

**HIGH WEAR RESISTANCE,  
HIGH VANADIUM CONTENT  
FINE GRAIN POWDER MATERIALS**  
優質高耐磨細晶體高鈇粉末鋼



SCHMOLZ + BICKENBACH

Providing special steel solutions



<b>DIN-Code DIN:</b> AISI 代號: <b>A11</b>	<b>Delivery condition:</b> 出廠狀態: <b>Pre-hardened</b> <b>預硬</b>			<b>60HRC-64HRC</b>			
<b>Chemical Composition 化學成份</b> (Typical analysis in %) (典型分析結果%)	<b>C 碳</b>	<b>Mn 錳</b>	<b>Si 硅</b>	<b>Cr 鉻</b>	<b>V 鈮</b>	<b>Mo 鉬</b>	<b>S 硫</b>
	2.45	0.50	0.90	5.25	9.75	1.30	0.07

<b>Size Change During Hardening 熱處理變型度</b>							
<b>Hardening Temperature 淬硬溫度</b>				<b>HRC</b>	<b>Longitudinal Size Change % 長度轉變</b>		
1950°F	1065°C	1000°F	540°C	60	+ .04		
2150°F	1175°C	1000°F	540°C	64	+ .04		

<b>Surface treatments</b>	GSP-10V can be nitrided, steam tempered or titanium-nitride coated if desired. If the CVD TiN treatment is used, care is required in vacuum hardening.	GSP-10V可氮化, 及造CVD Ti-N表面處理
---------------------------	--	----------------------------

<b>Physical Properties 物理性能</b>					
<b>Modulus of Elasticity</b> .....32 psi X 10 <sup>6</sup> (221 Gpa)					
<b>Specific Gravity</b> .....7.41					
<b>Density</b> .....0.268 lb/in <sup>3</sup> (7418 kg/m <sup>3</sup> )					
<b>Coefficient of thermal expansion (10<sup>-6</sup>m/(m . K))</b>		21-93°C	21-260°C	21-427°C	21-593°C
		10.7	11.1	11.8	12.3

<b>Applications 用途</b>	Mold inserts, gate/runner inserts, injection/extrusion screws, punches, powder compaction tooling, non-return valves and tips, granulator/pelletizer blades, wear parts, knives, dies, barrel liners, etc.	模具內模, 熱流道鑲件, 注塑及擠壓螺桿, 粉末成型模具, 止流閥, 刀具, 耐磨件及其它切粒刀等等.
------------------------	--	---

<b>Heat treatment 熱處理</b>	
<b>Critical Temperature:</b> 838°C	
<b>Forging:</b>	1095-1150°C. Do not forge below 930°C. Slow cool after forging.
<b>Annealing:</b>	870°C, hold 2 hours, slow cool 15°C /hr max. to 540°C, then air or furnace cool.
<b>Straightening:</b>	Best done warm 200-430°C.
<b>Hardening:</b>	Salt, vacuum or atmosphere.
<b>Preheat:</b>	820-845°C equalize. Second preheat stage at 1010-1040°C suggested for vacuum or atmosphere hardening.
<b>High heat:</b>	1010-1175°C. Standard recommendation to achieve Rc 60-62 after tempering is to use 1120°C.
<b>Quench:</b>	Salt, oil or atmosphere quench to 540-595°C, equalize, then air cool to below 50°C or hand warm. Vacuum or atmosphere quench rate through 1010-705°C range is critical to achieve optimum heat treat results.
<b>Temper:</b>	540°C minimum recommended. Double tempering is required.

<b>Hardening Data</b>							
<b>Hardening temperature °C 淬火溫度 °C</b>		1025	1040	1065	1120	1150	1175
<b>As quenched 淬火硬度 HRC</b>		61	63	65	65	64.5	63.5
<b>Optimum for maximum toughness and effective stress-relieving 回火數據</b>							
<b>Tempering temperature °C 回火溫度 °C</b>		<b>回火硬度 HRC</b>					
540		56	57	60.5	62	63	64
550		54	56	58.5	60	62	63
565		52	54	56.5	58	60	61
595		49	51	52	54	55	56
620		44	45	46	48	50	51
650		40	41	43	46	47	48

Results may vary with hardening method and section size, salt or oil quenching will give maximum response. Vacuum or atmosphere cooling may result in up to 1-2 HRC points lower.

<b>Minimum time at AUST temp (mins) 最小保溫時間</b>	60	45	30	20	15	10
<b>Minimum number of tempers (2 hrs) 回火次數</b>	2	2	2	2	3	3

# 斯穆+碧根柏特種鋼材集團

## SCHMOLZ + BICKENBACH

Providing special steel solutions



香港: 香港沙田火炭山尾街18-24號沙田商業中心1718室  
 東莞: 廣東省東莞市虎門鎮新聯村 (523917)  
 江蘇: 江蘇省太倉市沙溪鎮直塘管理區直水路9889 (215417)  
 浙江: 浙江省寧海縣科技工業園區金山五路26號 (315600)

電話: 00852-26990339  
 電話: 0769-85521777 85524209 85500365  
 電話: 0512-53253271 53253272  
 電話: 0574-65530928 65530972

傳真: 00852-26024765  
 傳真: 0769-85524174  
 傳真: 0512-53253273  
 傳真: 0574-65530973