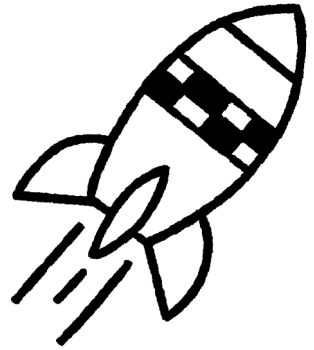


Koronto guri (Mains electricity)



Sayniska

Cutub: Iska caabbin (Resistance) iyo wareegyo barbar socda (parallel circuits)

Natiijo

Waxaan barbar dhigi karaa awoodda (power) qalabka kala duwan oo aan ogaan karaa inta ay kharash ku baxdo in la isticmaalo.

Erayada muhiimka ah

awood (power)

qadarka tamarta (energy) lagu wareejiyo ilbiriqsi kasta

watts (W)

halbeegga awoodda (power)

kilowatts (kW)

halbeeg awood oo ka weyn; $1 \text{ kW} = 1000 \text{ W}$

joules (J)

halbeegga tamarta (energy)

**kilowatt-saacadood
(kWh)**

halbeegga isticmaalka tamarta; $1 \text{ kWh} = 1$ halbeeg tamar la isticmaalay

Koronto guri (Mains electricity)



Waa maxay awoodda koronto (electrical power)?



Isticmaalka tamarta iyo kharashka

Waa maxay awoodda koronto (electrical power)?

Guryaheena waxaan ku haynaa qalab koronto oo kala duwan iyo aalado noo caawiya inaan shaqo qabanno.



Mid kastaa wuxuu isticmaalaa qadar tamar oo kala duwan ilbiriqsi kasta, waxayna ku xiran tahay shaqada uu qabto. Qadarka tamarta la isticmaalo ilbiriqsi kasta wuxuu la mid yahay awoodda (power) qalabka.

Qiimaha awoodda (power) qalab kasta waxaa badanaa laga helaa istiikar (sticker) dhabarka ama hoostiisa.



Nalkani wuxuu leeyahay qiime (value) awood (power) ah 25 W.



Qalalka codka (loudspeaker) wuxuu leeyahay qiime (value) awood (power) ah 50 W.

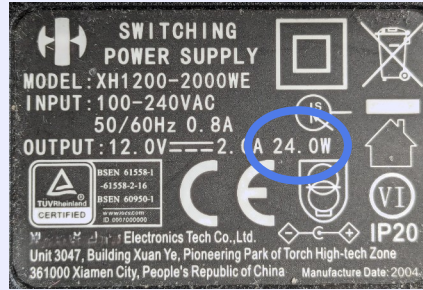


Rooti-kulayliyaha (toaster) wuxuu leeyahay qiime (value) awood (power) ah inta u dhaxaysa 860 iyo 1050 W.

W waa calaamadda loo isticmaalo cutubka awoodda (power); waxay u taagan tahay watts.

Waa maxay awoodda korantada (electrical power)?

Qiimaha (value) awoodda (power) ee saddex qalab ayaa hoos ku qoran. Qalabkee ayaa leh qiimaha (value) awoodda (power) ugu weyn?



Awoodda (power) waxaa lagu qiyaasaa watts (W).

Waxaad sidoo kale arki kartaa qiimayaasha (values) awoodda (power) oo lagu sheegay:

- milliwatts (mW)
- **kilowatts (kW)**
 - kumanaan meelood meel watt
- megawatts (MW)
 - kumanaan watts
- gigawatts (GW)
 - malaayiin watts
 - bilyan watts

Waa maxay awoodda korantada (electrical power)?

Qiimayaasha u dhigma ee awoodda (power):

1000 milliwatts = 1 watt

1000 watts = 1 kilowatt

1000 kilowatts = 1 megawatt

1000 megawatts = 1 gigawatt

Tirada waxay isku beddeshaa qodob 1000 markasta.

Waa maxay awoodda korantada (electrical power)?

Awoodda (power) kiinleyda ayaa hoos ku qoran. Immisa kW ayay kiinleyda isticmaashaa markay ku shaqeyso heerka ugu sarreeya?

a 3 ✓

b 60

c 240

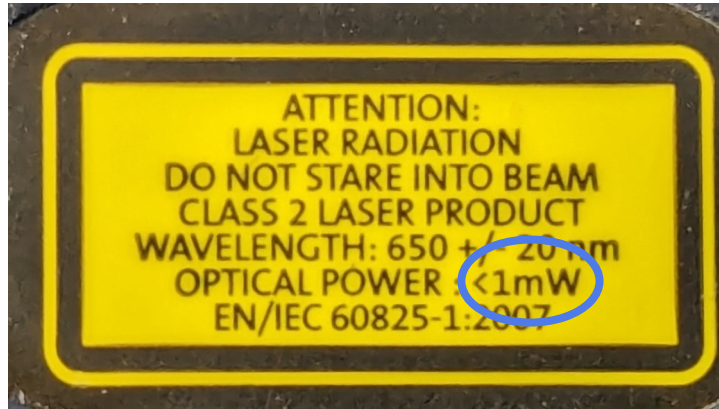
d 3000



3000 W = 3 kW

Waa maxay awoodda korantada (electrical power)?

Laydhka laser-ka waxaa lagu qiimeeyaa in ka yar 1 mW ama, 1/1000 watt.



Waa maxay awoodda korantada (electrical power)?



Sharaxaad

Taleefanka gacanta ee caadiga ah waxaa lagu qiimeeyaa ilaa 10 W, waxay ku xiran tahay waxa taleefanka loo isticmaalayo.



Caadi ahaan, tani waa wax aad uga yar.

Waa maxay awoodda korantada (electrical power)?

Kiinleyda ama rooti-karshe waxaa lagu qiimeeyaa ilaa 3000 W ama 3 kW.



Tani waxay ka badan tahay awoodda (power) uu dhali karo baaskiil-wade xirfadle ah – taas oo ka yar 2 kW.

Waa maxay awoodda korantada (electrical power)?



Hal marawaxadaha dabaysha ayaa dhali kara dhawr megawatts (MW).



Xarunta korontada ee shidaalka fosilka ah waxay dhali kartaa laba gigawatts (GW).

Waa maxay awoodda korantada (electrical power)?

Immisa marawaxadaha dabaysha 1 MW ayaa loo baahan yahay si loogu beddelo xarunta korontada ee dhuxusha 1 GW?

a

10

b

100

c

1000



d

10 000



Waa maxay awoodda korantada (electrical power)?

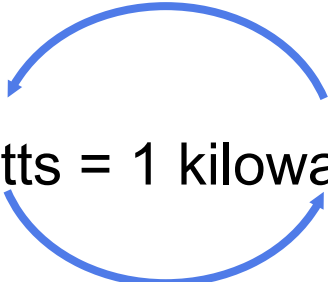
Beddelka u dhexeeya watts iyo kilowatts:



Si loo beddelo watts una loo beddelo kilowatts, u qaybi 1000.

Beddelka u dhexeeya kilowatts iyo watts:

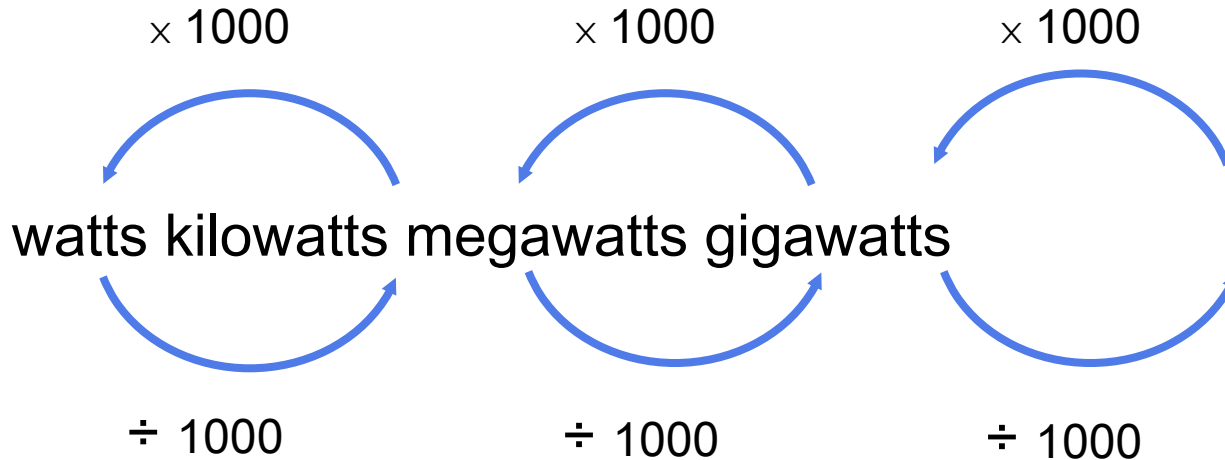
Si loo beddelo kilowatts una loo beddelo watts, ku dhufo 1000.


$$1000 \text{ watts} = 1 \text{ kilowatt}$$

Si loo beddelo watts una loo beddelo kilowatts, u qaybi 1000.

Waa maxay awood koronto (electrical power)?

Beddelka u dhexeeya horgalayaasha (prefixes):



Waa maxay awood koronto (electrical power)?

Kee ka mid ah awoodahan (powers) ayaa u dhigma 200 000 watts?

a

200 kW



b

2 000 kW

c

2 MW

d

0.2 MW



$$200\,000\text{ W} \div 1000 = 200\text{ kW}$$

$$200\text{ kW} \div 1000 = 0.2\text{ MW}$$

Waa maxay awood koronto (electrical power)?

Nalalka (light bulbs) ka hufan ee leh qiime (rating) awood (power) hoose ayaa bixin (emission) iftiin isku mid ah.



incandescent
(incandescent)
nalka (bulb):
60 W



nalka fluorescent ee iftiinka isku midka ah:
20 W



nalka LED ee iftiinka isku midka ah:
4 W

Waa maxay awoodda korantada (electrical power)?

Kee ka mid ah noocyada nalka ayaa u baahan awood (power) badan: nalka fluorescent 20 W ama 4×4 W nalka LED?

a

4 nalka LED

b

nalka fluorescent



c

labaduba waxay u baahan yihiin awood isku mid ah



$$4 \times 4 = 16 \text{ W}$$
$$20 > 16$$

1) U beddel awoodahan soo socda kilowatts (kW):

- a) 240 000 W
- b) 0.030 MW
- c) 0.000055 GW
- d) 150 000 mW

2) Guriga, qalabkan soo socda ayaa la shiday: 4 nalka LED, mid kastaa wuxuu qiime (value) ku leeyahay 5 W, foornada qiimeheedu yahay 1050 W, qaboojiyaha qiimeheedu yahay 400 W iyo router-ka WiFi qiimeheedu yahay 0.02 W.

Waa maxay wadarta awoodda (power) ay u baahan yihiin qalabkan oo dhan?

1) U beddel awoodahan soo socda kilowatts:

- a) $240\,000\text{ W} \div 1000 = 240\text{ kW}$
- b) $0.030\text{ MW} \times 1000 = 30\text{ kW}$
- c) $0.000055\text{ GW} \times 1000 = 0.055\text{ MW} \times 1000 = 55\text{ kW}$
- d) $150\,000\text{ mW} \div 1000 = 150\text{ W} \div 1000 = 0.15\text{ kW}$

2) Guriga, qalabkan soo socda ayaa la shiday: 4 nal LED, mid walba qiime (value) ah 5 W, foornada qiime (value) ah 1050 W, qaboojiyaha qiime (value) ah 400 W iyo router-ka WiFi qiime (value) ah 0.02 W.

Waa maxay wadarta tamarta (power) ay u baahan yihiin dhammaan qalabkan?

$$4 \times 5 = 20\text{ W}$$

$$\text{tamarta (power)} = 20\text{ W (4 nal)} + 1050\text{ W (foorno)} + 400\text{ W (qaboojiye)} + 0.02\text{ W (WiFi)} \text{ tamarta (power)} = 1470.02\text{ W}$$

Korantada guud (Mains electricity)



Waa maxay tamarta korantada (electrical power)?



Isticmaalka tamarta (energy) iyo kharashka

Tamarta (Power) waa cadadka tamarta (energy) (oo ku jira joules) la wareejiyo ilbiriqsi kasta.



Nalka LED: 4
W

Nalka 4 watt ee la muujiyey wuxuu isticmaali doonaa 4 joules ilbiriqsi kasta marka uu shidan yahay.

Haddii uu shido 1 daqiiqo (60 ilbiriqsi), wuxuu isticmaali doonaa $4 \times 60 = 240$ joules.

1 saac gudahood (60×60 ilbiriqsi), wuxuu isticmaali doonaa $4 \times 60 \times 60 = 144000$ joules.

Isticmaalka tamarta (energy) iyo kharashka

Imisa joules oo tamar (energy) ah ayay isticmaali doontaa nalka 60 W ee incandescent haddii la daayo 30 daqiiqo?

a

1 800 J

b

54 000 J

c

108 000 J



d

216 000 J



waqtiga ilbiriqsi = 30×60
 $60 \times 30 \times 60 = 108\,000\text{ J}$

Biyaha (water) guriga, waxaa naloo dallacaa tamarta (energy) aan isticmaalno cutubyo loo yaqaan kilowatt-saacadood.

Qiyaasida awoodda (power) kilowatt-ka iyo waqtiga saacadaha, tamarta (energy) la isticmaalay waxaa lagu helaa isla'egta (equation):

tamarta (energy) la isticmaalay = tamarta (power) × waqtiga

kWh kW hr

Tamarta (energy) la isticmaalay waxaa lagu qiyaasaa kilowatt-saacadood (kWh).

Kee ka mid ah kuwan soo socda waa halbeega (unit) saxda ah ee isticmaalka tamarta guriga?

a

MWmin

b

kWh



c

GJh

d

kJ

1 kilowatt-saacadood = 1 kilowatt $\times$ 1 saacad

= 1000 watts $\times$ 60 daqiiqo

= 1000 watts $\times$ 60 $\times$ 60 ilbiriqsi

= 3 600 000 joules

Qiyaasidda tamarta (energy) kilowatt-saacadood (kWh) ayaa ku habboon biilasha tamarta (energy bills) maxaa yeelay qiimaha (value) u dhigma ee joules ayaa aad uga weyn oo ka dhigaya mid adag in laga shaqeeyo qiimaha (cost) isticmaalka.

Joules ayaa weli loo isticmaali karaa xaddi yar oo tamar ah.

Mitirka korontada (electricity meter) wuxuu muujinayaa inta tamar (energy) la isticmaalay oo ku qiyaasan halbeegyada (units) kWh.



Mitirrada caqliga leh (smart meters) waxay sidoo kale muujin karaan qiimaha (cost), xaddiga tamarta (energy) la isticmaalay waqti go'an, waxayna kuu oggolaanayaan inaad falanqeyso isticmaalkaaga tamarta.

Shirkadaha bixiya korontada (electricity supply companies) waxay dadka ku dallacaan inta halbeeg (units) ay isticmaalaan.

Fahamka biilka korontada (electricity bill):

$$\text{unugyada la isticmaalay} = 82669 - 82516 \\ = 153$$

$$\text{kharashka (charge)} = 153 \times \text{£}0.24 \\ = \text{£}36.72$$

Previous reading (kWh)	Latest reading (kWh)	Units used	kWh rate	Charge
82516	82669	153	£ 0.24	£ 36.72
Standing charge				£ 15.75
Total charges for this period				£ 52.47

kharashka taagan (standing charge)
waa kharash go'an oo bixinta sahayda
(supply)

$$\text{£}36.72 + \text{£}15.75 = \text{£}52.47$$

Imisa unug (units) ayaa la isticmaalay inta u dhaxaysa labada akhrin (meter readings) ee la muujiyey?

a	110		
b	111	82376	akhrista bilowga (initial reading)
c	112	82489	akhrista ugu dambaysa (final reading)
d	113		



$$82489 - 82376 = 113 \text{ unug (units)}$$

Haddii kettel (kettle) 2000 W ah la isticmaalo 15 daqiiqo ($\frac{1}{4}$ saac):

$$\text{tamarta (energy)} = \text{awoodda (power)} \times \text{waqtiga (time)}$$



Kettel (kettle) koronto (electric) 2000 W

Haddii 1 kWh uu ku kacayo £0.20, kharashka (cost) isticmaalka kettel-ka (kettle) waa:

Isticmaalka tamarta (Energy use) iyo kharashka (cost)

Ka shaqee qiimaha (cost) hal kWh adoo isticmaalaya macluumaadka ka muuqda mitirka smart-ka (smart meter).

a 23.5 pence ✓

b 4.25 pence

c 12.19 pence

d 7.55 pence



$$2.32 \div 9.87 = 0.235 \text{ rodol (pounds)}$$
$$0.235 \text{ rodol} = 23.5 \text{ pence}$$

Mitirrada caqliga leh (smart meters) waxaa loo isticmaali karaa in lagu arko inta tamar (energy) aan isticmaalno si aan u noqonno kuwo tamar waxtar leh.



Mitirku wuxuu muujinayaa awoodda (power) iyo qiimaha (cost) 'hadda'.

Xakamaynta sida aan u isticmaalno qalabka tamar badan isticmaala waxay kaa caawinaysaa dhimista biilasha iyo horumarinta isticmaalka tamarta.

Isticmaalka tamar koronto (electrical energy) oo yar waxay badbaadinaysaa lacag waxayna yaraynaysaa bixinta (emission) kaarboon.

Tan waxaa lagu samayn karaa:

- isticmaalka qalabka tamar waxtar leh sida nalka LED (halkii laga isticmaali lahaa nalka incandescent)
- dami qalabka korontada marka aan loo baahnayn
- la socodka isticmaalka tamarta mitir caqli leh (smart meter) iyo samaynta isbeddelo lagu yareynayo.

Isticmaalka tamarta iyo qiimaha (cost)

Inta tamar (energy) uu isticmaalo kettel-ka karkarinaya biyo (water) 7 ilbiriqsi, haddii qiimaha awooddiisu (power rating) yahay 2000 W?

a 2000 J

Waqtiyada gaagaaban, waxaa fiican in la isticmaalo joules halkii kilowatt-saacadood.

b 2007 J

tamar (energy) = awood (power) × waqti (time)
= 2000 × 7
= 14 000 J

c 7000 J

d 14 000 J



Kettel-yadu waxay karkariyaan biyo (water) ilaa 7 s ka hor inta aanay si toos ah u damin.

Saciid iyo Yacquub waxay naqshadeynayaan buug-gacmeed (poster) si ay uga caawiyaan dadka inay isticmaalaan tamar (energy) yar oo ay yareeyaan saameynta deegaanka.



Waxaan dadka u sheegi lahaa inay damiyaan kettel-ka (kettle) marka uu bilaabo inuu karsado, halkii ay uga tagi lahaayeen inuu si otomaatig ah u damiyo.

Saciid

Waxaan dadka u sheegi lahaa inay damiyaan laydhadhka markay qolka ka baxayaan oo cidla ah.



Yacquub

- 1) Liiso qaar ka mid ah hababka kale ee kaydinta tamarta (energy) ee boodhka (poster) ku xiran.
- 2) Isbarbardhig fikradaha Saciid iyo Yacquub adigoo xisaabinaya inta tamar (energy) mid kastaa kaydintu karo.

1) Liiso hababka kaydinta tamarta (energy).

Jawaabaha la soo jeediyey:

- U cusboonaysii qalab tamar (energy) waxtar leh (laakin ka fogow inaad iibsato iyadoon la hubin in isticmaalka qalabka waxtarka yari ilaa uu shaqeynayo uu ka qiimo (value) yar yahay qiimaha (value) iibsashada iyo isticmaalka qalabka cusub muddadaas oo kale).
- Dami qalabka, sida TV-yada, oo inta badan lagu daayo standby habeenkii.
- Isticmaal wareegga (cycle) maydha heerkul hoose ah mashiinada dharka lagu maydho.
- Ka fogow kuleylinta guryaha iyo biyaha (water) in ka badan inta loo baahan yahay.
- Isticmaal mitir-ka (smart meter) si aad u aqoonsato qalabka isticmaala tamar (energy) badan.

2) Isbarbardhig fikradaha Saciid iyo Yacquub.

Waxaa laga yaabaa inaad samaysay xisaabo la mid ah kuwan:

Fikradda Saciid

Daminta kettel-ka (kettle) marka uu bilaabo inuu karsado (7 ilbiriqsi) waxay kayd in kartaa ilaa: $2000 \times 7 = 14\,000\text{ J}$

Fikradda Yacquub

Inaan la daayin laydh LED ah oo 5 W ah 1 saac waxay kayd in kartaa: $5 \times 60 \times 60 = 18\,000\text{ J}$ Inaan la daayin laydh incandescent ah oo 40 W ah 1 saac waxay kayd in kartaa: $40 \times 60 \times 60 = 144\,000\text{ J}$

Qalabka korontada iyo aaladaha waxay isticmaalaan xaddi kala duwan oo tamar ah ilbiriqsi kasta, sida lagu muujiyey qiimaha awoodda (power rating).

Awooddu (Power) waa cabbirka xaddiga tamarta ee uu isticmaalo ama uu siiyo aalad hal ilbiriqsi gudihiis, lagu qiyaaso watts (W).

Tamarta (energy) ay isticmaalaan qalabka iyo aaladaha guryaheena waxaa lagu qiyaasaa kilowatt-saac (kWh) iyo 1 kWh = 1 halbeeg (unit) oo tamar (energy) ah.

tamarta (energy) la isticmaalay = awood (power) x waqtiga

- Awoodda waxaa lagu qiyaasaa kilowatts (kW)
- Waqtiga waxaa lagu qiyaasaa saacadaha (h)

1 milliwatt = 0.001 W

1 kilowatt = 1000 W

1 megawatt = 1 000 000 W

1 gigawatt = 1 000 000 000 W