Duracap™ 86103: a Feasible solution for producing Gravitational Shieldings

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A polyvinyl chloride (PVC) compound, called Duracap™ 86103, can have its weight strongly decreased when subjected to extremely-low frequency (ELF) electromagnetic fields, and is feasibly suited for producing Gravitational Shieldings.

1. INTRODUCTION

It was recently discovered that, when electromagnetic fields are applied through a body, the *gravitational mass* of the body decreases, independently of its inertial mass [1]. The mass decrease depends on the electrical properties of the body (magnetic permeability, electric conductivity), and is directly proportional to the intensity of the electromagnetic field applied on the body, and inversely proportional to the field frequency. Thus, when *extreme-low frequency* (ELF) electromagnetic fields are applied on a body its *gravitational mass*, m_g, can be strongly *decreased*, and even made *negative*. This means that the *weight* of a body, $P = m_g g$, can be *reduced*, and even *inverted* by means of ELF electromagnetic fields. Here, it is shown that a PVC compound, called Duracap™ 86103 [1], can have its weight strongly decreased when subjected to ELF electromagnetic fields, being a feasible material to be used for producing Gravitational Shieldings.

2. THEORY

It was shown [1] that the relativistic *gravitational mass* $M_g = m_g \big/ \sqrt{1 - V^2/c^2}$ and the relativistic *inertial mass* $M_i = m_{i0} \big/ \sqrt{1 - V^2/c^2}$ are *quantized*, and given by $M_g = n_g^2 m_{i0(min)}$, $M_i = n_i^2 m_{i0(min)}$ where n_g and n_i are respectively, the *gravitational quantum number* and the *inertial quantum number*; $m_{i0(min)} = \pm 3.9 \times 10^{-73} kg$ is the elementary *quantum* of inertial mass. The masses m_g and m_{i0} are correlated by means of the following expression:

$$m_g = m_{i0} - 2\left[\sqrt{1 + \left(\frac{\Delta p}{m_{i0} c}\right)^2} - 1\right] m_{i0}. \qquad (1)$$

where Δp is the *momentum* variation on the particle and m_{i0} is the inertial mass at rest.

In general, the *momentum* variation Δp is expressed by $\Delta p = F \Delta t$ where F is the applied force during a time interval Δt. Note that there is no restriction concerning the *nature* of the force F, i.e., it can be mechanical, electromagnetic, etc.

For example, we can look on the *momentum* variation Δp as due to absorption or emission of *electromagnetic energy* by the particle. In this case, it was shown [1] that Δp can be expressed by means of the following expression

[1] Duracap™ 86103 is produced by Polyone Inc., www.polyone.com

$$\Delta p = \frac{U}{c} n_r$$

where U, is the electromagnetic energy absorbed by the particle and $n_r = c/v$ is the index of refraction.

Substitution of Δp into Eq. (1) yields

$$m_g = \left\{1 - 2\left[\sqrt{1 + \left(\frac{U}{m_{i0} c^2} n_r\right)^2} - 1\right]\right\} m_{i0} \qquad (2)$$

This equation can be rewritten in the following form

$$m_g = \left\{1 - 2\left[\sqrt{1 + \left(\frac{W}{\rho c^2} n_r\right)^2} - 1\right]\right\} m_{i0} \qquad (3)$$

where $W = U/V$, is the *density of electromagnetic energy* and $\rho = m_{i0}/V$ is the density of inertial mass.

The density of electromagnetic energy in an *electromagnetic* field can be deduced from Maxwell's equations [2] and has the following expression

$$W = \tfrac{1}{2}\varepsilon E^2 + \tfrac{1}{2}\mu H^2 \qquad (4)$$

It is known, that $B = \mu H$, $E/B = \omega/k_r$ [3] and

$$v = \frac{dz}{dt} = \frac{\omega}{\kappa_r} = \frac{c}{\sqrt{\frac{\varepsilon_r \mu_r}{2}\left(\sqrt{1 + (\sigma/\omega\varepsilon)^2} + 1\right)}} \qquad (5)$$

Where k_r is the real part of the *propagation vector* $\vec{k}$ (also called *phase constant* [4]); $k = \left|\vec{k}\right| = k_r + ik_i$; ε , μ and σ, are the electromagnetic characteristics of the medium in which the incident (or emitted) radiation is propagating ($\varepsilon = \varepsilon_r \varepsilon_0$, where ε_r is the *relative dielectric permittivity* and $\varepsilon_0 = 8.854 \times 10^{-12} F/m$; $\mu = \mu_r \mu_0$, where μ_r is the *relative magnetic permeability* and $\mu_0 = 4\pi \times 10^{-7} H/m$; σ is the *electrical conductivity*).

From (5), we see that the *index of refraction* n_r will be given by

$$n_r = \frac{c}{v} = \sqrt{\frac{\varepsilon_r \mu_r}{2}\left(\sqrt{1 + (\sigma/\omega\varepsilon)^2} + 1\right)} \qquad (6)$$

Equation (5) shows that $\omega/\kappa_r = v$. Thus, $E/B = \omega/k_r = v$, i.e., $E = vB = v\mu H$. Then, Eq. (4) can be rewritten in the following form:

$$W = \tfrac{1}{2}\left(\varepsilon v^2 \mu\right)\mu H^2 + \tfrac{1}{2}\mu H^2 \qquad (7)$$

For $\sigma << \omega\varepsilon$, Eq. (5) reduces to

$$v = \frac{c}{\sqrt{\varepsilon_r \mu_r}}$$

Then, Eq. (7) gives

$$W = \tfrac{1}{2}\left[\varepsilon\left(\frac{c^2}{\varepsilon_r \mu_r}\right)\mu\right]\mu H^2 + \tfrac{1}{2}\mu H^2 = \mu H^2 \qquad (8)$$

This equation can be rewritten in the following forms:

$$W = \frac{B^2}{\mu} \qquad (9)$$

or

$$W = \varepsilon E^2 \qquad (10)$$

For $\sigma >> \omega\varepsilon$, Eq. (5) gives

$$v = \sqrt{\frac{2\omega}{\mu\sigma}} \qquad (11)$$

Then, from Eq. (7) we get

$$W = \tfrac{1}{2}\left[\varepsilon\left(\frac{2\omega}{\mu\sigma}\right)\mu\right]\mu H^2 + \tfrac{1}{2}\mu H^2 = \left(\frac{\omega\varepsilon}{\sigma}\right)\mu H^2 + \tfrac{1}{2}\mu H^2 \cong$$

$$\cong \tfrac{1}{2}\mu H^2 \qquad (12)$$

Since $E = vB = v\mu H$, we can rewrite (12) in the following two forms:

$$W \cong \frac{B^2}{2\mu} \qquad (13)$$

or

$$W \cong \left(\frac{\sigma}{4\omega}\right)E^2 \qquad (14)$$

Substitution of Eq. (14) into Eq. (3) gives

$$m_g = \left\{1 - 2\left[\sqrt{1 + \frac{\mu}{4c^2}\left(\frac{\sigma}{4\pi f}\right)^3 \frac{E^4}{\rho^2}} - 1\right]\right\} m_{i0} \qquad (15)$$

Note that $E = E_m \sin \omega t$. The average value for E^2 is equal to $\tfrac{1}{2} E_m^2$ because E varies sinusoidaly (E_m is the maximum value for E). On the other hand, $E_{rms} = E_m / \sqrt{2}$. Consequently we can change E^4 for E_{rms}^4, and the equation above can be rewritten as follows

$$m_g = \left\{1 - 2\left[\sqrt{1 + 1.758 \times 10^{-27}\left(\frac{\mu_r \sigma^3}{\rho^2 f^3}\right)E_{rms}^4} - 1\right]\right\}m_{i0} \quad (16)$$

The Duracap™ 86103 has the following characteristics:

$$\mu_r = 1;\ \varepsilon_r = 3$$
$$\sigma = 3333.3 S/m$$
$$\rho = 1400 kg.m^{-3}$$
$$dieletric \quad strength = 3.87 KV / mm$$

Thus, according to Eq. (16), the *gravitational mass*, m_g, of the Duracap™ 86103, when subjected to an electromagnetic field of frequency f, is given by

$$m_g = \left\{1 - 2\left[\sqrt{1 + 3.3 \times 10^{-23}\frac{E_{rms}^4}{f^3}} - 1\right]\right\}m_{i0} \quad (17)$$

Note that, if the electromagnetic field through the Duracap has *extremely-low frequency*, for example, if $f = 1Hz$, and

$$E_{rms} = 4.4 \times 10^5 V/m \qquad (0.44 kV/mm).$$

Then, its the *gravitational mass* will be reduced down to $m_g \cong 0$, reducing in this way, the *weight* $(P = m_g g)$ of the Duracap to a value close to zero.

It was shown [1] that there is an additional effect of *Gravitational Shielding* produced by a substance whose gravitational mass was reduced or made negative. This effect shows that just *above the substance* the gravity acceleration g_1 will be reduced at the same proportion $\chi = m_g / m_{i0}$, i.e., $g_1 = \chi g$ (g is the gravity acceleration *bellow* the substance).

Thus, samples hung above the Duracap plate should exhibit a weight decrease when the frequency of the electromagnetic field is decreased or when the intensity of the electromagnetic field is increased.

3. THEORETICAL BACKGROUND FOR EXPERIMENTAL MEASUREMENTS

The Duracap™ 86103 is sold under the form of small cubes. Its melting temperature varies from 177ºC to 188ºC. Thus, a 15cm square Duracap plate with 1 mm thickness can be shaped by using a suitable mold, as the shown in Fig.1.

Figure 2(a) shows the Duracap plate between the plates of a parallel plate capacitor. The plates of the capacitor are made of Aluminum and have the following dimensions: 19cmX15cmX1mm. They are painted with an insulating varnish spray of high dielectric strength (ISOFILM). They are connected to a transformer, which is connected to a Function Generator that generates voltage *sinusoidal* waves. The distance between the Aluminum plates is $d = 1mm$. Thus, the electric field through the Duracap is given by

$$E_{rms} = \frac{E_m}{\sqrt{2}} = \frac{V_0}{\varepsilon_r d\sqrt{2}} \quad (18)$$

where ε_r is the relative permittivity of the dielectric(Duracap), and V_0 is the voltage applied on the capacitor.

The maximum value of the amplitude of the voltage produced by the Function Generator is $V_p^{max} = 10\ V$. The turns ratio of the transformer (Bosch red coil) is $200:1$. Thus, the maximum secondary voltage is $V_s^{max} = V_0^{max} = 2kV$. Consequently, Eq. (18) gives

$$E_{rms}^{max} = 4.7 \times 10^5 V/m$$

Thus, for $f = 1Hz$, Eq. (17) gives

$$m_g = -0.2 m_{i0}$$

The *variations on the gravitational mass* of the Duracap plate can be measured by a pan balance with the following characteristics: range 0-200g; readability 0.01g, using the set-up shown in Fig. 2 (a).

Figure 2 (b) shows the set-up to measure *the gravity acceleration variations above* the Duracap plate (Gravitational Shielding effect). The samples used in this case, can be of several types of material.

Since voltage waves with frequencies very below 1Hz have a very long period, we cannot consider, in practice, their *rms* values. However, we can add a sinusoidal voltage $V_{osc} = V_0 \sin \omega t$ with a DC voltage V_{DC}, by means of the circuit shown in Fig.3. Thus, we obtain $V = V_{DC} + V_0 \sin \omega t$; $\omega = 2\pi f$. If $V_0 << V_{DC}$ then $V \cong V_{DC}$. Thus, the voltage V varies with the frequency f, but its intensity is approximately equal to V_{DC}, i.e., V will be practically constant. This is of fundamental importance for maintaining the value of the gravitational mass of the body, m_g, sufficiently stable during all the time, in the case of $f << Hz$.

7. CONCLUSION

Other than, the Duracap^{TM} 86103, whose maximum working temperature is only about 100°C, there are materials with maximum working temperature of the order of 1600°C, which can be used in order to produce Gravitational Shieldings. These materials have electrical properties similar to those of Duracap.

For example, the CoorsTek Pure SiC^{TM} LR CVD *Silicon Carbide*, 99.9995% [2]. This Low-resistivity (LR) pure Silicon Carbide has electrical conductivity of *5000S/m* at room temperature; $\varepsilon_r = 10.8$; $\rho = 3210 kg.m^{-3}$; dielectric strength >10 KV/mm; maximum working temperature of 1600°C.

Another material is the *Alumina-CNT*, recently discovered[3]. It has electrical conductivity of *3375 S/m* at 77°C in samples that were 15% nanotubes by volume [5]; $\varepsilon_r = 9.8$; $\rho = 3980\, kg.m^{-3}$; dielectric strength 10-20KV/mm; maximum working temperature of 1750°C.

The novel *Carbon Nanotubes Aerogels*[4], called *CNT Aerogels* are also suitable to produce Gravitational Shieldings, mainly due to their very small densities. The electrical conductivity of the *CNT Aerogels* is 70.4 S/m for a density of $\rho = 7.5 kg.m^{-3}$ [7]; $\varepsilon_r \approx 10$; dielectric strength (Aerogels exhibit high dielectric strengths).

In summary, for what was exposed above, we can conclude that the requirements for a material to be considered feasibly good for Gravitational Shielding are the following:

- Electrical conductivity ranging between 10S/m to 10^4S/m
- Low density
- Low dielectric constant
- High dielectric strength

[2] www.coorstek.com ; info@coorstek.com

[3] Recently, it was discovered that Carbon nanotubes (CNTs) can be added to *Alumina* (Al_2O_3) to convert it into a good electrical conductor.

[4] In 2007, Mateusz Brying *et al.* working with Prof. Arjun Yodh at the University of Pennsylvania produced the first aerogels made entirely of carbon nanotubes (CNT Aerogels) [6] that, depending on the processing conditions, can have their electrical conductivity ranging as high as 100 S/m.

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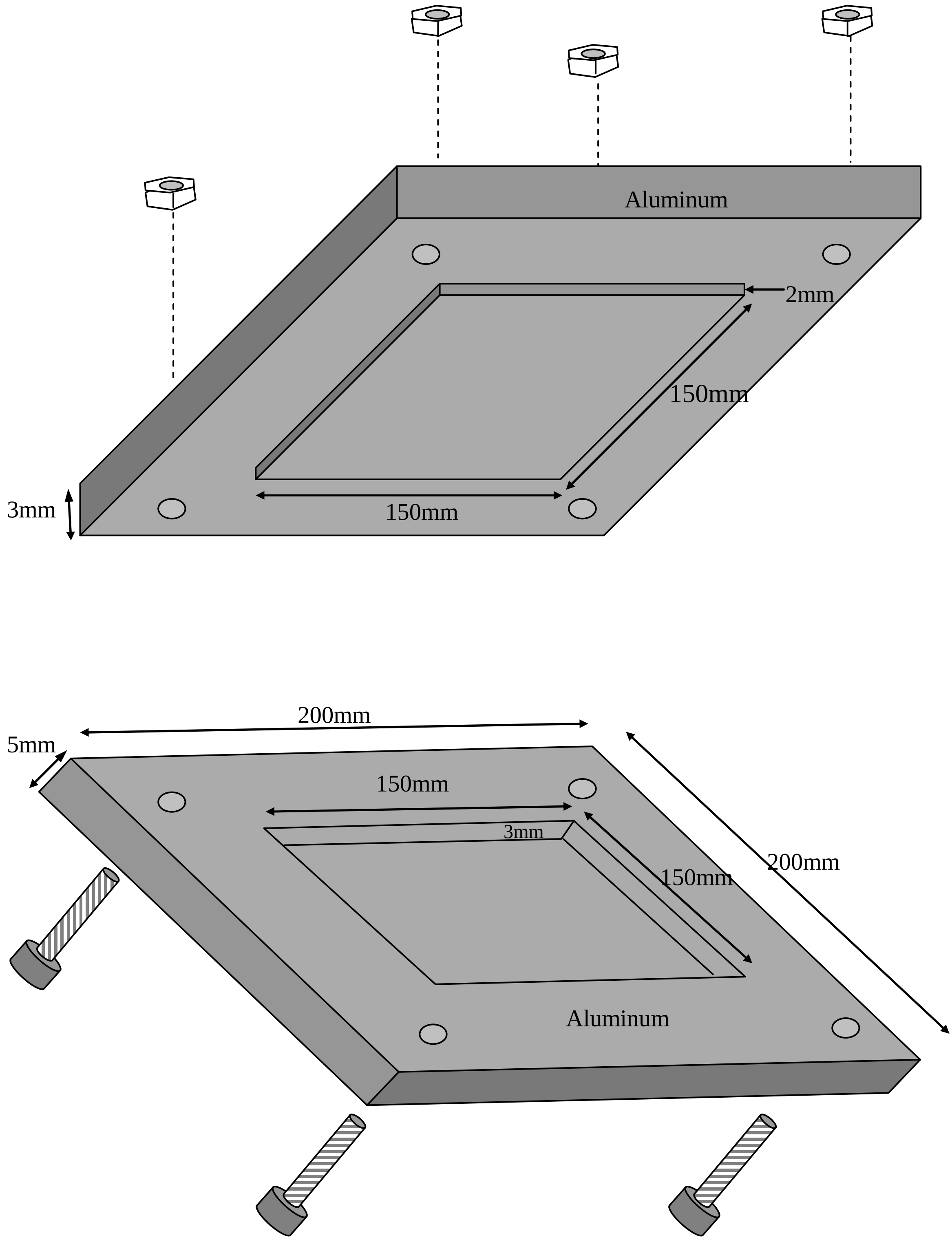

Fig.1 – Mold design

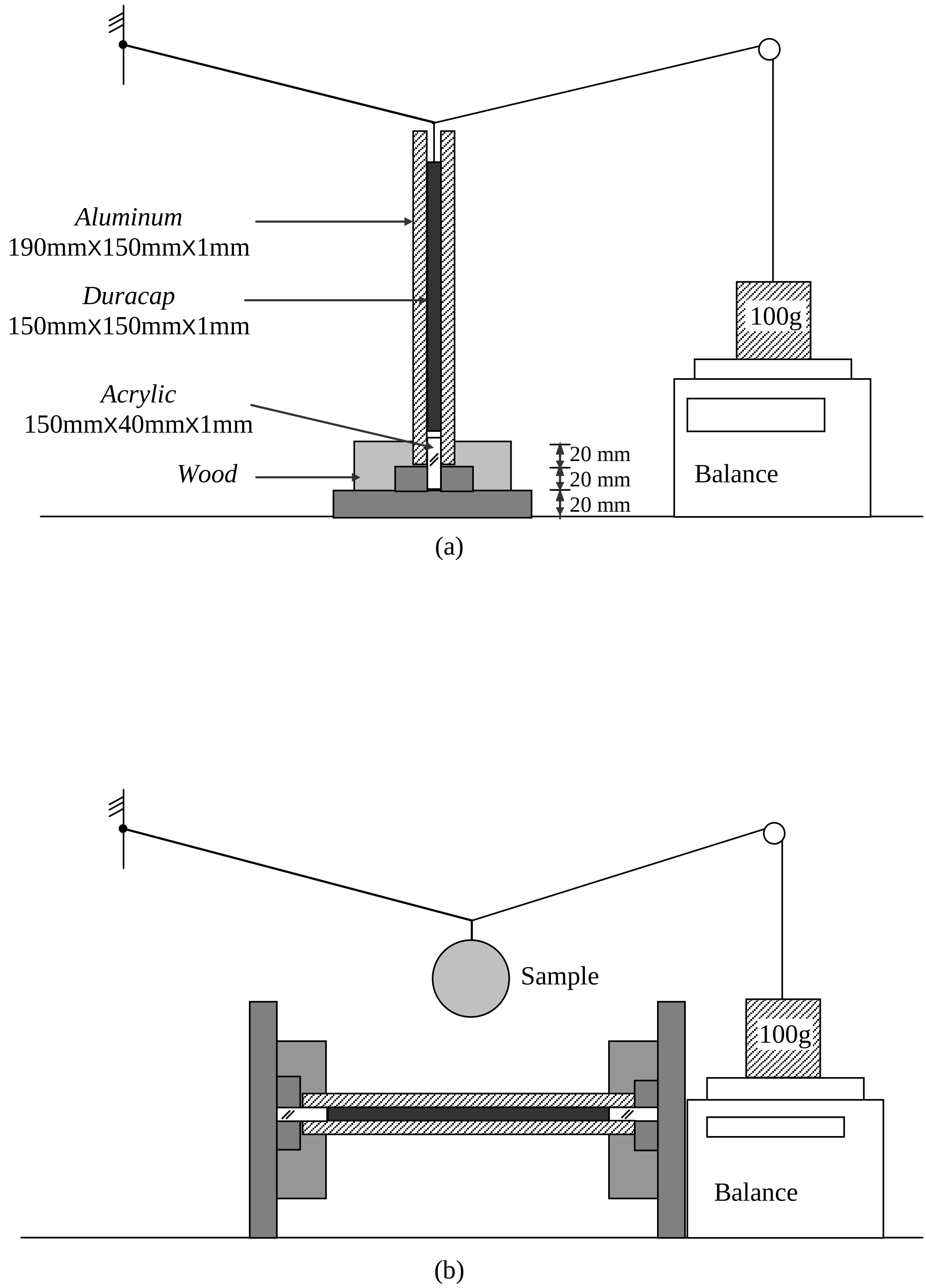

Fig.2 – Schematic diagram of the experimental set-up

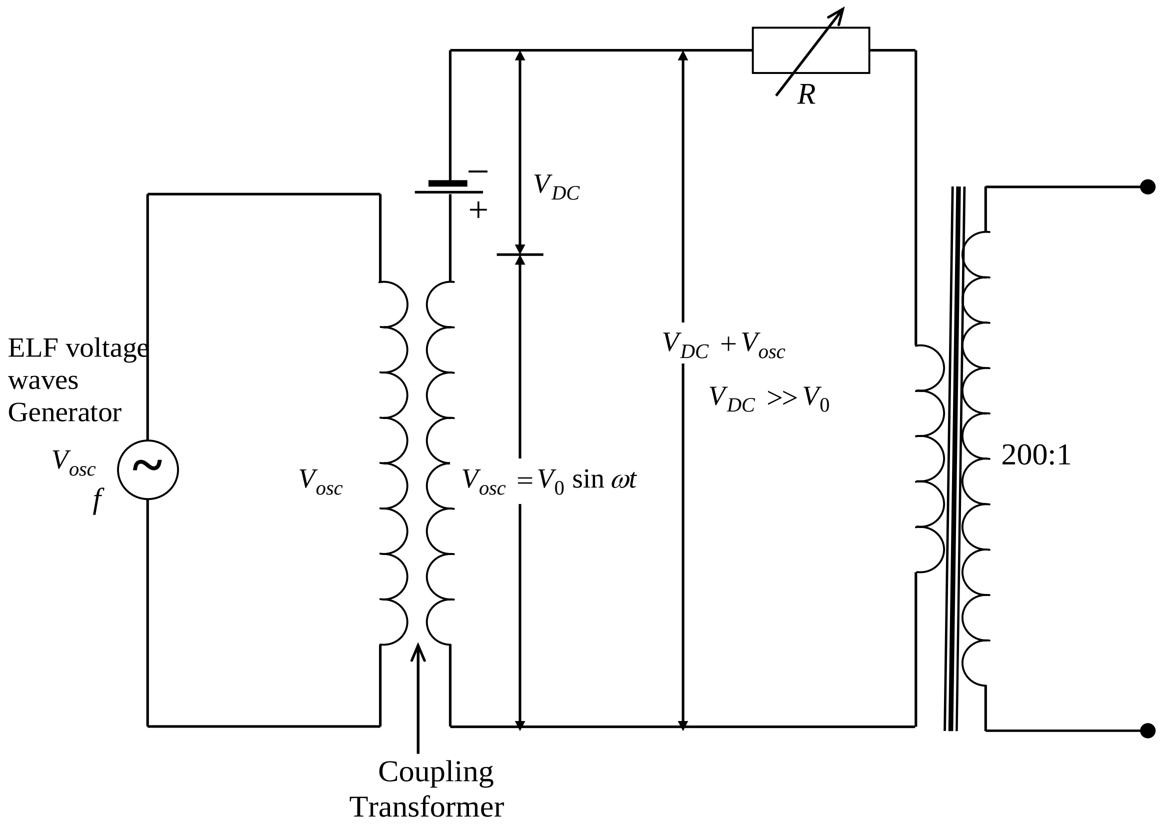

Fig. 3 – Equivalent Electric Circuit