

WALI

INDUSTRIAL BLADE STEEL GRADE COMPARISON GUIDE

工业刀片钢材牌号对照指南

Purpose / 用途

This guide provides a practical cross-reference for steel grades commonly considered for industrial blades and wear parts. It is intended for preliminary communication among buyers, engineers and suppliers. 本指南用于工业刀片及耐磨件常用钢材的初步牌号对照，便于采购、工程和供应商沟通。

IMPORTANT / 重要说明

The listed grades are comparable families or commonly used commercial cross-references, not guaranteed one-to-one substitutes. Chemical composition, cleanliness, product form, heat treatment, hardness, toughness and dimensional requirements must be confirmed against the current purchase specification and material certificate before production. 表中牌号属于近似体系或常见商业对照，并非保证可直接互换。生产前必须依据现行采购技术条件和材质证明确认化学成分、纯净度、供货状态、热处理、硬度、韧性及尺寸要求。

Main Grade Comparison / 主要牌号对照

Category 类别	China (GB) 中国牌号	EU / EN-DIN 欧盟牌号	USA AISI/SAE 美国牌号	Practical characteristics 实用特性	Typical blade applications 典型刀片用途
Cold-work / 冷作	Cr12	X210Cr12 / 1.2080	D3	High-chromium wear-resistant steel; strong abrasion resistance, relatively low toughness.	Low-impact shear blades, wear plates, slitting and blanking tools.
Cold-work / 冷作	Cr12MoV	X165CrMoV12 / 1.2601	No exact direct grade; often compared with the D2 family	Higher hardenability and toughness than Cr12; correspondence varies by supplier and product form.	General industrial knives, shear blades and wear-resistant cutting parts.
Cold-work / 冷作	Cr12Mo1V1	X153CrMoV12 / 1.2379 (also listed commercially as X155CrMoV12-1)	D2	Common high-wear cold-work steel with good dimensional stability; widely used for industrial knives.	Shredder fixed knives, granulator knives, shear blades and wear parts.
Shock-resistant / 耐冲击	6CrW2Si	60WCrV7 / approx. 1.2550	S1 (approx.)	Good impact resistance and edge support; lower abrasion resistance than D2-type steels.	Heavy-impact shear blades, chipping and demolition-related cutting tools.
Hot-work / 热作	4Cr5MoSiV	X37CrMoV5-1 / 1.2343	H11	High toughness and thermal-fatigue resistance; suitable where heat and impact occur together.	Hot shearing, hot-cutting knives and thermally loaded tooling.
Hot-work / 热作	4Cr5MoSiV1	X40CrMoV5-1 / 1.2344	H13	Balanced hot strength, toughness and heat-checking resistance.	Hot shear blades, high-temperature cutting and impact-loaded tooling.

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High-speed / 高速钢	W6Mo5Cr4V2	HS6-5-2C / 1.3343	M2	High hardness, edge retention and temper resistance; harder to machine and heat treat than D2-type steels.	High-speed cutting knives, fine-edge blades and demanding granulator knives.
High-speed / 高速钢	W18Cr4V	HS18-0-1 / 1.3355	T1	Classic tungsten high-speed steel with excellent hot hardness and edge retention.	Special cutting knives and high-temperature/high-speed edges.
High-speed cobalt / 含钴高速钢	W2Mo9Cr4VCo8	HS2-9-1-8 / 1.3247	M42	Very high hot hardness and wear resistance; lower toughness and higher cost require careful application review.	Precision slitting and severe high-speed cutting applications.
Martensitic stainless / 马氏体不锈钢	40Cr13 (legacy designation: 4Cr13)	X46Cr13 / 1.4034	420 family	Corrosion resistance with moderate-to-high hardness; exact AISI 420 chemistry depends on specification.	Food, wet-service and corrosion-sensitive industrial knives.
High-carbon stainless / 高碳不锈钢	9Cr18Mo (commercial comparison)	X105CrMo17 / 1.4125	440C	High hardness and corrosion resistance; Chinese grade is a commercial/functional comparison, not an automatic contractual equivalent.	Precision corrosion-resistant blades and small cutting components.
Bearing steel / 轴承钢	GCr15	100Cr6 / 1.3505	SAE 52100	High hardness, rolling-contact fatigue strength and fine wear resistance after controlled heat treatment.	Circular knives, slitting components and precision wear parts.
Spring/carbon alloy / 弹簧钢	65Mn	C67S / approx. 1.1231	1065 (approx.)	Economical steel with good strength and elasticity; limited corrosion and high-temperature performance.	Low-to-medium duty chopping knives, spacers and non-critical cutting parts.

Application-Oriented Selection Notes / 按工况选材提示

Application condition / 工况	Preferred starting grades / 建议起选牌号	Engineering focus / 选材重点
High abrasive wear, moderate impact 高磨损、中等冲击	Cr12Mo1V1 / D2 / 1.2379; Cr12MoV / 1.2601	Wear resistance, carbide distribution, chipping risk and section size.
Heavy impact or contaminated feedstock 重冲击或物料夹杂	6CrW2Si / S1 family; tougher proprietary cold-work grades	Prioritize toughness and edge support; do not maximize hardness alone.
High cutting speed / fine edge 高速切削或精细刀口	M2 / 1.3343; T1 / 1.3355; M42 / 1.3247	Hot hardness, edge stability, grinding quality and heat-treatment control.
Hot cutting or thermal cycling 热切削或冷热循环	H11 / 1.2343; H13 / 1.2344	Thermal-fatigue resistance, hot strength and impact loading.
Wet/corrosive or hygiene-sensitive service 潮湿、腐蚀或卫生要求	40Cr13 / 420 family; 9Cr18Mo / 440C family	Corrosion resistance must be balanced against hardness and toughness.

Engineering Notes / 工程说明

- 1. Blade performance is controlled by the complete system: steel grade, steelmaking quality, forging/rolling condition, heat treatment, hardness distribution, edge geometry, grinding condition, mounting accuracy and actual feedstock.
- 2. For shredder and granulator knives, increasing hardness may improve wear resistance but can also increase chipping or catastrophic fracture risk. Toughness must be reviewed whenever metal contamination, shock loading or large blade sections are present.
- 3. Proprietary grades such as DC53, powder-metallurgy tool steels and ESR variants should be identified by the producer's datasheet, not forced into a national-grade equivalence table.
- 4. WALI recommends confirming at minimum: machine model, original part number/drawing, processed material, contaminants, current failure mode, target service life, critical tolerances and required inspection records.

Recommended wording for quotations / 报价建议用语

Material requirement	Example
Preferred	Specify the exact governing standard, grade and revision, e.g. GB/T grade Cr12Mo1V1, or EN 1.2379, with agreed chemical and mechanical requirements.
Avoid	Do not state only 'D2 equivalent' when composition, heat treatment, hardness or acceptance criteria are contractually important.

References / 参考资料

[1] Baosteel, Tool & Die Steel Products - grade comparison tables for GB, AISI/ASTM, JIS and EN designations. <https://esales.baosteel.com/bsi/ologin/pdf/cpscxz/cpscxz17.pdf>

[2] Baosteel Special Steel product catalogue - tool steel and die steel grade cross-references. https://esales.baosteel.com/baosteel_bsi/sso_teg/cp_pages_tggmjg.jsp

[3] Uddeholm, Sverker 21 - standard specification W.-Nr. 1.2379 / AISI D2 and industrial knife applications. <https://www.uddeholm.com/netherlands/en/products/uddeholm-sverker-21/>

[4] Uddeholm, Orvar 2 Microdized / Orvar Supreme - W.-Nr. 1.2344 / AISI H13. <https://www.uddeholm.com/netherlands/en/products/uddeholm-orvar-2-microdized/>

[5] worldstainless, stainless steel technical property and grade tables, including EN 1.4034 / AISI 420 and EN 1.4125 / AISI 440C. https://worldstainless.org/wp-content/uploads/2025/02/Tables_TechnicalProperties_EN.pdf

[6] GB/T 1299, Tool and Die Steels. Always confirm the current edition and contractual requirements applicable to the purchase order.

WALI TECHNICAL SUPPORT	For grade selection, send the blade drawing, machine model, feedstock, contamination conditions, current hardness and failure photographs to WALI. / 如需选材建议，请向 WALI 提供刀片图纸、设备型号、处理物料、夹杂情况、现用硬度及失效照片。
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Document name: WALI Industrial Blade Steel Grade Comparison Guide / 文档名称：WALI 工业刀片钢材牌号对照指南