## The Abojet Series: Structural Crack-Injection Resins

### Crack Injection: Restoration Instead of Demolition

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The Abatron ABOJET crack-injection system is a proven method to restore monolithic integrity to a cracked structural element by injecting a structural adhesive epoxy resin (ABOJET) into the crack, to fill and "weld" it back together. Since ABOJET bonds permanently and is stronger than concrete, the so "welded" wall can be stronger than originally.

The ABOJET series of resins is best known in the restoration of load-bearing walls, but its advantages are also obvious in restoring structural and decorative components, machinery and equipment supports, cable systems, bridges, artifacts, archaeologic structures, sculptures.

Concrete is the material repaired in most cases, but most rigid materials can be restored, such as masonry, marble, stone, wood, ceramics, metals, stucco, gypsum.

Normally, an ABOJET resin system consists of 2 solventless ("100% solids") liquids packaged separately: Resin (part A) and Hardener (part B). When needed, A and B are mixed and the resulting blend is then injected into the crack or cavity. A reaction starts when A and B are mixed, and the blend will harden within minutes or hours (depending on the ABOJET chosen). Before hardening, the ABOJET A/B blend remains sufficiently fluid to be injected. The hardened system is dimensionally stable and virtually shrinkfree.

Where structural requirements cannot be compromised, the ABOJET system is often the only dependable and cost-effective alternative to demolition. Crack-injection with the ABOJET resins has also gained prominence in sealing foundations and other under-grade walls against water seepage.

The pictures above show front and back views of crack in a foundation concrete wall that was condemned by the local building department because of crack damages. Further construction could be approved only after Abatron’s ABOJET injection resin and ABOEWELD patching grout restored monolithic integrity, strength and water barrier. The only alternative the building inspector could have approved was demolition, removal and re-building.
**The Abojet Series: Structural Crack-Injection Resins**

**Outstanding:**
- **Strength**
- **Performance**
- **Cost Effectiveness**

Abatron manufactures many ABOJET resins that differ primarily in viscosity (lower viscosities for thin cracks, higher viscosities for wider cracks). Some are for special environments, like cold weather or wet areas.

The surface of the crack is first sealed on the back side of the wall with ABOWELD.

On the front, holes are drilled every 8-12” to insert the injection ports (cut from copper tubing, or specially made). The crack's surface is then sealed with ABOWELD between and around the ports.

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**Dispensing Methods**

1. **Bulk:** ABOJET is packaged in standard containers and measured and mixed by hand.

2. **Bulk & metering/mixing/dispensing pump:** ABOJET is packaged in standard containers and proportioned, pumped, mixed and dispensed by a specialized pump in one continuous operation.

3. **Pre-measured in 2 standard containers:** One container is partially filled with "A", the other with the premeasured amount of "B" to be poured and mixed in the "A" container.

4. **Pre-measured in compartmented cartridges:** Both A & B are in the same cartridge, separated by a diaphragm that is broken by a mixing plunger when ABOJET is needed.

The ABOJET blends mixed in (1) and (4) are subsequently poured into empty cartridges which are placed in manual or air-operated caulking guns for the injection procedure.

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**Injection Method**

Injection of ABOJET resin into a crack in a wall is a typical application. The injection procedure is as follows:

1. Clean the crack with a water jet, compressed air or similarly adequate means, to render the crack tree and accessible. Widen it if necessary. Ideally, it should be clean and dry.

2. Seal the crack surface along the backside of the wall with a grout like ABOWELD 8305-5, to contain the ABOJET injected from the front side.

3. Insert 2-3 inch long by ½ inch diameter copper tubing sections into the crack on the front side of the wall, starting from the bottom of the crack, every 8-12 inches, so that each tubing section can be used as a port through which to inject the resin into the crack. Holes can be pre-drilled for inserting the ports, and ¼" plastic tubing, like cocktail stir sticks, can be inserted to hold the ports in place while the ABOWELD 8305-5 hardens. Seal the crack around the ports and between them with ABOWELD 8305-5 (or ABOWELD 8708-2 or 8703-9, which harden faster).

4. Inject the A/B ABOJET blend through the lowest port (generally the one closest to the floor), until the resin starts oozing from the next port above.

5. Crimp the lowest port shut to prevent resin backflow, and inject resin through the next port above, until the resin starts oozing from the the port above that.

6. Crimp the second port, inject the resin through the port above it, etc. When no
The ABOJET A/B mix is injected starting at the lowest port, until resin starts oozing from the port above. Then the lowest port is crimped close to prevent backflow.

The resin is injected into each port in turn in the same manner, working up the crack, until the crack is filled to the top.

The wall surface with the "welded-back" crack can be sanded or otherwise finished for a neat, professional result.

more resin can be injected, the operation is completed.

The crack surface on the wall can be sanded or otherwise finished, and the resin wets with the surrounding material in a few hours. Its full structural strength is reached within 1-4 days, depending on the temperature and bulk (warmer environment and thicker sections accelerate hardening).

On horizontal surfaces, the process is often just a filling procedure by pouring or troweling, so that ports and caulking guns may not be needed.

Guidelines
(See our general instructions for Abatron epoxies and on individual products).

Filling upward from below helps prevent the formation of air pockets which would cause further cracking in the seasonal freeze/thaw cycles.

The areas to be filled and "welded together" must be accessible, clean, and free of foreign or loose matters. High-pressure water or air jets are recommended to clear the voids and remove loose particles. Contaminants, oil, grease, wax, paint must be removed with detergents, solvents, etching solutions or flame.

Proportioning A and B must be in the prescribed ratios, or the cured resin will be defective. Thorough mixing of A and B is essential, or "soft spots" will develop.

An induction period (waiting after mixing and before applying) of a few minutes is recommended with moisture-sensitive compounds, especially in the presence of high relative humidity, to facilitate tackfree hardening.

Blending fillers like sand with the resin A/B mix, before injecting, is useful for larger cracks (wider than 0.1 inch or 3mm), to compensate for the different coefficients of thermal expansion between the resin and surrounding material. Abocast 22-8 and Abocrete Kit are some of the Abatron filled products for that purpose.

Most Used ABOJET Resins:
ABOJET-2: For freezing weather, underwater or wet surfaces. Ratio A/B: 2/1. Low viscosity: <5 poises. Pot life: 30-60 minutes.

Patching and Sealing Pastes:

The above products are all 100% solids. More detailed information available upon request.
With strength and durability many times that of concrete, ABOJET is ideal for crack repair in many high-stress situations, such as this cracked heavy machine footing. ABOCRETE or ABO WELD can also be used, if the crack is wide enough.

This crumbling, bulldozer-ready concrete stair is typical of a structure that could be completely restored by use of ABOJET, ABO WELD and/or ABOCRETE, depending on the structural requirements.

Alternative and Complementary Products

ABOCAST 22-8: Filled high-viscosity casting/injecting system. For wide cracks & large volumes. 100% solids. Pot life: 30-40 minutes. All-purpose repair and filling system for permanent repairs by casting or troweling.

ABOCAST 8005-6: Adhesive to bond poured concrete to old concrete and other surfaces. 100% solids. Ratio: 7/3. Pot life: 30 minutes.

ABOTAR 8101-B: All-purpose Epoxy-Tar coating/resurfacer/filler usable in any thickness, neat or with sand. For concrete, metal, wood and asphaltic surfaces. 100% solids. Ratios: 1/1 or variable. Pot life: 50 minutes.

ABOCOAT 8508-1 SERIES: Heavy-duty colored floor and wall coatings in many standard and custom colors. 61% solids. Ratio: 1/1. Pot life: 8-12 hours.

ABOCAST 8508-3 SERIES: Heavy-duty colored solventless floor and wall coatings/resurfacers in many standard and custom colors. Can be poured and spread in any thickness to renew pitted and spalled areas, to fill holes, depressions, cracks and create new surfaces. 100% solids. Ratio: 108/20. Pot life: 40-60 minutes.

ABOSOLV: Clear solvent-diluent for cleanup and dilution. Available in many versions.

Safety

All safety requirements described in the Safety Material Data Sheets are to be used in addition and accordance to federal, state and local rules. Although the above products don’t present any great toxicity problems, all precautions should be observed dealing with hazardous materials, toxic vapors from organic materials, proper ventilation in enclosed areas, self-contained respirators where ventilation is not possible, protective/disposable clothing, gloves, goggles and protection against eventual dust.

The above information is only a general guide resulting from laboratory and field tests that may not apply to the user’s conditions. No guarantee is offered, as applications are beyond our control. The user is urged to test and adapt the above data in his own conditions and environment previous to product adoption. Specifications may be subject to state-of-the-art changes.

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