

HELIX[®]

STEEL



Washout Test Instructions

Field quality assurance is critical to the success of a project. The amount of Helix[®] Micro Rebar[™] added must be verified either by inspection or by testing. UES ER-279 (Helix Steel Evaluation Report) requires Washout Testing in accordance with CSA A23.2-16C for certain types of applications. The following are instructions on how to complete this testing and interpret the data in accordance with the requirements of the standard. This document contains an outline of the CSA Washout Test procedure to familiarize the user with the process. The actual procedure available from the CSA (<http://shop.csa.ca/>) should always be used when testing.

Scope

The test method is used to verify the dosage rate of Helix[®] Micro Rebar[™] in plastic concrete.

Summary

A sample of concrete of known volume is washed. Helixes are recuperated using a magnet then dried and weighed.

Apparatus

The testing apparatus shall consist of:

- A scale accurate to 0.05 kg (1 oz)
- A tamping rod
- An air meter bucket of known volume
- A steel strike off bar
- Strainer or wet sieve box
- Rubber Mallet
- Glass or Plate (larger than diameter of bucket)

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Sample

Samples of concrete shall be obtained at around 25%, 50%, and 75% points of discharge. Each sample shall be identified and tested separately.

Procedure

- Fill the air bucket in three layers, rodding each 25 times, tapping side at least 10 times after each layer until no large air bubbles surface.
- Strike off the top of the bucket with the strike-off bar and clean the exterior of the bucket.
- Calculate the net mass of the bucket (mass of bucket full of concrete minus empty bucket) and compute the density of the concrete (net mass / bucket volume).
- Wash the contents of the bucket out over a strainer or sieve fine enough to capture the Helix but large enough to remove the fine aggregates and cement.
- Use a magnet to separate the Helix from the remaining aggregates.
- If immediate/field results are needed, towel dry the Helix® Micro Rebar™ and weigh them. Record mass to nearest gram (0.05 oz). Retain the sample for oven drying.
- Oven-dry the Helix® Micro Rebar™ at 110 C (230 F) for 16 hours and weigh them. Record mass to nearest gram (0.05 oz).

Calculations

The dosage rate of Helix® Micro Rebar™ in kilograms per cubic meter (lb per cubic yard) of concrete in the individual samples shall be calculated by dividing the dry mass of the fibers in kilograms (lb) by the volume of the concrete sample in cubic meters (cubic yards). The reported dosage shall be the average of the three samples.



Verification of Compliance with ER 279

Given the random nature of Helix® Micro Rebar™ and variations in consistency of concrete there is a factor of safety built into all Helix designs to assure enough Helix is provided to meet the design criteria. The computed (or calculated) dosage based on the washout test must be equal to or greater than the minimums presented in Appendix A of the evaluation report (also included below).

Uniform Evaluation Report #279 Appendix A (2015)

Boxes Of Helix Added to 9 yd ³ Truck	Specified Helix Dosage (lb/yd ³)	Minimum Average Helix Dosage (lb/yd ³)
1	5	3.6
2	10	7.9
3	15	12.5
4	20	17.4
5	25	22.4
6	30	27.6
7	35	32.8
8	40	38.0
9	45	43.3
10	50	48.5
11	55	53.7
12	60	58.9
13	65	64.0

Boxes Of Helix Added to 10 yd ³ Truck	Specified Helix Dosage (lb/yd ³)	Minimum Average Helix Dosage (lb/yd ³)
1	4.5	3.3
2	9	7.0
3	13.5	11.1
4	18	15.4
5	22.5	19.9
6	27	24.5
7	31.5	29.1
8	36	33.8
9	40.5	38.5
10	45	43.3
11	49.5	48.0
12	54	52.6
13	58.5	57.3

Table 1 Imperial Unit Limits (9 and 10 yd³ Trucks)

Boxes Of Helix Added to 7 m ³ Truck	Specified Helix Dosage (kg/m ³)	Minimum Average Helix Dosage (kg/m ³)
1	2.9	2.1
2	5.8	4.5
3	8.8	7.2
4	11.7	10.0
5	14.6	12.9
6	17.5	15.9
7	20.5	18.9
8	23.4	22.0
9	26.3	25.0
10	29.2	28.1
11	32.1	31.1
12	35.1	34.2
13	38.0	37.2
14	40.9	40.2

Boxes Of Helix Added to 8 m ³ Truck	Specified Helix Dosage (kg/m ³)	Minimum Average Helix Dosage (kg/m ³)
1	2.6	1.8
2	5.1	4.0
3	7.7	6.3
4	10.2	8.8
5	12.8	11.3
6	15.3	13.9
7	17.9	16.6
8	20.5	19.2
9	23.0	21.9
10	25.6	24.6
11	28.1	27.2
12	30.7	29.9
13	33.2	32.6
14	35.8	35.2

Table 2 Metric Unit Limits (7 and 8 m³ Trucks)

Use only the most current version of ER 279 Appendix A downloadable at www.iapmoes.org.



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