

# NAS36

## Controlled Expansion Material

NAS36 is an alloy with nickel (36%) and iron as its main components. Because its coefficient of thermal expansion is extremely low, at about 1/10 that of 18-8 stainless steel, thermal stress caused by temperature changes can be held to a very low level, and complex shapes (wave, bellows, etc.) like those required with other low-temperature materials are not necessary. NAS36 also shows high toughness at low temperatures and provides excellent weldability. Nippon Yakin supplies NAS36 in plate, sheet and strip forms.

### Steel Grade/Standard

| Nippon Yakin Grade | JIS | ASTM | EN |
|--------------------|-----|------|----|
| NAS36              | —   | —    | —  |

### Chemical Composition

| [wt %] |       |       |           |      |
|--------|-------|-------|-----------|------|
| C      | Si    | Mn    | Ni        | Fe   |
| ≤0.05  | ≤0.30 | ≤0.80 | 35.0~37.0 | Bal. |

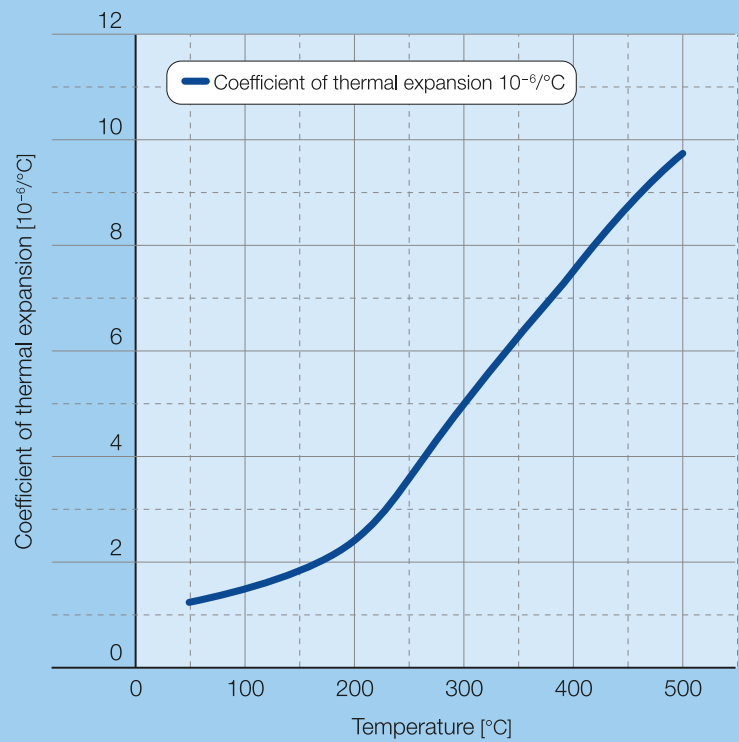
### Physical Properties

|  |                        |           |                        |
|--|------------------------|-----------|------------------------|
| Density                                  | [g/cm <sup>3</sup> ]   |           | 8.14                   |
| Specific heat                            | [J/kg · K]             | −196~20°C | 385                    |
| Electrical resistivity                   | [μΩ · cm]              | at 20°C   | 78                     |
| Thermal conductivity                     | [W/m · K]              | at 20°C   | 10.5                   |
|  |                        | at −196°C | 5.4                    |
| Average coefficient of thermal expansion | [10 <sup>−6</sup> /°C] | 25~100°C  | 1.5±0.5                |
| Young's modulus                          | [MPa]                  |           | 14.5 × 10 <sup>4</sup> |
| Curie point                              | [°C]                   |           | 240~260                |
| Melting range                            | [°C]                   |           | 1415~1465              |

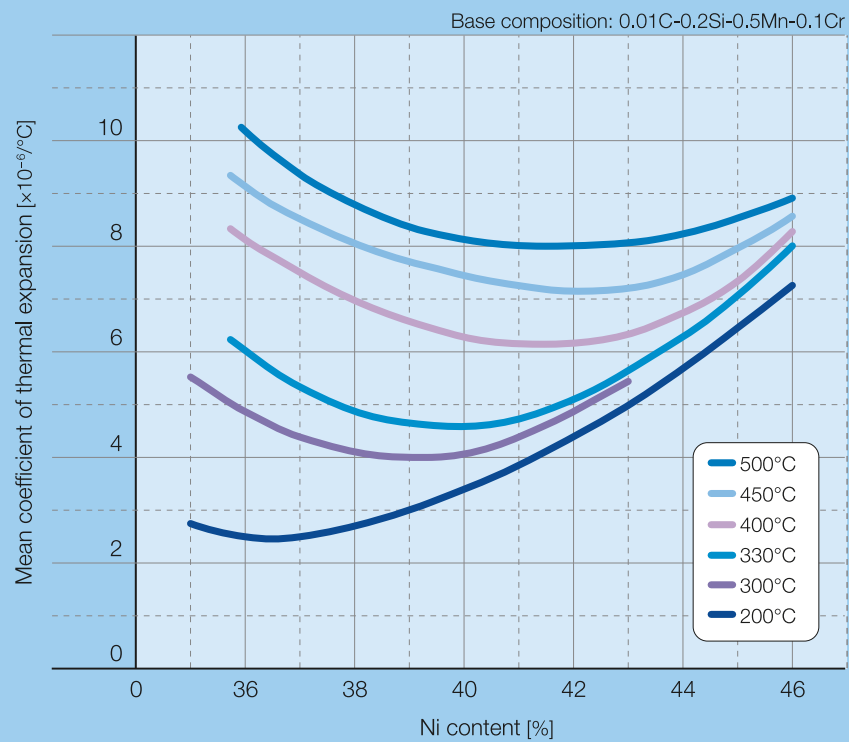


**NIPPON YAKIN KOGYO CO., LTD.**

Coefficient of Thermal Expansion



Mean coefficient of thermal expansion of Ni-Fe alloys



Mechanical Properties

Annealed Condition

|         |                                      | 0.2% proof stress<br>[MPa] | Tensile strength<br>[MPa] | Elongation<br>[%] | Hardness  |
|---------|--------------------------------------|----------------------------|---------------------------|-------------------|-----------|
| Example | Hot-rolled plate 22mm <sup>t</sup>   | 241                        | 430                       | 44                | 115 (HBW) |
|         | Cold-rolled sheet 1.3mm <sup>t</sup> | 292                        | 477                       | 37                | 132 (HV)  |

Weldability

NAS36 has good weldability. Joints of thin sheet materials can be welded by TIG welding without a filler, even in seam welding.

Applications

Molds for airplane body parts, Bimetals, Trimetals, Semiconductor manufacturing equipment.

---

**For more information, please contact:**

Nippon Yakin Kogyo Co., Ltd.

Material Solutions Sales Department

San-Ei Bldg., 5-8, 1-chome Kyobashi, Chuo-ku,  
Tokyo 104-8365 Japan

TEL: +81-3-3273-4649 FAX: +81-3-3273-4642

URL: <https://www.nyk.co.jp/en/>

**Note regarding the handling of property data:**

The technical information contained in this product guide is representative values obtained in property tests and other items used to explain the performance of the product. With the exception of items specifically mentioned as provisions of a "Standard," the contents do not represent guaranteed upper limit or lower limit values. The respective data given on this technical information are typical examples and may be different in some cases from the data obtained from the actual product. No responsibility shall, therefore, be assumed for damages arising from using the technical information data. This information is also subject to change in the future without notice. To obtain the most recent information, please contact Nippon Yakin. No part of this document may be copied or reproduced in any form without the consent of Nippon Yakin.