Jameco Part Number 463435

1.0 SCOPE

This Product Specification covers the 3.96 mm (.156 inch) centerline (pitch) 1.14mm (.045) square pin headers when mated with either printed circuit board (PCB) connectors or connectors terminated with 18 to 26 AWG wire using crimp technology.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBERS

Crimp Terminals: 2478,2578,2878,2477,
Crimp Housings: 2139, 41695
PCB Connectors: 2145, 41815
Headers: 41771, 41772, 41791, 41792, 42471, 42472, 42491, 42492, 41661, 41662, 41671, 61672, 41681, 41682
Other products conforming to this specification are noted on the individual drawings.

2.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

Terminal Material: Brass or Phos. Bronze (for Max performance use phos bronze material.)
Housing: Nylon or Polyester
Pins: Brass or Phos. Bronze
For more information on dimensions, materials, and plating see the individual drawings.

2.3 SAFETY AGENCY APPROVALS

UL File Number …….. E29179
CSA ……..LR19980

3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

3.1 PS-45499-002 COSMETIC SPECIFICATION

4.0 RATINGS

4.1 VOLTAGE

250 Volts

4.2 CURRENT

(Current is dependent on connector size, contact material, plating, ambient temperature, printed circuit board characteristics and related factors. Actual current rating is application dependent and should be evaluated for each application.)

a. For Crimp Terminals- and Applicable Wires

Wire Awg	Amps (Max) With Brass	Amps (Max) With Phos Bronze	Wire Insulation Dia
18	5.00	7.00	See terminal drawings
20	4.75	6.25	See terminal drawings
22	4.50	5.50	See terminal drawings
24	4.25	5.00	See terminal drawings
26	4.00	4.50	See terminal drawings

4.2 CURRENT (cont)

b. For Printed Circuit Board Connectors

Connector Style	Amps (Max) With Brass	Amps (Max) With Phos Bronze
Top Entry	4.50	5.00
Right Angle	4.50	5.00
Bottom Entry	4.00	4.50

4.3 TEMPERATURE (ambient + 30^{0}C temp rise)

	Brass	Phos Bronze
Operating Temperature	0^{0}C to +50^{0}C	0^{0}C to +75^{0}C
Non Operating Temperature	-40^{0}C to +105^{0}C	-40^{0}C to +105^{0}C

5.0 PERFORMANCE

5.1 ELECTRICAL REQUIREMENTS

DESCRIPTION	TEST CONDITION	REQUIREMENT
Contact Resistance (Low Level)	Mate connectors: apply a maximum voltage of 20 mV and a current of 100 mA.	10 milliohms MAXIMUM [initial]
Contact Resistance of Wire Termination (Low Level)	Terminate the applicable wire to the terminal and measure wire using a voltage of 20 mV and a current of 100 mA.	2 milliohms MAXIMUM [initial]
Insulation Resistance	Unmate & unmount connectors: apply a voltage of 500 VDC between adjacent terminals and between terminals to ground.	1000 Megohms MINIMUM
Dielectric Withstanding Voltage	Unmate connectors: apply a voltage of {two times the rated voltage plus 1000 volts} VAC for 1 minute between adjacent terminals and between terminals to ground.	No breakdown
Capacitance	Measure between adjacent terminals at 1 MHz.	1.2 picofarads MAXIMUM
Temperature Rise (via Current Cycling)	Mate connectors: measure the temperature rise at the rated current after: 1) 96 hours (steady state) 2) 240 hours (45 minutes ON and 15 minutes OFF per hour) 3) 96 hours (steady state)	Temperature rise: +30℃ MAXIMUM

5.2 MECHANICAL REQUIREMENTS

DESCRIPTION	TEST CONDITION	REQUIREMENT
Connector Mate and Unmate Forces	Per circuit when mated to a .045 Sq. pin. Mate and unmate connector (male to female) at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute.	Without Friction Lock 9.4 N (2.12 lbf) MAXIMUM insertion force & 1.8 N (0.40 lbf) MINIMUM withdrawal force
		With Friction Lock 10.7 N (2.40 lbf) MAXIMUM insertion force & 4.0 N (0.90 lbf) MINIMUM withdrawal force
Terminal Insertion Force (into Housing)	Apply an axial insertion force on the terminal at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute. (Forces will change with platings and materials.)	17.8 N (4.0 lbf) MAXIMUM insertion force
Terminal Retention Force (in Housing)	Axial pullout force on the terminal in the housing at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute. (Forces will change with platings and materials.)	35.6 N (8.0 lbf) MINIMUM withdrawal force
Durability	Mate connectors up to 25 cycles at a maximum rate of 10 cycles per minute prior to Environmental Tests.	10 milliohms MAXIMUM (change from initial)
Vibration (Random)	Mate connectors and vibrate per EIA 364-28, test condition VII.	10 milliohms MAXIMUM (change from initial) & Discontinuity < 1 microsecond
Shock (Mechanical)	Mate connectors and shock at 50 g's with ½ sine wave (11 milliseconds) shocks in the ±X,±Y,±Z axes (18 shocks total).	10 milliohms MAXIMUM (change from initial]) & Discontinuity < 1 microsecond
Wire Pullout Force (Axial)	Apply an axial pullout force on the wire at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute. (For maximum performance use Molex application tooling with stranded tinned copper wire)	18 awg = 89 N (20 lbf) 20 awg = 66 N (15 lbf) 22 awg = 53 N (12 lbf) 24 awg = 35 N (8 lbf) 26 awg = 22 N (5 lbf)
Normal Force	Apply a perpendicular force.	7.34 N (748 grams) average

5.3 ENVIRONMENTAL REQUIREMENTS

DESCRIPTION	TEST CONDITION	REQUIREMENT
Shock (Thermal)	Mate connectors; expose to 5 cycles of: Temperature ℃ — Duration (Minutes) -40 +0/-3 — 30 +25 ±10 — 5 MAXIMUM +105 +3/-0 — 30 +25 ±10 — 5 MAXIMUM	10 milliohms MAXIMUM (change from initial) & Visual: No Damage
Thermal Aging	Mate connectors; expose to: 96 hours at 105 ± 2℃	10 milliohms MAXIMUM (change from initial]) & Visual: No Damage
Humidity (Steady State)	Mate connectors: expose to a temperature of 40 ± 2℃ with a relative humidity of 90-95% for 96 hours. Note: Remove surface moisture and air dry for 1 hour prior to measurements.	10 milliohms MAXIMUM (change from initial) & Dielectric Withstanding Voltage: No Breakdown at 500 VAC & Insulation Resistance: 1000 Megohms MINIMUM & Visual: No Damage
Humidity (Cyclic)	Mate connectors: cycle per EIA-364-31: 24 cycles at temperature 25 ± 3℃ at 80 ± 5% relative humidity and 65 ± 3℃ at 50 ± 5% relative humidity; dwell time of 1.0 hour; ramp time of 0.5 hours. {Note: Remove surface moisture and air dry for 1 hour prior to measurements.}	10 milliohms MAXIMUM (change from initial) & Dielectric Withstanding Voltage: No Breakdown at 500 VAC & Insulation Resistance: 1000 Megohms MINIMUM & Visual: No Damage
Solderability	Per SMES-152	Solder coverage: 95% MINIMUM (per SMES-152)

5.3 ENVIRONMENTAL REQUIREMENTS

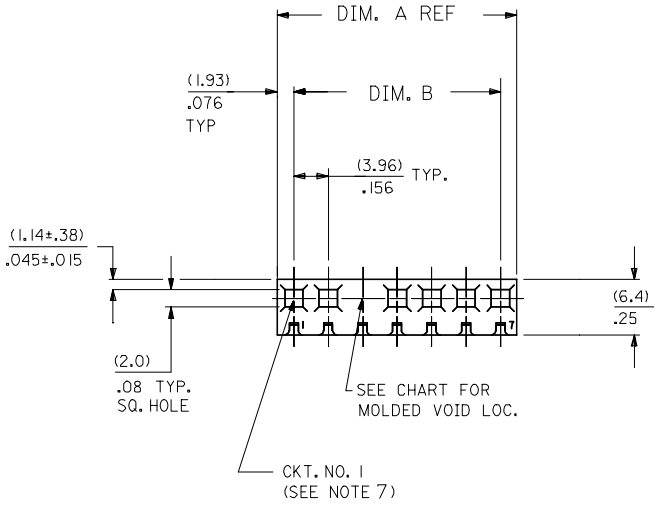
DESCRIPTION	TEST CONDITION	REQUIREMENT
Solder Resistance	Dip connector terminal tails in solder: Solder Duration: 5 ± 0.5 seconds; Solder Temperature: 230 ± 5℃	Visual: No Damage to insulator material
Cold Resistance	Mate connectors: Duration: 96 hours; Temperature: -40 ± 3℃	10 milliohms MAXIMUM (change from initial) & Visual: No Damage
Corrosive Atmosphere: Flowing Mixed Gas (FMG)	Mate connectors: Test per EIA-364-65, method 2A	10 milliohms MAXIMUM (change from initial) & Visual: No Damage

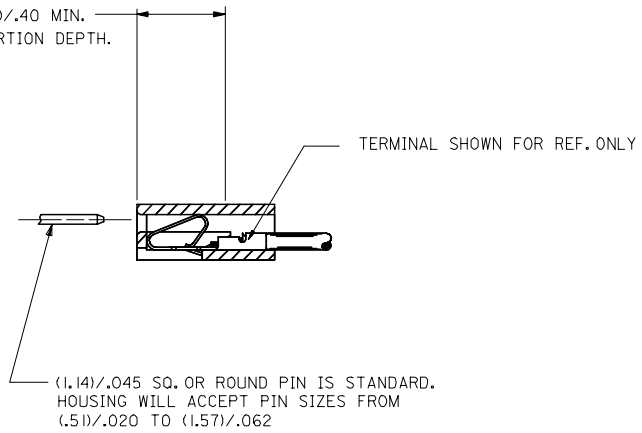
6.0 PACKAGING

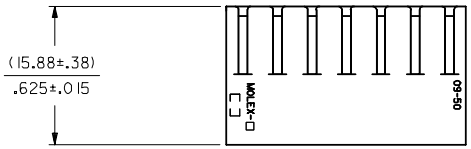
Parts shall be packaged to protect against damage during handling, transit and storage.

7.0 GAGES AND FIXTURES

8.0 OTHER







DIM. A	DIM. B	NO. OF
(7.82)	(3.96±.13)	2
.308	.156±.005	
(11.79)	(7.92±.13)	3
.464	.312±.005	
(15.75)	(11.89±.13)	4
.620	.468±.005	
(19.71)	(15.85±.13)	5
.776	.624±.005	
(23.67)	(19.81±.13)	6
.932	.780±.005	
(27.64)	(23.77±.13)	7
1.088	.936±.005	
(31.60)	(27.74±.25)	8
1.244	1.092±.010	
(35.56)	(31.70±.25)	9
1.400	1.248±.010	
(39.52)	(35.66±.25)	10
1.556	1.404±.010	
(43.48)	(39.62±.25)	11
1.712	1.560±.010	
(47.45)	(43.59±.25)	12
1.868	1.716±.010	
(51.41)	(47.55±.31)	13
2.024	1.872±.012	
(55.37)	(51.51±.36)	14
2.180	2.028±.014	
(59.33)	(55.47±.36)	15
2.336	2.184±.014	
(63.30)	(59.44±.36)	16
2.492	2.340±.014	
(67.26)	(63.40±.36)	17
2.648	2.496±.014	
(71.22)	(67.36±.36)	18
2.804	2.652±.014	
(75.18)	(71.32±.36)	19
2.960	2.808±.014	
(79.15)	(75.29±.36)	20
3.116	2.964±.014	
(83.11)	(79.25±.46)	21
3.272	3.120±.018	
(87.07)	(83.21±.46)	22
3.428	3.276±.018	
(91.03)	(87.17±.46)	23
3.584	3.432±.018	
(95.00)	(91.14±.46)	24
3.740	3.588±.018	

2139-N**-**-**

- NO. OF CKT'S.
- SELECTIVE RAMP LOC.
  BLANK=NONE
  AA=1ST. SEL. LOC.
  AB=2ND. SEL. LOC., ETC.
- VOID CODE
  NO. CORRESPONDS TO
  CKT. NO. VOIDED.
  MULT. VOIDS START WITH 51.
- COLOR CODE
  BLANK=NATURAL
  GN=GREEN
  YW=YELLOW
  RD=RED
  OR=ORNAGE
  BU=BLUE
  BK=BLACK

OPTION CODE

OPT. CODE	RAMP	POL. RIB	EARS	MATERIAL	ENGRAVING	PACKAGING
A	STD. RAMP	NO	NO	NYLON 94V-2	STD.	PK-2139-001
C	NONE	NO	NO	NYLON 94V-2	STD.	PK-2139-002
G	WIDE RAMP	NO	NO	NYLON 94V-2	STD.	PK-2139-001
M	STD. RAMP	NO	NO	NYLON 6 94V-2	STD.	TBD-INDIA
N	NONE	NO	NO	NYLON 6 94V-2	STD.	TBD-INDIA
P	STD. RAMP	YES	NO	NYLON 94V-2	STD.	TBD SINGAPORE

SEE NOTE 6

NOTES:
1. MATERIAL: SEE LEGEND.
2. FINISH: N/A
3. PARTS CONFORM TO PRODUCT SPECIFICATION PS-08-50.
4. PACKAGING INFORMATION: SEE LEGEND
5. THIS HOUSING FOR USE WITH TERMINAL NO. 2478 (18 TO 24 GA) & 2578 (22 TO 26 GA), WITH (2.54)/.100 MAX. INSULATION DIA.. HOUSING 41695 IS RECOMMENDED FOR OVER (2.54)/.100 DIA. INSULATION.
6. DIMENSIONS GIVEN ACROSS CENTERLINES ARE SYMMETRICAL ABOUT THOSE CENTERLINES WITHIN HALF THE TOTAL TOLERANCE.
7. FIRST CKT. NO. ON 1 THRU 5 CKT. HOUSINGS. FIRST AND LAST CKT. NO. ON 6 CKT HOUSING AND LARGER.
8. MAX BOW .005 MM/MM OR .005 IN/IN
9. 2139-NP-* IS MANUFACTURED IN SINGAPORE ONLY.

REV	DESCRIPTION	
AE1	UPDATE PER ECN	2005/12/09
	ECC NO: UCP2006-0451	2005/12/12
	DRWN: JLOWE	2005/12/12
	CHKD: ADERR	
	APPR: FSMITH	2005/12/14

QUALITY SYMBOLS
▼=0
▽=0

GENERAL TOLERANCES (UNLESS SPECIFIED)

	mm	INCH
4 PLACES	± ---	±---
3 PLACES	± ---	±.010
2 PLACES	± 0.25	±.014
1 PLACE	± 0.36	±---
ANGULAR ±1/2°		

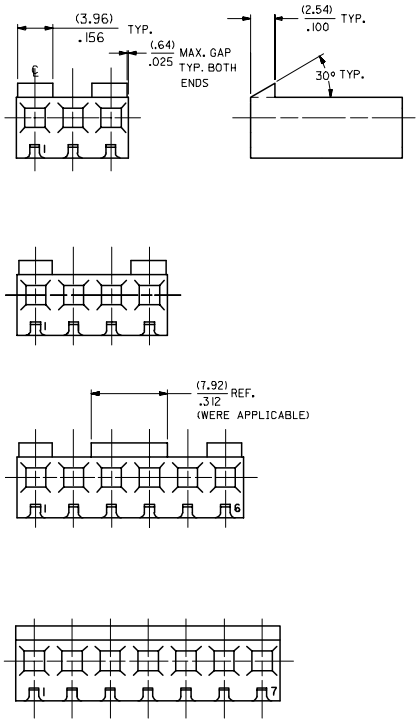
DRAFT WHERE APPLICABLE MUST REMAIN WITHIN DIMENSIONS

DIMENSION STYLE	MM/IN
SCALE	---
DESIGN UNITS	INCH
	THIRD ANGLE PROJECTION
DRAWN BY	SAMIEC
DATE	1986/01/17
CHECKED BY	PATEL
DATE	1986/01/17
APPROVED BY	LENZ
DATE	1986/01/07
MATERIAL NO.	SEE CHART
DOCUMENT NO.	SD-2139
SHEET NO.	1 OF 4
SIZE	D

TITLE: CONNECTOR HOUSING .156 CL CRIMP TERMINAL 2139 SERIES DWG.

MOLEX INCORPORATED

MFG. SHL	REV.
4	AE1
3	AE1
2	AE1
1	AE1



NO. OF CKT'S.	STANDARD RAMP IS LOCATED ON ℄ OF CKT. NOS.
2	ACROSS ENTIRE PART
3	1,3
4	1,4
5	1,3,5
6	1,3,4,6
7	ACROSS ENTIRE PART
8	1,3,6,8
9	ACROSS ENTIRE PART
10	1,3,5,6,8,10
11	ACROSS ENTIRE PART
12	1,3,5,8,10,12
13	1,3,5,7,9,11,13
14	1,3,5,7,8,10,12,14
15	1,3,5,7,9,11,13,15
16	1,3,5,7,10,12,14,16
17	1,3,5,7,9,11,13,15,17
18	1,3,5,7,9,10,12,14,16,18
19	1,3,5,7,9,11,13,15,17,19
20	1,3,5,7,9,12,14,16,18,20
21	1,3,5,7,9,11,13,15,17,19,21
22	1,3,5,7,9,11,12,14,16,18,20,22
23	1,3,5,7,9,11,13,15,17,19,21,23
24	1,3,5,7,9,11,14,16,18,20,22,24

STD. RAMP OPTION

, SEE CHART FOR RAMP LOCATIONS.

2139-NA-*				2139-NC-*			
ORDER NO.		ENG. NO.	VOIDS	ORDER NO.		ENG. NO.	VOIDS
09-50-3021	*	2139-2A		09-50-7021	*	2139-2C	
09-50-3031	*	2139-3A		09-50-7031	*	2139-3C	
09-50-3041	*	2139-4A		09-50-7041	*	2139-4C	
09-50-3051	*	2139-5A		09-50-7051	*	2139-5C	
09-50-3061	*	2139-6A		09-50-7061	*	2139-6C	
09-50-3071	*	2139-7A		09-50-7071	*	2139-7C	
09-50-3081	*	2139-8A		09-50-7081	*	2139-8C	
09-50-3091	*	2139-9A		09-50-7091	*	2139-9C	
09-50-3101	*	2139-10A		09-50-7101	*	2139-10C	
09-50-3111	*	2139-11A		09-50-7111	*	2139-11C	
09-50-3121	*	2139-12A		09-50-7121	*	2139-12C	
09-50-3131	*	2139-13A		09-50-7131	*	2139-13C	
09-50-3141	*	2139-14A		09-50-7141	*	2139-14C	
09-50-3151	*	2139-15A		09-50-7151	*	2139-15C	
09-50-3161	*	2139-16A		09-50-7161	*	2139-16C	
09-50-3171	*	2139-17A		09-50-7171	*	2139-17C	
09-50-3181	*	2139-18A		09-50-7181	*	2139-18C	
09-50-3191	*	2139-19A		09-50-7191	*	2139-19C	
09-50-3201	*	2139-20A		09-50-7201	*	2139-20C	
09-50-3211	*	2139-21A		09-50-7211	*	2139-21C	
09-50-3221	*	2139-22A		09-50-7221	*	2139-22C	
09-50-3231	*	2139-23A		09-50-7231	*	2139-23C	
09-50-3241	*	2139-24A		09-50-7241	*	2139-24C	
09-50-3036		2139-3A-2	2	09-50-7117		2139-11C-51	2,7,10
		2139-10A-2	2	09-50-7166		2139-16C-2	2
		2139-10A-51	2,5	09-50-7106		2139-10C-2	2
		2139-7A-2	2	09-50-7107		2139-10C-51	2,5
		2139-11A-51	2,7,10	09-50-7076		2139-7C-2	2
09-50-3163		2139-16A-2	2			2139-4C-3	3
09-50-3073		2139-10A-7	7	T 09-50-7108		2139-10C-4	4
09-50-3083		2139-10A-8	8	T 09-50-7109		2139-10C-5	5
09-50-3104		2139-10A-9	9			2139-5C-2	2
09-50-3162		2139-16A-51	2,15	09-50-3077		2139-7C-3	3
09-50-3092		2139-9A-51	2,6	09-50-3078		2139-7C-5	5
09-50-3075		2139-7A-51	1,7	09-50-7142		2139-14C-5	5
		2139-7A-6	6				
		2139-5A-51	2,4				
09-50-3047		2139-4A-3	3				
		2139-11A-2	2				
09-50-3052		2139-5A-4	4				
09-50-3076		2139-7A-52	4,7				
09-50-3125		2139-12A-5	5				
		2139-7A-3	3				
		2139-7A-5	5				
09-50-3053		2139-5A-2	2				
		2139-9A-2	2				
09-50-3127		2139-12A-2	2				
09-50-3143		2139-14A-2	2				
09-50-3202		2139-20A-2	2				
S		2139-9A-4	4				
09-50-3126		2139-12A-11	11				
09-50-3142		2139-14A-13	13				
09-50-3084		2139-8A-4	4				
09-50-3037		2139-3A-3	3				
09-50-3182		2139-18A-2	2				
09-50-3157		2139-15A-2	2				

UPDATE TITLE BLOCK
EC NO: UCP2006-0451 2005/12/09
DRWN: JLOWE 2005/12/12
CHKD: ADERR 2005/12/14
APPR: FSMITH
REV DESCRIPTION

QUALITY SYMBOLS
▼=0
▽=0

GENERAL TOLERANCES (UNLESS SPECIFIED)

	mm	INCH
4 PLACES	± ---	±---
3 PLACES	± ---	±.010
2 PLACES	± 0.25	±.014
1 PLACE	± 0.36	±---
ANGULAR ±1/2°		

DRAFT WHERE APPLICABLE MUST REMAIN WITHIN DIMENSIONS

DIMENSION STYLE: MM/IN
SCALE: ---
DESIGN UNITS: INCH
THIRD ANGLE PROJECTION

DRAWN BY	SAMIEC	DATE 1986/01/17
CHECKED BY	PATEL	DATE 1986/01/17
APPROVED BY	LENZ	DATE 1986/01/17

TITLE: CONNECTOR HOUSING FOR CRIMP TERMINAL 2139 SERIES DWG.

MOLEX INCORPORATED

MATERIAL NO.: SEE CHART
DOCUMENT NO.: SD-2139
SHEET NO.: 2 OF 4
SIZE: D

AE1

tb_frame_D_P_ME_T
Rev. D 2004/04/02

molex
one company › a world of innovation

RoHS Certificate of Compliance

05/08/2009

Table A

Molex Part Number	Part Description	RoHS Compliance Status
0009503031	3.96mm (.156") Pitch KK® Crimp Terminal Housing, Friction Ramp, 3 Circuits	ELV and RoHS Compliant

Table A provides the RoHS compliance status for the identified part number manufactured by Molex, contained in original Molex packaging and labeled with an inventory control date on or after the date of this certificate. Molex part numbers with the RoHS compliance status *"ELV and RoHS Compliant"* do not contain the substances listed in the table below in concentrations exceeding the Maximum Control Value (MCV) [1].

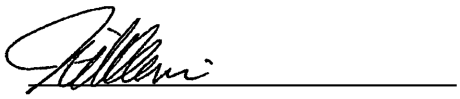
Substance	Maximum Control Value
Lead	0.1% by weight (1000 ppm) (2)
Mercury	0.1% by weight (1000 ppm)
Cadmium	0.01% by weight (100 ppm) (2)
Hexavalent Chromium	0.1% by weight (1000 ppm)
Polybrominated Biphenyls (PBB)	0.1% by weight (1000 ppm)
Polybrominated Diphenyl Ethers (PBDE) including deca-BDE	0.1% by weight (1000 ppm)

(2) The MCV does not apply to applications for which exemptions have been granted to the RoHS Directive

Products containing the substances listed in the table above, in concentrations below the MCV, are understood to be in compliance with Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronics equipment (RoHS Directive) in accordance with the definitions set forth in the directives.

Molex's sole liability for incorrectly certifying a product as having the substances listed in the table above, in concentrations below the MCV, shall be either replacement of the Molex product or, alternatively and in the sole discretion of Molex, return of the purchase price paid for the relevant Molex product.

For additional information regarding Molex's environmental initiatives, please visit the ECOCARE section of www.molex.com



Jay Williamson
World Wide V.P. of Quality

[1] In order to validate compliance, Molex is evaluating its products to the homogeneous material level. A homogeneous material is defined as either a raw material or a material applied during the construction of the product. For example, in terminals plated with both a nickel and a tin layer, the base metal (copper alloy) and both layers are considered homogeneous materials and therefore must be considered separately. In another example, a cable is constructed of wire, insulation, jacketing and may be marked with ink. All these are considered individual homogeneous materials.