

## Special Metals INCONEL® 718SPF, Nickel Superalloy, Annealed + Aged

Category : Metal , Nonferrous Metal , Nickel Alloy , Superalloy

### Material Notes:

Typical annealing - continuous process anneal, 1700°F (927°C) at 15 ft (4.57 m) per minute. This produces ASTM No. 12 grain size.

Typical aging - 1750°F (954°C)/1 h/AC plus 1325°F (719°C)/8 h/FC at 100°F (56°C)/h to 1150°F (621°C) plus 1150°F (621°C)/8 h/AC. Heat capacity, melting range, moduli, and Poisson's ratio reported herein are typical of INCONEL® alloy 718SPF (not necessarily annealed + aged samples). Data provided by the manufacturer, Special Metals.

Order this product through the following link:

[http://www.lookpolymers.com/polymer\\_Special-Metals-INCONEL-718SPF-Nickel-Superalloy-Annealed-Aged.php](http://www.lookpolymers.com/polymer_Special-Metals-INCONEL-718SPF-Nickel-Superalloy-Annealed-Aged.php)

| Physical Properties | Metric    | English                  | Comments |
|---------------------|-----------|--------------------------|----------|
| Density             | 8.22 g/cc | 0.297 lb/in <sup>3</sup> |          |

| Mechanical Properties      | Metric                      | English                       | Comments                        |
|----------------------------|-----------------------------|-------------------------------|---------------------------------|
| Hardness, Rockwell C       | 45                          | 45                            |                                 |
| Tensile Strength, Ultimate | 1550 MPa                    | 225000 psi                    |                                 |
| Tensile Strength, Yield    | 1390 MPa<br>@Strain 0.200 % | 202000 psi<br>@Strain 0.200 % |                                 |
| Elongation at Break        | 16 %                        | 16 %                          |                                 |
| Modulus of Elasticity      | 205 GPa                     | 29700 ksi                     | cold-rolled, heat treated sheet |
| Poissons Ratio             | 0.294                       | 0.294                         | cold-rolled, heat treated sheet |
| Shear Modulus              | 80.0 GPa                    | 11600 ksi                     | cold-rolled, heat treated sheet |

| Thermal Properties     | Metric                      | English                     | Comments |
|------------------------|-----------------------------|-----------------------------|----------|
| CTE, linear            | 12.15 µm/m-°C               | 6.750 µin/in-°F             | Mean     |
|                        | @Temperature 21.0 - 93.0 °C | @Temperature 69.8 - 199 °F  |          |
|                        | 13.77 µm/m-°C               | 7.650 µin/in-°F             |          |
|                        | @Temperature 21.0 - 316 °C  | @Temperature 69.8 - 601 °F  | Mean     |
|                        | 14.4 µm/m-°C                | 8.00 µin/in-°F              | Mean     |
|                        | @Temperature 21.0 - 538 °C  | @Temperature 69.8 - 1000 °F |          |
| Specific Heat Capacity | 0.435 J/g-°C                | 0.104 BTU/lb-°F             |          |

| Thermal Properties | Metric          | English         | Comments |
|--------------------|-----------------|-----------------|----------|
| Melting Point      | 1260 - 1335 Å°C | 2300 - 2435 Å°F |          |
| Solidus            | 1260 Å°C        | 2300 Å°F        |          |
| Liquidus           | 1335 Å°C        | 2435 Å°F        |          |

| Component Elements Properties | Metric        | English       | Comments         |
|-------------------------------|---------------|---------------|------------------|
| Aluminum, Al                  | 0.20 - 0.80 % | 0.20 - 0.80 % |                  |
| Boron, B                      | <= 0.0060 %   | <= 0.0060 %   |                  |
| Carbon, C                     | <= 0.050 %    | <= 0.050 %    |                  |
| Chromium, Cr                  | 17 - 21 %     | 17 - 21 %     |                  |
| Cobalt, Co                    | <= 1.0 %      | <= 1.0 %      |                  |
| Copper, Cu                    | <= 0.30 %     | <= 0.30 %     |                  |
| Iron, Fe                      | 19 %          | 19 %          | As remainder     |
| Manganese, Mn                 | <= 0.35 %     | <= 0.35 %     |                  |
| Molybdenum, Mo                | 2.8 - 3.3 %   | 2.8 - 3.3 %   |                  |
| Nickel, Ni                    | 50 - 55 %     | 50 - 55 %     | Including Cobalt |
| Niobium, Nb (Columbium, Cb)   | 4.75 - 5.25 % | 4.75 - 5.25 % | Includes Ta      |
| Nitrogen, N                   | <= 0.010 %    | <= 0.010 %    |                  |
| Phosphorous, P                | <= 0.015 %    | <= 0.015 %    |                  |
| Silicon, Si                   | <= 0.35 %     | <= 0.35 %     |                  |
| Sulfur, S                     | <= 0.0020 %   | <= 0.0020 %   |                  |
| Titanium, Ti                  | 0.65 - 1.15 % | 0.65 - 1.15 % |                  |

| Electrical Properties  | Metric          | English         | Comments                            |
|------------------------|-----------------|-----------------|-------------------------------------|
| Electrical Resistivity | 0.000120 ohm-cm | 0.000120 ohm-cm |                                     |
| Magnetic Permeability  | 1.0011          | 1.0011          | at 200 Oersted (15.9 kA/m);Annealed |
| Curie Temperature      | -113 Å°C        | -171 Å°F        |                                     |

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