

# 90 Series

## Lead Free Vitreous Enamel Molded Axial Term. Wirewound, 5% Tolerance Standard



95J1K6E  
160001

When you need the highest quality wirewound axial terminal resistors available, choose Ohmite's 90 Series resistors.

They are manufactured by a unique process that molds the vitreous enamel over the resistive element, helping to ensure consistent dimensions. This uniformity permits 90 Series resistors to be mounted in clips, creating a heat-sinking benefit (see next page).

The durable vitreous enamel coating, which is totally lead free, permits the 90 Series resistors to maintain a hard coating while operating at high temperatures. Mechanical integrity is enhanced by the all-welded construction.

### FEATURES

- Molded Construction provides consistent shape and size (Permits mounting in clips which extends power rating).
- Meets MIL-R-26 requirements for insulated resistors.
- All-welded construction.
- Flame resistant lead free vitreous enamel coating.
- Higher ratings in smaller sizes.
- Heat sink mounting clips available.
- RoHS compliant; add "E" suffix to part number to specify.

### SERIES SPECIFICATIONS

| Series | Wattage* | Ohms       | Voltage |
|--------|----------|------------|---------|
| 91     | 1.5      | 0.1Ω-3.6K  | 150     |
| 92     | 2.25     | 0.1Ω-3.5K  | 85      |
| 93     | 3.25     | 0.1Ω-10.5K | 200     |
| 95     | 5.0      | 0.1Ω-25K   | 495     |
| 96     | 6.5      | 0.1Ω-50K   | 625     |
| 90     | 11.0     | 0.1Ω-91K   | 1080    |

\* 2x power ratings by using heat-sink mounting clips shown on following page.

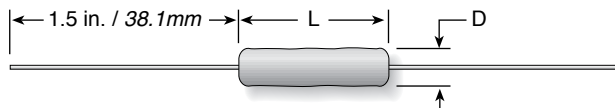
**Note:** Due to space restrictions, parts are stamped with wattage ratings reduced to the nearest whole number. The actual wattage ratings are as published in this catalog.

### CHARACTERISTICS

|                                        |                                                                                                     |
|----------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>Coating</b>                         | Molded lead free vitreous enamel                                                                    |
| <b>Core</b>                            | Ceramic                                                                                             |
| <b>Terminals</b>                       | Solder-coated copper clad axial. RoHS solder composition is 96% Sn, 3.5% Ag, 0.5% Cu                |
| <b>Derating</b>                        | Linearly from 100% @ +25°C to 0% @ +350°C                                                           |
| <b>Tolerance</b>                       | ±5% (other tolerances available)                                                                    |
| <b>Power rating</b>                    | Based on 25°C free air rating (other wattages available*)                                           |
| <b>Maximum ohmic values</b>            | See chart                                                                                           |
| <b>Overload</b>                        | Under 11 watts: 5 times rated wattage for 5 seconds. 11 watts: 10 times rated wattage for 5 seconds |
| <b>Temperature coefficient</b>         | 1 to 9.99Ω: ±100 ppm/°C; 10Ω and over: ±30 ppm/°C                                                   |
| <b>Dielectric withstanding voltage</b> | 500 VAC: 1W rating; 1000 VAC: 2, 3, 5 and 11W                                                       |

### DIMENSIONS

(in./mm max.)



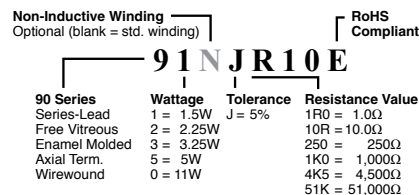
| Series | Wattage | Length       | Diameter    | Lead gauge |
|--------|---------|--------------|-------------|------------|
| 91     | 1.5     | 0.452 / 11.5 | 0.140 / 3.6 | 24         |
| 92     | 2.25    | 0.405 / 10.3 | 0.219 / 5.6 | 20         |
| 93     | 3.25    | 0.577 / 14.7 | 0.234 / 5.9 | 20         |
| 95     | 5.0     | 0.968 / 24.6 | 0.265 / 6.7 | 20         |
| 96     | 6.5     | 0.952 / 24.2 | 0.343 / 8.7 | 20         |
| 90     | 11.0    | 1.811 / 46.0 | 0.343 / 8.7 | 20         |

(continued)

# 90 Series

**Lead Free Vitreous Enamel Molded  
Axial Term. Wirewound,  
5% Tolerance Standard**

## ORDERING INFORMATION



### Standard part numbers for 90 series

| Ohmic value |        |     |      |      |   |    | Wattage  |        |     |      |      |   |    | Ohmic value |        |     |      |      |   |    | Wattage  |        |      |   |    |        |        | Ohmic value |   |    |        |        |   |    | Wattage  |  |  |  |  |  |  | Ohmic value |  |  |  |  |  |  | Wattage |  |  |  |  |  |  |
|-------------|--------|-----|------|------|---|----|----------|--------|-----|------|------|---|----|-------------|--------|-----|------|------|---|----|----------|--------|------|---|----|--------|--------|-------------|---|----|--------|--------|---|----|----------|--|--|--|--|--|--|-------------|--|--|--|--|--|--|---------|--|--|--|--|--|--|
| Part No.    |        |     |      |      |   |    | Part No. |        |     |      |      |   |    | Part No.    |        |     |      |      |   |    | Part No. |        |      |   |    |        |        | Part No.    |   |    |        |        |   |    | Part No. |  |  |  |  |  |  | Part No.    |  |  |  |  |  |  |         |  |  |  |  |  |  |
| Prefix      | Suffix | 1.5 | 2.25 | 3.25 | 5 | 11 | Prefix   | Suffix | 1.5 | 2.25 | 3.25 | 5 | 11 | Prefix      | Suffix | 1.5 | 2.25 | 3.25 | 5 | 11 | Prefix   | Suffix | 3.25 | 5 | 11 | Prefix | Suffix | 3.25        | 5 | 11 | Prefix | Suffix | 5 | 11 |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 1           | —1R0   | ✓   | ✓    | ✓    | ✓ | ✓  | 22       | —22R   | ✓   | ✓    | ✓    | ✓ | ✓  | 350         | —350   | ✓   | ✓    | ✓    | ✓ | ✓  | 3,500    | —3K5   | ✓    | ✓ | ✓  | 13,000 | —13K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 1.1         | —1R1   | ✓   | ✓    | ✓    | ✓ | ✓  | 24       | —24R   | ✓   | ✓    | ✓    | ✓ | ✓  | 360         | —360   | ✓   | ✓    | ✓    | ✓ | ✓  | 3,600    | —3K6   | ✓    | ✓ | ✓  | 14,000 | —14K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 1.2         | —1R2   | ✓   | ✓    | ✓    | ✓ | ✓  | 25       | —25R   | ✓   | ✓    | ✓    | ✓ | ✓  | 390         | —390   | ✓   | ✓    | ✓    | ✓ | ✓  | 3,900    | —3K9   | ✓    | ✓ | ✓  | 15,000 | —15K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 1.3         | —1R3   | ✱   | ✓    | ✓    | ✓ | ✓  | 27       | —27R   | ✓   | ✓    | ✓    | ✓ | ✓  | 400         | —400   | ✓   | ✓    | ✓    | ✓ | ✓  | 4,000    | —4K0   | ✓    | ✓ | ✓  | 16,000 | —16K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 1.5         | —1R5   | ✓   | ✓    | ✓    | ✓ | ✓  | 30       | —30R   | ✓   | ✓    | ✓    | ✓ | ✓  | 430         | —430   | ✓   | ✓    | ✓    | ✓ | ✓  | 4,300    | —4K3   | ✱    | ✓ | ✓  | 17,000 | —17K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 1.6         | —1R6   | ✱   | ✓    | ✓    | ✓ | ✓  | 33       | —33R   | ✓   | ✓    | ✓    | ✓ | ✓  | 450         | —450   | ✱   | ✓    | ✓    | ✓ | ✓  | 4,500    | —4K5   | ✓    | ✓ | ✓  | 18,000 | —18K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 1.8         | —1R8   | ✓   | ✓    | ✓    | ✓ | ✓  | 35       | —35R   | ✓   | ✓    | ✓    | ✓ | ✓  | 470         | —470   | ✓   | ✓    | ✓    | ✓ | ✓  | 4,700    | —4K7   | ✓    | ✓ | ✓  | 20,000 | —20K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 2           | —2R0   | ✓   | ✓    | ✓    | ✓ | ✓  | 36       | —36R   | ✓   | ✓    | ✓    | ✓ | ✓  | 500         | —500   | ✓   | ✓    | ✓    | ✓ | ✓  | 5,000    | —5K0   | ✓    | ✓ | ✓  | 22,000 | —22K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 2.2         | —2R2   | ✓   | ✓    | ✓    | ✓ | ✓  | 39       | —39R   | ✓   | ✓    | ✓    | ✓ | ✓  | 510         | —510   | ✓   | ✓    | ✓    | ✓ | ✓  | 5,100    | —5K1   | ✱    | ✓ | ✓  | 24,000 | —24K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 2.4         | —2R4   | ✓   | ✓    | ✓    | ✓ | ✓  | 40       | —40R   | ✱   | ✓    | ✓    | ✓ | ✓  | 560         | —560   | ✓   | ✓    | ✓    | ✓ | ✓  | 5,600    | —5K6   | ✓    | ✓ | ✓  | 25,000 | —25K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 2.7         | —2R7   | ✓   | ✓    | ✓    | ✓ | ✓  | 43       | —43R   | ✱   | ✓    | ✓    | ✓ | ✓  | 600         | —600   | ✓   | ✓    | ✓    | ✓ | ✓  | 6,000    | —6K0   | ✓    | ✓ | ✓  | 27,000 | —27K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 3           | —3R0   | ✓   | ✓    | ✓    | ✓ | ✓  | 47       | —47R   | ✓   | ✓    | ✓    | ✓ | ✓  | 620         | —620   | ✓   | ✓    | ✓    | ✓ | ✓  | 6,200    | —6K2   | ✓    | ✓ | ✓  | 30,000 | —30K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 3.3         | —3R3   | ✓   | ✓    | ✓    | ✓ | ✓  | 50       | —50R   | ✓   | ✓    | ✓    | ✓ | ✓  | 680         | —680   | ✓   | ✓    | ✓    | ✓ | ✓  | 6,800    | —6K8   | ✓    | ✓ | ✓  | 33,000 | —33K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 3.6         | —3R6   | ✱   | ✓    | ✓    | ✓ | ✓  | 51       | —51R   | ✱   | ✓    | ✓    | ✓ | ✓  | 700         | —700   | ✓   | ✓    | ✓    | ✓ | ✓  | 7,000    | —7K0   | ✓    | ✓ | ✓  | 35,000 | —35K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 3.9         | —3R9   | ✓   | ✓    | ✓    | ✓ | ✓  | 56       | —56R   | ✓   | ✓    | ✓    | ✓ | ✓  | 750         | —750   | ✓   | ✓    | ✓    | ✓ | ✓  | 7,500    | —7K5   | ✓    | ✓ | ✓  | 36,000 | —36K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 4           | —4R0   | ✓   | ✓    | ✓    | ✓ | ✓  | 62       | —62R   | ✓   | ✓    | ✓    | ✓ | ✓  | 800         | —800   | ✓   | ✓    | ✓    | ✓ | ✓  | 8,000    | —8K0   | ✓    | ✓ | ✓  | 39,000 | —39K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 4.3         | —4R3   | ✱   | ✓    | ✓    | ✓ | ✓  | 68       | —68R   | ✓   | ✓    | ✓    | ✓ | ✓  | 820         | —820   | ✓   | ✓    | ✓    | ✓ | ✓  | 8,200    | —8K2   | ✓    | ✓ | ✓  | 40,000 | —40K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 4.7         | —4R7   | ✓   | ✓    | ✓    | ✓ | ✓  | 75       | —75R   | ✓   | ✓    | ✓    | ✓ | ✓  | 900         | —900   | ✱   | ✓    | ✓    | ✓ | ✓  | 9,000    | —9K0   | ✓    | ✓ | ✓  | 43,000 | —43K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 5           | —5R0   | ✓   | ✓    | ✓    | ✓ | ✓  | 82       | —82R   | ✓   | ✓    | ✓    | ✓ | ✓  | 910         | —910   | ✓   | ✓    | ✓    | ✓ | ✓  | 9,100    | —9K1   | ✓    | ✓ | ✓  | 45,000 | —45K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 5.1         | —5R1   | ✱   | ✓    | ✓    | ✓ | ✓  | 91       | —91R   | ✓   | ✓    | ✓    | ✓ | ✓  | 1,000       | —1K0   | ✓   | ✓    | ✓    | ✓ | ✓  | 10,000   | —10K   | ✓    | ✓ | ✓  | 47,000 | —47K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 5.6         | —5R6   | ✓   | ✓    | ✓    | ✓ | ✓  | 100      | —100   | ✓   | ✓    | ✓    | ✓ | ✓  | 1,100       | —1K1   | ✓   | ✓    | ✓    | ✓ | ✓  | 11,000   | —11K   | ✓    | ✓ | ✓  | 50,000 | —50K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 6.2         | —6R2   | ✱   | ✓    | ✓    | ✓ | ✓  | 110      | —110   | ✓   | ✓    | ✓    | ✓ | ✓  | 1,200       | —1K2   | ✓   | ✓    | ✓    | ✓ | ✓  | 12,000   | —12K   | ✓    | ✓ | ✓  | 51,000 | —51K   | ✓           | ✓ | ✓  | ✓      | ✓      | ✓ |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 6.8         | —6R8   | ✓   | ✓    | ✓    | ✓ | ✓  | 120      | —120   | ✓   | ✓    | ✓    | ✓ | ✓  | 1,300       | —1K3   | ✓   | ✓    | ✓    | ✓ | ✓  |          |        |      |   |    |        |        |             |   |    |        |        |   |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 7.5         | —7R5   | ✱   | ✓    | ✓    | ✓ | ✓  | 130      | —130   | ✱   | ✓    | ✓    | ✓ | ✓  | 1,400       | —1K4   | ✓   | ✓    | ✓    | ✓ | ✓  |          |        |      |   |    |        |        |             |   |    |        |        |   |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 8.2         | —8R2   | ✓   | ✓    | ✓    | ✓ | ✓  | 150      | —150   | ✓   | ✓    | ✓    | ✓ | ✓  | 1,500       | —1K5   | ✓   | ✓    | ✓    | ✓ | ✓  |          |        |      |   |    |        |        |             |   |    |        |        |   |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 9.1         | —9R1   | ✱   | ✓    | ✓    | ✓ | ✓  | 160      | —160   | ✓   | ✓    | ✓    | ✓ | ✓  | 1,600       | —1K6   | ✓   | ✓    | ✓    | ✓ | ✓  |          |        |      |   |    |        |        |             |   |    |        |        |   |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 10          | —10R   | ✓   | ✓    | ✓    | ✓ | ✓  | 180      | —180   | ✓   | ✓    | ✓    | ✓ | ✓  | 1,800       | —1K8   | ✓   | ✓    | ✓    | ✓ | ✓  |          |        |      |   |    |        |        |             |   |    |        |        |   |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 11          | —11R   | ✓   | ✓    | ✓    | ✓ | ✓  | 200      | —200   | ✓   | ✓    | ✓    | ✓ | ✓  | 2,000       | —2K0   | ✓   | ✓    | ✓    | ✓ | ✓  |          |        |      |   |    |        |        |             |   |    |        |        |   |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 12          | —12R   | ✓   | ✓    | ✓    | ✓ | ✓  | 220      | —220   | ✓   | ✓    | ✓    | ✓ | ✓  | 2,200       | —2K2   | ✓   | ✓    | ✓    | ✓ | ✓  |          |        |      |   |    |        |        |             |   |    |        |        |   |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 13          | —13R   | ✓   | ✓    | ✓    | ✓ | ✓  | 240      | —240   | ✱   | ✓    | ✓    | ✓ | ✓  | 2,400       | —2K4   | ✓   | ✓    | ✓    | ✓ | ✓  |          |        |      |   |    |        |        |             |   |    |        |        |   |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 15          | —15R   | ✓   | ✓    | ✓    | ✓ | ✓  | 250      | —250   | ✓   | ✓    | ✓    | ✓ | ✓  | 2,500       | —2K5   | ✓   | ✓    | ✓    | ✓ | ✓  |          |        |      |   |    |        |        |             |   |    |        |        |   |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 16          | —16R   | ✓   | ✓    | ✓    | ✓ | ✓  | 270      | —270   | ✓   | ✓    | ✓    | ✓ | ✓  | 2,700       | —2K7   | ✓   | ✓    | ✓    | ✓ | ✓  |          |        |      |   |    |        |        |             |   |    |        |        |   |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 18          | —18R   | ✓   | ✓    | ✓    | ✓ | ✓  | 300      | —300   | ✓   | ✓    | ✓    | ✓ | ✓  | 3,000       | —3K0   | ✓   | ✓    | ✓    | ✓ | ✓  |          |        |      |   |    |        |        |             |   |    |        |        |   |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |
| 20          | —20R   | ✓   | ✓    | ✓    | ✓ | ✓  | 330      | —330   | ✓   | ✓    | ✓    | ✓ | ✓  | 3,300       | —3K3   | ✓   | ✓    | ✓    | ✓ | ✓  |          |        |      |   |    |        |        |             |   |    |        |        |   |    |          |  |  |  |  |  |  |             |  |  |  |  |  |  |         |  |  |  |  |  |  |

✓ = Standard values

✱ = Non-standard values subject to minimum handling charge per item

Shaded values involve very fine resistance wire and should not be used in critical applications without burn-in and/or thermal cycling.

✓ = Standard values

✦ = Non-standard values subject to minimum handling charge per item

Shaded values involve very fine resistance wire and should not be used in critical applications without burn-in and/or thermal cycling.

## MOUNTING CLIP



### FEATURES

- Prevents severe vibration or mechanical shock to resistor
- Increases resistor wattage up to 100% when mounted on metal surface (1.5 sq. in. by 0.040 in. thick min. per watt dissipated)
- Holes in clip base permit fastening to chassis surface with machine screws, eyelets or rivets
- Sold in bags of ten (10)

### Standard part numbers for mounting clip

| Part No. | Resistor rating (watts) | Clip length (in./mm) | Clip width (in./mm) | Clip height (in./mm) | No. of holes | Hole centers (in./mm) | Hole diameter (in./mm) |                                                                     |
|----------|-------------------------|----------------------|---------------------|----------------------|--------------|-----------------------|------------------------|---------------------------------------------------------------------|
| ✓ 5900   | 1.5                     | 0.40 / 10.319        | 0.150 / 3.810       | 0.250 / 6.350        | 1            |                       | 0.71 / 1.803           | ✦ = Most popular standard values                                    |
| ✓ 5902   | 2.25                    | 0.35 / 8.890         | 0.217 / 5.500       | 0.275 / 6.980        | 2            | 0.156 / 3.969         | 0.71 / 1.803           | ✓ = Standard values                                                 |
| ✦ 5904   | 3.25                    | 0.50 / 12.700        | 0.257 / 6.500       | 0.319 / 8.103        | 2            | 0.250 / 6.350         | 0.093 / 2.362          | ✦ = Non-standard values subject to minimum handling charge per item |
| ✦ 5906   | 5.0                     | 0.90 / 22.860        | 0.237 / 6.019       | 0.284 / 7.214        | 2            | 0.400 / 10.160        | 0.103 / 2.616          |                                                                     |
| ✦ 5908   | 11.0                    | 1.75 / 44.450        | 0.333 / 8.458       | 0.377 / 9.576        | 2            | 0.800 / 20.320        | 0.103 / 2.616          |                                                                     |