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*all it takes!*

# Soil and Asphalt Compaction Equipment

## Selection Guide



# What should I consider when selecting soil and asphalt compaction equipment?

Consider the type of soil, particle size distribution, moisture, and required final density of the soil or asphalt. This will help you determine:

1. Which type of machine is most suitable for the job.
2. Which piece of equipment achieves the required results in the most economical way.

**Remember to ask:** Will the machine be used on asphalt, granular, or cohesive soils?

## Granular Soils

Granular soils, which are grainy in nature, are compacted best using vibratory plates and rollers. The friction between individual particles holds the material in place. Granular soils range from uniform materials that contain only one particle size to well-graded soils that have a large variety of particle sizes. These materials result in stronger soils due to the medium and smaller particles that fill the voids between the larger ones and result in a dense material of great load-bearing capacity.

Applying vibratory energy is the most efficient way to compact granular soils. The vibrations penetrate the soil and create movement between the particles. As the particles move, they rotate in the same direction as the machine's exciter. After the machine passes over them, gravity causes the particles to settle into a dense configuration.



**TAKE NOTE:** For granular to semi-cohesive soils always consider a vibratory plate or smooth drum vibratory roller.

## Cohesive Soils

Clay particles (cohesive soils) are made up of tiny pancake-like platelets that layer upon each other. The gaps between them can be filled with air or water. Impact force is required to release trapped elements from cohesive soil because the molecular bonding between the platelets holds them in position.

Given the nature of cohesive soils, machines that produce an impact or shearing type of force – such as vibratory rammers or sheepfoot rollers – are required to obtain proper compaction. The high shoe stroke combined with a high frequency create a strong shearing force at the front of the shoe to break down the molecular bonds and allow the soil to compact. Sheepfoot rollers create shearing forces in the soil due to the cleats found on the surface of the drum. As the drums rotate, the edges of the cleats entering the soil will cut or shear the soil, breaking down the molecular bonds between adjacent soil particles.



**TAKE NOTE:** For semi-cohesive to highly cohesive soils always select a rammer or a vibratory roller with sheepfoot drums.

# Asphalt

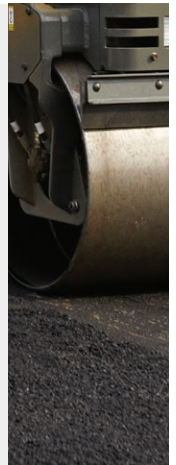
Compaction actually starts at the bottom and works its way back to the surface. Various types of compaction equipment are used for compacting asphalt. Vibratory plates are used in confined areas and patching jobs, but vibratory rollers are by far the most widely used piece of equipment for asphalt compaction.

## Rolling asphalt typically consists of three consecutive phases:

1. Breakdown or initial rolling - obtains practically all of the needed density.

2. Intermediate rolling - densifies and seals the surface.  
3. Finish rolling - removes roller marks and other blemishes left from previous rolling.

Vibratory compaction starts at the bottom and works its way back to the surface. High-frequency centrifugal forces radiate downward through the asphalt-aggregate mix. When those forces hit a stable base structure, they “bounce” back and shake the material from the bottom up.



Remember, the type of soil will determine the type of machine you will need:

For more information, visit [www.wackerneuson.com](http://www.wackerneuson.com).

- Granular Soil – Vibratory plate or smooth drum roller
- Cohesive Soil – Vibratory rammer or sheepsfoot roller
- Asphalt – Vibratory plate or smooth drum roller



Vibratory Rammer



Vibratory Roller



Roller with sheepsfoot drums



Vibratory Plate

DYNAMIC COMPACTION EQUIPMENT: TYPICAL APPLICATIONS	MAIN APPLICATION AREAS			TYPE OF EQUIPMENT					
	Δ Well suited	• relatively suited	- Not suited	Vibratory rammers	Vibratory plates	Single drum vibratory rollers	Double drum vibratory rollers	Universal rollers (sheepsfoot)	Articulated vibratory rollers
<b>SOIL COMPACTION</b>									
Narrow services or cable trenches	Δ	•	-	•	Δ	-	-	-	-
Trenches	Δ	•	-	•	Δ	-	-	Δ	-
Foundation jobs	•	•	-	•	Δ	•	Δ	Δ	-
Backfill around structures	•	•	-	•	Δ	•	Δ	Δ	Δ
Landscaping and gardening	•	•	-	•	Δ	Δ	Δ	•	Δ
Foot and bicycle paths	•	•	-	•	Δ	Δ	Δ	-	Δ
Garden and courtyard drives	•	•	-	•	Δ	Δ	Δ	-	Δ
Sports and games facility	•	•	-	•	Δ	•	Δ	-	Δ
Parking lots and industrial areas	•	•	-	•	•	-	Δ	-	Δ
Road construction	•	•	-	•	•	-	Δ	•	Δ
Railway construction	•	•	-	•	Δ	-	Δ	•	-
Hydraulic engineering, refuse dumps	•	•	-	•	•	-	•	Δ	-
<b>ASPHALT COMPACTION</b>									
Small patch applications	•	•	-	•	Δ	Δ	Δ	6" - 10"	Δ
Foot and bicycle paths	•	•	-	•	Δ	Δ	Δ	8" - 16"	Δ
Garden and courtyard drives	•	•	-	•	Δ	Δ	Δ	6" - 10"	Δ
Parking lots and industrial areas	-	•	-	•	•	•	Δ	8" - 16"	Δ
Road construction	•	•	-	•	•	•	•	6" - 10"	Δ
<b>OTHER TYPES OF COMPACTION APPLICATIONS</b>									
Natural or concrete paving stones	•	•	-	•	Δ	-	-	-	-
Roller compacted concrete	•	•	-	•	Δ	•	Δ	•	Δ
Stabilized sand	•	•	-	•	Δ	-	-	-	-

	 <p><b>COHESIVE SOIL</b> Clay Type</p>	 <p><b>GRANULAR SOIL</b> Sand, Gravel</p>	 <p><b>ASPHALT</b></p>
	<p>Utility Trenches, Backfill, Landscaping</p>	<p>Utility Trenches, Backfill, Landscaping</p>	<p>Along Walls, Curbs, Patching, Edging</p>
<p><b>SMALL or CONFINED AREA</b> 1,275 - 5,900 FT<sup>2</sup> \ hr</p>	<p><b>WIDTH: Up to 24"</b> <b>LIFT: Up to 16"</b> <b>PASSES: 2 - 4</b></p>  <p><b>AS50e, AS60e, BS50, BS60, BS70</b></p>	<p><b>AREA: Up to 5,900ft<sup>2</sup>/h</b> <b>LIFT: Up to 8"</b> <b>PASSES: 3 - 5</b></p>  <p>All BPS, APS and WP plates All Rammers</p>	 <p>Any forward plate with water tank like <b>BPS1135AW, BPS1550AW, APS1550w</b></p>
	<p>Trenches Wider than 24", Backfill, Landscaping</p>	<p>Wider/Longer Trenches, Backfill, Patio Sub Base, Driveway Sub Base</p>	<p>Walkways, Driveways, Larger Patch Areas</p>
<p><b>MEDIUM AREA</b> 5,500 - 13,000 FT<sup>2</sup> / hr</p>	<p><b>AREA: Up to 10,000ft<sup>2</sup>/hr</b> <b>LIFT: Up to 16"</b> <b>PASSES: 2 - 4</b></p>  <p><b>RTX-SC3</b></p>	<p><b>AREA: 5,500-13,000ft<sup>2</sup>/h</b> <b>LIFT: Up to 8"</b> <b>PASSES: 3 - 6</b></p>  <p><b>BPS1550A, APS2050e, WP1550A</b> Reversible Plates up to <b>DPU6555, RD12, RD18</b></p>	 <p><b>BPS1550AW, BPS2050AW, WP1550AW, RD12, RD18</b></p>
	<p>Road Construction, Subdivision Development, Golf Course Layout</p>	<p>Commercial Concrete Floor Prep, Parking Lot Base</p>	<p>Roadway, Driveways, Parking Lots</p>
<p><b>LARGER AREA</b> &gt; 13,000 FT<sup>2</sup> \ hr</p>	<p><b>AREA: &gt;13,000ft<sup>2</sup>/hr</b> <b>LIFT: Up to 28"</b> <b>PASSES: 3-6</b></p>  <p><b>RC50p, RC70p, RC110p - Padfoot</b></p>	<p><b>AREA: &gt;13,000ft<sup>2</sup>/hr</b> <b>LIFT: 8" to 28"</b> <b>PASSES: 3-6</b></p>  <p><b>DPU90, DPU110, RD24, RD28, RD40, RC50, RC70, RC110 smooth drum</b></p>	 <p><b>RD24, RD28, RD40, RD45</b></p>