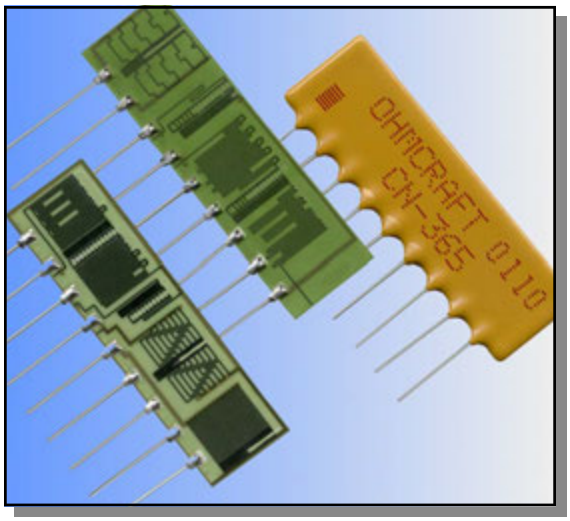
CN SERIES

Custom Leaded Resistor Networks

Ohmcraft's revolutionary fine film, thick film technology, called **FineFilm**, provides an entirely new level of performance and stability in custom leaded resistor networks.



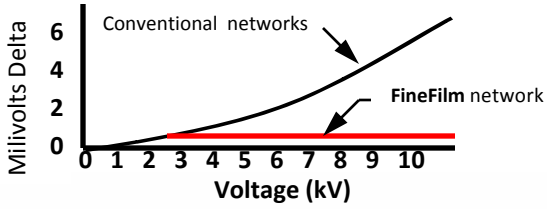
- **Ohmic Values to 2,000 GigOhms**
- **Tight Ratio Tolerances (to 0.1%)**
- **Ultra High stability**
- **Very Low noise**
- **Low TCR (to 10 ppm/°C)**
- **Low TCR Tracking (to 5 ppm/°C)**
- **Low VCR (to 0.05 ppm/Volt)**
- **Custom Configurations**

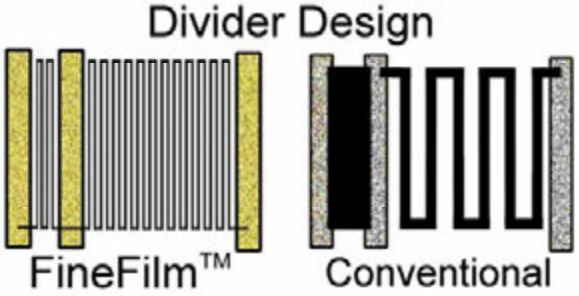
The usual hybrid technologies for manufacturing resistors depend upon composite materials that have limitations. Traditional thick-film methods severely limit performance characteristics and thin-film methods are limited in attainable ohmic values. The **FineFilm** method of manufacturing offers the best characteristics of both methods, plus adds many unique features. **FineFilm** resistors feature a longer, high-aspect ratio trace of lower resistivity film. The combination of long line, high-aspect ratio, and higher conductivity film, give **FineFilm** resistors unmatched design efficiency, versatility, linearity, stability and low noise. The **FineFilm** method allows control of process parameters to very tight tolerances. The result is dividers with outstanding tracking performance over a wide range of temperature, voltage and ohmic values.

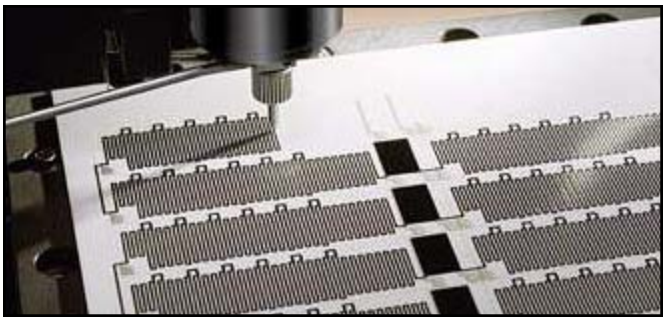
Using the same method, a complete line of **FineFilm** surface mount and wire bondable chip resistors are manufactured. For information on those products, please refer to the appropriate data sheets.

Excellent VCR Tracking

The low resistivity composition **FineFilm** resistors is significantly better than conventional designs. They have a virtually flat VCR over a wide rang of values.







Writing resistors using MicroPen™ technology

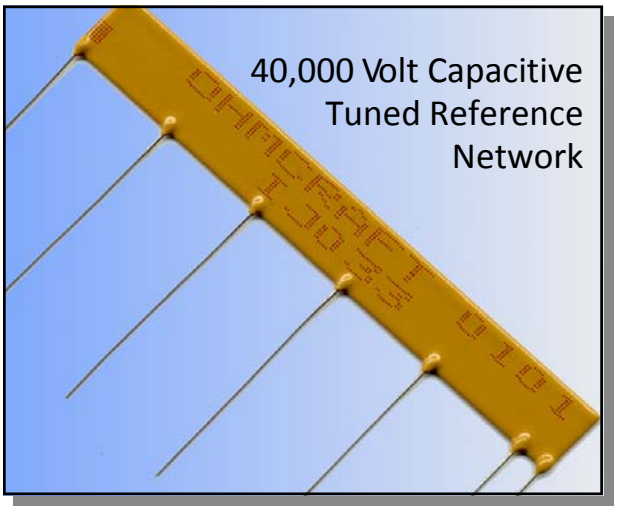
Design Flexibility

The long serpentine pattern used in manufacturing FineFilm High Voltage Dividers (HVDs), coupled with the use of low ohms/square thick film inks, makes it possible to create virtually any divider ratio. For example, Ohmcraft has produced 800 meg-ohm dividers with a 20,000:1 ratio. What are your needs?

Low noise, low TCR, low VCR, and many other features add up to the finest leaded divider in the market today.

Custom Leaded Resistor Networks

CN SERIES

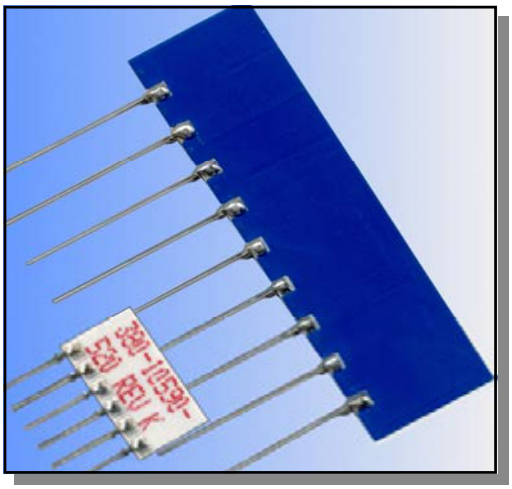


Our unique CAD/CAM direct write system allows us to custom fabricate resistor networks:

- **Immediate prototyping**
- **No special tooling**
- **Easy design changes**
- **Short or long runs**
- **High quality**

FineFilm technology is based on combining very high aspect ratios, and low film resistivities. This combination is unobtainable using standard methods of manufacturing. The outcome is a resistor that surpasses the parameters that are generally acceptable in the industry. A resistor that has higher stability, lower VCRs, lower noise, and lower TCRs.

For further information, please contact us.



We would be glad to work with you on your custom network needs:

Because each network is different, there is no standard part number. Each network is assigned it's own number as it is received by the factory. To obtain a quote on a network, please contact us. Please include the following information:

- A schematic & physical diagram showing how all of the resistors interconnect.
- The value of each resistor.
- The desired TCR value (ppm/^{o}C)
- Overall tolerance, and the tolerances for each individual component value.
- Type & length of the leads
- Any other information necessary to the manufacture of the network.

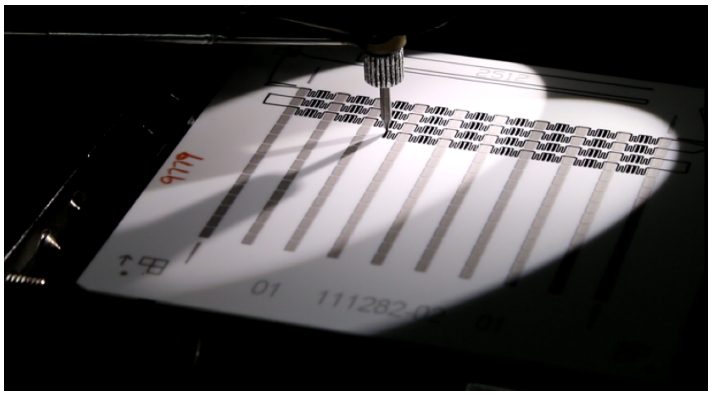
GENERAL INFORMATION

As a leading division of Exxelia, Ohmcraft specializes in the **design and manufacturing of high-performance custom resistors** for a diverse range of industries (Medical, Test & Measurement, Power supply, Defense & Aerospace). With unparalleled expertise and a commitment to excellence, we engineer solutions that power cutting-edge technologies worldwide.

The Exxelia Micropen electronic printing system is the core technology for the design and manufacture of Exxelia Ohmcraft's complete line of resistors – chip resistors, flat leaded resistors, axial leaded resistors and custom resistive product solutions.

Our Direct Write Micropenning printing process grants our resistors with unique benefits :

- **Fine line widths with smooth edge**
  Extremely low noise
- **Long length resistor**
  Low VCR & High voltage
- **Precise thickness control**
  Low TCR



Our dedication to quality and reliability is reflected in every resistor we produce, tailored to meet the unique requirements of our clients. Backed by decades of experience, state-of-the-art facilities, and a passion for advancement, Exxelia Ohmcraft stands as a trusted partner in your pursuit of technological excellence.

Exxelia Ohmcraft's high-performance resistors enable **medical product designers** to continue to improve the quality of life of patients around the world. Our resistors are designed for a variety of products to be used in medical diagnosis, treatment, and prevention. From small, implantable, and non-invasive devices, to large diagnostic imaging equipment, Exxelia Ohmcraft resistors are chosen by medical manufacturers because the operating environments are high voltage and magnetic fields where accuracy and stability are paramount.

Our precision resistors are also able to achieve the precision and repeatability required by modern measurement and detection equipment.

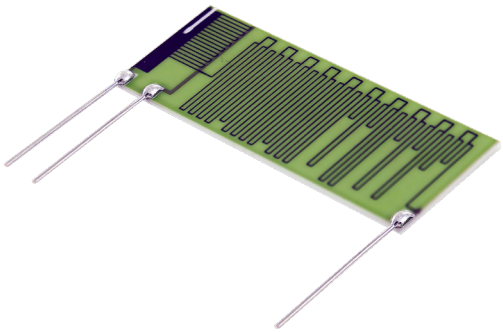
Our qualified engineering team works closely with industry leaders to produce the most advanced test equipment and instrumentation. Exxelia Ohmcraft's custom dividers, resistors, and networks provide a level of service and performance unmatched in the **instrumentation marke** .

Exxelia Ohmcraft has been committed to supporting the high-voltage and precision needed by the **power supply industry**. We provide many market leaders with standard and custom products. Our surface mount resistors can withstand voltages up to 10kV and our leaded resistors are designed to operate up to 40kV.

Exxelia Ohmcraft has served markets in **electronic warfare, weapons platforms, force protection, and intelligence programs** for over two decades, reliably supporting a wide range of products, programs, and applications. Our custom resistors are designed to support the rigorous specifications required by military suppliers who depend on the precision and reliability of our products.

Exxelia Ohmcraft has served markets in **intelligence and space programs** for over two decades, reliably supporting a wide range of products, programs, and applications. Our custom resistors are designed to support the rigorous specifications required by space suppliers who depend on the precision and reliability of our products. Exxelia Ohmcraft is able to screen and qualify our resistors to the following specifications: MIL-PRF-55342, MIL-PRF-49462, NASA EEE-INST-002 (Level 1 & 2).

Discover how our resistors can elevate your applications and propel your innovations forward. Explore the precision-driven world of Exxelia Ohmcraft today.



LOT ACCEPTANCE TESTING (LAT)

ADVANTAGES

Lot Acceptance Testing provides screening and qualification tests to enable the use of Exxelia Ohmcraft's standard parts in flight applications (Aerospace/Space). Exxelia Ohmcraft can screen and qualify its resistor products to MIL-PRF-55342, MIL-PRF-49462, NASA EEE-INST-002 (Level 1 or Level 2) or a custom test plan. LAT Testing includes but is not limited to:

- Thermal Shock
- Power Conditioning
- High Temperature Exposure
- Solderability
- TCR
- Load Life
- Short Term Overload
- Terminal Strength
- Resistance to Solvents

Electrical Specifi ation

Value R	R Ω	Resistance Value in kΩs, MΩs, GΩs, or TΩs
Tolerance	± X% at V	Resistance Tolerance measured at specified voltage
TCR	< [Ordering Coder TCR] ppm/°C (Hot to Tmax°C, Cold to Tmin°C) < 2*[Ordering Coder TCR] ppm/°C (Hot to 125°C, Cold to -55°C)	TCR referenced to 25°C
Working Voltage	V	Voltage across the resistor during application operation
Max Voltage Ratin	V	Maximum Voltage based on resistance value or case rating
Max Power Ratin	W	Maximum Wattage based on resistance value or case rating

Conformance Testin

Pre-Cap Visual Inspection

Prior to Conformance Test	13 pcs

Conformance Test – 100% Screening

Visual Inspectio Magnification: 30x to 60x	100%
Mechanical Inspection	3 pcs. (min.)
DC Resistance Per MIL-STD-202, Method 303 Measured at specified test voltage for resistance tolerance	100%
Thermal Shock Per-MIL-STD-202. Method 107, Test Condition B (modified) 5 cycles (MIL-PRF-55342), 10 cycles (NASA level 2) or 25 cycles (NASA level 1)	100%
High Temperature Exposure (SMT) 100 hours at 125°C	100%
Power Conditioning (Leaded 100 hours at Working Voltage at 25°C	100%
Final DC Resistance Measured at specified test voltage for resistance tolerance	100%

Conformance PDA: 5% (NASA Level 1 or MIL-PRF-55342), 10% (MIL-PRF-49462) or 15% (NASA Level 2)

LOT ACCEPTANCE TESTING (LAT)

Qualification testin

Group	NASA Sample Size (Level 1 / Level 2)
Group 1 Conformance Testing: Basic Screening	100%
Group 2 Solderability MIL-STD-202, Method 208 Resistance to Solvents (Leaded) MIL-STD-202, Method 215	3 pcs / 3 pcs
Group 3 Temperature Coefficient (TCR) Per MIL-STD-202, Method 304 Reference Temperature: 25°C Low Temperature Storage -65°C no load dwell for 24±4 hours +25°C ambient no load dwell for 2-8 hours Low Temperature Operation -65°C no load dwell for 1 hour Working Voltage for 54 minutes +25°C no load dwell for 24±4 hours Short Time Overload 2X Working Voltage for 5 seconds	10 pcs / 6 pcs
Group 4 Resistance to soldering heat MIL-STD-202, Method 210, Test Condition B (modified) 260°C for 20 seconds Terminal Strength (Leaded) MIL-STD-202, Method 211 Test Condition C 16 ounces ± 1 ounce for 10 seconds	9 pcs / 6 pcs

Group	NASA Sample Size (Level 1 / Level 2)
Group 5 Shock (Leaded) MIL-STD-202, Method 213B, Test Condition I Vibration (Leaded) Per MIL-STD-202, Method 204, Test Condition D	9 pcs / 6 pcs
Group 6 Load Life Per MIL-STD-202, Method 108 Working Voltage for 1000 or 2000 hours at 25°C	12 pcs / 9 pcs
Group 7 Resistance to Bonding Exposure (SMT) Solder mounted to a ceramic test plate 4-12 hours stabilization at 25°C	10 pcs / 5 pcs
Group 8 No Applicable Tests	–
Group 9 High Temperature Exposure 125°C for 100 hours	5 pcs

Custom Configurations Available Upon Request

Please consult with our knowledgeable sales staff f or help specifying custom parts to meet your needs.

