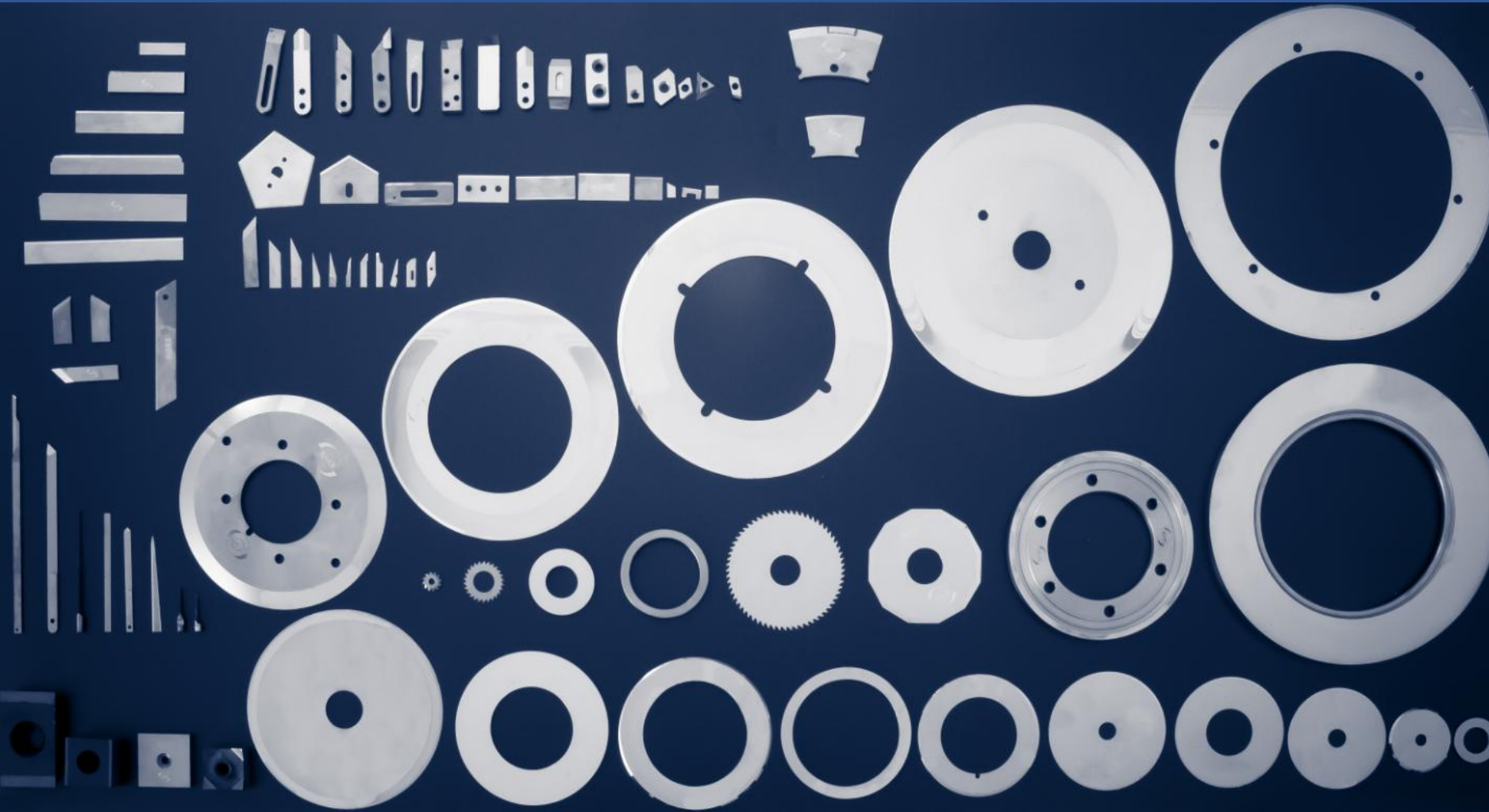




How Do We Make A Carbide Knife For You



Note: Carbide knife is made by tungsten carbide and binder materials. It has high hardness and wear resistance which lead to longer lifespan .



ISO 9001
ISO 14001
OHSAS
18001

CERTIFIED
ENTERPRISE





NO. 2 WORKSHOP



EXHIBITION HALL



BADMINTON COURT



DORMITORY



MAIN CONTENTS

- **Raw Material**
 - Acceptance / Weigh / Ball Milling / Spray Drying / RTP Inspection
- **Green Part**
 - Pressing / Green Machining
- **Blanks**
 - Sintering / Inspection / Blank Stock
- **Machining**
 - Process documentation / Machines / Workshops
- **Finished Inspection**
 - Geometry Inspection / Working Test / Inspection Reports
- **Pack & Delivery**

Raw Material — Weigh

Shen Gong has more than 20 different grades which include **Cemented Carbide** and **Cermet**. Weigh of each raw material according to recipe is the first step to make different grade of carbide.

- Recipe (Made by material engineer, and approved by senior material engineer)
- Weighing & Mixing (Executed by operator, and supervised by material engineer)



配料卡片

编号: JL/08-05-2019

序号	类别	批号	重量(g)	供应商
1		J184219	5940.0	✓
2		N50186028	25605.0	✓
3		2018235	540.0	✓
4		2018434	270.0	✓
5		2018241	3690.0	✓
6				
7				
8				
9				
10				
11				
12				
13			765.0	
14			90ml	

牌号: PL19004

湿磨机号: 10# 开机时间: _____

球磨时间: _____ 停机时间: _____

酒精加量: 30L 配料人: _____

监督人: _____ 卸料人: _____

备注: 先加酒精... 加原料和酒精研磨... 后卸料进行喷雾干燥。

编制人: _____ 时间: 2019/7/8

项目负责人: _____ 时间: _____

Grade Recipe

配料记录表

编号: JL/08-05-2019

日期	批号	配料量 (kg)	原料	批号	用量 (g)	供应商	使用设备名称	设备编号	配料人	监督人	时间段	备注
19.7.	PL19004	45		J184219	5740		球磨机	Ssk 05	张	何	10:00-11:00	
				15086028	25605							
				181071	5760							
				2018234	810							
				00242125	405							
				2018235	90							
				8012370763	152							

项目负责人: _____

Record of Weighing & Mixing

Raw Material — Ball Milling

After weighing and mixing, we load the materials into ball milling machine with grinding media and other additives for wet ball milling. There are 2 purposes of ball milling: Well mixing all raw materials, and crush them finer to our selected grain size.

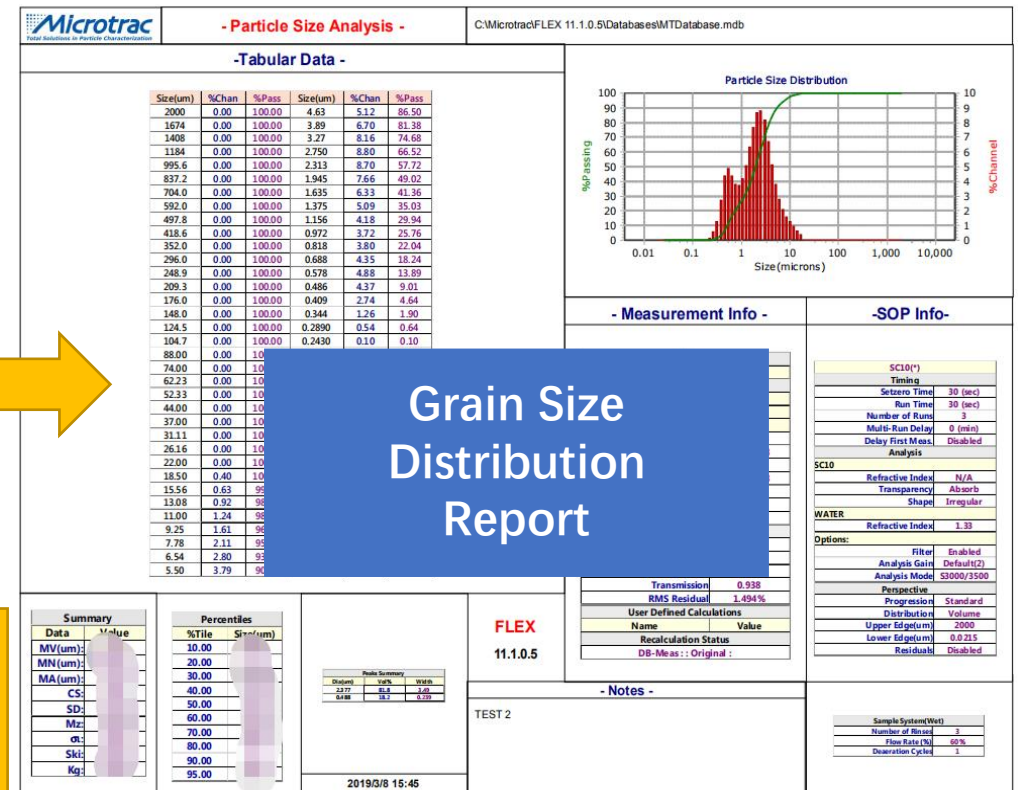
Shen Gong is equipped with US made MICROTRAC distributor for grain size distribution measurement after ball milling.

Every batch must meet internal controlling spec.

Note: Material is thick black slurry after ball milling.



**US MICROTRAC
Distribution**



Raw Material — Ball Milling Records

湿磨原始记录表

项目名称: [REDACTED] 编号: JL/08-07-2019

日期	牌号	批号	配料重 (kg)	球重 (kg)	石磨 (g)	油酸 (m)	酒精 (L)	机号	转速	研磨时间 (h)	开始时间	结束时间	作业员	备注
19.7.8		PL19004	45					10#					王敬忠	
		"	"	"	"	"	"	"	"	"			王敬忠	

Milling time record

项目负责人: 魏香花

湿磨卸料记录表

项目名称: [REDACTED] 编号: JL/08-08-2019

日期	牌号	批号	配料重 (kg)	机号	卸料酒精 (L)	开始时间	结束时间	作业员	备注
19.7.11		PL19004		10		12:50	14:00	范小东	

Milling media add record

项目负责人: 魏香花

搅拌记录表

项目名称: [REDACTED] 编号: JL/08-09-2019

日期	牌号	批号	设备名称	开始时间	结束时间	作业员	备注
19.7.11		PL19004	搅拌机	14:00	15:10	范小东	

Mixing time record after ball milling

项目负责人: 魏香花

Raw Material — Adjustment after ball milling

After ball milling, and before spray drying, we need to do some adjustments for our material's viscosity, to make sure it is suitable for next step (spray drying).



US made Brookfield Viscosity

粘度检测记录表

研发项目名称: [REDACTED] 编号: JL/08-16-2019

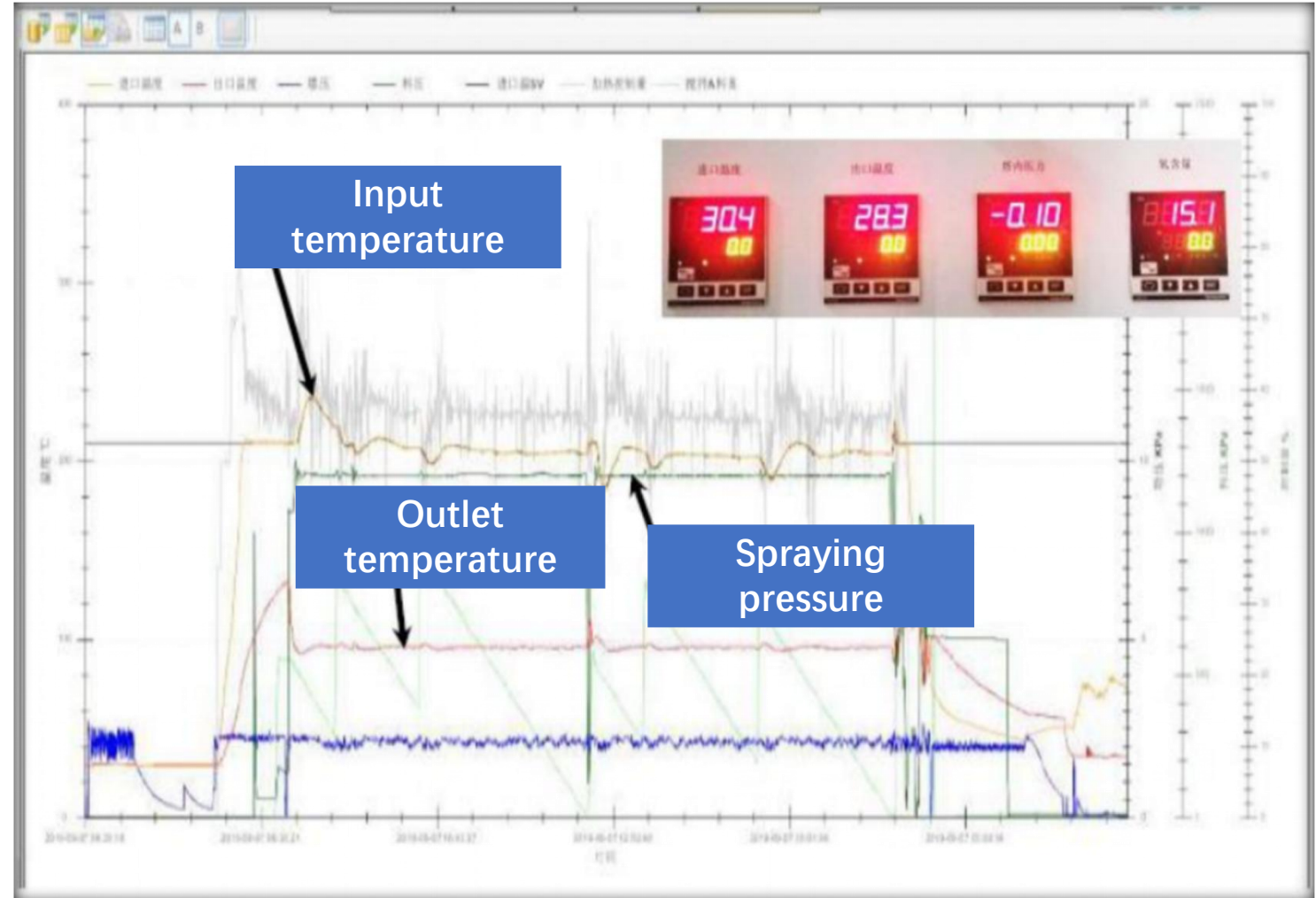
检测日期	时间段	检测人员	编号	批号	黏度值	CP (实测值)	测量仪器	转速	转子	百分比	备注
2019.07.11	11:00-11:15	钟嘉彬	SC-20	PL19004	250 ± 50	198	黏度计	563	100		

Adjustment record after ball milling

项目负责人: [Signature]

Raw Material — Spray Drying

Spray drying is the process to make the RTP (Ready-to-press powder) from ball-milling material. Input/outlet temperature and spraying pressure are strictly controlled.

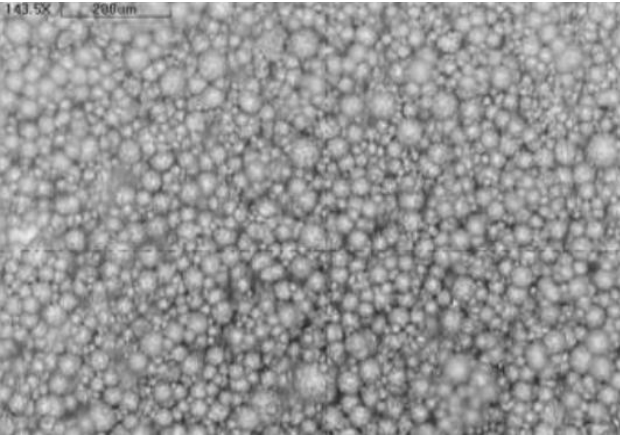


Raw Material — Spray Drying Record

喷雾干燥记录													
项目名称:						编号: JL/08-19-2019							
日期	时间段	参与人员	设备型号	牌号	批号	重量 (KG)	运转条件						备注
							入口温度	排风温度	平均粒径	塔底回收量 (g)	旋风回收量 (g)	调机用量 (g)	
19.7.11	15:10~16:10	解工	BP-300D		PL19004						40900		
Spray Drying Record													

注：所有内容需及时如实填写，一旦发现不填，忘填或所填内容不实，将严肃处理。

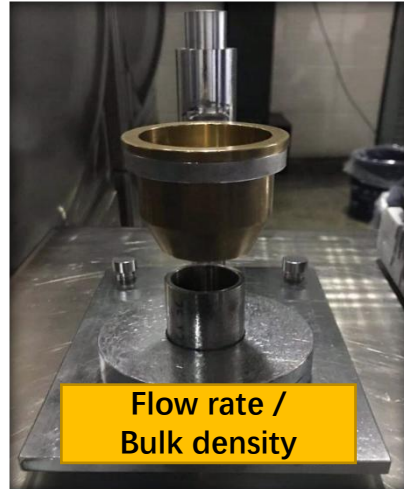
魏春花



RTP After spray drying (x140)

Raw Material — Inspection/Adjustment of RTP

Below inspections and adjustments of RTP in Shen Gong are executed:
Cooling, flow rate, bulk density, water contents and classifying mesh.
To guarantee qualified Shen Gong RTP.



Green Part — Pressing

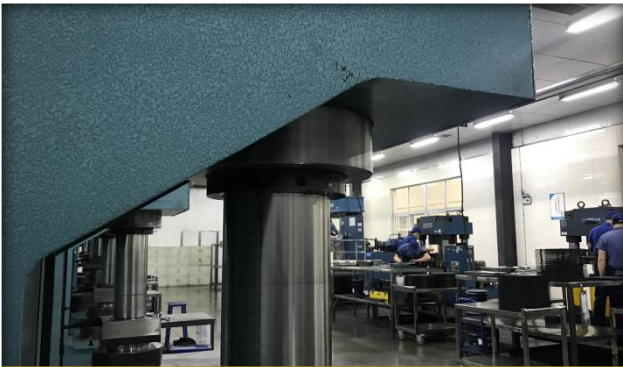
Shen Gong is equipped with different types of press machines for different shapes and tolerances of products.



CNC Press



Mechanical Press



Hydraulic Press



Work together

Press Tooling

Green Part — Pressing

Pressing condition is made by pressing engineer. Green density, size and appearance are strictly controlled.

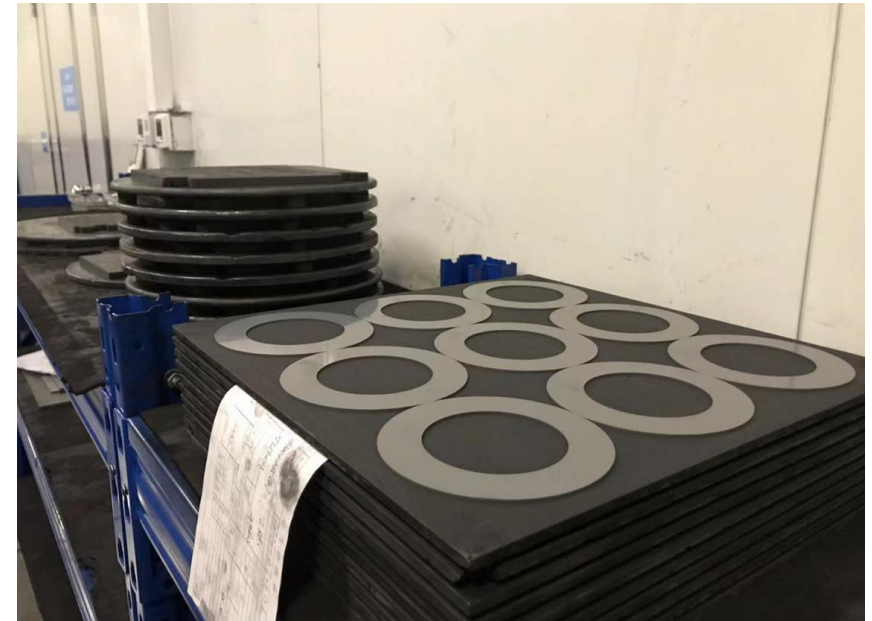
压制记录表

项目名称: _____ 编号: JL/08-11-2019

日期	牌号	批号	规格	模具编号	测量仪器	压机号	压机吨位 (t)	压力 (Mpa)	压高 (mm)	单重 (g)	数量 (pcs)	压制人员	开始时间	结束时间	调机材料用量 (g)	备注
2019.07.13		PL19002		无	FSR 电子秤	S121	10	10.5				林兴	10:10	10:50	10	
												林兴	13:45	15:00	10	

Pressing Record

项目负责人: 林兴



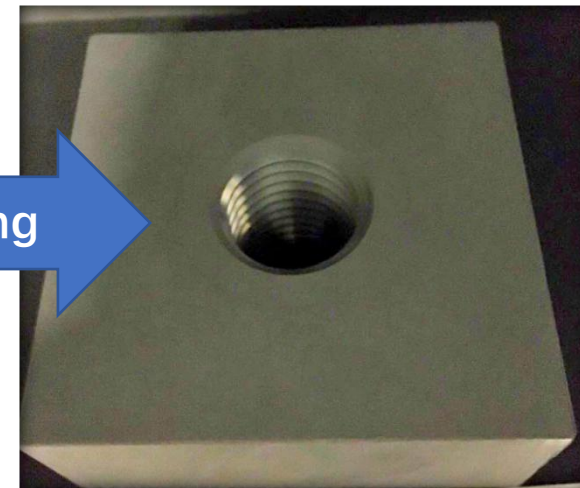
Green parts before sintering

Green Part — Pre-Machining

Pre-Machining (before sintering) for some difficult-to-grinding parts.



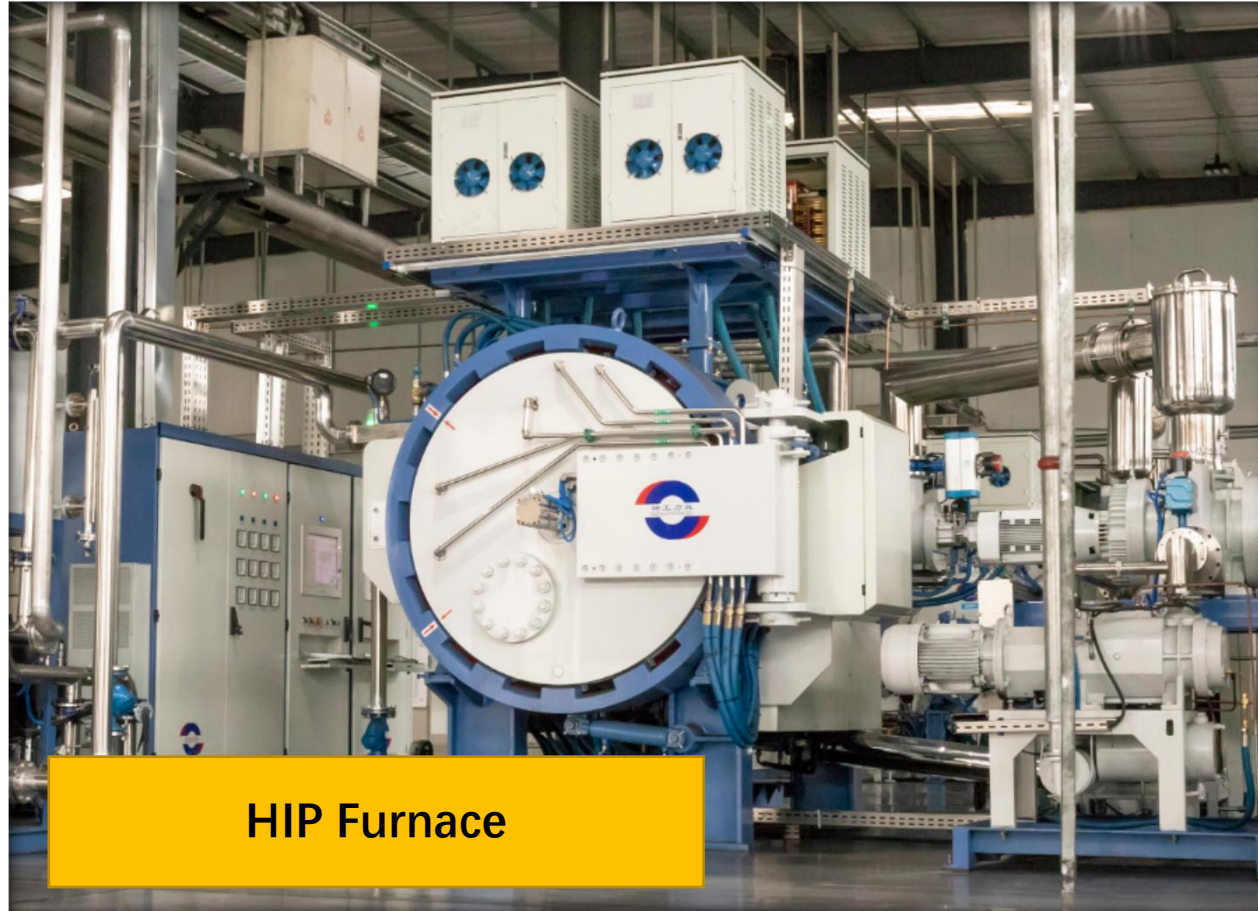
Pre-machining



E.g. screw hole on solid carbide part.

Blank — Sintering

After 1400°C-1600°C sintering, green part turns to strong and solid alloy which is cemented carbide blank. We are equipped with different functions of furnaces for different sintering profiles. Temperature and pressure controlling is the most important of sintering.



Blank — Sintering Records

烧结原始记录表

项目名称: [Redacted] 编号: JL/08-12-2019

日期	炉号	牌号	产品型号	烧结温度	数量	装炉时间	出炉时间	作业员	备注
2019.07.12	7#	[Redacted]	[Redacted]	[Redacted]	10	15:10	[Redacted]	张成	PL19004
2019.07.13	7#	[Redacted]	[Redacted]	[Redacted]	10	15:45	[Redacted]	张成	PL19004
2019.07.14	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	19004
2019.07.15	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	19004
2019.07.16	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	19004
2019.07.17	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	19004

项目负责人: [Redacted]

Sintering Info
Records

真空烧结炉记录表

研发项目名称: [Redacted] 编号: JL/08-13-2019

日期: 2019.7.12 开炉前检查记录

炉次号: 7# 1. 炉门、电极、石墨元件: [Redacted]

班次: 白班 2. 冷却水: [Redacted]

时间段: [Redacted] 3. 黄油: [Redacted]

操作者: 张成 4. 使用气体: 上部进气 下部进气

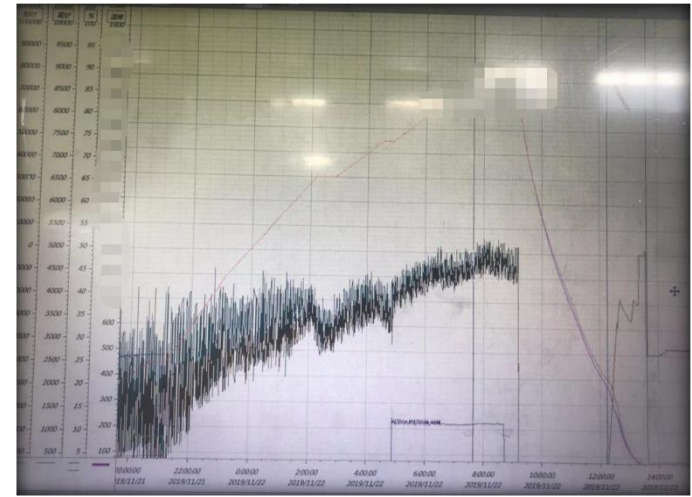
项目负责人: [Redacted] 5. 窑工艺编号: 宝星陶瓷 6. 烧结温度: 1560°C 舟温: TIN

时间	温度 (°C)			压力	N2流速	上区功率	下区功率	真空度	炉气温度	回水温度	备注
	设定	上区	下区								
15:10	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
16:00	[Redacted]	[Redacted]	[Redacted]	-925.1	[Redacted]	0	35	2492	65	34	[Redacted]
16:30	[Redacted]	[Redacted]	[Redacted]	-925.3	[Redacted]	31	0	2535	69	34	[Redacted]
17:00	[Redacted]	[Redacted]	[Redacted]	-925.6	[Redacted]	11	29	2535	73	35	[Redacted]
17:30	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
18:00	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
18:30	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
19:00	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
19:30	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
20:00	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
20:30	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
21:00	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
21:30	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
22:00	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
22:30	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
23:00	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
23:30	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
0:00	[Redacted]	[Redacted]	[Redacted]	-94819	[Redacted]	30	40	1	35	34	[Redacted]
0:30	[Redacted]	[Redacted]	[Redacted]	-94777	[Redacted]	36	41	1	32	35	[Redacted]
1:00	[Redacted]	[Redacted]	[Redacted]	-94772	[Redacted]	29	38	1	32	34	[Redacted]
1:30	[Redacted]	[Redacted]	[Redacted]	-94714	[Redacted]	30	34	1	31	35	[Redacted]
2:00	[Redacted]	[Redacted]	[Redacted]	-94610	[Redacted]	33	44	1	31	35	[Redacted]
2:30	[Redacted]	[Redacted]	[Redacted]	-94610	[Redacted]	40	36	1	31	35	[Redacted]
3:00	[Redacted]	[Redacted]	[Redacted]	-94646	[Redacted]	35	39	1	30	35	[Redacted]
3:30	[Redacted]	[Redacted]	[Redacted]	-94670	[Redacted]	42	47	1170	30	35	[Redacted]
4:00	[Redacted]	[Redacted]	[Redacted]	-93852	[Redacted]	39	42	1168	30	35	[Redacted]
4:30	[Redacted]	[Redacted]	[Redacted]	-93642	[Redacted]	42	48	1249	29	35	[Redacted]
5:00	[Redacted]	[Redacted]	[Redacted]	-93583	[Redacted]	47	44	1220	28	35	[Redacted]
5:30	[Redacted]	[Redacted]	[Redacted]	-93588	[Redacted]	46	43	1196	28	35	[Redacted]
6:00	[Redacted]	[Redacted]	[Redacted]	-93623	[Redacted]	47	49	1196	28	36	[Redacted]
6:30	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	45	49	1170	28	36	[Redacted]
7:00	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	45	43	1196	29	35	[Redacted]
7:40	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]

要求: 1. 必须认真, 如实填写所有项目; 2. 6:30-7:00 分钟时, 必须填写; 3. 如有异常情况应及时通知相关人员, 并填写; 4. 如有异常情况应及时通知相关人员, 并填写.

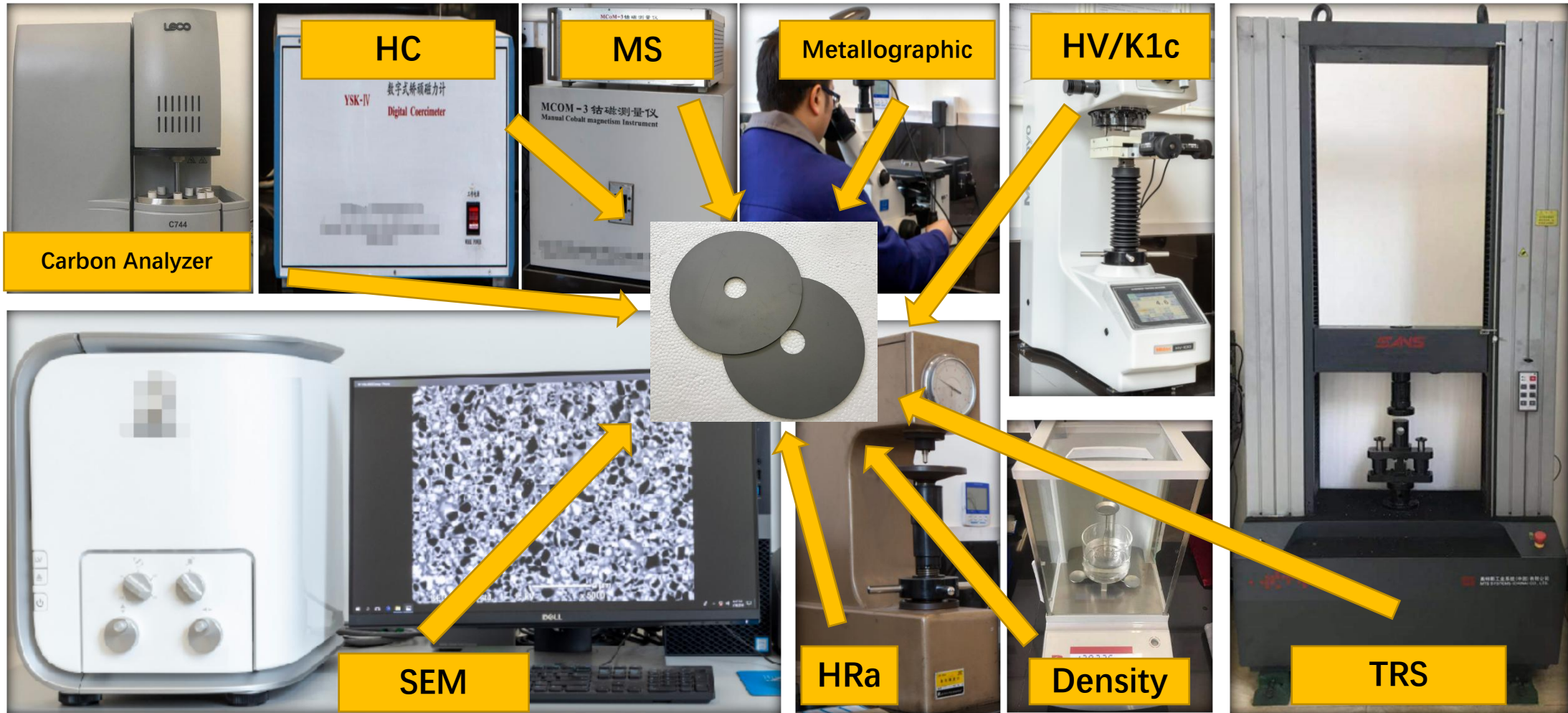
项目负责人: [Redacted]

Sintering Profile
Records



E.g. A Sintering Profile in furnace

Blank — Physical Properties Inspection



Blank — Warehouse

After blank inspection (Geometry and Physical Properties), Qualified blanks will be in stock and waiting for machining.



Machining — Process Documentation

其

X 2:1

名称	圆切刀	5代码	
规格型号	Ø256*Ø160*1.3	4代码	
图号		2代码	
制图		共张	第 张
校对		审核	时间
审核		四川神工钨钢刀具有限公司	

工艺卡

产品名称: 大圆刀 产品规格: $\phi 256 \times \phi 160 \times 1.3$ /GS260Y//6- $\phi 10$ PCD- $\phi 180$ /SGDYD0033-25 制单人: 闵球建

序号	工序名称	工艺参数	工艺说明	机床	检验方式	砂轮型号	砂轮粒度	要求尺寸	平面度	平行度	直线度	垂直度	同轴度	圆度	跳动
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															

Each product has a general production drawing and detailed processes card.

Machining — Machines

More than 20 Years Experience On Carbide Knife Machining!



Lapping Machine



CNC Turning



ID Grinder



OD Grinder



Machining Center

Machining — Workshop Overview



Clean and well organized grinding workshop



Lapping Tooling



Grinding Tooling

Finished Inspection — Geometry Inspection

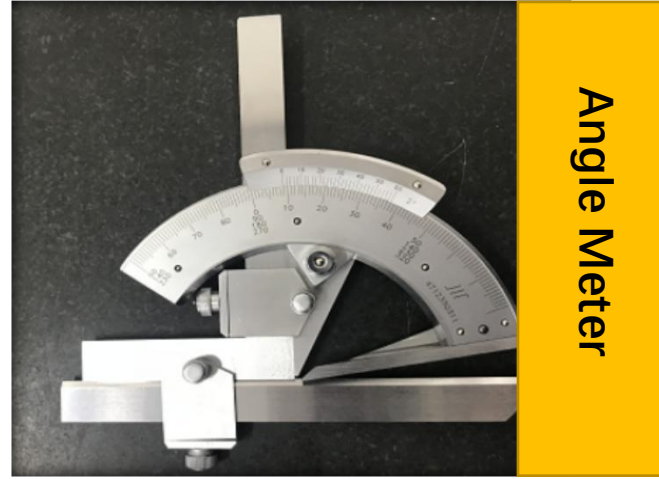
We keep improving of geometry measuring device for our finished products.



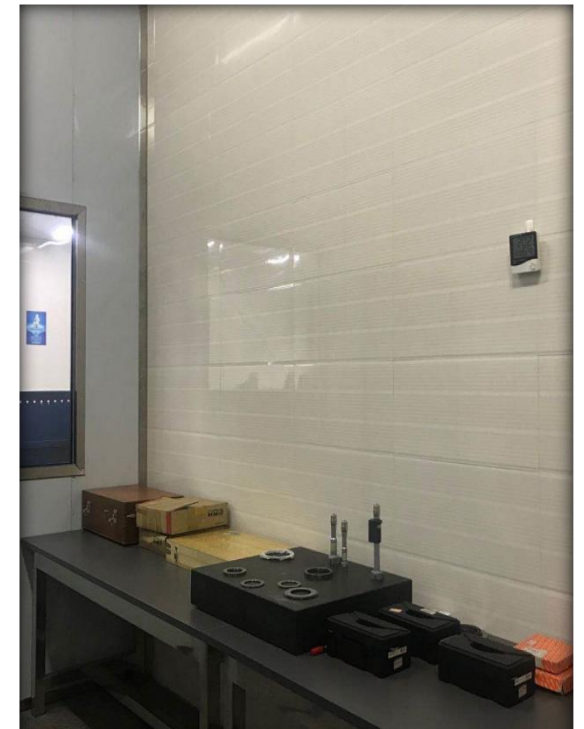
Mitutoyo
Roughness



Keyence Visual
Measurement System



Angle Meter



Constant temperature
Inspection room



Mitutoyo Micrometer



Caliper



Micrometer

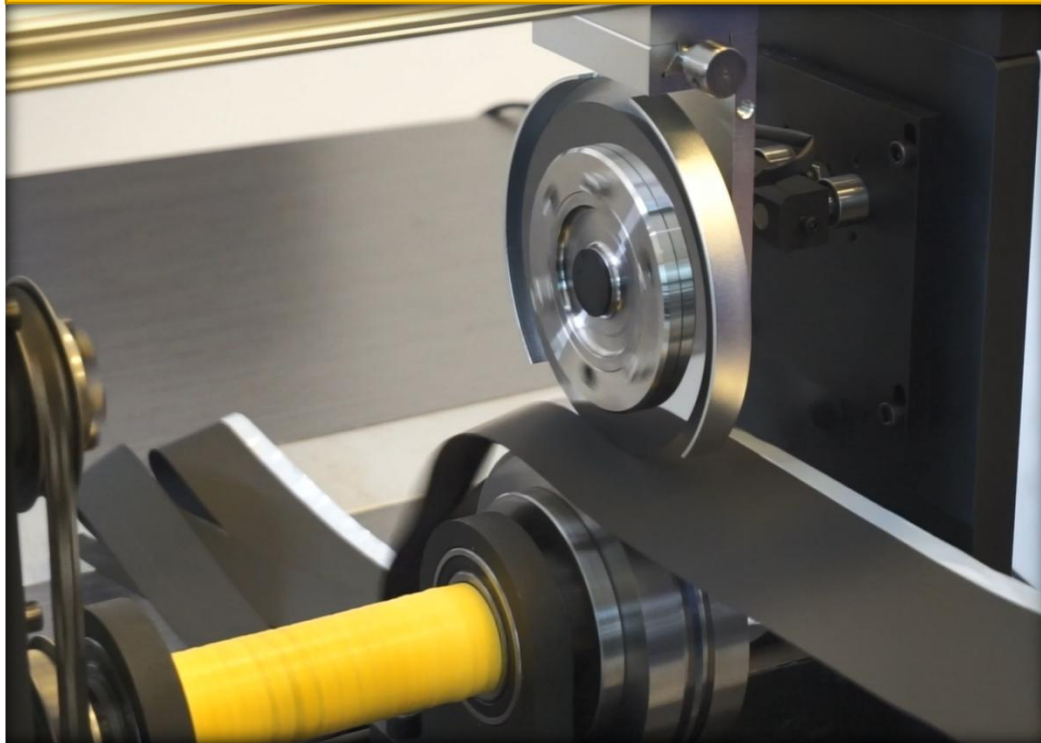


ID
Micrometer

Simulation Working Test

Shen Gong has capability to run simulation working test for new developed carbide knife.

Shear slitter knife working test





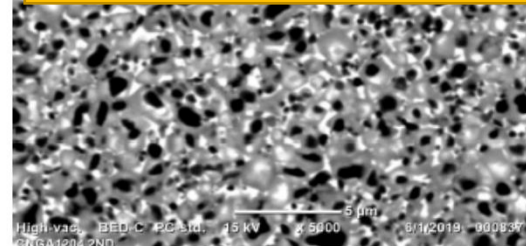
Score slitter knife working test



Finished Inspection — Report

Shen Gong has capability to provide our customer with complete geometry and material inspection reports.

 四川神工钨钢刀具有限公司 Sichuan Shen Gong Carbide Knives Co. Ltd. 3119 of Airport 3 rd road, southwest airport development zone, Shuangliu county, Chengdu city, Sichuan, China. 610207					
Inspection Result Sheet 検査成績表			Inspection Date 検査日	2019年 10月 08日	Approved 承認 Inspector 作成 刘志彬 万顺霞
Product Number 品名	Razor blade 40x18x0.25	Measurement 寸法	OK 合格	Lot # ロット番号	XS19031281
Drawing Number 図番	SG-BPD177-2	Material Grade 材質	G526J	Outer Appearance 外觀	OK 合格
Manufacturer メーカー名	四川神工钨钢刀具有限公司 Sichuan Shen Gong carbide knives co.ltd				
Measurement Place					
Geometry Inspection					
	03	39.96	18.04	0.26	19.4°
	04	40.00	18.08	0.27	19.5°
	05	39.99	18.03	0.27	19.4°
	06	39.98	18.05	0.25	19.5°
	07	39.98	18.08	0.25	19.5°
	08	39.98	18.02	0.26	19.4°
	09	39.98	18.08	0.27	19.4°
	10	39.98	18.02	0.27	19.4°
[Note] * Number of Sample <In case number of inspection 400 pieces : 10 samples>					

 四川神工钨钢刀具有限公司 Sichuan Shen Gong Carbide Knives Co. Ltd. 3119 of Airport 3 rd Road, Southwest Airport Development Zone, Shuangliu County, Chengdu, Sichuan, China. 610207						
金屬陶瓷 SC10 物性分析報告 Physical Properties Report						
样品名 (Name)		碳化钨基金属陶瓷 SC10				
材质 (Grade)		批号 (Lot #)		数量 (Quantity)		
SC10		XS19050433		3 PCS		
物理性能 (Physical & Static Properties)						
洛氏硬度 (HRa)	维氏硬度 HV (kgf/mm ²)	密度 (g/cm ³)	矫顽磁力 HC (Oe)	磁饱和 MS (emu/g)	断裂韧性 K1c (kgf/m ^{3/2})	抗弯强度 TRG (N/mm ²)
91.7	1548	6.39	9.07	8.58	10.40	1850
镜面处理 & 结晶组织 (Polished Surface & Microstructure)						
孔隙度 Porosity		η相 η phase	结晶粒径 (μm) Grain size	备注 Remark		
A02						
Material Inspection						
 High-vac. BEI-TOPO. 15KV X5000 0/1/2019 000839 CHINA 2mm						
四川神工钨钢刀具有限公司 技术部 2019/06/21						

Packaging & Delivery



Shen Gong cooperates with worldwide courier companies, deliver our knives to all over the world fast and safely.



**THANKS
FOR YOUR ATTENTION**