

FORTA Corporation
INSTALLATION MANUAL:
The Big Shot® Fiber Transport System



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Introduction

The Big Shot[®] fiber transport system was designed to quickly and safely move synthetic fiber reinforcement from ground-level storage to upper-level concrete batching systems and concrete mixer trucks. The Big Shot[®] provides a simple and inexpensive way to add pre-weighed bags or even loose fiber to almost any concrete mixing system. With no moving parts and minimal, if any maintenance, this system requires only PVC pipe, a few hangers, and a supply of compressed air. The Big Shot[®] system has been installed and used in scores of applications, and represents the most efficient fiber-addition method known to minimize addition time and maximize safety.

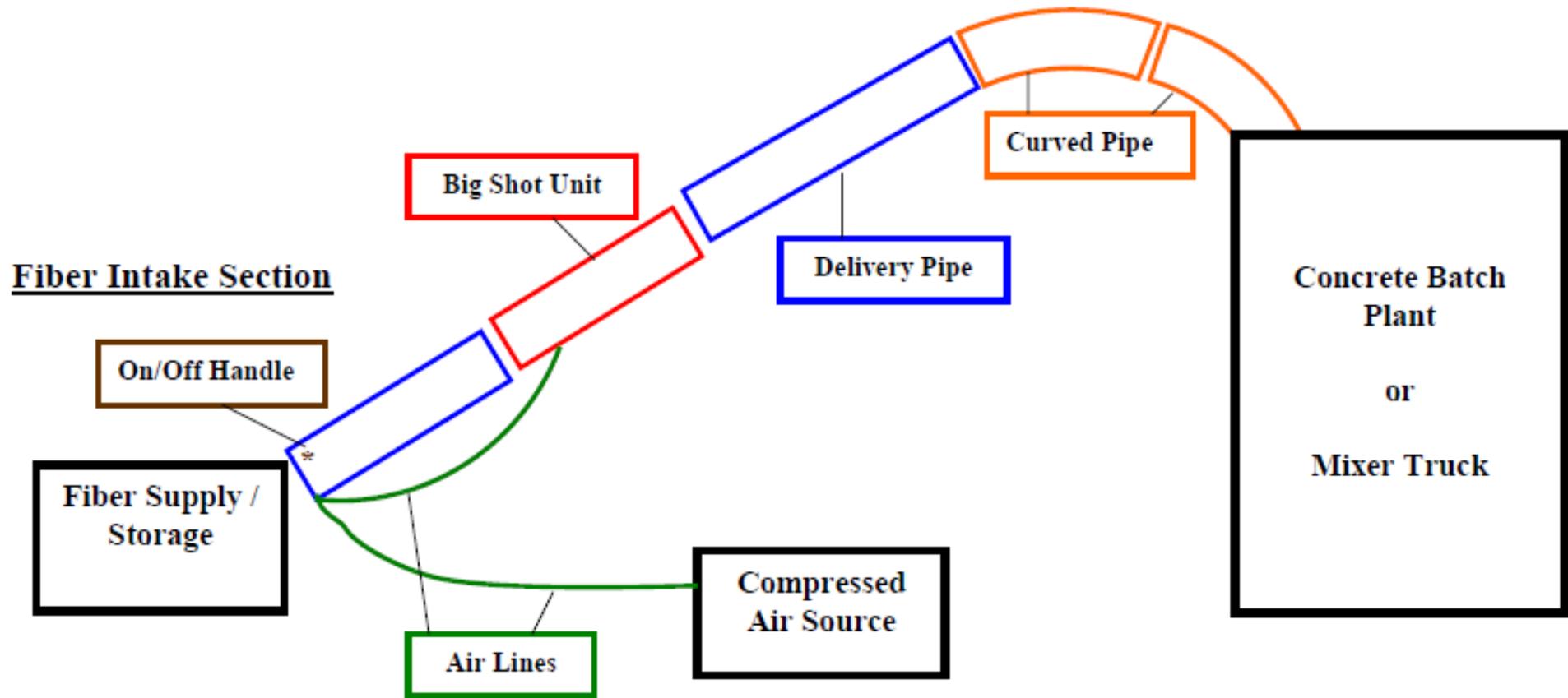
General Information

Synthetic fiber reinforcement for concrete and asphalt was introduced by FORTA Corporation to the U. S. construction market first in 1978. Since that time, fibers have become a commonly used material in a wide variety of projects, products, and applications.

As a result, it was desirable to develop a system that would allow the concrete and asphalt mix producer to add fiber, accurately, quickly, and safely to any batching and mixing system. While these lightweight materials could be easily and accurately weighed and packaged in a clean and dry fiber-production facility, the exercise was much more difficult and challenging in the outdoor dusty and/or damp environments of a typical concrete and/or asphalt plant. A FORTA ready-mix concrete customer in Colorado developed the Big Shot[®] system to add fibers at their own plants, and subsequently perfected and patented the system. Under exclusive license, FORTA Corporation manufactures and produces the Big Shot[®] units for use in the worldwide market.

The basic operational premise of the Big Shot[®] is similar to that of a drive-through teller window at a bank, where an initial vacuum combines with air pressure to send the canister to its destination. This same basic principle is applied to the Big Shot[®] - the pre-weighed fiber bags are first sucked into, and then pushed through the system's pipe delivery channel, arriving at a point of discharge at the batching system. This process requires no mechanical moving parts, and provides a safe and maintenance-free way to add fibers to almost any system.

Flow Chart



Parts List

The Big Shot[®] system includes the following items and parts:

- One (1) active Big Shot[®] unit (red) (36" long x 11" diameter; approximate weight 50 pounds)
- One 1/2" / 3/4" elbow line connection for standard air line (may be pre-installed on the Big Shot[®] unit)
- Curved PVC pipe elbow (135° total curvature; may be in a 1 or 2-piece configuration)

Additional parts are necessary for installation and operation of the Big Shot[®] system, and will depend on the height, distance, and desired location at each individual installation. These additional pieces/parts may be easily found locally and are not included with the system to minimize costs and shipping:

- One (1) 5 to 10 foot long, 8" diameter Schedule 40 PVC pipe section (installed as fiber-intake entry section prior to the active Big Shot[®] unit)
- Additional sections of 8" diameter Schedule 40 PVC pipe (as needed to arrive at batching entry point for the specific plant)
- 8" diameter radiator hose-type clamp brackets or heavy-duty plastic zip ties (as needed to hang and support PVC pipe system to batch plant framing)
- One (1) 3/4" diameter standard flexible airline (from compressed air source to the active Big Shot[®] unit)
- Source of compressed air 90 p.s.i. @ 25 CFM.
- One (1) 3/4" in-line shut-off valve/handle (to be located near fiber addition point for operation)
- One (1) 1/2" / 3/4" elbow line connection for standard air line (only necessary when two air lines are needed for instances where heavier fiber bags or longer distances are involved.)

Installation

Installation of the Big Shot[®] system is relatively quick and easy, and should pose few problems for the normal production and/or maintenance personnel at concrete or asphalt plants. Technical assistance is available from the local FORTA field representative, or by contacting the FORTA Corporation Operations Department for telephone consultation. Installation of the Big Shot[®] system is also available through FORTA Corporation at a cost of travel, lodging, and technician time onsite. Contact FORTA Corporation for details.

Layout

As shown in the Flow Chart diagram, the Big Shot[®] setup is fairly simple and straight-forward. Naturally, the location of the intake section, active Big Shot[®] unit, carry-pipe sections, and discharge sections, depend on the desired fiber storage and addition point and the desired and the desired discharge point at the batch entry. Once the desired addition-point and discharge-point have been determined, the pipe system can be laid out accordingly, keeping the entire system in as straight a line as possible. The angle of repose may be anything from horizontal (0°) to straight up (90°), however the typical and preferred angle is the range of 45° to 75°. The angle and line of repose may be determined by the framing and support system of the batch plant, and will vary with each specific plant instance.

Start Point

It is desirable to have the starting or fiber-addition point as close as possible to the area where the fibers are stored. In some cases, this may be near the fiber-inventory storage shed, or even an open ground-level area where fiber cartons or pallets can be moved to, and covered or protected from the weather.



Fiber addition point located near product storage area.

Once the appropriate start-point has been determined, it is essential to start with a length of 8" diameter Schedule 40 PVC pipe, anywhere from 5 to 10 feet in length. This section is necessary to create the initial vacuum required to move the fiber bags through the system. The upper end of this pipe (male end) is placed into the female entry end of the active Big Shot® unit.

[**NOTE: It is not recommended that this entry joint be glued, to allow for easier disconnection in the event the active unit or the entry pipe needs changed or replaced at some point in the future.]



Initial pipe section should be 5 to 10 feet long to create vacuum.

The Big Shot® active unit has a directional arrow labeled on the outside to help the installer determine the proper in-end and out-end. When installed, the directional arrow should point upwards to the eventual discharge point. Though not glued, the entry and discharge joints at the unit itself should be supported and hung as close to the joints as possible to the plant frame. This will allow for extra support and continued tight connections of the heavy active unit. Use 8" diameter radiator hose-type clamp brackets or heavy-duty zip-ties to hang these sections to the batch-plant framing system where needed.



Product-flow directional arrow shown just above the air-line inlet elbow. The red active unit should be anchored to plant frame near inlet and outlet ends for additional support

Air Supply

The Big Shot[®] system requires a supply of compressed air – one that can supply 25 cfm (cubic feet per minute) of air at 90 p.s.i. of line pressure. This represents a relatively low air requirement, one that is typically already available at the vast majority of plants. A 3/4" minimum diameter flexible air line must be run from the compressor source to the red active unit, and connected into the 3/4" to 1/2" elbow supplied with the Big Shot[®] unit. It is important to use "Air-Rated" line, fixtures, and connections throughout, to improve the system's efficiency and maintain a high level of safety.

[** NOTE: The use of 1" diameter line increases the system's efficiency, though it is typically not necessary. The use of 1" air line would naturally require a 1" to 1/2" elbow (not included) to connect to the active unit.]

[**NOTE: Allow for extra air line in order to install the turn-on/turn-off handle near the fiber addition point.]



Supply air-line connected to the intake elbow on the red Big Shot[®] unit, and runs to the Operation Handle noted in the next section.

One air line is typically sufficient to operate the Big Shot® over normal distances. If more strenuous circumstances exist, a second airline connection has been pre-installed on the active Big Shot® unit for possible use.

[**NOTE: If it has been determined that a second airline source is desirable, it is important that the second line be run directly from the compressor or compressed air source. Running a single air line with a simple “Y”-type connection to each air intake elbow on the unit will not enhance the vacuum capacity of the system.]

Operation Handle

The 3/4” Turn-on/Turn-off handle placed in the air supply line should be mounted/strapped near the lower end of the initial entry pipe section. Locate the handle in a place that is convenient to the operator who is loading the fiber bags into the system entry point. Secure the operational handle firmly to a rigid support to prevent future line damage. The air line then continues and is attached to the active red unit, as noted in the previous “Air Supply” section.



Operational on/off handle placed in-line from the air source. Mount the handle connection firmly to prevent future air-line damage.

Additional Pipe Sections

From the exit end of the active (red) Big Shot® unit, additional lengths of 8” diameter Schedule 40 PVC pipe should be connected as needed to reach the eventual fiber discharge point. These additional joint sections should be glued with standard PVC joint glue to prevent future separation.

[**NOTE: As noted in the Installation: “Start Point” section, it is not recommended that the Big Shot® unit exit joint be glued, to allow for easier disconnection in the event it needs changed or replaced in the future.]

Though these additional pipe sections should be kept as straight-line as possible, slight angles or curves will not dramatically affect the overall performance. Anchor pipe sections with clamp brackets or zip-ties to plant framing as needed, preferable near pipe joints to add additional connection support.



Add, glue, and place additional straight PVC pipe sections above active unit as needed.

Top Curvature

To arrive at the ultimate fiber discharge point, a curve at the top section is typically necessary. To allow for smooth fiber flow and delivery, a gradual turn or curve is required – sharp or 90° angles should be avoided. Due to the difficulty in extruding curved Schedule 40 PVC pipe, this section is supplied as part of the Big Shot® fiber system. The total curvature supplied is approximately 135°, which will accommodate the vast majority of installation requirements. This curved segment included may be in one-single or two-separate pieces, depending on availability. This curved section may be used as one piece, or may be cut and pieced depending on the location needs of a specific installation. Connect, glue, and hang this section as needed.



A slow top-bend curvature enables a smooth fiber delivery.

Discharge Point

At the end of the top curvature section, add a straight piece (or pieces) of Schedule 40 PVC pipe to arrive at the desired fiber discharge point. This exit point might be at a porthole opening in a precast batching system, the top of an aggregate-feed conveyor of a central-batch system, or simply the top hopper of a ready-mix truck.



Final straight pipe section added after curvature to arrive at discharge point.

If the discharge point is onto an aggregate-supply belt or near the head-pulley of a material-supply system, care should be taken to allow for sufficient fiber-bag clearance under hoods and/or safeguards. Due to the velocity of the fiber package at discharge, trials should be performed before gluing and anchoring the final section to make sure that fiber-bag “bounce-off” is not an issue.



Fiber discharge point located at the same opening used for aggregate supply.

Operation

Once the unit, pipe sections, and air-supply lines have been installed, the Big Shot[®] system is ready for operation. Though the air compressor must be on at all times, the actual air supply handle only needs to be turned on when adding fiber bags at the entry point. As a result, the Big Shot[®] system requires very little actual compressor time to charge fibers into the mixing system.

When ready to add loose fibers or fiber bags, simply turn on the air supply at the handle, and place the fiber up to the intake pipe. The immediate vacuum created when the air supply is turned on will suck the fibers/bags into the system, and shoot it quickly to the discharge point. Typical delivery time for a 50-foot system is 2 to 3 seconds. The inlet pipe should NOT be loaded up with multiple fiber bags prior to turning the air supply on. The system is designed to shoot one bag at a time into the concrete mixing system, and depends on the vacuum created to accomplish this function. Though the Big Shot® is a single-bag system, the product flow is extremely fast, and typically, the first bag has been delivered into the mixer by the time the operator can pick up and load the next bag. Typical total time required to load a 10 cubic yard batch would be 10-15 seconds. Even if the discharge point is not visible from the ground-level addition, the operator will detect an audible change in vacuum sound, alerting him/her that the fiber has been discharged. Once the proper number of fiber bags have been added and dispensed, the air-supply handle is turned off.

Normal 1.0 lb. and 1.5 lb. bags, typical of first-generation monofilament or fibrillated fibers, offer no problem to the Big Shot® fiber transport system. The Big Shot® is also very capable of handling larger-weight macro/structural fiber bags, however, trials should be performed prior to project start-up. Larger bags can be “folded” lengthwise to facilitate their easy addition at the entry-point pipe.

[**NOTE: Sufficient free space at the pipe opening must be available to allow for the vacuum process to function properly. Do NOT over-stuff fiber packages into the entry pipe.]

If larger fiber packages are to be used and appear to be oversized for the 8” diameter pipe opening, they can simply be opened and emptied into a rigid open container, and the loose fiber can be easily “vacuumed” into and through the Big Shot® system.

CAUTION:

The Big Shot® system was designed to transport light-weight synthetic fibers, and should not be expected to accommodate other heavier materials, such as coarse aggregates, ice, or steel fibers. Caution should also naturally be exercised to keep small children and pets away from the fiber intake section during operation. Installation of a closeable guard or trap-door may be advised if the unit is to be used in an open or unsupervised area.

Warranty

The Big Shot® fiber transport system is a unique patented unit that is essentially free of moving parts, and should require no conventional maintenance. The unit operates on an air induction system, and therefore depends on PVC pipe sections and connections that are free from cracks and/or leaks. The Big Shot® active unit must be protected from surrounding equipment damage and severe impact, and is not warranted against unusual circumstances, Acts of God, and the like.

Assuming the above conditions, the active Big Shot® unit is hereby warranted to be constructed of first-class materials and workmanship, and free of defects that would not permit it to operate in an effective manner. If the unit is proven to be defective in these conditions for a period of three years from the date of lease and/or purchase, FORTA Corporation will at its sole option, repair and/or replace The Big Shot® system at no charge, not including delivery and/or installation costs or charges. The warranty covers only the Big Shot® active unit, and does not cover any additional pieces, parts, or sections that may have been utilized in the installation process.

FORTA Corporation's sole and exclusive warranty is that The Big Shot® system will comply with the descriptions and specifications listed in this Warranty Section and will be free from defects in workmanship or material for a period of three years from the date of lease or purchase. FORTA Corporation's sole responsibility under this exclusive warranty is, at FORTA Corporation's sole discretion, to repair or replace The Big Shot® system.

EXCEPT AS EXPRESSLY STATED IN THIS EXCLUSIVE WARRANTY, FORTA CORPORATION DISCLAIMS ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE BIG SHOT® SYSTEM, OR ANY UNDERSTAKINGS, ACTS OR OMISSIONS RELATING THERETO.

The lessee's sole and exclusive remedy in connection with an accepted offer for The Big Shot® system shall be the repair or replacement of The Big Shot® system.

FORTA CORPORATION SHALL IN NO EVENT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL OR CONTINGENT DAMAGES OF ANY TYPE, WHETHER ARISING OUT OF BREACH OF CONTRACT, BREACH OF WARRANTY, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHER THEORIES OF LAW, WITH RESPECT TO THE BIG SHOT® SYSTEM LEASED OR SOLD BY FORTA CORPORATION, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO.