

**Bakersfield College**  
**Engineering B47**  
**Systems of Units & Unit Conversion**  
**Classroom Notes**

I. Dimensions vs. Units

- a.
- b.

II. Fundamental (Base) Units vs. Derived Units

III. U.S. Customary System of Units / British System

- a.
- b.
- c.
- d.
- e.
- f.

IV. Base US Units

<b>Dimension</b>	<b>Unit</b>	<b>Symbol</b>
length	Foot	ft
force	pound-force	lbf
time	second	s
current	ampere	A
temperature	Kelvin	K

V. Derived U.S. Units

<b>Dimension</b>	<b>Derived Unit</b>	<b>Symbol</b>
area	square foot	ft <sup>2</sup>
volume	cubic foot	ft <sup>3</sup>
mass	pound-mass	lbm
mass	lbf-s <sup>2</sup> /ft	slug
velocity	foot per second	ft/s
acceleration	foot per second squared	ft/s <sup>2</sup>
pressure, stress	pound-force/foot <sup>2</sup>	lbf/ft <sup>2</sup>
electric potential	volt	V

VI. International System of Units (SI system)

- a.
- b.
- c.
- d.

VII. Base SI Units

<b>Dimension</b>	<b>Unit</b>	<b>Symbol</b>
Length	meter	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Temperature	Kelvin	K

VIII. Derived SI Units

<b>Dimension</b>	<b>Derived Unit</b>	<b>Symbol</b>
area	square meter	m <sup>2</sup>
volume	cubic meter	m <sup>3</sup>
speed, velocity	meter per second	m/s
acceleration	meter per second squared	m/s <sup>2</sup>
force	Newton	N
pressure, stress	Pascal	Pa
temperature	degree Celsius	°C

IX. SI Prefixes

<b>Prefix</b>	<b>Symbol</b>	<b>Multiplier</b>
giga	G	10 <sup>9</sup>
mega	M	10 <sup>6</sup>
kilo	k	10 <sup>3</sup>
milli	m	10 <sup>-3</sup>
micro	μ	10 <sup>-6</sup>
nano	n	10 <sup>-9</sup>

## X. Unit Conversion

*Examples:*

1. Convert 645 lbm to kg.

2. Convert 323 N to lbf.

3. Convert 50 slugs to grams.

4. Convert 22.3 m/s to mph.

5. Convert 98.2 °F to Kelvin.

**Engineering B47**  
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**Class Assignment**

**Names:** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*Complete the specified conversions. Show ALL work:*

1. Convert 475 acres to  $m^2$ .

2. Convert 5500 gal to liters.

3. Convert 88 ft/s to m/s.

4. Convert 285 hp to Watts.

5. Convert  $125.5 \text{ ft}^3/\text{min}$  to  $m^3/\text{s}$ .

6. Convert 750.5 Pascals to psi.

7. Convert 225 lbf to N.

8. Convert 1.955 atm to Pascals.

9. Convert 685 ft·lbf to joules.

10. Convert  $77.7 \text{ slug/ft}^3$  to grams per cubic centimeter.