

SIZES

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 |

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|-------------|------|-----------------------|-------|-----------------------|-------|-----------------------|-------|-----------------------|-------|
| | | 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 Hebrew & transliterated | Examples | Conversions | |
| King James | R.S.V. | | | 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 Hebrew & transliterated | Examples | Conversions | |
| King James | R.S.V. | | | SI | U.S. |
| "cubit of a man" | cubit | אמה ammah = 6 tophach | Deuteronomy 3:11 | 444 mm | 17.47" |
| cubit | | | 1 Samuel 17:4 Genesis 7:20 Esther 7:19 2 Kings 14:13 Nehemiah 3:13 Jeremiah 52:21 | | |
| "the cubit is a cubit and an hand breadth" | | | Ezekiel 40:5, 43:13 | 518 mm | 20.38" |
| 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 | 0.2 ha | around 1/2 acre |
| | acre | | Isaiah 5:10 | | |
| 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 | 230 L | 6.5 bushels |
| measure | cor | | 1 Kings 5:11 | | |
| | lethech | לתך lethech = 1/2 chomer | | 115 L | 3 1/4 bushels |

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 | עֶשְׂרוֹן 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 29 dry pints |

Units of Liquid Capacity

| | | | | | |
|------|------|--------------------------------------|--|--------|-------------|
| | | כּוֹר 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 |

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 | פִּים pim | 1 Samuel 13:21 | | |
| bekah | beka | בֶּקָע beka | Exodus 38:26 | 5.7 g | 88.1 grains |
| | gerah | גֵּרָה 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.