

**MOLEX MATERIAL SPECIFICATION – C42500 ALLOY METAL STRIPS**

**1.0 SCOPE**

This specification covers the technical requirements, applicable reference documents, and quality requirements for metal strips. The values listed for acceptance criteria are in SI units.

**2.0 PURPOSE**

The purpose of this specification is to comprehensively define the Molex requirements for alloy C42500 chemical composition, physical properties, mechanical properties, and reference other applicable documents related to quality requirements and standard default dimensional tolerances.

This specification is a merger of ASTM B591, ASTM B888M, JIS H3100 and other industry norms for UNS alloy C42500 to meet the needs of Molex connector applications.

**3.0 REFERENCE DOCUMENTS**

This primary specification focuses on the physics of C42500 alloy and related mechanical properties to assure Molex product performance. Other Molex documents are necessary to verify material characteristics that support high quality and manufacturability of products.

These reference documents are crucial to the Molex process / product and therefore all requirements contained within them must be attested to and demonstrate their conformance, within the supplier's process certification:

- ASTM B888M and the associated reference documents listed under Section 2.1 *ASTM Standards*
- ASTM B820 is specifically mentioned as critical to Molex formability requirements
- 2090580043 Geometric Conditions and Tolerances for Metal Strips
- 2090580044 Metal Strip Surface Conditions and Requirements

**4.0 ORDER OF PRECEDENCE**

This defines the priority order that should be followed when reviewing attributes and requirements of metal strip:

1. Molex Purchase Order
2. Packaging Specifications
3. Molex (Individual) Metal Strip Specification (i.e. Part Number Specification)
4. Molex Material Alloy Specification (**This document** – 2090580053– Molex Material Specification – C42500 Alloy Metal Strips)
5. Surface (2090580044) and Geometric (2090580043) Global Engineering Specifications

THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION	NEW RELEASE (TRANSITIONED FROM 400005028-ES)			<b>MOLEX MATERIAL SPECIFICATION – C42500 ALLOY METAL STRIPS</b>			
CHANGE NO.	849683						
REVISED BY	ELIJAH RESNICK	DATE	2026/04/15	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	DANIEL MOLLA	DATE	2026/04/15	QMD	ENGINEERING STANDARD	000	209058
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	LAWRENCE WOJNICZ	DATE	2026/01/20	MOLEX INTERNAL	2090580053	A	1 OF 7
INITIAL APPR	SHIVA B. ARALI	DATE	2026/01/20				

**5.0 TECHNICAL REQUIREMENTS**

**5.1 Chemical Composition**

UNS #	Cu wt. %	Sn wt. %	Fe wt. %	P wt. %	Zn wt. %
C42500 <sup>2</sup>	87.0 – 90.0	1.5 – 3.0	≤ 0.05	≤ 0.35	Remainder

2. Copper + Sum of Named Elements = 99.7% min.

Limits for named and unnamed elements may be established between Molex and the supplier to satisfy certain environmental (REACH/RoHS) or other customer requirements. Reference “Molex Chemical Substances Specification for Products and Packaging: Supplier Requirements” (2014040014).

**5.2 Mechanical Properties (longitudinal direction)**

<b>Mechanical Properties Table C42500</b>				
Designation	Tensile (1)	Yield (1)	Elongation %	RTF Grain Size (2)
	(MPa)	0.2% offset (MPa)	In 50mm	(mm)
Annealed	285 - 380	≥ 90	≥ 26	≤ 0.030
H01	340 - 405	≥ 140	≥ 24	≤ 0.030
H02	390 - 480	≥ 330	≥ 13	≤ 0.030
H03	430 - 510	≥ 370	≥ 8	≤ 0.025
H04	485 - 565	≥ 425	≥ 5	≤ 0.010
H06	520 - 625	≥ 460	≥ 3	≤ 0.010
H08	580 - 650	≥ 520	≥ 1	≤ 0.010
H10	≥ 635	≥ 570	≥ 1	≤ 0.010

Notes:

- (1) Tensile requirements are longitudinal values in uniaxial tension in accordance with ASTM E8M
- (2) Ready to Finish (RTF) grain size is measured before final rolling (H tempers) and at finish annealing for the Annealed temper designation.
- (3) The rolled “H” tempers from H03 > H10 are listed with restricted grain sizes prior to finish rolling, this promotes bend formability.
- (4) For cold worked tempers that are “stress relieved”, an “R” should be added after the “H”; ex. HR08. The “H” temper properties listed also apply for the corresponding “HR” temper code as a default.

THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION	NEW RELEASE (TRANSITIONED FROM 400005028-ES)			<b>MOLEX MATERIAL SPECIFICATION – C42500 ALLOY METAL STRIPS</b>			
CHANGE NO.	849683						
REVISED BY	ELIJAH RESNICK	DATE	2026/04/15	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	DANIEL MOLLA	DATE	2026/04/15	QMD	ENGINEERING STANDARD	000	209058
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	LAWRENCE WOJNICZ	DATE	2026/01/20	MOLEX INTERNAL	2090580053	A	2 OF 7
INITIAL APPR	SHIVA B. ARALI	DATE	2026/01/20				

**5.3 Electrical Conductivity**

- 5.3.1 For anneal to temper the minimum requirement shall be 15 MS/m (26% IACS) @ 20°C
- 5.3.2 For rolled tempers (“H”, “HR” temper codes) the minimum requirement shall be 11.6 MS/m (20% IACS) @ 20°C
- 5.3.3 The test standard shall be ASTM E 1004 (eddy current) or ASTM B 193 (resistivity)

**5.4 Bending properties**

Bending of metal strip samples shall be in accordance with ASTM B 820; Bend Test for Formability of Copper Alloy Spring Material. The requirement is that the supplier’s material when tested at finished thickness and temper, will be capable to achieve the inside bend radii as listed in the tables below without observable cracking on the outside bend radius (reference 5.4.1.) At a minimum, samples shall be tested in both directions, at 180° of bending, at the most representative thickness category for the metal strip purchase order.

If special forming requirements are necessary, those will be listed separately on the part number document.

THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION		NEW RELEASE (TRANSITIONED FROM 400005028-ES)		<b>MOLEX MATERIAL SPECIFICATION – C42500 ALLOY METAL STRIPS</b>			
CHANGE NO.		849683					
REVISED BY	ELIJAH RESNICK	DATE	2026/04/15	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	DANIEL MOLLA	DATE	2026/04/15	QMD	ENGINEERING STANDARD	000	209058
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	LAWRENCE WOJNICZ	DATE	2026/01/20	MOLEX INTERNAL	2090580053	A	3 OF 7
INITIAL APPR	SHIVA B. ARALI	DATE	2026/01/20				

<b>H02</b>		90° GW	180° GW	90° BW	180° BW	<b>HR02</b>		90° GW	180° GW	90° BW	180° BW
	Thickness	10:1 w/t		10:1 w/t			Thickness	10:1 w/t		10:1 w/t	
	0.51-1.0 mm	-	-	-	-		0.51-1.0 mm	-	-	-	-
	0.3-0.5 mm	0 r/t	0 r/t	0 r/t	1.0 r/t		0.3-0.5 mm	0 r/t	0 r/t	0 r/t	1.0 r/t
	0.15-0.29 mm	0 r/t	0 r/t	0 r/t	1.0 r/t		0.15-0.29 mm	0 r/t	0 r/t	0 r/t	1.0 r/t
	≤0.149 mm	0 r/t	0 r/t	0 r/t	0.9 r/t		≤0.149 mm	0 r/t	0 r/t	0 r/t	0.9 r/t
<b>H03</b>		90° GW	180° GW	90° BW	180° BW	<b>HR03</b>		90° GW	180° GW	90° BW	180° BW
	Thickness	10:1 w/t		10:1 w/t			Thickness	10:1 w/t		10:1 w/t	
	0.51-1.0 mm	-	-	-	-		0.51-1.0 mm	-	-	-	-
	0.3-0.5 mm	0 r/t	1.0 r/t	0 r/t	1.5 r/t		0.3-0.5 mm	0 r/t	1.0 r/t	0 r/t	1.5 r/t
	0.15-0.29 mm	0 r/t	0 r/t	0 r/t	1.4 r/t		0.15-0.29 mm	0 r/t	0 r/t	0 r/t	1.4 r/t
	≤0.149 mm	0 r/t	0 r/t	0 r/t	1.2 r/t		≤0.149 mm	0 r/t	0 r/t	0 r/t	1.2 r/t
<b>H04</b>		90° GW	180° GW	90° BW	180° BW	<b>HR04</b>		90° GW	180° GW	90° BW	180° BW
	Thickness	10:1 w/t		10:1 w/t			Thickness	10:1 w/t		10:1 w/t	
	0.51-1.0 mm	-	-	-	-		0.51-1.0 mm	-	-	-	-
	0.3-0.5 mm	0 r/t	1.5 r/t	0 r/t	2.0 r/t		0.3-0.5 mm	0 r/t	1.4 r/t	0 r/t	1.8 r/t
	0.15-0.29 mm	0 r/t	1.4 r/t	0 r/t	1.8 r/t		0.15-0.29 mm	0 r/t	1.3 r/t	0 r/t	1.6 r/t
	≤0.149 mm	0 r/t	1.2 r/t	0 r/t	1.5 r/t		≤0.149 mm	0 r/t	1.1 r/t	0 r/t	1.3 r/t
<b>H06</b>		90° GW	180° GW	90° BW	180° BW	<b>HR06</b>		90° GW	180° GW	90° BW	180° BW
	Thickness	10:1 w/t	10:1 w/t	10:1 w/t	10:1 w/t		Thickness	10:1 w/t	10:1 w/t	10:1 w/t	10:1 w/t
	0.51-1.0 mm	-	-	-	-		0.51-1.0 mm	-	-	-	-
	0.3-0.5 mm	0.5 r/t	2.0 r/t	1.0 r/t	2.5 r/t		0.3-0.5 mm	0.5 r/t	1.8 r/t	0.8 r/t	2.3 r/t
	0.15-0.29 mm	0.5 r/t	1.8 r/t	0.9 r/t	2.3 r/t		0.15-0.29 mm	0.5 r/t	1.6 r/t	0.7 r/t	2.2 r/t
	≤0.149 mm	0.5 r/t	1.5 r/t	0.7 r/t	2.1 r/t		≤0.149 mm	0.5 r/t	1.3 r/t	0.5 r/t	2.0 r/t
<b>H08</b>		90° GW	180° GW	90° BW	180° BW	<b>HR08</b>		90° GW	180° GW	90° BW	180° BW
	Thickness	10:1 w/t	10:1 w/t	10:1 w/t	10:1 w/t		Thickness	10:1 w/t	10:1 w/t	10:1 w/t	10:1 w/t
	0.51-1.0 mm	-	-	-	-		0.51-1.0 mm	-	-	-	-
	0.3-0.5 mm	1.0 r/t	2.5 r/t	2.0 r/t	4.0 r/t		0.3-0.5 mm	0.9 r/t	2.3 r/t	1.8 r/t	3.8 r/t
	0.15-0.29 mm	0.9 r/t	2.2 r/t	1.8 r/t	3.7 r/t		0.15-0.29 mm	0.8 r/t	2.1 r/t	1.6 r/t	3.5 r/t
	≤0.149 mm	0.75 r/t	2.0 r/t	1.5 r/t	3.4 r/t		≤0.149 mm	0.6 r/t	1.9 r/t	1.3 r/t	3.2 r/t
<b>H10</b>		90° GW	180° GW	90° BW	180° BW	<b>HR10</b>		90° GW	180° GW	90° BW	180° BW
	Thickness	10:1 w/t	10:1 w/t	10:1 w/t	10:1 w/t		Thickness	10:1 w/t	10:1 w/t	10:1 w/t	10:1 w/t
	0.51-1.0 mm	-	-	-	-		0.51-1.0 mm	-	-	-	-
	0.3-0.5 mm	3.0 r/t	N/A	9.0 r/t	N/A		0.3-0.5 mm	2.7 r/t	N/A	8.5 r/t	N/A
	0.15-0.29 mm	2.6 r/t	N/A	8.0 r/t	N/A		0.15-0.29 mm	2.4 r/t	N/A	7.5 r/t	N/A
	≤0.149 mm	2.3 r/t	N/A	7.5 r/t	N/A		≤0.149 mm	2.2 r/t	N/A	7.0 r/t	N/A






**Notes:**

- (1) W/t = width to thickness ratio (defining bending width). r/t = inside bend radius to thickness ratio. N/A = Not Available.
- (2) It is the expectation that tempers lower than H02 will possess bend formability that is as good (or better) than the values listed for the H02 temper.
- (3) For testing purposes, a bend radius of "0 r/t" is defined as ≤25% of the strip thickness

THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION	NEW RELEASE (TRANSITIONED FROM 400005028-ES)			<b>MOLEX MATERIAL SPECIFICATION – C42500 ALLOY METAL STRIPS</b>			
CHANGE NO.	849683						
REVISED BY	ELIJAH RESNICK	DATE	2026/04/15	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	DANIEL MOLLA	DATE	2026/04/15	QMD	ENGINEERING STANDARD	000	209058
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	LAWRENCE WOJNICZ	DATE	2026/01/20	MOLEX INTERNAL	2090580053	A	4 OF 7
INITIAL APPR	SHIVA B. ARALI	DATE	2026/01/20				

**5.4.1 Acceptance Criteria for Bending**

Bending Observations	Acceptance Criteria	Rank
	"Accepted", smooth, no orange peel, no cracks	1
	"Accepted", small orange peel, no cracks	2
	"Accepted", heavy orange peel, no cracks	3
	"Rejected", heavy orange peel, shallow cracks	4
	"Rejected", heavy orange peel, deep cracks	5

**5.5 Stress Relaxation Resistance minimum expectation (in accordance with ASTM E 328)**

5.5.1 Stress relaxation resistance for tempers H04/HR04 and below:

<b>C42500 Alloy ≤H04 Stress Relaxation in Percent Retained @ 1000 Hours</b>						
Temp °C	50% R <sub>p0.2</sub>	80% R <sub>p0.2</sub>	100% R <sub>p0.2</sub>	50% R <sub>p0.2</sub> †	80% R <sub>p0.2</sub> †	100% R <sub>p0.2</sub> †
75	97%	93%	75%	93%	87%	69%
100	94%	90%	72%	90%	84%	66%
125	85%	80%	60%	78%	72%	52%
150	61%	55%	38%	53%	47%	30%

5.5.2 Stress relaxation resistance for tempers H06/HR06 and above:

<b>C42500 Alloy ≥H06 Stress Relaxation in Percent Retained @ 1000 Hours</b>						
Temp °C	50% R <sub>p0.2</sub>	80% R <sub>p0.2</sub>	100% R <sub>p0.2</sub>	50% R <sub>p0.2</sub> †	80% R <sub>p0.2</sub> †	100% R <sub>p0.2</sub> †
75	89%	85%	67%	85%	79%	61%
100	79%	75%	57%	75%	69%	51%
125	75%	70%	50%	68%	62%	42%
150	66%	60%	43%	58%	52%	35%

Confirmation testing: On well-established alloys such as C42500, it is allowable to use Larson Miller Parameters to fulfill the annual confidence testing requirement.

THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION	NEW RELEASE (TRANSITIONED FROM 400005028-ES)			<b>MOLEX MATERIAL SPECIFICATION – C42500 ALLOY METAL STRIPS</b>			
CHANGE NO.	849683						
REVISED BY	ELIJAH RESNICK	DATE	2026/04/15	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	DANIEL MOLLA	DATE	2026/04/15	QMD	ENGINEERING STANDARD	000	209058
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	LAWRENCE WOJNICZ	DATE	2026/01/20	MOLEX INTERNAL	2090580053	A	5 OF 7
INITIAL APPR	SHIVA B. ARALI	DATE	2026/01/20				

**6.0 CERTIFICATION REQUIREMENTS**

Certification at P.O. Level	Supplied Data at P.O. Level	Annual Capability Statement	Engineering Data by Request
Chemical Composition (data)		Chemical Capability	
Tensile (data)		Tensile Capability	Transverse properties
Yield (data)		Yield Capability	Spring Bending Limit
Elongation (data)			
Grain size (data)			
			Elastic Modulus (data)
Thickness (data)		Thickness Capability	
Width (data)		Width Capability	
Camber (pass/fail)			
Surface Roughness (data)			
		Stress Relaxation Verification	
Burr (pass/fail)			
Bend Formability (pass/fail)			ASTM B820 Appendix narrow beam reporting table, or other
Electrical Conductivity (data)			
			Other Physical Properties
Reference Documents (pass/fail)			

**6.1 Requirements for “Annual Capability Assessment” of critical characteristics**

- 6.1.1** Chemical composition requires a statistical assessment on an annual basis to verify capability. This assessment be on file and available to Molex when requested.
- 6.1.2** Mechanical properties, requires a statistical assessment on an annual basis to verify capability. This assessment be on file and available to Molex when requested.
- 6.1.3** Dimensional tolerances, requires a statistical assessment on an annual basis to verify capability. This assessment be on file and available to Molex when requested.
- 6.1.4** Stress relaxation resistance is to be verified for a temper and a process in the H04 to H08 designation range at 80% of yield strength for 1000 hours at 75°C and 125°C. The supplier shall select an active Molex item to fulfill this requirement. It is acceptable to utilize Larson Miller Parameters to facilitate this annual verification audit.

**6.2 Engineering Data**

Acceptance of this material specification and the requirements includes the supplier’s commitment to provide other engineering data when requested. These types of data may include transverse properties, spring bending limits or other physical properties of this material.

THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION	NEW RELEASE (TRANSITIONED FROM 400005028-ES)			<b>MOLEX MATERIAL SPECIFICATION – C42500 ALLOY METAL STRIPS</b>			
CHANGE NO.	849683						
REVISED BY	ELIJAH RESNICK	DATE	2026/04/15	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	DANIEL MOLLA	DATE	2026/04/15	QMD	ENGINEERING STANDARD	000	209058
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	LAWRENCE WOJNICZ	DATE	2026/01/20	MOLEX INTERNAL	2090580053	A	6 OF 7
INITIAL APPR	SHIVA B. ARALI	DATE	2026/01/20				

**6.3 Recent Change Summary**

Document ID# Change from **400005028-ES** → **2090580053**.

Updated **Section 3: Reference Documents** to reflect new **2090580043** and **2090580044** titles and content.

Removed **ES-40000-5006: Mechanical Tool-Wear Test Standard** from **Section 3: Reference Documents** due to obsolescence.

Changed **Section 4: Definitions** (with no entries) to **Section 4: Order of Precedence**.

Removal of what was previous **Section 6: Dimensional Requirements**

- All current Geometric and Dimensional Requirements are contained in **2090580043: GEOMETRIC CONDITIONS AND TOLERANCES FOR METAL STRIPS**. Including:
  - Strip Thickness
  - Strip Width
  - Burr
  - Camber
- All current Surface Condition Requirements are contained in **2090580044: METAL STRIP SURFACE CONDITIONS AND REQUIREMENTS**. Including:
  - Surface Roughness

Therefore, the previous **Section 7: Certification Requirements** and associated 7.X.Y subsections have decreased by one to become **Section 6: Certification Requirements** and associated 6.X.Y subsections.

THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION		NEW RELEASE (TRANSITIONED FROM 400005028-ES)		<b>MOLEX MATERIAL SPECIFICATION – C42500 ALLOY METAL STRIPS</b>			
CHANGE NO.		849683					
REVISED BY	ELIJAH RESNICK	DATE	2026/04/15	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	DANIEL MOLLA	DATE	2026/04/15	QMD	ENGINEERING STANDARD	000	209058
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	LAWRENCE WOJNICZ	DATE	2026/01/20	MOLEX INTERNAL	2090580053	A	7 OF 7
INITIAL APPR	SHIVA B. ARALI	DATE	2026/01/20				