**Hydraulic Anchor & Patching Cements**



**ROCKITE** & **KWIXSET** are a fast setting, hydraulic type cement compound of more than twice the strength of fully cured conventional concrete. When mixed with water to pourable consistency it flows and seeps into place as though it were molten lava. It takes an initial set within 15 minutes. Within one hour it develops compression strength of 31Mpa or4500 psi. Its adhesion is due to expansion and when fully set it grips metal to concrete permanently.

**Sample only of some of the Strength Test Results**

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| --- | --- | --- | --- | --- | --- |
| Imbedded Item | Hole Diameter mm inches | Hole Depth  mm inches | Applied Load (kN) | Applied Load (psi) | Mode of Failure |
| Rebar Grade 500  12mm | 19mm  ¾ inch | 100mm  4 inches | 72.2 | 10,479 | Bolt Failure |
|  |  |  |  |  |  |
| Mild Steel Bolt 20mm | 50mm  2 inches | 100mm  4 inches | 101.92 | 14,792 | Bolt Failure |
| Open the following link for the comprehensive test results | | | | | |

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**Rockite & Kwixset - Directions for Use**

**[](http://roadsandconcrete.com/wp-content/uploads/2011/11/Rockite-using-it.jpg)How to mix the cement**

Always use a clean container. Never add sand, gravel or other foreign substances to Rockite or Kwixset. They weaken the cement and affect the setting.

**Fluid (pouring) Consistency:**

Mix Rockite & Kwixset with water to a thick paste. Let the mixture stand for about one minute. Then stir thoroughly. At this point, the mixture will become more fluid. The proper consistency is more like a thick batter, just fluid enough to pour BUT not WATERY. Keep the mix thick. This makes stronger cement. Add water very sparingly. If the mix is thin, add more Rockite/Kwixset promptly to thicken it. You wish to measure, the correct water addition is 4 ½ oz. per lb. or 1 ½ pints per 5lb box. When using this method, MEASURE ACCURATELY.

**How to Anchor; Bolts, Post, Starter Rods etc in concrete**

1. Drill the hole never less than 2 inches (50mm)
2. Blow out all the dust and loose particles.
3. Flush out hole with water. Be sure to remove excess water leaving the hole clean and uniformly damp. (the substrate can be damp when Rockite/Kwixset is poured into the hole)
4. For anchoring machinery in concrete, use the fluid consistency as above. Insure that anchor rods have nut head and washer on before placing them in the opening. Pour the Rockite/Kwixset into the space around the rod/bolt. Tamp bolt to settle Rockite/kwixset completely around the rod/bolt.
5. For exterior anchoring of ornamental iron, pour the fluid consistency (as above) around the rod, tapping the rod to settle the Rockite/Kwixset
6. For anchoring in vertical walls, use the plastic consistency (see below) Fill the holes with the plastic cement first. Then tamp the bolt or rod into place. If the cement becomes to fluid because of the tamping process and sags out of place, let it stand for a few moments and it will stiffen. Carry on with procedure.
7. Let the cement harden for at least 30 minutes. (Initial set is 15 minutes). For heavy equipment, allow one hour.

**[](http://roadsandconcrete.com/wp-content/uploads/2011/11/Rockite-Pond-and-Rail.jpg)How to Patch holes and cracks in concrete floors**

1. Cracks should be raked out to remove any loose debris or loose particles. If a hole is to be repaired, chisel down the edges to provide a ‘form’ for the cement when it is poured.
2. If the hole is clean, simply remove lose chips and dirt.
3. Sprinkle the whole/crack with water. Leave the surface damp and not wet
4. Mix Rockite/Kwixset to fluid consistency for patching floors and plastic mix for walls.
5. Pour a little *dry* cement into the hole and scrub it into the surface with a stiff brush or broom to drive the cement into the pores. This helps the patch t o adhere. Then add enough cement to match the level of the surrounding surface. The cement will self-level.
6. When the cement begins to thicken (about 10 minutes), smooth out any imperfections in the surface with a cement trowel.
7. After 30 minutes, sprinkle the patch with water. Foot traffic and light trucking may be resumed immediately. For heavy trucking, allow one hour.

**Freezing Temperature Application**

The procedure described in the foregoing may be used safely at temperatures down to 25 degrees Fahrenheit. If the temperature is below 25 F, keep the Rockite/KWixset in a warm place before using. When ready to apply, mix the Rockite/Kwixset with warm water and keep the mixture in a warm area. As soon as the mixture begins to stiffen slightly, (approximately 10 minutes after the water is added) pour the mixture quickly into place. The hardening process then creates heat and protects the Rockite/Kwixset from freezing. Do not add anti-freeze compounds to the Rockite/Kwixset mixture.

**Note: DO NOT USE ROCKITE IN SWIMMING POOLS** - **USE KWIXSET**  
When used outdoors, ROCKITE should be allowed to dry out thoroughly for seven days and then protected with a coat of good grade exterior paint. ROCKITE should not be used underwater or as a primary structural member. ROCKITE should not be used outdoors for anchoring in porous materials, such as brick, limestone and granite, when they are exposed to wet conditions.

**WARNING: Due to the expansion properties of Rockite/Kwixset do not use RockiteKwixset for anchoring in cement that is narrow on top such as handicapped ramps, concrete construction barriers or concrete walls. When using Rockite/Kwixset always leave at least 4 inches from the edge of the concrete to the hole.**

**WARNING: Kwixset has very strong expansion properties which generate the high tensile loads that can be achieved. Therefore we do not recommend its use in hollow bricks, concrete block, limestone or granite. Always leave at least 4 inches from the edge of the concrete to the hole.**

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Compressive test of Rockite 2. Comparison compressive tests with Kwixset (water proof version of Rockite) Portland Cement and Rockite 3. Tension test from the center of concrete slab using Rebar Grade 500 4. 4 Tension tests at nominally 45mm from face edge with mild steel anchors and Rebar grade 500. 5. Strain Bearing Ability   The following test results were established in laboratory conditions at **Opus International Consultants Limited**, Auckland New Zealand. Where indicated test results were established in laboratory conditions in the US  **Test Results 1:** Tests were conducted in the USA  **Compressive test of Rockite**  **Set 1**: Compression Strength at the end of one hour   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Cube No | Area in Sq inches | Area in Sq centimeters | Lbs. Load at failure | Mpa Load at failure | | 1 | 4.00 | 101.6 | 17,270 | 118.99 | | 2 | 16,920 | 116.57 | | 3 | 18,440 | 127.05 |   **Set 2:** Compression Strength at the end of seven days   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Cube No | Area in Sq inches | Area in Sq centimeters | Lbs. Load at failure | Mpa Load at failure | | 4 | 4.00 | 101.6 | 33,650 | 231.84 | | 5 | 32,220 | 221.99 | | 6 | 31,550 | 217.37 |   **Test Result 2:** Tests were conducted in the USA  Comparison compressive tests with Kwixset (water proof version of Rockite) Portland Cement and Rockite  **Set 1:**   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | **Rockite Cement** | | **Kwixset Cement** | | **Iron Bearing Portland Cement** | | | Setting Time | 20-30 minutes | | 15-20 minutes | | 4-8 hours | | | Compression Strengths  In 60 minutes  In 24 Hours  In 7 days | 4600 psi  5000 psi  8000 psi | 31.69mpa  34.45mpa  55.12mpa | 4100 psi  8100 psi  9300 psi | 28.24 mpa  55.80 mpa  64.07 mpa | 0 psi  2450 psi  5500 psi | 0 mpa  16.88 mpa  37.89 mpa | | Linear movement | Positive expansion 0.18% controlled | | Positive expansion 0.125% controlled | | Expands or shrinks | | | Movement With Time | Completely stable for all practical purposes | | Completely stable for all practical purposes | | Continued expansion sufficient to cause self-destruction | | | Contains Rust Promoting | No | | No | | Yes | | | Consistency | Sufficiently fluid to be self-leveling | | Sufficiently fluid to be self-leveling | | Must be vibrated to achieve leveling | | | Weight of dry mix to produce 1 cubic foot (yield) | 92 pounds or  41.73 kilograms | | 110 pounds or  49.89 kilograms | | 140 pounds or  63.50 kilograms | |   **Test Results 3**: Opus Consultancy Reference No P/7B/97  Tension tests from the center of concrete slab (35Mpa) using Rebar Grade 500  **Set 1:** 12mm Diameter Rebar Grade 500 (Rb12)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Imbedded Item (mm) | Hole Diameter (mm) | Hole Depth (mm) | Average load at failure  (kN) | Average load at failure  (psi) | Failure Mode | | Rb12 | 15 | 100 | 16.7 | 2,423 | Bond Failure | | 16 | 20.8 | 3,018 | Bond Failure | | 19 | 71.8 | 10,420 | Bar Failure |   \* The above table indicates that as the diameter of the hole was increased. The average loading on Rockite increases due to the expansion qualities of Rockite.  **Set 2:** 12mm Diameter Rebar Grade 500 (Rb12)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Imbedded Item (mm) | Hole Diameter (mm) | Hole Depth (mm) | Applied load at failure(kN) | Applied load at failure(psi) | Mode of failure | | Rb12 Reidbar | 19 | 100 | 71.7 | 10,406 | Bar Failure | | 72.2 | 10,478 | | 71.6 | 10,391 |   **Set 3:** 12mm Diameter Rebar Grade 500 (Rb12)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Imbedded Item (mm) | Hole diameter (mm) | Hole Depth (mm) | Applied load at failure (kN) | Applied load at failure(psi) | Mode of failure | | Rb 12 Reidbar | 19 | 50 | 16.5 | 2,394 | Pulled bar out of grout | | 17.1 | 2,481 | | 15.8 | 2,239 |   **Set 4:** 16mm Diameter Rebar Grade 500 (Rb16)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Imbedded Item (mm) | Hole Diameter (mm) | Hole Depth (mm) | Average load at failure (kN) | Average load at failure(psi) | Mode of Failure | | Rb16  Reidbar | 20 | 100 | 30.2 | 4,383 | Failure in the Rockite and damage to the concrete | | 26.8 | 3,889 | | 29.7 | 4,310 | | 28 | 100 | 14,513 | No failure in the Rockite at the applied load **\*** |   \* As Rockite held firm we were unable to determine the failure point. The maximum load bearing of 100kN is the maximum for the testing equipment. This test equates to, for this size bar approximately 500Mpa  **Set 5:** 20mm Diameter Rebar Grade 500 (Rb20)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Imbedded Item (mm) | Hole Diameter (mm) | Hole Depth (mm) | Average load at failure (kN) | Average load at failure (psi) | Mode of Failure | | Rb20 Reidbar | 28 | 100 | 57.3 | 8,316 | Concrete Failure | | 56.9 | 8,258 | | 48.2 **\*** |  |  |   **\*** This test resulted in the concrete cracking of the slab.  **Set 6: see next page**  **Set 6:**  Mild Steel Bolts (M12)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Imbedded Item (mm) | Hole Diameter (mm) | Hole Depth (mm) | Average load at failure (kN) | Average load at failure (psi) | Mode of failure | | M12  Mild Steel Bolt | 30 | 50 | 36.6 | 5,312 | Pulled bolt out of grout | | 40.0 | 5,805 | | 37.2 | 5,399 | | 100 | 50.9 | 7,387 | Bolt Failure | | 51.8 | 7,518 | | 51.6 | 7,489 |   **Test Results 4:** Opus Consultancy Reference No 03/420/001  **Tension tests at nominally 45mm from face edge with mild steel anchors and Rebar Grade 500**  **Set 1:**  10 mm Diameter Reid Anchors (mild Steel)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Anchor Diameter (mm) | Hole Diameter (mm) | Hole Depth (mm) | Applied load at failure (kN) | Applied load at failure (psi) | Failure Mode | | 10 | 14 | 100 | 33.2 | 4,818 | Bond failure with very shallow concrete cone | | 16 | 34.8 | 5,050 | Bar Failure | | 18 | 34.9 | 5,065 |   **Set 2:** 12mm Diameter Reid Anchors (mild steel)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Anchor Diameter (mm) | Hole Diameter (mm) | Hole Depth (mm) | Applied load at failure (kN) | Applied load at failure (psi) | Failure Mode | | 12 | 16 | 100 | 44.8 | 6,502 | Concrete Failure | | 18 | 41.9 | 6,081 | | 20 | 48.7 | 7,068 | Bar Failure | | 16 | 120 | 48.2 | 6,995 | Bar Failure | | 18 | 47.6 | 6,908 | Concrete Failure | | 20 | 48.0 | 6,966 |   **Set 3:** 16mm diameter Reid Anchors (mild steel)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Anchor Diameter (mm) | Hole Diameter (mm) | Hole Depth (mm) | Applied load at failure (kN) | Applied load at failure (psi) | Failure Mode | | 16 | 20 | 110 | 84.6 | 12,191 | Concrete | | 20 | 120 | 88.6 | 12,859 | Bar Failure | | 24 | 100 | 68.9 | 10,000 | Concrete Failure | | 24 | 110 | 88.1 | 12,786 | Bar Failure | | 24 | 120 | 77.4 | 11,233 | Concrete Failure |   **Set 4:** 12mm Diameter Rebar Grade 500 (Rb12)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Anchor Diameter (mm) | Hole Diameter (mm) | Hole Depth (mm) | Applied load at failure (kN) | Applied load at failure (psi) | Failure Mode | | RB12 | 16 | 100 | 68.6 | 9,956 | Bond failure with very shallow concrete cone | | 18 | 80.6 | 11,698 | Bar Failure | | 20 | 79.8 | 11,582 | | 16 | 120 | 80.4 | 11,669 | | 18 | 80.2 | 11,640 | | 20 | 80.4 | 11,669 |   **Test Results 5:** Strain Bearing Ability. USA Test Results  The compound shall produce a setting with an average strain bearing ability for each respective bolt and opening size, as shown in the following chart.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **Diameter of Mild Steel Bolt**  **\*** | | **Hole Diameter \*\*** | | Hole Depth | | **Average strain Bearing Ability \*\*\*** | | | **mm** | **inches** | **mm** | **inches** | **mm** | **inches** | **Kilogram** | **Pounds** | | 9.52 | 3/8 | 31.4 | 1 ¼ | 76.2 | 3 | 3,900 | 8,600 | | 12.7 | 1/2 | 44.4 | 1 ¾ | 101.6 | 4 | 7,030 | 15,500 | | 19.05 | 3/4 | 63.5 | 2 ½ | 152.4 | 6 | 17,100 | 37,700 | | 25.4 | 1 | 88.9 | 3 ½ | 203.2 | 8 | 26,762 | 59,000 | | 31.75 | 1 ¼ | 107.9 | 4 ¼ | 304.8 | 12 | 42,729 | 94,200 |   \* All bolts shall be equipped with a washer large enough to fit the diameter of the opening with only enough tolerance so that the washer will be free to reach and rest snugly against the head of the bolt at the bottom of the opening.  \*\* Depths shown are based opening drilled in sound concrete having a compressive strength of 24.8 Mpa/3600psi. In the case of weaker concrete, the depth shall be increased to provide a greater purchase to the concrete slab. This minimizes the danger of failure due to fracture of the concrete when subjected to extreme strains.  \*\*\* Data determined by tests in which the strains recorded were limited to stresses sufficient to rupture mild steel bolts of each representative diameter. In no case was the setting injured. | |

**Quantity Calculations**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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Of  Drilled Opening | Depth if Drilled opening | | | | | | | | | | | | | | | | | | 2" | | 3" | | 4" | | 5" | | 6" | | 8" | | 10" | | 12" | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | 1/4" | 1/2" | 0.25 | oz | 0.40 | oz | 0.50 | oz | 0.75 | oz | 1.00 | oz | 1.25 | oz | 1.50 | oz | 1.50 | oz | |  | 3/4' | 0.70 | oz | 1.00 | oz | 1.50 | oz | 2.00 | oz | 3.00 | oz | 3.50 | oz | 4.00 | oz | 4.00 | oz | | |  | | --- | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | 3/8" | 5/8" | 0.35 | oz | 0.50 | oz | 0.75 | oz | 1.00 | oz | 1.50 | oz | 1.70 | oz | 2.00 | oz | 2.00 | oz | |  | 3/4" | 0.50 | oz | 0.80 | oz | 1.00 | oz | 1.75 | oz | 2.25 | oz | 2.75 | oz | 3.25 | oz | 3.25 | oz | |  | 1" | 1.00 | oz | 1.50 | oz | 2.00 | oz | 3.00 | oz | 4.00 | oz | 5.00 | oz | 6.00 | oz | 6.00 | oz | |  | 1 1/4" | 1.75 | oz | 2.75 | oz | 3.75 | oz | 5.50 | oz | 7.50 | oz | 8.50 | oz | 10.00 | oz | 10.00 | oz | | |  | | --- | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | 1/2" | 3/4" | 0.40 | oz | 0.60 | oz | 0.90 | oz | 1.25 | oz | 1.75 | oz | 2.00 | oz | 2.50 | oz | 2.50 | oz | |  | 1" | 1.00 | oz | 1.50 | oz | 2.00 | oz | 3.00 | oz | 4.00 | oz | 5.00 | oz | 6.00 | oz | 6.00 | oz | |  | 1 1/4" | 1.75 | oz | 2.50 | oz | 3.50 | oz | 6.00 | oz | 7.00 | oz | 9.00 | oz | 10.50 | oz | 10.50 | oz | |  | 1 3/4" | 4.00 | oz | 6.00 | oz | 8.00 | oz | 12.00 | oz | 1.00 | lb | 1.25 | lb | 1.50 | lb | 1.50 | lb | | |  | | --- | |  | |  |  | oz |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | 5/8" | 1" | 0.80 | oz | 1.25 | oz | 1.75 | oz | 2.50 | oz | 3.50 | oz | 1.25 | oz | 5.00 | oz | 5.00 | oz | |  | 1 1/4" | 1.50 | oz | 2.25 | oz | 3.25 | oz | 4.75 | oz | 6.50 | oz | 8.00 | oz | 9.50 | oz | 9.50 | oz | |  | 1 3/4" | 4.00 | oz | 5.75 | oz | 8.00 | oz | 11.00 | oz | 1.00 | oz | 1.25 | lb | 1.40 | lb | 1.40 | lb | |  | 2" | 4.75 | oz | 7.00 | oz | 9.50 | oz | 13.75 | oz | 1.20 | oz | 1.50 | lb | 1.70 | lb | 1.70 | lb | | |  | | --- | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | 1" | 0.60 | oz | 1.00 | oz | 1.25 | oz | 2.00 | oz | 2.50 | oz | 3.00 | oz | 4.00 | oz | 4.00 | oz | | 3/4' | 1 1/4" | 1.25 | oz | 2.00 | oz | 2.50 | oz | 4.00 | oz | 5.00 | oz | 6.50 | oz | 8.00 | oz | 8.00 | oz | |  | 1.50 | 2.25 | oz | 3.25 | oz | 4.50 | oz | 6.50 | oz | 9.00 | oz | 11.00 | oz | 13.00 | oz | 13.00 | oz | |  | 2" | 5.00 | oz | 7.00 | oz | 9.50 | oz | 14.00 | oz | 1.25 | lb | 1.50 | lb | 1.75 | lb | 1.75 | lb | |  | 2 1/2" | 7.50 | oz | 11.00 | oz | 15.00 | oz | 1.40 | lb | 1.90 | lb | 2.40 | lb | 2.80 | lb | 2.80 | lb | | |  | | --- | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | 1" | 1.50 | 1.75 | oz | 2.50 | oz | 3.50 | oz | 5.00 | oz | 7.00 | oz | 8.50 | oz | 10.00 | oz | 10.00 | oz | |  | 2" | 4.00 | oz | 6.00 | oz | 8.00 | oz | 12.00 | oz | 1.00 | lb | 1.25 | lb | 1.50 | lb | 1.50 | lb | |  | 2.50 | 7.00 | oz | 10.00 | oz | 14.00 | oz | 1.30 | lb | 1.75 | lb | 2.20 | lb | 2.60 | lb | 2.60 | lb | |  | 3.50 | 15.00 | oz | 1.40 |  | 1.90 |  | 2.75 | lb | 3.75 | lb | 4.60 | lb | 5.60 | lb | 5.60 | lb | | |  | | --- | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | 1 1/4" | 1 1/2" | 1.00 | oz | 1.50 | oz | 2.00 | oz | 3.00 | oz | 4.00 | oz | 5.00 | oz | 6.00 | oz | 6.00 | oz | |  | 2" | 3.50 | oz | 5.00 | oz | 7.00 | oz | 10.00 | oz | 13.00 | oz | 1.00 | lb | 1.20 | lb | 1.20 | lb | |  | 2 1/2" | 6.50 | oz | 10.00 | oz | 13.00 | oz | 1.20 | lb | 1.60 | lb | 2.00 | lb | 2.40 | lb | 2.40 | lb | |  | 3" | 10.00 | oz | 15.00 | oz | 1.25 | lb | 1.90 | lb | 2.40 | lb | 3.10 | lb | 3.80 | lb | 3.80 | lb | |  | 4 1/4" | 1.40 | lb | 2.00 | lb | 2.75 | lb | 4.10 | lb | 5.50 | lb | 6.90 | lb | 8.20 | lb | 8.20 | lb | | |  | | --- | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | 1 1/2" | 2" | 2.25 | oz | 3.50 | oz | 4.50 | oz | 7.00 | oz | 9.40 | oz | 12.00 | oz | 14.50 | oz | 14.50 | oz | |  | 2 1/2" | 5.50 | oz | 8.00 | oz | 11.00 | oz | 1.00 | lb | 1.40 | lb | 1.75 | lb | 2.00 | lb | 2.00 | lb | |  | 3" | 9.00 | oz | 13.00 | oz | 1.10 | oz | 1.70 | lb | 2.25 | lb | 2.80 | lb | 3.40 | lb | 3.40 | lb | |  | 4" | 1.20 | lb | 1.70 | lb | 2.30 | lb | 3.30 | lb | 4.60 | lb | 5.75 | lb | 7.00 | lb | 7.00 | lb | | |  | | --- | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | 2" | 2 1/2" | 3.00 | oz | 4.50 | oz | 6.10 | oz | 9.20 | oz | 12.25 | oz | 15.30 | oz | 1.20 | oz | 1.20 | oz | |  | 3" | 6.50 | oz | 10.00 | oz | 13.00 | oz | 1.30 | lb | 1.60 | lb | 2.00 | lb | 2.50 | lb | 2.50 | lb | |  | 4" | 1.00 | lb | 1.50 | lb | 2.00 | lb | 3.00 | lb | 4.00 | lb | 5.00 | lb | 6.00 | lb | 6.00 | lb | | |  | | --- | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | 2 1/2" | 3" | 3.50 | oz | 5.50 | oz | 7.00 | oz | 11.00 | oz | 14.00 | oz | 1.20 | lb | 1.40 | lb | 1.40 | lb | |  | 4" | 13.00 | oz | 1.25 | lb | 1.70 | lb | 2.50 | lb | 3.30 | lb | 4.25 | lb | 5.00 | lb | 5.00 | lb | | |  | | --- | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | 3" | 4" | 10.00 | oz | 14.00 | oz | 1.30 | lb | 1.75 | lb | 2.40 | lb | 3.00 | lb | 3.70 | lb | 3.70 | lb | |



Metric Quantity Calculations

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Dia. Of  Drilled Opening | Depth if Drilled opening | | | | | | | | | | | | | |
|
| 50mm | | 75mm | | 100mm | | 150mm | | 200mm | | 250mm | | 300mm | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6mm | 12mm | 7 | gm | 11.4 | gm | 14.3 | gm | 21.4 | gm | 28.5 | gm | 1.25 | gm | 42.8 | gm |
|  | 20mm | 20 | gm | 28.5 | gm | 42.8 | gm | 57.1 | gm | 85.6 | gm | 3.50 | gm | 114.2 | gm |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 16mm | 10 | gm | 14.3 | gm | 21.4 | gm | 28.5 | gm | 42.8 | gm | 1.70 | gm | 57.1 | gm |
| 10mm | 18mm | 14 | gm | 22.8 | gm | 28.5 | gm | 49.9 | gm | 64.2 | gm | 2.75 | gm | 92.8 | gm |
|  | 25mm | 29 | gm | 42.8 | gm | 57.1 | gm | 85.6 | gm | 114.2 | gm | 5.00 | gm | 171.2 | gm |
|  | 32mm | 50 | gm | 78.5 | gm | 107.0 | gm | 157.0 | gm | 214.1 | gm | 8.50 | gm | 285.4 | gm |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 18mm | 11 | gm | 17.1 | gm | 25.7 | gm | 35.7 | gm | 49.9 | gm | 2.00 | gm | 71.4 | gm |
| 12mm | 25mm | 29 | gm | 42.8 | gm | 57.1 | gm | 85.6 | gm | 114.2 | gm | 5.00 | gm | 171.2 | gm |
|  | 32mm | 50 | gm | 71.4 | gm | 99.9 | gm | 171.2 | gm | 199.8 | gm | 9.00 | gm | 299.7 | gm |
|  | 45mm | 114 | gm | 171.2 | gm | 228.3 | gm | 342.5 | gm | 456.6 | gm | 1.25 | gm | 684.9 | gm |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 25mm | 23 | gm | 35.7 | gm | 49.9 | gm | 71.4 | gm | 99.9 | gm | 1.25 | gm | 142.7 | gm |
| 16mm | 32mm | 43 | gm | 64.2 | gm | 92.8 | gm | 135.6 | gm | 185.5 | gm | 8.00 | gm | 271.1 | gm |
|  | 45mm | 114 | gm | 164.1 | gm | 228.3 | gm | 313.9 | gm | 456.6 | gm | 1.25 | gm | 639.2 | gm |
|  | 50mm | 136 | gm | 199.8 | gm | 271.1 | gm | 392.4 | gm | 547.9 | gm | 1.50 | gm | 776.2 | gm |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 20mm | 25mm | 17 | gm | 28.5 | gm | 35.7 | gm | 57.1 | gm | 71.4 | gm | 3.00 | gm | 114.2 | gm |
|  | 32mm | 36 | gm | 57.1 | gm | 71.4 | gm | 114.2 | gm | 142.7 | gm | 6.50 | gm | 228.3 | gm |
| 20mm | 38mm | 64 | gm | 92.8 | gm | 128.4 | gm | 185.5 | gm | 256.9 | gm | 11.00 | gm | 371.0 | gm |
|  | 50mm | 143 | gm | 199.8 | gm | 271.1 | gm | 399.6 | gm | 570.7 | gm | 1.50 | gm | 799.0 | gm |
|  | 65mm | 214 | gm | 313.9 | gm | 428.1 | gm | 639.2 | gm | 867.5 | gm | 2.40 | gm | 1,278.5 | gm |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 38mm | 50 | gm | 71.4 | gm | 99.9 | gm | 142.7 | gm | 199.8 | gm | 8.50 | gm | 285.4 | gm |
| 25mm | 50mm | 114 | gm | 171.2 | gm | 228.3 | gm | 342.5 | gm | 456.6 | gm | 1.25 | gm | 684.9 | gm |
|  | 65mm | 200 | gm | 285.4 | gm | 399.6 | gm | 593.6 | gm | 799.0 | gm | 2.20 | gm | 1,187.1 | gm |
|  | 87mm | 428 | gm | 639.2 | gm | 867.5 | gm | 1,255.6 | gm | 1,712.2 | gm | 4.60 | gm | 2,556.9 | gm |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 38mm | 29 | gm | 42.8 | gm | 57.1 | gm | 85.6 | gm | 114.2 | gm | 5.00 | gm | 171.2 | gm |
| 32mm | 50mm | 100 | gm | 142.7 | gm | 199.8 | gm | 285.4 | gm | 371.0 | gm | 1.00 | gm | 547.9 | gm |
|  | 65mm | 186 | gm | 285.4 | gm | 371.0 | gm | 547.9 | gm | 730.5 | gm | 2.00 | gm | 1,095.8 | gm |
|  | 75mm | 285 | gm | 428.1 | gm | 570.7 | gm | 867.5 | gm | 1,095.8 | gm | 3.10 | gm | 1,735.0 | gm |
|  | 107mm | 639 | gm | 913.2 | gm | 1,255.6 | gm | 1,872.0 | gm | 2,511.2 | gm | 6.90 | gm | 3,744.0 | gm |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 50mm | 64 | gm | 99.9 | gm | 128.4 | gm | 199.8 | gm | 268.3 | gm | 12.00 | gm | 413.8 | gm |
| 38mm | 65mm | 157 | gm | 228.3 | gm | 313.9 | gm | 456.6 | gm | 639.2 | gm | 1.75 | gm | 913.2 | gm |
|  | 75mm | 257 | gm | 371.0 | gm | 502.2 | gm | 776.2 | gm | 1,027.3 | gm | 2.80 | gm | 1,552.4 | gm |
|  | 100mm | 548 | gm | 776.2 | gm | 1,050.2 | gm | 1,506.7 | gm | 2,100.3 | gm | 5.75 | gm | 3,196.1 | gm |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 65mm | 86 | gm | 128.4 | gm | 174.1 | gm | 262.6 | gm | 349.6 | gm | 15.30 | gm | 547.9 | gm |
| 50mm | 75mm | 186 | gm | 285.4 | gm | 371.0 | gm | 593.6 | gm | 730.5 | gm | 2.00 | gm | 1,141.5 | gm |
|  | 100mm | 2 | gm | 684.9 | gm | 913.2 | gm | 1,369.8 | gm | 1,826.4 | gm | 5.00 | gm | 2,739.5 | gm |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 65mm | 75mm | 100 | gm | 157.0 | gm | 199.8 | gm | 313.9 | gm | 399.6 | gm | 1.20 | gm | 639.2 | gm |
|  | 100mm | 371 | gm | 570.7 | gm | 776.2 | gm | 1,141.5 | gm | 1,506.7 | gm | 4.25 | gm | 2,283.0 | gm |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 75mm | 100mm | 285 | gm | 399.6 | gm | 593.6 | gm | 799.0 | gm | 1,095.8 | gm | 3.00 | gm | 1,689.4 | gm |