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International Union of Laboratories and Experts in Construction Materials, Systems and Structures Réunion  
Internationale des Laboratoires d'Essais et de Recherches sur les Matériaux et les Constructions

**RILEM Task Group 2**  
*Mixture Design and Compaction*



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*To : RILEM TG2 First Work Plan*

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*Object: Confirm for Participation and Financial Commitment*

**HEAVY COMPACTOR**

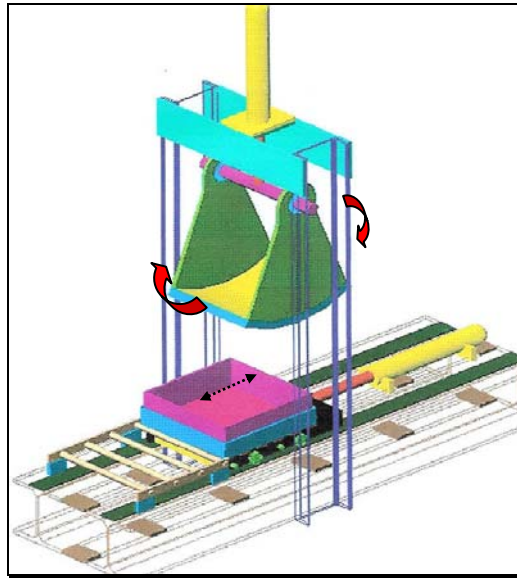
The Heavy Compactor is able to compact hot mix asphalt concrete square slabs of 50 cm side length and 15 cm thickness and it is able to thicken the mixture as the roller would compact it during road construction works.

**Technical characteristics.**

The Heavy Compactor has the following technical characteristics:

- ♦ height: 2200 mm
- ♦ length: 3200 mm
- ♦ width: 1050 mm
- ♦ weight: 1600 kg
- ♦ installed power 4.6 kW
- ♦ maximum electrical input 8.5°
- ♦ rotation speed 1716 rpm

The heavy compactor is constituted by an hydraulic press, schematized in figure 1, composed by two fundamental components welded each other: the frame (chassis) and the bed.

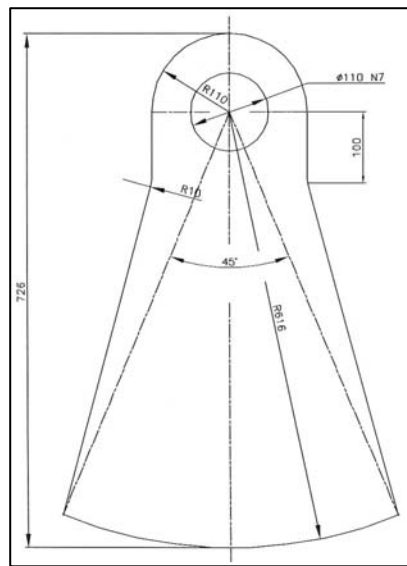


*Fig.1 – Heavy compactor scheme*

On the bed runs a trolley, moved by an oildynamic cylinder able to give a maximum thrust of about 3 ton. The frame is constituted by two side vertical rods joined with two crossbars on the top.

On the two crossbars is set the compactor (Fig.2), constituted by a balancing element hanged on a second oildynamic cylinder.

This second oildynamic cylinder works between a maximum pressure of 150 bar (thrust of 8 ton) and a minimum pressure of 15 bar (thrust 0.8 ton).



*Fig. 2 – Compactor*

A proper adjusting screw, on the oildynamic control unit, allows to change the cylinders pressure. The maximum and the minimum pressure are controlled by means of three safety valves: two valves are for the maximum pressure, on the control unit, near the valves that control the pressure, and one is a one-way valve, near the vertical cylinder.

The two throttle valves on the control unit allow to control the speed of the pistons.

Along the pistons strokes there are some positioning and/or safety micro-switches. In particular:

- ♦ on the vertical cylinder: end stroke superior, middle, lower
- ♦ on the horizontal cylinder: end stroke back, trolley parking (position central), ahead, extreme (for box extraction).



*Fig.3 –The heavy compactor equipment.*

### **Compaction procedure.**

The compaction procedure for a layer of 5 cm is based on the following steps:

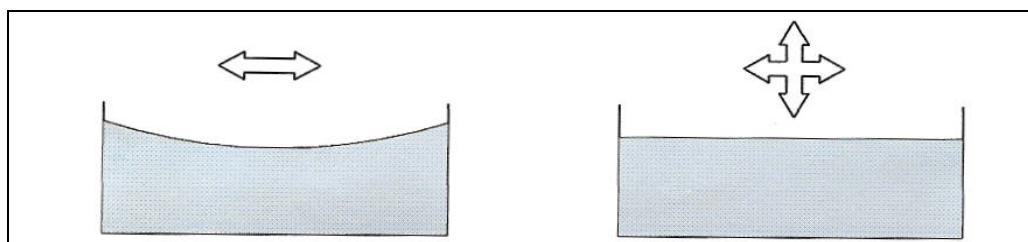
1. Asphalt concrete: once the asphalt concrete is warmed, the box is filled with the asphalt concrete (Fig. 4).

2. Loading: when the equipment is on, the compactor is raised to the superior end stroke, then the trolley is positioned to the end stroke for the extraction of the box and the box with the asphalt concrete to be compacted is put in.
3. Cycle start: once correctly positioned the box (that is blocked with the closing head-on plate), the trolley is put in the central position. The compactor is let down to the middle end stroke and the box is positioned at the end stroke ahead. Then the automatic procedure with the required number of cycles is set out and the equipment starts.
4. Rotation of the box during cycles: at the end of first cycle (ahead and return) the box is rotated of 90°. This procedure allows to obtain an homogeneous density in all the slab of compacted asphalt concrete and a flat surface all over the sample (Fig. 5).
5. Cycle end: the equipment gets back to manual control and the trolley is positioned in parking (central position). Then the compactor is raised and the trolley is drawn.

If the sample requires an height higher than 5 cm, the procedure is repeated, adding the warm asphalt concrete over the compacted layers.



*Fig. 4 – Box filling with asphalt concrete*



*Fig.5. – Surface of the sample.*