Quick Guide to Vibrating Concrete
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The creation of this quick guide is in part combined experience of experts in the field, proven consolidation products, and ACI 309-Concrete Consolidation guidelines. It covers both internal and external vibration product applications and best recommended practices. Please note that even with the best situation, product, and technique, a perfect looking end product is typically impossible to obtain.

INTERNAL VIBRATORS

Lift Depth

ACI 309 guidelines state that a 20 inch lift depth will yield the best results for consolidation by vibration. Most contractors have achieved good results however using 4 foot lifts. The diagram below details how form pressure and concrete weight can play a role in reducing optimum results.

Insertion Rate: Internal Vibration

Recommended timing for vibrator insertion into plastic concrete is as follows:
1. Insert the head as quickly as possible.
2. Leave at the bottom of the lift for 5 seconds doing a slight jigging motion.
3. Withdraw at a rate of 1-2 inches per second.
   For example a 20 inch lift will take about 10-20 seconds to vibrate properly after jigging.
   Remove head quickly out of concrete at top of lift.
4. For each new lift, penetrate 6 inches into the lift below it first, and repeat step 2.
Frequency and Amplitude

Frequency and amplitude are the 2 key factors when choosing the proper consolidation products for your job. They act in an inverse relationship in that as frequency goes up, amplitude goes down and vice-versa. All of the products Wacker Neuson makes for concrete consolidation meets the recommended frequencies and amplitudes recommended by ACI 309 for both internal and external vibration. A later section of this guide covers two simple methods to check your equipment to make sure the products are running at optimum levels for your project. (See recommended frequency ranges)

Frequency is how many times the head moves per minute and amplitude is how far from the center point. The number is different for internal versus external due to the nature of the vibration energy given.
External vibrators are used in several applications where internal vibrators can’t. This includes under window openings, cantilevered forms, very tall walls, and where heavy reinforcing steel interferes with head insertion.

Wacker Neuson Corporation offers several form clamps to fasten to almost any form type and material. The clamps and AR26 motors can be mounted horizontally or vertically to the form beams to direct the energy into the forms and concrete inside them. Wood beams will absorb more of the energy and may need to be vibrated longer than metal.

### External Rules

1. Motors should be located 1 foot from bottom and corners and 3-4 feet apart.
2. Take length of wall and divide by 4+1 to get good estimate of motors needed for 1 course.
3. Typically need 2 courses.
4. Start motors at half of lift at half power, increase to full at lift depth height.
5. Run 3-5 minutes.
6. Premark forms for next location as you leap frog motors up the form face.
7. Mock up panel is highly recommended.
8. Follow form depth recommendations at right.

Any form over 40 inches wide should be supplemented internally. Results depend on concrete slump.
The chart above highlights the various vibrators available and their recommended best practices. All of the above products mentioned are designed to run at the optimum levels to achieve the best results for the application. High cycle or high cycle vibrators lose very little power when placed in the concrete or when under load due to the nature of the motor in head design. Wacker Neuson high cycle vibrators are unique in the industry in that they don’t need a special inverter to run. Just plug into a common 120V outlet on a generator. Rubber coated heads are available for epoxy coated rebar applications for both modular, backpack, and high cycle vibrators.

Walk behind screeds run at a range of 4000-6000 rpms. This gives the screed a higher amplitude and lower frequency which is beneficial for slab consolidation and leveling of the concrete surface.

### Checking your equipment

Checking the frequency and amplitude prior to starting any job is key to a successful pour. There are several ways for doing this, but the quickest and easiest is shown below

**Amplitude of vibration indicator**

The optical wedge is a decal you attach to the head with the V pointing down, and the tachometer you hold onto the head or shaft to check frequency.
**Recommendations:**

- Recommended shaft length and head for the BV50A-H is a SM3-S (10 foot) shaft and H45HA (1.8 inch) head.
- Vibrate concrete in front of you, not beneath.
- Read the operators manual for recommended maintenance intervals.
- Don’t hang or hold internal vibrators by the cord attached to the motor.
- You are more likely to under-vibrate than over-vibrate.
- Make sure external motors are tightly mounted to clamps which are centered and clamped tightly on form member.
- Consider a mock up panel.

**Products**

- Concrete technology
- Compaction
- Excavators
- Wheel loaders
- Telehandlers
- Skid Steer Loaders
- Dumpers
- Generators
- Lighting
- Pumps
- Heaters
- Certified Used Equipment

**Services**

- Warranty Program
- Flexible Financing
- Wacker Neuson University
- EquipCare
- The concrete specialists

**Spare parts**

- Spare Parts

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