

CODE

25.2.10.1 It shall be permitted to use a clear spacing other than 75 mm provided shotcrete mockup panels are used to demonstrate proper encasement of the reinforcement in accordance with 25.2.7.1

25.3—Standard hooks, seismic hooks, crossties, and minimum inside bend diameters

25.3.1 Standard hooks for the development of deformed bars in tension shall conform to Table 25.3.1.


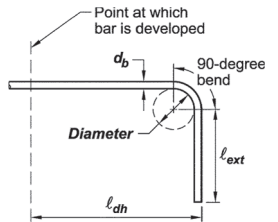
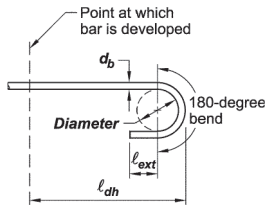
COMMENTARY

the licensed design professional based on shotcrete mockup panels demonstrating that the reinforcement can be encased without voids.

R25.3—Standard hooks, seismic hooks, crossties, and minimum inside bend diameters

R25.3.1 Standard bends in reinforcing bars are described in terms of the inside diameter of bend because the inside bend diameter is easier to measure than the radius of bend. The primary factors affecting the minimum bend diameter are feasibility of bending without breakage and avoidance of crushing the concrete inside the bend.

Table 25.3.1—Standard hook geometry for development of deformed bars in tension

Type of standard hook	Bar size	Minimum inside bend diameter, mm	Straight extension ^[1] ℓ_{ext} , mm	Type of standard hook
90-degree hook	No. 10 through No. 25	$6d_b$	 $12d_b$	
	No. 29 through No. 36	$8d_b$		
	No. 43 through No. 57	$10d_b$		
180-degree hook	No. 10 through No. 25	$6d_b$	Greater of $4d_b$ and 65 mm	
	No. 29 through No. 36	$8d_b$		
	No. 43 through No. 57	$10d_b$		

^[1]A standard hook for deformed bars in tension includes the specific inside bend diameter and straight extension length. It shall be permitted to use a longer straight extension at the end of a hook. A longer extension shall not be considered to increase the anchorage capacity of the hook.

25.3.2 Minimum inside bend diameters for bars used as transverse reinforcement and standard hooks for bars used to anchor stirrups, ties, hoops, and spirals shall conform to Table 25.3.2. Standard hooks shall enclose longitudinal reinforcement.

R25.3.2 Standard stirrup, tie, and hoop hooks are limited to No. 25 bars and smaller, and the 90-degree hook with $6d_b$ extension is further limited to No. 16 bars and smaller, as the result of research showing that larger bar sizes with 90-degree hooks and $6d_b$ extensions tend to spall off the cover concrete when the reinforcement is stressed and the hook straightens.

The minimum $4d_b$ bend for the bar sizes commonly used for stirrups, ties, and hoops is based on accepted industry practice in the United States. Use of a stirrup bar size No. 16 or smaller for the 90-, 135-, or 180-degree standard stirrup hook will permit multiple bending on standard stirrup bending equipment.

Constructibility issues should be considered in selecting anchorage details. In particular, the use of 180-degree hooks