TERMINOLOGY

The following list of terms or calculation bases serves as a help for better understanding of the technical data.

Axle load	kg	The value of the static weight (in kg) applied to an axle
Amplitude	mm	Half of the oscillation distance in millimetres (mm) that the compacting tool (plate or drum) moves during one rotation of the exciter shaft
Basic weight	Kg	The static weight of the machine without fuels and lubricants
Centrifugal force or t	kN	The force generated by the exciter shaft in kilonewtons (kN), which causes the compaction medium (drum or plate) to vibrate. Depends on the vibrating mass of the compacting tool and the frequency. **Attention**: the indication of a high centrifugal mass is no guarantee for a high compaction performance.
Dimensions	mm	All dimensions in mm
Frequency	Hz	The number of revolutions the exciter shaft performs per second (Hz) or per minute (I/min) Example: 50 Hz = 50 rev./sec = 50 x 60 = 3000 rpm
Operating weight (CECE)	kg	The static weight of the machine including: Fluids and lubricants: 50% of the fuel tank contents x 0.84 (specific weight). 50% of the water tank contents. 75kg weight of the operator (only for ride on machines).
Static **area** load	Kg/m^2	In accordance with the operating weight of the machine in kg divided by the contact area of the **base plate**
Static **linear** load	Kg/cm or kg/m	The axle load (kg) divided by the load or working width of the drum in kg/m (cm) or (m)
Why Compact ?		The compaction process consolidates material and removes air voids, thus increasing density and the load bearing capacity of the soil lift or asphalt layer
Which machine should be chosen for compaction		There are many factors that influence the choice of proper compaction equipment for a particular job. The first consideration should be the material to be compacted and the job specification being applied. Here are the most important factors: 1. Material type (e.g. Gravel, Sand, Silt, Asphalt mix) 2. Type of site (general applications with no restriction, trenches, confined areas, limited working widths, repairs, pot hole patchings. 3. Specifications (degree of density or surface smoothness required) 4. Layer thickness (if specified) 5. Production requirements
Rolling speed		Rolling speed plays an important part during vibratory compaction. With increasing speed, the compaction energy offered to a given surface area reduces. The distance between each vertical vibration movement of the vibratory compactor also increases at higher speed. When the distance between vibrations is too great, waves may result on the surface of asphalt layers. In addition to speed, the distance between vibrations is also influenced by frequency. The faster the roller and lower the frequency. The greater the distance between vibrations and the greater the rippling effect. This negatively affects the evenness of the layer. The following rolling speeds are recommended: 1 to 4 km/h for soil compaction & 2 to 6 km/h for asphalt compaction
Series 600		Earthworks in accordance with Table 6/4
Series 800		Unbound materials in accordance with Table 8/4
Series 900		Bituminous Bound Materials in accordance with Clause 903
Series 1000		Cement Bound Material in accordance with Table 10/8

Vibratory Roller

Mass per meter width of vibrating roll

$$\frac{\text{Mass}}{\text{Width (X)} \times \text{Number of Rolls}}$$

Half the number of passes for double drum rollers

Vibratory Plate Compactor

Mass per SQ M^2 (meter) of Base Plate

Divide weight of machine by the contact surface area of base plate

$$\frac{\text{Mass}}{X \times Y}$$

= mass per sq (m^2) of base plate contact area

Vibro - Tamper

Vibrating Tamper
The operating weight of the machine
To decide which one of the four categories the machine meets

1	2	3	4
50kg up to 65kg /	65kg up to 75kg /	75kg up to 100kg /	over 100kg

Mass = Weight

Structural design of a road		A typical asphalt road construction is multi-layered in form, comprising bitumen-bound and unbound materials. Essentially, the lower indigenous subgrade layer is covered by a bound or unbound sub-base, providing drainage and frost protection for the subgrade, and a road base layer upon which the asphalt layers are laid as a final surface coating. The structural design of a pavement relates to the ability of the road to carry the imposed loads without the need for excessive maintenance. 
Bitumen and Asphalt		Bitumen is a crucial component of asphalt - the most widely used material for constructing and maintaining roads in the world. Asphalt is typically a mixture of approximately 95% aggregate particles and sand, and 5% bitumen, which acts as the binder, or glue. There are many different types of asphalt, each with its own combination of different amounts and type of bituminous binder and mineral aggregate, and each type of asphalt has performance characteristics appropriate for specific applications. Thus, for each application there is a suitable asphalt mixture available.
SMA		Stone Mastic Asphalt (SMA). Has a high coarse aggregate content that interlocks to form a stone skeleton that resists permanent deformation. The stone skeleton is filled with a mastic of bitumen and filler to which fibers are added to provide adequate stability of bitumen and to prevent drainage of binder during transport and placement. Typical SMA composition consists of 70−80% coarse aggregate, 8−12% filler, 6.0−7.0% binder, and 0.3 per cent fibre.
CBR		California Bearing Ratio. CBR-test the pressure generated by a cylindrical pressure punch pressed into the soil with uniform speed down to penetration depths of 0.25 to 0.5 cm is determined.
Soil Compaction		The purpose of soil compaction is to reduce air voids and water filled cavities in the soil. This increases density and in general also the load bearing capacity of the soil. It also increases the stiffness and impermeability. The tendency of cohesive soils to absorb water is also reduced by compaction. Well compacted soil provides stable construction layers for projects such as dam, highway and railway construction without the risk of later settlement. Permanent deformation caused for example by repeated traffic loading is also minimised. Sealing against water ingress as, for example, with landfill site construction is also achieved by means of the compaction process. The correct selection of compaction equipment, layer thickness, rolling speed and number of passes is dependent upon the compaction characteristics of the soil and the specified level of compaction.
Asphalt Compaction		The asphalt layer must be compacted sufficiently so that density is increased and air voids are reduced. This will result in a higher stability and resistance to deformation. Good compaction will also increase resistance to surface layer damage caused by the action of traffic, increase impermeability thus reducing the susceptibility to frost damage and the embrittlement of binder which leads to loss of aggregates from the matrix. The compaction equipment is also required to produce an even surface finish to meet the requirements for driving comfort and safety. In particular the wearing course layer must exhibit a uniform profile and tightly closed texture. Texture depth must be preserved to provide adequate resistance to skidding. Well compacted asphalt layers will reduce the tendency for subsequent compaction under traffic. This is important if long term riding comfort and safety is to be maintained. The choice of compaction equipment, the method of use (static or dynamic) and the number of passes is mainly determined by the compactability of the bituminous mix, the layer thickness and the specified degree of compaction.