



 BÖHLER

 MADE IN
AUSTRIA

高速鋼

HIGH SPEED STEEL

品質之熱衷追求

Quality is our Passion

voestalpine BÖHLER Edelstahl GmbH & Co KG
www.voestalpine.com/boehler-edelstahl

voestalpine



ONE STEP AHEAD.
梧濟工業股份有限公司
WUJII INDUSTRY CO., LTD.

HIGH PERFORMANCE MATERIALS FOR HIGH PERFORMANCE TOOLS

高性能工具用之 優異鋼材

SPEED SKILLS

voestalpine BÖHLER Edelstahl GmbH & Co KG is your partner of choice, if you require High Speed Steel that is capable of defining new limits in tool life connected with consistent quality and the passion to go the extra mile.

高速的技藝

高速鋼協助您在穩定品質下實踐刷新工具新壽命極限，並讓改善熱衷得以展現，此時奧鋼聯百樂鋼將是您的最佳夥伴。

MICROCLEAN®

Powder Metallurgy high performance steels
粉末冶金高性能鋼

ISORAPID®

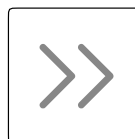
Electro Slag Remelted steels (ESR quality)
電渣重熔鋼 ESR品質

CONVENTIONAL HIGH SPEED STEEL

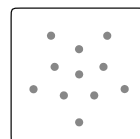
High Speed Steels that are produced with conventional ingot casting.

常規煉鋼高速鋼

常規鋼錠鑄造法高速鋼



HIGH SPEED
STEEL
高速鋼



POWDER
METALLURGY
粉末冶金







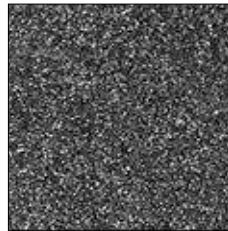
粉末冶金製程 Powder Metallurgical Production

MICROCLEAN®

FOR THE HIGHEST DEMANDS: 滿足最嚴苛條件

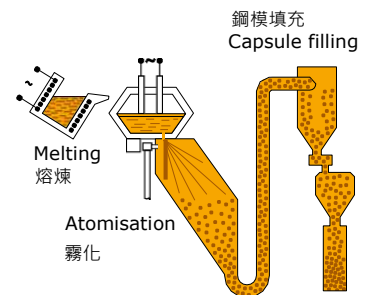
Segregation free high performance steel	無偏析高性能鋼
The finest carbide distribution	最細緻碳化物分布
The highest metallurgical purity	最高冶金清淨度
Isotropic properties	性能等向性
Maximum wear resistance with a simultaneously higher toughness	相對高的韌性下最大抗耐磨耗性
A high degree of hardness	高硬度
Very good dimensional stability	極佳尺寸穩定性
High compressive strength	抗壓強度佳

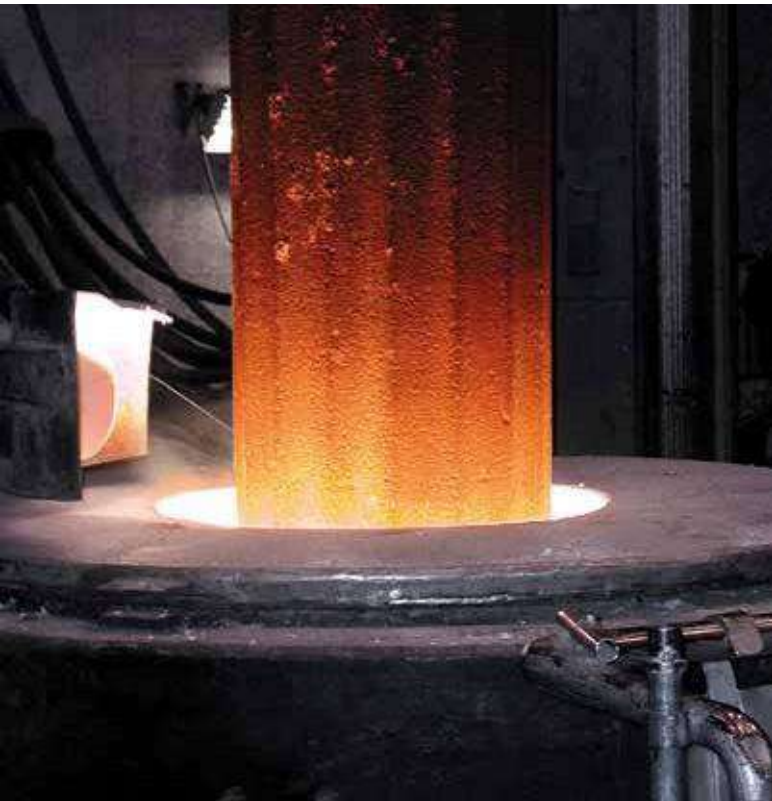
MICROCLEAN®
Microstructure
PM materials
粉末冶金
顯微組織



3 QUALITY LEVELS 3 TECHNOLOGIES

3種品質等級 3種煉鋼技術

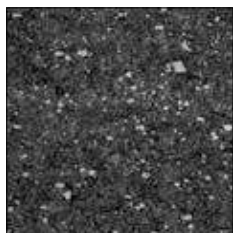
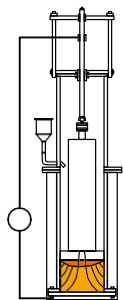




電渣重熔製程
Electro Slag Remelting
Production

ISORAPID®

IMPROVED SERVICE LIFE DUE TO:	能提升模具壽命，由於
The least possible inclusion content	最少不純物
Lower micro and macro segregation	降低微觀和宏觀之偏析
Good homogeneity and a higher degree of purity	良好的均質化組織和較佳的清淨度
A homogenic structure throughout the entire cross-section and bar length	橫截面和棒材長度方向均為均質化之組織
Producing larger bar dimensions at a constant carbide distribution	能生產碳化物分布一致之大尺寸鋼材
Uniform dimensional stability	一致的尺寸穩定性
A broad range of application owing to a high degree of toughness	因有較佳的韌性，能有更廣的應用



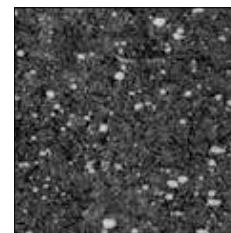
Microstructure
BÖHLER S600
in ESR quality
百樂ESR等級
S600 鋼種
顯微組織

常規煉鋼製程
Conventional
Production

THE STANDARD MATERIAL FOR RELIABLE BENEFITS 擁有可信賴性能之標準材料

State of the Art level: 最高水準之

Structural conditions	結構狀態
Carbide distribution	碳化物分布
Homogeneity	均質化
Individual carbides	碳化物大小
Degree of purity	清淨度
Toughness	韌性



Microstructure
BÖHLER S600
百樂S600 鋼種
顯微組織



BÖHLER HAS IMPROVED THE PRODUCTION PROCESS FOR POWDER METALLURGY STEELS AND TOOL STEELS. MICROCLEAR MATERIALS OF THE 3RD GENERATION WITH IMPROVED PERFORMANCE FEATURES ARE PRODUCED IN KAPFENBERG ON THE MOST MODERN UNIT WORLDWIDE. AN WIDE RANGE OF HIGH SPEED STEELS PROVIDES OUR CUSTOMERS WITH A DEFINITIVE COMPETITIVE ADVANTAGE.

百樂鋼致力於優化粉末冶金鋼及模具鋼之製造工藝。
 在擁有全世界最先進設備之奧地利卡芬堡鋼廠，製造最高性能之
 第三代MICROCLEAR粉末材。
 種類廣泛的高速鋼讓我們的客戶擁有絕對的競爭力優勢。

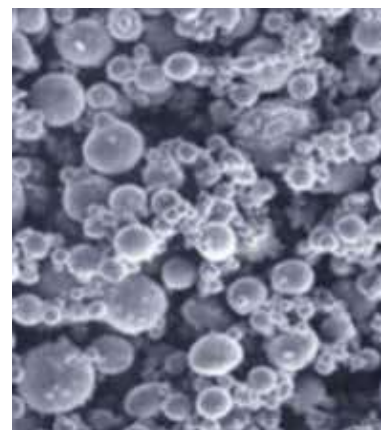
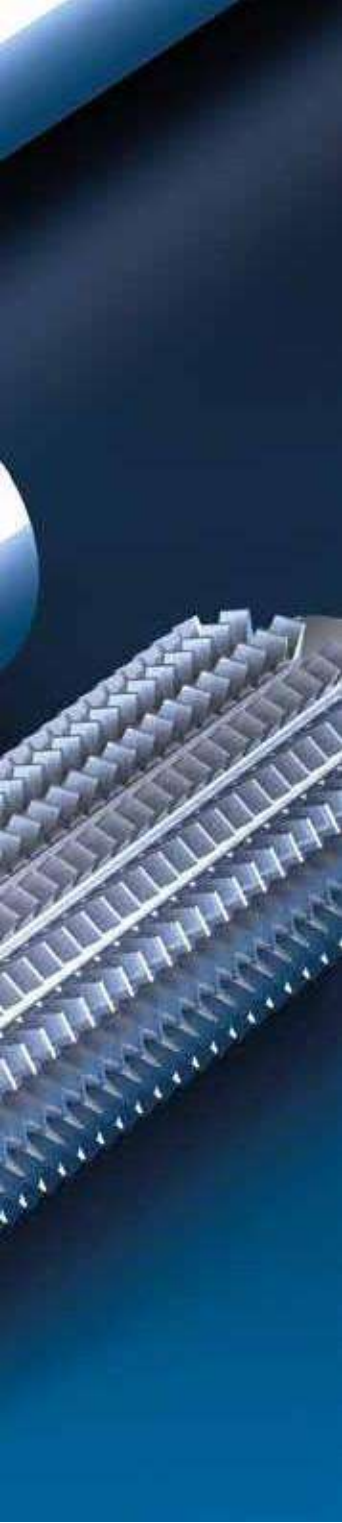


Image of the powder structure
 BÖHLER-S390 MICROCLEAR

百樂S390粉末高速鋼
 粉末外觀

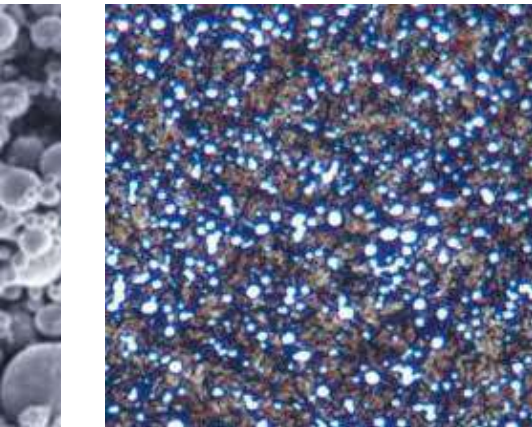


我們的專業 OUR SPECIALTY MICROCLEAN®

百樂MICROCLEAN 粉末鋼種
能提供您如下優勢

**BÖHLER MICROCLEAN STEELS
OFFER YOU THE FOLLOWING BENEFITS:**

- | | |
|---|---------------|
| » Extremely high wear resistance | » 極高耐磨性 |
| » The best grindability | » 最佳研磨性 |
| » High degree of toughness | » 高韌性 |
| » Low isotropic dimensional changes | » 尺寸變形量低且具等向性 |
| » Reproducible production sequences | » 製程及品質之再現性 |
| » Better resistance to oscillation | » 優異之抗振性 |
| » More resistance to mechanical impacts | » 耐機械衝擊 |



Your advantage 您的優勢

The result 效益

The highest precision parts 最高精度零件

Better in productivity 提高生產

The longest tool service life 最長的工具壽命

Lower unit costs 降低單位成本

Predictable tool service life 工具壽命可預測性

Greater chances on the market
with a greater yield
獲得高收益市場之眾多機會

HIGHEST PRODUCTIVITY 最高的生產力

Image of the microstructure
BÖHLER-S390 MICROCLEAN
百樂S390粉末高速鋼
顯微組織

MOST FREQUENTLY USED HIGH SPEED STEELS

This range of products shows the master brands of our High Speed Steel. You can quickly and clearly find the most suitable quality for your application.

常用高速鋼種

下表為我們高速鋼的主要鋼種。您可以快速並清楚地搜尋在應用上最符合之需求品質等級

BÖHLER grade 百樂牌號	Chemical composition in % 合金成分 (%)							Standards 對應通用牌號	
	C	Cr	W	Mo	V	Co	Others	DIN / EN	AISI
MICROCLEAN MICROCLEAN 粉末冶金鋼種									
BÖHLER S290 MICROCLEAN®	2,00	3,80	14,30	2,50	5,10	11,0	-	-	-
BÖHLER S390 MICROCLEAN® ²⁾	1,64	4,80	10,40	2,00	4,80	8,00	-	-	-
BÖHLER S393 MICROCLEAN®	1,64	4,00	12,10	-	4,80	5,00	-	-	T15
BÖHLER S590 MICROCLEAN® ²⁾	1,29	4,20	6,30	5,00	3,00	8,40	-	< 1.3244 >	HS6-5-3-8 -
BÖHLER S690 MICROCLEAN® ²⁾	1,35	4,10	5,90	5,00	4,10	-	-	~ 1.3351	~ HS6-5-4 ~ M4
BÖHLER S790 MICROCLEAN® ²⁾	1,29	4,20	6,30	5,00	3,00	-	-	< 1.3345 >	HS6-5-3C ~ M3 CI.2
ISORAPID ISORAPID 電渣重熔(ESR)鋼種									
BÖHLER S600 ISORAPID®	0,90	4,10	6,20	5,00	1,80	-	-	< 1.3343 > ~ 1.3554 LW	HS6-5-2C ~ M2 reg.C
CONVENTIONAL HIGH SPEED STEEL 常規煉鋼高速鋼鋼種									
BÖHLER S200	0,76	4,10	18,00	-	1,10	-	-	< 1.3355 >	HS18-0-1 T1
BÖHLER S400	1,02	3,80	1,80	8,60	1,90	-	-	< 1.3348 >	HS2-9-2 M7
BÖHLER S401	0,84	3,80	1,80	8,60	1,20	-	-	< 1.3346 >	HS2-9-1 M1
BÖHLER S404	0,89	3,80	1,00	4,30	1,80	-	-	< 1.3326 >	HS2-4-1 M52
BÖHLER S600 ¹⁾	0,90	4,10	6,20	5,00	1,80	-	-	< 1.3343 > ~ 1.3554 LW	HS6-5-2C ~ M2 reg.C
BÖHLER S607	1,21	4,10	6,20	5,00	2,90	-	-	< 1.3344 >	HS6-5-3 ~ M3 CI. 2
BÖHLER S630 ³⁾	0,95	4,00	4,00	4,00	2,00	-	+ Al	< 1.3330 >	HS4-4-2 -
BÖHLER S500	1,10	3,90	1,40	9,20	1,00	7,80	-	< 1.3247 >	HS2-9-1-8 ~ M42
BÖHLER S705	0,92	4,10	6,20	5,00	1,90	4,80	-	< 1.3243 >	HS6-5-2-5 ~ M35
BÖHLER S730 ³⁾	0,92	4,10	4,25	4,15	1,95	4,75	+ Al	< 1.3230 >	HS4-4-2-5 -

¹⁾ also available in the BHT execution

²⁾ also available with sulphur as S392 MICROCLEAN, S592 MICROCLEAN, S692 MICROCLEAN, S792 MICROCLEAN;

³⁾ BÖHLER Patent

¹⁾ 此鋼種也供應淬火回火後的預硬狀態

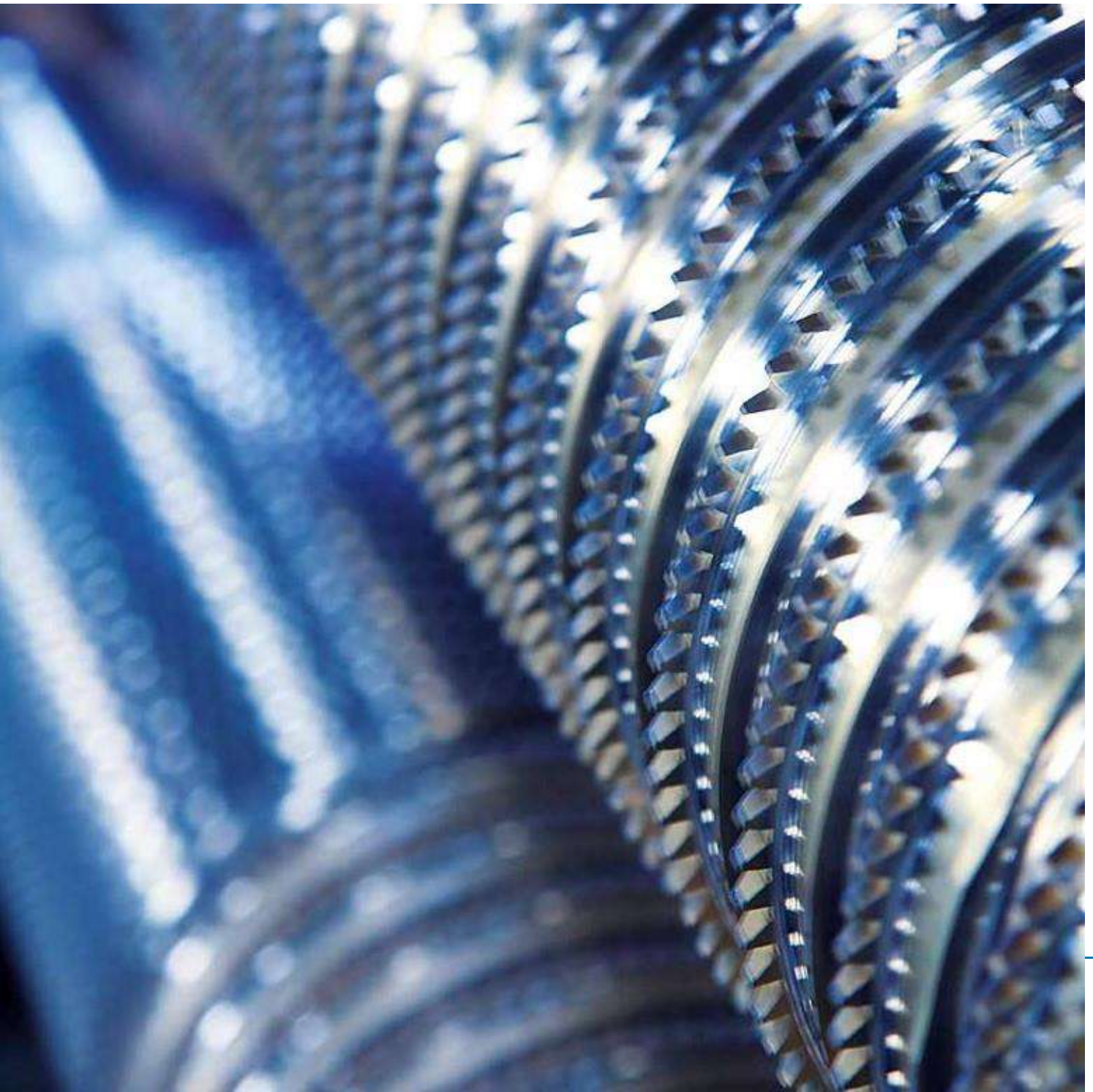
²⁾ 還提供含硫的鋼種。如: S392 MICROCLEAN, S592 MICROCLEAN, S692 MICROCLEAN, S792 MICROCLEAN;

³⁾ BÖHLER 百樂專利鋼種



主要鋼種性能之比較

COMPARISON OF THE MAJOR STEEL PROPERTIES



BÖHLER grade 百樂鋼種	Red hardness 紅熱硬度	Wear resistance 抗磨耗性	Toughness 韌性	Grindability 可研磨性	Compressive strength 抗壓強度
BÖHLER S290 MICROCLEAN®					
BÖHLER S390 MICROCLEAN®					
BÖHLER S393 MICROCLEAN®					
BÖHLER S590 MICROCLEAN®					
BÖHLER S690 MICROCLEAN®					
BÖHLER S790 MICROCLEAN®					
BÖHLER S200					
BÖHLER S400					
BÖHLER S401					
BÖHLER S404					
BÖHLER S600					
BÖHLER S630					
BÖHLER S607					
BÖHLER S500					
BÖHLER S705					
BÖHLER S730					

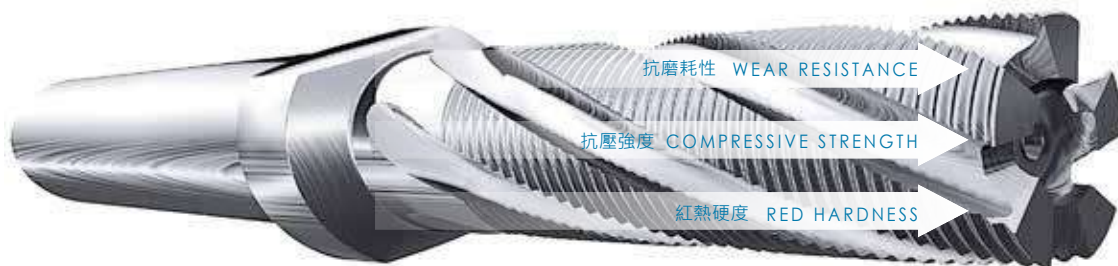
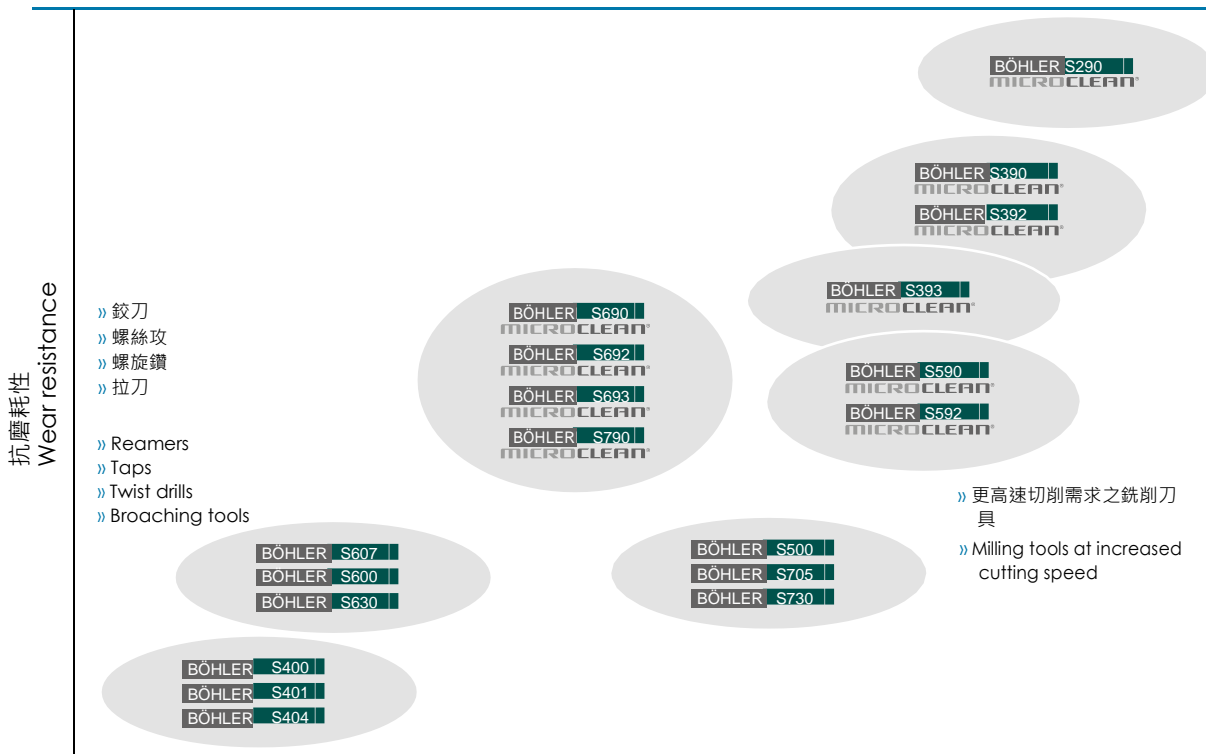
Overview for first orientation. Please contact us for our expertise.

以上資料僅為概述，如需更詳細資料請與我們聯繫

切削業界需求

MAIN SEGMENTS HIGH-SPEED STEEL: CUTTING

Requirements in the cutting industry 切削業界的的需求





Applications 應用

Drilling 鑽頭

Tapping 螺絲攻

Gear cutting tools 齒切工具

Broaching and reaming 拉刀和鉸刀

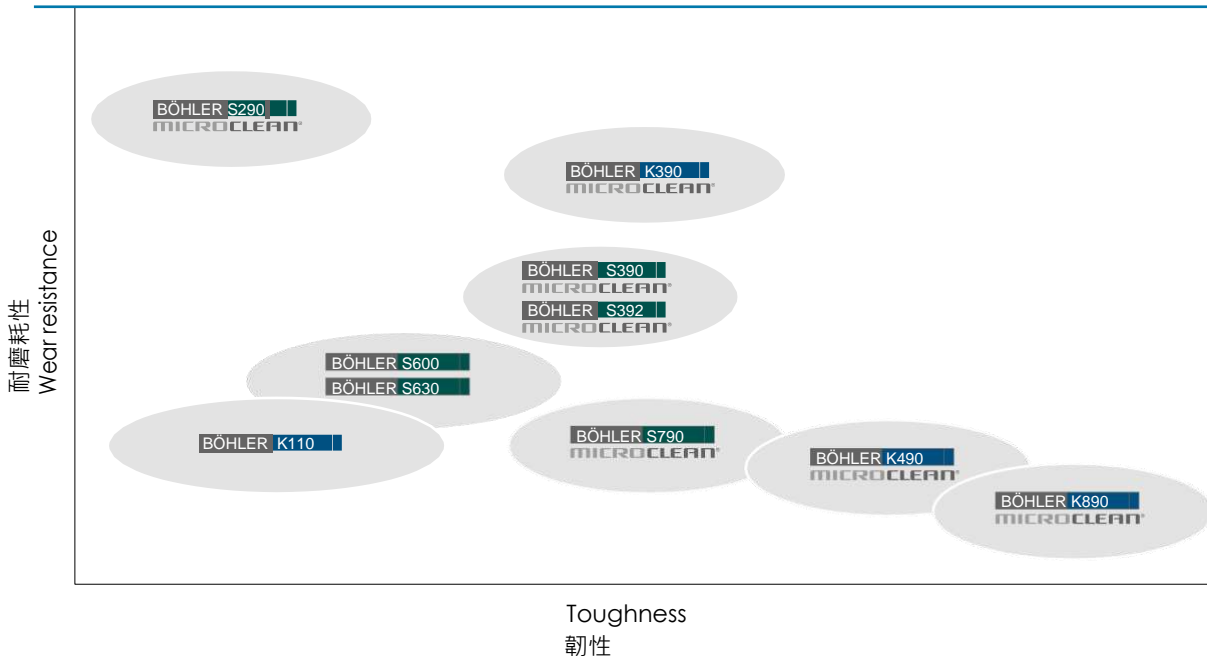
End milling 端銑刀

Sawing 鋸切刀

冷作成型領域之需求

MAIN SEGMENTS HIGH-SPEED STEEL: COLD WORK

Requirements in the cold forming sector 冷作成型領域之需求





Applications 應用

Blanking and fine blanking tools
下料及精密下料工具

Extrusion tools 擠型工具

Drawing and deep-drawing tools
抽製和深抽工具

Stamping tools 沖壓工具

Thread rolling tools 螺紋滾壓工具

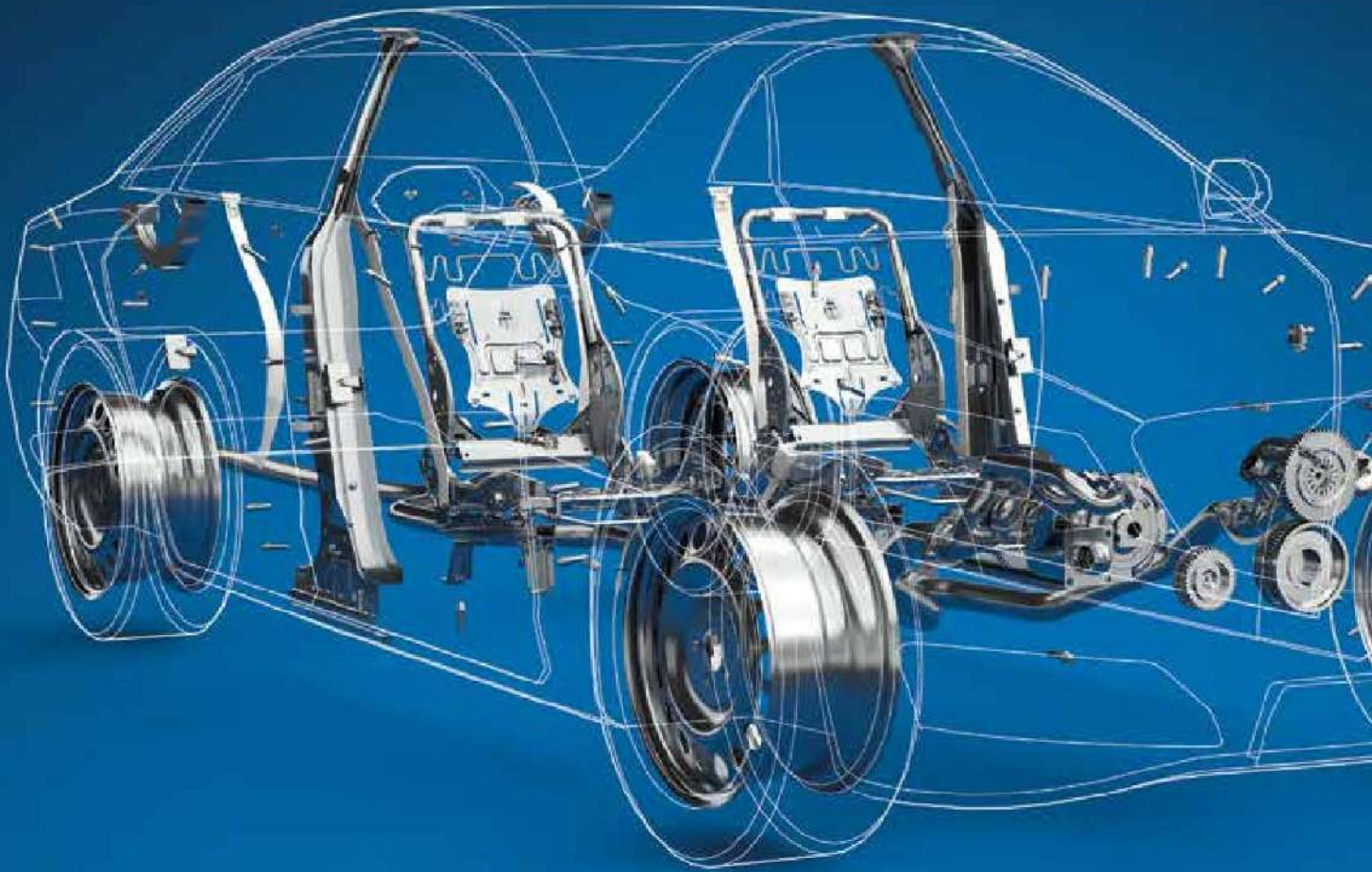
Cold rolls for multiple roller stands
多輓冷軋機之軋輓

Cold pilger tools 冷軋管工具

Knives 刀具

Powder compaction 粉末壓造

Cold massive forming 大型冷成形



High Speed Steel is being used more and more for the so-called non-tooling applications and is utilized as a component in several different branches of industry.

This is exactly where voestalpine BÖHLER High Speed Steel succeeds with its ability to deal with compressive strength, making it the ideal material for the automotive industry or for pumps and other such components.

MAIN SEGMENTS HIGH SPEED STEEL: NON TOOLING APPLICATIONS

高速鋼的另一種主用途： 非工具類應用

現今高速鋼於所謂非工具應用方面有越來越多的趨勢，並可被製成多種不同產業之組件。

也正是由於奧鋼聯百樂高速鋼具有相當抗壓強度，可以成功成為汽車工業或幫浦領域及其他此類零組件之理想材料。

由於這範圍應用一直在穩定增長，業界也開始出現創新且富有挑戰性的應用，這正是奧鋼聯百樂所擅長的。因為這是可以展現出我們無以倫比的產品品質及行動力，與對最佳優勢所需最頂尖要求之認知力。從而為您訂製解決方案，並提供最佳支持。



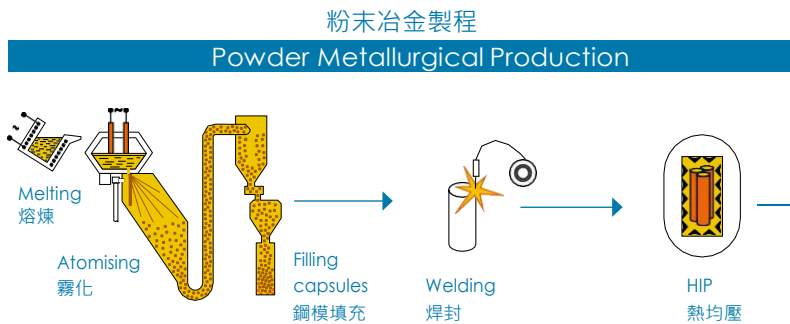
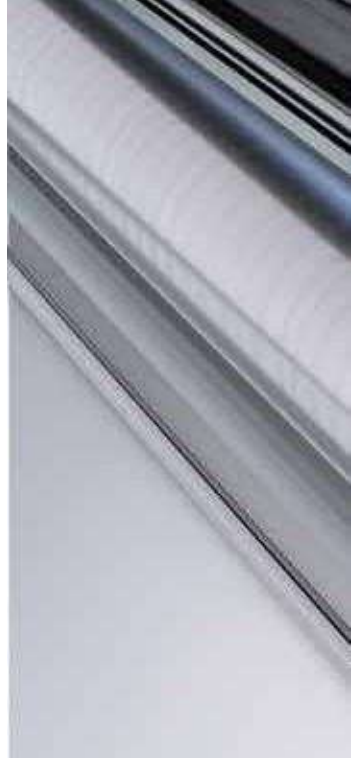
跳脫框架 OUTSIDE THE BOX

Since this segment has been growing steadily and new and challenging applications are becoming available, this is exactly where we at voestalpine BÖHLER Edelstahl feel particularly at home. Because this is where we can show off our unbeatable product quality, our viability and our receptiveness cutting-edge demands to their best advantage, optimally supporting you with customized solutions.

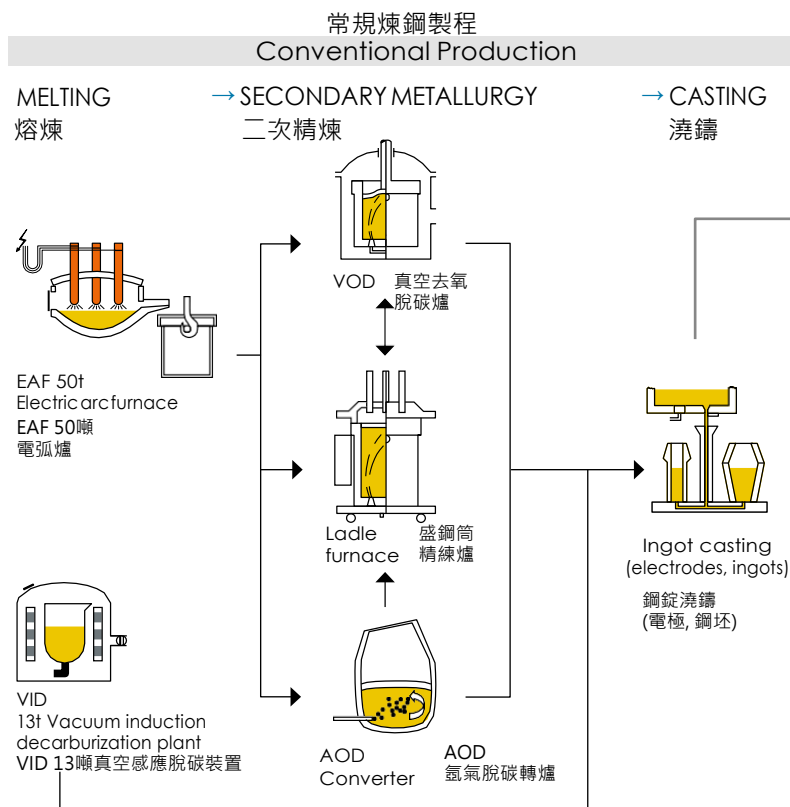


煉鋼製程

FLOW OF MATERIAL



MICROCLEAN®

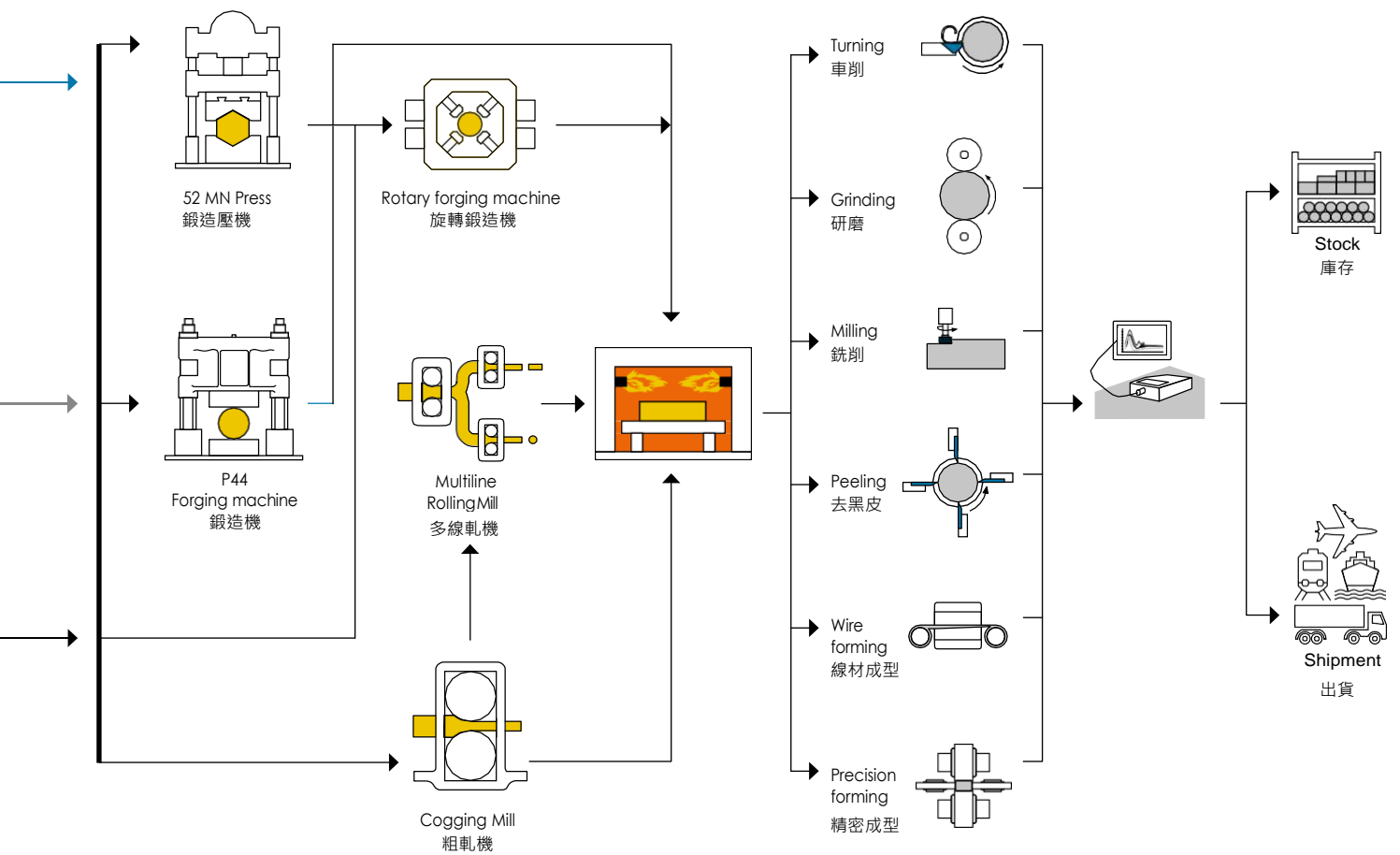


ISORAPID®

常規煉鋼高速鋼製程
CONVENTIONAL HIGH SPEED STEEL



滾軋和鍛造 → ROLLING AND FORGING 熱處理 → HEAT TREATMENT 加工 → MACHINING 品質檢測 → TESTING 物流 → DISPATCH



The data contained in this brochure is merely for general information and therefore shall not be binding on the company. We may be bound only through a contract explicitly stipulating such data as binding. The manufacture of our products does not involve the use of substances detrimental to health or to the ozone layer.

本手冊中包含的數據僅供參考，因此不具保證之約束力。我們可能僅針對明列在合約上的數據做保證。我們產品的製造不涉及對健康或臭氧層有害的物質。

我們團隊由專家組成 提供您最令人信賴的服務

YOU CAN TRUST OUR SPECIALISTS

YOU'VE GOT THE IDEAS AND WE'VE GOT THE SOLUTIONS. ANY PROBLEM THAT ARISES, ANY CUSTOMER REQUIREMENT AT HAND MEANS NEW ANSWERS TO BE FOUND, FOR OVER 100 YEARS NOW. THIS KNOW-HOW IS AVAILABLE TO YOU, WHETHER AS SUPPORT FOR MATERIALS OR AS APPLICATIONS. TECHNICAL CONSULTING IS OUR SUPREME DISCIPLINE AND YOU AS OUR PARTNER CAN CERTAINLY BENEFIT FROM IT.

您有創新的想法，我們則有解決方案來幫您實現。在過去超過100年至今，客戶對我們提出的任何需求以及問題，都代表我們會發現新的解答。我們所累積的這些專業知識，無論是材料知識面或應用面，均能為您所用。提供客戶專業的技術諮詢是我們銷售的最高指導原則，若與我們共同攜手合作將獲益匪淺。

Our services include:

On-going responsibility for quality
(from the inquiry to issuing the certificate)

Technical interface between the customer
(sales, marketing, ...) and the production

Technical request handling

Technical order processing/inspection/monitoring

Product certification (issuing certificates)

Product and process approvals/qualifications

Continuous product optimization throughout the
entire production process

Technical customer advisory service/
applications engineering

Technical trainings

Process optimization and development

Central coordination of testing activities

我們的服務包含:

持續並負責的堅守品質
(從詢價直到提供材證)

客戶 (銷售、市場...) 與生
產之間的技術平台

提供技術支援

創新技術訂單處理/檢查/監控

產品認證 (頒發材證)

產品和過程批准/認證

在整個生產過程中持續進行
產品優化

技術客戶諮詢服務/應用工程

提供技術培訓

工藝優化與開發

集中協調進行創新技術測試





研究與開發

RESEARCH AND DEVELOPMENT

THE RESEARCH AND DEVELOPMENT PROGRAM IS FOCUSED AMONG OTHER ISSUES ON EXPANDING ON OUR CORE COMPETENCES, ONE OF WHICH IS HIGH SPEED STEEL.

開發與研究是我們維持及擴大核心競爭力的方式，
高速鋼即為其中一項重要項目



The work program for the voestalpine BÖHLER Edelstahl Research and Development departments has turned to innovative product and process development and is oriented towards efficiently living up to market expectations and fulfilling the ever-changing customer needs.

Efficiently implementing the research and development programs is facilitated by the use and development of simulation programs for computer-assisted material and alloy development, by the mathematic simulation of manufacturing and process steps and by the physical simulation of material behavior during the production process and in components to guarantee best possible benefits for our customers.

奧鋼聯百樂鋼研發部門的目標已轉向新產品和工藝的研發，並旨在有效地滿足市場期望，並滿足不斷變化的客戶需求。

透過開發並應用電腦輔助材料及合金模擬程式，並以數學及物理模擬製造過程及製程中之材料特性，實現有效率之產品製程研發規畫，並確保為客戶帶來最大的利益。



梧濟工業股份有限公司

<http://www.wujii.com.tw/>

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