



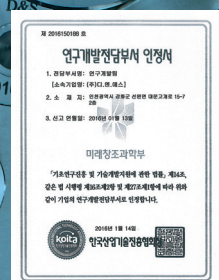
Natural diamond dies / PCD dies / Tungsten carbide dies

WIRE DRAWING DIES

*Precision tooling
for quality*

- + for SUS Wire
- + for Saw Wire
- + for Welding Cable
- + for Bonding Wire
- + for Copper Wire
- + for TCD Wire





正道



D&S DIES는 1990년 1월 11일을 시작으로, Diamond Dies를 정밀가공해 온 전문기업 입니다.
그동안 많은 시행 착오와 온갖 역경 속에서도 오직 고객이 만족할 때 까지 최선을 다하자는 일념으로 끊임 없이 연구 개발하고, 고객의 채워지지 않는 요구를 채워가며 보다 우수한 고품질의 제품생산에 주력하고 있습니다.
모든 부문에 전사적으로 매진하고 있으며, 또한 함께 일하는 우리 직원의 행복 창출을 위해 최고의 기업이 되고자 노력하고 있습니다. 앞으로도 많은 지도편달과 격려를 간곡히 부탁드립니다.
대단히 감사합니다.

Customers' impression fully touched with our Excellent Hi-End Dies

D&S DIES is the professional company for precision processing of Diamond Drawing Dies beginning in 11th January 1990. Since then, we have been doing our best to keep our R & D activities to achieve customers' satisfaction through a lot of trial and error and all in the face of adversity, and have been focusing on producing excellent & hi-quality products to live up to our customers' unfilled needs. In every part we have been striving to create the happiness of our staff members working together, to become the top global dies company and to enrich the values of customers.
We earnestly hope let us have a lot of your advice and encouragement continuously.
Thank you very much for your attention.

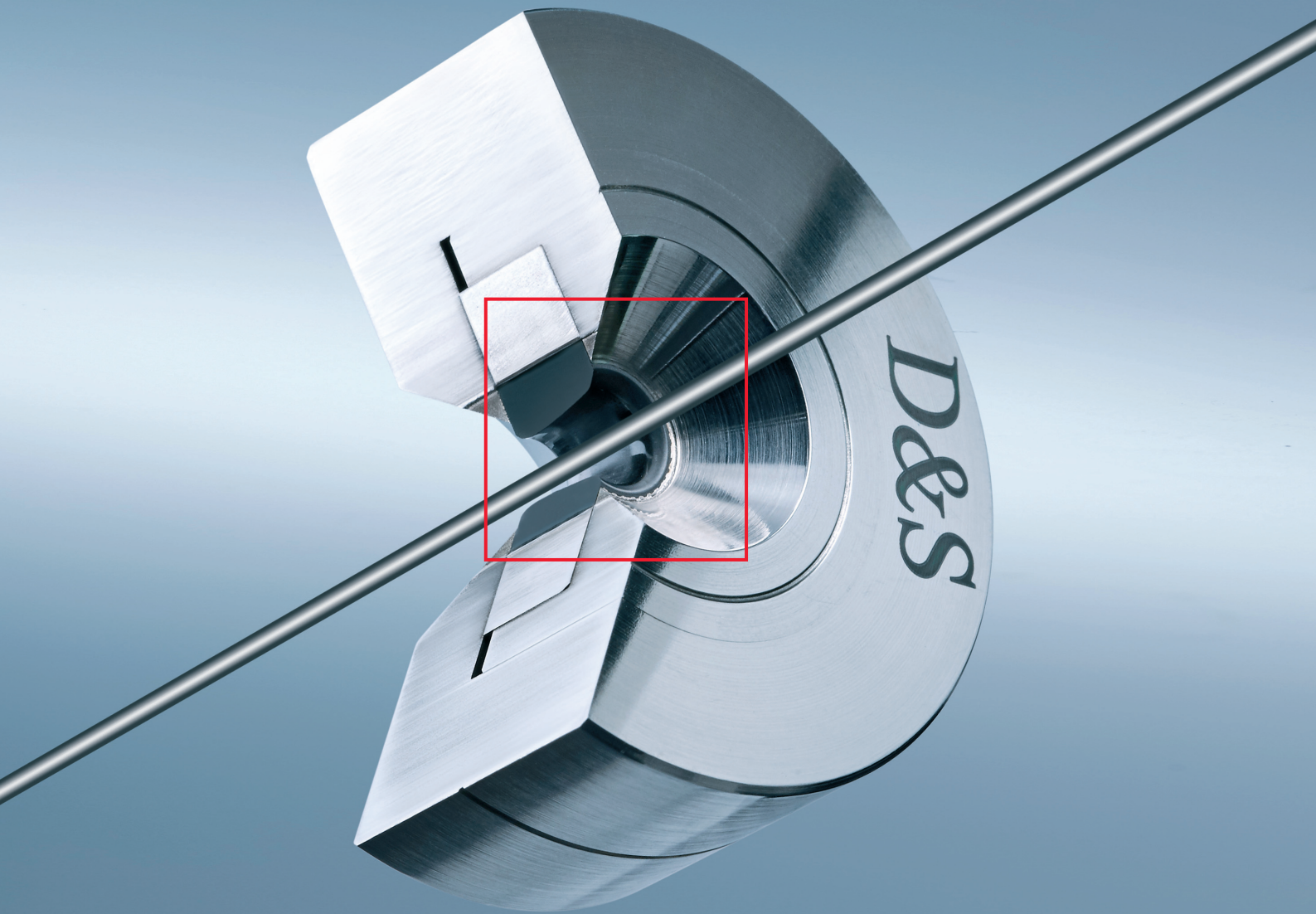
President
Jung man Lee



Shandong Weihai Factory in China

Head Office • Factory

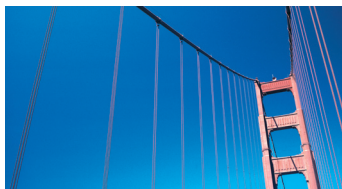
Advantage of D&S DIES



와이어 드로잉 다이의 적용 분야 Applications of wire drawing dies



스프링 와이어 Spring Wire



와이어 로프 Wire Rope



의료 부품 Medical Parts



태양전지판 Solar Cell

Tolerance ± 0.0001 !

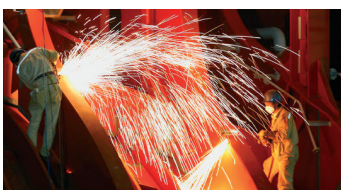
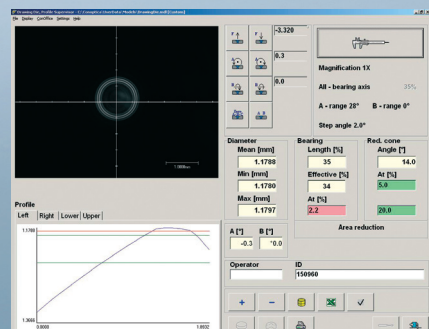
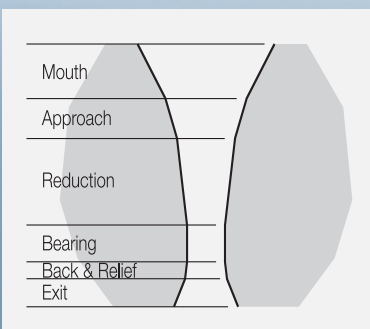
초정밀 홀 설계가 경쟁력입니다 !

The precision design for excellent surface finish !

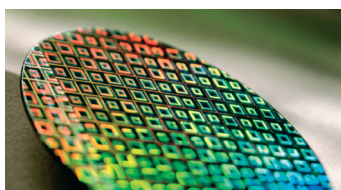
초정밀 제품을 가공하여 저배율에서 고배율까지 정밀하게 내경을 확인할 수 있으며, 고해상도 모니터를 통하여 여러명이 동시 분석 하여, 고품질의 Dies를 생산합니다. 또한 첨단설비의 3차원 측정기 Comptica를 통하여 고객이 원하는 규격에 맞추며, 허용공차 ± 0.0001 의 범위내에 diameter를 비롯하여, reduction의 각도, Bearing의 길이 등을 측정하며, profile graphs를 통하여 내경 형상을 검수할 수 있는 system을 갖추고 있습니다.

On processing superprecision products, D&S DIES can produces high quality dies after analyzing from several professional staff at the same time through a high-resolution monitor, and able to check the internal space delicately from a high magnification to times. Moreover we can measure the diameter, the angle of reduction, the length of bearing and etc. in a range of ± 0.0001 tolerance, and meet the specs from clients' needs via Conoptica(three dimension coordinate measuringmachine), and also have a system which can examine the form of internal space via profile graphs.

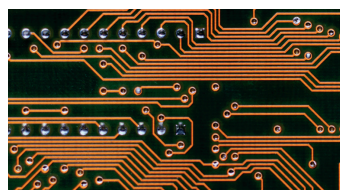
초정밀 가공을 위한 인선부 설계 Edge design for ultra precision machining



용접봉 Welding Wire



실리콘 웨이퍼 Silicon Wafer

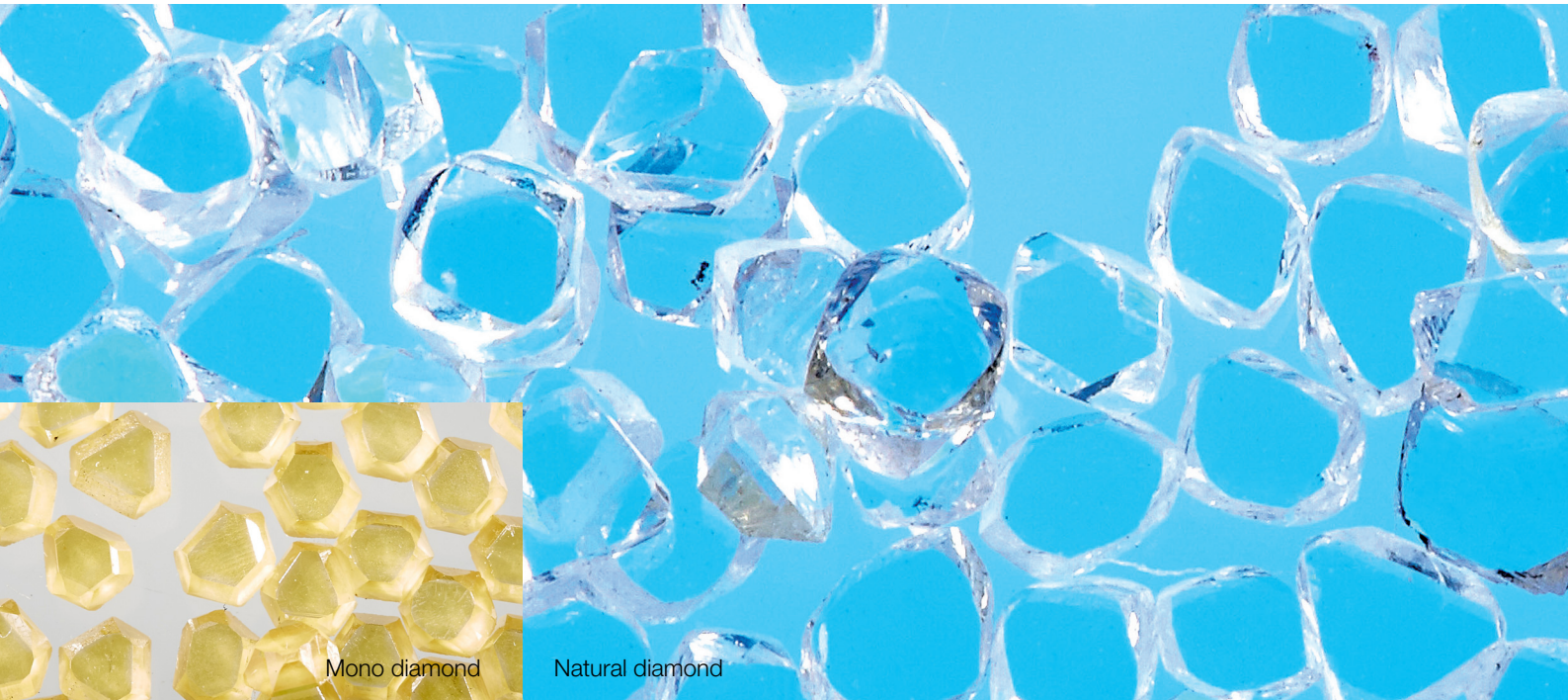


본딩 와이어 Bonding Wire



동선 케이블 Copper wire

Natural/Mono diamond dies

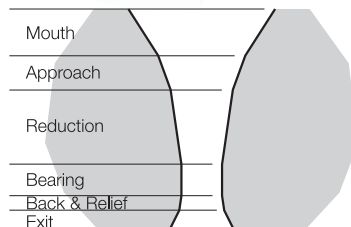


Natural diamond dies

단결정체인 천연다이아몬드는 엄격한 개별 정밀검사 과정을 통하여, 111방향과 상하면이 평행이 되도록 정교하게 연마 후 특수 소결공법으로 제작합니다. Through the strict individual accuracy inspection, the natural diamond is produced with the sintering techniques of the special processing after delicate polishing to make parallel between 111-direction and upper & lower sides.

Mono diamond dies

천연 다이아몬드의 단점을 보완하여 고온, 고압의 특수공법으로 생산되는 모노 다이아몬드는 단결정체로써 높은 내구성을 유지하기에 적합합니다. Mono Diamond is produced with the special processing of high-temperature & pressure to complement the weakness of the natural diamond, and is quite suitable for maintaining the high durability.



Advantages

- 특수공법의 원석가공
- Wire의 광택 및 표면 우수
- 극세선 Wire 0.015까지 생산
- 정확한 규격의 정밀도
- Use the special processing for cutting gemstone.
- Superb polish and surface
- Drawing for Ultra-fine wire up to 0.015mm
- Precision of exact standards

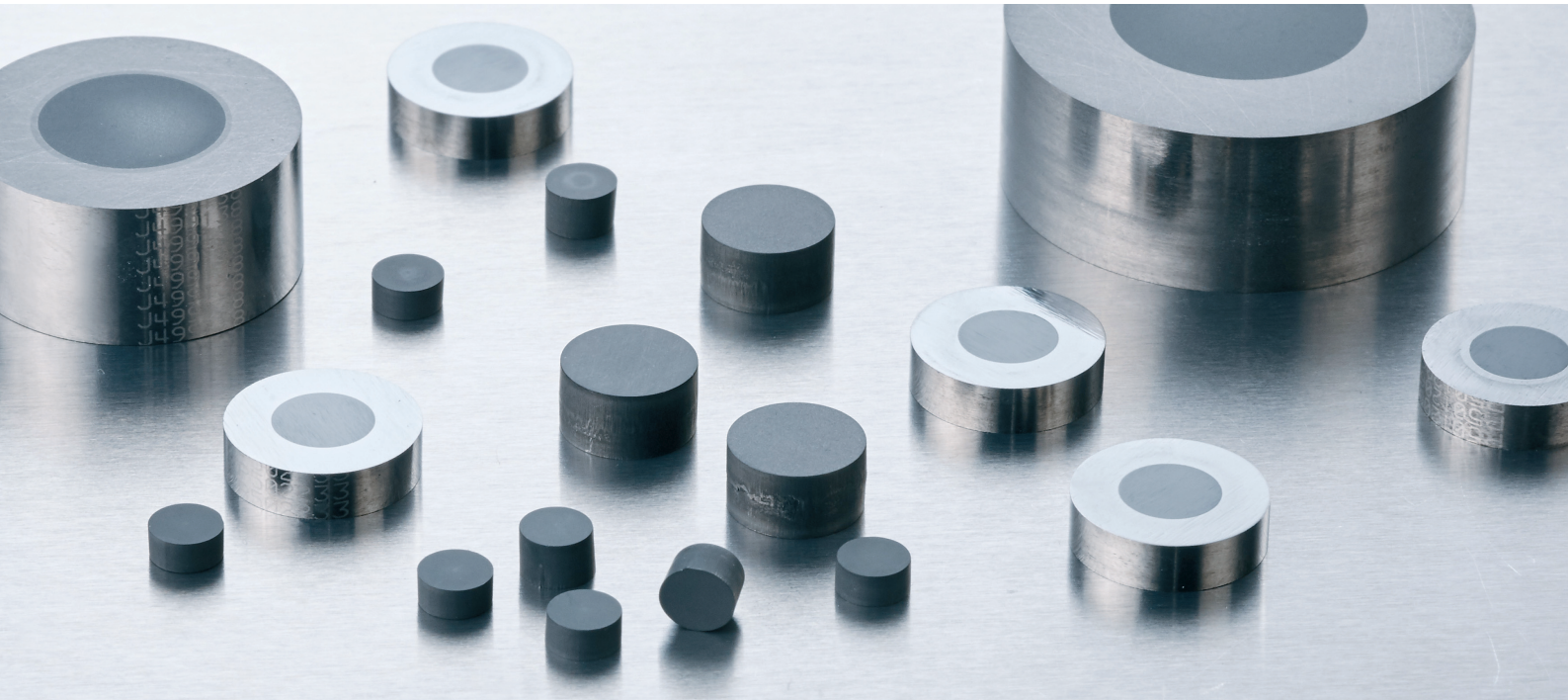
Applications

- Bonding wire (Gold, Cu, AL)
- Stainless steel wire
- Saw wire
- Copper wire
- Medical wire
- EDM wire

Standard specification

	Stainless Steel Wire	Stranded Wire	A/L wire
Mouth(α)	$60^\circ \pm 20^\circ$	$70^\circ \pm 20^\circ$	$80^\circ \pm 20^\circ$
Approach	$30^\circ \pm 5^\circ$	$35^\circ \pm 5^\circ$	$35^\circ \pm 5^\circ$
Reduction	$14^\circ \pm 2^\circ$	$16^\circ \pm 2^\circ$	$20^\circ \pm 2^\circ$
Bearing	30~50% D	20~40% D	20~40% D
Back & Relief	$15^\circ \pm 5^\circ$	$15^\circ \pm 5^\circ$	$20^\circ \pm 5^\circ$
Exit	$50^\circ \pm 20^\circ$	$50^\circ \pm 20^\circ$	$50^\circ \pm 20^\circ$

Polycrystalline diamond dies



합성다이아몬드인 PCD는 미국의 D.I사 (**Sandvik-Hyperion**)의 Compax Dies Blank와 일본의 **Sumitomo**사의 Sumidia Blank를 포함하여 신선에 적합한 원석을 사용합니다. 특수공법의 소결 기술로 PCD를 장착하여 신선 다이스를 생산합니다. 다결정체로 구성된 PCD 다이스는 가공 및 연마 기술의 발달로 연선, 강선용에 적합하며 수명이 오래 갑니다.

PCD uses Compax dies blank made by 'D.I.' company(Sandvik-Hyperion) in US and the Diamond made by 'Sumitomo' company in Japan. D&S DIES produces wire drawing equipped with PCD focusing on sintering techniques of the special processing. PCD dies which consists of polycrystal is suitable for stranded wire and steel wire and moreover, it lasts a long time.



Advantages

- 내마모성이 우수하여 수명이 길다
- ND보다 파손이 적다
- 다이아몬드 입자(Grain size)를 Wire에 따라 다양하게 선택 가능
- Wire 0.07mm~32mm까지 신선 가능
- Superior to wear resistance and lasts a long time
- Less damaged than ND
- Able to select diamond grain size variously according to the wire
- Able to create wire drawing from 0.07mm to 32mm

Applications

- Saw wire
- Stainless wire
- Welding wire
- Tire cord
- Brass-plater wire
- Electrical wire
- Copper /Pipe/ Cable wire

Compax PCD blank

Self-supported die blanks

ADDMA	Nominal Diamond Diameter x Thickness	Grain size						Product Dimension[mm]	
		Sub μm	3 μm	5 μm	12 μm	25 μm	50 μm	Tool Blank Diameter	Recommended Bore Size(mm)
D6	3.1 x 1.0	● O		● O		● O			0.5
D12	3.1 x 1.5	● O		● O		● O			1.0
D15	5.2 x 2.5	● O		● O		● O			1.5
D18	5.2 x 3.6	● O		● O		● O			2.0

● = MF(metal filled) O = TS(thermally stable)

Sub-micron die blanks belong to our Compax® die blanks family of products and one of many premium products available for the wire industry. Sun-micron die blanks are polycrystalline (PCD) product with an ultra-fine grain microstructure. The unique material properties provide very good abrasion resistance and the ability to achieve a high quality surface finish.

Tatget applications

- brass-plated wire
- electrical wire
- fine finishing applications
- glass scribing
- sawing wire
- stainless steel
- tire cord
- welding wire

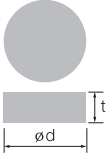
Tungsten carbide-supported die blanks

ADDMA	Nominal Diamond Diameter x Thickness	Grain size						Product Dimension[mm]	
		Sub μm	3 μm	5 μm	12 μm	25 μm	50 μm	Tool Blank Diameter	Recommended Bore Size(mm)
D12	1.5 x 1.5					O		3.99 \pm 0.013	0.8
D15	4.0 x 2.3		O		O	O	O	8.12 \pm 0.013	1.8
D18	4.0 x 2.9							8.12 \pm 0.013	2.3
D21	7.0 x 4.0							13.65 \pm 0.013	3.5
D24	7.0 x 5.3			O		O	O	13.65 \pm 0.013	4.6
	13.0 x 7.0					O	O	24.13 \pm 0.025	5.2
D27	13.0 x 8.7				O	O	O	24.13 \pm 0.025	5.8
D30	13.0 x 11.6				O	O	O	24.13 \pm 0.025	7.6
	18.6 x13.5					O		34.00 \pm 0.025	11.6
D33	18.6 x 15.5					O		34.00 \pm 0.025	12.0
	18.6 x 17.5					O			12.5
D36	18.6 x 18.5					O		34.00 \pm 0.025	12.7

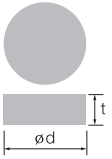
Maximum recommended bore size for non-ferrous wire. Hard-ferrous wire die size normally should not exceed 65% of this diameter.

Sumidia PCD blank

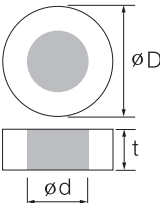

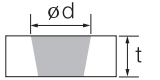

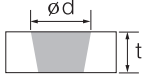
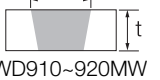
Self-supported die blanks

ADDMA	Product No.	Dimensions			Concen- tricity (mm)	Maximum hole size (mm)	Grain size					Shape
		Ød	ØD	t			F 1	S 3	M 5	C 12	E 25	
D6	WD705	2.5	—	1.0	—	0.5	●	—	●	O	O	
D12	WD710	3.2	—	1.5	—	1.0	●	—	●	O	O	
D15	WD715	5.2	—	2.5	—	1.5	●	—	●	O	O	
D18	WD720	5.2	—	3.5	—	2.0	●	—	●	O	O	

Self-supported die blanks with thermal stability

ADDMA	Product No.	Dimensions			Concen- tricity (mm)	Maximum hole size (mm)	Grain size					Shape
		Ød	ØD	t			F 1	S 3	M 5	C 12	E 25	
D6	WD805	2.5	—	1.0	—	0.5	●	—	●	O	O	
D12	WD810	3.2	—	1.5	—	1.0	●	—	●	O	O	
D15	WD815	5.2	—	2.5	—	1.5	●	—	●	O	O	
D18	WD820	5.2	—	3.5	—	2.0	●	—	●	O	O	

Supported die blanks

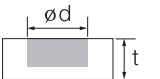
ADDMA	Product No.	Dimensions			Concen- tricity (mm)	Maximum hole size (mm)	Grain size					Shape
		Ød	ØD	t			F 1	S 3	M 5	C 12	E 25	
D12	WD910	1.5	4.00	1.5	0.20	0.8	●	●	●	O	O	
D15	WD915	4.0	8.12	2.3	0.25	1.8	●	●	●	O	O	
D18	WD920	4.0	8.12	2.9	0.25	2.3	●	●	●	●	O	
D21	WD925	7.0	13.65	4.0	0.35	3.5	—	●	●	●	O	
D24	WD930	7.0	13.65	5.3	0.40	4.6	—	●	●	●	O	
D27	WD940	9.0	14.50	7.5	0.40	5.4	—	—	●	●	O	
D27	WD945	13.0	24.13	9.0	0.33	5.8	—	—	●	●	O	
D30	WD950	13.0	24.13	12.0	0.33	7.6	—	—	●	●	O	
D33	WD960	16.0	24.13	16.0	0.33	10.5	—	—	—	●	●	
D36	WD970	19.0	35.00	19.0	0.60	12.7	—	—	—	—	●	
	WD975	25.0	42.00	20.0	0.60	15.7	—	—	—	—	O	
	WD980	30.0	47.00	22.0	0.60	19.0	—	—	—	—	●	
	WD990	40.0	67.00	25.0	0.75	25.7	—	—	—	—	O	
	WD995	45.0	67.00	27.0	0.75	29.0	—	—	—	—	O	

WD910~950/ 975~995

WD960 / WD970

WD910~920MW

Tungsten carbide supported die blanks with back support

ADDMA	Product No.	Dimensions			Concen- tricity (mm)	Maximum hole size (mm)	Grain size					Shape
		Ød	ØD	t			F 1	S 3	M 5	C 12	E 25	
D12	WD910MW	1.5	4.00	3.5(1.5)	0.20	0.8	—	—	O	—	—	
D15	WD915MW	4.0	8.12	4.3(2.3)	0.25	1.8	—	—	●	—	—	
D18	WD920MW	4.0	8.12	4.9(2.9)	0.25	2.3	—	—	●	—	—	

● = Standard-stock item O = Non-stock item — = Not available

The number of () shows tentative thickness of diamond.

Tungsten carbide dies



Alloy drawing dies

- Tungsten carbide drawing dies
- Sample work (Lost of kinds with small quantity)
- Guide dies for wire pressuring
- Copper pipe pressuring



Alloy enamel coating

- For enamel coating of copper and aluminum wire (Parts for electric equipments)
- Ultra precise nipple die F/S dies
- Case : Stainless, Copper, Aluminum

Specifications

Raw ore information. Dies standard manufacturing option

Usage	Subject	Mouth	Approach	Reduction Angle Length		Bearing	Back	Exit
Hard wire	Stainless welding rod	50 ~ 70°	35 ± 5°	12 ~ 14°	More than 1.0d	30 ~ 50 %	More than 1.0d	50 ~ 80°
Soft wire	Tire cord / Copper	60 ~ 80°	35 ± 5°	16 ~ 18°	More than 0.8d	20 ~ 40 %	More than 1.0d	50 ~ 80°
Skin pass	Coated copper wire	50 ~ 70°	20 ± 5°	10 ~ 12°	More than 0.8d	40 ~ 60 %	More than 1.0d	50 ~ 80°
Tin wire	Copper plating	60 ~ 80°	40 ± 5°	20 ~ 22°	More than 0.5d	10 ~ 20 %	More than 1.0d	50 ~ 80°
Multi	Copper	60 ~ 80°	40 ± 5°	20 ~ 22°	More than 0.8d	20 ~ 30 %	More than 1.0d	50 ~ 80°
Pipe	Copper pipe	60 ~ 80°	40 ± 5°	28 ~ 30°	More than 0.8d	20 ~ 30 %	-	50 ~ 80°
Copper	Copper	60 ~ 80°	35 ± 5°	14 ~ 16°	More than 0.8d	20 ~ 40 %	More than 1.0d	50 ~ 80°

Special manufacturing option

Check list		Saw wire	Copper wire		A.L	Stainless 1			Stainless 2			
		PCD	ND	PCD	PCD(vtc)	ND	PCD	Spring	5010	5015 5025	5035	5853
Entrance	Angle (°)	65 ±5	70 ±5	70 ±5	70 ±5	60 ±5	60 ±5	60 ±5	60 ±5	60 ±5	60 ±5	60 ±5
	Length (d,%)		30 ~40	30 ~40	30 ~40	20 ~30	20 ~30	20 ~30	20 ~30	20 ~30	20 ~30	20 ~30
Approach	Angle (°)	30 ±5	20 ~30	20 ~35	18 ~25	18 ~30	18 ~30	18 ~30	18 ~30	18 ~30	18 ~30	18 ~30
	Length (d,%)		40 ~50	40 ~50	50 ~60	40 ~60	40 ~60	40 ~60	40 ~60	40 ~60	40 ~60	40 ~60
Reduction	Angle (°)	9 ~11	14 ~18	14 ~18	12 ~16	12 ~16	12 ~16	10 ~12	10 ~12	10 ~12	13 ~15	15 ~17
	Length (d,%)		30 ~40	30 ~40	40 ~50	50 ~70	50 ~70	50 ~70	50 ~70	50 ~70	50 ~70	50 ~70
Bearing	Length (d,%)	25 ~35	20 ~40	20 ~40	20 ~30	20 ~50	20 ~50	30 ~40	30 ~40	30 ~40	30 ~40	30 ~40
Back relief	Angle (°)	20 ±5	20 ±5	20 ±5	10 ~15	14 ~18	14 ~18	14 ~18	14 ~18	14 ~18	14 ~18	14 ~18
	Length (d,%)		10 ~20	10 ~20	10 ~20	10 ~20	10 ~20	10 ~20	10 ~20	10 ~20	10 ~20	10 ~20
Exit	Angle (°)	55 ±2	60 ±5	60 ±5	50 ±5	50 ±5	50 ±5	50 ±5	50 ±5	50 ±5	50 ±5	50 ±5
	Length (d,%)		20 ~30	20 ~30	20 ~30	20 ~30	20 ~30	20 ~30	10 ~20	10 ~20	10 ~20	10 ~20
Case size	d x t (mm)	28 x 12	25 x 8	25 x 12	25 x 12	25 x 8	25 x 12	25 x 8	25 x 10	25 x 12	28 x 15	42 x 24
Case taper	Front (mm)	10	8	10	10	8	10	8	8	10	13	16
	Rear (mm)	9	7	9	9	7	9	7	7	9	12	15
Standard tolerance	+ Tolerance (mm)	0	0.0005	0.0005	0.0005	0.001~2	0.001~3	0	0	0	0	0
	- Tolerance (mm)	0.0005	0.0001	0.0015	0.0015	0	0	0.001~3	0.001~3	0.005~7	0.007~0.01	0.01~0.015
Test1	Internal hole surface should be good					Bare eye / microscope test						
Test2	Size					Whole test (Conoptica)						
Test3	Shape of dies					Sampling 5% (Conoptica)						
Other	1. Visual check 1) Eccentricity 2) Condition of surface 3) Bubble 4) Ring 5) Reduction bending 6) Aliien material							Less 1.5mm RD Angel 10~12	1.5~2.3mm RD Angel 13~15	More than 2.3mm RD Angel 15~17		

Applications of dies



Dies for SUS Wire

스테인레스 와이어는 다양한 규격과 인장 강도를 가지며, 태양전지 모듈을 비롯한 다방면의 산업용 제품으로 사용되고 있습니다.

The drawn stainless wire has various standards and strong tensile strength. It is used as an array of industrial product including solar battery module.

Applications

- Spring wire
- Rope wire
- Solar cell wire
- Medical wire
- Knitting wire
- Metal meshes wire

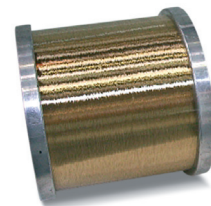


Dies for Saw Wire

- 신재생 에너지 (태양광) 및 IT산업 (반도체, LED), Wafer 절단에 적합
- 극세선경 Saw wire용 개발 - 0.040mm
- Using for new and renewable energy (sunlight) & IT industry (semiconductor, LED), Cutting wafer
- Development of Ultra-fine size wire for saw wire - 0.040mm

Applications

- Cutting wire



Dies for Welding Wire

해양 구조물, 조선, 에너지 & 정유화학 플랜 및 기타 가공 산업 분야에 적용되고 있습니다.

It is utilized in marine structure, shipbuilding, energy & oil / chemistry plant with the other processing industry.

Applications

- Solid wire
- Flux cored wire
- Seamless wire
- Nickel based alloy & others



Dies for Bonding Wire

- 반도체 회로의 연결을 위한 핵심적인 재료로 사용되고 있습니다.
- 초정밀 극세 선경 -0.015mm
- The wire is used for connecting either semiconductors' terminal or circuit as a conducting wire. It is a fundamental material for producing semiconductor.

Applications

- Au wire
- Ag wire
- Cu wire
- PCC wire
- PCC_Au Coating wire



Dies for Copper Wire

일반적으로 많이 사용되고 있는 연동선과 강도를 높인 경동선이 있으며, 에너지 케이블, 산업용 특수 케이블, 통신제품을 비롯하여 기초산업 분야에 다양하게 사용되고 있습니다.

There are annealed copper wire using generally and hard-drawn copper wire raising strength. They are variously used for energy and industrial special cables in a basic industry including communication products.

Applications

- Industrial Cable
- Power Cable
- Power & Control Cable
- Fiber Optic Cable
- Enamel Wire



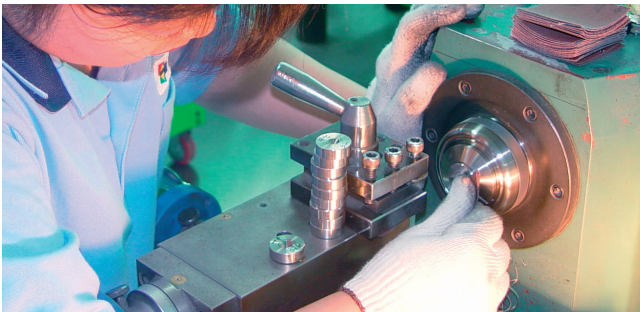
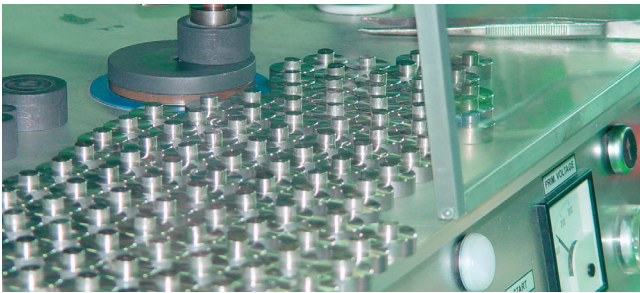
Advanced machines

세계최고의 정밀도를 자랑하는 첨단설비

High-End facilities being proud of the degree of precision in the world

D & S Dies는 우수한 성능으로 생산성을 극대화 시켜주는 첨단 설비를 보유하고 있으며, 공정별 가공 노하우를 구축하여 최상의 성능으로 효율적이고 정밀한 제품을 생산하고 있습니다.

D&S DIES has high-end facilities to maximize its productivity with excellent performance, and also produces efficient & precise products at peak performance based on the accumulated processing know-how.



보유설비 Equipment

성형 레이저기/ 소결기/ 원석 연마기/ 자동 가공기/ 자동 폴리싱기/ 수동 폴리싱기/ 초음파 자동연마기/ 자동선반/ Conoptica/ 전자현미경 / 품질 검수설비/ 기타 특수설비

Forming laser machines/ Melting and fusing equipments/ Raw ore grinding equipments/ Automatic processing equipments / Manual polishing equipments/ Automatic ultrasonic polishing equipments/ Automatic lathes/ Conoptica/ Electronic - microscopes/ Quality checking equipments/ Other special equipments

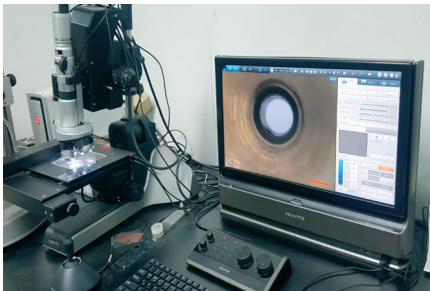
Quality assurance system



Conoptica gauger

3D 3차원 측정기로써 20X, 10X, 3X, 1X(0.015mm~4.00mm)까지 측정 가능하며, 내경의 bearing length, reduction cone angle과 내경형상의 profile graphs를 측정합니다.

As a 3D measuring instrument, it can measure the bearing length of the bore, the reduction of cone angle and the form of internal space of profile graphs in a range of 20X, 10X, 3X, 1X (0.015mm~4.00mm) tolerance.

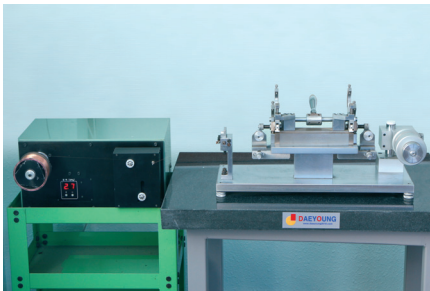


Micro hole meter

다양한 규격에 맞춰 정밀 측정이 가능하도록 독자적으로 재 구성한 3차원 현미경 입니다.

It is the 3-D(three dimensional) microscope peculiarly customized to measure various standards accurately.

Magnification : 50X ~1000X



Wire cutter

평균 머리카락 굵기 1/4정도의 초미세 Wire를 일정한 장력을 유지하여, 200mm를 Cutting 하여 측정하는 system입니다. 측정규격 : 0.1500mm~0.02500mm

Measuring system to check the ultrafine wires cutted in 200mm of average a fourth of the diameter of a human hair under the condition of maintaining constant tension.



Measurement Scale

0.001mg 단위의 Wire로 중량 측정합니다. 측정된 중량값을 선경으로 환산하며 매우 정확한 값을 제공 합니다.

Measure weights with wire in 0.001mg unit. And it gives very exact value after converting measured weight value into wire diameter.



Cylinder gauge

정밀기기의 직경 측정범위를 초과한 내경의 안지름을 측정하며, 내면의 평행도와 오차의 정밀 측정에 쓰입니다. 측정범위 : 6.0mm ~ 31.0mm

It is the apparatus (calibrator) for checking the internal diameter exceeding the measurement range of the diameter of a precision instrument: Used for measuring the diameter the parallel alignment error of inner side

Measuring range : 6.0mm ~ 31.0mm



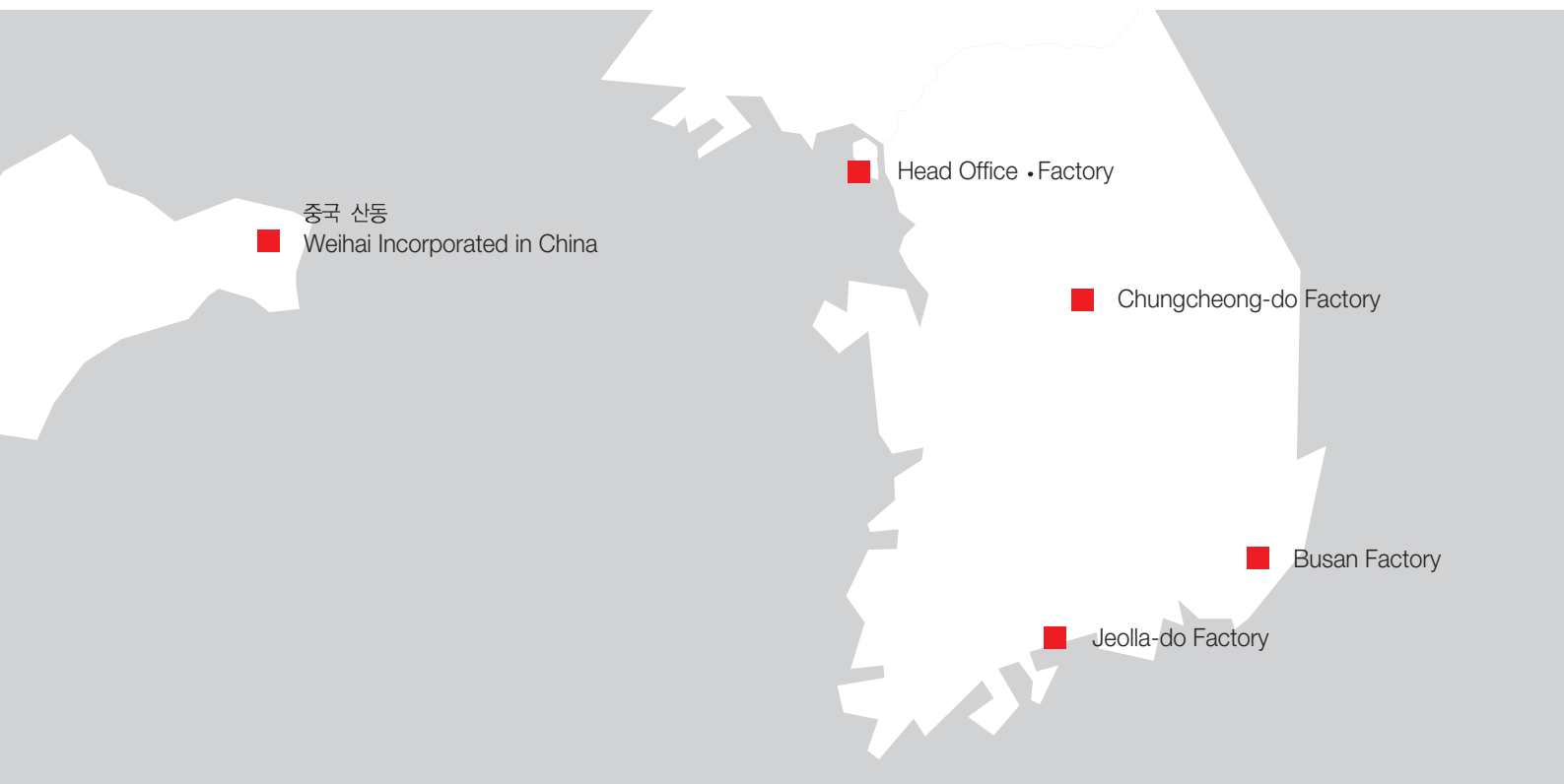
Non-contact laser diameter gauger 비접촉 레이저 외경측정기

비접촉 레이저 외경 측정기로서 미크론의 정밀도에 따라 고속으로 측정하는 system 입니다.

As a non-contact laser external diameter gauger, it can measure the the diameter of Wire at high speed according to the degree of precision of the micron.



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