6h	0	-53	0	-67
			-	-	-	-	-	7e6e	-	-	-	-
			7G	-	-	-	-	7g6g	-	-	-	-
			7H	-	-	-	-	7h6h	-	-	-	-
			-	-	-	-	-	8e	-	-	-	-
			8G	-	-	-	-	8g	-	-	-	-
8H	-	-	-	-	9g8g	-	-	-	-			

Table 1 (continued)

Basic major diameter		Pitch	Internal thread					External thread				
over	up to		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter	
				<i>ES</i>	<i>EI</i>	<i>ES</i>	<i>EI</i>		<i>es</i>	<i>ei</i>	<i>es</i>	<i>ei</i>
mm	mm			mm	µm	µm	µm		µm	µm	µm	µm
0,99	1,4	0,3	-	-	-	-	-	3h4h	0	-28	0	-48
			-	-	-	-	-	4g	-18	-54	-18	-66
			4H	48	0	53	0	4h	0	-36	0	-48
			-	-	-	-	-	5g4g	-18	-63	-18	-66
			5G	78	18	85	18	5g6g	-18	-63	-18	-93
			5H	60	0	67	0	5h4h	0	-45	0	-48
			-	-	-	-	-	5h6h	0	-45	0	-75
			-	-	-	-	-	6e	-	-	-	-
			-	-	-	-	-	6f	-	-	-	-
			6G	93	18	103	18	6g	-18	-74	-18	-93
			6H	75	0	85	0	6h	0	-56	0	-75
			-	-	-	-	-	7e6e	-	-	-	-
			7G	-	-	-	-	7g6g	-	-	-	-
			7H	-	-	-	-	7h6h	-	-	-	-
			-	-	-	-	-	8e	-	-	-	-
			8G	-	-	-	-	8g	-	-	-	-
8H	-	-	-	-	9e8e	-	-	-	-			
1,4	2,8	0,2	-	-	-	-	-	3h4h	0	-25	0	-36
			-	-	-	-	-	4g	-17	-49	-17	-53
			4H	42	0	38	0	4h	0	-32	0	-36
			-	-	-	-	-	5g4g	-17	-57	-17	-53
			5G	-	-	-	-	5g6g	-17	-57	-17	-73
			5H	-	-	-	-	5h4h	0	-40	0	-36
			-	-	-	-	-	5h6h	0	-40	0	-56
			-	-	-	-	-	6e	-	-	-	-
			-	-	-	-	-	6f	-	-	-	-
			6G	-	-	-	-	6g	-17	-67	-17	-73
			6H	-	-	-	-	6h	0	-50	0	-56
			-	-	-	-	-	7e6e	-	-	-	-
			7G	-	-	-	-	7g6g	-	-	-	-
			7H	-	-	-	-	7h6h	-	-	-	-
			-	-	-	-	-	8e	-	-	-	-
			8G	-	-	-	-	8g	-	-	-	-
-	-	-	-	-	9e8e	-	-	-	-			
8H	-	-	-	-	9g8g	-	-	-	-			

Table 1 (continued)

Basic major diameter		Pitch mm	Internal thread				External thread					
over mm	up to mm		Toler- ance class	Pitch diameter		Minor diameter		Toler- ance class	Pitch diameter		Major diameter	
				<i>ES</i>	<i>EI</i>	<i>ES</i>	<i>EI</i>		<i>es</i>	<i>ei</i>	<i>es</i>	<i>ei</i>
$\mu\text{m}$	$\mu\text{m}$			$\mu\text{m}$	$\mu\text{m}$	$\mu\text{m}$	$\mu\text{m}$		$\mu\text{m}$	$\mu\text{m}$		
1,4	2,8	0,25	-	-	-	-	3h4h	0	-28	0	-42	
			-	-	-	-	4g	-18	-54	-18	-60	
			4H	48	0	45	0	4h	0	-36	0	-42
			-	-	-	-	-	5g4g	-18	-63	-18	-60
			5G	78	18	74	18	5g6g	-18	-63	-18	-85
			5H	60	0	56	0	5h4h	0	-45	0	-42
			-	-	-	-	-	5h6h	0	-45	0	-67
			-	-	-	-	-	6e	-	-	-	-
			-	-	-	-	-	6f	-	-	-	-
			6G	-	-	-	-	6g	-18	-74	-18	-85
			6H	-	-	-	-	6h	0	-56	0	-67
			-	-	-	-	-	7e6e	-	-	-	-
			7G	-	-	-	-	7g6g	-	-	-	-
			7H	-	-	-	-	7h6h	-	-	-	-
			-	-	-	-	-	8e	-	-	-	-
			8G	-	-	-	-	8g	-	-	-	-
8H	-	-	-	-	9e8e	-	-	-	-			
1,4	2,8	0,35	-	-	-	-	3h4h	0	-32	0	-53	
			-	-	-	-	4g	-19	-59	-19	-72	
			4H	53	0	63	0	4h	0	-40	0	-53
			-	-	-	-	-	5g4g	-19	-69	-19	-72
			5G	86	19	99	19	5g6g	-19	-69	-19	-104
			5H	67	0	80	0	5h4h	0	-50	0	-53
			-	-	-	-	-	5h6h	0	-50	0	-85
			-	-	-	-	-	6e	-	-	-	-
			-	-	-	-	-	6f	-34	-97	-34	-119
			6G	104	19	119	19	6g	-19	-82	-19	-104
			6H	85	0	100	0	6h	0	-63	0	-85
			-	-	-	-	-	7e6e	-	-	-	-
			7G	-	-	-	-	7g6g	-19	-99	-19	-104
			7H	-	-	-	-	7h6h	0	-80	0	-85
			-	-	-	-	-	8e	-	-	-	-
			8G	-	-	-	-	8g	-	-	-	-
-	-	-	-	-	9e8e	-	-	-	-			
8H	-	-	-	-	9g8g	-	-	-	-			



Table 1 (continued)

Basic major diameter		Pitch	Internal thread					External thread				
over	up to		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter	
				<i>ES</i>	<i>EI</i>	<i>ES</i>	<i>EI</i>		<i>es</i>	<i>ei</i>	<i>es</i>	<i>ei</i>
mm	mm			μm	μm	μm	μm		μm	μm	μm	μm
1,4	2,8	0,4	-	-	-	-	-	3h4h	0	-34	0	-60
			-	-	-	-	-	4g	-19	-61	-19	-79
			4H	56	0	71	0	4h	0	-42	0	-60
			-	-	-	-	-	5g4g	-19	-72	-19	-79
			5G	90	19	109	19	5g6g	-19	-72	-19	-114
			5H	71	0	90	0	5h4h	0	-53	0	-60
			-	-	-	-	-	5h6h	0	-53	0	-95
			-	-	-	-	-	6e	-	-	-	-
			-	-	-	-	-	6f	-34	-101	-34	-129
			6G	109	19	131	19	6g	-19	-86	-19	-114
			6H	90	0	112	0	6h	0	-67	0	-95
			-	-	-	-	-	7e6e	-	-	-	-
			7G	-	-	-	-	7g6g	-19	-104	-19	-114
			7H	-	-	-	-	7h6h	0	-85	0	-95
			-	-	-	-	-	8e	-	-	-	-
			8G	-	-	-	-	8g	-	-	-	-
8H	-	-	-	-	9e8e	-	-	-	-			
1,4	2,8	0,45	-	-	-	-	-	3h4h	0	-36	0	-63
			-	-	-	-	-	4g	-20	-65	-20	-83
			4H	60	0	80	0	4h	0	-45	0	-63
			-	-	-	-	-	5g4g	-20	-76	-20	-83
			5G	95	20	120	20	5g6g	-20	-76	-20	-120
			5H	75	0	100	0	5h4h	0	-56	0	-63
			-	-	-	-	-	5h6h	0	-56	0	-100
			-	-	-	-	-	6e	-	-	-	-
			-	-	-	-	-	6f	-35	-106	-35	-135
			6G	115	20	145	20	6g	-20	-91	-20	-120
			6H	95	0	125	0	6h	0	-71	0	-100
			-	-	-	-	-	7e6e	-	-	-	-
			7G	-	-	-	-	7g6g	-20	-110	-20	-120
			7H	-	-	-	-	7h6h	0	-90	0	-100
			-	-	-	-	-	8e	-	-	-	-
			8G	-	-	-	-	8g	-	-	-	-
-	-	-	-	-	9e8e	-	-	-	-			
8H	-	-	-	-	9g8g	-	-	-	-			

ITC STANDARD PREVIEW  
 (standards.itech.ai)  
<https://standards.itech.ai/catalog/standards/sist/ecff6858-48e0-4064-a70d-d06b228f5494/iso-dis-965-3>

Table 1 (continued)

Basic major diameter		Pitch	Internal thread					External thread				
over	up to		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter	
				<i>ES</i>	<i>EI</i>	<i>ES</i>	<i>EI</i>		<i>es</i>	<i>ei</i>	<i>es</i>	<i>ei</i>
mm	mm			mm	µm	µm	µm		µm	µm	µm	µm
2,8	5,6	0,35	-	-	-	-	-	3h4h	0	-34	0	-53
			-	-	-	-	-	4g	-19	-61	-19	-72
			4H	56	0	63	0	4h	0	-42	0	-53
			-	-	-	-	-	5g4g	-19	-72	-19	-72
			5G	90	19	99	19	5g6g	-19	-72	-19	-104
			5H	71	0	80	0	5h4h	0	-53	0	-53
			-	-	-	-	-	5h6h	0	-53	0	-85
			-	-	-	-	-	6e	-	-	-	-
			-	-	-	-	-	6f	-34	-101	-34	-119
			6G	109	19	119	19	6g	-19	-86	-19	-104
			6H	90	0	100	0	6h	0	-67	0	-85
			-	-	-	-	-	7e6e	-	-	-	-
			7G	-	-	-	-	7g6g	-19	-104	-19	-104
			7H	-	-	-	-	7h6h	0	-85	0	-85
			-	-	-	-	-	8e	-	-	-	-
			8G	-	-	-	-	8g	-	-	-	-
			8H	-	-	-	-	9e8e	-	-	-	-
2,8	5,6	0,5	-	-	-	-	-	3h4h	0	-38	0	-67
			-	-	-	-	-	4g	-20	-68	-20	-87
			4H	63	0	90	0	4h	0	-48	0	-67
			-	-	-	-	-	5g4g	-20	-80	-20	-87
			5G	100	20	132	20	5g6g	-20	-80	-20	-126
			5H	80	0	112	0	5h4h	0	-60	0	-67
			-	-	-	-	-	5h6h	0	-60	0	-106
			-	-	-	-	-	6e	-50	-125	-50	-156
			-	-	-	-	-	6f	-36	-111	-36	-142
			6G	120	20	160	20	6g	-20	-95	-20	-126
			6H	100	0	140	0	6h	0	-75	0	-106
			-	-	-	-	-	7e6e	-50	-145	-50	-156
			7G	145	20	200	20	7g6g	-20	-115	-20	-126
			7H	125	0	180	0	7h6h	0	-95	0	-106
			-	-	-	-	-	8e	-	-	-	-
			8G	-	-	-	-	8g	-	-	-	-
			-	-	-	-	-	9e8e	-	-	-	-
8H	-	-	-	-	9g8g	-	-	-	-			

Table 1 (continued)

Basic major diameter		Pitch	Internal thread					External thread				
over	up to		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter	
				<i>ES</i>	<i>EI</i>	<i>ES</i>	<i>EI</i>		<i>es</i>	<i>ei</i>	<i>es</i>	<i>ei</i>
mm	mm	mm		µm	µm	µm	µm		µm	µm	µm	µm
2,8	5,6	0,6	-	-	-	-	-	3h4h	0	-42	0	-80
			-	-	-	-	-	4g	-21	-74	-21	-101
			4H	71	0	100	0	4h	0	-53	0	-80
			-	-	-	-	-	5g4g	-21	-88	-21	-101
			5G	111	21	146	21	5g6g	-21	-88	-21	-146
			5H	90	0	125	0	5h4h	0	-67	0	-80
			-	-	-	-	-	5h6h	0	-67	0	-125
			-	-	-	-	-	6e	-53	-138	-53	-178
			-	-	-	-	-	6f	-36	-121	-36	-161
			6G	133	21	181	21	6g	-21	-106	-21	-146
			6H	112	0	160	0	6h	0	-85	0	-125
			-	-	-	-	-	7e6e	-53	-159	-53	-178
			7G	161	21	221	21	7g6g	-21	-127	-21	-146
			7H	140	0	200	0	7h6h	0	-106	0	-125
			-	-	-	-	-	8e	-	-	-	-
			8G	-	-	-	-	8g	-	-	-	-
8H	-	-	-	-	9e8e	-	-	-	-			
2,8	5,6	0,7	-	-	-	-	-	3h4h	0	-45	0	-90
			-	-	-	-	-	4g	-22	-78	-22	-112
			4H	75	0	112	0	4h	0	-56	0	-90
			-	-	-	-	-	5g4g	-22	-93	-22	-112
			5G	117	22	162	22	5g6g	-22	-93	-22	-162
			5H	95	0	140	0	5h4h	0	-71	0	-90
			-	-	-	-	-	5h6h	0	-71	0	-140
			-	-	-	-	-	6e	-56	-146	-56	-196
			-	-	-	-	-	6f	-38	-128	-38	-178
			6G	140	22	202	22	6g	-22	-112	-22	-162
			6H	118	0	180	0	6h	0	-90	0	-140
			-	-	-	-	-	7e6e	-56	-168	-56	-196
			7G	172	22	246	22	7g6g	-22	-134	-22	-162
			7H	150	0	224	0	7h6h	0	-112	0	-140
			-	-	-	-	-	8e	-	-	-	-
			8G	-	-	-	-	8g	-	-	-	-
-	-	-	-	-	9e8e	-	-	-	-			
8H	-	-	-	-	9g8g	-	-	-	-			

Table 1 (continued)

Basic major diameter		Pitch	Internal thread				External thread					
over	up to		Tolerance class	Pitch diameter		Minor diameter		Tolerance class	Pitch diameter		Major diameter	
				<i>ES</i>	<i>EI</i>	<i>ES</i>	<i>EI</i>		<i>es</i>	<i>ei</i>	<i>es</i>	<i>ei</i>
mm	mm			µm	µm	µm	µm		µm	µm	µm	µm
2,8	5,6	0,75	-	-	-	-	3h4h	0	-45	0	-90	
			-	-	-	-	4g	-22	-78	-22	-112	
			4H	75	0	118	4h	0	-56	0	-90	
			-	-	-	-	5g4g	-22	-93	-22	-112	
			5G	117	22	172	5g6g	-22	-93	-22	-162	
			5H	95	0	150	5h4h	0	-71	0	-90	
			-	-	-	-	5h6h	0	-71	0	-140	
			-	-	-	-	6e	-56	-146	-56	-196	
			-	-	-	-	6f	-38	-128	-38	-178	
			6G	140	22	212	6g	-22	-112	-22	-162	
			6H	118	0	190	6h	0	-90	0	-140	
			-	-	-	-	7e6e	-56	-168	-56	-196	
			7G	172	22	258	7g6g	-22	-134	-22	-162	
			7H	150	0	236	7h6h	0	-112	0	-140	
			-	-	-	-	8e	-	-	-	-	
			8G	-	-	-	8g	-	-	-	-	
8H	-	-	-	9e8e	-	-	-	-				
2,8	5,6	0,8	-	-	-	-	3h4h	0	-48	0	-95	
			-	-	-	-	4g	-24	-84	-24	-119	
			4H	80	0	125	4h	0	-60	0	-95	
			-	-	-	-	5g4g	-24	-99	-24	-119	
			5G	124	24	184	5g6g	-24	-99	-24	-174	
			5H	100	0	160	5h4h	0	-75	0	-95	
			-	-	-	-	5h6h	0	-75	0	-150	
			-	-	-	-	6e	-60	-155	-60	-210	
			-	-	-	-	6f	-38	-133	-38	-188	
			6G	149	24	224	6g	-24	-119	-24	-174	
			6H	125	0	200	6h	0	-95	0	-150	
			-	-	-	-	7e6e	-60	-178	-60	-210	
			7G	184	24	274	7g6g	-24	-142	-24	-174	
			7H	160	0	250	7h6h	0	-118	0	-150	
			-	-	-	-	8e	-60	-210	-60	-296	
			8G	224	24	339	8g	-24	-174	-24	-260	
-	-	-	-	9e8e	-60	-250	-60	-296				
8H	200	0	315	9g8g	-24	-214	-24	-260				