

MOLEX MATERIAL SPECIFICATION

Interpretation Guidelines

1.0 SCOPE

This document provides into the specification intent and should be used as an additional reference document for the supplier to understand and fulfill the requirements of the specification.

2.0 PURPOSE

This section states it will define specific alloy properties; reference other documents and list standard default tolerances. Specific to standard default tolerances, these tolerances will be applied to the part number document as a default. If engineering or manufacturing determines that a different tolerance value should be applied to a characteristic, it will be applied to the part number document in lieu of the default value.

Molex considers ASTM B36M/B888M, to be the regional metal strip norms that supports Molex globally. This document is constantly referenced, considered and applied as frequently as possible to derive this global Molex specification.

3.0 REFERENCE DOCUMENTS

ASTM B36M and the associated reference documents listed under 2.1 ASTM Standards are cited to reference a consistent set of test methods to verify the specified values.

The other documents, 2090580043 & 2090580044 are Molex engineering standards that list and define a multitude of critical metal strip characteristics; these reference documents must be acknowledged in the supplier’s contract review and quality plan document:

- ASTM B36M/B888M and the associated reference documents listed under 2.1 ASTM Standards
- ASTM B820 – Bend Formability is specifically mentioned as critical to Molex requirements
- 2090580043 Geometric Conditions and Tolerances for Metal Strips
- 2090580044 Metal Strip Surface conditions and Requirements

4.0 DEFINITIONS

5.0 TECHNICAL REQUIREMENTS

5.1 Chemical Composition

The current acceptable composition limits respecting environmental and Molex customer requirements.

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REVISION DESCRIPTION				NEW RELEASE (TRANSITIONED FROM ES-40000-5021)				MOLEX MATERIAL SPECIFICATION INTERPRETATION GUIDELINES			
CHANGE NO.				849682							
REVISED BY	ELIJAH RESNICK	DATE	2026/04/15	DOC TYPE	DOC TYPE DESCRIPTION			DOC PART	SERIES		
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5.2 Mechanical Properties

The mechanical properties table is to ASTM B36M/B888M and Molex adjustments to yield strength based on mandated maximum RTF grain sizes.

These temper categories comprise two types of processing logic, annealed to temper (OS025, 081 & 082) and rolled to temper (H01 through H10). Therefore, the supplier is directing RTF grain size or rolling reduction or both to achieve the temper requirement. The guiding property requirements are grain size range for OS025 and tensile strength for the other categories. Consequently, yield strength and elongation values are set at very achievable minimum values while the supplier focuses the process logic on the tensile strength range.

As stated in ASTM B 601 (temper designations), cold-worked tempers that stress-relieved will be designated with and HR.

The past can never be a perfect predictor of the future requirements. When new engineering applications are encountered suggesting a temper modification, that will be addressed through a cooperative review with the supplier and may result in a special temper on a part number. Special temper modifications are awarded only by approval from senior engineering management.

5.3 Modulus of Elasticity

A range of expected Modulus data is listed for reference. Molex will acquire modulus data for the various temper categories in both directions to assist in modelling material behavior. This will be accomplished by requesting modulus data from the supplier at the appropriate time under specific conditions as listed in section 7.

5.4 Electrical Conductivity

Electrical conductivity is a measurable requirement specified in the annealed or rolled to temper condition and will be reported at the purchase order level of certification.

5.5 Bending properties

The bending tables have been derived from temper categories applied to Molex designs and supplier published values. This sets the performance expectation for the supplier and Molex engineering/manufacturing. These tables are specified requirements that will be tested and certified at the purchase order level.

The “acceptance criteria” requires rank = 3 as a minimum acceptability requirement. This rank 3 relates to “functional integrity of the geometry” and does not relate to customer cosmetic acceptance. Molex engineering may determine that “rank = 3” will not fulfill the product/customer requirement and consequently specify a lower rank value on the part number document i.e. requires “rank 1 or rank 2” acceptance criteria.

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5.6 Stress Relaxation Resistance

The listed table is a general minimum expectation of stress relaxation rate. Final processing schemes can cause profound variances to the listed expectation, especially early in the temperature exposure. Therefore, the supplier will perform an annual test for capability to the expectations table on an active Molex part number within the stated temper ranges listed in section 7.

The samples for test shall include representative samples in both the longitudinal and transverse direction. If the result is less than the stated expectation in the table provided, the Molex Materials and Processes group representative for metals shall be notified of the result. This notification will result in a technical discussion for cause and a plan for resolution.

Suppliers who provide multiple alloys to Molex will provide an inspection plan to the receiving plants supplier quality representatives. The requirement for testing will not exceed 3 alloys per calendar year. The elements of the supplier’s test plan will include the supplier’s plan to rotate through all the alloys supplied to Molex over the course “X” years.

6.0 DIMENSIONAL TOLERANCES

The tolerances listed are the “standard default tolerances” that have been applied to Molex metal strip specifications since the inception of e-metals. These values set the initial expectation between Molex and the supplier.

Thickness tolerances was developed from Vollmer trace data representing a single line of continuous measurement down the entire length of a coil on the finish rolling mill pass. Early in the 2000’s, some manufacturers added multiple measuring devices and locations. This practice documents more thickness variability across the entire width of the sheet. The supplier should take this into account when practicing measurements in multiple locations and then calculating their capability.

Width tolerance was developed from the group size measurement (5 individuals) for each cutter rotation of the head. These subgroups were then used to develop width capability. In the last decade, some manufacturers have installed continuous measuring device for width. These devices don’t utilize subgroups of 5 but, thousands of individual measuring points. The supplier should take this into account when practicing many individual measurements in multiple locations and then calculating their capability.

Burr tolerance was developed by manufacturing necessity. A burr in excess of 0.018 mm causes die and equipment debris resulting in an unacceptable manufacturing condition. A burr at 0.018 mm is a feelable burr and as such is easily detectable at slitting. These feelable burrs are not acceptable to Molex and the slitter setups must be precise to minimize the burr condition.

These standard default tolerances will be applied to metal strip part numbers in lieu of engineering or manufacturing input. As these tolerances were initiated from engineering and manufacturing input, they can be modified at the part number level to assure product function and or manufacturability

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7.0 CERTIFICATION REQUIREMENTS

The table lists four levels of requirements for certification of compliance (COC). First, certification to the purchase order level, second, supplied data at the purchase order level, third, annual capability statements and fourth, engineering data by request. Compliance to this specification means that the supplier commits to providing all four component levels.

8.0 SUMMARY OF CHANGES

Document ID# Change from **ES-40000-5021** → **2090580046**.

Revision B2 includes appropriate mention of **2090580043**: Geometric Conditions and Tolerances for Metal Strips, which now contains all geometric and dimensional requirements for Molex received strip.

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