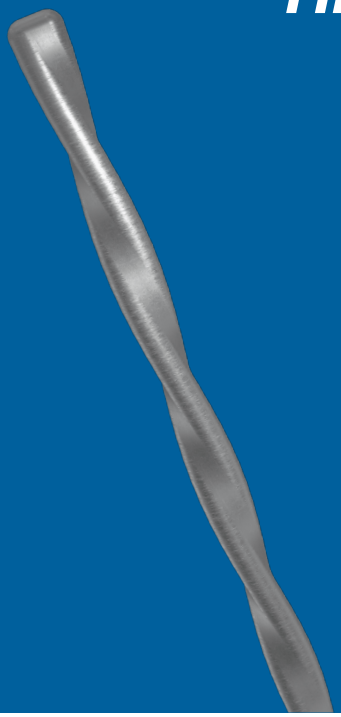
CONCRETE REINFORCEMENT TECHNOLOGY

HELIX® 5-25 MICRO REBAR®



The unique twisted design of Helix® Micro Rebar® allows for efficient tensile stress re-distribution within the concrete matrix prior to concrete cracking. The result is a significant increase in the concrete's strain capacity and pre-crack properties. Unlike rebar and other forms of reinforcement, Helix Micro Rebar provides proactive reinforcement, which engages the concrete before large cracks form.

APPLICATIONS

- Slab on Grade
- Slab on Composite Metal Deck
- Foundation Walls
- Above Grade Walls
- ICF Walls
- Footings
- Insulated Tilt Walls
- Precast
- Pavements

CODE EVALUATION REPORTS

- IAPMO ER-279
- ICC-ES ESR-3949
- ICC-ES EER-3949

GEOMETRY

- 11,500 pieces/lb (25,307 pieces/kg)
- Length: 1 in (25 mm)
- Diameter: 0.02 in (0.50 mm)

PROPERTIES

- Tensile Strength: 246.5 ksi (1700 MPa) minimum
- Material: Carbon Steel Wire

COATING

- Coated for corrosion protection

DOSING INSTRUCTIONS

Mixing should be done in accordance with ASTM C94 and the mixing instructions below. The quantity of Helix Micro Rebar™ added to the mix should be noted on the batch documentation in accordance with Uniform Evaluation Service ER 279 Section 5.15 and may be verified using the procedure in ER 279 Appendix A if desired.

MIX DESIGN RECOMMENDATIONS

Standard mix design practices (ACI 211.1) are recommended for Helix Micro Rebar-reinforced concrete. A test batch is recommended. Here are some tips and best practices for designing mixes with Helix Micro Rebar:

Compressive Strength and Helix Micro Rebar Dosage

The minimum compressive strength and Helix Micro Rebar dosage must comply with the requirements in ER 279 or ICC-ES ESR-3949.

Mix Proportions

Attention should be given to providing adequate paste to coat the Helix Micro Rebar in the mix. This becomes more important as the dosage increases. We recommend submitting your mix to our engineering department (sales@helixsteel.com) prior to your first batch to obtain recommendations for optimizing your mix.

Regarding Slump and Workability

Helix Micro Rebar workability (flow with vibration) is not directly related to slump. Slump should be adjusted with water reducers/plastizers as needed for placement. Water should never be added to adjust slump or workability.

MADE IN THE USA
MANUFACTURED IN MICHIGAN

MIXING INSTRUCTIONS

To prevent Helix Micro Rebar Reinforcement from clumping, follow the procedures below:

Ready Mix Plants (Dry) - Truck Mixer

1. Add all Helix 525™ Reinforcement to the truck drum. Typically this is done by conveyor or by hand, placing the entire contents of the box into the drum while it is at idle speed. Dumping boxes by hand can be done from a slump check stand if available.
2. Drive the truck into the plant.
3. Once truck is in position under the chute, increase the drum to full charging speed and add a minimum of 50% of the batch water to the truck (more than 50% is okay).
4. Allow the Helix Micro Rebar and water to mix for no less than 45 seconds while delaying the addition of the remaining materials. *Note: Once the water and Helix Micro Rebar are in the drum and the drum is at charging speed, the drum speed must not decrease until all batching is complete.*
5. Add coarse aggregate, sand, cement and remaining water to the truck and mix in normal manner (60 revolutions minimum).

Ready Mix Plants (Wet) - Central Mix

1. For dosages below 15 lb/yd^3 (9 kg/m^3), follow procedures for "Truck Mixer" above with dry procedures with 7 gallons (27 liters) of water in the drum (instead of the 50% requirement). *Note: Once the water and Helix Micro Rebar are in the drum and the drum is at charging speed, the drum speed must not decrease until all batching is complete.*
2. For higher dosage please use the Site Batching instructions below.

Site Batching into Ready Mix Trucks (Loaded Truck at Construction Site)

1. Set the drum to charging speed.
2. Sift Helix TSMR™ reinforcement through a 2" x 2" (50mm x 50mm) mesh or use a Helix Micro Rebar Dosing Unit (contact Helix Steel to order). The dosing unit breaks up clumps and ensures Helix Micro Rebar goes into the truck at a controlled rate (about one box per minute). When Helix Micro Rebar is added at this stage, it must enter the mixer clump-free.
3. Helix Micro Rebar may collect on residual concrete on the interior surfaces of the hopper. Push the Helix Micro Rebar into the drum avoiding clumps. Rinsing down the hopper or adding a slippery lining, such as PVC sheeting, to the hopper may help avoid these buildups.
4. Mix at charging speed for five minutes (60 revolutions) after Helix Micro Rebar is added.

Pan Mixer / Drum Mixer

1. Set the mixer to the proper speed.
2. Add Helix Micro Rebar at a rate of 45 lb (20 kg) per 45-60 seconds.
3. Helix Micro Rebar should be added with the aggregates.
4. Mix at maximum speed for five minutes after Helix Micro Rebar is added.

Effects on Slump

A slump of 5" (125mm) or higher will facilitate strike off. A slump of less than 5" is not recommended for flatwork as this will prevent surface segregation of the cement and fines from the aggregate and Helix Micro Rebar. Slump should be measured on the initial load and adjustments made with a water reducer or plasticizer, not water.

PUMPING INSTRUCTIONS

Helix Micro Rebar pieces are 1" long and present minimal pumping resistance. A minimum 3" line should be used to pump Helix Micro Rebar-reinforced concrete. Typical slump loss through the pump should be accounted for, but the slump loss is unaffected by the Helix Micro Rebar.

PLACING & FINISHING INSTRUCTIONS

Finishing of Helix Micro Rebar-reinforced concrete does not require any special equipment. It can be finished according to standard, proper finishing procedures (ACI 302.IR), and can be stained and stamped.

Some best practices for placing and finishing concrete with Helix Micro Rebar are presented below:

Screed

A vibrating screed is recommended. Allow the concrete to swell above the grade line in front of the screed so it can fully engage the concrete as it levels the concrete back to grade. This helps to segregate the paste from aggregates and force the Helix Micro Rebar and coarse aggregates below the surface.

Bull Float

A bull float eliminates ridges and fills in voids left by screeding. The importance of the bull float cannot be overstated as the process aids the separation of the cement and fines from the aggregate.

Power Float[1, 2]

A power float, with float pans or float shoes, is critical to break open the concrete surface: large aggregate and Helix Micro Rebar float downwards while cement and fine aggregates are sucked to the surface. A small raised ridge of paste should be visible around the pans. If power floating is not done sufficiently or if it is started too late, both aggregate and Helix Micro Rebar will remain on the surface or just below as segregation could not occur. The same recommendations apply to hand floating.

Trowel[1]

The purpose of troweling is to produce a dense, smooth, hard surface. Troweling is done after the power float. No troweling should ever be done on a surface that has not been power or hand floated.

Pavements or Rough Finishes

The power float and troweling operations may be eliminated or replaced with a broom finish.

1. The power float and troweling operations are typically eliminated for pavements; contact Helix Steel for tips on finishing Helix Micro Rebar reinforced pavement.
2. If high flatness is a requirement, contact Helix Steel for the float procedure.

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