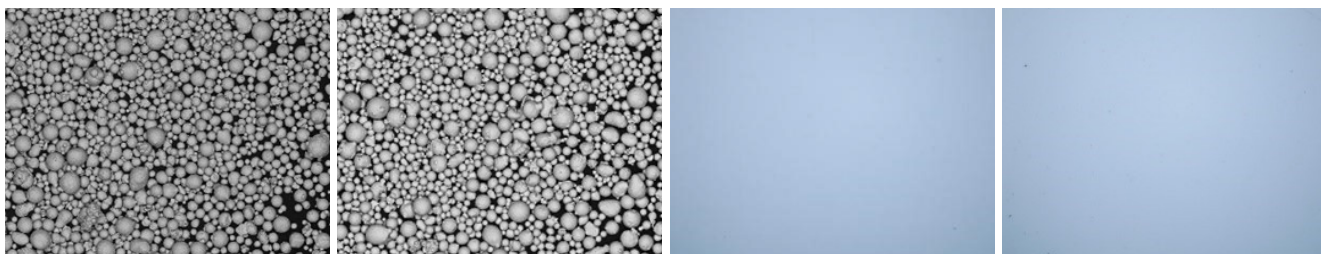


# MS1 Die steel

[ Great tensile strength, fatigue durability, corrosion preventive, oxidation resistance ]

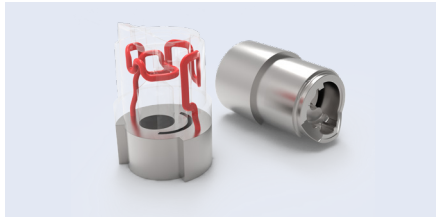
## Material Introduction

MS1 is a Fe–Ni alloy with ultra–low carbon content. Using carbon free or micro carbon martensite as the matrix, MS1 precipitates alloy compounds through elements such as Mo, Co, Ti, Al during aging, and finally forms a second phase reinforced ultra–high strength steel.

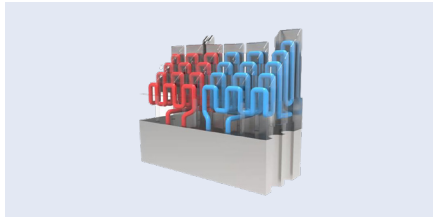


## Applications

It is suitable for SLM processing of conformal cooling channel molds such as plastic injection molds.



Conformal cooling channel<1>



Conformal cooling channel<2>



Automotive CV Joint

## Chemical Composition (wt.%)

| Fe   | Ni    | Al        | Ti      | Mo      | Co      | C     |
|------|-------|-----------|---------|---------|---------|-------|
| Bal. | 17–19 | 0.05–0.15 | 0.6–0.8 | 4.5–5.2 | 8.5–9.5 | ≤0.03 |
| Si   | Mn    | Cr        | P       | S       | O       | N     |
| ≤0.1 | ≤0.10 | ≤0.30     | ≤0.01   | ≤0.01   | ≤0.04   | ≤0.02 |

## Physical Property

| Granularity(μm) |       |     | Sphericity | Loose density (g/cm³) | Tap density (g/cm³) | Flowability (s/50g) |
|-----------------|-------|-----|------------|-----------------------|---------------------|---------------------|
| D10             | D50   | D90 |            |                       |                     |                     |
| ≥15             | 30–40 | ≤60 | ≥0.9       | ≥4.0                  | ≥4.5                | ≤20                 |



## Parameters

| Laser power(W) | Laser speed(mm/s) | Scanning spacing(mm) | Layer thickness ( mm ) |
|----------------|-------------------|----------------------|------------------------|
| 295            | 910               | 0.11                 | 0.05                   |

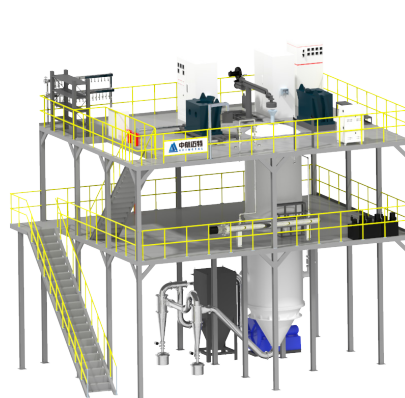
## Mechanical Property

| Condition    | Rockwell Hardness/HRC | Tensile Strength/MPa | Elongation/% |
|--------------|-----------------------|----------------------|--------------|
| As-Deposited | 38-42                 | ≥ 1170               | ≥ 11.0       |
| Heat-Treated | 54-57                 | ≥ 1900               | ≥ 4.0        |

## Advanced Powder Metallurgy Technology



The powder metallurgy technology and equipment production line—  
Vacuum Induction Gas Atomization (AVI-VIGA)



The powder metallurgy technology and equipment production line—  
Non-Vacuum Gas Atomization (AVI-GA)

## Adapting Devices

10+ proprietary LPBF equipment systems supporting build sizes from 100 mm to 1500 mm.



MT170H



MT280



MT400M



MT450



MT650

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