TECHNICAL MANUAL

Betonamit is pronounced Beh-tah-nuh-mite

Betonamit has been used safely and with great results by thousands of contractors and homeowners all over the world. Safe use depends on following instructions and **wearing safety goggles** at all times. Although non-toxic, **Betonamit** is caustic, and can cause severe eye injury if splashed into eyes while mixing or pouring.

Also, the chemical reaction of **Betonamit** and water generates heat. If this reaction goes too quickly, the temperature can go above the boiling point of water before all the water has chemically com bined with the **Betonamit**. This can result in a steam-driven explosion which blows the **Betonamit** from the hole with sudden force.

To avoid blowouts, follow the instructions regarding mix water temperatures and hole sizes, as told later in the manual. **Always wear safety goggles** , and never use drill holes larger than 1-1/2" diam eter. Blow dust out of the holes after drilling, and keep **Betonamit** cool before use.

Hole Depth

1. Maximum Hole Depth is 10 feet.
2. Minimum Hole Depth is 4 times hole diameter; for example 5" with 1-1/4" hole, 6" with 1-1/2". Holes shallower than 4 times diameter are likely to blow out.
3. In reinforced concrete, drill 85 to 90% of its depth. In ledge, drill as deep as you want to remove. In boulders, drill 2/3 to 3/4 of the rock's thickness.

Hole Pattern

1. Holes must be drilled so as to allow a free face for the **Betonamit** to push toward. For example, drilling at 45o angle in a flat surface of ledge will push it upwards, but drilling straight down might not allow anywhere for the pressure to go.

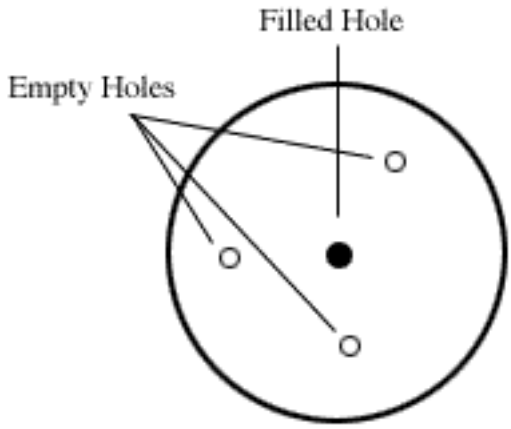
2. To demolish a slab without pushing out the walls which surround it, drill a cone shaped pattern at the center and fill these holes first. The cone will pop upwards and create a free face.

3. Hole pattern depends on tensile strength of what you're breaking, amount of rebar if any, and the size of the pieces you want when you're done. This can often be determined by experiment; a good starting point is to space holes one foot on center in rows one and a half feet on center. In non-reinforced concrete, holes may be spaced as far apart as 24".

4. Hole pattern also depends on how fast you need results. More holes spaced closer together will live faster break times and smaller pieces, but this costs more in labor and **Betonamit**.

5. Boulders are much easier to break than reinforced concrete or ledge, and drill holes can be spaced further apart , especially if breaking speed is not critical.

6. When removing part of a slab, you will want to prevent cracks from spreading into the rest of the slab. Drill holes 6" on center in a line between the "demolish" section and the "keep" section, then fill every third hole. The empty holes form weak points and prevent cracks from spreading into the "keep" section.



7. Empty holes can also be used to direct cracks -they cost less than filled holes. For example, if you want to break a boulder into thirds, you can use this pattern:

This will save money campared to filling all the holes, but will slow down the breaking time.

These instructions are essential for safe and effective use of Betonamit.

Temperature Chart

Rock or Concrete Temp	Water Temp(F)	Hole Size

25 to 40 F	110 F max	1-1/2" dia.
41 to 57 F	85 F max	1-1/2" or 1-3/8" dia.
58 to 72 F	65 F max	1-1/4", 1-3/8", or 1-1/2" dia.
73 to 80 F	40 F max.(iced)	1-1/4" or 1-3/8" dia.
81 to 95 F	33 F max.(iced)	1-1/4" dia.

When rock or concrete is above 73 F, add 5 ounces of extra water per 5 kilo container, 33(iced).
Halve this amount when using Type S in 2-1/2 kilo containers.
Over 95 F cool holes with cold water, then blow out before installing Betonamit.

Notes:

1. Hole temperature can often be reduced by waiting until late night or early morning.
2. When rock or concrete is above 65oF, keep the **Betonamit** as cool as possible before use.
3. When rock or concrete is above 85oF, store **Betonamit** in a cooler with ice or in a refrigerator before use.
4. When rock or concrete is above 73oF, do not mix more than one 5 kilo container at a time.
5. Measure the rock or concrete temperature - **DON'T GUESS!** Tie a string onto the thermometer and lower it into the drill hole.

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1-800-639-2021 | (603) 323-2323 | Fax (603) 323-2322 | info@betonamit.net

Mixing Betonamit -Type R (Liquid)

1. Read this manual page for page before using **Betonamit**.
2. **Wear safety goggles** and clear the area of all non-essential personnel.
3. Measure temperature of drill holes.
4. Add one liter of clean water of proper temperature to plastic mixing bucket. See Temperature Chart on preceding page.
5. Dump one 5 kilo container of **Betonamit** into bucket with water.
6. Begin mixing immediately wait 1/2" electric drill with mixing attachment.
7. **Betonamit** will seem dry at first ***-do not add more water!***
8. ***Once mixing begins, you have only 5 minutes to finish mixing and fill holes*** . Do not stop to take a phone call or fool around. Longer mixing times increase likelihood of blowouts.
9. Fill holes as quickly as possible. Do not use a funnel. Do not plug holes or place heavy objects on holes.
10. Cover holes with a tarp if people will remain in the area -especially in hot weather, when blowouts are more likely to occur.

Notes:

1. Never fill glass or metal containers with **Betonamit**, or any container which widens towards the bottom.
2. Never pump **Betonamit**.
3. Mixing by hand lengthens mix time and is more likely to result in a blowout.
4. When rock or concrete is above 73 F, add 5 ounces of extra water per 5 kilo container (33 F, iced).

Estimating Quantity Required

Type R (Liquid) 5kg.

Each 5 kilo container will fill 7-1/2 linear feet of 1-1/2" hole, 10 linear feet of 1-3/8" hole, or 11 feet of 1-1/4" hole.

For 1-1/2" holes: # of holes x depth in feet divided by 7.5 = # of 5kg containers needed.

For 1-3/8" holes: # of holes x depth in feet divided by 10 = # of 5kg containers needed.

For 1-1/4" holes: # of holes x depth in feet divided by 11 = # of 5kg containers needed.

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Mixing Betonamit -Type S (Putty) Additive

Betonamit Type S is an additive that you add to the Type R mix and it forms a putty instead of a liquid, for use in horizontal holes, uphill and overhead holes, and holes with water seeping in.

1. Read this manual page for page before using **Betonamit**.
2. Wear safety goggles and clear the area of all non-essential personnel.
3. Measure temperature of drill holes.
4. Add one liter of clean water of the proper temperature to a plastic mixing bucket.
See temperature chart
5. Dump one 5 kilo container of **Betonamit** Type R and the Type S additive to the bucket with water.
6. Begin mixing immediately with a 1/2" electric drill with mixing attachment.
7. Type S (Putty) **Betonamit** may seem dry at first ***- do not add more water!***
8. Mix until material is thoroughly moistened and forms small balls.
9. Wearing rubber gloves or surgical gloves, pick up a handful of **Betonamit** and knead it like dough.
10. On a clean surface, roll **Betonamit** into cylindrical sausage shapes slightly smaller than the hole diameter.
11. Place the rolled **Betonamit** in holes and pack tightly with a dowel or rod slightly smaller than hole diameter.
12. Cover holes with a tarp if people will remain in the area.

Notes:

1. Mix only one 5 kilo container at a time.
2. Two people are recommended - one to knead and roll, one to pack.
3. Fill holes within five minutes.
4. Type S is useful when holes have water seeping in.
5. Drilling holes at a slight downward angle instead of horizontal allows the use of Type R (liquid) which is easier and faster.
6. When rock or concrete is above 73 F, add 2-1/2 ounces of extra water (33 F,iced).

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Notes:

1. **Betonamit** is usually not cost effective in slabs less than 5" thick. A pavement breaker or hydraulic hammer works well, unless noise is a problem.

2. The most cost effective demolition technique for ledge is often a combination of **Betonamit** (to produce cracks) and a hydraulic hammer. Drill holes can be spaced out further in this case.

3. Using **Betonamit** Type R (Liquid) is much easier than Type S (Putty). It is usually better to drill holes downhill and use Type R, than to drill horizontally and use Type S.

4. The best way to demolish underwater rocks or concrete is to build a coffer dam and pump out the area. **Betonamit** hardens in fifteen to twenty minutes, after that area can be flooded again.

5. **Betonamit** must be used in holes ; pouring it into existing cracks in rock will not work.

6. **Safety goggles must be worn at all times by everyone in the area** . Hard hats and steel toed boots are a good idea on any construction or demolition site. *As an added benefit, use of safety gear enhances your professional image in the eyes of the public, and avoids OSHA fines.*

7. When using the temperature chart, bear in mind that the actual drill hole temperature may be much higher than the surrounding air temperature if it is in the sun or affected by nearby heat from machinery or from drilling the holes.

8. Cold temperature, hard rock, or holes spaced too far apart can lengthen breaking times. If it did not break overnight - wait a while before assuming failure. **Betonamit** continues to increase pressure for 3 days.

9. If **Betonamit** drops below freezing, the reaction will stop, but it will start up again once it thaws.

10. If mixed **Betonamit** begins to steam in the bucket, add 1/2 gallon or more of water, stir, and throw it away. You've allowed too much time to pass from beginning to mix.

11. If filled holes start to smoke or steam, that is a sign they may be about to blow out. Immediately clear the area of people. The vapors are only steam, and are not hazardous or toxic in any way.

12. Make sure that everyone working with **Betonamit** understands the possibility of blowouts and has read this technical manual thoroughly.

Ledge, boulder, and concrete will vary in strength , but there is nothing on Earth too strong for Betonamit to beak, as long as there is a free face to break towards. Always wear safety goggles when working with Betonamit.

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What Can Cause a Blowout?

1. Using too large a hole diameter. *See temperature chart.*
2. Using too warm mix water. *See temperature chart.*
3. Using too little water, especially when rock or concrete is above 73 F.
4. Lots of dry dust in holes can absorb water from the mixed **Betonamit**, causing same as #3 above.
5. Too much time passing between beginning to mix and filling holes.
6. Mixing by hand can result in #5 above.
7. Guessing at drill hole temperature instead of measuring it.
8. Guessing at water temperature instead of measuring it.
9. Holes that are too shallow. Depth must be 4 times diameter or more.
10. Allowing the **Betonamit** powder to become too hot before mixing with water.
11. A "know-it-all" attitude that causes some people to ignore this manual instead of reading it thoroughly, cover to cover.
12. Holes drilled closer than 10" apart in soft rock or concrete, in hot weather.

Always wear safety goggles when working with Betonamit.

NEVER USE DRILL HOLE DIAMETERS LARGER THAN 1-1/2"

Blowouts will usually not occur more than 3 hours after filling holes.

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Consult This Checklist Before You Mix

1. Are you wearing goggles?	____
2. Is everyone nearby wearing goggles?	____
3. What is rock / concrete temperature?	____ (F)
4. What is water temperature?	____ (in.)
5. What is drill hole diameter?	____ (F)
6. Are numbers 3, 4, and 5 within correct ranges?	____
7. Have you measured extra water if rock / concrete is above 73 F?	____
8. Is the electric mixer all ready to go and operational?	____
9. Has the **Betonamit** been kept cool?	____
10. Are you going to throw a tarp over the filled holes?	____
11. Have you read this instruction booklet 100%?	____

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Conversion Chart:

1 liter = 34 fluid ounces.
1/2 liter = 17 fluid ounces.
5 ounces = 147 cc.

33 F = 0.5 C
40 F = 4.5 C
58 F = 14.5 C
65 F = 18 C
72 F = 22 C
80 F = 26.5 C
85 F = 29.5 C
95 F = 35 C

ALWAYS!
WEAR SAFETY GOGGLES
WHILE MIXING, FILLING HOLES, AND
WHILE IN THE VICINITY OF FILLED HOLES

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Material Safety Data Sheet - U.S. Department of Labor Occupational Safety and Health Administration

May be used to comply with OSHA's Hazard Communication Standard

29 CFR 1910.1200.

Identity: Betonamit

Section I

Manufacturer: Betonamit International AG; Industriestrasse, FL-9491 Ruggell, Liechtenstein
Emergency Telephone #: 603-323-2323 **Information Telephone #:** 603-323-2323
Date Prepared: March 1 , 2007

Section II - Hazardous Ingredients/ Identity Information

Hazardous Components: Calcium Oxide (CaO) ~75% by weight. CAS #1305-78-8. Permissible exposure limit per OSHA- 5mg per cubic meter of air. No skin designation per OSHA.

Section III - Physical/ Chemical Characteristics
Boiling Point: N/A Specific Gravity (H2O = 1): 3.1 Vapor Pressure (mm Hg): N/A
Melting Point: 2000 O C Vapor Density: N/A Evaporation Rate: N/A
Solubility in Water: Slight Appearence and Odor: Gray Powder, No odor
Section IV - Fire and Explosion Hazard Data: Not Applicable

Section V - Reactivity Data

Incompatibility (materials to avoid): None, but store in a dry place.
Hazardous Decomposition or Byproducts: None
Hazardous Polymerization: Will not occur.

Section VI - Health Hazard Data

Avoid ingestion, inhalation, eye contact and skin contact.
Health Hazards:
1) Skin and Eye Contact: Irritation and burn (Betonamit is caustic).
2) Inhalation and Ingestion: Alkali burns.

Emergency and First Aid Procedures:
1) Skin Contact: Rinse off with clean water.
2) Eye Contact: Flood with water and consult a physician immediately.

Section VII - Precautions for Safe Handling and Use

1) Wear safety goggles and rubber gloves and store in a dry place.
2) In case of spill, hose down with water.
3) Never fill into holes larger than 1 1/2" in diameter, to avoid blowout. (See technical manual)
4) Read technical manual thoroughly before use. Copies available by calling 603-323-2323.

Section VIII - Control Measures

Eye Protection: Safety goggles.
Protective Gloves: Ordinary rubber gloves.
Respiratory Protection: Ordinary dust mask is recommended.

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