

Laser Scanning for F-numbers: A Caution Specification Compliance

American Society of Concrete Contractors (ASCC) organized a study to evaluate laser scanning for F-numbers. The study was conducted on a construction site in Walnut Creek, CA, October 6 and 7, 2018. Eight participants (each comprising one to three individuals) scanned portions of the project, and their measurements were compared against independently obtained reference data. An article on F-numbers will be published in *ACI Concrete International* in the near future. The accuracy of measuring target coordinates with lasers from this study was previously reported in “ASCC 3-D Laser Scanning Study” published in *ACI Concrete International* January 2019.

The study was not successful in getting a reasonable comparison between F-numbers obtained by the Dipstick® and those with laser imaging devices. ASTM E1155-14 permits the use of a laser imaging device to collect F-numbers. Note 3 (shown below) in ASTM E1155 cautions the users that “all project participants” should agree on the exact test apparatus to be used “prior to the application” for contract specification enforcement.

NOTE 3—Since the bias of the results obtained with this test method will vary directly with the accuracy of the particular measurement device employed, all project participants should agree on the exact test apparatus to be used prior to the application of this test method for contract specification enforcement.

At this time, ASCC does not recommend the use of a laser imaging device for specification compliance. In addition, to the study in Walnut Creek, ASCC is collecting F-number measurement correlations between the Dipstick® and laser imaging devices. Table 1 shows some results below. Two operators used different devices and different sample measurement lines so this is an example of reproducibility.

The values within three points are reasonable (highlighted in green), however those that differ by more than three points are not reasonable (highlighted in red). We have not been able to determine at this time, when the two devices will provide a reasonable comparison, and under what conditions, and when they will not. If you have comparison data, please send to bsuprenant@asconline.org. Until such time that we are confident in obtaining a reasonable comparison each time, we are unable to recommend the use of a laser imaging device for F-number specification compliance.

Table 1 Reproducibility of F-numbers with Dipstick and Laser							
Building	Pour	Floor Flatness			Floor Levelness		
		Dipstick	Laser	Difference	Dipstick	Laser	Difference
A	1	48.10	55.90	7.80	32.62	26.20	6.42
A	2	46.73	52.64	5.91	29.17	32.13	2.96
B	1	38.79	40.74	1.95	35.53	33.46	2.07
B	2	34.39	33.85	0.54	30.56	27.67	2.89