# 17-4PH

composition after sintering

| Ni% | Cr% | C% | Cu% | Nb+Ta% | Mn% | Si% | Fe% |
|---|---|---|---|---|---|---|---|
| 3.0-5.0 | 15.5-17.5 | ≤0.07 | 3.0-5.0 | 0.15-0.45 | ≤1.0 | ≤1.0 | balance |

standards

GB 0Cr17Ni4Cu4Nb； DIN 1.4542, X 5 CrNiCuNb 17 4；
AISI/UNS S17400; SAE J 467 (17-4PH);MPIF MIM-17-4PH

Characteristic Properties
(Typical values are shown in bracket)

| | as sintered | heat-treated |
|---|---|---|
| Density\g/cm3 | ≥7.6 | |
| Yield Strength $R_{P0.2}$\Mpa | ≥700（750） | ≥1090（1200） |
| Ultimate Tensile Strength\Mpa | ≥850（900） | ≥1200（1300） |
| Elongation\% | ≥6 | ≥6 |
| Hardness | 260-350 HV0.3 or 24-35 HRC | 36-42 HRC （40-42） |
| corrosion resistance | 48h neutral salt spray test qualified | |

返回

# 17-4PHN

composition after sintering

| Ni% | Cr% | C% | Cu% | Nb+Ta% | Mn% | Si% | N% | Fe% |
|---|---|---|---|---|---|---|---|---|
| 3.0-5.0 | 15.5-17.5 | ≤0.15 | 3.0-5.0 | 0.15-0.45 | ≤1.0 | ≤1.0 | ≥0.3 | balance |

Characteristic Properties (Typical values are shown in bracket)

| | as sintered | heat-treated |
|---|---|---|
| Density\g/cm3 | ≥7.6 | |
| Yield Strength $R_{P0.2}$\Mpa | ≥380（420） | ≥350（400） |
| Ultimate Tensile Strength\Mpa | ≥690（800） | ≥600（700） |
| Elongation\% | ≥20（40） | ≥13（20） |
| Hardness\HV0.3 | 220-280 | 200-260 |
| Relative permeability | | ≤1.01 |
| corrosion resistance | | 48h neutral salt spray test qualified |

返回

# 316L

composition after sintering

| Ni% | Cr% | C% | Mo% | Mn% | Si% | Fe% |
|---|---|---|---|---|---|---|
| 10.0-14.0 | 16.0-18.0 | ≤0.03 | 2.0-3.0 | ≤2.0 | ≤1.0 | balance |

standards

GB 022Cr17Ni12Mo2； DIN1.4404, X 2 CrNiMo 17 13 2
AISI 316L; UNS S31603； MPIF MIM-316L

Characteristic Properties
(Typical values are shown in bracket)

| | as sintered |
|---|---|
| Density\g/cm3 | ≥7.8(7.85) |
| Yield Strength $R_{P0.2}$\Mpa | ≥160（180） |
| Ultimate Tensile Strength\Mpa | ≥480（520） |
| Elongation\% | ≥50 |
| Hardness\HV0.3 | 120-180 |
| Relative permeability | ≤1.01 |
| Corrosion resistance | 48h neutral salt spray test qualified |

返回

# 316 duplex

composition after sintering

| Ni% | Cr% | C% | Mo% | Mn% | Si% | N% | Fe% |
|---|---|---|---|---|---|---|---|
| 4.5-6.5 | 21.0-23.0 | ≤0.03 | 2.5-3.5 | ≤2.0 | ≤1.0 | 0.1-0.22 | balance |

standards

DIN 1.4462

Characteristic Properties
(Typical values are shown in bracket)

| | as sintered |
|---|---|
| Density\g/cm3 | ≥7.65(7.7) |
| Yield Strength $R_{P0.2}$\Mpa | ≥450 |
| Ultimate Tensile Strength\Mpa | ≥650 |
| Elongation\% | ≥25 |
| Hardness\HV0.3 | 270-320 |
| corrosion resistance | 48h neutral salt spray test qualified |

返回

# 304L

composition after sintering

| C% | Cr% | Ni% | Si% | Mn% | P% | S% | Fe% |
|---|---|---|---|---|---|---|---|
| ≤0.03 | 18.0-20.0 | 8.0-12.0 | ≤1.0 | ≤2.0 | ≤0.045 | ≤0.03 | balance |

standards AISI 304L;GB/T 20878-2007022Cr19Ni10

Characteristic Properties
(Typical values are shown in bracket)

| | as sintered |
|---|---|
| Density\g/cm3 | ≥7.75(7.85) |
| Yield Strength $R_{P0.2}$\Mpa | ≥160（170） |
| Ultimate Tensile Strength\Mpa | ≥480（490） |
| Elongation\% | ≥50 |
| Hardness\HV0.3 | 120-180 |

返回

# 430L

composition after sintering

| C% | Cr% | Mn% | Si% | Fe% |
|---|---|---|---|---|
| ≤0.05 | 15.5-17.5 | ≤1.0 | ≤1.0 | balance |

standards

DIN 1.4016,X 6Cr17;MPIF MIM-430L
AISI; SAE J 405 (51430); UNS S43000

Characteristic Properties
(Typical values are shown in bracket)

| | as sintered |
|---|---|
| Density\g/cm3 | ≥7.55(7.6) |
| Yield Strength $R_{P0.2}$\Mpa | ≥200（240） |
| Ultimate Tensile Strength\Mpa | ≥380（420） |
| Elongation\% | ≥20（27） |
| Hardness\HV0.3 | 120-170 |

返回

# 430FR

composition after sintering

| Fe% | C% | Mn% | Si% | Cr% | Ni% | Mo% | P% |
|---|---|---|---|---|---|---|---|
| Bal. | ≤0.065 | ≤0.8 | 1.0-1.5 | 17.25-18.25 | ≤0.6 | ≤0.5 | <0.03 |

standards

ASTM A838 430FR

Characteristic Properties
(Typical values are shown in bracket)

| | as sintered |
|---|---|
| Density\g/cm3 | ≥7.55 |
| Yield Strength $R_{P0.2}$\Mpa | ≥280（300） |
| Ultimate Tensile Strength\Mpa | ≥400（450） |
| Elongation\% | ≥20（25） |
| Hardness\HV0.3 | 130-190 |

返回

# 303

composition after sintering

| C% | Cr% | Ni% | Si% | Mn% | P% | S% | Fe% |
|---|---|---|---|---|---|---|---|
| ≤0.15 | 17.0-19.0 | 8.0-10.0 | ≤1.0 | ≤2.0 | ≤0.2 | ≥0.15 | balance |

standards

AISI 303

Characteristic Properties
(Typical values are shown in bracket)

| | as sintered |
|---|---|
| Density\g/cm3 | ≥7.6 |
| Yield Strength $R_{P0.2}$\Mpa | ≥160（180） |
| Ultimate Tensile Strength\Mpa | ≥530（580） |
| Elongation\% | ≥40（50） |
| Hardness\HV0.3 | 120-180 |

返回

# 440CNb

composition after sintering

| C% | Cr% | Ni% | Mo% | Nb% | Si% | Mn% | P% | S% | Fe% |
|---|---|---|---|---|---|---|---|---|---|
| 0.95-1.25 | 16.0-18.0 | ≤0.60 | ≤0.75 | 2.5-3.5 | ≤1.0 | ≤1.0 | ≤0.04 | ≤0.03 | balance |

standards

Nb-modified UNS S44004,AISI 440C;SAE 51440 C;
DIN1.4125,X105CrMo 17

Characteristic Properties
(Typical values are shown in bracket)

| | as sintered |
|---|---|
| Density\g/cm3 | ≥7.6 |
| Yield Strength $R_{P0.2}$\Mpa | ≥750（850） |
| Ultimate Tensile Strength\Mpa | ≥1150（1250） |
| Elongation\% | ≥1.0 |
| Hardness\HRC | ≥40 |

返回

# 440C

composition after sintering

| C% | Cr% | Ni% | Si% | Mn% | P% | Mo | S% | Fe% |
|---|---|---|---|---|---|---|---|---|
| 0.95-1.2 | 16.0-18.0 | ≤0.60 | ≤1.0 | ≤1.0 | ≤0.04 | ≤0.75 | ≤0.03 | balance |

standards

UNS S44004,AISI 440C;SAE 51440 C;DIN1.4125,X105CrMo 17

Characteristic Properties
(Typical values are shown in bracket)

| | as sintered |
|---|---|
| Density\g/cm3 | ≥7.6 |
| Yield Strength $R_{P0.2}$\Mpa | ≥750（850） |
| Ultimate Tensile Strength\Mpa | ≥1150（1250） |
| Elongation\% | ≥1.0 |
| Hardness\HRC | ≥40 |

返回

# 420W

composition after sintering

| C% | Cr% | Ni% | Mo% | Mn% | Si% | Nb% | P% | S% | Fe% |
|---|---|---|---|---|---|---|---|---|---|
| 0.35-0.5 | 12.0-14.0 | ≤0.6 | ≤0.65 | ≤1.0 | ≤1.0 | 1.0-2.0 | ≤0.04 | ≤0.03 | balance |

standards

Nb-modified SUS 420-J2, AISI 420F, UNS S42020. UNS J91154, DIN 1.4028,X30 Cr13

Characteristic Properties

| | as sintered | Heat-treated |
|---|---|---|
| Density\g/cm3 | ≥7.6 | |
| Yield Strength $R_{P0.2}$\Mpa | ≥1100 | ≥1200 |
| Ultimate Tensile Strength\Mpa | ≥1300 | ≥1750 |
| Elongation\% | ≥1.0 | ≥1.0 |
| Hardness\HRC | ≥45 | ≥55 |

返回

# panacea

composition after sintering

| C% | Cr% | N% | Ni% | Mo% | Mn% | Si% | Fe% |
|---|---|---|---|---|---|---|---|
| ≤0.2 | 16.5-17.5 | 0.60-0.90 | ≤0.1 | 3.0-3.5 | 10.0-12.0 | ≤1.0 | balance |

Characteristic Properties
(Typical values are shown in bracket)

| | heat-treated after sintering |
|---|---|
| Density\g/cm3 | ≥7.5(7.65) |
| Yield Strength $R_{P0.2}$\Mpa | ≥550(600) |
| Ultimate Tensile Strength\Mpa | ≥900(950) |
| Elongation\% | ≥35 |
| Hardness\HV10 | 260-320 |
| Corrosion resistance | Crevice corrosion resistance and resistance against pitting better than for 316L |
| Nickel-release-rate | much below the limits established in the EU-guideline 94/27/EC |

返回

# 4605

composition after sintering

| C% | Si% | Ni% | Mo% | Fe% |
|---|---|---|---|---|
| 0.4-0.6 | ≤1.0 | 1.5-2.5 | 0.2-0.5 | balance |

standards

ASTM MIM-4605, MPIF MIM-4605

Characteristic Properties
(Typical values are shown in bracket)

| | as sintered | heat-treated |
|---|---|---|
| Density\g/cm3 | ≥7.5 | |
| Yield Strength $R_{P0.2}$\Mpa | ≥205(255) | 1310(1480) |
| Ultimate Tensile Strength\Mpa | ≥380(415) | 1480(1655) |
| Elongation\% | ≥11(15) | <1.0 |
| Hardness | ≥150 HV10 | 48 HRC |

返回

# FN02

composition after sintering

| C% | Ni% | Fe% |
|---|---|---|
| ≤0.1 | 1.9-2.2 | balance |

Characteristic Properties

| | as sintered | heat-treated |
|---|---|---|
| Density\g/cm3 | ≥7.5 | |
| Yield Strength $R_{P0.2}$\Mpa | ≥150 | |
| Ultimate Tensile Strength\Mpa | ≥260 | |
| Elongation\% | ≥25 | |
| Hardness | 90-110 HV10 | ≥600HV10（55HRC） |

返回

# FN04

composition after sintering

| C% | Ni% | Fe% |
|---|---|---|
| 0.4-0.6 | 3.5-4.5 | balance |

Characteristic Properties

| | as sintered |
|---|---|
| Density\g/cm3 | ≥7.5 |
| Yield Strength $R_{P0.2}$\Mpa | ≥300 |
| Ultimate Tensile Strength\Mpa | ≥600 |
| Elongation\% | ≥10 |
| Hardness\HV0.3 | 150-250 |

返回

# FN08

composition after sintering

| Sinter-atmosphere | C% | Ni% | Fe% |
|---|---|---|---|
| H2 | ≤0.1 | 7.5-8.5 | balance |
| N2 | 0.4-0.6 | 7.5-8.5 | balance |

Characteristic Properties

| | Sintered in $H_2$ | sintered in $H_2$ and case hardened | sintered in $N_2$ | sintered in $N_2$ and heat-treated |
|---|---|---|---|---|
| Density\g/cm3 | ≥7.5 | | ≥7.5 | |
| Yield Strength $R_{P0.2}$\Mpa | ≥210 | | ≥400 | ≥1100 |
| Ultimate Tensile Strength\Mpa | ≥380 | | ≥700 | ≥1250 |
| Elongation\% | ≥15 | | ≥3 | ≥3 |
| Hardness | 90-140 HV10 | ≥600HV10 | 150-280 HV10 | 400 HV10( 40 HRC) |

返回

# HK30

composition after sintering

| C% | Cr% | Ni% | Nb% | Si% | P% | S% | Fe% |
|---|---|---|---|---|---|---|---|
| 0.2-0.5 | 24.0-26.0 | 19.0-22.0 | 1-1.75 | 0.75-1.3 | ≤0.045 | ≤0.015 | balance |

standards

Nb-modified UNS 94203, ACI HK30; DIN 1.4848, GX40CrNiSi25-20

Characteristic Properties
(Typical values are shown in bracket)

| | Sintered in $N_2$ | Sintered in Ar |
|---|---|---|
| Density\g/cm3 | ≥7.6(7.7) | ≥7.55(7.65) |
| Yield Strength $R_{P0.2}$\Mpa | ≥420 | ≥250 |
| Ultimate Tensile Strength\Mpa | ≥750 | ≥600 |
| Elongation\% | ≥11 | ≥20 |
| Hardness | surface≥220 HV1 | 150 HV1 |
| | core≥170 HV1 | |

返回

# In 713C

composition after sintering

| Cr % | Mo % | C% | Ti % | Al % | Si% | Mn % | Nb+Ta % | Zr% | B% | Fe% | Co% | S、P% | Cu % | Ni % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12.0-14.0 | 3.8-5.2 | 0.08-0.20 | 0.5-1.0 | 5.5-6.5 | <0.5 | <0.25 | 1.8-2.8 | 0.05-0.15 | 0.005-0.015 | <2.5 | <1.0 | <0.015 | <0.5 | Bal. |

Characteristic Properties

| | as sintered at RT | as sintered at 1050℃ | Heat treated at RT | Heat treated at 1050℃ |
|---|---|---|---|---|
| Density\g/cm3 | 7.85 | | | |
| Yield Strength $R_{P0.2}$\Mpa | 800 | 90 | 900 | 150 |
| Ultimate Tensile Strength\Mpa | 1350 | 130 | 1370 | 155 |
| Elongation\% | 24 | 8.5 | 16 | 3 |
| Hardness\HV1 | ≥320 | | | |

返回

# Ti

composition after sintering

| C% | O% | N% | Ti% |
|---|---|---|---|
| ≤0.2 | ≤0.4 | ≤0.1 | balance |

standards

ASTM grade 4 ; UNS R50700
DIN 3.7056,Ti4

Characteristic Properties
(Typical values are shown in bracket）

| | as sintered |
|---|---|
| Density\g/cm3 | ≥4.2 |
| Yield Strength $R_{P0.2}$\Mpa | ≥480 |
| Ultimate Tensile Strength\Mpa | ≥550 |
| Elongation\% | ≥5 |
| Hardness\HV1 | 160-240 |

返回

# TC4

composition after sintering

| O% | C% | H% | N% | Fe% | Al% | V% | Ti |
|---|---|---|---|---|---|---|---|
| ≤0.2 | ≤0.1 | ≤0.015 | ≤0.04 | ≤0.3 | 5.5-6.75 | 3.5-4.5 | balance |

standards

GB TC4； ASTM B348-02 Ti–6Al–4V Grade5

Characteristic Properties

| | as sintered |
|---|---|
| Density\g/cm3 | ≥4.2 |
| Yield Strength $R_{P0.2}$\Mpa | ≥720 |
| Ultimate Tensile Strength\Mpa | ≥900 |
| Elongation\% | ≥5 |
| Hardness | 300 HV1 |

返回

# Cu

composition after sintering

| Cu% |
| --- |
| ≥99.5 |

Characteristic Properties

| | as sintered |
| --- | --- |
| Density\g/cm3 | ≥8.5 |
| Yield Strength $R_{P0.2}$\Mpa | ≥70 |
| Ultimate Tensile Strength\Mpa | ≥190 |
| Elongation\% | ≥30 |
| Relative electric conductivity\% | ≥80 |

返回

# Cu-Cr-Zr

composition after sintering

| Cr% | Zr% | Cu% |
|---|---|---|
| 0-1 | 0-1 | balance |

Characteristic Properties
(Typical values are shown in bracket)

| | heat-treated after sintering |
|---|---|
| Density\g/cm3 | ≥8.5 |
| Yield Strength $R_{P0.2}$\Mpa | ≥150(180) |
| Ultimate Tensile Strength\Mpa | ≥260(300) |
| Elongation\% | ≥20 |
| Relative electric conductivity\% | ≥70 |

返回

# W18Cr4V

composition after sintering

| C% | Mn% | Si% | Cr% | W% | Mo% | V% | Fe% |
|---|---|---|---|---|---|---|---|
| 0.70-0.80 | ≤0.4 | ≤0.4 | 3.80-4.40 | 17.50-19.0 | ≤0.30 | 1.00-1.40 | balance |

standards

GB/T 9943-2008

Characteristic Properties
(Typical values are shown in bracket)

| | As sintered | heat-treated |
|---|---|---|
| Density\g/cm3 | ≥8.5(8.65) | |
| Yield Strength $R_{P0.2}$\Mpa | ≥1100(1200) | ≥1800（2000） |
| Ultimate Tensile Strength\Mpa | ≥1450(1550) | ≥2000（2300） |
| Hardness\HRC | ≥45(50) | ≥57（60） |

返回

# W-Ni-Cu

composition after sintering

| W% | Ni% | Cu% |
|---|---|---|
| 96-97 | 1.5-2.5 | 0.8-1.8 |

Characteristic Properties

| | as sintered | heat-treated |
|---|---|---|
| Density\g/cm3 | ≥18.4 | |
| Yield Strength $R_{P0.2}$\Mpa | ≥571 | 650 |
| Ultimate Tensile Strength\Mpa | ≥648 | 900 |
| Elongation\% | ≥1 | ≥5 |
| Hardness\HRC | 22-33 | |
| magnetism | Not have | Not have |

返回

# W-Ni-Fe

composition after sintering

| W% | Ni% | Fe% |
|---|---|---|
| 95.5-96.5 | 2.0-2.8 | 1.2-2.0 |

Characteristic Properties

| | as sintered |
|---|---|
| Density\g/cm3 | ≥18.25 |
| Yield Strength $R_{P0.2}$\Mpa | ≥600 |
| Ultimate Tensile Strength\Mpa | ≥900 |
| Elongation\% | ≥10 |
| Hardness\HRC | 25-35 |
| magnetism | have |

返回

# W-Ni-Cu-Co

composition after sintering

| W% | Ni% | Cu% | Co% |
|---|---|---|---|
| 95.5-96.5 | 2.5-3.0 | 0.5-1.0 | 0.3-0.7 |

Characteristic Properties

| | as sintered |
|---|---|
| Density\g/cm3 | ≥18.30 |
| Yield Strength $R_{P0.2}$\Mpa | ≥600 |
| Ultimate Tensile Strength\Mpa | ≥900 |
| Elongation\% | ≥7 |
| Hardness\HRC | 27-35 |
| magnetism | Not have |

返回

# YG8

composition
after sintering

| WC% | Co% |
|---|---|
| 92 | 8 |

Characteristic
Properties
(Typical values)

| | as sintered |
|---|---|
| Density\g/cm3 | 14.7 |
| Hardness\HRA | ≥89.0 |
| magnetic saturation\% | 7.5 |
| magnetic coercivity\kA*m-1 | 11.5 |
| Flexure strength\Mpa | 2400 |

返回

# YG15

composition after sintering

| WC% | Co% |
|---|---|
| 85 | 15 |

Characteristic Properties
(Typical values)

| | as sintered |
|---|---|
| Density\g/cm3 | 14.0 |
| Hardness\HRA | ≥86.5 |
| magnetic saturation\% | 14.0 |
| magnetic coercivity\kA*m-1 | 7.5 |
| Flexure strength\Mpa | 2700 |

返回

# WC-10Ni

composition after sintering

| Ni% | Cr3C2% | WC% |
|---|---|---|
| 9.0-11.0 | 0.5-1.5 | balance |

Characteristic Properties

| | as sintered |
|---|---|
| Density\g/cm3 | 14.8-15.0 |
| Flexure strength\Mpa | ≥1800 |
| Relative permeability \% | ≤1.05 |
| Hardness\HRA | 90 |

返回

# black $ZrO_2$

composition after sintering

| $Y_2O_3$% | pigment% | $SiO_2$% | $ZrO_2+Y_2O_3$+pigment% |
|---|---|---|---|
| 4.0-6.0 | ≤5.0 | ≤0.05 | ≥99.9 |

Characteristic Properties

| | as sintered |
|---|---|
| Density\g/$cm^3$ | ≥6 |
| Flexure strength\Mpa | ≥800 |
| Fracture toughness\Mpa.$m^{0.5}$ | 5 |
| Hardness\HV1 | 1200 |

返回

# Fe-50Ni

composition after sintering

| C% | Ni% | Si% | Fe% |
|---|---|---|---|
| ≤0.05 | 49.0-51.0 | ≤1.0 | balance |

Characteristic Properties (Typical values)

| | as sintered |
|---|---|
| Density\g/cm3 | 7.7 |
| Yield Strength $R_{P0.2}$\Mpa | 160 |
| Ultimate Tensile Strength\Mpa | 455 |
| Elongation\% | 30 |
| Hardness\HRB | 50 |
| Maximum Permeability μ max | 27000 |

返回