

How CHAENG to choose girth gear material

In the “grinding-calcination-grinding” cement production line, the three core equipment “mill-kiln-mill” all require the component girth gear, so the girth gear quality is directly related to the normal operation of the entire production line. Then how does CHAENG select the girth gear material?



The girth gear requires high hardness and wear resistance of the tooth surface, and sufficient toughness of the tooth core. And the girth gear with complex shape and large diameter usually adopts carbon steel and alloy steel with carbon content of about 1.4% to ensure the quality, so ZG35Mn, ZG35CrMo, ZG42CrMo are often used. The following are the composition of ZG35Mn, ZG35CrMo, ZG42CrMo:

钢号 [Ⓐ]	C [Ⓐ]	Si [Ⓐ]	Mn [Ⓐ]	S [Ⓐ]	P [Ⓐ]	Cr [Ⓐ]	Mo [Ⓐ]	Cu [Ⓐ]	Vi [Ⓐ]
ZG35Mn [Ⓐ]	0.32-0.40 [Ⓐ]	0.60-0.80 [Ⓐ]	1.10-1.40 [Ⓐ]	≤0.04 [Ⓐ]	≤0.04 [Ⓐ]	≤0.30 [Ⓐ]	-- [Ⓐ]	≤0.30 [Ⓐ]	≤0.30 [Ⓐ]
ZG35CrMo [Ⓐ]	0.30-0.40 [Ⓐ]	0.147-0.37 [Ⓐ]	0.50-0.80 [Ⓐ]	≤0.04 [Ⓐ]	≤0.04 [Ⓐ]	0.80-1.10 [Ⓐ]	0.20-0.30 [Ⓐ]	≤0.30 [Ⓐ]	≤0.30 [Ⓐ]
ZG42 CrMo [Ⓐ]	0.38-0.45 [Ⓐ]	0.30-0.50 [Ⓐ]	0.50-0.80 [Ⓐ]	≤0.035 [Ⓐ]	≤0.075 [Ⓐ]	0.80-1.20 [Ⓐ]	0.20-0.30 [Ⓐ]	-- [Ⓐ]	-- [Ⓐ]

The following is a comparison of mechanical properties of ZG35Mn, ZG35CrMo, ZG42CrMo:

Grade	σ_b \MPa [Ⓐ]	σ_s \Mpa [Ⓐ]	ψ % [Ⓐ]	δ_5 % [Ⓐ]	Ak 1\J [Ⓐ]	Hardness \ HBS 2 [Ⓐ]	Heat treatment & Application
ZG35Mn [Ⓐ]	≥570 [Ⓐ]	≥345 [Ⓐ]	≥20 [Ⓐ]	≥12 [Ⓐ]	≥24 [Ⓐ]	163-207 [Ⓐ]	Normalizing + tempering, for friction parts
ZG35CrMo [Ⓐ]	≥580 [Ⓐ]	≥390 [Ⓐ]	≥20 [Ⓐ]	≥12 [Ⓐ]	≥23.5 [Ⓐ]	183-213 [Ⓐ]	Normalizing + tempering, for girth gear, pinion
ZG42 CrMo [Ⓐ]	≥569 [Ⓐ]	≥343 [Ⓐ]	≥20 [Ⓐ]	≥12 [Ⓐ]	— [Ⓐ]	195-130 [Ⓐ]	Normalizing + tempering, for high-load parts, pinion

After comprehensive analysis, ZG35Mn has better repair welding performance, ZG35CrMo has strong corrosion resistance and heat resistance, and ZG42CrMo has outstanding hardness and wear resistance.

CHAENG analyzes the operating environment and characteristics of the girth gear of the rotary kiln and the ball mill, and selected the suitable materials. Moreover, CHAENG has advanced “normalizing + tempering” heat treatment process, so that the wear resistance and the impact resistance of girth gear are greatly enhanced, the service life are greatly extended. CHAENG girth gear has been well received by domestic and foreign customers.

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