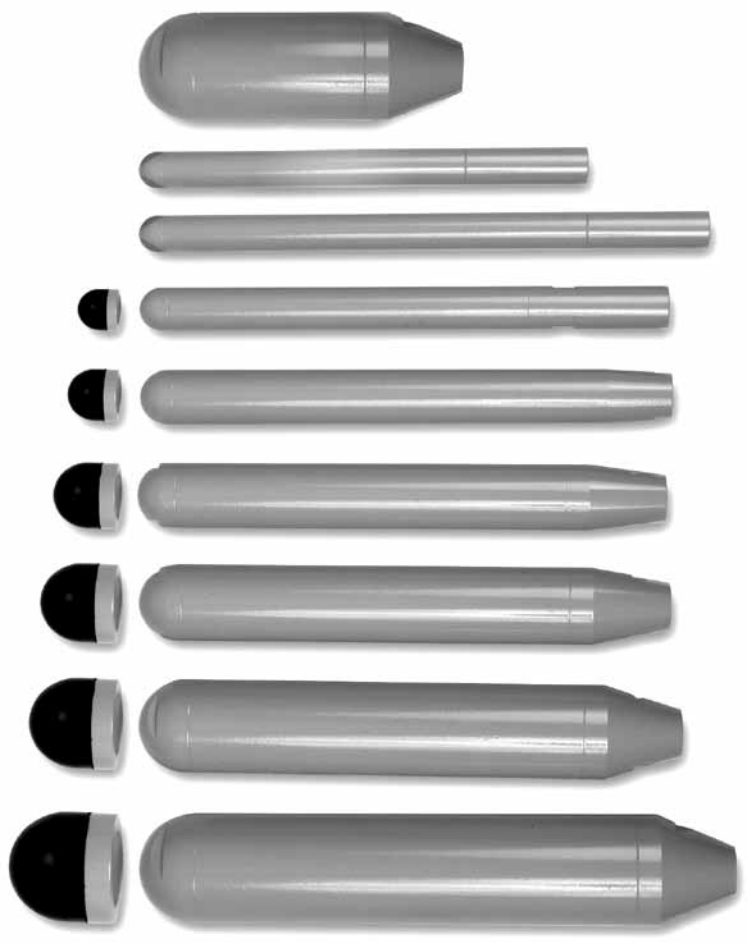
Viber® Heads

Operating Instructions

Heads for
Internal Concrete Vibrators



Head Sizes:

Special Purpose

2⅛" Short Head - 5 ⅞" long

⅞" Low Force Head - 92 force pounds

Rubber or Steel Tip

⅞"
1"
1 ¼"
1 ½"
1 ¾"
2 ⅛"
2 ½"

Global® VIBRATORS Viber® VIBRATORS Global® AIR BLASTERS

GlobalManufacturing.com

Global Manufacturing Inc.®

1801 East 22nd St
Little Rock, Arkansas 72206

501.374.7416 TEL
800.551.3569 TOLL FREE USA & CANADA
501.376.7147 FAX

Copyright © 2015 by Global Manufacturing, Inc

Table of Contents

I. Introduction

You have purchased a Viber® Electric Power Unit, the center of your Smart!Parts™ Internal Concrete Vibrator System. The other system components include a Viber® vibrator head and a Viber® reversible flexible drive.

Power Unit+ Flexible Drive+ Head = Smart!Parts™ System

You build the right Smart!Parts™ System for your application by choosing from the wide range of Viber® components including many different power options, different flexible drive lengths, and steel and rubber tipped vibrator heads or heads coated completely with polyurethane. These components all use identical fittings so that Viber® components are completely interchangeable. Any flexible drive can be used with any of the power units (electric, pneumatic, or gasoline) and any of the heads. See Section IV, on page 7, for recommendations to select the best Viber® power unit, head and flex drive for your application.

When properly used, your Smart!Parts™ System will effectively compact concrete to remove entrapped air, producing high quality concrete that is dense, strong, durable, and impermeable.

Global Manufacturing, Inc ®
1801 East 22nd Street
Little Rock, AR 72206 USA

800.551.3569 TOLL FREE USA & CANADA
501.374.7416 TEL 501.376.7147 FAX
www.GlobalManufacturing.com

⚠ CAUTION

CHECK YOUR EQUIPMENT

1. Inspect the vibrator system for damage. Never use a damaged vibrator.
2. Have all components of the vibrator system received proper maintenance?
3. Are all vibrator system connections tight? Apply Teflon® tape to the casing threads, before attaching the head and motor. This gives a water tight connection that will not come loose during operation.
4. Do you have the proper power source?
5. If using an electric motor, is it properly grounded?
6. Use the proper size extension cord.

CHECK YOUR FORMS

They need to be well made to withstand the strains of vibration.

1. Use screws instead of nails (nails will back out with vibration).
2. Forms need to be well braced to prevent bulging.
3. Joints need to be closely fit to prevent leaking.
4. Monitor forms during placement of concrete. Tighten as needed.

EXTENSION CORD RECOMMENDATIONS

The voltage drops along the length of an extension cord because of the resistance of the wire. This voltage drop is important to consider because as the voltage drops the motor slows down and has less power, which leads to decreased performance. More importantly, the power drop causes the motor to pull more current. The temperature of the motor windings increases considerably with small increases in current. This combined with the slower speed, which greatly reduces the effect of the cooling fan, causes the winding temperatures to exceed the rating of the insulation. Breakdown of the insulation is cumulative. You may use the motor infrequently, but if it is overloaded each time it will fail after a few uses. A motor can withstand about a 10% voltage drop without too many problems. Unless the supplied voltage is known (it has been measured while motor is running), assume 5% less source voltage than stated. For 120 volts, assume 114 volts. For 240 volts, assume 228 volts.

To protect your motor and maximize its performance, use the proper size extension cord to prevent the voltage from dropping more than 6 volts over the length of the cord (12 volts for 240V systems). The table below shows the gauge of wire to use for various lengths of extension cords. ***The smaller the number the heavier the cord. Never use a lighter weight cord than specified.*** If you connect two or more cords together, the total length of ALL cords must be used to determine proper sized wire.

Motor Model	**VMK-1500**	**VMK-1500**	**VMK-2500**	**VMK-2500**
Voltage	**120V**	**240V**	**120V**	**240V**
Cord Length	**Wire Size (Gauge)**			
Up to 50'	#14	#14	#14	#14
50' to 100'	#14	#14	#12	#14
100' - 150'	#12	#14	#10	#14
150' - 200'	#10	#14	#8	#14
200' - 250'	#10	#14	#8	#14
250' - 300'	#8	#14	#8	#14
300' - 400'	#8	#14	#6	#12
400' - 500'	#6	#12	#4	#12

II. Assembling Concrete Vibrator

All Viber® system components are interchangeable. All flexible drives (cores and casings) can be used to attach any head to any power unit (although certain combinations are not recommended). For optimum performance and wear consult your Smart!Parts™ System Guide on page 7 or the tables on pages 8-9 for the best combination of components.

NOTE: All electric motors come with or without the quick disconnect. The gasoline and pneumatic models come only with the quick disconnect. Follow instructions for connecting without the quick disconnect on page 4 (#4) and models with the quick disconnect on page 5 (#4a).

1. Always be sure the power is disengaged before assembling or disassembling your system.

IMPORTANT!

The flexible drive includes a casing with a lubricated core installed. If you do not have an assembled flexible drive, the core must be lubricated before installing it in the casing. Run the core through a handful of Viber® Core Grease as you insert it into the casing. Attach the end of the casing, where the core was inserted, to the motor. As the system runs the grease will migrate from the motor end towards the head.

2. To attach the Vibrator Head to the flexible drive, apply two layers of Teflon® tape to the casing threads before attaching the head. Engage the core in the head drive coupling. Turn the head clockwise to tighten. Use a crescent wrench on the machined flats on the head and channel locks or a small pipe wrench on the casing fitting to make sure the connection is tight.

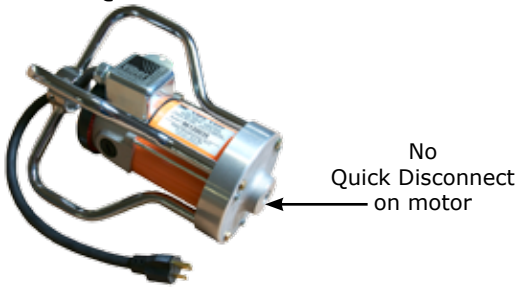
IMPORTANT!

Do NOT leave out the Teflon® tape! It is required to provide a watertight seal between the head and casing. If Teflon® tape or a similar sealant is not used the Head can be damaged by water that penetrates this connection and the Head may unscrew during operation and fall into the pour.

Also apply Teflon® tape to the male threads of the casing before attaching to the motor.

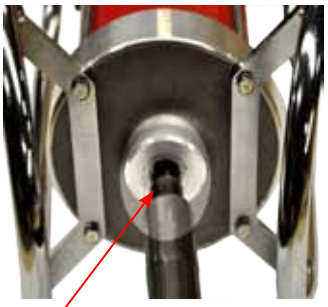
3. Before attaching the power unit, check the length of core extending from the motor end of the flexible drive. Measure from the shoulder on the casing fitting to the end of the exposed core. If this length is greater than 2-3/4", twist the core while pushing it into the casing to make sure it is fully seated in the head. If the exposed core is greater than 2-3/4" when it is fully seated in the head it might bind and cause damage to the core, casing, or head. Do not use the system. Contact your dealer or Global Manufacturing at 1-800-551-3569.

4. **Attaching the Flexible Drive to the Power Unit with NO Quick Disconnect on Motor:**



Apply two layers of Teflon® tape to the casing threads before attaching the flexible drive (casing with lubricated core installed) to the power unit. Engage the core in the motor drive coupling

located in the end of the shaft. Turn the casing clockwise to tighten. Once the threads are engaged let the motor hang vertically from the flexible drive and spin the motor until it cannot be turned by hand.

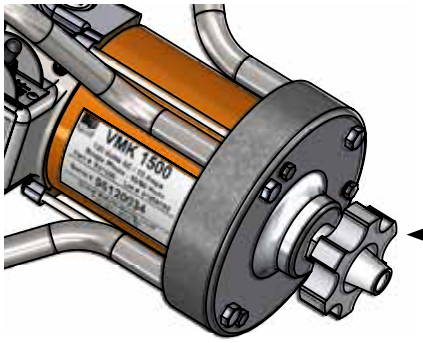


Must apply Teflon® tape to the casing threads

Pipe wrench

Use a small pipe wrench or channel locks to tighten the connection.

4a. Attaching the Flexible Drive to the Power Unit with a Quick Disconnect on Motor:



Quick Disconnect on motor

The flexible drive must have a quick disconnect drive fitting on the motor end. If it was not purchased this way attach a quick disconnect drive fitting (pn 414911) to the casing fitting. Apply two layers of Teflon® tape to the casing threads before screwing on the drive fitting in a clockwise direction. Tighten the fitting securely with a small pipe wrench. File off any burrs this creates.

Drive Fitting

Engage the core in the motor drive fitting located inside the motor quick disconnect fitting. Press the quick disconnect drive fitting onto the cone of the motor fitting.

Turn the large hand nut clockwise to tighten the connection as viewed from the flexible shaft side. The hand nut has left hand threads to ensure it will remain tight while operating the system. Once the large hand nut feels tight tap the nut with a mallet on one of its wings to be sure the connection is secure.

An o-ring inside the nut helps keep the connection secure. If the connection comes loose during operation make sure the o-ring is not missing.

III. Operation

Follow the guidelines below when using your Viber® Internal Concrete Vibrator for consolidating concrete:

1. Do not leave the vibrator running in air. Totally submerse the vibrator head in the concrete. This cools the bearings. Running the vibrator in air without regularly submersing it in the concrete will overheat the bearings.

2. Avoid making sharp bends in the flexible shaft.

3. Make sure you can see the concrete surface. Use lighting if necessary.

4. Place the concrete in layers no deeper than the length of the vibrator head plus 4-6". Layers should not exceed 18-20", otherwise the weight of the concrete can prevent the entrapped air from escaping.

5. Keep the vibrator head at least 3-4" from the forms. It can damage the forms causing surface defects in the concrete.

6. Do not allow the vibrator head to touch reinforcements, such as rebar. Vibration can break the bond between the reinforcement and preceding layers of stiffened concrete.

7. Let the vibrator head penetrate to the bottom of the layer as quickly as possible under its own weight.

8. Keep the vibrator head vertical to minimize voids and enhance the release of entrapped air. For shallow flat slabs, lay the vibrator head horizontally and drag it through the concrete or use our Shallow Pour Head - VH34-SP.

9. Withdraw the vibrator head slowly. Be sure concrete fills in behind leaving no hole. Do not attempt to "stir" the concrete.

10. Use repeated placements of the vibrator in a systematic pattern to be sure the entire surface has been vibrated. The area of action can be observed by noting how far from the vibrator head bubbles appear on the surface. Placements of the head should insure overlapping of the areas of action.

11. When compacting concrete placed on a previously compacted layer, push the vibrator 4-6" into the lower layer. Move the vibrator up & down for 5-15 seconds to "knit" the two layers together.

12. Avoid placing the concrete in "heaps". If it is necessary to flatten a heap, insert the vibrator head around the perimeter of the heap using as many placements as necessary.

13. Consolidation is complete when no new bubbles come to the top, a glistening layer of mortar covers the concrete surface, and the "whine" of the motor indicates that the vibrator speed has leveled off.

14. Clean all vibrator parts immediately following each use.

⚠ CAUTION

Always disconnect the motor from the power source before starting any maintenance or repair.

Vibrator Heads: Viber® heads have permanently lubricated bearings and require no routine maintenance.

Flexible Drives: Re-grease the core using Viber® Core Grease after every 50 hours of use or if the core rattles excessively in the casing. To lubricate the core, detach the casing from the motor and pull it down to expose 18-24" of core. Rub a handful of Viber® Core Grease over the exposed section of core. Reattach the casing to the motor. The fresh grease will travel the full length of the flexible drive as the vibrator is operated. DO NOT allow the core to be contaminated with dirt or other debris while re-greasing.

IV. Smart Parts System Selection Guide

1		2	3		4	5								
Application	**Slump**	**Space Limitations**	**Head Diameter**	**Radius of Action**	**Power Units**	**Flexible Drive Length (Feet)**								
						1	**3**	**5**	**7**	**10**	**14**	**21**	**28***	**35***
Block Walls & Small Diameter Fills: Plastic and flowing concrete for very thin members & walls & confined places.	> 3"	2.5" x 2.5"	7/8" VH 14	5"	VMK-1500	X	X	X	X	X	X	X	X	X
					VMP TURBO	X	X	X	X	X	X	X	X	X
					VMG-1750BP	X	X	X	X	X	X	X	X	X
					VMG-2500BP	7' or longer			X	X	X	X	X	X
Thinnest Prestressed Sections: Plastic and flowing concrete for very thin members & walls & confined places.	>3"	3" x 3"	1" VH 16	5"	VMK-1500	X	X	X	X	X	X	X	X	X
					VMP TURBO	X	X	X	X	X	X	X	X	X
					VMG-1750BP	X	X	X	X	X	X	X	X	X
					VMG-2500BP	7' or longer			X	X	X	X	X	X
Thin Prestessed Sections: Plastic concrete in thin walls, columns, beams, precast piles, thin slabs, and along construction joints.	3 - 5"	3.25" x 3.25"	1-1/4" VH 20	7"	VMK-1500	X	X	X	X	X	X	X	X	X
					VMK-2500/2750	X	X	X	X	X	X	X	X	X
					VMP TURBO	X	X	X	X	X	X	X	X	X
					VMG-1750BP	X	X	X	X	X	X	X	X	X
					VMG-2500BP	7' or longer			X	X	X	X	X	X
Thin Wall Sections and General Use: Plastic concrete in thin walls, columns, beams, precast piles, thin slabs, and along construction joints.	3 - 5"	3.5" x 3.5"	1-1/2" VH 24	13"	VMK-1500	X	X	X	X	X	X	X	X	X
					VMK-2500/2750	X	X	X	X	X	X	X	X	X
					VMP TURBO	X	X	X	X	X	X	X	X	X
					VMG-1750BP	X	X	X	X	X	X	X	X	X
					VMG-2500BP	7' or longer			X	X	X	X	X	X
General Use: Plastic & stiff plastic concrete in general construction such as walls, columns, beams, pre-stressed piles, and heavy slabs.	2 - 4"	3.75" x 3.75"	1-3/4" VH 28	17"	VMK-1500	X	X	X	X	X	X	X	X	X
					VMK-2500/2750	X	X	X	X	X	X	X	X	X
					VMK-3500	X	X	X	X	X	X	X	X	X
					VMP TURBO	X	X	X	X	X	X	X	X	X
					VMG-1750BP	X	X	X	X	X	X	X	X	X
					VMG-2500BP	7' or longer			X	X	X	X	X	X
Stiff Low-Slump Concrete: Stiff plastic concrete in general construction such as walls, columns, beams, pre-stressed piles, and heavy slabs.	1 - 3"	4" x 4"	2-1/8" VH 34	21"	VMK-2750	X	X	X	X	X	X	X	X	X
					VMK-3500	X	X	X	X	X	X	X	X	X
					VMP TURBO	X	X	X	X	X	X	X	X	X
					VMG-2500BP	7' or longer			X	X	X	X	X	X
Stiffest Low-Slump Concrete: Mass and structural concrete deposited in relatively open forms.	< 2"	5" x 5"	2-1/2" VH 40	24"	VMK-2750	X	X	X	X	X	X	X	X	X
					VMK-3500	X	X	X	X	X	X	X	X	X
					VMP TURBO	X	X	X	X	X	X	X	X	X
					VMG-2500BP	7' or longer			X	X	X	X	X	X
Shallow Pours: Plastic & stiff plastic concrete in slabs and other shallow pours less than 12" thick.	2-4"	4" x 4"	2-1/8" VH 34-SP	13"	VMK-1500	X	X	X	X	X	X	X	X	X
					VMK-2500	X	X	X	X	X	X	X	X	X
					VMP TURBO	X	X	X	X	X	X	X	X	X
					VMG-1750BP	X	X	X	X	X	X	X	X	X
					VMG-2500BP	7' or longer			X	X	X	X	X	X
ICF Applications: Plastic and flowing concrete for very thin members & walls & confined places where insulated concrete forms are used.	> 4"	2.5" x 2.5"	7/8" VH 14-LF	4"	VMK-1500	X	X	X	X	X	X	X	X	X
					VMP TURBO	X	X	X	X	X	X	X	X	X
					VMG-1750BP	X	X	X	X	X	X	X	X	X
					VMG-2500BP	7' or longer			X	X	X	X	X	X

1. Find description in column 1 that matches your application.
2. Use column 2 to adjust for any size restrictions due to reinforcements,such as rebar, or other limiting structures.
3. Column 3 gives the diameter of the vibrator head needed.
4. Select the power unit desired from column 4. **VMK** units are universal electric motors available in 10 amps (1500), 15 amps (2500 OR 2750), or 20 amps (3500). The VMK-3500 and the models ending with an "L" come with a twist lock plug. The motor with the higher amp rating will consolidate low slump concrete more efficiently. **VMP TURBO** is a 2hp pneumatic motor. **VMG-1750BP** is a 1.6 hp backpack mounted gasoline engine (also available as a handheld unit). **VMG-2500BP** is a 2.5 hp backpack mounted gasoline engine.
5. Find the core and casing length desired in section 5. Smart Part Systems with a 7/8" head come with 7/8" diameter flexible drive. All other systems come with a 1-1/16" diameter flexible drive.

*****Note: 28' and 35' flex drives require coupling two shorter drives together using a Viber VCP Coupling.

V. PERFORMANCE DATA FOR VIBER® POWER UNITS & INTERCHANGEABLE HEADS

Row	Head Specifications - Rubber or Steel Tip						VMK-1500		VMK-2500	
	Diameter	Length	Weight	Unbalance	Ave Amp (Peak-to-Peak)	Radius of Action	Speed[1]	Force pounds	Speed[1]	Force pounds
	in	in	lb	lb-in	in	in	rpm		rpm	
1	⅞	11.94	1.4	0.029	0.041	4.6"	**14,000**	**161**	**15,300**	**193**
2	**1**	12.45	2.1	0.029	0.028	5.0"	**14,000**	**161**	**15,300**	**193**
3	**1¼**	12.19	3.0	0.092	0.062	7.5"	**12,600**	**415**	**13,300**	**462**
4	**1½**	12.04	4.1	0.162	0.079	9.5"	**12,000**	**663**	**12,300**	**859**
5	**1 ¾**	13.05	6.2	0.236	0.077	11.0"	**11,500**	**886**	**11,800**	**933**
6	**2 ⅛**	13.01	9.2	0.337	0.073	14.0"	**9,500**	**864**	**11,000**	**1,158**
7	**2 ½**	12.52	12.2	0.478	0.078	18.0"	**8,900**	**1,075**	**10,000**	**1,358**
	Special Purpose Heads									
8	**⅞ Low Force**	9.94	1.2	0.012	0.021		**14,200**	**69**	**15,500**	**82**
9	**2 ⅛ Shallow Pour**	5.84	3.3	0.168	0.102		**12,200**	**710**	**12,500**	**746**

Continued on next page

Unshaded	Best Performance.
Shaded	***Gray Shaded areas are NOT recommended. Vibrator motor and head performance are reduced because speed is either too fast or too slow.*** The speed provided is an approximation of the head speed in concrete for the specified motor-head combination. The actual speed will vary depending on temperature, consistency of the concrete, the power unit's condition, the hours on the bearings, etc.... **A 10% increase in speed reduces the head bearing life by 50%.**

1 The speed provided above is an approximation of the head speed in concrete for the specified motor-head combination. The actual speed will vary depending on temperature, consistency of the concrete, the degree of brush wear, the hours on the bearings, etc. Running an electric motor with too large a head will slow the motor and can result in excess amp draw and heat generation with premature motor failure.

2 The speed provided above is an approximation of the head speed in concrete with the VMG-2500 Gasoline Engine Backpack Power Unit at maximum throttle. Unit operates at a maximum of 12,670 rpm. The actual speed will vary depending on temperature, consistency of the concrete, the hours on the bearings, etc.

3 The speed provided above is an approximation of the head speed in concrete with the VMG-1750 Gasoline Engine Power Units at maximum throttle. Unit operates at a maximum of 10,000 rpm. The actual speed will vary depending on temperature, consistency of the concrete, the hours on the bearings, etc.

4 The speed provided above is an approximation of the head speed in concrete with the VMP TURBO Pneumatic Power Unit with the control valve set for the appropriate head size. The actual speed will vary depending on temperature, consistency of the concrete, the hours on the bearings, etc.

Continued on next page

Global Manufacturing, Inc ®
1801 East 22nd Street
Little Rock, AR 72206 USA

800.551.3569 TOLL FREE USA & CANADA
501.374.7416 TEL 501.376.7147 FAX
www.GlobalManufacturing.com

PERFORMANCE DATA FOR VIBER®
POWER UNITS & INTERCHANGEABLE HEADS

Row		VMK-2750		VMK-3500		VMG-1750HH/BP		VMG-2500BP		VMP Turbo	
	Diameter	Speed[1]	Force pounds	Speed[1]	Force pounds	Speed[3]	Force pounds	Speed[2]	Force pounds	Speed[4]	Force pounds
	in	rpm		rpm		rpm		rpm		rpm	
1	⅞	15,800	206	16,500	224	10,000	82	12,670	132	13,000	139
2	1	15,800	206	16,500	224	10,000	82	12,670	132	13,000	139
3	1¼	14,000	512	14,600	557	10,000	261	12,670	419	12,500	408
4	1½	13,000	778	13,200	802	10,000	460	12,670	739	12,500	719
5	1 ¾	12,900	1,115	12,900	1,115	10,000	670	12,670	1,076	12,000	965
6	2 ⅛	11,900	1,355	12,200	1,425	9,600	882	12,670	1,536	12,000	1,378
7	2 ½	10,900	1,613	12,000	1,955	9,100	1,124	11,750	1,874	12,000	1,955
	Special Purpose Heads										
8	⅞ Low Force	15,900	86	16,700	95	10,000	34	12,670	55	13,500	62
9	2 ⅛ Shallow Pour	13,200	831	13,400	857	10,000	477	12,670	766	12,800	782

VI. PERFORMANCE DATA FOR VIBER® INTERCHANGEABLE HEADS

Head Specifications						Minimum Speed*		Maximum Speed*	
Size Diameter	Length	Weight	Unbalance	Average Amplitude (Peak-to-Peak)	Radius of Action	Speed	Force Produced	Speed	Force Produced
in	in	lb	lb-in	in	in	rpm	lb	rpm	lb
	mm	kg	Nm	mm	mm		kN		kN
⅞	11.94	1.4	0.029	0.041	5	10,000	82	14,000	161
	303	0.6	0.003	1.05	127		0.4		1
1	12.45	2.1	0.029	0.028	5	10,000	82	14,000	161
	316	0.9	0.003	0.72	127		0.4		1
1¼	12.19	3.0	0.092	0.062	7	10,000	261	14,000	512
	310	1.3	0.010	1.58	178		1		2
1½	12.04	4.1	0.162	0.079	13	10,000	460	13,200	802
	306	1.9	0.018	2.01	330		2		4
1 ¾	13.05	6.2	0.236	0.077	17	10,000	670	12,900	1,115
	331	2.8	0.027	1.95	432		3		5
2 ⅛	13.01	9.2	0.337	0.073	21	10,000	957	12,200	1,425
	330	4.2	0.038	1.86	533		4		6
2 ½	12.52	12.2	0.478	0.078	24	10,000	1,358	12,000	1,955
	318	5.5	0.054	1.99	610		6		9
Special Purpose Heads									
⅞ Low Force	9.94	1.1	0.012	0.022	5	10,000	34	14,200	69
	252	0.5	0.001	0.56	127		0.2		0.3
2 ⅛ Shallow Pour	5.84	3.3	0.168	0.102	19	10,000	477	13,500	870
	148	1.5	0.019	2.59	483		2		4

* Approximate speed in concrete with head moving. Actual speed depends on numerous factors including power unit used, slump of concrete, temperature, and amount of lubrication in flex drive.

** These heads are available with steel or rubber tips. Rubber tip models are 1/2" - 3/4" longer than shown.

VII. PERFORMANCE DATA for *Viber® POWER UNITS*

Model	Type	Weight lb	hp	Amp Rating	Plug	Quick Disconnect	Maximum Head Size inches
VMK 1500	Electric	13.0	2.5	10 amps	Standard	No	**1 ½**
VMK 1500 L	Electric	13.2	2.5	10 amps	Twist Lock	No	**1 ½**
VMK 1500 240V	Electric	13.0	2.5	6 amps	240 V	No	**1 ½**
VMK 1500 Q	Electric	13.4	2.5	10 amps	Standard	Yes	**1 ½**
VMK 1500 QL	Electric	13.5	2.5	10 amps	Twist Lock	Yes	**1 ½**
VMK 1500 Q 240V	Electric	13.4	2.5	6 amps	240 V	Yes	**1 ½**
VMK 2500	Electric	15.7	2.5	15 amps	Standard	No	**1 ¾**
VMK 2500 L	Electric	15.9	2.5	15 amps	Twist Lock	No	**1 ¾**
VMK 2500 240V	Electric	15.7	2.5	8 amps	230 V	No	**1 ¾**
VMK 2500 Q	Electric	16.1	2.5	15 amps	Standard	Yes	**1 ¾**
VMK 2500 QL	Electric	16.2	2.5	15 amps	Twist Lock	Yes	**1 ¾**
VMK 2500 Q 240V	Electric	16.1	2.5	8 amps	230 V	Yes	**1 ¾**
VMK 2750	Electric	21.6	2.5	15 amps	Standard	No	**2 ⅛**
VMK 2750 L	Electric	21.8	2.5	15 amps	Twist Lock	No	**2 ⅛**
VMK 2750 240V	Electric	21.6	2.5	9 amps	240 V	No	**2 ⅛**
VMK 2750 Q	Electric	22.0	2.5	15 amps	Standard	Yes	**2 ⅛**
VMK 2750 QL	Electric	22.2	2.5	15 amps	Twist Lock	Yes	**2 ⅛**
VMK 2750 Q 240V	Electric	22.0	2.5	9 amps	240 V	Yes	**2 ⅛**
VMK 3500	Electric	24.1	3.0	20 amps	Twist Lock	No	**2 ½**
VMK 3500 240V	Electric	24.1	3.0	12 amps	240 V	No	**2 ½**
VMK 3500 Q	Electric	24.5	3.0	20 amps	Twist Lock	Yes	**2 ½**
VMK 3500 Q 240V	Electric	24.5	3.0	12 amps	240 V	Yes	**2 ½**
VMP TURBO - Handle	Pneumatic	14.9	2.2		None	Yes	**2 ½**
VMP TURBO - Cage	Pneumatic	17.7	2.2		None	Yes	**2 ½**
VMG 1750HH	4-Cycle Gas	13.0	1.6		None	Yes	**1 ¾**
VMG 1750BP	4-Cycle Gas	17.4	1.6		None	Yes	**1 ¾**
VMG 2500BP	4-Cycle Gas	26.7	2.5		None	Yes	**2 ½**