Thread Insert

One-Stop Fastening & Connection Solutions

High-Performance Internal Thread Inserts

Crafted from high-strength stainless steel wire, these inserts provide a superior alternative to direct tapping. They are engineered to enhance or restore threaded holes in lightweight materials (aluminum, magnesium, plastics), ensuring high-strength performance with exceptional wear and vibration resistance.

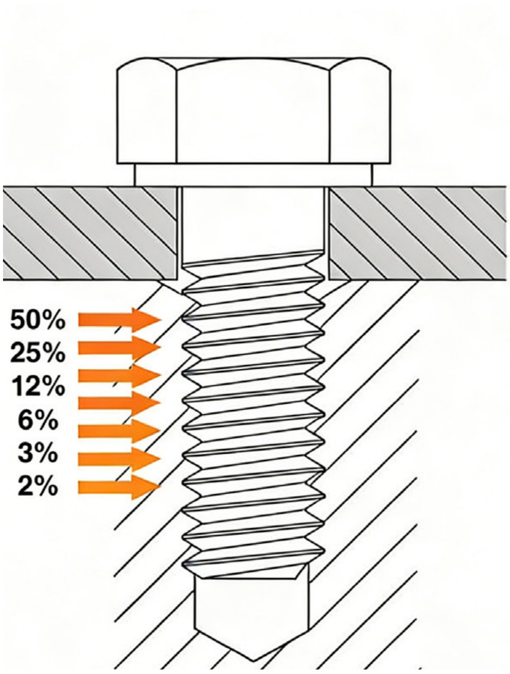
Key Advantages

Lightweight yet robust, thread inserts are typically manufactured from hardened 304 stainless steel. They feature a material hardness of HRC 43-50 and a tensile strength of no less than 1,370 MPa.

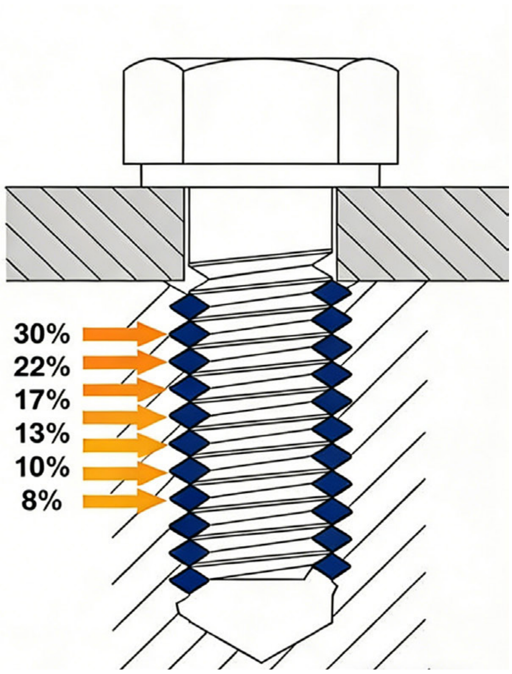
Stress Strain Curve

Key Advantages

Thread inserts effectively enhance the internal thread strength of light alloys (such as magnesium and aluminum) to Grade 12. Without the insert, the first thread often bears 50% of the total load. Thread inserts eliminate this stress concentration, ensuring long-term reliability.



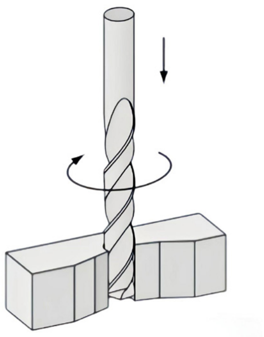
Standard Tapped Hole



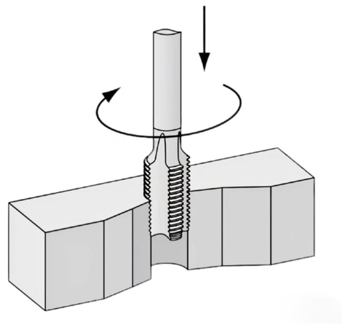
Tapped Hole with Inserts

These dual advantages enable thread holes in light alloys to accommodate high-strength bolts of Grade 8.8 and above once reinforced with thread inserts.

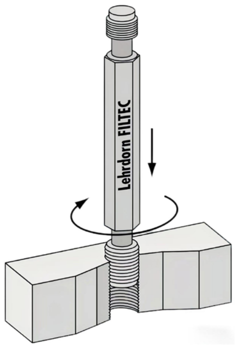
Operating Principle



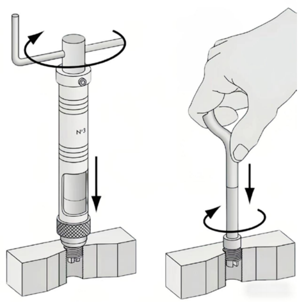
Drilling



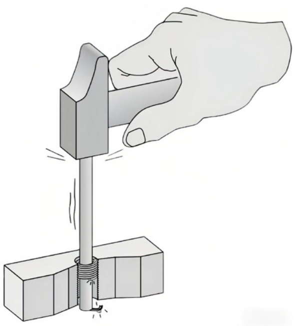
Tapping



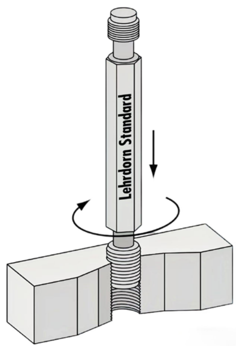
Thread Insppection



Installation

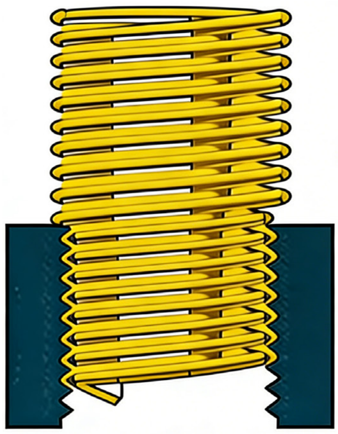


Tang Removal

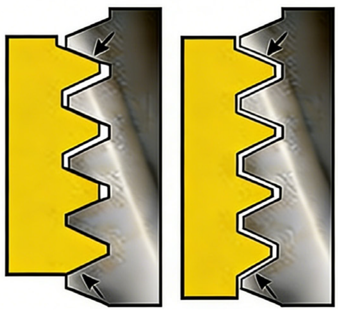


Final Inspection

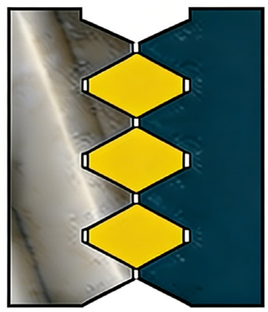
Installation Precautions



Partical Insertion



Pitch & Angular Misalignment



Fully Insertion

1. Place the insert onto the dedicated installation tool (manual or power tool). Align it with the pre-tapped hole in the parent material and screw it in vertically until the insert partially enters the hole.
2. Keep the tool perpendicular to the workpiece to avoid "Angular Errors". Simultaneously, the correct tap must be used to match the specific pitch.
3. Thread the insert until it reaches the specified depth—typically one pitch (1P) below the surface. At this stage, the installation tang remains exposed, ready for subsequent removal (if required).

Installation Tools

Inspection Tools

Key Characteristics

Material Options: SUS304 & SUS316 & Phosphor Bronze & Inconel Nickel

Surface Treatment: Dry Film Lubricant & Tin/Zinc/Silver Plated

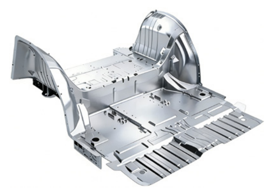
Size: M2-M39

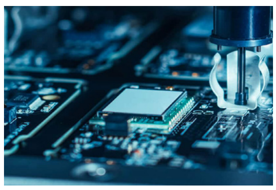
Length: 1D, 1.5D, 2D, 2.5D, 3D, 5D
Non-strandard lengths can be tailored to specific requirements.

Function Types: Standard (Free running) & Screw Locking

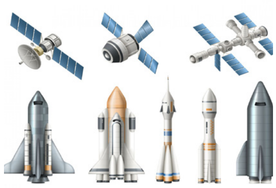
Installation Types: Tang-type & Tangless

Industrial Applications

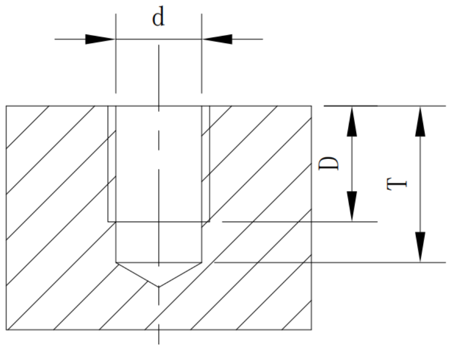






Standards

Table 1: Metric Thread - Drill Hole and Tapping Depth Specifications



Metric Coarse Thread	Pitch (mm)	Bottom Hole Diameter d (mm)	Drill Depth T (mm)	Thread Depth D (mm)	Metric Fine Thread	Pitch (mm)	Bottom Hole Diameter d (mm)	Drill Depth T (mm)	Thread Depth D (mm)
M2. 0	0. 4	1. 6	6	4	M2. 5	0. 35	2. 2	6	4
M2. 2	0. 45	1. 75	6	4	M3. 5	0. 35	2. 7	8	6
M2. 3	0. 45	1. 9	6	4	M4. 0	0. 5	3. 5	9	7
M2. 5	0. 45	2. 1	7	4. 5	M4. 5	0. 5	4	9	7
M2. 6	0. 45	2. 2	7	4. 5	M5. 0	0. 5	4. 5	14	11
M2. 0	0. 5	2. 5	8	6	M5. 5	0. 5	5	14	11
M3. 5	0. 6	2. 9	8	6	M6. 0	0. 75	5. 3	15	12
M4. 0	0. 7	3. 3	9	7	M7. 0	0. 75	6. 3	15	12
M4. 5	0. 75	3. 25	9	7	M8. 0	1	7	18	15
M4. 5	0. 75	3. 8	10	8	M8. 0	0. 75	7. 3	18	15
M5. 0	0. 8	4. 2	14	11	M8. 5	0. 75	7. 3	18	15
M5. 0	0. 9	4. 1	14	11	M9. 0	0. 75	8	18	15
M6. 0	1	5	15	12	M9. 0	0. 75	8. 3	18	15
M7. 0	1	6	15	12	M10. 0	1. 25	8. 8	20	17
M8. 0	1. 25	6. 8	18	15	M10. 0	0. 75	9	20	17
M9. 0	1. 25	7. 8	18	15	M11. 0	0. 75	9. 3	20	17
M10. 0	1. 5	8. 5	20	17	M11. 0	1. 25	10. 3	20	17
M11. 0	1. 5	9. 5	20	17	M12. 0	1. 25	10. 8	20	17
M12. 0	1. 75	10. 3	20	17	M12. 0	1. 25	10. 8	20	17
M14. 0	2	12	25	22	M12. 0	1. 25	10. 8	20	17
M16. 0	2	14	25	22	M14. 0	1. 5	12. 5	25	22
M18. 0	2. 5	15. 5	25	22	M15. 0	1. 5	13. 5	25	22
M20. 0	2. 5	17. 5	25	22	M16. 0	1. 5	14. 5	25	22
M22. 0	2. 5	19. 5	25	22	M20. 0	1. 5	15	25	22
M24. 0	3	21	25	22	M22. 0	2	18	25	22
M27. 0	3	24	25	22	M24. 0	2	18	25	22
M30. 0	3. 5	26. 5	25	22	M27. 0	2	16. 5	25	22
M33. 0	3. 5	29. 5	25	22	M30. 0	2	16. 5	25	22
M36. 0	4	32	25	22	M33. 0	2	16. 5	25	22
M39. 0	4	35	25	22	M36. 0	2	16. 5	25	22

Table 2. Specifications for Thread Inserts — Metric Coarse Thread (GB/T 24425.1-2009)

Thread Specification	Tap Drill Size dy		Free State Hole Diameter Dz		Nominal Length n*p	Number of Turns in Free State N (min)		Length After Installation	
/	min	max	min	max	/	min	max	min	max
M2	—	—	2.53	2.7	1d	3	3.4	1.6	1.8
					1.5d	5.3	5.6	2.6	2.8
					2d	7.6	7.9	3.6	3.8
					2.5d	9.9	10.2	4.6	4.8
					3d	12.2	12.4	5.5	5.8
M2.5	—	—	3.2	3.7	1d	3.3	3.8	2.05	2.375
					1.5d	5.9	6.3	3.3	3.525
					2d	8.5	8.8	4.55	4.775
					2.5d	11.1	11.4	5.8	6.025
					3d	13.6	13.9	7.05	7.275
M3	—	—	3.8	4.35	1d	3.6	4.3	2.5	2.75
					1.5d	6.3	7.1	4	4.25
					2d	9	9.8	5.5	5.75
					2.5d	11.8	12.6	7	7.25
					3d	14.5	15.3	8.5	8.75
M4	—	—	5.05	5.6	1d	3.6	4.2	3.3	3.65
					1.5d	6.3	6.9	5.3	5.65
					2d	9.1	9.5	7.3	7.65
					2.5d	11.8	12.2	9.3	9.65
					3d	14.4	14.9	11.3	11.65
M5	—	—	6.25	6.8	1d	4	4.7	4.2	4.6
					1.5d	6.8	7.6	6.7	7.1
					2d	9.6	10.6	9.2	9.6
					2.5d	12.4	13.5	11.7	12.1
					3d	15.2	16.4	14.2	14.5
M6	7.28	7.58	7.58	7.95	1d	3.8	4.5	5	5.5
					1.5d	6.5	7.3	8	8.5
					2d	9.2	10.2	11	11.5
					2.5d	12	13	14	14.5
					3d	14.6	15.8	17	17.5
M7	8.28	8.58	8.58	9.2	1d	4.7	5.4	6	6.5
					1.5d	7.9	8.8	9.5	10
					2d	11	12.1	13	13.5
					2.5d	14.2	15.4	16.5	17
					3d	17.3	18.7	20	20.5

Table 2 (Continued)

Thread Specification	Tap Drill Size dy		Free State Hole Diameter Dz		Nominal Length n*p	Number of Turns in Free State N (min)		Length After Installation	
/	min	max	min	max	/	min	max	min	max
M8	9.55	9.85	9.85	10.35	1d	4.4	4.9	6.75	7.375
					1.5d	7.3	8	10.75	11.375
					2d	10.3	11.1	14.75	15.375
					2.5d	13.3	14.1	18.75	19.375
					3d	16.4	17.2	22.75	23.375
M10	11.82	12.1	12.1	12.8	1d	4.7	5.2	8.5	9.25
					1.5d	7.8	8.4	13.5	14.25
					2d	11	11.6	18.5	19.25
					2.5d	14.2	14.8	23.5	24.25
					3d	17.3	18	28.5	29.25
M12	14.2	14.5	14.5	15	1d	4.8	5.4	10.25	11.125
					1.5d	8.1	8.7	16.25	17.125
					2d	11.3	12	22.25	23.125
					2.5d	14.6	15.3	28.25	29.125
					3d	17.8	18.6	34.25	35.125
M14	16.47	16.87	16.87	17.87	1d	4.9	5.5	12	13
					1.5d	8.3	8.9	19	20
					2d	11.6	12.3	26	27
					2.5d	14.9	15.6	33	34
					3d	18.2	19	40	41
M16	18.67	18.87	18.87	19.9	1d	6	6.5	14	15
					1.5d	9.8	10.3	22	23
					2d	13.6	14.2	30	31
					2.5d	17.4	18	38	39
					3d	21	21.9	46	47
M18	21	21.4	21.4	22	1d	5.2	6.1	15.5	16.75
					1.5d	8.6	9.5	24.5	25.75
					2d	12.1	13	33.5	34.75
					2.5d	15.5	16.5	42.5	43.75
					3d	18.9	20	51.5	52.75
M20	23.01	23.46	23.46	24.4	1d	6	6.8	17.5	18.75
					1.5d	9.7	10.7	27.5	28.75
					2d	13.5	14.6	37.5	38.75
					2.5d	17.3	18.4	47.5	48.75
					3d	21.2	22.3	57.5	58.75

Table 2 (Continued)

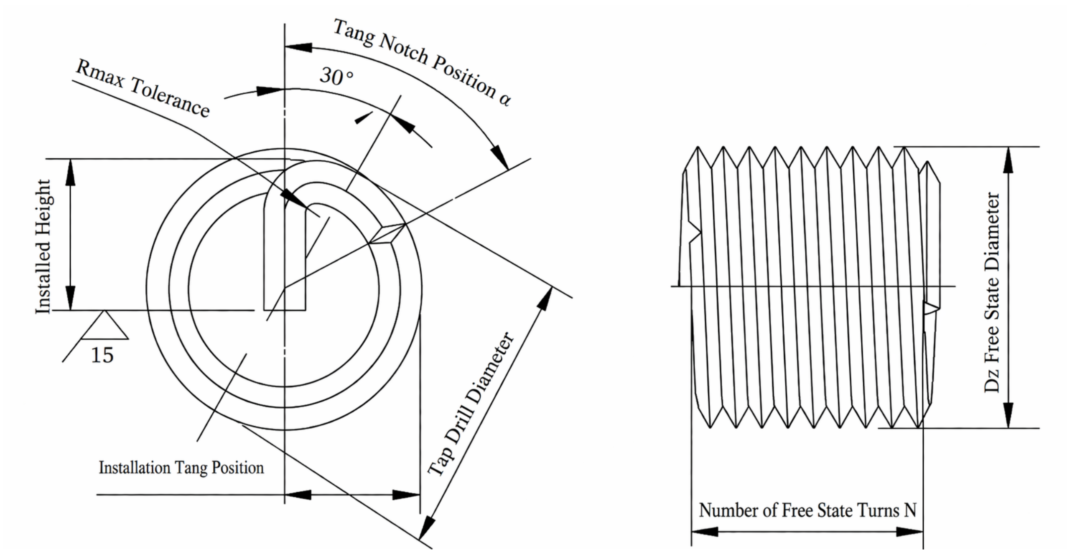
Thread Specification	Tap Drill Size dy		Free State Hole Diameter Dz		Nominal Length n*p	Number of Turns in Free State N (min)		Length After Installation	
/	min	max	min	max	/	min	max	min	max
M22	25.01	25.61	25.61	26.9	1d	6.7	7.6	19.5	20.75
					1.5d	10.9	11.9	30.5	31.75
					2d	15.1	16.1	41.5	42.75
					2.5d	19.3	20.4	52.5	53.75
					3d	23.5	24.6	63.5	64.75
M24	27.55	28.15	28.15	29.1	1d	6	6.7	21	22.5
					1.5d	9.8	10.6	33	34.5
					2d	13.6	14.4	45	46.5
					2.5d	17.4	18.3	57	58.5
					3d	21.3	22.2	69	70.5
M27	30.55	31.15	31.15	32.4	1d	6.9	7.7	24	25.5
					1.5d	11.1	12.2	37.5	39
					2d	15.5	16.7	51	52.5
					2.5d	19.3	20.4	64.5	66
					3d	23.9	24.7	78	79.5
M30	34.1	34.7	34.7	35.81	1d	6.5	7.1	26.5	28.25
					1.5d	10.6	11.3	41.5	43.25
					2d	14.4	15.4	56.5	58.25
					2.5d	18.7	19.2	71.5	73.25
					3d	22.8	23.4	86.5	88.25
M33	37.09	37.7	37.7	39.01	1d	7.3	8.2	29.5	31.25
					1.5d	11.8	12.9	46	47.75
					2d	16.3	17.6	62.5	64.25
					2.5d	20.8	21.3	79	80.75
					3d	25.3	25.8	95.5	97.25
M36	40.63	41.33	41.33	42.67	1d	6.9	7.5	32	34
					1.5d	11.2	11.9	50	52
					2d	15.5	16.3	68	70
					2.5d	19.7	20.3	86	88
					3d	24	24.6	104	106
M39	43.63	44.33	44.33	45.75	1d	7.7	8.3	35	37
					1.5d	12.3	13	54.5	56.5
					2d	17	17.7	74	76
					2.5d	21.6	22.1	93.5	95.5
					3d	26.2	26.8	113	115

Custom-Made Thread Insert

Table 3. Custom-Made Thread Insert Specifications (Coarse Thread)

Wire Thread Insert Specification	Nominal Length n*p	Number of Turns N	Free State Diameter Dz	Color	With Tang / Tangless
M4	1d	3.6-4.2	5.05-5.6	Green	With Tang
	3d	14.4-14.9	5.05-5.6	Natural	With Tang
M5	1.5d	6.8-7.6	6.25-6.80	Red	Tang Hole, Slot 65%
	1.5d	6.75-7.25	6.28-6.8	Green	With Tang
	1.5d	6.8-7.6	6.15-6.54	Green	With Tang
	1.5d	/	/	Natural	Tangless
	2d	9.45-9.7	6.35-6.6	Green	With Tang
	2d	9.6-10.6	6.35-6.4	Natural	With Tang
	2d	/	/	Natural	Tangless
M6	1.5d	6.5-7.3	7.5-7.55	Natural	With Tang
	2d	9.2-10.2	7.5-7.55	Natural	With Tang

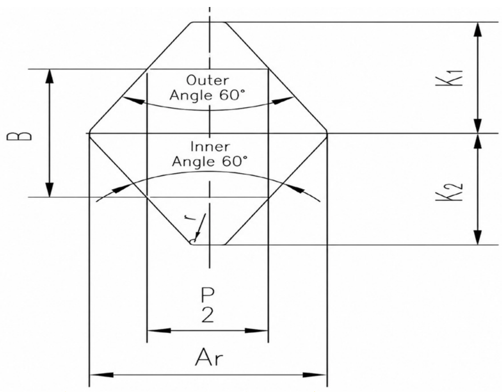
Wire Thread Insert Specification	Nominal Length n*p	Number of Turns N	Free State Diameter Dz	Color	With Tang / Tangless
M7	1d	/	/	Natural	With Tang
	1.5d	/	/	Red	With Tang
M8	1d	4.55-4.9	9.7-9.8	Natural	Tangless
	1.5d	7.3-8.0	9.85-10.35	Natural	With Tang
	2d	10.3-11.1	9.85-10.35	Natural	With Tang
	2.5d	13.3-14.1	9.85-10.35	Green	With Tang
M10	1.5d	7.8-8.4	12.1-12.8	Green	With Tang
	2d	11-11.6	12.1-12.8	Green	With Tang
	3d	20.2-21.6	11.87-12.65	Green	With Tang



Standards

Table 4. Thread Insert Specifications (GJB 119.4A-2001)

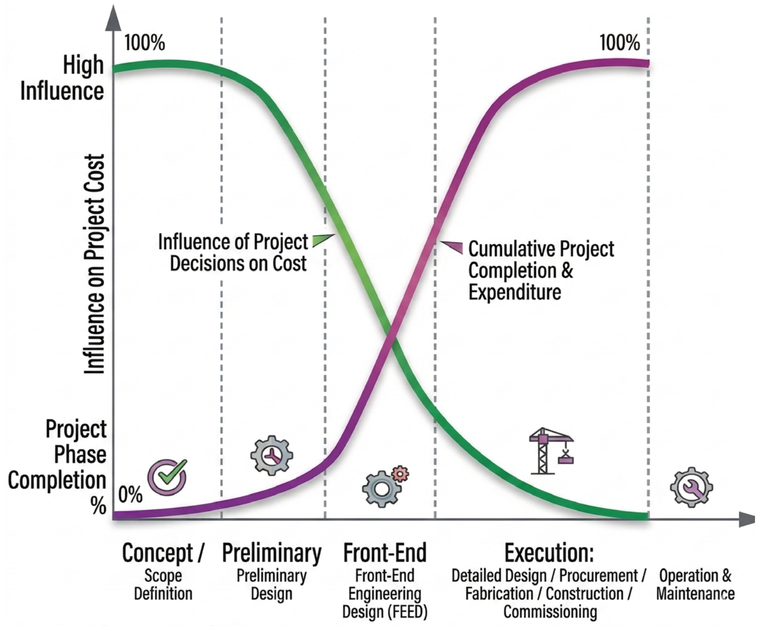
Thread Pitch P (mm)	B (mm) Base Size	B Upper Deviation (μm)	B Lower Deviation (μm)	K_1 (mm) Base Size	K_1 Upper Deviation (μm)	K_1 Lower Deviation (μm)	K_2 (mm) Base Size	K_2 Upper Deviation (μm)	K_2 Lower Deviation (μm)	A min (mm)
0.4	0.26	0	-10	0.26	0	-50	0.217	0	-20	0.32
0.45	0.292	0	-10	0.292	0	-50	0.244	0	-20	0.36
0.5	0.325	0	-10	0.325	0	-60	0.271	0	-25	0.4
0.7	0.455	0	-10	0.455	0	-60	0.379	0	-25	0.56
0.8	0.52	0	-12	0.52	0	-60	0.433	0	-40	0.64
1	0.65	0	-12	0.65	0	-90	0.541	0	-40	0.8
1.25	0.812	0	-12	0.812	0	-90	0.677	0	-55	1
1.5	0.974	0	-13	0.974	0	-120	0.812	0	-55	1.2
1.75	1.137	0	-13	1.137	0	-120	0.947	0	-70	1.4
2	1.299	0	-13	1.299	0	-120	1.083	0	-70	1.6
2.5	1.624	0	-13	1.624	0	-160	1.353	0	-100	2
3	1.949	0	-13	1.949	0	-160	1.624	0	-100	2.4
3.5	2.273	0	-13	2.273	0	-200	1.894	0	-120	2.8
4	2.598	0	-13	2.598	0	-200	2.165	0	-120	3.2



Industry Challenges

Project Cycle Cost Impact Model

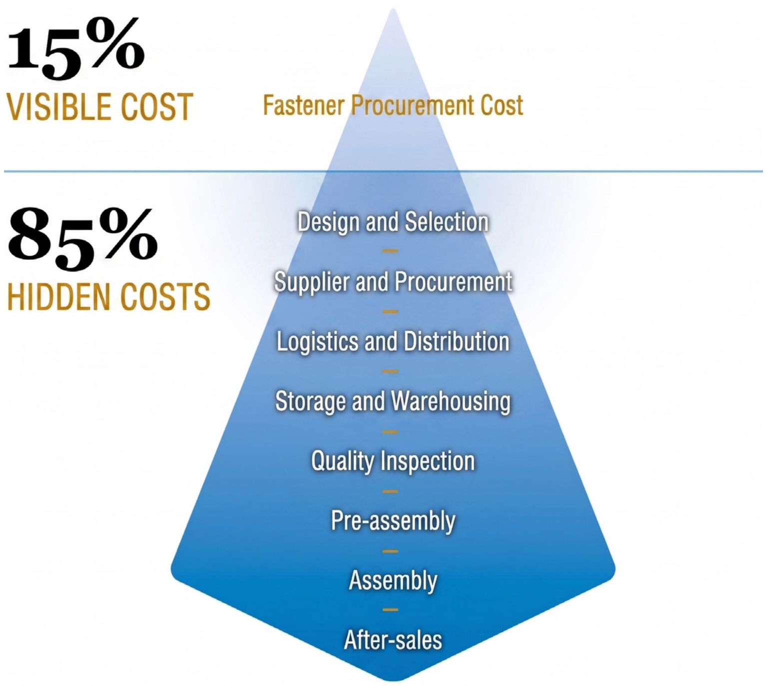
In today's rapidly evolving society, the core challenge facing enterprise R&D lies in this paradox: the early-stage decision-making window is extremely narrow, yet it locks in the majority of costs; while substantial investments are made in the later stages, the cost of correcting mistakes becomes prohibitively high—resulting in a serious mismatch between risks and returns. This requires enterprises to make accurate judgments at the very early stage to address market uncertainty.



Project Cost Influence and Completion Curve

The 15-85 Law

Another challenge facing enterprises today is this: excessive focus on explicit procurement costs, while ignoring the implicit costs that account for 85% of the total. Enterprises often lack systematic coordination across design, supply chain, after-sales and other links, leading to high manufacturing costs, rework, quality and after-sales issues caused by early-stage decision-making errors—ultimately driving up the total cost of ownership (TCO) significantly.



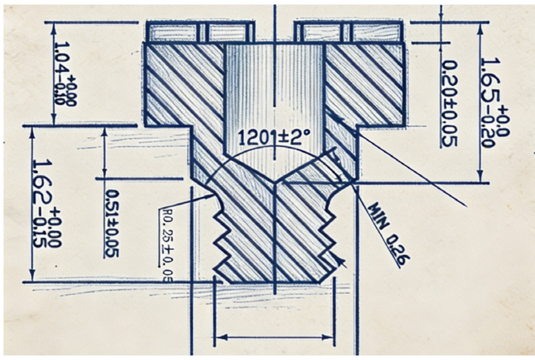
Services Offered by ZCJ

Total Cost Optimization Expert from Prototype Design to After-Sales

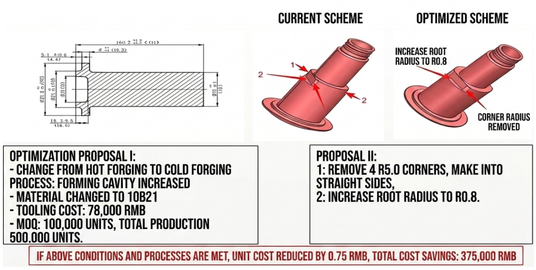
Rapid Prototypes

Professional Training

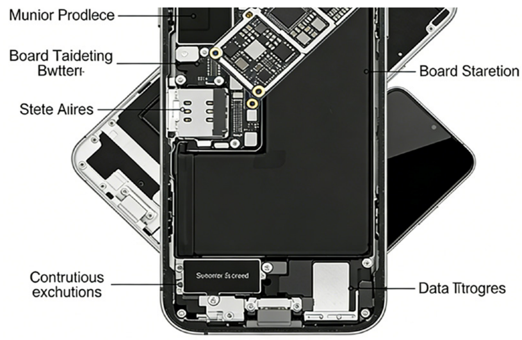
Professional Testing Services



Professional Design Consulting



Continuous Process Improvement



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