Unit Conversions Using OpenOffice.org Calc

Calc performs conversions between systems of units using the `convert_add` function. It accepts three values, in order:

- A numeric quantity to be converted
- A string that represents the units to be converted from
- A string that represents the units to be converted to

The number can be a constant or a formula, including references to cells containing numbers. Strings are enclosed in double quotation marks, and are limited to codes listed in the documentation. They are mostly case-sensitive.

**Example 1:** the Type 997 Porsche 911 GT2 sports car develops 523 brake horse power. What's that in kilowatts?

```
=convert_add(523;"HP";"kW")  Ans: 390
```

Conversions are typically of three kinds:

- Convert a value from one predefined unit to another (such as the above example);
- Determine the conversion factor from one predefined unit to another (use 1 as the number); or
- Convert from one system to another where multiple units are used.

Predefined units include some powers for area and volume such as \( m^2 \) (square metres) and \( \text{in}^3 \) (cubic inches).

The last type can include division (speed in km/hr or flow in litres per minute) powers (typically area or volume) and a combination of these (acceleration in \( \text{ms}^{-2} \)). The general principles to apply here are:

- the conversion is broken up into components, which are combined in the same way as the original composite units; and
- if you need to raise a conversion to a power, you must use 1 as the number and multiply the original number separately.

**Example 2:** convert a flow of petroleum of 34.2 barrels per minute into litres per second.

Analysis: this is a division without powers, convert the volume units and divide by the factor that converts the time units.

```
=convert_add(34.2;"barrel";"L")/convert_add(1;"mn";"s")  90.62
```

Note that the minutes code is \( \text{mn} \), and 1 is used as the denominator conversion factor.

**Example 3:** what is the acceleration due to gravity at the Earth's surface (9.81m/s\(^2\)) in the odd but legal units of nautical miles per minute per minute.

```
=convert_add(9.81;"m";"Nmi")/convert_add(1;"s";"mn")^2  19.07
```

**Example 4:** using only fundamental units, convert 88 square feet to square metres.

```
=88*convert_add(1;"ft";"m")^2  8.175
```

This is *not* equivalent to \( =\text{convert_add}(88;"ft";"m")^2 \), which is the area in square metres of a square that is 88 feet on one side, or 719\( \text{m}^2 \).