NICOMATIC R&D LABORATORY	QUALIFICATION TEST REPORT	QTR18033a
EMM SERIE ACCORDING TO MIL-DTL-83513G STANDARD		Page : 1 /18
		Qualification status : PASSED

CRIMP TENSILE STRENGTH

According to MIL-DTL-83513G §3.5.18, 4.5.20 and WHMA-A-620B table 19-12

ISSUE	MODIFICATION	VISA	DATE
a	Original Issue	AJ	14/11/17
b			
c			

	Name	Duty	Date	Visa
Written by	A.JAGHMIM	Test & Measurement Manager	18/05/18	AJ
Test Operator(s)	A.JAGHMIM	Test & Measurement Manager	18/05/18	AJ
Checked by	C.CHIFFARD	Product Manager	18/05/18	CC
Approved by	J.RIGAT	Project Manager	18/05/18	JR
Requested by	J.RIGAT	Project Manager	18/05/18	JR

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1 Conclusion

The EMM connectors are **qualified** regarding CRIMP TENSILE STRENGTH according to MIL-DTL-83513G standard & WHMA-A-620B standard.

2 Technical Features Proposal

EMM Crimp Tensile Strength performance:

AWG 24: Required = 35.6 N min / Measured = 49.98 N min
AWG 26: Required = 22.3 N min / Measured = 36.64 N min
AWG 28: Required = 13.4 N min / Measured = 16.90 N min
AWG 30: Required = 6.7 N min / Measured = 13.32 N min

3 Connate Reports

4 Information about the tests

4.1 Object

The object of this test is to qualify the EMM connectors regarding Crimp Tensile Strength according to MIL-DTL-83513G & IPC/WHMA-A-620B standard.

4.2 Reference documents/Qualification Plan

- MIL-DTL-83513G
- WHMA-A-620B table 19-12 pull test force value
- EIA-364-08 test procedure

4.3 Tested Products

Designation	Article Reference*	Drawing issue*	Batch / DI*	Quantity
C18892-30 (Female, Straight on PCB, E60 guiding)	C18892-30	na	DI7576	20
C18900-30 (Female Straight on PCB, E50)	C18900-30	na	DI7577	20
C18891-30 (Male, Straight on PCB, E10)	C18891-30	na	DI7579	20
C18904-30 (Male, 90° on PCB, E11 guiding)	C18904-30	na	DI7578	20
C18893-30 (Female, 90° on PCB, E61 guiding)	C18893-30	na	DI7580	20
C18901-30 (Female, 90° on PCB, E51 jackscrew)	C18901-30	na	DI7581	20
C18981-30-0250 (Male, on cable AWG30, E01 jackscrew)	C18981-30-0250	na	DI7592	20
C18980-30-0250 (Male, on cable AWG28, E01 jackscrew)	C18980-30-025	na	DI7591	20
C18902-30-0250 (Male, on cable AWG26, E01 jackscrew)	C18902-30-0250	na	DI7588	20
C18979-30-0250 (Male, on cable AWG24, E01 jackscrew)	C18979-30-0250	na	DI7589	20
C18902-30-0250-BP (Male, on cable AWG26, E01 jackscrew BP)	C18902-30-0250-BP	na	DI7586	20
18224-AWG24	18224-AWG24	na	DI7594	25
18224-AWG26	18224-AWG26	na	DI7596	25
18240-AWG28	18240-AWG28	na	DI7597	25
18240-AWG30	18240-AWG30	na	DI7598	25

4.4 Persons present during the tests

Name	Duty
A.JAGHMIM	Test & Measurement Manager

4.5 Date and place of the tests

NICOMATIC HQ R&D Lab. from 09/01/18 to 10/01/18

4.6 Environmental conditions

Ambient temperature: 23.7°C
Pressure: 941 mbar
Humidity: 27%

4.7 Incidents during the test

None

4.8 Test Equipments

Designation	Calibration Data	
Force sensor ANDILOG N° 00602 (200N)	**Last calibration date**	23/02/17
	Next calibration date	23/02/18

4.9 Test Tooling

Designation	Tooling reference
Vertical test stand ANDILOG ATLAS II	/
Crimp Tensile tools	/

5 Requirements

5.1 Requirements according to WHMA-A-620B table 19-12 pull test force value

Tableau 19-12 Valeurs minimales à respecter lors du Test de Traction

Taille du conducteur		Contacts usinés				Epissures Serties		Contacts et Terminaisons emboutis	
		Fil plaqué Argent/étain		Fil plaqué Nikel					
AWG	(mm²)	Lbs	(N)	Lbs	(N)	Pounds	(N)	Pounds	(N)
30	0.050	1.5	6.7	1.5	6.7	1.5	6.7	1.5*	6.7*
28	0.080	3	13.4	2	8.9	2	8.9	2*	8.9*
26	0.130	5	22.3	3	13.4	3	13.4	7	31.2
24	0.200	8	35.6	6	26.7	5	22.3	10	44.5
22	0.324	12	53.4	8	35.6	8	35.6	15	66.8
20	0.519	20	89.0	19	84.6	13	57.9	19	84.6
18	0.823	32	142	NE	NE	20	89.0	38	169.1
16	1.310	50	222.3	37	164.6	30	133.5	50	222.5
14	2.080	70	311.5	60	266.9	50	222.5	70	311.5
12	3.310	110	489.5	100	445.0	70	311.5	110	489.5
10	5.261	150	667.5	135	600.5	80	356.0	150	667.5
8	8.367	220	978.6	200	890.0	90	400.5	225	1001.3
6	13.300	300	1235.0	270	1201.0	100	445.0	300	1335.0
4	21.150	400	1780.0	360	1601.4	140	623.0	400	1780.0
3	26.670	NE	NE	NE	NE	160	712.0	NE	NE
2	33.620	550	2447.5	495	2201.9	180	801.0	550	2447.5
1	42.410	650	2892.5	585	2602.2	200	890.0	650	2892.5
1/0	53.490	700	3115.0	630	2757.9	250	1112.5	700	3115.0
2/0	67.430	750	3337.5	675	3002.5	300	1235.0	750	3337.5
3/0	85.010	NE	NE	NE	NE	350	1557.5	825	3671.3
4/0	107.200	875	3893.0	785	3491.9	450	2202.5	875	3893.8
250	127	NE	NE	NE	NE	500	2225.0	NE	NE
300	156	NE	NE	NE	NE	550	2447.5	NE	NE
350	177	NE	NE	NE	NE	600	2670.0	NE	NE
400	203	NE	NE	NE	NE	650	2892.5	NE	NE
500	253	NE	NE	NE	NE	800	3560.0	NE	NE
600	304	NE	NE	NE	NE	900	4005.0	NE	NE
700-2000	355-1016	NE	NE	NE	NE	1000	4450.0	NE	NE

* Valeurs établies selon la spécification UL 486A et uniquement pour les assemblages de Classe 1.

5.2 Requirements according to MIL-DTL-83513G

3.5.18 Crimp tensile strength (type I contacts only). When tested as specified in 4.5.20, the wire shall not break or pull out of the crimp at less than 5 pounds, 10 pounds for wire in accordance with SAE AS22759/33 and DSCC Drawing 04035. Wire breakage other than at the crimp shall not constitute failure.

6 Test Procedure

6.1 Test Procedure according to MIL-DTL-83513G

4.5.20 Crimp tensile strength (type I contacts only). Specimens of contacts crimped to wires shall be placed in a standard tensile-testing machine and an axial load shall be applied. The holding surfaces or clamps of tensile testing machine may be serrated to provide sufficient gripping or holding strength. The rate of travel of the head of the testing machine shall be approximately 1 inch per minute minimum. The crimp tensile shall be as specified in 3.5.18.

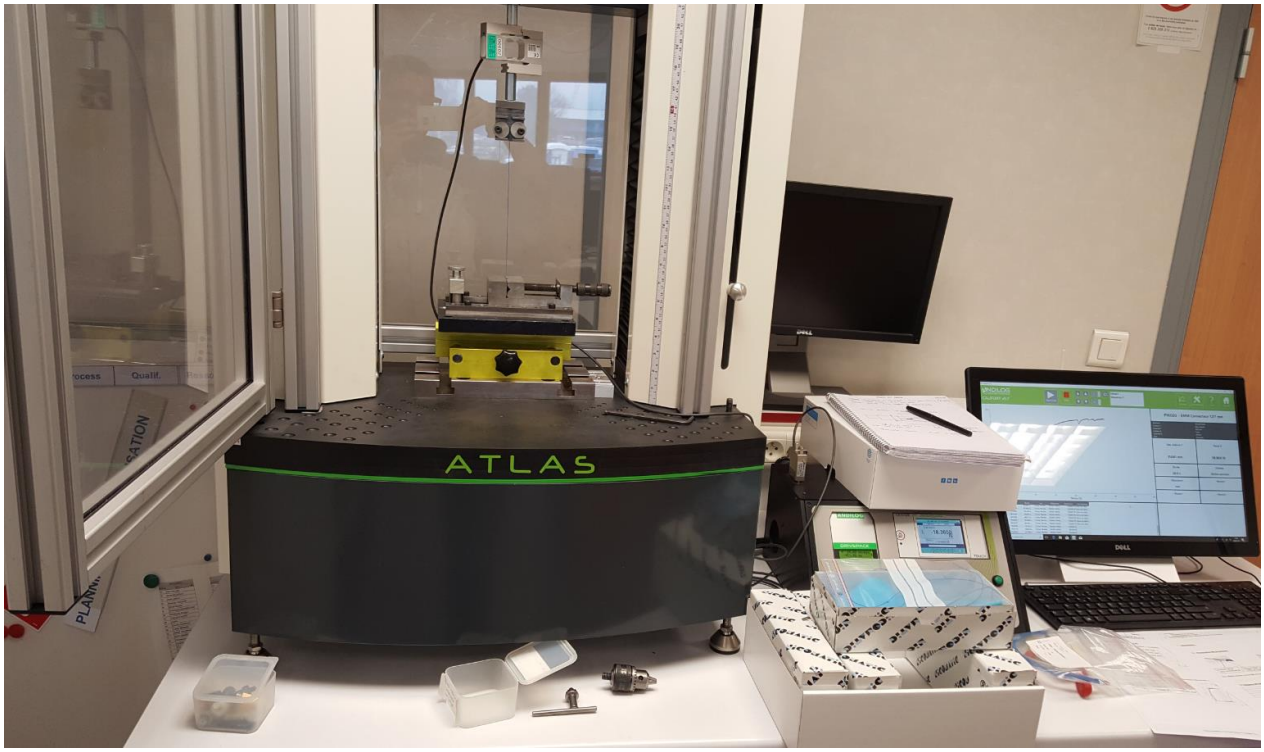
6.2 Test Procedure according to EIA-364-08

- Place crimped sample into test fixture of tensile tester.
- Activate tensile equipment so that an axial force is exerted at a speed of 25 ± 6 millimetres per minute (1 ± ¼ inch per minute) until separation occurs between contact and conductor.
- Record tensile data and examine sample.
- Separation

Types of separation resulting from this test are as follows:

- Slip (pull out).
- Conductor broken in crimp area (some or all).
- Contact broke in crimp area (some or all).
- Conductor broken outside crimp area.
- Contact broken outside crimp area.

7 Test setup



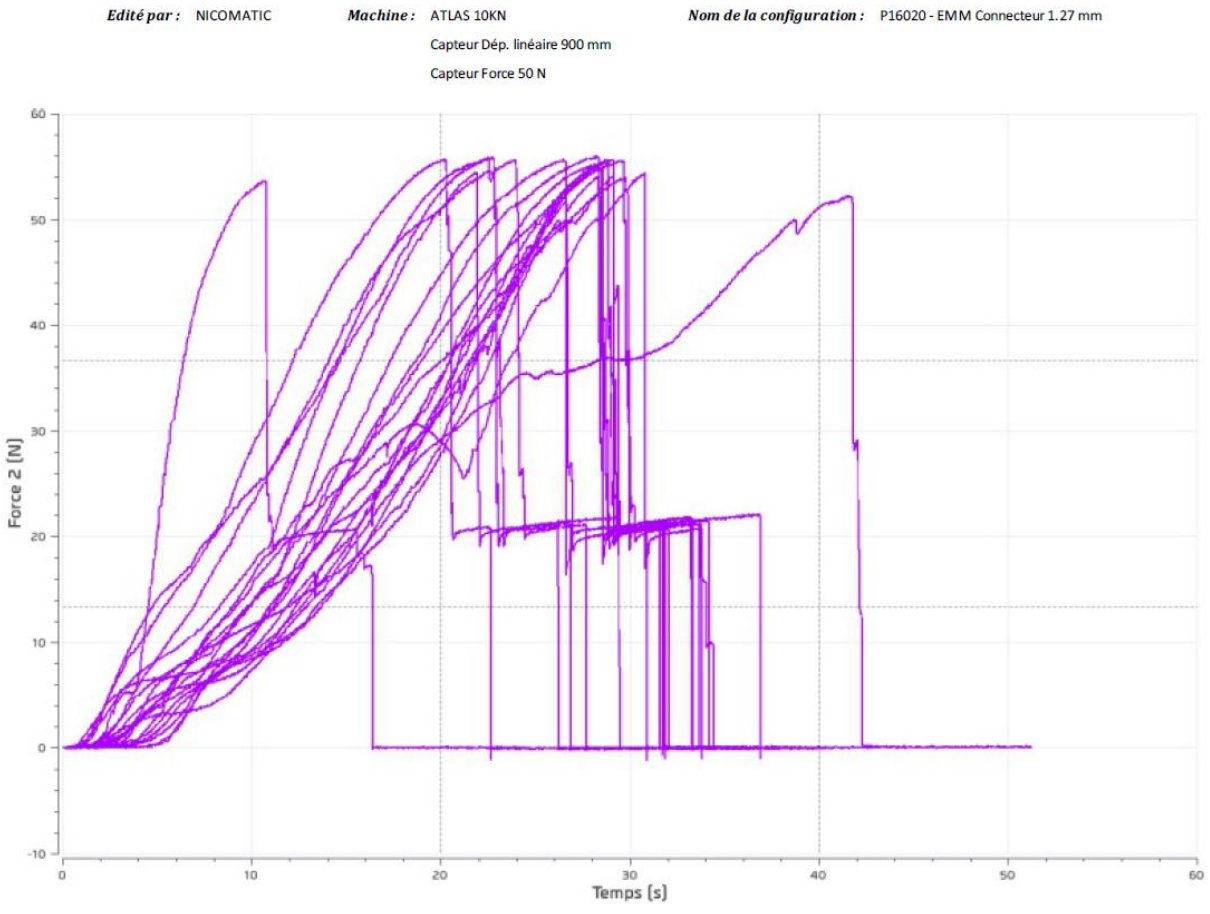
8 Measurements results

8.1 Resume

Crimp Tensile Strength Force (N)				
	AWG Cable			
	24	26	28	30
Min	**49.98**	**36.64**	**16.90**	**13.32**
Max	**56.00**	**37.62**	**19.82**	**14.52**
Average	**54.69**	**37.33**	**18.38**	**13.79**
Requirement	35.6	22.3	13.4	6.7

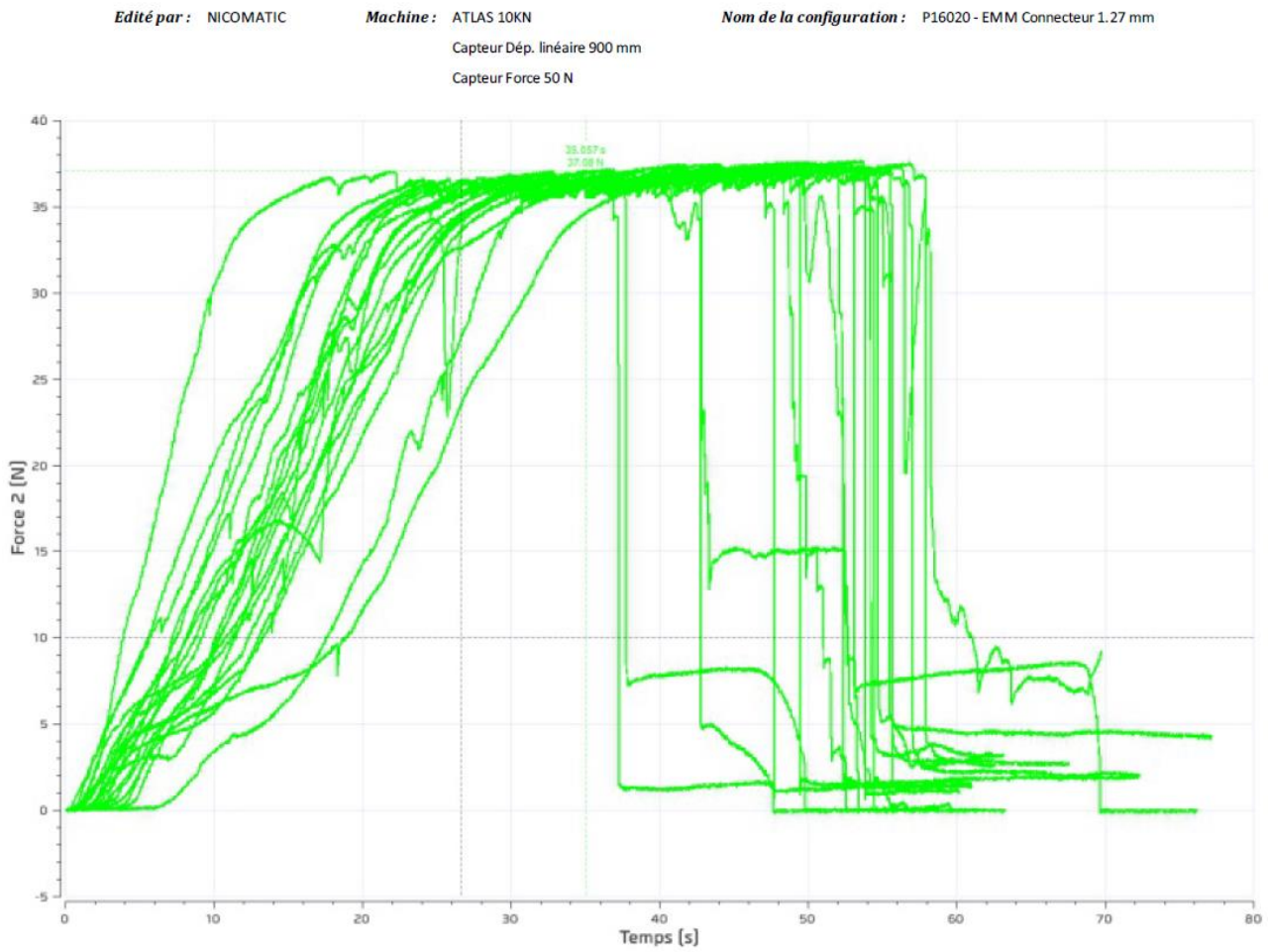
All the cable break at the crimping point

8.2 AWG24 Results



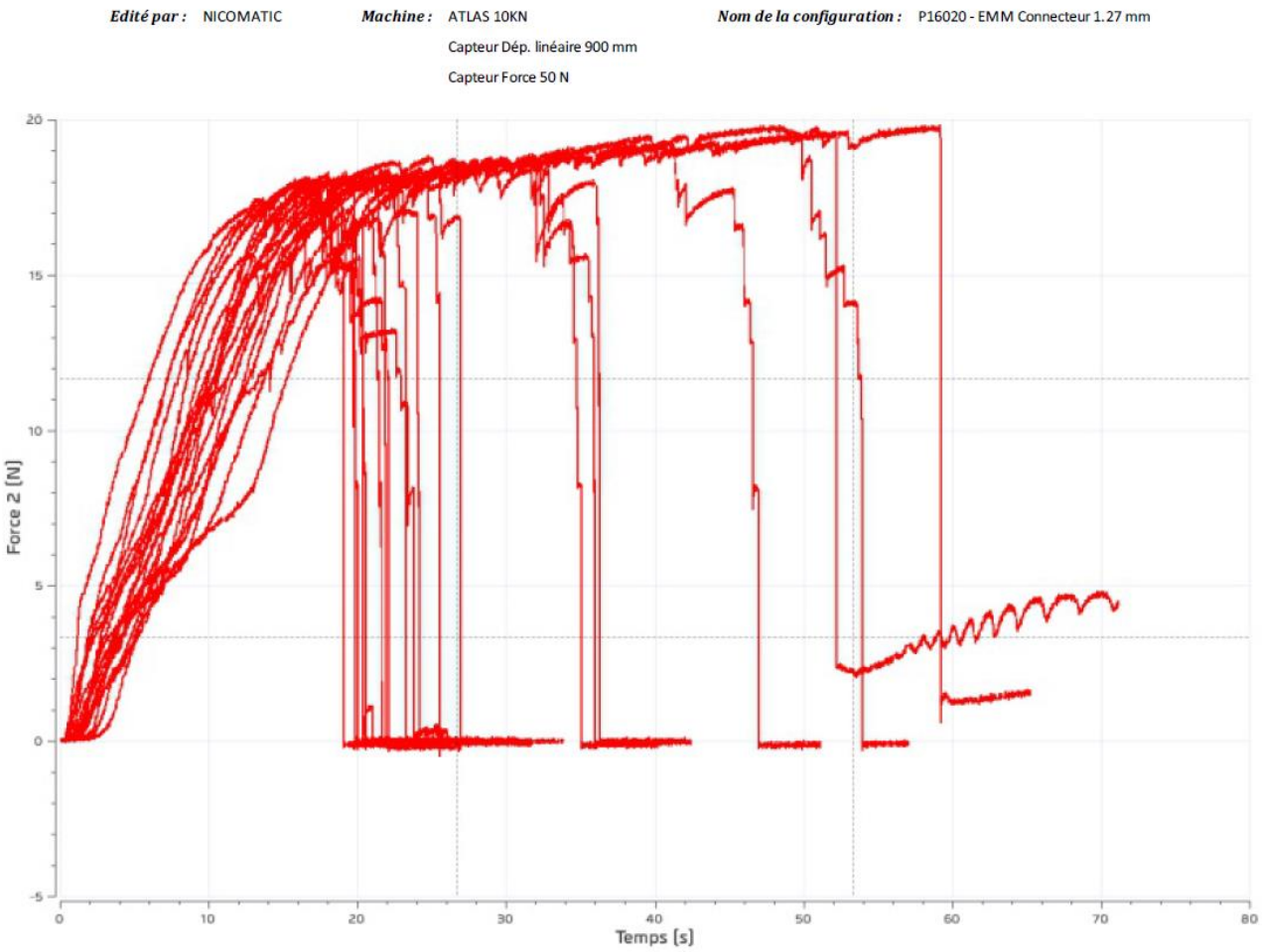
Force 2		*Lot*	*Référence*	*Notes*	*Durée*	*Maximum*
	10.01.18_15:34:30	Crimp Tensile Strength	18224-AWG24_1		24.44 s	53.660 N
	10.01.18_15:38:16	Crimp Tensile Strength	18224-AWG24_2		40.367 s	55.440 N
	10.01.18_15:40:18	Crimp Tensile Strength	18224-AWG24_3		39.395 s	49.980 N
	10.01.18_15:42:21	Crimp Tensile Strength	18224-AWG24_4		36.379 s	54.420 N
	10.01.18_15:43:57	Crimp Tensile Strength	18224-AWG24_5		43.243 s	54.340 N
	10.01.18_15:48:42	Crimp Tensile Strength	18224-AWG24_6		51.225 s	52.260 N
	10.01.18_15:50:52	Crimp Tensile Strength	18224-AWG24_7		37.4 s	55.700 N
	10.01.18_15:52:33	Crimp Tensile Strength	18224-AWG24_8		36.83 s	55.480 N
	10.01.18_15:54:04	Crimp Tensile Strength	18224-AWG24_9		32.12 s	55.840 N
	10.01.18_15:55:41	Crimp Tensile Strength	18224-AWG24_10		36.769 s	54.040 N
	10.01.18_15:57:56	Crimp Tensile Strength	18224-AWG24_11		37 s	54.140 N
	10.01.18_16:00:22	Crimp Tensile Strength	18224-AWG24_12		38.223 s	56.000 N
	10.01.18_16:01:52	Crimp Tensile Strength	18224-AWG24_13		29.882 s	55.720 N
	10.01.18_16:03:43	Crimp Tensile Strength	18224-AWG24_14		39.398 s	54.000 N
	10.01.18_16:05:45	Crimp Tensile Strength	18224-AWG24_15		36.783 s	54.780 N
	10.01.18_16:09:27	Crimp Tensile Strength	18224-AWG24_16		40.761 s	55.580 N
	10.01.18_16:11:11	Crimp Tensile Strength	18224-AWG24_17		33.785 s	55.700 N
	10.01.18_16:14:53	Crimp Tensile Strength	18224-AWG24_18		38.955 s	55.640 N
	10.01.18_16:16:38	Crimp Tensile Strength	18224-AWG24_19		31.079 s	55.860 N
	10.01.18_16:18:26	Crimp Tensile Strength	18224-AWG24_20	Perte de communication	39.549 s	55.260 N
	Moyenne				37.179 s	54.692 N
	Ecart type				5.467 s	1.474 N

8.3 AWG 26 Results



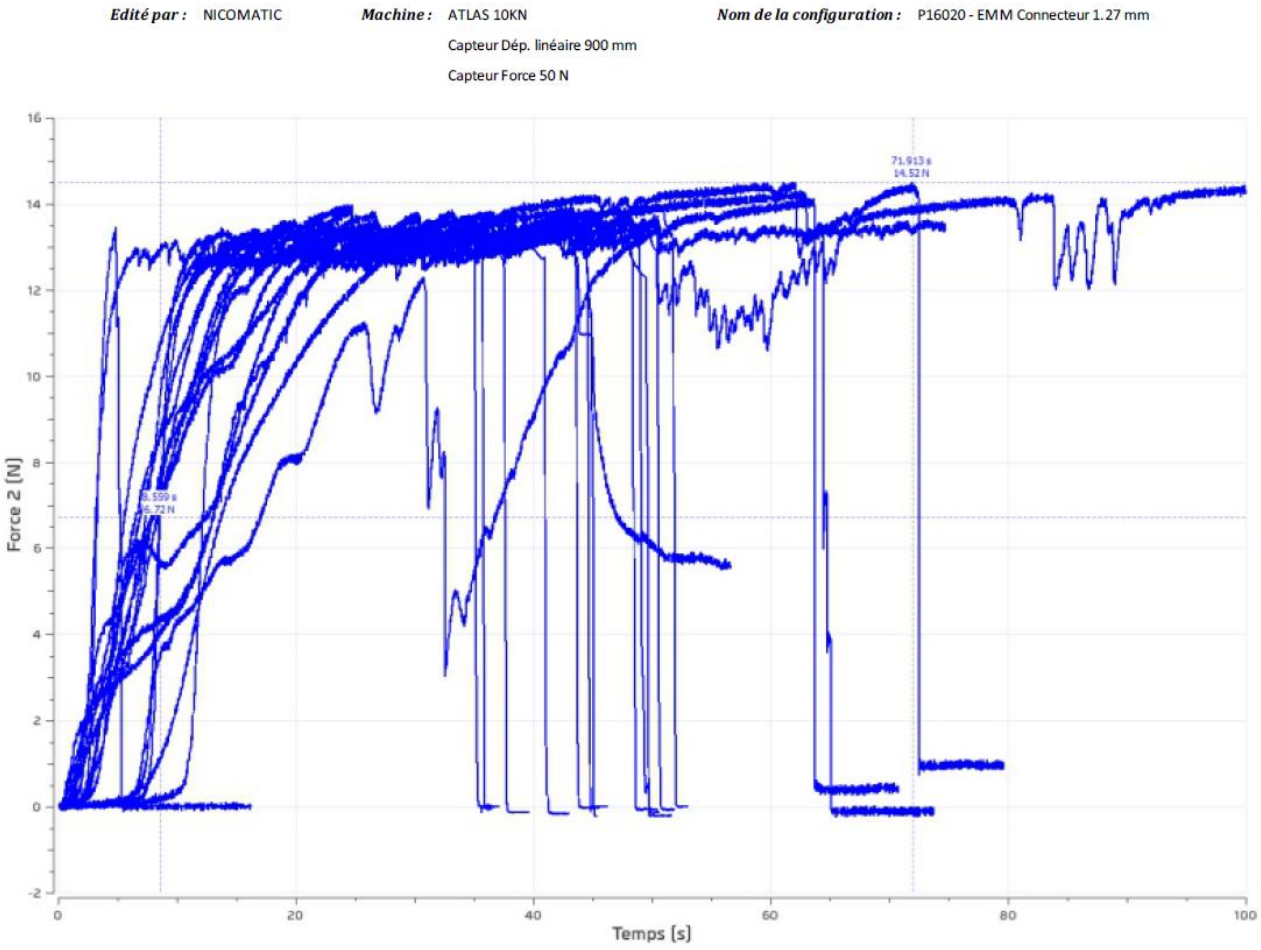
Force 2		Lot	Référence	Notes	Durée	Maximum
	10.01.18_14:37:23	Crimp Tensile Strength	18224-AWG26_1		62.586 s	37.380 N
	10.01.18_14:39:41	Crimp Tensile Strength	18224-AWG26_2		60.001 s	37.280 N
	10.01.18_14:42:02	Crimp Tensile Strength	18224-AWG26_3		72.197 s	37.340 N
	10.01.18_14:44:32	Crimp Tensile Strength	18224-AWG26_4		63.292 s	37.600 N
	10.01.18_14:46:43	Crimp Tensile Strength	18224-AWG26_5		51.654 s	36.640 N
	10.01.18_14:48:35	Crimp Tensile Strength	18224-AWG26_6		72.307 s	37.340 N
	10.01.18_14:50:50	Crimp Tensile Strength	18224-AWG26_7		61.366 s	37.200 N
	10.01.18_14:53:12	Crimp Tensile Strength	18224-AWG26_8		77.179 s	37.600 N
	10.01.18_14:55:23	Crimp Tensile Strength	18224-AWG26_9		67.57 s	37.520 N
	10.01.18_14:57:41	Crimp Tensile Strength	18224-AWG26_10		60.203 s	37.680 N
	10.01.18_15:01:28	Crimp Tensile Strength	18224-AWG26_11		47.643 s	37.060 N
	10.01.18_15:03:27	Crimp Tensile Strength	18224-AWG26_12		63.19 s	37.260 N
	10.01.18_15:08:41	Crimp Tensile Strength	18224-AWG26_13		62.377 s	37.600 N
	10.01.18_15:10:44	Crimp Tensile Strength	18224-AWG26_14		54.786 s	36.980 N
	10.01.18_15:14:09	Crimp Tensile Strength	18224-AWG26_15		76.169 s	37.620 N
	10.01.18_15:16:47	Crimp Tensile Strength	18224-AWG26_16		60.384 s	37.300 N
	10.01.18_15:20:31	Crimp Tensile Strength	18224-AWG26_17		61.024 s	37.320 N
	10.01.18_15:24:57	Crimp Tensile Strength	18224-AWG26_18		58.114 s	36.900 N
	10.01.18_15:27:23	Crimp Tensile Strength	18224-AWG26_19		69.768 s	37.420 N
	10.01.18_15:29:57	Crimp Tensile Strength	18224-AWG26_20		60.969 s	37.460 N
	Moyenne				63.139 s	37.325 N
	Ecart type				7.619 s	0.269 N

8.4 AWG28 Results



Force 2		Lot	Référence	Notes	Durée	Maximum
	09.01.18_14:23:15	Crimp Tensile Strength	18240-AWG28_1		31.75 s	16.900 N
	09.01.18_14:27:14	Crimp Tensile Strength	18240-AWG28_2		33.819 s	18.140 N
	09.01.18_14:29:53	Crimp Tensile Strength	18240-AWG28_3		27.796 s	18.160 N
	09.01.18_14:31:35	Crimp Tensile Strength	18240-AWG28_4		65.262 s	19.820 N
	09.01.18_14:44:33	Crimp Tensile Strength	18240-AWG28_5		30.819 s	17.980 N
	09.01.18_14:46:39	Crimp Tensile Strength	18240-AWG28_6		25.792 s	17.980 N
	09.01.18_14:48:06	Crimp Tensile Strength	18240-AWG28_7		31.114 s	18.160 N
	09.01.18_14:50:17	Crimp Tensile Strength	18240-AWG28_8		42.444 s	18.820 N
	09.01.18_14:52:53	Crimp Tensile Strength	18240-AWG28_9		27.89 s	18.220 N
	09.01.18_14:55:00	Crimp Tensile Strength	18240-AWG28_10		30.79 s	18.440 N
	09.01.18_14:56:43	Crimp Tensile Strength	18240-AWG28_11		57.034 s	19.560 N
	09.01.18_14:59:22	Crimp Tensile Strength	18240-AWG28_12		26.974 s	17.420 N
	09.01.18_15:01:02	Crimp Tensile Strength	18240-AWG28_13		51.133 s	19.340 N
	09.01.18_15:03:02	Crimp Tensile Strength	18240-AWG28_14		25.314 s	17.440 N
	09.01.18_15:04:31	Crimp Tensile Strength	18240-AWG28_15		23.574 s	18.080 N
	09.01.18_15:06:10	Crimp Tensile Strength	18240-AWG28_16		24.604 s	18.100 N
	09.01.18_15:07:36	Crimp Tensile Strength	18240-AWG28_17		31.768 s	17.960 N
	09.01.18_15:09:20	Crimp Tensile Strength	18240-AWG28_18		42.094 s	18.500 N
	09.01.18_15:11:17	Crimp Tensile Strength	18240-AWG28_19		40.175 s	18.800 N
	09.01.18_15:13:12	Crimp Tensile Strength	18240-AWG28_20		71.156 s	19.820 N
	Moyenne				37.065 s	18.382 N
	Ecart type				13.904 s	0.784 N

8.5 AWG30 Results



Force 2		Lot	Référence	Notes	Durée	Maximum
	09.01.18_11:48:58	Crimp Tensile Strength	18240-AWG30_1	Casse du fil au point de maintient. Sertissage OK	37.126 s	13.840 N
	09.01.18_11:51:37	Crimp Tensile Strength	18240-AWG30_2		56.587 s	13.600 N
	09.01.18_11:56:12	Crimp Tensile Strength	18240-AWG30_3		74.699 s	13.640 N
	09.01.18_11:59:12	Crimp Tensile Strength	18240-AWG30_4		79.602 s	14.520 N
	09.01.18_12:02:12	Crimp Tensile Strength	18240-AWG30_5		70.737 s	14.140 N
	09.01.18_12:04:50	Crimp Tensile Strength	18240-AWG30_6	Dépassement du temps maximum d'une séquence	99.988 s	14.420 N
	09.01.18_12:14:30	Crimp Tensile Strength	18240-AWG30.sp_6		16.197 s	13.460 N
	09.01.18_12:22:09	Crimp Tensile Strength	18240-AWG30_7		73.696 s	14.340 N
	09.01.18_13:57:09	Crimp Tensile Strength	18240-AWG30_8	Sens du déplacement erroné	42.969 s	13.820 N
	09.01.18_13:59:30	Crimp Tensile Strength	18240-AWG30_9	Sens du déplacement erroné	45.288 s	13.400 N
	09.01.18_14:01:59	Crimp Tensile Strength	18240-AWG30_10	Sens du déplacement erroné	52.978 s	14.000 N
	09.01.18_14:04:03	Crimp Tensile Strength	18240-AWG30_11	Sens du déplacement erroné	50.535 s	13.920 N
	09.01.18_14:05:51	Crimp Tensile Strength	18240-AWG30_12	Sens du déplacement erroné	51.587 s	13.320 N
	09.01.18_14:08:14	Crimp Tensile Strength	18240-AWG30_13	Sens du déplacement erroné	51.855 s	13.760 N
	09.01.18_14:10:22	Crimp Tensile Strength	18240-AWG30_14	Sens du déplacement erroné	45.415 s	13.620 N
	09.01.18_14:12:45	Crimp Tensile Strength	18240-AWG30_15	Sens du déplacement erroné	39.631 s	13.380 N
	09.01.18_14:15:30	Crimp Tensile Strength	18240-AWG30_16	Sens du déplacement erroné	46.171 s	13.620 N
	09.01.18_14:18:22	Crimp Tensile Strength	18240-AWG30_17	Sens du déplacement erroné	36.389 s	13.620 N
	09.01.18_14:20:07	Crimp Tensile Strength	18240-AWG30_18	Sens du déplacement erroné	50.441 s	13.600 N
	Moyenne				53.784 s	13.791 N
	Ecart type				18.962 s	0.354 N

9 Visual Inspection

Required by the applicable standard ?			
YES		NO	☐

**********END OF REPORT**********

10 APPENDIX

Internal use only ?			
YES	☒	NO	☐

10.1 The Laboratory Advice

10.2 Pictures

**********END OF APPENDIX**********