

表 15-1-52 齿轮精度公差计算及使用说明

名称及代号	5 级精度的齿轮公差计算式	使用 说明
单个齿距偏差 f_{pt}	$f_{pt} = 0.3(m+0.4\sqrt{d})+4$	<p>①5 级精度的未圆整的计算值乘以 $2^{0.5(Q-5)}$, 即可得到任意精度等级的待求值, Q 为待求值的精度等级数</p> <p>②应用公式时, 参数 m、d 和 b 应取该分段界限值的几何平均值代入。例如: 如果实际模数是 7mm, 分段界限值为 $m=6\text{mm}$ 和 $m=10\text{mm}$, 允许偏差用 $m=\sqrt{6\times 10}=7.746\text{mm}$ 代入计算。如果计算值大于 $10\mu\text{m}$, 圆整到最接近的整数; 如果计算值小于 $10\mu\text{m}$, 圆整到最接近的相差小于 $0.5\mu\text{m}$ 的小数或整数; 如果计算值小于 $5\mu\text{m}$, 圆整到最接近的相差小于 $0.1\mu\text{m}$ 的一位小数或整数</p> <p>③将实测的齿轮偏差值与表 15-1-53~表 15-1-62 中的值比较, 以评定齿轮的精度等级</p> <p>④当齿轮参数不在给定的范围内或供需双方同意时, 可以在公式中代入实际的齿轮参数</p>
齿距累积偏差 F_{pk}	$F_{pk} = f_{pt} + 1.6\sqrt{(k-1)m}$	
齿距累积总偏差 F_p	$F_p = 0.3m + 1.25\sqrt{d} + 7$	
齿廓总偏差 F_α	$F_\alpha = 3.2\sqrt{m} + 0.22\sqrt{d} + 0.7$	
齿廓形状偏差 f_{fa}	$f_{fa} = 2.5\sqrt{m} + 0.17\sqrt{d} + 0.5$	
齿廓倾斜偏差 $f_{H\alpha}$	$f_{H\alpha} = 2\sqrt{m} + 0.14\sqrt{d} + 0.5$	
螺旋线总偏差 F_β	$F_\beta = 0.1\sqrt{d} + 0.63\sqrt{b} + 4.2$	
螺旋线形状偏差 $f_{f\beta}$	$f_{f\beta} = 0.07\sqrt{d} + 0.45\sqrt{b} + 3$	
螺旋线倾斜偏差 $f_{H\beta}$	$f_{H\beta} = 0.07\sqrt{d} + 0.45\sqrt{b} + 3$	
切向综合总偏差 F'_i	$F'_i = F_p + f'_i$	
一齿切向综合偏差 f'_i	$f'_i = K(4.3 + f_{pt} + F_\alpha)$ $= K(9 + 0.3m + 3.2\sqrt{m} + 0.34\sqrt{d})$ <p>式中, 当 $\varepsilon_\gamma < 4$ 时, $K = 0.2\left(\frac{\varepsilon_\gamma + 4}{\varepsilon_\gamma}\right)$; 当 $\varepsilon_\gamma \geq 4$ 时, $K = 0.4$</p> <p>如果产品齿轮与测量齿轮的齿宽不同, 则按较小的齿宽进行 ε_γ 计算</p> <p>如果对轮齿的齿廓或螺旋线进行了较大的修形, 检验时 ε_γ 和 K 会受到较大的影响, 因而在评定测量结果时, 这些因素必须考虑在内, 在这种情况下, 对检验条件和记录曲线的评定另订专门的协议</p>	
径向综合偏差 F''_i	$F''_i = 3.2m_n + 1.01\sqrt{d} + 6.4$	<p>①5 级精度的未圆整的计算值乘以 $2^{0.5(Q-5)}$, 即可得到任意精度等级的待求值, Q 为待求值的精度等级数</p> <p>②应用公式时, 参数 m_n、d 和 b 应取该分段界限值的几何平均值代入。如果计算值大于 $10\mu\text{m}$, 圆整到最接近的整数; 如果计算值小于 $10\mu\text{m}$, 圆整到最接近的相差小于 $0.5\mu\text{m}$ 的小数或整数</p> <p>③采用表 15-1-63~表 15-1-65 中的值评定齿轮精度, 仅用于供需双方有协议时。无协议时, 用模数 m_n 和直径 d 的实际值代入公式计算公差值, 评定齿轮的精度等级</p> <p>④当齿轮参数不在给定的范围内, 使用公式时, 须供需双方协商一致</p>
一齿径向综合偏差 f''_i	$f''_i = 2.96m_n + 0.01\sqrt{d} + 0.8$	
径向跳动公差 F_r	$F_r = 0.8F_p = 0.24m_n + 1.0\sqrt{d} + 5.6$	

表 15-1-53 单个齿距偏差 $\pm f_{pt}$

分度圆直径 d/mm	模数 m/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$\pm f_{\text{pt}}/\mu\text{m}$												
$5 \leq d \leq 20$	$0.5 \leq m \leq 2$	0.8	1.2	1.7	2.3	3.3	4.7	6.5	9.5	13.0	19.0	26.0	37.0	53.0
	$2 < m \leq 3.5$	0.9	1.3	1.8	2.6	3.7	5.0	7.5	10.0	15.0	21.0	29.0	41.0	59.0
$20 < d \leq 50$	$0.5 \leq m \leq 2$	0.9	1.2	1.8	2.5	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0	56.0
	$2 < m \leq 3.5$	1.0	1.4	1.9	2.7	3.9	5.5	7.5	11.0	15.0	22.0	31.0	44.0	62.0
	$3.5 < m \leq 6$	1.1	1.5	2.1	3.0	4.3	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0
	$6 < m \leq 10$	1.2	1.7	2.5	3.5	4.9	7.0	10.0	14.0	20.0	28.0	40.0	56.0	79.0

续表

分度圆直径 d/mm	模数 m/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$\pm f_{pt}/\mu\text{m}$												
$50 < d \leq 125$	$0.5 \leq m \leq 2$	0.9	1.3	1.9	2.7	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	61.0
	$2 < m \leq 3.5$	1.0	1.5	2.1	2.9	4.1	6.0	8.5	12.0	17.0	23.0	33.0	47.0	66.0
	$3.5 < m \leq 6$	1.1	1.6	2.3	3.2	4.6	6.5	9.0	13.0	18.0	26.0	36.0	52.0	73.0
	$6 < m \leq 10$	1.3	1.8	2.6	3.7	5.0	7.5	10.0	15.0	21.0	30.0	42.0	59.0	84.0
	$10 < m \leq 16$	1.6	2.2	3.1	4.4	6.5	9.0	13.0	18.0	25.0	35.0	50.0	71.0	100.0
	$16 < m \leq 25$	2.0	2.8	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	63.0	89.0	125.0
$125 < d \leq 280$	$0.5 \leq m \leq 2$	1.1	1.5	2.1	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	48.0	67.0
	$2 < m \leq 3.5$	1.1	1.6	2.3	3.2	4.6	6.5	9.0	13.0	18.0	26.0	36.0	51.0	73.0
	$3.5 < m \leq 6$	1.2	1.8	2.5	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0	56.0	79.0
	$6 < m \leq 10$	1.4	2.0	2.8	4.0	5.5	8.0	11.0	16.0	23.0	32.0	45.0	64.0	90.0
	$10 < m \leq 16$	1.7	2.4	3.3	4.7	6.5	9.5	13.0	19.0	27.0	38.0	53.0	75.0	107.0
	$16 < m \leq 25$	2.1	2.9	4.1	6.0	8.0	12.0	16.0	23.0	33.0	47.0	66.0	93.0	132.0
	$25 < m \leq 40$	2.7	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	61.0	86.0	121.0	171.0
$280 < d \leq 560$	$0.5 \leq m \leq 2$	1.2	1.7	2.4	3.3	4.7	6.5	9.5	13.0	19.0	27.0	38.0	54.0	76.0
	$2 < m \leq 3.5$	1.3	1.8	2.5	3.6	5.0	7.0	10.0	14.0	20.0	29.0	41.0	57.0	81.0
	$3.5 < m \leq 6$	1.4	1.9	2.7	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	62.0	88.0
	$6 < m \leq 10$	1.5	2.2	3.1	4.4	6.0	8.5	12.0	17.0	25.0	35.0	49.0	70.0	99.0
	$10 < m \leq 16$	1.8	2.5	3.6	5.0	7.0	10.0	14.0	20.0	29.0	41.0	58.0	81.0	115.0
	$16 < m \leq 25$	2.2	3.1	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0	70.0	99.0	140.0
	$25 < m \leq 40$	2.8	4.0	5.5	8.0	11.0	16.0	22.0	32.0	45.0	63.0	90.0	127.0	180.0
	$40 < m \leq 70$	3.9	5.5	8.0	11.0	16.0	22.0	31.0	45.0	63.0	89.0	126.0	178.0	252.0
$560 < d \leq 1000$	$0.5 \leq m \leq 2$	1.3	1.9	2.7	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	61.0	86.0
	$2 < m \leq 3.5$	1.4	2.0	2.9	4.0	5.5	8.0	11.0	16.0	23.0	32.0	46.0	65.0	91.0
	$3.5 < m \leq 6$	1.5	2.2	3.1	4.3	6.0	8.5	12.0	17.0	24.0	35.0	49.0	69.0	98.0
	$6 < m \leq 10$	1.7	2.4	3.4	4.8	7.0	9.5	14.0	19.0	27.0	38.0	54.0	77.0	109.0
	$10 < m \leq 16$	2.0	2.8	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	63.0	89.0	125.0
	$16 < m \leq 25$	2.3	3.3	4.7	6.5	9.5	13.0	19.0	27.0	38.0	53.0	75.0	106.0	150.0
	$25 < m \leq 40$	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	47.0	67.0	95.0	134.0	190.0
	$40 < m \leq 70$	4.1	6.0	8.0	12.0	16.0	23.0	33.0	46.0	65.0	93.0	131.0	185.0	262.0
$1000 < d \leq 1600$	$2 \leq m \leq 3.5$	1.6	2.3	3.2	4.5	6.5	9.0	13.0	18.0	26.0	36.0	51.0	72.0	103.0
	$3.5 < m \leq 6$	1.7	2.4	3.4	4.8	7.0	9.5	14.0	19.0	27.0	39.0	55.0	77.0	109.0
	$6 < m \leq 10$	1.9	2.6	3.7	5.5	7.5	11.0	15.0	21.0	30.0	42.0	60.0	85.0	120.0
	$10 < m \leq 16$	2.1	3.0	4.3	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	97.0	136.0
	$16 < m \leq 25$	2.5	3.6	5.0	7.0	10.0	14.0	20.0	29.0	40.0	57.0	81.0	114.0	161.0
	$25 < m \leq 40$	3.1	4.4	6.5	9.0	13.0	18.0	25.0	36.0	50.0	71.0	100.0	142.0	201.0
	$40 < m \leq 70$	4.3	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	97.0	137.0	193.0	273.0
$1600 < d \leq 2500$	$3.5 \leq m \leq 6$	1.9	2.7	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	61.0	86.0	122.0
	$6 < m \leq 10$	2.1	2.9	4.1	6.0	8.5	12.0	17.0	23.0	33.0	47.0	66.0	94.0	132.0
	$10 < m \leq 16$	2.3	3.3	4.7	6.5	9.5	13.0	19.0	26.0	37.0	53.0	74.0	105.0	149.0
	$16 < m \leq 25$	2.7	3.8	5.5	7.5	11.0	15.0	22.0	31.0	43.0	61.0	87.0	123.0	174.0
	$25 < m \leq 40$	3.3	4.7	6.5	9.5	13.0	19.0	27.0	38.0	53.0	75.0	107.0	151.0	213.0
	$40 < m \leq 70$	4.5	6.5	9.0	13.0	18.0	25.0	36.0	50.0	71.0	101.0	143.0	202.0	286.0
$2500 < d \leq 4000$	$6 \leq m \leq 10$	2.3	3.3	4.6	6.5	9.0	13.0	18.0	26.0	37.0	52.0	74.0	105.0	148.0
	$10 < m \leq 16$	2.6	3.6	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0	82.0	116.0	165.0
	$16 < m \leq 25$	3.0	4.2	6.0	8.5	12.0	17.0	24.0	33.0	47.0	67.0	95.0	134.0	189.0
	$25 < m \leq 40$	3.6	5.0	7.0	10.0	14.0	20.0	29.0	40.0	57.0	81.0	114.0	162.0	229.0
	$40 < m \leq 70$	4.7	6.5	9.5	13.0	19.0	27.0	38.0	53.0	75.0	106.0	151.0	213.0	301.0

续表

分度圆直径 d/mm	模数 m/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$\pm f_{pt}/\mu\text{m}$												
$4000 < d \leq 6000$	$6 \leq m \leq 10$	2.6	3.7	5.0	7.5	10.0	15.0	21.0	29.0	42.0	59.0	83.0	118.0	167.0
	$10 < m \leq 16$	2.9	4.0	5.5	8.0	11.0	16.0	23.0	32.0	46.0	65.0	92.0	130.0	183.0
	$16 < m \leq 25$	3.3	4.6	6.5	9.0	13.0	18.0	26.0	37.0	52.0	74.0	104.0	147.0	208.0
	$25 < m \leq 40$	3.9	5.5	7.5	11.0	15.0	22.0	31.0	44.0	62.0	88.0	124.0	175.0	248.0
	$40 < m \leq 70$	5.0	7.0	10.0	14.0	20.0	28.0	40.0	57.0	80.0	113.0	160.0	226.0	320.0
$6000 < d \leq 8000$	$10 \leq m \leq 16$	3.1	4.4	6.5	9.0	13.0	18.0	25.0	36.0	50.0	71.0	101.0	142.0	201.0
	$16 < m \leq 25$	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0	57.0	80.0	113.0	160.0	226.0
	$25 < m \leq 40$	4.1	6.0	8.5	12.0	17.0	23.0	33.0	47.0	66.0	94.0	133.0	188.0	266.0
	$40 < m \leq 70$	5.5	7.5	11.0	15.0	21.0	30.0	42.0	60.0	84.0	119.0	169.0	239.0	338.0
$8000 < d \leq 10000$	$10 \leq m \leq 16$	3.4	4.8	7.0	9.5	14.0	19.0	27.0	38.0	54.0	77.0	108.0	153.0	217.0
	$16 < m \leq 25$	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	60.0	85.0	121.0	171.0	242.0
	$25 < m \leq 40$	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0	70.0	99.0	140.0	199.0	281.0
	$40 < m \leq 70$	5.5	8.0	11.0	16.0	22.0	31.0	44.0	62.0	88.0	125.0	177.0	250.0	353.0

表 15-1-54

齿距累积总偏差 F_p

分度圆直径 d/mm	模数 m/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$F_p/\mu\text{m}$												
$5 \leq d \leq 20$	$0.5 \leq m \leq 2$	2.0	2.8	4.0	5.5	8.0	11.0	16.0	23.0	32.0	45.0	64.0	90.0	127.0
	$2 < m \leq 3.5$	2.1	2.9	4.2	6.0	8.5	12.0	17.0	23.0	33.0	47.0	66.0	94.0	133.0
$20 < d \leq 50$	$0.5 \leq m \leq 2$	2.5	3.6	5.0	7.0	10.0	14.0	20.0	29.0	41.0	57.0	81.0	115.0	162.0
	$2 < m \leq 3.5$	2.6	3.7	5.0	7.5	10.0	15.0	21.0	30.0	42.0	59.0	84.0	119.0	168.0
	$3.5 < m \leq 6$	2.7	3.9	5.5	7.5	11.0	15.0	22.0	31.0	44.0	62.0	87.0	123.0	174.0
	$6 < m \leq 10$	2.9	4.1	6.0	8.0	12.0	16.0	23.0	33.0	46.0	65.0	93.0	131.0	185.0
$50 < d \leq 125$	$0.5 \leq m \leq 2$	3.3	4.6	6.5	9.0	13.0	18.0	26.0	37.0	52.0	74.0	104.0	147.0	208.0
	$2 < m \leq 3.5$	3.3	4.7	6.5	9.5	13.0	19.0	27.0	38.0	53.0	76.0	107.0	151.0	214.0
	$3.5 < m \leq 6$	3.4	4.9	7.0	9.5	14.0	19.0	28.0	39.0	55.0	78.0	110.0	156.0	220.0
	$6 < m \leq 10$	3.6	5.0	7.0	10.0	14.0	20.0	29.0	41.0	58.0	82.0	116.0	164.0	231.0
	$10 < m \leq 16$	3.9	5.5	7.5	11.0	15.0	22.0	31.0	44.0	62.0	88.0	124.0	175.0	248.0
	$16 < m \leq 25$	4.3	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	136.0	193.0	273.0
$125 < d \leq 280$	$0.5 \leq m \leq 2$	4.3	6.0	8.5	12.0	17.0	24.0	35.0	49.0	69.0	98.0	138.0	195.0	276.0
	$2 < m \leq 3.5$	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0	70.0	100.0	141.0	199.0	282.0
	$3.5 < m \leq 6$	4.5	6.5	9.0	13.0	18.0	25.0	36.0	51.0	72.0	102.0	144.0	204.0	288.0
	$6 < m \leq 10$	4.7	6.5	9.5	13.0	19.0	26.0	37.0	53.0	75.0	106.0	149.0	211.0	299.0
	$10 < m \leq 16$	4.9	7.0	10.0	14.0	20.0	28.0	39.0	56.0	79.0	112.0	158.0	223.0	316.0
	$16 < m \leq 25$	5.5	7.5	11.0	15.0	21.0	30.0	43.0	60.0	85.0	120.0	170.0	241.0	341.0
	$25 < m \leq 40$	6.0	8.5	12.0	17.0	24.0	34.0	47.0	67.0	95.0	134.0	190.0	269.0	380.0
$280 < d \leq 560$	$0.5 \leq m \leq 2$	5.5	8.0	11.0	16.0	23.0	32.0	46.0	64.0	91.0	129.0	182.0	257.0	364.0
	$2 < m \leq 3.5$	6.0	8.0	12.0	16.0	23.0	33.0	46.0	65.0	92.0	131.0	185.0	261.0	370.0
	$3.5 < m \leq 6$	6.0	8.5	12.0	17.0	24.0	33.0	47.0	66.0	94.0	133.0	188.0	266.0	376.0
	$6 < m \leq 10$	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	97.0	137.0	193.0	274.0	387.0
	$10 < m \leq 16$	6.5	9.0	13.0	18.0	25.0	36.0	50.0	71.0	101.0	143.0	202.0	285.0	404.0
	$16 < m \leq 25$	6.5	9.5	13.0	19.0	27.0	38.0	54.0	76.0	107.0	151.0	214.0	303.0	428.0
	$25 < m \leq 40$	7.5	10.0	15.0	21.0	29.0	41.0	58.0	83.0	117.0	165.0	234.0	331.0	468.0
	$40 < m \leq 70$	8.5	12.0	17.0	24.0	34.0	48.0	68.0	95.0	135.0	191.0	270.0	382.0	540.0

续表

分度圆直径 d/mm	模数 m/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$F_p/\mu\text{m}$												
$560 < d \leq 1000$	$0.5 \leq m \leq 2$	7.5	10.0	15.0	21.0	29.0	41.0	59.0	83.0	117.0	166.0	235.0	332.0	469.0
	$2 < m \leq 3.5$	7.5	10.0	15.0	21.0	30.0	42.0	59.0	84.0	119.0	168.0	238.0	336.0	475.0
	$3.5 < m \leq 6$	7.5	11.0	15.0	21.0	30.0	43.0	60.0	85.0	120.0	170.0	241.0	341.0	482.0
	$6 < m \leq 10$	7.5	11.0	15.0	22.0	31.0	44.0	62.0	87.0	123.0	174.0	246.0	348.0	492.0
	$10 < m \leq 16$	8.0	11.0	16.0	22.0	32.0	45.0	64.0	90.0	127.0	180.0	254.0	360.0	509.0
	$16 < m \leq 25$	8.5	12.0	17.0	24.0	33.0	47.0	67.0	94.0	133.0	189.0	267.0	378.0	534.0
	$25 < m \leq 40$	9.0	13.0	18.0	25.0	36.0	51.0	72.0	101.0	143.0	203.0	287.0	405.0	573.0
	$40 < m \leq 70$	10.0	14.0	20.0	29.0	40.0	57.0	81.0	114.0	161.0	228.0	323.0	457.0	646.0
$1000 < d \leq 1600$	$2 \leq m \leq 3.5$	9.0	13.0	18.0	26.0	37.0	52.0	74.0	105.0	148.0	209.0	296.0	418.0	591.0
	$3.5 < m \leq 6$	9.5	13.0	19.0	26.0	37.0	53.0	75.0	106.0	149.0	211.0	299.0	423.0	598.0
	$6 < m \leq 10$	9.5	13.0	19.0	27.0	38.0	54.0	76.0	108.0	152.0	215.0	304.0	430.0	608.0
	$10 < m \leq 16$	10.0	14.0	20.0	28.0	39.0	55.0	78.0	111.0	156.0	221.0	313.0	442.0	625.0
	$16 < m \leq 25$	10.0	14.0	20.0	29.0	41.0	57.0	81.0	115.0	163.0	230.0	325.0	460.0	650.0
	$25 < m \leq 40$	11.0	15.0	22.0	30.0	43.0	61.0	86.0	122.0	172.0	244.0	345.0	488.0	690.0
	$40 < m \leq 70$	12.0	17.0	24.0	34.0	48.0	67.0	95.0	135.0	190.0	269.0	381.0	539.0	762.0
$1600 < d \leq 2500$	$3.5 \leq m \leq 6$	11.0	16.0	23.0	32.0	45.0	64.0	91.0	129.0	182.0	257.0	364.0	514.0	727.0
	$6 < m \leq 10$	12.0	16.0	23.0	33.0	46.0	65.0	92.0	130.0	184.0	261.0	369.0	522.0	738.0
	$10 < m \leq 16$	12.0	17.0	24.0	33.0	47.0	67.0	94.0	133.0	189.0	267.0	377.0	534.0	755.0
	$16 < m \leq 25$	12.0	17.0	24.0	34.0	49.0	69.0	97.0	138.0	195.0	276.0	390.0	551.0	780.0
	$25 < m \leq 40$	13.0	18.0	26.0	36.0	51.0	72.0	102.0	145.0	205.0	290.0	409.0	579.0	819.0
	$40 < m \leq 70$	14.0	20.0	28.0	39.0	56.0	79.0	111.0	158.0	223.0	315.0	446.0	603.0	891.0
$2500 < d \leq 4000$	$6 \leq m \leq 10$	14.0	20.0	28.0	40.0	56.0	80.0	113.0	159.0	225.0	318.0	450.0	637.0	901.0
	$10 < m \leq 16$	14.0	20.0	29.0	41.0	57.0	81.0	115.0	162.0	229.0	324.0	459.0	649.0	917.0
	$16 < m \leq 25$	15.0	21.0	29.0	42.0	59.0	83.0	118.0	167.0	236.0	333.0	471.0	666.0	942.0
	$25 < m \leq 40$	15.0	22.0	31.0	43.0	61.0	87.0	123.0	174.0	245.0	347.0	491.0	694.0	982.0
	$40 < m \leq 70$	16.0	23.0	33.0	47.0	66.0	93.0	132.0	186.0	264.0	373.0	525.0	745.0	1054.0
$4000 < d \leq 6000$	$6 \leq m \leq 10$	17.0	24.0	34.0	48.0	68.0	97.0	137.0	194.0	274.0	387.0	548.0	775.0	1095.0
	$10 < m \leq 16$	17.0	25.0	35.0	49.0	69.0	98.0	139.0	197.0	278.0	393.0	556.0	786.0	1112.0
	$16 < m \leq 25$	18.0	25.0	36.0	50.0	71.0	100.0	142.0	201.0	284.0	402.0	568.0	804.0	1137.0
	$25 < m \leq 40$	18.0	26.0	37.0	52.0	74.0	104.0	147.0	208.0	294.0	416.0	588.0	832.0	1176.0
	$40 < m \leq 70$	20.0	28.0	39.0	55.0	78.0	110.0	156.0	221.0	312.0	441.0	624.0	883.0	1249.0
$6000 < d \leq 8000$	$10 \leq m \leq 16$	20.0	29.0	41.0	57.0	81.0	115.0	162.0	230.0	325.0	459.0	650.0	919.0	1299.0
	$16 < m \leq 25$	21.0	29.0	41.0	59.0	83.0	117.0	166.0	234.0	331.0	468.0	662.0	936.0	1324.0
	$25 < m \leq 40$	21.0	30.0	43.0	60.0	85.0	121.0	170.0	241.0	341.0	482.0	682.0	964.0	1364.0
	$40 < m \leq 70$	22.0	32.0	45.0	63.0	90.0	127.0	179.0	254.0	359.0	508.0	718.0	1015.0	1436.0
$8000 < d \leq 10000$	$10 \leq m \leq 16$	23.0	32.0	46.0	65.0	91.0	129.0	182.0	258.0	365.0	516.0	730.0	1032.0	1460.0
	$16 < m \leq 25$	23.0	33.0	46.0	66.0	93.0	131.0	186.0	262.0	371.0	525.0	742.0	1050.0	1485.0
	$25 < m \leq 40$	24.0	34.0	48.0	67.0	95.0	135.0	191.0	269.0	381.0	539.0	762.0	1078.0	1524.0
	$40 < m \leq 70$	25.0	35.0	50.0	71.0	100.0	141.0	200.0	282.0	399.0	564.0	798.0	1129.0	1596.0

表 15-1-55

齿廓总偏差 F_α

分度圆直径 d/mm	模数 m/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$F_\alpha/\mu\text{m}$												
$5 \leq d \leq 20$	$0.5 \leq m \leq 2$	0.8	1.1	1.6	2.3	3.2	4.6	6.5	9.0	13.0	18.0	26.0	37.0	52.0
	$2 < m \leq 3.5$	1.2	1.7	2.3	3.3	4.7	6.5	9.5	13.0	19.0	26.0	37.0	53.0	75.0

分度圆直径 d/mm	模数 m/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$F_{\alpha}/\mu\text{m}$												
$20 < d \leq 50$	$0.5 \leq m \leq 2$	0.9	1.3	1.8	2.6	3.6	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0
	$2 < m \leq 3.5$	1.3	1.8	2.5	3.6	5.0	7.0	10.0	14.0	20.0	29.0	40.0	57.0	81.0
	$3.5 < m \leq 6$	1.6	2.2	3.1	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0	70.0	99.0
	$6 < m \leq 10$	1.9	2.7	3.8	5.5	7.5	11.0	15.0	22.0	31.0	43.0	61.0	87.0	123.0
$50 < d \leq 125$	$0.5 \leq m \leq 2$	1.0	1.5	2.1	2.9	4.1	6.0	8.5	12.0	17.0	23.0	33.0	47.0	66.0
	$2 < m \leq 3.5$	1.4	2.0	2.8	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	63.0	89.0
	$3.5 < m \leq 6$	1.7	2.4	3.4	4.8	6.5	9.5	13.0	19.0	27.0	38.0	54.0	76.0	108.0
	$6 < m \leq 10$	2.0	2.9	4.1	6.0	8.0	12.0	16.0	23.0	33.0	46.0	65.0	92.0	131.0
	$10 < m \leq 16$	2.5	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0	56.0	79.0	112.0	159.0
	$16 < m \leq 25$	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	136.0	192.0
$125 < d \leq 280$	$0.5 \leq m \leq 2$	1.2	1.7	2.4	3.5	4.9	7.0	10.0	14.0	20.0	28.0	39.0	55.0	78.0
	$2 < m \leq 3.5$	1.6	2.2	3.2	4.5	6.5	9.0	13.0	18.0	25.0	36.0	50.0	71.0	101.0
	$3.5 < m \leq 6$	1.9	2.6	3.7	5.5	7.5	11.0	15.0	21.0	30.0	42.0	60.0	84.0	119.0
	$6 < m \leq 10$	2.2	3.2	4.5	6.5	9.0	13.0	18.0	25.0	36.0	50.0	71.0	101.0	143.0
	$10 < m \leq 16$	2.7	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	60.0	85.0	121.0	171.0
	$16 < m \leq 25$	3.2	4.5	6.5	9.0	13.0	18.0	25.0	36.0	51.0	72.0	102.0	144.0	204.0
	$25 < m \leq 40$	3.8	5.5	7.5	11.0	15.0	22.0	31.0	43.0	61.0	87.0	123.0	174.0	246.0
$280 < d \leq 560$	$0.5 \leq m \leq 2$	1.5	2.1	2.9	4.1	6.0	8.5	12.0	17.0	23.0	33.0	47.0	66.0	94.0
	$2 < m \leq 3.5$	1.8	2.6	3.6	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0	82.0	116.0
	$3.5 < m \leq 6$	2.1	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	48.0	67.0	95.0	135.0
	$6 < m \leq 10$	2.5	3.5	4.9	7.0	10.0	14.0	20.0	28.0	40.0	56.0	79.0	112.0	158.0
	$10 < m \leq 16$	2.9	4.1	6.0	8.0	12.0	16.0	23.0	33.0	47.0	66.0	93.0	132.0	186.0
	$16 < m \leq 25$	3.4	4.8	7.0	9.5	14.0	19.0	27.0	39.0	55.0	78.0	110.0	155.0	219.0
	$25 < m \leq 40$	4.1	6.0	8.0	12.0	16.0	23.0	33.0	46.0	65.0	92.0	131.0	185.0	261.0
	$40 < m \leq 70$	5.0	7.0	10.0	14.0	20.0	28.0	40.0	57.0	80.0	113.0	160.0	227.0	321.0
$560 < d \leq 1000$	$0.5 \leq m \leq 2$	1.8	2.5	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0	56.0	79.0	112.0
	$2 < m \leq 3.5$	2.1	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	48.0	67.0	95.0	135.0
	$3.5 < m \leq 6$	2.4	3.4	4.8	7.0	9.5	14.0	19.0	27.0	38.0	54.0	77.0	109.0	154.0
	$6 < m \leq 10$	2.8	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	62.0	88.0	125.0	177.0
	$10 < m \leq 16$	3.2	4.5	6.5	9.0	13.0	18.0	26.0	36.0	51.0	72.0	102.0	145.0	205.0
	$16 < m \leq 25$	3.7	5.5	7.5	11.0	15.0	21.0	30.0	42.0	59.0	84.0	119.0	168.0	238.0
	$25 < m \leq 40$	4.4	6.0	8.5	12.0	17.0	25.0	35.0	49.0	70.0	99.0	140.0	198.0	280.0
	$40 < m \leq 70$	5.5	7.5	11.0	15.0	21.0	30.0	42.0	60.0	85.0	120.0	170.0	240.0	339.0
$1000 < d \leq 1600$	$2 \leq m \leq 3.5$	2.4	3.4	4.9	7.0	9.5	14.0	19.0	27.0	39.0	55.0	78.0	110.0	155.0
	$3.5 < m \leq 6$	2.7	3.8	5.5	7.5	11.0	15.0	22.0	31.0	43.0	61.0	87.0	123.0	174.0
	$6 < m \leq 10$	3.1	4.4	6.0	8.5	12.0	17.0	25.0	35.0	49.0	70.0	99.0	139.0	197.0
	$10 < m \leq 16$	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0	56.0	80.0	113.0	159.0	225.0
	$16 < m \leq 25$	4.0	5.5	8.0	11.0	16.0	23.0	32.0	46.0	65.0	91.0	129.0	183.0	258.0
	$25 < m \leq 40$	4.7	6.5	9.5	13.0	19.0	27.0	38.0	53.0	75.0	106.0	150.0	212.0	300.0
	$40 < m \leq 70$	5.5	8.0	11.0	16.0	22.0	32.0	45.0	64.0	90.0	127.0	180.0	254.0	360.0
$1600 < d \leq 2500$	$3.5 \leq m \leq 6$	3.1	4.3	6.0	8.5	12.0	17.0	25.0	35.0	49.0	70.0	98.0	139.0	197.0
	$6 < m \leq 10$	3.4	4.9	7.0	9.5	14.0	19.0	27.0	39.0	55.0	78.0	110.0	156.0	220.0
	$10 < m \leq 16$	3.9	5.5	7.5	11.0	15.0	22.0	31.0	44.0	62.0	88.0	124.0	175.0	248.0
	$16 < m \leq 25$	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0	70.0	99.0	141.0	199.0	281.0
	$25 < m \leq 40$	5.0	7.0	10.0	14.0	20.0	29.0	40.0	57.0	81.0	114.0	161.0	228.0	323.0
	$40 < m \leq 70$	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	135.0	191.0	271.0	383.0

续表

分度圆直径 d/mm	模数 m/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$F_{\alpha}/\mu\text{m}$												
$2500 < d \leq 4000$	$6 \leq m \leq 10$	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	62.0	88.0	124.0	176.0	249.0
	$10 < m \leq 16$	4.3	6.0	8.5	12.0	17.0	24.0	35.0	49.0	69.0	98.0	138.0	196.0	277.0
	$16 < m \leq 25$	4.8	7.0	9.5	14.0	19.0	27.0	39.0	55.0	77.0	110.0	155.0	219.0	310.0
	$25 < m \leq 40$	5.5	8.0	11.0	16.0	22.0	31.0	44.0	62.0	88.0	124.0	176.0	249.0	351.0
	$40 < m \leq 70$	6.5	9.0	13.0	18.0	26.0	36.0	51.0	73.0	103.0	145.0	206.0	291.0	411.0
$4000 < d \leq 6000$	$6 \leq m \leq 10$	4.4	6.5	9.0	13.0	18.0	25.0	35.0	50.0	71.0	100.0	141.0	200.0	283.0
	$10 < m \leq 16$	4.9	7.0	9.5	14.0	19.0	27.0	39.0	55.0	78.0	110.0	155.0	220.0	311.0
	$16 < m \leq 25$	5.5	7.5	11.0	15.0	22.0	30.0	43.0	61.0	86.0	122.0	172.0	243.0	344.0
	$25 < m \leq 40$	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	136.0	193.0	273.0	386.0
	$40 < m \leq 70$	7.0	10.0	14.0	20.0	28.0	39.0	56.0	79.0	111.0	158.0	223.0	315.0	445.0
$6000 < d \leq 8000$	$10 \leq m \leq 16$	5.5	7.5	11.0	15.0	21.0	30.0	43.0	61.0	86.0	122.0	172.0	243.0	344.0
	$16 < m \leq 25$	6.0	8.5	12.0	17.0	24.0	33.0	47.0	67.0	94.0	113.0	189.0	267.0	377.0
	$25 < m \leq 40$	6.5	9.5	13.0	19.0	26.0	37.0	52.0	74.0	105.0	148.0	209.0	296.0	419.0
	$40 < m \leq 70$	7.5	11.0	15.0	21.0	30.0	42.0	60.0	85.0	120.0	169.0	239.0	338.0	478.0
$8000 < d \leq 10000$	$10 \leq m \leq 16$	6.0	8.0	12.0	16.0	23.0	33.0	47.0	66.0	93.0	132.0	186.0	263.0	372.0
	$16 < m \leq 25$	6.5	9.0	13.0	18.0	25.0	36.0	51.0	72.0	101.0	143.0	203.0	287.0	405.0
	$25 < m \leq 40$	7.0	10.0	14.0	20.0	28.0	40.0	56.0	79.0	112.0	158.0	223.0	316.0	447.0
	$40 < m \leq 70$	8.0	11.0	16.0	22.0	32.0	45.0	63.0	90.0	127.0	179.0	253.0	358.0	507.0

表 15-1-56

齿廓形状偏差 f_{fa}

分度圆直径 d/mm	法向模数 m/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$f_{\text{fa}}/\mu\text{m}$												
$5 \leq d \leq 20$	$0.5 \leq m \leq 2$	0.6	0.9	1.3	1.8	2.5	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0
	$2 < m \leq 3.5$	0.9	1.3	1.8	2.6	3.6	5.0	7.0	10.0	14.0	20.0	29.0	41.0	58.0
$20 < d \leq 50$	$0.5 \leq m \leq 2$	0.7	1.0	1.4	2.0	2.8	4.0	5.5	8.0	11.0	16.0	22.0	32.0	45.0
	$2 < m \leq 3.5$	1.0	1.4	2.0	2.8	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	62.0
	$3.5 < m \leq 6$	1.2	1.7	2.4	3.4	4.8	7.0	9.5	14.0	19.0	27.0	39.0	54.0	77.0
	$6 < m \leq 10$	1.5	2.1	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	48.0	67.0	95.0
$50 < d \leq 125$	$0.5 \leq m \leq 2$	0.8	1.1	1.6	2.3	3.2	4.5	6.5	9.0	13.0	18.0	26.0	36.0	51.0
	$2 < m \leq 3.5$	1.1	1.5	2.1	3.0	4.3	6.0	8.5	12.0	17.0	24.0	34.0	49.0	69.0
	$3.5 < m \leq 6$	1.3	1.8	2.6	3.7	5.0	7.5	10.0	15.0	21.0	29.0	42.0	59.0	83.0
	$6 < m \leq 10$	1.6	2.2	3.2	4.5	6.5	9.0	13.0	18.0	25.0	36.0	51.0	72.0	101.0
	$10 < m \leq 16$	1.9	2.7	3.9	5.5	7.5	11.0	15.0	22.0	31.0	44.0	62.0	87.0	123.0
	$16 < m \leq 25$	2.3	3.3	4.7	6.5	9.5	13.0	19.0	26.0	37.0	53.0	75.0	106.0	149.0
$125 < d \leq 280$	$0.5 \leq m \leq 2$	0.9	1.3	1.9	2.7	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	60.0
	$2 < m \leq 3.5$	1.2	1.7	2.4	3.4	4.9	7.0	9.5	14.0	19.0	28.0	39.0	55.0	78.0
	$3.5 < m \leq 6$	1.4	2.0	2.9	4.1	6.0	8.0	12.0	16.0	23.0	33.0	46.0	65.0	93.0
	$6 < m \leq 10$	1.7	2.4	3.5	4.9	7.0	10.0	14.0	20.0	28.0	39.0	55.0	78.0	111.0
	$10 < m \leq 16$	2.1	2.9	4.0	6.0	8.5	12.0	17.0	23.0	33.0	47.0	66.0	94.0	133.0
	$16 < m \leq 25$	2.5	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0	56.0	79.0	112.0	158.0
	$25 < m \leq 40$	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	135.0	191.0

分度圆直径 d/mm	法向模数 m/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$f_{\text{ta}}/\mu\text{m}$												
$280 < d \leq 560$	$0.5 \leq m \leq 2$	1.1	1.6	2.3	3.2	4.5	6.5	9.0	13.0	18.0	26.0	36.0	51.0	72.0
	$2 < m \leq 3.5$	1.4	2.0	2.8	4.0	5.5	8.0	11.0	16.0	22.0	32.0	45.0	64.0	90.0
	$3.5 < m \leq 6$	1.6	2.3	3.3	4.6	6.5	9.0	13.0	18.0	26.0	37.0	52.0	74.0	104.0
	$6 < m \leq 10$	1.9	2.7	3.8	5.5	7.5	11.0	15.0	22.0	31.0	43.0	61.0	87.0	123.0
	$10 < m \leq 16$	2.3	3.2	4.5	6.5	9.0	13.0	18.0	26.0	36.0	51.0	72.0	102.0	145.0
	$16 < m \leq 25$	2.7	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	60.0	85.0	121.0	170.0
	$25 < m \leq 40$	3.2	4.5	6.5	9.0	13.0	18.0	25.0	36.0	51.0	72.0	101.0	144.0	203.0
	$40 < m \leq 70$	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	62.0	88.0	125.0	177.0	250.0
$560 < d \leq 1000$	$0.5 \leq m \leq 2$	1.4	1.9	2.7	3.8	5.5	7.5	11.0	15.0	22.0	31.0	43.0	61.0	87.0
	$2 < m \leq 3.5$	1.6	2.3	3.3	4.6	6.5	9.0	13.0	18.0	26.0	37.0	52.0	74.0	104.0
	$3.5 < m \leq 6$	1.9	2.6	3.7	5.5	7.5	11.0	15.0	21.0	30.0	42.0	59.0	84.0	119.0
	$6 < m \leq 10$	2.1	3.0	4.3	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	97.0	137.0
	$10 < m \leq 16$	2.5	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0	56.0	79.0	112.0	159.0
	$16 < m \leq 25$	2.9	4.1	6.0	8.0	12.0	16.0	23.0	33.0	46.0	65.0	92.0	131.0	185.0
	$25 < m \leq 40$	3.4	4.8	7.0	9.5	14.0	19.0	27.0	38.0	54.0	77.0	109.0	154.0	217.0
	$40 < m \leq 70$	4.1	6.0	8.5	12.0	17.0	23.0	33.0	47.0	66.0	93.0	132.0	187.0	264.0
$1000 < d \leq 1600$	$2 \leq m \leq 3.5$	1.9	2.7	3.8	5.5	7.5	11.0	15.5	21.0	30.0	42.0	60.0	85.0	120.0
	$3.5 < m \leq 6$	2.1	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	48.0	67.0	95.0	135.0
	$6 < m \leq 10$	2.4	3.4	4.8	7.0	9.5	14.0	19.0	27.0	38.0	54.0	76.0	108.0	153.0
	$10 < m \leq 16$	2.7	3.9	5.5	7.5	11.0	15.0	22.0	31.0	44.0	62.0	87.0	124.0	175.0
	$16 < m \leq 25$	3.1	4.4	6.5	9.0	13.0	18.0	25.0	35.0	50.0	71.0	100.0	142.0	201.0
	$25 < m \leq 40$	3.6	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0	82.0	117.0	165.0	233.0
	$40 < m \leq 70$	4.4	6.0	8.5	12.0	17.0	25.0	35.0	49.0	70.0	99.0	140.0	198.0	280.0
$1600 < d \leq 2500$	$3.5 \leq m \leq 6$	2.4	3.4	4.8	6.5	9.5	13.0	19.0	27.0	38.0	54.0	76.0	108.0	152.0
	$6 < m \leq 10$	2.7	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	60.0	85.0	120.0	170.0
	$10 < m \leq 16$	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	136.0	192.0
	$16 < m \leq 25$	3.4	4.8	7.0	9.5	14.0	19.0	27.0	39.0	55.0	77.0	109.0	154.0	218.0
	$25 < m \leq 40$	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	63.0	89.0	125.0	177.0	251.0
	$40 < m \leq 70$	4.6	6.5	9.5	13.0	19.0	26.0	37.0	53.0	74.0	105.0	149.0	210.0	297.0
$2500 < d \leq 4000$	$6 \leq m \leq 10$	3.0	4.3	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	136.0	193.0
	$10 < m \leq 16$	3.4	4.7	6.5	9.5	13.0	19.0	27.0	38.0	54.0	76.0	107.0	152.0	214.0
	$16 < m \leq 25$	3.8	5.5	7.5	11.0	15.0	21.0	30.0	42.0	60.0	85.0	120.0	170.0	240.0
	$25 < m \leq 40$	4.3	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	136.0	193.0	273.0
	$40 < m \leq 70$	5.0	7.0	10.0	14.0	20.0	28.0	40.0	56.0	80.0	113.0	160.0	226.0	320.0
$4000 < d \leq 6000$	$6 \leq m \leq 10$	3.4	4.8	7.0	9.5	14.0	19.0	27.0	39.0	55.0	77.0	109.0	155.0	219.0
	$10 < m \leq 16$	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	60.0	85.0	120.0	170.0	241.0
	$16 < m \leq 25$	4.2	6.0	8.5	12.0	17.0	24.0	33.0	47.0	67.0	94.0	133.0	189.0	267.0
	$25 < m \leq 40$	4.7	6.5	9.5	13.0	19.0	26.0	37.0	53.0	75.0	106.0	150.0	212.0	299.0
	$40 < m \leq 70$	5.5	7.5	11.0	15.0	22.0	31.0	43.0	61.0	87.0	122.0	173.0	245.0	346.0
$6000 < d \leq 8000$	$10 \leq m \leq 16$	4.2	6.0	8.5	12.0	17.0	24.0	33.0	47.0	67.0	94.0	133.0	188.0	266.0
	$16 < m \leq 25$	4.6	6.5	9.0	13.0	18.0	26.0	37.0	52.0	73.0	103.0	146.0	207.0	292.0
	$25 < m \leq 40$	5.0	7.0	10.0	14.0	20.0	29.0	41.0	57.0	81.0	115.0	162.0	230.0	325.0
	$40 < m \leq 70$	6.0	8.0	12.0	16.0	23.0	33.0	46.0	66.0	93.0	131.0	186.0	263.0	371.0
$8000 < d \leq 10000$	$10 \leq m \leq 16$	4.5	6.5	9.0	13.0	18.0	25.0	36.0	51.0	72.0	102.0	144.0	204.0	288.0
	$16 < m \leq 25$	4.9	7.0	10.0	14.0	20.0	28.0	39.0	56.0	79.0	111.0	157.0	222.0	314.0
	$25 < m \leq 40$	5.5	7.5	11.0	15.0	22.0	31.0	43.0	61.0	87.0	123.0	173.0	245.0	347.0
	$40 < m \leq 70$	6.0	8.5	12.0	17.0	25.0	35.0	49.0	70.0	98.0	139.0	197.0	278.0	393.0

表 15-1-57

齿廓倾斜偏差 $\pm f_{H\alpha}$

分度圆直径 d/mm	法向模数 m/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$f_{H\alpha}/\mu\text{m}$												
$5 \leq d \leq 20$	$0.5 \leq m \leq 2$	0.5	0.7	1.0	1.5	2.1	2.9	4.2	6.0	8.5	12.0	17.0	24.0	33.0
	$2 < m \leq 3.5$	0.7	1.0	1.5	2.1	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	47.0
$20 < d \leq 50$	$0.5 \leq m \leq 2$	0.6	0.8	1.2	1.6	2.3	3.3	4.6	6.5	9.5	13.0	19.0	26.0	37.0
	$2 < m \leq 3.5$	0.8	1.1	1.6	2.3	3.2	4.5	6.5	9.0	13.0	18.0	26.0	36.0	51.0
	$3.5 < m \leq 6$	1.0	1.4	2.0	2.8	3.9	5.5	8.0	11.0	16.0	22.0	32.0	45.0	63.0
	$6 < m \leq 10$	1.2	1.7	2.4	3.4	4.8	7.0	9.5	14.0	19.0	27.0	39.0	55.0	78.0
$50 < d \leq 125$	$0.5 \leq m \leq 2$	0.7	0.9	1.3	1.9	2.6	3.7	5.5	7.5	11.0	15.0	21.0	30.0	42.0
	$2 < m \leq 3.5$	0.9	1.2	1.8	2.5	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0	57.0
	$3.5 < m \leq 6$	1.1	1.5	2.1	3.0	4.3	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0
	$6 < m \leq 10$	1.3	1.8	2.6	3.7	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0	83.0
	$10 < m \leq 16$	1.6	2.2	3.1	4.4	6.5	9.0	13.0	18.0	25.0	35.0	50.0	71.0	100.0
	$16 < m \leq 25$	1.9	2.7	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	60.0	86.0	121.0
$125 < d \leq 280$	$0.5 \leq m \leq 2$	0.8	1.1	1.6	2.2	3.1	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0
	$2 < m \leq 3.5$	1.0	1.4	2.0	2.8	4.0	5.5	8.0	11.0	16.0	23.0	32.0	45.0	64.0
	$3.5 < m \leq 6$	1.2	1.7	2.4	3.3	4.7	6.5	9.5	13.0	19.0	27.0	38.0	54.0	76.0
	$6 < m \leq 10$	1.4	2.0	2.8	4.0	5.5	8.0	11.0	16.0	23.0	32.0	45.0	64.0	90.0
	$10 < m \leq 16$	1.7	2.4	3.4	4.8	6.5	9.5	13.0	19.0	27.0	38.0	54.0	76.0	108.0
	$16 < m \leq 25$	2.0	2.8	4.0	5.5	8.0	11.0	16.0	23.0	32.0	45.0	64.0	91.0	129.0
	$25 < m \leq 40$	2.4	3.4	4.8	7.0	9.5	14.0	19.0	27.0	39.0	55.0	77.0	109.0	155.0
$280 < d \leq 560$	$0.5 \leq m \leq 2$	0.9	1.3	1.9	2.6	3.7	5.5	7.5	11.0	15.0	21.0	30.0	42.0	60.0
	$2 < m \leq 3.5$	1.2	1.6	2.3	3.3	4.6	6.5	9.0	13.0	18.0	26.0	37.0	52.0	74.0
	$3.5 < m \leq 6$	1.3	1.9	2.7	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	61.0	86.0
	$6 < m \leq 10$	1.6	2.2	3.1	4.4	6.5	9.0	13.0	18.0	25.0	35.0	50.0	71.0	100.0
	$10 < m \leq 16$	1.8	2.6	3.7	5.0	7.5	10.0	15.0	21.0	29.0	42.0	59.0	83.0	118.0
	$16 < m \leq 25$	2.2	3.1	4.3	6.0	8.5	12.0	17.0	24.0	35.0	49.0	69.0	98.0	138.0
	$25 < m \leq 40$	2.6	3.6	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0	82.0	116.0	164.0
	$40 < m \leq 70$	3.2	4.5	6.5	9.0	13.0	18.0	25.0	36.0	50.0	71.0	101.0	143.0	202.0
$560 < d \leq 1000$	$0.5 \leq m \leq 2$	1.1	1.6	2.2	3.2	4.5	6.5	9.0	13.0	18.0	25.0	36.0	51.0	72.0
	$2 < m \leq 3.5$	1.3	1.9	2.7	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	61.0	86.0
	$3.5 < m \leq 6$	1.5	2.2	3.0	4.3	6.0	8.5	12.0	17.0	24.0	34.0	49.0	69.0	97.0
	$6 < m \leq 10$	1.7	2.5	3.5	4.9	7.0	10.0	14.0	20.0	28.0	40.0	56.0	79.0	112.0
	$10 < m \leq 16$	2.0	2.9	4.0	5.5	8.0	11.0	16.0	23.0	32.0	46.0	65.0	92.0	129.0
	$16 < m \leq 25$	2.3	3.3	4.7	6.5	9.5	13.0	19.0	27.0	38.0	53.0	75.0	106.0	150.0
	$25 < m \leq 40$	2.8	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	62.0	88.0	125.0	176.0
	$40 < m \leq 70$	3.3	4.7	6.5	9.5	13.0	19.0	27.0	38.0	53.0	76.0	107.0	151.0	214.0
$1000 < d \leq 1600$	$2 \leq m \leq 3.5$	1.5	2.2	3.1	4.4	6.0	8.5	12.0	17.0	25.0	35.0	49.0	70.0	99.0
	$3.5 < m \leq 6$	1.7	2.4	3.5	4.9	7.0	10.0	14.0	20.0	28.0	39.0	55.0	78.0	110.0
	$6 < m \leq 10$	2.0	2.8	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	62.0	88.0	125.0
	$10 < m \leq 16$	2.2	3.1	4.5	6.5	9.0	13.0	18.0	25.0	36.0	50.0	71.0	101.0	142.0
	$16 < m \leq 25$	2.5	3.6	5.0	7.0	10.0	14.0	20.0	29.0	41.0	58.0	82.0	115.0	163.0
	$25 < m \leq 40$	3.0	4.2	6.0	8.5	12.0	17.0	24.0	33.0	47.0	67.0	95.0	134.0	189.0
	$40 < m \leq 70$	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0	57.0	80.0	113.0	160.0	227.0
$1600 < d \leq 2500$	$3.5 \leq m \leq 6$	2.0	2.8	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	62.0	88.0	125.0
	$6 < m \leq 10$	2.2	3.1	4.4	6.0	8.5	12.0	17.0	25.0	35.0	49.0	70.0	99.0	139.0
	$10 < m \leq 16$	2.5	3.5	4.9	7.0	10.0	14.0	20.0	28.0	39.0	55.0	78.0	111.0	157.0
	$16 < m \leq 25$	2.8	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	63.0	89.0	126.0	178.0
	$25 < m \leq 40$	3.2	4.5	6.5	9.0	13.0	18.0	25.0	36.0	51.0	72.0	102.0	144.0	204.0
	$40 < m \leq 70$	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	60.0	85.0	121.0	170.0	241.0

续表

分度圆直径 d/mm	法向模数 m/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$f_{\text{Ha}}/\mu\text{m}$												
$2500 < d \leq 4000$	$6 \leq m \leq 10$	2.5	3.5	4.9	7.0	10.0	14.0	20.0	28.0	39.0	56.0	79.0	112.0	158.0
	$10 < m \leq 16$	2.7	3.9	5.5	7.5	11.0	15.0	22.0	31.0	44.0	62.0	88.0	124.0	175.0
	$16 < m \leq 25$	3.1	4.3	6.0	8.5	12.0	17.0	24.0	35.0	49.0	69.0	98.0	139.0	196.0
	$25 < m \leq 40$	3.5	4.9	7.0	10.0	14.0	20.0	28.0	39.0	55.0	78.0	111.0	157.0	222.0
	$40 < m \leq 70$	4.1	5.5	8.0	11.0	16.0	23.0	32.0	46.0	65.0	92.0	130.0	183.0	259.0
$4000 < d \leq 6000$	$6 \leq m \leq 10$	2.8	4.0	5.5	8.0	11.0	16.0	22.0	32.0	45.0	63.0	90.0	127.0	179.0
	$10 < m \leq 16$	3.1	4.4	6.0	8.5	12.0	17.0	25.0	35.0	49.0	70.0	98.0	139.0	197.0
	$16 < m \leq 25$	3.4	4.8	7.0	9.5	14.0	19.0	27.0	38.0	54.0	77.0	109.0	154.0	218.0
	$25 < m \leq 40$	3.8	5.5	7.5	11.0	15.0	22.0	30.0	43.0	61.0	86.0	122.0	172.0	244.0
	$40 < m \leq 70$	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0	70.0	99.0	141.0	199.0	281.0
$6000 < d \leq 8000$	$10 \leq m \leq 16$	3.4	4.8	7.0	9.5	14.0	19.0	27.0	39.0	54.0	77.0	109.0	154.0	218.0
	$16 < m \leq 25$	3.7	5.5	7.5	11.0	15.0	21.0	30.0	42.0	60.0	84.0	119.0	169.0	239.0
	$25 < m \leq 40$	4.1	6.0	8.5	12.0	17.0	23.0	33.0	47.0	66.0	94.0	132.0	187.0	265.0
	$40 < m \leq 70$	4.7	6.5	9.5	13.0	19.0	27.0	38.0	53.0	76.0	107.0	151.0	214.0	302.0
$8000 < d \leq 10000$	$10 \leq m \leq 16$	3.7	5.0	7.5	10.0	15.0	21.0	29.0	42.0	59.0	83.0	118.0	167.0	236.0
	$16 < m \leq 25$	4.0	5.5	8.0	11.0	16.0	23.0	32.0	45.0	64.0	91.0	128.0	181.0	257.0
	$25 < m \leq 40$	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0	71.0	100.0	141.0	200.0	283.0
	$40 < m \leq 70$	5.0	7.0	10.0	14.0	20.0	28.0	40.0	57.0	80.0	113.0	160.0	226.0	320.0

表 15-1-58 螺旋线总偏差 F_{β}

分度圆直径 d/mm	齿宽 b/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$F_{\beta}/\mu\text{m}$												
$5\leq d\leq 20$	$4\leq b\leq 10$	1.1	1.5	2.2	3.1	4.3	6.0	8.5	12.0	17.0	24.0	35.0	49.0	69.0
	$10<b\leq 20$	1.2	1.7	2.4	3.4	4.9	7.0	9.5	14.0	19.0	28.0	39.0	55.0	78.0
	$20<b\leq 40$	1.4	2.0	2.8	3.9	5.5	8.0	11.0	16.0	22.0	31.0	45.0	63.0	89.0
	$40<b\leq 80$	1.6	2.3	3.3	4.6	6.5	9.5	13.0	19.0	26.0	37.0	52.0	74.0	105.0
$20<d\leq 50$	$4\leq b\leq 10$	1.1	1.6	2.2	3.2	4.5	6.5	9.0	13.0	18.0	25.0	36.0	51.0	72.0
	$10<b\leq 20$	1.3	1.8	2.5	3.6	5.0	7.0	10.0	14.0	20.0	29.0	40.0	57.0	81.0
	$20<b\leq 40$	1.4	2.0	2.9	4.1	5.5	8.0	11.0	16.0	23.0	32.0	46.0	65.0	92.0
	$40<b\leq 80$	1.7	2.4	3.4	4.8	6.5	9.5	13.0	19.0	27.0	38.0	54.0	76.0	107.0
	$80<b\leq 160$	2.0	2.9	4.1	5.5	8.0	11.0	16.0	23.0	32.0	46.0	65.0	92.0	130.0
$50<d\leq 125$	$4\leq b\leq 10$	1.2	1.7	2.4	3.3	4.7	6.5	9.5	13.0	19.0	27.0	38.0	53.0	76.0
	$10<b\leq 20$	1.3	1.9	2.6	3.7	5.5	7.5	11.0	15.0	21.0	30.0	42.0	60.0	84.0
	$20<b\leq 40$	1.5	2.1	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	95.0
	$40<b\leq 80$	1.7	2.5	3.5	4.9	7.0	10.0	14.0	20.0	28.0	39.0	56.0	79.0	111.0
	$80<b\leq 160$	2.1	2.9	4.2	6.0	8.5	12.0	17.0	24.0	33.0	47.0	67.0	94.0	133.0
	$160<b\leq 250$	2.5	3.5	4.9	7.0	10.0	14.0	20.0	28.0	40.0	56.0	79.0	112.0	158.0
	$250<b\leq 400$	2.9	4.1	6.0	8.0	12.0	16.0	23.0	33.0	46.0	65.0	92.0	130.0	184.0
$125<d\leq 280$	$4\leq b\leq 10$	1.3	1.8	2.5	3.6	5.0	7.0	10.0	14.0	20.0	29.0	40.0	57.0	81.0
	$10<b\leq 20$	1.4	2.0	2.8	4.0	5.5	8.0	11.0	16.0	22.0	32.0	45.0	63.0	90.0
	$20<b\leq 40$	1.6	2.2	3.2	4.5	6.5	9.0	13.0	18.0	25.0	36.0	50.0	71.0	101.0
	$40<b\leq 80$	1.8	2.6	3.6	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0	82.0	117.0
	$80<b\leq 160$	2.2	3.1	4.3	6.0	8.5	12.0	17.0	25.0	35.0	49.0	69.0	98.0	139.0
	$160<b\leq 250$	2.6	3.6	5.0	7.0	10.0	14.0	20.0	29.0	41.0	58.0	82.0	116.0	164.0
	$250<b\leq 400$	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	47.0	67.0	95.0	134.0	190.0
	$400<b\leq 650$	3.5	4.9	7.0	10.0	14.0	20.0	28.0	40.0	56.0	79.0	112.0	158.0	224.0

续表

分度圆直径 d/mm	齿宽 b/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$F_{\beta}/\mu\text{m}$												
$280 < d \leq 560$	$10 \leq b \leq 20$	1.5	2.1	3.0	4.3	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	97.0
	$20 < b \leq 40$	1.7	2.4	3.4	4.8	6.5	9.5	13.0	19.0	27.0	38.0	54.0	76.0	108.0
	$40 < b \leq 80$	1.9	2.7	3.9	5.5	7.5	11.0	15.0	22.0	31.0	44.0	62.0	87.0	124.0
	$80 < b \leq 160$	2.3	3.2	4.6	6.5	9.0	13.0	18.0	26.0	36.0	52.0	73.0	103.0	146.0
	$160 < b \leq 250$	2.7	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	60.0	85.0	121.0	171.0
	$250 < b \leq 400$	3.1	4.3	6.0	8.5	12.0	17.0	25.0	35.0	49.0	70.0	98.0	139.0	197.0
	$400 < b \leq 650$	3.6	5.0	7.0	10.0	14.0	20.0	29.0	41.0	58.0	82.0	115.0	163.0	231.0
	$650 < b \leq 1000$	4.3	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	136.0	193.0	272.0
$560 < d \leq 1000$	$10 \leq b \leq 20$	1.6	2.3	3.3	4.7	6.5	9.5	13.0	19.0	26.0	37.0	53.0	74.0	105.0
	$20 < b \leq 40$	1.8	2.6	3.6	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0	82.0	116.0
	$40 < b \leq 80$	2.1	2.9	4.1	6.0	8.5	12.0	17.0	23.0	33.0	47.0	66.0	93.0	132.0
	$80 < b \leq 160$	2.4	3.4	4.8	7.0	9.5	14.0	19.0	27.0	39.0	55.0	77.0	109.0	154.0
	$160 < b \leq 250$	2.8	4.0	5.5	8.0	11.0	16.0	22.0	32.0	45.0	63.0	90.0	127.0	179.0
	$250 < b \leq 400$	3.2	4.5	6.5	9.0	13.0	18.0	26.0	36.0	51.0	73.0	103.0	145.0	205.0
	$400 < b \leq 650$	3.7	5.5	7.5	11.0	15.0	21.0	30.0	42.0	60.0	85.0	120.0	169.0	239.0
	$650 < b \leq 1000$	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0	70.0	99.0	140.0	199.0	281.0
$1000 < d \leq 1600$	$20 \leq b \leq 40$	2.0	2.8	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	63.0	89.0	126.0
	$40 < b \leq 80$	2.2	3.1	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0	71.0	100.0	141.0
	$80 < b \leq 160$	2.6	3.6	5.0	7.0	10.0	14.0	20.0	29.0	41.0	58.0	82.0	116.0	164.0
	$160 < b \leq 250$	2.9	4.2	6.0	8.5	12.0	17.0	24.0	33.0	47.0	67.0	94.0	133.0	189.0
	$250 < b \leq 400$	3.4	4.7	6.5	9.5	13.0	19.0	27.0	38.0	54.0	76.0	107.0	152.0	215.0
	$400 < b \leq 650$	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	62.0	88.0	124.0	176.0	249.0
	$650 < b \leq 1000$	4.5	6.5	9.0	13.0	18.0	26.0	36.0	51.0	73.0	103.0	145.0	205.0	290.0
$1600 < d \leq 2500$	$20 \leq b \leq 40$	2.1	3.0	4.3	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	136.0
	$40 < b \leq 80$	2.4	3.4	4.7	6.5	9.5	13.0	19.0	27.0	38.0	54.0	76.0	107.0	152.0
	$80 < b \leq 160$	2.7	3.8	5.5	7.5	11.0	15.0	22.0	31.0	43.0	61.0	87.0	123.0	174.0
	$160 < b \leq 250$	3.1	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0	70.0	99.0	141.0	199.0
	$250 < b \leq 400$	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0	56.0	80.0	112.0	159.0	225.0
	$400 < b \leq 650$	4.0	5.5	8.0	11.0	16.0	23.0	32.0	46.0	65.0	92.0	130.0	183.0	259.0
	$650 < b \leq 1000$	4.7	6.5	9.5	13.0	19.0	27.0	38.0	53.0	75.0	106.0	150.0	212.0	300.0
$2500 < d \leq 4000$	$40 \leq b \leq 80$	2.6	3.6	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0	82.0	116.0	165.0
	$80 < b \leq 160$	2.9	4.1	6.0	8.5	12.0	17.0	23.0	33.0	47.0	66.0	93.0	132.0	187.0
	$160 < b \leq 250$	3.3	4.7	6.5	9.5	13.0	19.0	26.0	37.0	53.0	75.0	106.0	150.0	212.0
	$250 < b \leq 400$	3.7	5.5	7.5	11.0	15.0	21.0	30.0	42.0	59.0	84.0	119.0	168.0	238.0
	$400 < b \leq 650$	4.3	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	136.0	192.0	272.0
	$650 < b \leq 1000$	4.9	7.0	10.0	14.0	20.0	28.0	39.0	55.0	78.0	111.0	157.0	222.0	314.0
$4000 < d \leq 6000$	$80 \leq b \leq 160$	3.2	4.5	6.5	9.0	13.0	18.0	25.0	36.0	51.0	72.0	101.0	143.0	203.0
	$160 < b \leq 250$	3.6	5.0	7.0	10.0	14.0	20.0	28.0	40.0	57.0	80.0	114.0	161.0	228.0
	$250 < b \leq 400$	4.0	5.5	8.0	11.0	16.0	22.0	32.0	45.0	63.0	90.0	127.0	179.0	253.0
	$400 < b \leq 650$	4.5	6.5	9.0	13.0	18.0	25.0	36.0	51.0	72.0	102.0	144.0	203.0	288.0
	$650 < b \leq 1000$	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0	82.0	116.0	165.0	233.0	329.0
$6000 < d \leq 8000$	$80 \leq b \leq 160$	3.4	4.8	7.0	9.5	14.0	19.0	27.0	38.0	54.0	77.0	109.0	154.0	218.0
	$160 < b \leq 250$	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	61.0	86.0	121.0	171.0	242.0
	$250 < b \leq 400$	4.2	6.0	8.5	12.0	17.0	24.0	34.0	47.0	67.0	95.0	134.0	190.0	268.0
	$400 < b \leq 650$	4.7	6.5	9.5	13.0	19.0	27.0	38.0	53.0	76.0	107.0	151.0	214.0	303.0
	$650 < b \leq 1000$	5.5	7.5	11.0	15.0	22.0	30.0	43.0	61.0	86.0	122.0	172.0	243.0	344.0

续表

分度圆直径 d/mm	齿宽 b/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$F_{\beta}/\mu\text{m}$												
$8000 < d \leq 10000$	$80 \leq b \leq 160$	3.6	5.0	7.0	10.0	14.0	20.0	29.0	41.0	58.0	81.0	115.0	163.0	230.0
	$160 < b \leq 250$	4.0	5.5	8.0	11.0	16.0	23.0	32.0	45.0	64.0	90.0	128.0	181.0	255.0
	$250 < b \leq 400$	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0	70.0	99.0	141.0	199.0	281.0
	$400 < b \leq 650$	4.9	7.0	10.0	14.0	20.0	28.0	39.0	56.0	79.0	112.0	158.0	223.0	315.0
	$650 < b \leq 1000$	5.5	8.0	11.0	16.0	22.0	32.0	45.0	63.0	89.0	126.0	178.0	252.0	357.0

表 15-1-59 螺旋线形状偏差 f_{HP} 和螺旋线倾斜偏差 $\pm f_{\text{HP}}$

分度圆直径 d/mm	齿宽 b/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		f_{HP} 和 $\pm f_{\text{HP}}/\mu\text{m}$												
$5 \leq d \leq 20$	$4 \leq b \leq 10$	0.8	1.1	1.5	2.2	3.1	4.4	6.0	8.5	12.0	17.0	25.0	35.0	49.0
	$10 < b \leq 20$	0.9	1.2	1.7	2.5	3.5	4.9	7.0	10.0	14.0	20.0	28.0	39.0	56.0
	$20 < b \leq 40$	1.0	1.4	2.0	2.8	4.0	5.5	8.0	11.0	16.0	22.0	32.0	45.0	64.0
	$40 < b \leq 80$	1.2	1.7	2.3	3.3	4.7	6.5	9.5	13.0	19.0	26.0	37.0	53.0	75.0
$20 < d \leq 50$	$4 \leq b \leq 10$	0.8	1.1	1.6	2.3	3.2	4.5	6.5	9.0	13.0	18.0	26.0	36.0	51.0
	$10 < b \leq 20$	0.9	1.3	1.8	2.5	3.6	5.0	7.0	10.0	14.0	20.0	29.0	41.0	58.0
	$20 < b \leq 40$	1.0	1.4	2.0	2.9	4.1	6.0	8.0	12.0	16.0	23.0	33.0	46.0	65.0
	$40 < b \leq 80$	1.2	1.7	2.4	3.4	4.8	7.0	9.5	14.0	19.0	27.0	38.0	54.0	77.0
	$80 < b \leq 160$	1.4	2.0	2.9	4.1	6.0	8.0	12.0	16.0	23.0	33.0	46.0	65.0	93.0
$50 < d \leq 125$	$4 \leq b \leq 10$	0.8	1.2	1.7	2.4	3.4	4.8	6.5	9.5	13.0	19.0	27.0	38.0	54.0
	$10 < b \leq 20$	0.9	1.3	1.9	2.7	3.8	5.0	7.5	11.0	15.0	21.0	30.0	43.0	60.0
	$20 < b \leq 40$	1.1	1.5	2.1	3.0	4.3	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0
	$40 < b \leq 80$	1.2	1.8	2.5	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0	56.0	79.0
	$80 < b \leq 160$	1.5	2.1	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	48.0	67.0	95.0
	$160 < b \leq 250$	1.8	2.5	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0	56.0	80.0	113.0
	$250 < b \leq 400$	2.1	2.9	4.1	6.0	8.0	12.0	16.0	23.0	33.0	46.0	66.0	93.0	132.0
$125 < d \leq 280$	$4 \leq b \leq 10$	0.9	1.3	1.8	2.5	3.6	5.0	7.0	10.0	14.0	20.0	29.0	41.0	58.0
	$10 < b \leq 20$	1.0	1.4	2.0	2.8	4.0	5.5	8.0	11.0	16.0	23.0	32.0	45.0	64.0
	$20 < b \leq 40$	1.1	1.6	2.2	3.2	4.5	6.5	9.0	13.0	18.0	25.0	36.0	51.0	72.0
	$40 < b \leq 80$	1.3	1.8	2.6	3.7	5.0	7.5	10.0	15.0	21.0	29.0	42.0	59.0	83.0
	$80 < b \leq 160$	1.5	2.2	3.1	4.4	6.0	8.5	12.0	17.0	25.0	35.0	49.0	70.0	99.0
	$160 < b \leq 250$	1.8	2.6	3.6	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0	83.0	117.0
	$250 < b \leq 400$	2.1	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	135.0
	$400 < b \leq 650$	2.5	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0	56.0	80.0	113.0	160.0
$280 < d \leq 560$	$10 \leq b \leq 20$	1.1	1.5	2.2	3.0	4.3	6.0	8.5	12.0	17.0	24.0	34.0	49.0	69.0
	$20 < b \leq 40$	1.2	1.7	2.4	3.4	4.8	7.0	9.5	14.0	19.0	27.0	38.0	54.0	77.0
	$40 < b \leq 80$	1.4	1.9	2.7	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	62.0	88.0
	$80 < b \leq 160$	1.6	2.3	3.2	4.6	6.5	9.0	13.0	18.0	26.0	37.0	52.0	73.0	104.0
	$160 < b \leq 250$	1.9	2.7	3.8	5.5	7.5	11.0	15.0	22.0	30.0	43.0	61.0	86.0	122.0
	$250 < b \leq 400$	2.2	3.1	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0	70.0	99.0	140.0
	$400 < b \leq 650$	2.6	3.6	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0	82.0	116.0	165.0
	$650 < b \leq 1000$	3.0	4.3	6.0	8.5	12.0	17.0	24.0	34.0	49.0	69.0	97.0	137.0	194.0

续表

分度圆直径 d/mm	齿宽 b/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		f_{IP} 和 $\pm f_{\text{HP}}/\mu\text{m}$												
$560 < d \leq 1000$	$10 \leq b \leq 20$	1.2	1.7	2.3	3.3	4.7	6.5	9.5	13.0	19.0	26.0	37.0	53.0	75.0
	$20 < b \leq 40$	1.3	1.8	2.6	3.7	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0	83.0
	$40 < b \leq 80$	1.5	2.1	2.9	4.1	6.0	8.5	12.0	17.0	23.0	33.0	47.0	66.0	94.0
	$80 < b \leq 160$	1.7	2.4	3.4	4.9	7.0	9.5	14.0	19.0	27.0	39.0	55.0	78.0	110.0
	$160 < b \leq 250$	2.0	2.8	4.0	5.5	8.0	11.0	16.0	23.0	32.0	45.0	64.0	90.0	128.0
	$250 < b \leq 400$	2.3	3.2	4.6	6.5	9.0	13.0	18.0	26.0	37.0	52.0	73.0	103.0	146.0
	$400 < b \leq 650$	2.7	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	60.0	85.0	121.0	171.0
	$650 < b \leq 1000$	3.1	4.4	6.5	9.0	13.0	18.0	25.0	35.0	50.0	71.0	100.0	142.0	200.0
$1000 < d \leq 1600$	$20 \leq b \leq 40$	1.4	2.0	2.8	3.9	5.5	8.0	11.0	16.0	22.0	32.0	45.0	63.0	89.0
	$40 < b \leq 80$	1.6	2.2	3.1	4.4	6.5	9.0	13.0	18.0	25.0	35.0	50.0	71.0	100.0
	$80 < b \leq 160$	1.8	2.6	3.6	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0	82.0	116.0
	$160 < b \leq 250$	2.1	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	47.0	67.0	95.0	134.0
	$250 < b \leq 400$	2.4	3.4	4.8	6.5	9.5	13.0	19.0	27.0	38.0	54.0	76.0	108.0	153.0
	$400 < b \leq 650$	2.8	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	63.0	89.0	125.0	177.0
	$650 < b \leq 1000$	3.2	4.6	6.5	9.0	13.0	18.0	26.0	37.0	52.0	73.0	103.0	146.0	207.0
$1600 < d \leq 2500$	$20 \leq b \leq 40$	1.5	2.1	3.0	4.3	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0
	$40 < b \leq 80$	1.7	2.4	3.4	4.8	6.5	9.5	13.0	19.0	27.0	38.0	54.0	76.0	108.0
	$80 < b \leq 160$	1.9	2.7	3.9	5.5	7.5	11.0	15.0	22.0	31.0	44.0	62.0	87.0	124.0
	$160 < b \leq 250$	2.2	3.1	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0	71.0	100.0	141.0
	$250 < b \leq 400$	2.5	3.5	5.0	7.0	10.0	14.0	20.0	28.0	40.0	57.0	80.0	113.0	160.0
	$400 < b \leq 650$	2.9	4.1	6.0	8.0	12.0	16.0	23.0	33.0	46.0	65.0	92.0	130.0	184.0
	$650 < b \leq 1000$	3.3	4.7	6.5	9.5	13.0	19.0	27.0	38.0	53.0	76.0	107.0	151.0	214.0
$2500 < d \leq 4000$	$40 \leq b \leq 80$	1.8	2.6	3.6	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0	83.0	117.0
	$80 < b \leq 160$	2.1	2.9	4.1	6.0	8.5	12.0	17.0	23.0	33.0	47.0	66.0	94.0	133.0
	$160 < b \leq 250$	2.4	3.3	4.7	6.5	9.5	13.0	19.0	27.0	38.0	53.0	75.0	106.0	150.0
	$250 < b \leq 400$	2.6	3.7	5.5	7.5	11.0	15.0	21.0	30.0	42.0	60.0	85.0	120.0	169.0
	$400 < b \leq 650$	3.0	4.3	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	97.0	137.0	193.0
	$650 < b \leq 1000$	3.5	4.9	7.0	10.0	14.0	20.0	28.0	39.0	56.0	79.0	112.0	158.0	223.0
$4000 < d \leq 6000$	$80 \leq b \leq 160$	2.2	3.2	4.5	6.5	9.0	13.0	18.0	25.0	36.0	51.0	72.0	101.0	144.0
	$160 < b \leq 250$	2.5	3.6	5.0	7.0	10.0	14.0	20.0	29.0	40.0	57.0	81.0	114.0	161.0
	$250 < b \leq 400$	2.8	4.0	5.5	8.0	11.0	16.0	22.0	32.0	45.0	64.0	90.0	127.0	180.0
	$400 < b \leq 650$	3.2	4.5	6.5	9.0	13.0	18.0	26.0	36.0	51.0	72.0	102.0	144.0	204.0
	$650 < b \leq 1000$	3.7	5.0	7.5	10.0	15.0	21.0	29.0	41.0	58.0	83.0	117.0	165.0	234.0
$6000 < d \leq 8000$	$80 \leq b \leq 160$	2.4	3.4	4.8	7.0	9.5	14.0	19.0	27.0	39.0	54.0	77.0	109.0	154.0
	$160 < b \leq 250$	2.7	3.8	5.5	7.5	11.0	15.0	21.0	30.0	43.0	61.0	86.0	122.0	172.0
	$250 < b \leq 400$	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	48.0	67.0	95.0	135.0	190.0
	$400 < b \leq 650$	3.4	4.7	6.5	9.5	13.0	19.0	27.0	38.0	54.0	76.0	107.0	152.0	215.0
	$650 < b \leq 1000$	3.8	5.5	7.5	11.0	15.0	22.0	31.0	43.0	61.0	86.0	122.0	173.0	244.0
$8000 < d \leq 10000$	$80 \leq b \leq 160$	2.5	3.6	5.0	7.0	10.0	14.0	20.0	29.0	41.0	58.0	81.0	115.0	163.0
	$160 < b \leq 250$	2.8	4.0	5.5	8.0	11.0	16.0	23.0	32.0	45.0	64.0	90.0	128.0	181.0
	$250 < b \leq 400$	3.1	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0	70.0	100.0	141.0	199.0
	$400 < b \leq 650$	3.5	4.9	7.0	10.0	14.0	20.0	28.0	40.0	56.0	79.0	112.0	158.0	224.0
	$650 < b \leq 1000$	4.0	5.5	8.0	11.0	16.0	22.0	32.0	45.0	63.0	90.0	127.0	179.0	253.0

表 15-1-60

f_i/K 的比值

分度圆直径 d/mm	法向模数 m/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$(f_i/K)/\mu m$												
$5 \leq d \leq 20$	$0.5 \leq m \leq 2$	2.4	3.4	4.8	7.0	9.5	14.0	19.0	27.0	38.0	54.0	77.0	109.0	154.0
	$2 < m \leq 3.5$	2.8	4.0	5.5	8.0	11.0	16.0	23.0	32.0	45.0	64.0	91.0	129.0	182.0
$20 < d \leq 50$	$0.5 \leq m \leq 2$	2.5	3.6	5.0	7.0	10.0	14.0	20.0	29.0	41.0	58.0	82.0	115.0	163.0
	$2 < m \leq 3.5$	3.0	4.2	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	135.0	191.0
	$3.5 < m \leq 6$	3.4	4.8	7.0	9.5	14.0	19.0	27.0	38.0	54.0	77.0	108.0	153.0	217.0
	$6 < m \leq 10$	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	63.0	89.0	125.0	177.0	251.0
$50 < d \leq 125$	$0.5 \leq m \leq 2$	2.7	3.9	5.5	8.0	11.0	16.0	22.0	31.0	44.0	62.0	88.0	124.0	176.0
	$2 < m \leq 3.5$	3.2	4.5	6.5	9.0	13.0	18.0	25.0	36.0	51.0	72.0	102.0	144.0	204.0
	$3.5 < m \leq 6$	3.6	5.0	7.0	10.0	14.0	20.0	29.0	40.0	57.0	81.0	115.0	162.0	229.0
	$6 < m \leq 10$	4.1	6.0	8.0	12.0	16.0	23.0	33.0	47.0	66.0	93.0	132.0	186.0	263.0
	$10 < m \leq 16$	4.8	7.0	9.5	14.0	19.0	27.0	38.0	54.0	77.0	109.0	154.0	218.0	308.0
	$16 < m \leq 25$	5.5	8.0	11.0	16.0	23.0	32.0	46.0	65.0	91.0	129.0	183.0	259.0	366.0
$125 < d \leq 280$	$0.5 \leq m \leq 2$	3.0	4.3	6.0	8.5	12.0	17.0	24.0	34.0	49.0	69.0	97.0	137.0	194.0
	$2 < m \leq 3.5$	3.5	4.9	7.0	10.0	14.0	20.0	28.0	39.0	56.0	79.0	111.0	157.0	222.0
	$3.5 < m \leq 6$	3.9	5.5	7.5	11.0	15.0	22.0	31.0	44.0	62.0	88.0	124.0	175.0	247.0
	$6 < m \leq 10$	4.4	6.0	9.0	12.0	18.0	25.0	35.0	50.0	70.0	100.0	141.0	199.0	281.0
	$10 < m \leq 16$	5.0	7.0	10.0	14.0	20.0	29.0	41.0	58.0	82.0	115.0	163.0	231.0	326.0
	$16 < m \leq 25$	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	136.0	192.0	272.0	384.0
	$25 < m \leq 40$	7.5	10.0	15.0	21.0	29.0	41.0	58.0	82.0	116.0	165.0	233.0	329.0	465.0
$280 < d \leq 560$	$0.5 \leq m \leq 2$	3.4	4.8	7.0	9.5	14.0	19.0	27.0	39.0	54.0	77.0	109.0	154.0	218.0
	$2 < m \leq 3.5$	3.8	5.5	7.5	11.0	15.0	22.0	31.0	44.0	62.0	87.0	123.0	174.0	246.0
	$3.5 < m \leq 6$	4.2	6.0	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	136.0	192.0	271.0
	$6 < m \leq 10$	4.8	6.5	9.5	13.0	19.0	27.0	38.0	54.0	76.0	108.0	153.0	216.0	305.0
	$10 < m \leq 16$	5.5	7.5	11.0	15.0	22.0	31.0	44.0	62.0	88.0	124.0	175.0	248.0	350.0
	$16 < m \leq 25$	6.5	9.0	13.0	18.0	26.0	36.0	51.0	72.0	102.0	144.0	204.0	289.0	408.0
	$25 < m \leq 40$	7.5	11.0	15.0	22.0	31.0	43.0	61.0	86.0	122.0	173.0	245.0	346.0	489.0
	$40 < m \leq 70$	9.5	14.0	19.0	27.0	39.0	55.0	78.0	110.0	155.0	220.0	311.0	439.0	621.0
$560 < d \leq 1000$	$0.5 \leq m \leq 2$	3.9	5.5	7.5	11.0	15.0	22.0	31.0	44.0	62.0	87.0	123.0	174.0	247.0
	$2 < m \leq 3.5$	4.3	6.0	8.5	12.0	17.0	24.0	34.0	49.0	69.0	97.0	137.0	194.0	275.0
	$3.5 < m \leq 6$	4.7	6.5	9.5	13.0	19.0	27.0	38.0	53.0	75.0	106.0	150.0	212.0	300.0
	$6 < m \leq 10$	5.0	7.5	10.0	15.0	21.0	30.0	42.0	59.0	84.0	118.0	167.0	236.0	334.0
	$10 < m \leq 16$	6.0	8.5	12.0	17.0	24.0	33.0	47.0	67.0	95.0	134.0	189.0	268.0	379.0
	$16 < m \leq 25$	7.0	9.5	14.0	19.0	27.0	39.0	55.0	77.0	109.0	154.0	218.0	309.0	437.0
	$25 < m \leq 40$	8.0	11.0	16.0	23.0	32.0	46.0	65.0	92.0	129.0	183.0	259.0	366.0	518.0
	$40 < m \leq 70$	10.0	14.0	20.0	29.0	41.0	57.0	81.0	115.0	163.0	230.0	325.0	460.0	650.0
$1000 < d \leq 1600$	$2 \leq m \leq 3.5$	4.8	7.0	9.5	14.0	19.0	27.0	38.0	54.0	77.0	108.0	153.0	217.0	307.0
	$3.5 < m \leq 6$	5.0	7.5	10.0	15.0	21.0	29.0	41.0	59.0	83.0	117.0	166.0	235.0	332.0
	$6 < m \leq 10$	5.5	8.0	11.0	16.0	23.0	32.0	46.0	65.0	91.0	129.0	183.0	259.0	366.0
	$10 < m \leq 16$	6.5	9.0	13.0	18.0	26.0	36.0	51.0	73.0	103.0	145.0	205.0	290.0	410.0
	$16 < m \leq 25$	7.5	10.0	15.0	21.0	29.0	41.0	59.0	83.0	117.0	166.0	234.0	331.0	468.0
	$25 < m \leq 40$	8.5	12.0	17.0	24.0	34.0	49.0	69.0	97.0	137.0	194.0	275.0	389.0	550.0
	$40 < m \leq 70$	11.0	15.0	21.0	30.0	43.0	60.0	85.0	120.0	170.0	241.0	341.0	482.0	682.0
$1600 < d \leq 2500$	$3.5 \leq m \leq 6$	5.5	8.0	11.0	16.0	23.0	32.0	46.0	65.0	92.0	130.0	183.0	259.0	367.0
	$6 < m \leq 10$	6.5	9.0	13.0	18.0	25.0	35.0	50.0	71.0	100.0	142.0	200.0	283.0	401.0
	$10 < m \leq 16$	7.0	10.0	14.0	20.0	28.0	39.0	56.0	79.0	111.0	158.0	223.0	315.0	446.0
	$16 < m \leq 25$	8.0	11.0	16.0	22.0	31.0	45.0	63.0	89.0	126.0	178.0	252.0	356.0	504.0
	$25 < m \leq 40$	9.0	13.0	18.0	26.0	37.0	52.0	73.0	103.0	146.0	207.0	292.0	413.0	585.0
	$40 < m \leq 70$	11.0	16.0	22.0	32.0	45.0	63.0	90.0	127.0	179.0	253.0	358.0	507.0	717.0

续表

分度圆直径 d/mm	法向模数 m/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$(f_i'/K)/\mu\text{m}$												
$2500 < d \leq 4000$	$6 \leq m \leq 10$	7.0	10.0	14.0	20.0	28.0	39.0	56.0	79.0	111.0	157.0	223.0	315.0	445.0
	$10 < m \leq 16$	7.5	11.0	15.0	22.0	31.0	43.0	61.0	87.0	122.0	173.0	245.0	346.0	490.0
	$16 < m \leq 25$	8.5	12.0	17.0	24.0	34.0	48.0	68.0	97.0	137.0	194.0	274.0	387.0	548.0
	$25 < m \leq 40$	10.0	14.0	20.0	28.0	39.0	56.0	79.0	111.0	157.0	222.0	315.0	445.0	629.0
	$40 < m \leq 70$	12.0	17.0	24.0	34.0	48.0	67.0	95.0	135.0	190.0	269.0	381.0	538.0	761.0
$4000 < d \leq 6000$	$6 \leq m \leq 10$	8.0	11.0	16.0	22.0	31.0	44.0	62.0	88.0	125.0	176.0	249.0	352.0	498.0
	$10 < m \leq 16$	8.5	12.0	17.0	24.0	34.0	48.0	68.0	96.0	136.0	192.0	271.0	384.0	543.0
	$16 < m \leq 25$	9.5	13.0	19.0	27.0	38.0	53.0	75.0	106.0	150.0	212.0	300.0	425.0	601.0
	$25 < m \leq 40$	11.0	15.0	21.0	30.0	43.0	60.0	85.0	121.0	170.0	241.0	341.0	482.0	682.0
	$40 < m \leq 70$	13.0	18.0	25.0	36.0	51.0	72.0	102.0	144.0	204.0	288.0	407.0	576.0	814.0
$6000 < d \leq 8000$	$10 \leq m \leq 16$	9.5	13.0	19.0	26.0	37.0	52.0	74.0	105.0	148.0	210.0	297.0	420.0	594.0
	$16 < m \leq 25$	10.0	14.0	20.0	29.0	41.0	58.0	81.0	115.0	163.0	230.0	326.0	461.0	652.0
	$25 < m \leq 40$	11.0	16.0	23.0	32.0	46.0	65.0	92.0	130.0	183.0	259.0	366.0	518.0	733.0
	$40 < m \leq 70$	14.0	19.0	27.0	38.0	54.0	76.0	108.0	153.0	216.0	306.0	432.0	612.0	865.0
$8000 < d \leq 10000$	$10 \leq m \leq 16$	10.0	14.0	20.0	28.0	40.0	56.0	80.0	113.0	159.0	225.0	319.0	451.0	637.0
	$16 < m \leq 25$	11.0	15.0	22.0	31.0	43.0	61.0	87.0	123.0	174.0	246.0	348.0	492.0	695.0
	$25 < m \leq 40$	12.0	17.0	24.0	34.0	49.0	69.0	97.0	137.0	194.0	275.0	388.0	549.0	777.0
	$40 < m \leq 70$	14.0	20.0	28.0	40.0	57.0	80.0	114.0	161.0	227.0	321.0	454.0	642.0	909.0

注: f_i' 的公差值, 由表中的值乘以 K 计算得出。

表 15-1-61

径向综合偏差 F_i''

分度圆直径 d/mm	法向模数 m_n/mm	精度等级								
		4	5	6	7	8	9	10	11	12
		$F_i''/\mu\text{m}$								
$5 \leq d \leq 20$	$0.2 \leq m_n \leq 0.5$	7.5	11	15	21	30	42	60	85	120
	$0.5 < m_n \leq 0.8$	8.0	12	16	23	33	46	66	93	131
	$0.8 < m_n \leq 1.0$	9.0	12	18	25	35	50	70	100	141
	$1.0 < m_n \leq 1.5$	10	14	19	27	38	54	76	108	153
	$1.5 < m_n \leq 2.5$	11	16	22	32	45	63	89	126	179
	$2.5 < m_n \leq 4.0$	14	20	28	39	56	79	112	158	223
$20 < d \leq 50$	$0.2 \leq m_n \leq 0.5$	9.0	13	19	26	37	52	74	105	148
	$0.5 < m_n \leq 0.8$	10	14	20	28	40	56	80	113	160
	$0.8 < m_n \leq 1.0$	11	15	21	30	42	60	85	120	169
	$1.0 < m_n \leq 1.5$	11	16	23	32	45	64	91	128	181
	$1.5 < m_n \leq 2.5$	13	18	26	37	52	73	103	146	207
	$2.5 < m_n \leq 4.0$	16	22	31	44	63	89	126	178	251
	$4.0 < m_n \leq 6.0$	20	28	39	56	79	111	157	222	314
$50 < d \leq 125$	$6.0 < m_n \leq 10$	26	37	52	74	104	147	209	295	417
	$0.2 \leq m_n \leq 0.5$	12	16	23	33	46	66	93	131	185
	$0.5 < m_n \leq 0.8$	12	17	25	35	49	70	98	139	197
	$0.8 < m_n \leq 1.0$	13	18	26	36	52	73	103	146	206
	$1.0 < m_n \leq 1.5$	14	19	27	39	55	77	109	154	218
	$1.5 < m_n \leq 2.5$	15	22	31	43	61	86	122	173	244
	$2.5 < m_n \leq 4.0$	18	25	36	51	72	102	144	204	288
	$4.0 < m_n \leq 6.0$	22	31	44	62	88	124	176	248	351
	$6.0 < m_n \leq 10$	28	40	57	80	114	161	227	321	454

续表

分度圆直径 d/mm	法向模数 m_n/mm	精度等级								
		4	5	6	7	8	9	10	11	12
		$F''_i/\mu\text{m}$								
$125 < d \leq 280$	$0.2 \leq m_n \leq 0.5$	15	21	30	42	60	85	120	170	240
	$0.5 < m_n \leq 0.8$	16	22	31	44	63	89	126	178	252
	$0.8 < m_n \leq 1.0$	16	23	33	46	65	92	131	185	261
	$1.0 < m_n \leq 1.5$	17	24	34	48	68	97	137	193	273
	$1.5 < m_n \leq 2.5$	19	26	37	53	75	106	149	211	299
	$2.5 < m_n \leq 4.0$	21	30	43	61	86	121	172	243	343
	$4.0 < m_n \leq 6.0$	25	36	51	72	102	144	203	287	406
	$6.0 < m_n \leq 10$	32	45	64	90	127	180	255	360	509
$280 < d \leq 560$	$0.2 \leq m_n \leq 0.5$	19	28	39	55	78	110	156	220	311
	$0.5 < m_n \leq 0.8$	20	29	40	57	81	114	161	228	323
	$0.8 < m_n \leq 1.0$	21	29	42	59	83	117	166	235	332
	$1.0 < m_n \leq 1.5$	22	30	43	61	86	122	172	243	344
	$1.5 < m_n \leq 2.5$	23	33	46	65	92	131	185	262	370
	$2.5 < m_n \leq 4.0$	26	37	52	73	104	146	207	293	414
	$4.0 < m_n \leq 6.0$	30	42	60	84	119	169	239	337	477
	$6.0 < m_n \leq 10$	36	51	73	103	145	205	290	410	580
$560 < d \leq 1000$	$0.2 \leq m_n \leq 0.5$	25	35	50	70	99	140	198	280	396
	$0.5 < m_n \leq 0.8$	25	36	51	72	102	144	204	288	408
	$0.8 < m_n \leq 1.0$	26	37	52	74	104	148	209	295	417
	$1.0 < m_n \leq 1.5$	27	38	54	76	107	152	215	304	429
	$1.5 < m_n \leq 2.5$	28	40	57	80	114	161	228	322	455
	$2.5 < m_n \leq 4.0$	31	44	62	88	125	177	250	353	499
	$4.0 < m_n \leq 6.0$	35	50	70	99	141	199	281	398	562
	$6.0 < m_n \leq 10$	42	59	83	118	166	235	333	471	665

表 15-1-62 一齿径向综合偏差 f''_i

分度圆直径 d/mm	法向模数 m_n/mm	精度等级								
		4	5	6	7	8	9	10	11	12
		$f''_i/\mu\text{m}$								
$5 \leq d \leq 20$	$0.2 \leq m_n \leq 0.5$	1.0	2.0	2.5	3.5	5.0	7.0	10	14	20
	$0.5 < m_n \leq 0.8$	2.0	2.5	4.0	5.5	7.5	11	15	22	31
	$0.8 < m_n \leq 1.0$	2.5	3.5	5.0	7.0	10	14	20	28	39
	$1.0 < m_n \leq 1.5$	3.0	4.5	6.5	9.0	13	18	25	36	50
	$1.5 < m_n \leq 2.5$	4.5	6.5	9.5	13	19	26	37	53	74
	$2.5 < m_n \leq 4.0$	7.0	10	14	20	29	41	58	82	115
$20 < d \leq 50$	$0.2 \leq m_n \leq 0.5$	1.5	2.0	2.5	3.5	5.0	7.0	10	14	20
	$0.5 < m_n \leq 0.8$	2.0	2.5	4.0	5.5	7.5	11	15	22	31
	$0.8 < m_n \leq 1.0$	2.5	3.5	5.0	7.0	10	14	20	28	40
	$1.0 < m_n \leq 1.5$	3.0	4.5	6.5	9.0	13	18	25	36	51
	$1.5 < m_n \leq 2.5$	4.5	6.5	9.5	13	19	26	37	53	75
	$2.5 < m_n \leq 4.0$	7.0	10	14	20	29	41	58	82	116
	$4.0 < m_n \leq 6.0$	11	15	22	31	43	61	87	123	174
	$6.0 < m_n \leq 10$	17	24	34	48	67	95	135	190	269

续表

分度圆直径 d/mm	法向模数 m_n/mm	精度等级								
		4	5	6	7	8	9	10	11	12
		$f_r'/\mu\text{m}$								
$50 < d \leq 125$	$0.2 \leq m_n \leq 0.5$	1.5	2.0	2.5	3.5	5.0	7.5	10	15	21
	$0.5 < m_n \leq 0.8$	2.0	3.0	4.0	5.5	8.0	11	16	22	31
	$0.8 < m_n \leq 1.0$	2.5	3.5	5.0	7.0	10	14	20	28	40
	$1.0 < m_n \leq 1.5$	3.0	4.5	6.5	9.0	13	18	26	36	51
	$1.5 < m_n \leq 2.5$	4.5	6.5	9.5	13	19	26	37	53	75
	$2.5 < m_n \leq 4.0$	7.0	10	14	20	29	41	58	82	116
	$4.0 < m_n \leq 6.0$	11	15	22	31	44	62	87	123	174
	$6.0 < m_n \leq 10$	17	24	34	48	67	95	135	191	269
$125 < d \leq 280$	$0.2 \leq m_n \leq 0.5$	1.5	2.0	2.5	3.5	5.5	7.5	11	15	21
	$0.5 < m_n \leq 0.8$	2.0	3.0	4.0	5.5	8.0	11	16	22	32
	$0.8 < m_n \leq 1.0$	2.5	3.5	5.0	7.0	10	14	20	29	41
	$1.0 < m_n \leq 1.5$	3.0	4.5	6.5	9.0	13	18	26	36	52
	$1.5 < m_n \leq 2.5$	4.5	6.5	9.5	13	19	27	38	53	75
	$2.5 < m_n \leq 4.0$	7.5	10	15	21	29	41	58	82	116
	$4.0 < m_n \leq 6.0$	11	15	22	31	44	62	87	124	175
	$6.0 < m_n \leq 10$	17	24	34	48	67	95	135	191	270
$280 < d \leq 560$	$0.2 \leq m_n \leq 0.5$	1.5	2.0	2.5	4.0	5.5	7.5	11	15	22
	$0.5 < m_n \leq 0.8$	2.0	3.0	4.0	5.5	8.0	11	16	23	32
	$0.8 < m_n \leq 1.0$	2.5	3.5	5.0	7.5	10	15	21	29	41
	$1.0 < m_n \leq 1.5$	3.5	4.5	6.5	9.0	13	18	26	37	52
	$1.5 < m_n \leq 2.5$	5.0	6.5	9.5	13	19	27	38	54	76
	$2.5 < m_n \leq 4.0$	7.5	10	15	21	29	41	59	83	117
	$4.0 < m_n \leq 6.0$	11	15	22	31	44	62	88	124	175
	$6.0 < m_n \leq 10$	17	24	34	48	68	96	135	191	271
$560 < d \leq 1000$	$0.2 \leq m_n \leq 0.5$	1.5	2.0	3.0	4.0	5.5	8.0	11	16	23
	$0.5 < m_n \leq 0.8$	2.0	3.0	4.0	6.0	8.5	12	17	24	33
	$0.8 < m_n \leq 1.0$	2.5	3.5	5.5	7.5	11	15	21	30	42
	$1.0 < m_n \leq 1.5$	3.5	4.5	6.5	9.5	13	19	27	38	53
	$1.5 < m_n \leq 2.5$	5.0	7.0	9.5	14	19	27	38	54	77
	$2.5 < m_n \leq 4.0$	7.5	10	15	21	30	42	59	83	118
	$4.0 < m_n \leq 6.0$	11	16	22	31	44	62	88	125	176
	$6.0 < m_n \leq 10$	17	24	34	48	68	96	136	192	272

表 15-1-63

径向跳动公差 F_r

分度圆直径 d/mm	法向模数 m_n/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$F_r/\mu\text{m}$												
$5 \leq d \leq 20$	$0.5 \leq m_n \leq 2.0$	1.5	2.5	3.0	4.5	6.5	9.0	13	18	25	36	51	72	102
	$2.0 < m_n \leq 3.5$	1.5	2.5	3.5	4.5	6.5	9.5	13	19	27	38	53	75	106
$20 < d \leq 50$	$0.5 \leq m_n \leq 2.0$	2.0	3.0	4.0	5.5	8.0	11	16	23	32	46	65	92	130
	$2.0 < m_n \leq 3.5$	2.0	3.0	4.0	6.0	8.5	12	17	24	34	47	67	95	134
	$3.5 < m_n \leq 6.0$	2.0	3.0	4.5	6.0	8.5	12	17	25	35	49	70	99	139
	$6.0 < m_n \leq 10$	2.5	3.5	4.5	6.5	9.5	13	19	26	37	52	74	105	148

分度圆直径 d/mm	法向模数 m_n/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$F_r/\mu\text{m}$												
$50 < d \leq 125$	$0.5 \leq m_n \leq 2.0$	2.5	3.5	5.0	7.5	10	15	21	29	42	59	83	118	167
	$2.0 < m_n \leq 3.5$	2.5	4.0	5.5	7.5	11	15	21	30	43	61	86	121	171
	$3.5 < m_n \leq 6.0$	3.0	4.0	5.5	8.0	11	16	22	31	44	62	88	125	176
	$6.0 < m_n \leq 10$	3.0	4.0	6.0	8.0	12	16	23	33	46	65	92	131	185
	$10 < m_n \leq 16$	3.0	4.5	6.0	9.0	12	18	25	35	50	70	99	140	198
	$16 < m_n \leq 25$	3.5	5.0	7.0	9.5	14	19	27	39	55	77	109	154	218
$125 < d \leq 280$	$0.5 \leq m_n \leq 2.0$	3.5	5.0	7.0	10	14	20	28	39	55	78	110	156	221
	$2.0 < m_n \leq 3.5$	3.5	5.0	7.0	10	14	20	28	40	56	80	113	159	225
	$3.5 < m_n \leq 6.0$	3.5	5.0	7.0	10	14	20	29	41	58	82	115	163	231
	$6.0 < m_n \leq 10$	3.5	5.5	7.5	11	15	21	30	42	60	85	120	169	239
	$10 < m_n \leq 16$	4.0	5.5	8.0	11	16	22	32	45	63	89	126	179	252
	$16 < m_n \leq 25$	4.5	6.0	8.5	12	17	24	34	48	68	96	136	193	272
$280 < d \leq 560$	$25 < m_n \leq 40$	4.5	6.5	9.5	13	19	27	38	54	76	107	152	215	304
	$0.5 \leq m_n \leq 2.0$	4.5	6.5	9.0	13	18	26	36	51	73	103	146	206	291
	$2.0 < m_n \leq 3.5$	4.5	6.5	9.0	13	18	26	37	52	74	105	148	209	269
	$3.5 < m_n \leq 6.0$	4.5	6.5	9.5	13	19	27	38	53	75	106	150	213	301
	$6.0 < m_n \leq 10$	5.0	7.0	9.5	14	19	27	39	55	77	109	155	219	310
	$10 < m_n \leq 16$	5.0	7.0	10	14	20	29	40	57	81	114	161	228	323
$560 < d \leq 1000$	$16 < m_n \leq 25$	5.5	7.5	11	15	21	30	43	61	86	121	171	242	343
	$25 < m_n \leq 40$	6.0	8.5	12	17	23	33	47	66	94	132	187	265	374
	$40 < m_n \leq 70$	7.0	9.5	14	19	27	38	54	76	108	153	216	306	432
	$0.5 \leq m_n \leq 2.0$	6.0	8.5	12	17	23	33	47	66	94	133	188	266	376
	$2.0 < m_n \leq 3.5$	6.0	8.5	12	17	24	34	48	67	95	134	190	269	380
	$3.5 < m_n \leq 6.0$	6.0	8.5	12	17	24	34	48	68	96	136	193	272	385
$1000 < d \leq 1600$	$6.0 < m_n \leq 10$	6.0	8.5	12	17	25	35	49	70	98	139	197	279	394
	$10 < m_n \leq 16$	6.5	9.0	13	18	25	36	51	72	102	144	204	288	407
	$16 < m_n \leq 25$	6.5	9.5	13	19	27	38	53	76	107	151	214	302	427
	$25 < m_n \leq 40$	7.0	10	14	20	29	41	57	81	115	162	229	324	459
	$40 < m_n \leq 70$	8.0	11	16	23	32	46	65	91	129	183	258	365	517
	$2.0 \leq m_n \leq 3.5$	7.5	10	15	21	30	42	59	84	118	167	236	334	473
$1600 < d \leq 2500$	$3.5 < m_n \leq 6.0$	7.5	11	15	21	30	42	60	85	120	169	239	338	478
	$6.0 < m_n \leq 10$	7.5	11	15	22	30	43	61	86	122	172	243	344	487
	$10 < m_n \leq 16$	8.0	11	16	22	31	44	63	88	125	177	250	354	500
	$16 < m_n \leq 25$	8.0	11	16	23	33	46	65	92	130	184	260	368	520
	$25 < m_n \leq 40$	8.5	12	17	24	34	49	69	98	138	195	276	390	552
	$40 < m_n \leq 70$	9.5	13	19	27	38	54	76	108	152	215	305	431	609
$1600 < d \leq 2500$	$3.5 \leq m_n \leq 6.0$	9.0	13	18	26	36	51	73	103	145	206	291	411	582
	$6.0 < m_n \leq 10$	9.0	13	18	26	37	52	74	104	148	209	295	417	590
	$10 < m_n \leq 16$	9.5	13	19	27	38	53	75	107	151	213	302	427	604
	$16 < m_n \leq 25$	9.5	14	19	28	39	55	78	110	156	220	312	441	624
	$25 < m_n \leq 40$	10	14	20	29	41	58	82	116	164	232	328	463	655
	$40 < m_n \leq 70$	11	16	22	32	45	63	89	126	178	252	357	504	713

续表

分度圆直径 d/mm	法向模数 m_n/mm	精度等级												
		0	1	2	3	4	5	6	7	8	9	10	11	12
		$F_r/\mu\text{m}$												
$2500 < d \leq 4000$	$6.0 \leq m_n \leq 10$	11	16	23	32	45	64	90	127	180	255	360	510	721
	$10 < m_n \leq 16$	11	16	23	32	46	65	92	130	183	259	367	519	734
	$16 < m_n \leq 25$	12	17	24	33	47	67	94	133	188	267	377	533	754
	$25 < m_n \leq 40$	12	17	25	35	49	69	98	139	196	278	393	555	785
	$40 < m_n \leq 70$	13	19	26	37	53	75	105	149	211	298	422	596	843
$4000 < d \leq 6000$	$6.0 \leq m_n \leq 10$	14	19	27	39	55	77	110	155	219	310	438	620	876
	$10 < m_n \leq 16$	14	20	28	39	56	79	111	157	222	315	445	629	890
	$16 < m_n \leq 25$	14	20	28	40	57	80	114	161	227	322	455	643	910
	$25 < m_n \leq 40$	15	21	29	42	59	83	118	166	235	333	471	665	941
	$40 < m_n \leq 70$	16	22	31	44	62	88	125	177	250	353	499	706	999
$6000 < d \leq 8000$	$6.0 \leq m_n \leq 10$	16	23	32	45	64	91	128	181	257	363	513	726	1026
	$10 < m_n \leq 16$	16	23	32	46	65	92	130	184	260	367	520	735	1039
	$16 < m_n \leq 25$	17	23	33	47	66	94	132	187	265	375	530	749	1059
	$25 < m_n \leq 40$	17	24	34	48	68	96	136	193	273	386	545	771	1091
	$40 < m_n \leq 70$	18	25	36	51	72	102	144	203	287	406	574	812	1149
$8000 < d \leq 10000$	$6.0 \leq m_n \leq 10$	18	26	36	51	72	102	144	204	289	408	577	816	1154
	$10 < m_n \leq 16$	18	26	36	52	73	103	146	206	292	413	584	826	1168
	$16 < m_n \leq 25$	19	26	37	52	74	105	148	210	297	420	594	840	1188
	$25 < m_n \leq 40$	19	27	38	54	76	108	152	216	305	431	610	862	1219
	$40 < m_n \leq 70$	20	28	40	56	80	113	160	226	319	451	639	903	1277

6.5 齿轮坯的精度

有关齿轮齿精度（齿廓偏差、相邻齿距偏差等）的参数数值，只有明确其特定的旋转轴线时才有意义。当测量时齿轮围绕其旋转的轴如有改变，则这些参数测量值也将改变。因此在齿轮的图纸上必须把规定轮齿公差的基准轴线明确表示出来，事实上所有整个齿轮的几何形状均以其为准。

齿轮坯的尺寸偏差和齿轮箱体的尺寸偏差对于齿轮副的接触条件和运行状况有着极大的影响。由于在加工齿轮坯和箱体时保持较紧的公差，比加工高精度的轮齿要经济得多，因此应首先根据拥有的制造设备的条件，尽量使齿轮坯和箱体的制造公差保持最小值。这种办法，可使加工的齿轮有较松的公差，从而获得更为经济的整体设计。

6.5.1 基准轴线与工作轴线之间的关系

基准轴线是制造者（和检验者）用来对单个零件确定轮齿几何形状的轴线，设计者应确保其精确的确定，保证齿轮相应于工作轴线的技术要求得以满足。通常，满足此要求的最常用的方法是确定基准轴线使其与工作轴线重合，即将安装面作为基准面。

在一般情况下首先需确定一个基准轴线，然后将其他所有的轴线（包括工作轴线及可能还有一些制造轴线）用适当的公差与之相联系，在此情况下，公差链中所增加的链节的影响应该考虑进去。

6.5.2 确定基准轴线的方法

一个零件的基准轴线一般是用基准面来确定的，有三种基本方法实现。对与轴做成一体的小齿轮可将该零件安置于两端的顶尖上，由两个中心孔确定它的基准轴线。表 15-1-56 给出了确定基准轴线的方法。

6.5.3 基准面与安装面的形状公差

基准面的要求精度取决于：

- ① 规定的齿轮精度，基准面的极限值应确定规定得比单个轮齿的极限值紧得多；
- ② 基准面的相对位置，一般地说，跨距占齿轮分度圆直径的比例越大，给定的公差可以越松。

基准面的精度要求，必须在零件图上规定。所有基准面的形状公差不应大于表 15-1-65 中所规定的数值，公差应减至最小。