

clocks is optimized for a much lower current draw but a much longer life than a C cell made for flashlights.

Cylindrical Dry Cells						
Designation U.S. IEC	Nom. dia.	Height	Capacity, mAh			
			Carbon Zinc 1.5v	Alkaline 1.5v	Nickel cadmium 1.25v	
AAA	R 03	1 3/32"	1 3/4"	20	100	600
AA	R 6	9/16"	1 31/32"	25	150	1,000
C	R 14	1 1/32"	1 13/16"	80	480	3,000
D	R 20	1 11/32"	2 13/32"	150	650	10,000†
F	R 25	1 1/4"	3 7/16"	—	—	—
G	R 26	1 11/32"	4 5/32"	300	—	—
No. 6	—	2 5/8"	6 1/16"*	1500	—	—
N	—	0.445	1.180	20	85	300

* Height does not include height of terminals.
 † Many consumer D-cell ni-cads are simply C-cells in a D-cell package. These have a capacity of around 1800 mAh.

bearings, ball

Because the best ball bearings in early 20TH c were made by German manufacturers, ball bearings have usually been sized in millimeters, even those made in the USA—but the balls themselves were frequently sized in inches. The Anti-Friction Bearing Manufacturers Assn. adopted a classification of ball bearings according to their construction, with each type identified by a symbol (such as "BA"). Symbols that include the letter "I" identify types that are nominally sized in inches; of ten types, only two have an "I."

Embedded in the manufacturer's model number for most ball bearings is a three-digit code that gives its dimensions in millimeters. The first digit refers to the series. There are four principal series: 100, extra light; 200, light; 300, medium; and 400, heavy. The table below shows the sizes up through a bore of 50 mm, but much bigger sizes are defined. In the medium series, for example, a 356 bearing takes a shaft with a diameter of 280 mm—more than eleven inches.

Designation	Bore	Series 100 (x = 1)		Series 200 (x = 2)		Series 300 (x = 3)		Series 400 (x = 4)	
		OD	Width	OD	Width	OD	Width	OD	Width
x00	10	26	8	30	9	35	11	—	—
x01	12	28	8	32	10	37	12	—	—
x02	15	32	9	35	11	42	13	—	—
x03	17	35	10	40	12	47	14	62	17
x04	20	42	12	47	14	52	15	72	19
x05	25	47	12	52	15	62	17	80	21

Designation	Bore	Series 100 (x = 1)		Series 200 (x = 2)		Series 300 (x = 3)		Series 400 (x = 4)	
		OD	Width	OD	Width	OD	Width	OD	Width
x06	30	55	13	62	16	72	19	90	23
x07	35	62	14	72	17	80	21	100	25
x08	40	68	15	80	18	90	23	110	27
x09	45	75	16	85	19	100	25	120	29
x10	50	80	16	90	20	110	27	130	31

becquerel

The unit of activity (of a radioactive substance) in SI. Symbol, Bq. A substance is radioactive if the nuclei of its atoms are unstable, spontaneously changing into nuclei of another element and emitting radiation in the process. One becquerel is one such spontaneous nuclear transition per second.

The CGPM adopted the becquerel in 1975 (15TH CGPM, Resolution 8) on the advice of the International Commission on Radiation Units and Measurement and the International Commission on Radiological Protection. It replaced the curie, whose continued use was temporarily sanctioned. One curie = 3.7×10^{10} Bq. The primary reason for the change was to make SI coherent.

bells, tolling of

Funeral. It was the custom in England to toll the funeral bell in spells of 3 for a child, 6 for a woman, and 9 for a man. In some areas the bell also tolled the number of years the person had lived.

Ship's. The ship's bell is tolled every half hour. A single stroke is struck a half hour after the beginning of each watch, at 12:30, 4:30, and 8:30 (both AM and PM). An additional stroke is added at each tolling, every half hour, so that 8 bells is struck at the end of the watch: 4:00, 8:00, and 12:00 (again, both AM and PM). Ship's bells are no longer rung on merchant ships, but the custom is maintained on passenger, training, and naval vessels.

Bible, units in the

A number of units of measurement occur in the Bible, and sometimes it is necessary to understand a unit's meaning to understand the significance of the passage in which it occurs. For good reasons, translators have sometimes rendered a number of different units by the same word in English. In the Revised Standard Version the word "measure," for example, is used for the *batos*, *koros*, and *saton*, units that differ in magnitude by a factor of 30. Sometimes a particular word in the Hebrew or Greek is translated by different English words in different contexts, e.g. *pechus* is sometimes translated as "cubit" and sometimes converted to the equivalent in yards.

How do we know how big Biblical units were? We can only guess at the size of some units (e.g., a "gomedh", the length of Ehud's sword in Judges 3:16) The value of other units during certain periods is fairly

well known because of archeological discoveries. For example, archaeologists have found the tunnel dug by Hezekiah (2 Kings 20:20). In the tunnel is an inscription stating that the tunnel is 1,200 cubits long. Measuring the tunnel and dividing by 1,200 gives the size of a cubit, at least on the date when the inscription was made. This value can then be checked by measuring other structures built at the time, since people tend to build in round numbers. (A visitor from another planet wandering around an American lumber yard could soon figure out we had a foot unit and another one-twelfth its size.) And in fact, structures were found with dimensions that were a whole number (such as 50) of the tunnel cubit. Sometimes, too, archeologists recover actual standards of weight and capacity, such as pots marked with the name of a unit, just as someone thousands of years from now might find a glass measuring cup from some farmer's kitchen. Even these, however, do not necessarily provide a final word on the size of a unit.

Because the Old Testament touches such a vast sweep of time, geography and culture, a word naming a unit may represent many different magnitudes. Today a gallon in Canada is not the same size as a gallon in the United States, and neither is the same as an English ale gallon in 1600. The people of the Old Testament were themselves aware of the variability of weights and measures; think of Ezekiel's attempt at restandardization after the Babylonian Exile (Ezek. 45). It is hardly surprising that the meaning of many of the units is still debated. Among Jewish scholars, for example, there are two schools regarding measures: the "Na'eh" interpretation, by which, for example, the fingerbreadth is 2 cm, and the "Hazon Ish" interpretation, which takes it to be 2.4 cm. The sizes of such units figure in present-day religious observances; to play it safe, the observant generally choose whichever interpretation is most onerous under the circumstances.

In general, we can be more certain of the meaning of the units in the New Testament, since it covers a much shorter and more recent period of time. Some of the New Testament units were widely used Greek or Roman units. Others are hellenized versions of long-established Hebrew units, for example, saton for seah.

Units in the Old Testament					
Word in the translation		unit in	Conversions		
King James	R.S.V.	Hebrew & transliterated	Examples	SI	U.S.
Units of Length					
reed	reed	קנה kannah = 6 ammah	Ezekiel 40:5	2.67 m	8' 9"

Units in the Old Testament					
Word in the translation		unit in	Conversions		
King James	R.S.V.	Hebrew & transliterated	Examples	SI	U.S.
"cubit of a man"	cubit	אמה ammah = 6 tophach	Deuteronomy 3:11 1 Samuel 17:4 Genesis 7:20 Esther 7:19 2 Kings 14:13 Nehemiah 3:13 Jeremiah 52:21	444 mm	17.47"
cubit			Ezekiel 40:5, 43:13	518 mm	20.38"
"the cubit is a cubit and an hand breadth"					
cubit	cubit	גומד gomedh	Judges 3:16	?	?
span	span	זרת zeres = 3 tophach (some say 2)	1 Samuel 17:4 Ezekiel 43:13 Isaiah 40:12	22.2 cm	8.75"
hand breadth	handbreadth	טפח tophach = 4 etzbah	Ezekiel 40:5; 43:13	7.4 cm	2.9"
finger	finger	אצבע etzbah	Jeremiah 52:21	1.9 cm	3/4"

Units of Area					
"an half acre of land, which a yoke of oxen might plow"	acre	צמד tzemed, lit. "yoke"	1 Samuel 14:14 Isaiah 5:10	0.2 ha	around 1/2 acre
acre					
homer	homer	חומר chomer	Lev. 27:16	2.4 ha	6 acres

Units of Dry Capacity					
homer	homer	חומר chomer	Numbers 11:32 Isaiah 5:10 Ezekiel 45:11, 13, 14* Hosea 3:2	230 L	6.5 bushels
measure	measure		1 Kings 18: 32		
cor	cor	כור kor	Ezekiel 45:14 1 Kings 5:11	230 L	6.5 bushels
measure	cor				
	lethech	לתך lethech = 1/2 chomer		115 L	3 1/4 bushels

SIZES

Units in the Old Testament					
Word in the translation		unit in Hebrew & transliterated	Examples	Conversions	
King James	R.S.V.			SI	U.S.
ephah	ephah	אֵפָה ephah = 1/10 chomer	Exodus 16:36 Lev. 5:11, 6:20; 19:36 Ezekiel 45:10, 11*, 24; 46:5 Numbers 5:15 Judah 6:19 Ruth 2:17 1 Sam 1:24, 17:17 Isaiah 5:10 Amos 8:5 Zechariah 5:6-10	23 L	21 dry quarts
measure	measure	סֵאָה seah = 1/3 ephah	Genesis 18:6 Isaiah 40:12	7.6 L	7 dry quarts
omer	omer	עֹמֶר omer = 1/10 ephah	Exodus 16:16, 18, 22, 32, 33, 36*	2.2 L	4 dry pints
a tenth deal of flour	tenth part	עֲשָׂרוֹן issaron = 1/10 ephah	Exodus 29:40 Lev. 5:11; 6:20 Numbers 28:13 Ezekiel 45:11	2.2 L	4 dry pints
cab	kab	קָב kav	2 Kings 6:25	1.2 L	2 2/3 dry pints

Units of Liquid Capacity					
		סֵף kor same vol. as dry kor			
bath	bath	בַּת bath = 1/10 kor	1 Kings 7:26, 38 2 Chr 2:10; 4:5 Ezekiel 7:22 Isaiah 5:10 Ezekiel 45:10, 11, 16; 14	22 L	5.8 gallons
hin	hin	הִין hin = 1/6 bath	Exodus 29:40 Lev. 19:36 Numb. 15:4, 5, 6, 9; 28:5, 7, 14 Ezekiel 4:11; 45:24; 46:5, 7, 11, 14	3.66 L	3.86 quarts
		qabh = 1/3 hin		1.3 L	1.35 qts
log	log	לוֹג log = 1/12 hin	Lev. 14:10, 12, 15, 21, 24	320 mL	0.67 pint

SIZES

Units in the Old Testament					
Word in the translation		unit in Hebrew & transliterated	Examples	Conversions	
King James	R.S.V.			SI	U.S.
Units of Mass					
talent	talent	כִּיקָר kikkar	2 Kings 18:14		75.6 lbs
maneh	mina	מָנָה maneh	Ezekiel 45:12*	571 g	20.15 oz
shekel	shekel	שֶׁקֶל sheqel	1 Samuel 17:5, 7	11.4 g	176.3 grains
shekel of the sanctuary	shekel of the sanctuary	הַקֹּדֶשׁ בְּשֶׁקֶל bishekel hachodesh	Exodus 30:13 Lev. 5:15; 27:25 Num. 3:47; 18:6 Ezekiel 45:12		
not translated	pim	פִּימ pim	1 Samuel 13:21		
bekah	beka	בֶּקָע beka	Exodus 38:26	5.7 g	88.1 grains
	gerah	גֶּרָה gerah	Exodus 30:13 Lev. 27:25* Numbers 3:47; 18:16 Ezekiel 45:12	570 mg	8.8 grains

*Starred passages contain a definition of the unit.