



Alpha Wire | 711 Lidgerwood Avenue, Elizabeth, NJ 07207  
Tel: 1-800-52 ALPHA (25742), Web: [www.alphawire.com](http://www.alphawire.com)

# Customer Specification

## PART NO. FIT-221-MS-1

### Construction

| 1) Tubing Type     |                          | Heat Shrinkable Tubing (Assortment) |                                         |          |
|--------------------|--------------------------|-------------------------------------|-----------------------------------------|----------|
| 2) Tubing Material |                          | Cross Linked Polyolefin             |                                         |          |
| 3) Color(s)        |                          | BLACK, RED, BLUE, GREEN, YELLOW     |                                         |          |
| PartNumber         | Minimum Supplied ID (In) | Maximum Recovered ID (In)           | Nomiminal Recovered Wall Thickness (In) | Quantity |
| FIT-221-3/64       | 0.046                    | 0.023                               | 0.016                                   | 6 x 6 IN |
| FIT-221-1/16       | 0.063                    | 0.031                               | 0.017                                   | 6 x 6 IN |
| FIT-221-3/32       | 0.093                    | 0.046                               | 0.020                                   | 6 x 6 IN |
| FIT-221-1/8        | 0.125                    | 0.062                               | 0.020                                   | 6 x 6 IN |
| FIT-221-3/16       | 0.187                    | 0.093                               | 0.020                                   | 6 x 6 IN |

### Applicable Specifications

|                      |                                        |  |
|----------------------|----------------------------------------|--|
| 1) UL                | Standard 224 (Except Clear) 600V       |  |
| 2) CSA International | Standard 198 (Except Clear) 600V       |  |
| 3) Other             | AMS-DTL-23053/5 Class 1 (Except Clear) |  |

### Environmental

|                                     |                                                                                                                                                                                                                                                                 |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1) EU Directive 2011/65/EU(RoHS2):  |                                                                                                                                                                                                                                                                 |
|                                     | All materials used in the manufacture of this part are in compliance with European Directive 2011/65/EU regarding the restriction of use of certain hazardous substances in electrical and electronic equipment. Consult Alpha Wire's web site for RoHS C of C. |
| 2) REACH Regulation (EC 1907/2006): |                                                                                                                                                                                                                                                                 |
|                                     | This product does not contain Substances of Very High Concern (SVHC) listed on the European Union's REACH candidate list in excess of 0.1% mass of the item. For up-to-date information, please see Alpha's REACH SVHC Declaration.                             |
| 3) California Proposition 65:       |                                                                                                                                                                                                                                                                 |
|                                     | The outer surface materials used in the manufacture of this part meet the requirements of California Proposition 65.                                                                                                                                            |

### Properties

| Physical & Mechanical Properties |                                |               |
|----------------------------------|--------------------------------|---------------|
| 1) Temperature Range             | -55 to 135°C                   |               |
| 2) Shrink Ratio                  | Approximately 2:1              |               |
| 3) Full Recovery Temperature     | 121°C                          |               |
| 4) Minimum Shrink Temperature    | 90°C                           |               |
| 5) Tensile Strength              | 1500psi, Min                   | ASTM D638     |
| 6) Elongation                    | 200%, Min                      | ASTM D638     |
| 7) Low Temperature Flex(-55°C)   | no cracking                    | AMS-DTL-23053 |
| 8) Heat Shock(250°C,4hrs)        | no cracking                    | AMS-DTL-23053 |
| 9) Secant Modulus                | $2.5 \times 10^4$ psi, Min     | ASTM D882     |
| 10) Longitudinal Change          | +/-5%                          | AMS-DTL-23053 |
| 11) Specific Gravity(Colors)     | 1.35, Max                      | ASTM D792     |
| Specific Gravity(Clear)          | 1.00, Max                      |               |
| 12) Shelf Life                   | 5 Years @ 18 to 35°C           |               |
| Electrical Properties            |                                |               |
| 1) Dielectric Strength           | 500 V/mil, Min                 | ASTM D876     |
| 2) Volume Resistivity            | $1 \times 10^{14}$ ohm-cm, Min | ASTM D876     |
| Chemical Properties              |                                |               |
| 1) Water Absorption              | 0.50%, Max                     | ASTM D570     |
| 2) Corrosion(0°C,16hrs)          | no corrosion                   | AMS-DTL-23053 |
| 3) Fluid Resistance(23°C,24 Hrs) | 1000 PSI, Min                  | AMS-DTL-23053 |
| 4) Fungus Resistance             | Pass                           | AMS-DTL-23053 |
| 5) Vacuum Outgassing - CVCM      | 0.10%, Max                     | ASTM E595     |
| 6) Halogen Free                  | No                             |               |
| 7) Lead Free                     | Yes                            |               |

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## EU/China ROHS CERTIFICATE OF COMPLIANCE

To Whom It May Concern:

Alpha Wire Part Number: FIT-221-MS-1

FIT-221-MS-1, RoHS-Compliant Commencing With 3/1/2005 Production

This document certifies that the Alpha part number cited above is manufactured in accordance with Directive 2011/65/EU of the European Parliament, better known as the RoHS Directive, with regards to restrictions of the use of certain hazardous substances used in the manufacture of electrical and electronic equipment. The reader is referred to this Directive for the specific definitions and extents of this Directive. **No Exemptions are required for RoHS Compliance on this item.** It should be noted that this product does not fall within the scope of Directive 2011/65/EU, but this Certificate is offered for cases where this product will be used within EEE that does fit within the Directive's scope. Additionally, Alpha certifies that the listed part number is in compliance with China RoHS "Marking for Control of Pollution by Electronic Information Products" standard SJ/T 11364-2006.

### Substance

### Maximum Control Value

|                                                               |                            |
|---------------------------------------------------------------|----------------------------|
| Lead                                                          | 0.1% by weight (1000 ppm)  |
| Mercury                                                       | 0.1% by weight (1000 ppm)  |
| Cadmium                                                       | 0.01% by weight (100 ppm)  |
| Hexavalent Chromium                                           | 0.1% by weight (1000 ppm ) |
| Polybrominated Biphenyls (PBB)                                | 0.1% by weight (1000 ppm)  |
| Polybrominated Diphenyl Ethers (PBDE) ,<br>Including Deca-BDE | 0.1% by weight (1000 ppm)  |

The information provided in this document and disclosure is correct to the best of Alpha Wire's knowledge, information and belief at the date of its release. The information provided is designed only as a general guide for the safe handling, storage, and any other operation of the product itself or the one that it will become part of. The intent of this document is not to be considered a warranty or quality specification. Regulatory information is for guidance purposes only. Product users are responsible for determining the applicability of legislation and regulations based on their individual usage of the product.

Authorized Signatory for the Alpha Wire Company:

A handwritten signature in black ink, appearing to read 'Dave Watson'.

Dave Watson, Director of Engineering & QA

5/2/2013