# Slug (mass) http://en.wikipedia.org/wiki/Slug_(mass)

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The **slug** is a unit of mass associated with Imperial units. It is a mass that accelerates by 1 ft/s$^2$ when a force of one pound-force ($lb_F$) is exerted on it.

$$1\,\text{slug} = 1\,\frac{\text{lb}_F \cdot \text{s}^2}{\text{ft}} \qquad \Longleftrightarrow \qquad 1\,\text{lb}_F = 1\,\frac{\text{slug} \cdot \text{ft}}{\text{s}^2}$$

- With standard gravitation $g_c$ = 9.80665 m/s$^2$, the international foot of 0.3048 m and the avoirdupois pound of 0.45359237 kg, one slug therefore has a mass of approximately 32.17405 lb or 14.593903 kg.[1] At the surface of the Earth, an object with a mass of 1 slug exerts a force of about 32.17 $lb_F$ or 143 N.[2][3]

## History

The *slug* is part of a subset of units known as the gravitational FPS system, one of several such specialized systems of mechanical units developed in the late 19th and the 20th century. *Geepound* was another name for this unit in early literature.[4]

The name "slug", as a unit of inertia, was coined before 1900 by British physicist Arthur Mason Worthington,[5] but it did not see any significant use until decades later. A 1928 textbook says:

No name has yet been given to the unit of mass and, in fact, as we have developed the theory of dynamics no name is necessary. Whenever the mass, *m*, appears in our formulae, we substitute the ratio of the convenient force-acceleration pair *(w/g)*, and measure the mass in lbs. per ft./sec.$^2$ or in grams per cm./sec.$^2$.

**Three approaches to mass and force units**[6]

| System v · d · e | Gravitational | | Engineering | | Science (absolute) | | | |
|---|---|---|---|---|---|---|---|---|
| Force (*F*) | $F = m \cdot a = w \cdot \frac{a}{g}$ | | $F = m \cdot \frac{a}{g_c} = w \cdot \frac{a}{g}$ | | $F = m \cdot a = w \cdot \frac{a}{g}$ | | | |
| Weight (*w*) | $w = m \cdot g$ | | $w = m \cdot \frac{g}{g_c} \approx m$ | | $w = m \cdot g$ | | | |
| Base unit | force | | both | | mass | | | |
| **Units** | **BG** | **GM** | **EE** | **EM** | **AE** | **CGS** | **MTS** | **SI** |
| Acceleration (*a*) | ft/s$^2$ | m/s$^2$ | ft/s$^2$ | m/s$^2$ | ft/s$^2$ | gal | m/s$^2$ | m/s$^2$ |
| Mass (*m*) | **slug** | hyl | $lb_m$ | kg | lb | g | t | kg |
| Force (*F*) | lb | kp | $lb_F$ | kp | pdl | dyn | sn | N |
| Pressure (*p*) | lb/in$^2$ (PSI) | at | $lb_F$/in$^2$ (PSI) | atm | pdl/in$^2$ | Ba | pz | Pa |