

Update to WWR Tolerance Question from October 2010

Ward Malisch answered this question about welded wire reinforcement (WWR) tolerances in the October 2010 VOICE. Since then the answer has changed. See both the 2010 and the 2017 answers below.

QUESTION: What is the tolerance for deflection in 2.9x2.9, 2.0x2.0, and 1.4x1.4 welded-wire reinforcement (WWR) that is specified to be in the upper one-third of a 6-in.-thick slab-on-ground? The wires are spaced at 6 in. for all three wire sizes. I have chaired up the WWR using 4.5-inch plastic high chairs and placed them at 48 in. on center as recommended by the engineer. In addition to using chairs, I have two additional employees using wire pullers to pull and hold the WWR up while concrete is being placed. Normally we pull the WWR up as we pour without chairs and do an excellent job ensuring the mesh is pulled up while placing. The general contractor has decided that the WWR is deflecting more than ½ in. and wants us to space chairs every 1.5 sq. ft. He says ACI requires a tighter tolerance than ½ in. Putting a chair every 1.5 sq. ft. will cost me an additional \$15,000 dollars for the 240,000 sq. ft. of slab I need to place. The general contractor then told me to put chairs where I would like, saying they will core drill the slab when it's completed. He said if they find the wire mesh 1/6 in. out of the specified depth in the slab, he'll require me to remove and replace the slab at my expense.

2010 ANSWER: You can't be held to any tolerance on WWR location in the slab unless there is a tolerance stated in your specification. Ask the general contractor where he got his information about ACI tolerances for location of WWR. ACI 117-10 is silent on this because the committee knows it's impossible to keep light-gage WWR at or near the specified height above the subgrade or subbase when concrete is placed. Here's a quote from Sections R2.2.1, R2.2.2, and R2.2.3 of ACI 117-10:¹

"Tolerances for fabrication, placement, and lap splices for welded wire reinforcement are not covered by ACI 117 and, if required, should be specified by the Specifier."

2017 ANSWER: ACI 117-10, re-approved in 2015, still has the same language in it and thus the 2010 answer based only on ACI 117 is still correct. However, ACI 301² "Specifications for Structural Concrete" added WWR tolerances in their 2016 version. And ACI 301 is likely cited in your specification. ACI 301 has tolerances based on two groups (A) WWR in slabs on composite deck and slabs-on-ground and (B) WWR in elevated formed slabs, slabs on noncomposite steel deck, and members not covered in (A). The WWR tolerances as shown below are based on wire sizes with the heavier wire sizes, W4.0 or D4.0 or above being controlled by ACI 117 tolerances on nonprestressed reinforcement and lighter wire sizes, less than W4.0 or D4.0, being controlled by a support spacing requirement. ACI 117-10(15) provides a ± ¼ inch and a ± 3/8 inch placement tolerance for slabs 4 in or less or between 4 and 12 inches in thickness, respectively.

ACI 301-16 "Specifications for Structural Concrete" WWR Tolerances		
	Wire Size	
	WWR W4.0 or D4.0 and greater	WWR less than W4.0 or D4.0
(A) WWR in slabs on composite deck and slabs-on-ground	Same as for tolerances in ACI 117 for nonprestressed reinforcement.	Continuous support spacing shall not exceed 12 inches.
(B) WWR in elevated formed slabs, slabs on noncomposite steel deck, and members not covered in (A)	Same as for tolerances in ACI 117 for nonprestressed reinforcement.	Continuous support spacing shall not exceed 12 inches.

References:

1. "Specification for Tolerances for Concrete Construction and Materials and Commentary (ACI 117-10)," American Concrete Institute, Farmington Hills, MI, 2010.
2. "Specifications for Structural Concrete (ACI 301-16)," American Concrete Institute, Farmington Hills, MI, 2010.