# The characteristic of Our Powder

◎ Powder production using vacuum melting-gas atomizing process.

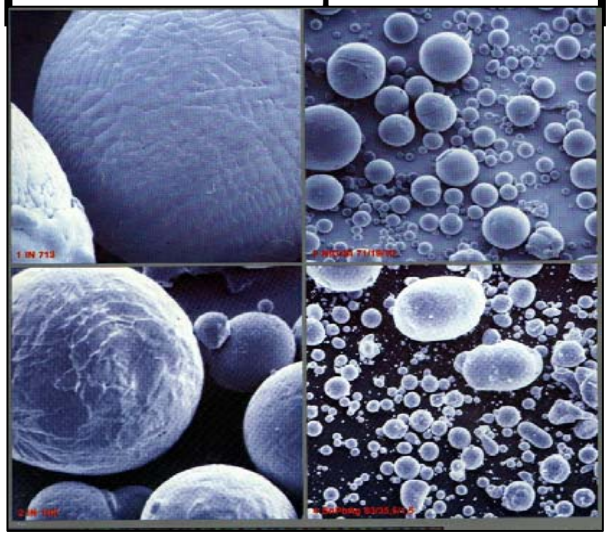
◎ High purity ( low Oxygen ).

◎ Special-shape powder superior in formability compressibility and compactability.

◎ Particle size between several $\mu$m and 100 $\mu$m available.

◎ Free selection of alloy designs is possible to match the intended purpose

Photo of particle



RAINSUN GROUP
RainSun

# Production equipment (A01)


**ALD Vacuum melting**


**ALD gas atomizing**

# Production equipment (A02)

# Production equipment (05)

# Inspection and analysis equipment

01：ICP-Emission spectrometry ,
PERKIN ELMER, OPTIMA 3200L.

02：Carbon / sulfur analyzer, HORIBA, EMIA-8200.

03：Oxygen / nitrogen analyzer, HORIBA, EMGA-520.

04：Laser scattering particle size distribution analyzer,
HORIBA, LA-920

05：High temperature differential thermal analyzer,
TA INSTRUMENT, 1600DTA

06：High temperature and high pressure
X-RD analyzer, PHILIPS.

# Inspection and analysis equipment(01)

**ICP-Emission spectrometry , PERKIN ELMER, OPTIMA 3200L.**

# Inspection and analysis equipment(02)

**C、Si (C、S) analyzer**
**Carbon / sulfur analyzer, HORIBA, EMIA-8200.**

# Inspection and analysis equipment(03)


**N、O analyzer**

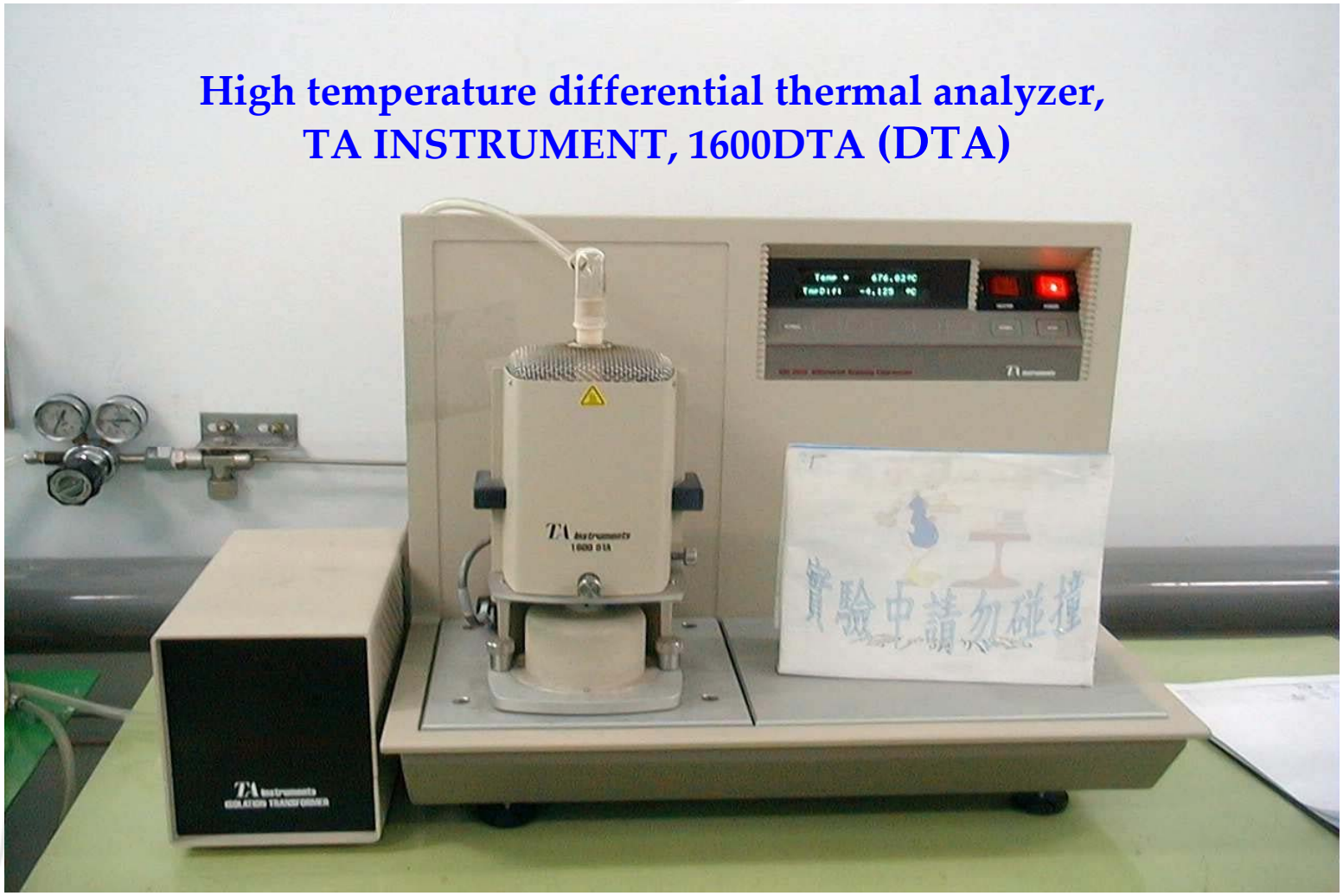
**Oxygen / nitrogen analyzer, HORIBA, EMGA-520**

# Inspection and analysis equipment(04)


**Laser scattering particle size distribution analyzer HORIBA, LA-920**

# Inspection and analysis equipment(05)

**High temperature differential thermal analyzer,**
**TA INSTRUMENT, 1600DTA (DTA)**



# Inspection and analysis equipment(06)


**X-ray**
**High temperature and high pressure X-RD analyzer, PHILIPS.**

# Production application

| Power Material | |
|---|---|
| NiMH battery powder | AB5 |
| Metal Injection Moulding | |
| Stainless Steel | 303L、304L、316L 、410L 、420 、440C<br>430L 、17-4PH |
| High speed 、<br>Tooling stainless | A30 、440 V 、420V 、SKD11 、M7 、<br>T15 、M2 |
| Ni Metal | NiCr 、NiCrW |
| Low profile steel | AISI4340 、4630 、4650 、8%Ni Steel |
| Laser component | Invr(Fe36Ni) 、Kovar(F-15,FeNiCo) |
| Magnetism material | |
| Clutch powder | FeCr 、FeCoCr 、FeCo 、SiFe |
| Enhanced Magnetism material | NdFeB 、NiFe |

## ※ Stainless steel powder

| Grade | Standard Chemical Composition | | | | |
|---|---|---|---|---|---|
| | Fe | Cr | Ni | Mo | C |
| 304L | Bal | 19 | 10 | | 0.02 |
| 308L | Bal | 20 | 11 | | 0.07 |
| 309L | Bal | 23 | 13.5 | | 0.02 |
| 310 | Bal | 25 | 20.5 | | 0.2 |
| 316L | Bal | 17 | 11 | 2 | 0.02 |
| 410L | Bal | 12.5 | | | 0.02 |
| 440C | Bal | 17 | | 0.75 | 1.1 |
| 630L | Bal | 3 | 16 | Cu : 3.0 | 0.02 |

## ※ High-speed and other Tool steel powder

| Grade | Standard Chemical Composition | | | | | | |
|---|---|---|---|---|---|---|---|
| | Fe | C | Cr | V | W | Mo | Co |
| T15 | Bal | 1.5 | 4.0 | 5.0 | 12.0 | | 5.0 |
| M2 | Bal | 1.0 | 4.0 | 2.0 | 6.0 | 5.0 | |
| D2 | Bal | 1.5 | 12.0 | 1.0 | | 1.0 | |
| 440V | Bal | 2.2 | 17.5 | 5.7 | | 0.5 | |

## ※ Nickel Alloy and Magnetic material powder

| Grade | Standard Chemical Composition | | | | |
|---|---|---|---|---|---|
| | Fe | Ni | Mo | Si | Al |
| Fe-8Ni | Bal | 8.0 | | | |
| Inver | Bal | 36.0 | | | |
| PB-47 | Bal | 47.0 | | | |
| NiFe | Bal | 50.0 | | | |
| PC-78 | Bal | 78.0 | 4.0 | | |
| Fe-3Si | Bal | | | 3.5 | |
| Fe-5.5Si | Bal | | | 3.5 | |
| FeAlSi | Bal | | | 3.5 | 5.5 |

## ※ Other Alloy powder

| Grade | Standard Chemical Composition | | | | | |
|---|---|---|---|---|---|---|
| | Fe | Ni | C | Si | | |
| NiFeAl | Bal | 30.0 | | | Al : 10.0 | |
| NiCu | Bal | 30.0 | | | Al : 5.0 | Cu : 10 |
| NiCrW | 2.5 | Bal | 0.66 | 4.0 | W : 9.6 | B : 2.9 |
| FeCMnSi | Bal | | 0.5 | 2.5 | Mn : 8.0 | |
| 4340 | Bal | 1.8 | 0.35 | Cr : 0.8 | Mo : 0.25 | Mn : 0.8 |

# List of Ultra-fine MIM Powders

**List of Ultra-fine MIM Powders: Representative Grade Its Chemical composition**

| | | Chemical Composition (%) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Alloy Grade | C | Si | Mn | P | S | Cr | Ni | Mo | Cu | Nb | Co | W | V | Fe | O |
| **Stainless Steel** | 303 | 0.019% | 0.8% | 0.1% | 0.020% | 0.200% | 16.5% | 13.6% | \ | 2.0% | \ | \ | \ | \ | Bal | \ |
| **Stainless Steel** | 304L | 0.017% | 0.8% | 0.1% | 0.025% | 0.005% | 18.2% | 10.8% | \ | \ | \ | \ | \ | \ | Bal | \ |
| **Stainless Steel** | 316L | 0.017% | 0.8% | 0.1% | 0.025% | 0.005% | 17.0% | 12.8% | 2.1% | \ | \ | \ | \ | \ | Bal | \ |
| **Stainless Steel** | 317L | 0.017% | 0.8% | 0.1% | 0.025% | 0.005% | 19.5% | 14.5% | 3.3% | \ | \ | \ | \ | \ | Bal | \ |
| **Stainless Steel** | 410L | 0.017% | 0.8% | 0.1% | 0.025% | 0.005% | 12.5% | 0.2% | \ | \ | \ | 5.0% | \ | \ | Bal | \ |
| **Stainless Steel** | 430L | 0.017% | 0.8% | 0.1% | 0.025% | 0.005% | 16.5% | 0.2% | \ | \ | \ | \ | \ | \ | Bal | \ |
| **Stainless Steel** | 434L | 0.017% | 0.8% | 0.1% | 0.025% | 0.005% | 16.9% | 0.2% | 1.0% | \ | \ | \ | \ | \ | Bal | \ |
| **Stainless Steel** | 440A | 0.700% | 0.8% | 0.1% | 0.025% | 0.005% | 17.0% | 0.2% | \ | \ | \ | \ | \ | \ | Bal | \ |
| **Stainless Steel** | 440C | 1.000% | 0.8% | 0.1% | 0.025% | 0.005% | 17.0% | 0.2% | \ | \ | \ | \ | \ | \ | Bal | \ |
| **Stainless Steel** | 17-4PH | 0.040% | 0.8% | 0.1% | 0.025% | 0.005% | 16.5% | 4.1% | \ | 4.0% | 0.3% | \ | \ | \ | Bal | \ |
| | | | | | | | | | | | | | | | | |
| **Fe-Ni Alloy** | Invar | 0.008% | 0.1% | 0.1% | 0.005% | 0.002% | 0.1% | 36.0% | \ | \ | \ | \ | \ | \ | Bal | \ |
| **Fe-Ni Alloy** | PB-47 | 0.008% | 0.1% | 0.1% | 0.005% | 0.002% | 0.1% | 47.5% | \ | \ | \ | \ | \ | \ | Bal | \ |
| **Fe-Ni Alloy** | 50%Ni-Fe | 0.008% | 0.1% | 0.1% | 0.005% | 0.002% | 0.1% | 50.0% | \ | \ | \ | \ | \ | \ | Bal | \ |
| **Fe-Ni Alloy** | PC-78 | 0.008% | 0.1% | 0.1% | 0.005% | 0.002% | 0.1% | 79.8% | 5.2% | \ | \ | \ | \ | \ | Bal | \ |
| **Fe-Co Alloy** | 50%Co-Fe | 0.005% | 0.1% | 0.1% | 0.005% | 0.004% | 0.1% | \ | \ | \ | \ | 50.0% | \ | \ | Bal | \ |
| **Fe-Co Alloy** | Permendur | 0.005% | 0.1% | 0.1% | 0.005% | 0.003% | 0.1% | \ | \ | \ | \ | 49.0% | \ | 2.0% | Bal | \ |
| | | | | | | | | | | | | | | | | |
| **Fe-Ni-Co Alloy** | Super Invar | 0.004% | 0.1% | \ | 0.004% | 0.004% | 0.1% | 32.0% | \ | \ | \ | 5.5% | \ | \ | Bal | \ |
| **Fe-Ni-Co Alloy** | Kovar(F-15) | 0.010% | 0.1% | \ | 0.002% | 0.003% | 0.1% | 29.2% | \ | \ | \ | 16.7% | \ | \ | Bal | \ |
| **Alnico Alloy** | Alnico 2 | 0.008% | 0.3% | \ | 0.005% | 0.003% | \ | 26.9% | \ | 4.1% | \ | 2.5% | Al=12.5% | \ | Bal | \ |
| **Alnico Alloy** | Alnico 6 | 0.010% | 0.2% | \ | 0.005% | 0.001% | \ | 18.1% | \ | 3.4% | \ | 25.8% | Al=7.3% | \ | Bal | \ |
| **Alnico Alloy** | Alnico 8 | 0.008% | 0.3% | \ | 0.005% | 0.005% | \ | 13.5% | \ | 3.2% | 0.5% | 36.5% | Al=7.4% | \ | Bal | \ |
| | | | | | | | | | | | | | | | | |
| **Fe-Si Alloy** | Fe-3%Si | 0.008% | 3.0% | 0.1% | 0.005% | 0.005% | 0.1% | \ | \ | \ | \ | \ | \ | \ | Bal | \ |
| **Fe-Si Alloy** | Fe-5.5%Si | 0.008% | 5.2% | 0.1% | 0.005% | 0.005% | 0.1% | \ | \ | \ | \ | \ | \ | \ | Bal | \ |
| **Fe-Si-Al** | Sendust | 0.020% | 9.7% | 0.1% | 0.005% | 0.005% | \ | \ | \ | \ | \ | \ | Al=6.0% | \ | Bal | \ |
| | | | | | | | | | | | | | | | | |
| | SKH-57 | 1.26% | 0.3% | 0.1% | 0.016% | 0.016% | 4.3% | \ | 3.6% | \ | \ | 9.4% | 9.3% | 3.4% | Bal | \ |
| **OTHER** | Hastelloy | \ | 0.7% | 0.2% | 0.002% | 0.005% | 15.5% | Bal | 16.3% | \ | \ | 2.0% | 4.2% | \ | Bal | \ |
| | SCM-415 | 0.15% | 0.2% | 0.1% | 0.015% | 0.005% | 1.1% | \ | 0.2% | \ | \ | \ | \ | \ | Bal | \ |

# Powders

| Alloy Grade | | C | Si | B | Fe | Cr | Ni | Mo | Mn | W | Co | Hardness | Particle Distribution | | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | % | % | % | % | % | % | % | % | % | % | HV | um | um | % |
| **Nickle-Base** | **1616-02** | 0.20% | 1.00% | \ | 0.50% | 20.00% | Bal | \ | 0.75% | \ | \ | 280 | 53 | 20 | \ |
| **Nickle-Base** | **276** | <0.02% | 0.10% | \ | 0.70% | 15.20% | Bal | 16.00% | \ | 3.80% | 2.00% | 260 | 53 | 20 | \ |
| **Nickle-Base** | **1640-02** | 0.25% | 3.50% | 1.60% | 2.50% | 7.50% | Bal | \ | \ | \ | \ | 380 | 53 | 20 | \ |
| **Nickle-Base** | **1645-02** | 0.35% | 3.70% | 1.80% | 2.60% | 8.90% | Bal | \ | \ | \ | \ | 450 | 53 | 20 | \ |
| **Nickle-Base** | **1650-02** | 0.45% | 3.90% | 2.30% | 2.90% | 11.00% | Bal | \ | \ | \ | \ | 570 | 53 | 20 | \ |
| **Nickle-Base** | **1660-02** | 0.75% | 4.30% | 3.10% | 3.70% | 14.80% | Bal | \ | \ | \ | \ | 780 | 53 | 20 | \ |
| **Nickle-Base** | **1660-22** | 0.90% | 4.30% | 3.30% | 4.20% | 16.30% | Bal | \ | \ | \ | \ | 820 | 53 | 20 | \ |
| | | | | | | | | | | | | | | | |
| **Cobalt-Base** | **2637-.02** | 1.10% | 1.00% | \ | 1.50% | 28.50% | 1.50% | \ | \ | 4.40% | Bal | 380 | 53 | 20 | \ |
| **Cobalt-Base** | **2640-.02** | 1.70% | 1.20% | \ | 1.20% | 25.70% | 22.80% | \ | \ | 12.50% | Bal | 400 | 53 | 20 | \ |
| | | | | | | | | | | | | | | | |
| **Iron-Base** | **316L** | <0.03% | 0.80% | \ | Bal | 17.00% | 12.00% | 2.50% | 1.50% | \ | \ | 180 | 53 | 20 | \ |
| **Iron-Base** | **316HIC** | 0.11% | 0.80% | \ | Bal | 17.00% | 12.00% | 2.20% | 0.20% | \ | \ | 180 | 75 | 45 | \ |
| **Iron-Base** | **3650.- 02** | 1.80% | 1.30% | \ | Bal | 28.00% | 16.00% | 4.50% | 0.80% | \ | \ | 500 | 53 | 20 | \ |