



## Aggregate Extension Guidelines for Five Star® Cementitious Grouts

**Five Star Grout, Five Star Fluid Grout 100, Five Star High Strength Grout, and Five Star Hybrid Grout** may be placed up to 6" (150 mm) in depth neat. For placement over 6", clean washed pea gravel meeting ASTM C33 should be used according to the following table:

Estimated Depth of Pour, in (mm)	Unit Size, lb (kg)		Aggregate Extension Percentage*, %	Aggregate Extension Weight, lb (kg)
7 (178)	45 (20.5)		35	15.8 (7.2)
		50 (22.7)		17.5 (8.0)
		55 (25.0)		19.3 (8.8)
9 (230)	45 (20.5)		50	22.5 (10.2)
		50 (22.7)		25.0 (11.4)
		55 (25.0)		27.5 (12.5)
12 (305)	45 (20.5)		60	27.0 (12.3)
		50 (22.7)		30.0 (13.6)
		55 (25.0)		33.0 (15.0)
15 (380)	45 (20.5)		70	31.5 (14.3)
		50 (22.7)		35.0 (15.9)
		55 (25.0)		38.5 (17.5)
18 (455)	45 (20.5)		80	36.0 (16.4)
		50 (22.7)		40.0 (18.2)
		55 (25.0)		44.0 (20.0)

**Five Star Instant Grout** may be placed up to 3" (75mm) in depth neat. For placement over 3" (75mm) clean, washed pea gravel meeting ASTM C33 should be used according to the following table:

Estimated Depth of Pour, in (mm)	Unit Size, lb (kg)	Aggregate Extension Percentage*, %	Aggregate Extension Weight, lb (kg)
4 (101)	55.0 (25.0)	40	22 (10)
6 (150)	55.0 (25.0)	50	27.5 (12.5)
8 (203)	55.0 (25.0)	60	33 (15)
10 (254)	55.0 (25.0)	70	38.5 (17.5)
12 (305)	55.0 (25.0)	80	44.0 (20)

### Five Star Product/Unit Size/Yield

Product	Unit Size, lb (kg)	Yield/Unit, ft <sup>3</sup> (L), max water
Hybrid Grout	45.0 (20.5)	0.39 (11)
Five Star Grout	50.0 (22.7)	0.50 (14.1)
High Strength Grout	50.0 (22.7)	0.40 (11.3)
Fluid Grout 100	55.0 (25.0)	0.50 (14.1)
Instant Grout	55.0 (25.0)	0.44 (12.5)

\*To estimate increase in yield, an aggregate specific gravity of 2.65 is assumed. For every 5.0 lb (2.3 kg) of aggregate extension added, an approximate increase in yield of about 0.03 ft<sup>3</sup> (0.85 L) can be expected compared to neat product mixed at the same water level. Ultimate yield may be influenced by aggregate specific gravity, weather conditions, mixing, placement, and water content. Actual yields attained in the field will vary and should be verified where greater accuracy is required. Yields are at maximum water.

## Mixing

**Mortar Mixer:** When mixing grout in a mortar mixer (stationary barrel mixer), coarse aggregate should be added after initial mixing of 3 to 4 minutes. Add coarse aggregate prior to final water adjustment. Mix until coarse aggregate is uniformly and completely wetted with grout. Add balance of water, or gauge as necessary to desired slump/flow.

**Concrete Mixer:** Concrete Mixer: When mixing grout in a concrete mixer (rotating drum mixer), add water (~80%) and coarse aggregate to the mixer first, with the mixer running, followed by grout. After 3 to 4 minutes of mixing, make final water adjustment as needed up to 100% (maximum water content). Concrete mixers are only acceptable when extending grout with coarse aggregate.

**Five Star Fluid Grout 100** should only be extended when mixed to less than a fluid consistency (flowable).

For extension guidance using **Five Star HTR Grout**, contact Five Star Products' Engineering and Technical Center at 1-800-243-2206.

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