ASME B29.14M-1996 (Revision of ANSI/ASME B29.14M-1984)

ATTACHUS, AIDS AND SPROCKET TEEL

AN AMERICAN NATIONAL STANDARD





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"H" TYPE MILL CHAINS, ATTACHMENTS, AND SPROCKET TEETH

ASME B29.14M-1996 (Revision of ANSI/ASME B29.14M-1984)

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FOREWORD

(This Foreword is not part of ASME B29.14M-1996.)

The "H" type mill chains are a derivative of the malleable detachable chains and were developed to meet the demands of heavier duty service.

These chains were developed principally for the lumber and pulp and paper industries for drives, transfer, and drag conveyors. They are also well adapted to elevator service of moderate speeds and loads.

Interchangeability between chains of various manufacturers is important with the widespread usage of these chains.

In September 1967, a subcommittee of American National Standards Committee B29 was appointed with members from the malleable chain industry to develop a standard for the "H" type mill chains, attachments, and sprocket teeth.

The standard developed by this committee restricts only those dimensions that affect interchangeability.

To promote the use of this Standard in the International Market, the metric equivalent of all dimensions is given.

Added to the current revision is the minimum bolt hole diameter required for bolt diameter given for the particular attachment.

This document was approved as an American National Standard on December 17, 1971. This revision was approved by the American National Standards Institute on July 16, 1996.

ASME STANDARDS COMMITTEE B29 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.)

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"H" TYPE MILL CHAINS, ATTACHMENTS, AND SPROCKET TEETH

1 NOMENCLATURE

"H" type mill chains: a series of identical cast offset links having barrels to contact the sprocket teeth and pins that articulate in the barrels of the links

Pins are fixed in the sidebar pitch holes by either press fits and/or mechanical locks, such as flats, to prevent rotation of the pins in the sidebar pitch holes.

2 GENERAL CHAIN PROPORTIONS AND DESIGNATIONS

2.1 Proof Test Load

The minimum proof test load listed in Table 1 is the load in pounds (or kilonewtons) that the chain withstood at the time of assembly at the factory. Maximum proof test loads may be determined by the manufacturer provided they do not cause damage or distortion to the chain parts.

The values listed in Table 1 cover the two most common materials used in the links:

- (a) Class M. Malleable Iron (ASTM Specification A 47-68, Grade 32510 or Grade 35018)
- (b) Class P. Pearlitic Malleable Iron (ASTM Specification A 220-68, Grade 60004)

Class P chains are approximately 25% stronger than Class M chains.

2.2 Measuring Load

The measuring load, in pounds or kilonewtons, listed in Table 1, is the load under which a dry or lightly lubricated chain should be measured for length.

2.3 Strand Length Tolerance

New chains under measuring load may be over length up to 0.75 in. in 120 in. (19.05 mm in 3,048 mm), but must not be under minimum length.

Maximum and minimum strand lengths for each chain are listed in Table 1.

2.4 Dimensions for Chain Links

To assure interchangeability of links as produced by different makers of chain, standard minimum and maximum dimensions are adopted. They are not actual dimensions used in manufacturing but limiting dimensions, minimum or maximum, required to assure the desired interchangeability.

All dimensions are given in a decimal inch system. The metric equivalent dimensions are for reference only.

"H" TYPE MILL CHAINS, ATTACHMENTS, AND SPROCKET TEETH

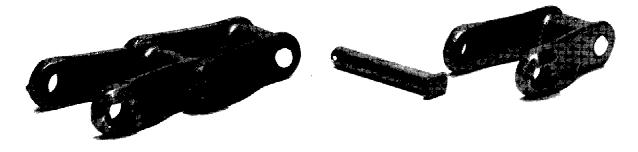


FIG. 1 "H" TYPE MILL CHAIN

A =inside width for sprocket contact

B = inside diameter of barrel

D = pin diameter

F = chain height

H = barrel outside diameter

J = pin head to center line

K = pin end to center line

L = riveted head to center line

P = chain pitch (This is a theoretical reference dimension used for basic calculations.)

V = sidebar end clearance radius — pin end $V_a =$ sidebar end clearance radius — barrel end

X = width of link at barrel end extending to a point on the pitch line Y inches from the center line as shown

Y =straight before bend — barrel end

 $Y_a = \text{straight before bend} - \text{pin end}$

Z = width between sidebars at pin end extending to a point on the pitch line Y_a inches from the center line as shown

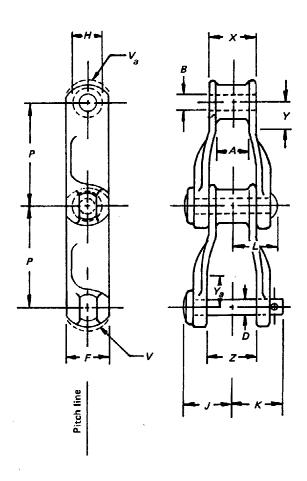


FIG. 2 "H" TYPE MILL CHAIN NOMENCLATURE

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TABLE 1 GENERAL CHAIN DIMENSIONS, PROOF TEST LOAD, STRAND LENGTH, AND **MEASURING LOAD FOR CHECKING CHAIN LENGTHS**

			Chain No.		
	H60	H74	H78	H82	H124
	Dimensions,	in.			
P = chain pitch	2.308	2.609	2.609	3.075	4.000
D = pin diameter	0.312	0.375	0.500	0.562	0.750
F = chain height	0.75	1.00	1.12	1.25	1.56
H = barrel outside diameter	0.75	0.88	0.88	1.19	1.44
Proof test load, lb, minimum					
Class M	2800	4000	6400	8000	12.000
Class P	3500	5000	8000	10.000	15,000
Number of pitches/nominal 120 in. strand	52	46	46	39	30
Maximum measuring length of nominal 120 in. strand	120.77	120.76	120.76	120.67	120.75
Minimum measuring length of nominal 120 in. strand	120.02	120.01	120.01	119.92	120.00
Measuring load, lb	100	200	200	300	400
	imensions,	nm			
P = chain pitch	58.62	66.27	66.27	78.10	101.60
D = pin diameter	7.92	9.52	12.70	14.27	19.05
F = chain height	19.0	25.4	28.4	31.75	39.62
H = barrel outside diameter	19.0	22.3	22.3	30.2	36.6
Proof test load, kN, minimum					
Class M	12.50	17.80	28.50	35.60	53.40
Class P	15.60	22.20	35.60	44.50	66.80
Number of pitches/nominal 3048 mm strand	52	46	46	39	30
Maximum measuring length of nominal 3048 mm strand	3067.6	3067.3	3067.3	3065.0	3067.0
Minimum measuring length of nominal 3048 mm strand	3048.5	3048.2	3048.2	3046.0	3048.0
Measuring load, kN	450	900	900	1340	1790

CAUTION — The numerical values in this Table do not afford a sufficient or appropriate basis for determining chain application and must be read in conjunction with the definitions and explanatory notes on page 1.

TABLE 2 MINIMUM AND MAXIMUM CONTROLLING DIMENSIONS FOR INTERCHANGEABLE CHAIN LINKS

			Chain No).	
	H60	H74	H78	H82	H124
Dimensions, in.				·	•
P = chain pitch	2.308	2.609	2.609	3.075	4.000
D = pin diameter (max)	0.315	0.378	0.503	0.565	0.753
B _i = inside diameter of barrel (min.)	0.32	0.383	0.508	0.570	0.758
4 = inside width of barrel for sprocket contact (min.)	0.75	1.00	1.12	1.25	1.62
H = barrel height (max)	0.78	0.92	0.92	1.26	1.48
Y = straight before bend — barrel end (min.)	0.42	0.52	0.60	0.66	0.82
$Y_a = \text{straight before bend} - \text{pin end (min.)}$	0.42	0.52	0.60	0.66	0.82
/ = sidebar end clearance radius — pin end (max) [Note (1)]	0.42	0.52	0.60	0.66	0.82
/ _a = sidebar end clearance radius — barrel end (max) [Note (1)]	0.42	0.52	0.60	0.66	0.82
K = width of link, barrel end (max)	1.53	1.66	1.91	2.22	2.80
Z = width between sidebars, pin end (min.)	1.55	1.68	1.93	2.24	2.82
Dimensions, mm					
o = chain pitch	58.62	66.27	66.27	78.11	101.60
D = pin diameter (max)	8.00	9.60	12.78	14.35	19.13
B = inside diameter of barrel (min.)	8.13	9.73	12.90	14.48	19.25
A = inside width of barrel for sprocket contact (min.)	19.0	25.4	28.4	31.8	41.2
f = barrel height (max)	19.8	23.4	23.4	32.0	37.6
<pre>/ = straight before bend — barrel end (min.)</pre>	10.7	13.2	15.2	16.8	20.8
$l_{\theta}' = \text{straight before bend } \text{pin end (min.)}$	10.7	13.2	15.2	16.8	20.8
/ = sidebar end clearance radius — pin end (max) [Note (1)]	10.7	13.2	15.2	16.8	20.8
/ _a = sidebar end clearance radius — barrel end (max) [Note (1)]	10.7	13.2	15.2	16.8	20.8
C = width of link, barrel end (max)	38.9	42.2	48.5	56.4	71.1
? = width between sidebars, pin end (min.)	39.8	42.7	49.0	56.9	71.6

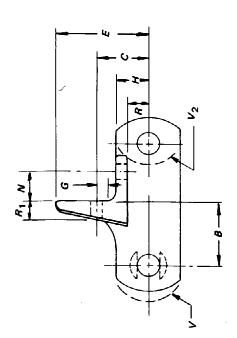
NOTE:

TABLE 3 CHAIN CLEARANCE DIMENSIONS

			Chain No.		
	H60	H74	H78	H82	H124
	Dimens	ions, in.			
F = chain height (max)	0.82	1.06	1.18	1.32	1.62
J = pin head to center line of chain (max)	1.37	1.53	1.71	2.00	2.50
K = pin end to center line of chain (max)	1.53	1.65	1.97	2.16	2.69
L = riveted head to center line of chain (max)	1.42	1.53	1.68	2.00	2.45
	Dimensi	ons, mm			
F = chain height (max)	20.8	26.9	30.0	33.5	41.2
J = pin head to center line of chain (max)	34.8	38.9	43.4	50.8	63.5
K = pin end to center line of chain (max)	38. 9	41. 9	50.0	54.9	68.3
L = riveted head to center line of chain (max)	36.1	38.9	42.7	50.8	62.2

⁽¹⁾ V max and V_a max can be exceeded provided the extension beyond V max and V_a max shown is relieved to avoid interference with the sidebar.

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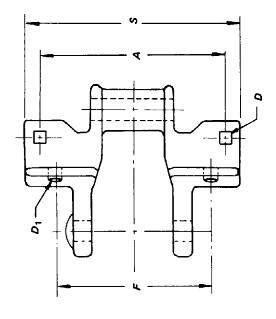


						TABLE 4	E 4 F4	F4 ATTACHMENT	HMEN							
Afternoon				-	Q											
Chain No.	₹	40	v	Bolt Size	Min. Hole (Square)	D ₁ , Bolt Size	E, Max	ų	Min. Flat	Max.	2	Œ	Æ	S, Max	V, Max	V ₂ , Min.
							٥	Dimensions, in.	ri.							
09H	3.94	0.88	1.25	0.31	0.34	0.38	2.19	3.06	0.78	0.38	0.75	0.22	0.31	4.75	0.42	0.44
H74	4.12	1.18	1.38	0.31	0.34	0.38	2.31	3.25	0.72	0.50	0.75	0.25	0.38	5.03	0.52	0.54
H78	4.50	1.00	1.44	0.38	0.40	0.38	2.38	3.76	0.72	0.56	0.94	0.25	0.38	5.56	0.60	0.62
H82	5.00	1.26	1.50	0.38	0.40	0.38	2.44	4.12	0.78	0.62	0.88	0.28	0.38	90.9	99.0	0.68
H124	5.26	1.50	1.66	0.38	0.40	0.38	2.88	4.38	0.75	0.78	1.06	0.31	0.50	6.32	0.82	0.84
							ā	Dimensions, mm	E E							
09H	100.1	22.4	31.8	7.9	8.6	9.7	55.6	7.77	19.8	6.7	19.1	5.6	7.9	120.7	10.7	11.2
H74	104.6	30.0	35.1	7.9	8.6	9.7	58.7	82.6	18.3	12.7	19.1	6,4	9.7	127.8	13.2	13.7
H78	114.3	25.4	36.6	9.7	10.2	9.7	60.5	95.5	18.3	14.2	23.9	6.4	9.7	141.2	15.2	15.7
H82	127.0	32.0	38.1	9.7	10.2	9.7	62.0	104.6	19.8	15.7	22.4	7.1	9.7	153.9	16.8	17.3
H124	133.6	38.1	42.2	9.7	10.2	9.7	73.2	111.3	19.1	19.8	26.9	7.9	12.7	160.5	20.8	21.3
GENERA	L NOTE: P	in head s	GENERAL NOTE: Pin head side location at ma		nufacturer's option	į			ı		:					

"H" TYPE MILL CHAINS, ATTACHMENTS, AND SPROCKET TEETH

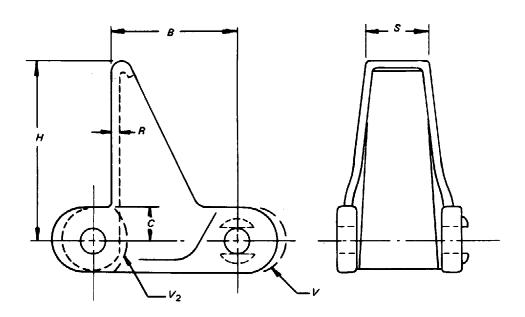


TABLE 5 H2 ATTACHMENT

Chain No.	В	с	H, Max	R	<i>S</i> , Max	<i>V,</i> Max	V₂, Min.
140			1	Dimensions	s, in.		
H60	2.12	0.38	2.50	0.09	1.00	0.42	0.44
H78	2.30	0.56	3.56	0.12	1.19	0.60	0.62
			C	imensions,	mm		<u>. </u>
H60	53.8	9.7	63.5	2.3	25.4	10.7	11.2
H78	58.4	14.2	90.4	3.0	30.2	15.2	15.7

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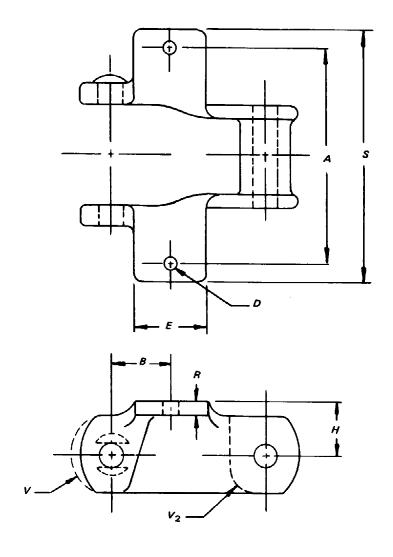


TABLE 6 K1 ATTACHMENT

		_		D						-
Chain No.	A	В	Bolt Size	Min. Hole	<i>E,</i> Max	<i>H</i> , Max	R	<i>S</i> , Max	V, Max	V ₂ , Min.
					Dimen	sions, in	i .			
H60	3.00	1.06	0.31	0.34	1.19	0.81	0.18	4.06	0.42	0.44
H78	4.00	1.26	0.38	0.40	1.44	0.88	0.22	5.12	0.60	0.62
H82	4.20	1.50	0.38	0.40	1.81	1.00	0.22	5.44	0.66	0.68
					Dimens	ions, m	m			
H60	76.2	26.9	7.9	8.6	30.2	20.6	4.6	103.1	10.7	11.2
H78	101.6	32.0	9.7	10.2	36.6	22.4	5.6	130.0	15.2	15.7
H82	106.7	38.1	9.7	10.2	46.0	25.4	5.6	138.2	16.8	17.3

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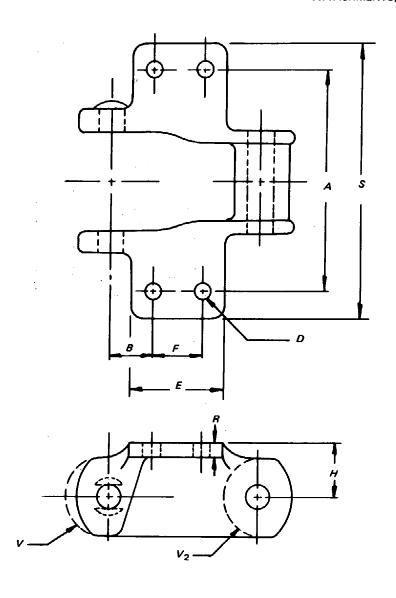


TABLE 7 K2 ATTACHMENT

				D							
Chain No.	A	В	Bolt Size	Min. Hole	<i>E,</i> Max	F	<i>H,</i> Max	R	<i>S,</i> Max	<i>V,</i> Max	V₂, Міп.
				٠	Din	ension	s, in.				
H78	4.00	0.41	0.38	0.40	2.19	1.12	0.88	0.25	5.06	0.60	0.62
H82	4.25	0.75	0.38	0.40	2.38	1.31	0.94	0.31	5.56	0.66	0.68
H124	5.25	0.88	0.38	0.40	3.00	1.94	1.25	0.31	6.50	0.82	0.84
					Dim	ensions,	, mm				
H78	101.6	10.4	9.7	10.2	55.6	28.4	22.4	6.4	128.5	15.2	15.7
H82	108.0	19.1	9.7	10.2	60.5	33.3	23.9	7.9	141.2	16.8	17.3
H124	133.4	22.4	9.7	10.2	76.2	49.3	31.8	7.9	165.1	20.8	21.3

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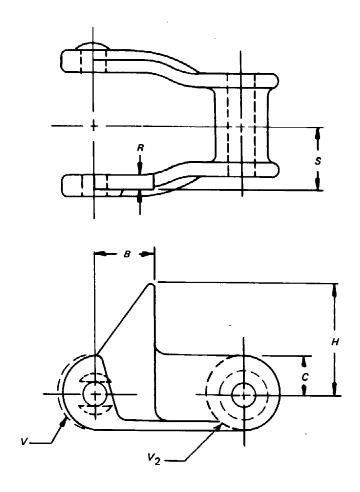


TABLE 8 R1 ATTACHMENT

Chain No.	В	C	<i>H,</i> Max	R	S, Max	V, Max	V₂, Min.
				Dimensions	, in.		
H74	1.12	0.50	1.56	0.25	1.14	0.52	0.54
H78	1.15	0.56	1.62	0.31	1.31	0.60	0.62
			D	imensions,	mm		
H74	28.4	12.7	39.6	6.4	29.0	13.2	13.7
H78	29.2	14.2	41.1	7.9	33.3	15.2	15.7

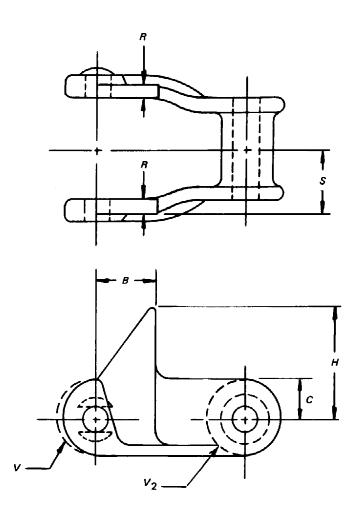
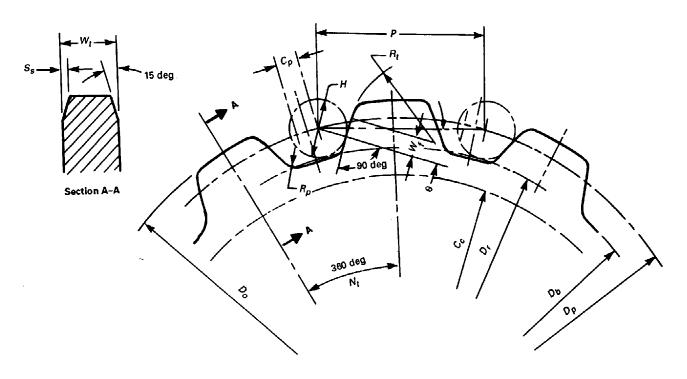


TABLE 9 RR ATTACHMENT

Chain No.	В	С	<i>Н,</i> Мах	R	<i>S</i> , Max	<i>V,</i> Max	V₂, Min.
			1	Dimensions	, in.		
H78	1.15	0.56	1.62	0.31	2.68	0.60	0.62
			0	imensions,	mm		
H78	29.2	14.2	41.1	7.9	68.1	15.2	15.7

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3 SPROCKET TOOTH FORM



The elements of a chain sprocket and the tooth form may be determined by the following:

 C_b = undersize compensation (typically 0.06 in.)

 C_c = chain clearance circle [Note (1)] = $P(C_{cf} - 0.05) - F \max$

 C_{cf} = clearance circle and outside diameter factor (see Table 11) = cot (180/ N_t)

 C_p = pitch line clearance = $P \times 0.10$ to $P \times 0.15$

 $D_b = \text{bottom diameter [Note (2)]} = D_r - C_b$

 D_o = outside diameter [Note (3)] = $(P \times C_{cf}) + F \max$

 $D_p = \text{pitch diameter} = P \times D_{pf}$

 D_{pf} = pitch diameter factor (see Table 11) = c_{sc} (180/ N_t)

 $D_r = \text{root diameter [Note (2)]} = (P \times D_{pf}) - H \text{ max}$

F = max chain height (see Table 3)

 $H = \max$ chain barrel height (see Table 2)

 N_t = number of teeth

P = chain pitch

 $R_p = \text{pocket radius [Note (2)]}, < H/2$

 $R_t = \text{topping radius} = 0.5 \times P$

 S_s = side slope = approximately 0.12 x W_t , not to exceed 0.38 in. (9.6 mm)

 $W_t = \text{working face [Note (4)]} = 0.01 \times P \times N_t$

 $W_t = \text{max tooth width} = 0.95A \text{ min. of chain}$

 θ = pressure angle (see Table 11)

NOTES:

- (1) No portion of hub, beads, lugs, or fillets shall extend beyond this circle in the sidebar zone.
- (2) The bottom diameter should be smaller than the root diameter, and the pocket radius should be smaller than H/2. Oversize dimensions cause improper chain and sprocket action and excessive chain loads.
- (3) Outside diameter may be increased to give a full height tooth when the top of the chain is clear of flights, pans, buckets, etc. Tooth working face length provides for approximately 6% chain pitch elongation.
- (4) Limitation on length of working face the working face shall not extend beyond the line through the adjacent pitch point that is perpendicular to the working face.

FIG. 3 SPROCKET TOOTH FORM

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4 SPROCKETS

TABLE 10 SPROCKETS — MAXIMUM ECCENTRICITY AND FACE RUNOUT AT ROOT DIAMETER

		Pitch Dia	ameter				entricity	Max Fac	e Runout IR
	in.			mm					
Over		Including	Over		Including	in.	mm	in.	mm
0	up to	12	0	up to	305	0.09	2.29	0.06	1.52
12	up to	24	305	up to	610	0.15	3.81	0.12	3.05
24	up to	36	610	up to	915	0.21	5.33	0.20	5.08
36	up to	48	915	up to	1,220	0.27	6.86	0.30	7.62
48	up to	60	1,220	up to	1,524	0.33	8.38	0.33	8.38
60	up to	72	1,524	up to	1,830	0.39	9.91	0.36	9.14
	Over 72			Over 1,830		Consu	It Mfg.	Consu	lt Mfg.

TABLE 11 SPROCKET TOOTH FORM FACTORS

C_{cf}	$D_{ ho f}$	N_t	θ, deg
1.73	2.000	6	9
2.07	2.304	7	10
2.41	2.613	8	11
2.74	2.923	9	12
3.07	3.236	10	13
3.40	3.549	11	14
3.73	3.863	12	15
4.05	4.178	13	16
4.38	4.494	14	17
4.70	4.809	15	18
5.03	5.125	16	19
5.35	5.442	17	20
5.67	5.758	18	20
5.99	6.075	19	21
6.31	6.392	20	21
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9.51	9.566	30	24
9.83	9.884	31	24
10.15	10.202	32	24
10.47	10.520	33	25
10.79	10.837	34	25
11.11	11.155	35	25
11.43	11.473	36	25

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