



## OHMALLOY MATERIAL CO., LTD.

No. 1502, Youyi Road, Baoshan district, Shanghai 201999

TEL: +86-21-66796338

FAX: +86-21-66796339

Web: [www.alloywirecable.com](http://www.alloywirecable.com)

Email: [sales@ohmalloy.com](mailto:sales@ohmalloy.com)

### Type E Bare Wire

TYPE E (CHROMEL vs Constantan) may be used in oxidizing, inert or dry reducing atmospheres, or for short periods of time under vacuum. Must be protected from sulfurous and marginally oxidizing atmospheres. Produces the highest EMF per degree of any standardized thermocouple.

#### 1. Chemical Composition

| Material       | Chemical composition (%) |    |    |    |    |
|----------------|--------------------------|----|----|----|----|
|                | Ni                       | Cr | Cu | Mn | Al |
| EP(Chromel)    | 90                       | 10 |    |    |    |
| EN(Constantan) | 45                       |    | 55 |    |    |

#### 2. Physical properties and Mechanical properties

| Material       | Density(g/cm <sup>3</sup> ) | Melting point(°C) | Tensile Strength(Mpa) | Volume resistivity(μΩ.cm) | Elongation rate (%) |
|----------------|-----------------------------|-------------------|-----------------------|---------------------------|---------------------|
| EP(Chromel)    | 8.5                         | 1427              | >490                  | 70.6(20°C)                | >25                 |
| EN(Constantan) | 8.8                         | 1220              | >390                  | 49.0(20°C)                | >25                 |

#### 3. EMF Value range at different temperature

| Material       | EMF value Vs Pt(μV) |           |             |             |             |             |
|----------------|---------------------|-----------|-------------|-------------|-------------|-------------|
|                | 100°C               | 200°C     | 300°C       | 400°C       | 500°C       | 600°C       |
| KP(Chromel)    | 2769~2859           | 5921~6019 | 9272~9374   | 12709~12819 | 16144~16282 | 19537~19699 |
| EN(Constantan) | 3499~3561           | 7389~7513 | 11647~11779 | 16109~16255 | 20699~20885 | 25362~25588 |

| EMF value Vs Pt(μV) |             |       |        |        |
|---------------------|-------------|-------|--------|--------|
| 700°C               | 800°C       | 900°C | 1000°C | 1100°C |
| 22859~23043         | 26102~26308 |       |        |        |
| 30030~30292         | 34664~34960 |       |        |        |

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