

From MS/ENB3	Our reference Prijo Ulahannan	Phone +91 80 6783 6100	E-Mail Prijo.ulahannan@in.bosch.com	Date: 18-Aug-2022 Report No.: Ather_05_TR
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Report:	Test report
Title:	Interlock withdrawal force test
Customer:	Ather India

Document approval		
	Name	Signature
Prepared by	Prijo Ulahannan	
Reviewed by	Mahantesh Ramannavar	

1. Issues (situation, motivation and tasks)

The Ather Company has designed and developed a charging connector for electric vehicles, which is patented. Ather has approached Bosch (BGSW) to validate the charging connector between the vehicle and the charging station according to IS 17017 selective tests as prescribed by Ather requirements.

Samples of vehicle connector and vehicle inlet (With mechanical interlock) used for test were used for test. The task was to check the withdrawal force of the interlock with with specified force values. Test and acceptance criteria are as per **IS 17017** chapter no.14.1.5 and 14.1.6 to check the functionality of the samples.

2. Results, short version

	o.k.	not o.k.
2.1 Visual inspection of plastic parts for cracks and breakage (New condition)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.2 Test to check withdrawal force (Only plastic parts with interlock on vehicle inlet)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.3 Withdrawal test with 90-degree rotation (Vehicle connector and inlet assembly)	<input checked="" type="checkbox"/>	<input type="checkbox"/>

The overall result of the examined samples is:

- ☒ **Positive**
☐ **Negative: No further analysis required**

Recommendation for further work: NA

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3. Conclusions and consequences

All connector samples have passed the test. All the test parameters are within the specified limit of assessment criteria.

4. Results, long version

- Plastic parts and terminals inspected before test for abnormalities like cracks, burrs, rust and breakage. All the samples subjected to test were in good/acceptable condition → **OK**

4.1 Test to check withdrawal force (Only plastic parts with mechanical interlock on vehicle inlet) - OK

(See chapter 5.4 for criteria)

Sample - 1	OK
Sample - 2	OK
Sample - 3	OK

4.2 Withdrawal test with 90-degree rotation (Vehicle connector and inlet assembly) – OK

(See chapter 5.4 for criteria)

Sample - 1	OK
Sample - 2	OK
Sample - 3	OK

5. Details

5.1 Part details:

Sl. No.	Description	Part number	Manufacture date / Received date	Remarks
1	Vehicle Inlet (With locking)	340A0013634	July-2022	-
2	Vehicle connector	340A0021042	July-2022	-
3	Vehicle connector (Only plastic)	340A0003338	July-2022	-

5.2 Equipment details:

Sl. No.	Test equipment	Equipment no.	Remarks
1	UTM	ENB/CL/002-1027832	Location: BGSW

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5.3 Sample preparation, test setup and test details:

5.3.1 Test to check withdrawal force (Only plastic parts with mechanical interlock on vehicle inlet)

1. Visual inspection of plastic parts conducted on all the samples before test.
2. 3 samples of vehicle inlets and vehicle connectors are used for test.
3. The connector is inserted into and withdrawn ten times.
4. The connector with interlock is fixed to the support of an apparatus so that the axis of separation is vertical and the movement is downwards (See chapter 6 for pictures)
5. A force equal to one-tenth of the withdrawal force as per table 9 (See chapter 5.4) is applied and maintained for 60s.
6. Same procedure was followed for the all the other samples.

5.3.2 Withdrawal test with 90-degree rotation (Vehicle connector and inlet assembly)

1. Visual inspection of plastic parts conducted on all the samples before test.
2. 3 samples of vehicle inlets and vehicle connectors are used for test.
3. The connector is inserted into and withdrawn ten times.
4. Connector with interlock is fixed to the support so that the axis of separation is horizontal.
5. A force equal to one-tenth of the withdrawal force as per table 9 (See chapter 5.4) is applied and maintained for 60s.
6. Continuity check is performed during test
7. The test is repeated three times, by rotating 90° on the vertical plane each time as shown in Fig. 9B (See chapter 5.4)
5. Same procedure was followed for the all the other samples

5.4 Test conditions and assessment criteria:

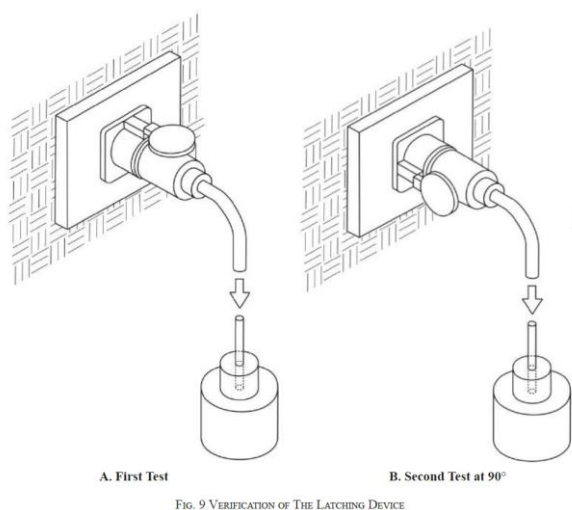


Table 9 Withdrawal Force with Respect to Ratings
(Clauses 14.1.5 and 14.1.6)

a.c. Rated Current	Withdrawal Force
A	N
From 6 up to and including 40	165
From 41 up to and including 80	300
From 81 up to and including 150	440
From 151 up to and including 250	660
d.c. Rated Current	750

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Asessemnt Criteria:

During the tests plug shall not come out of the socket-outlet or vehicle connector and the latching devices holding the plug in the socket-outlet or vehicle connector shall remain in locked position.

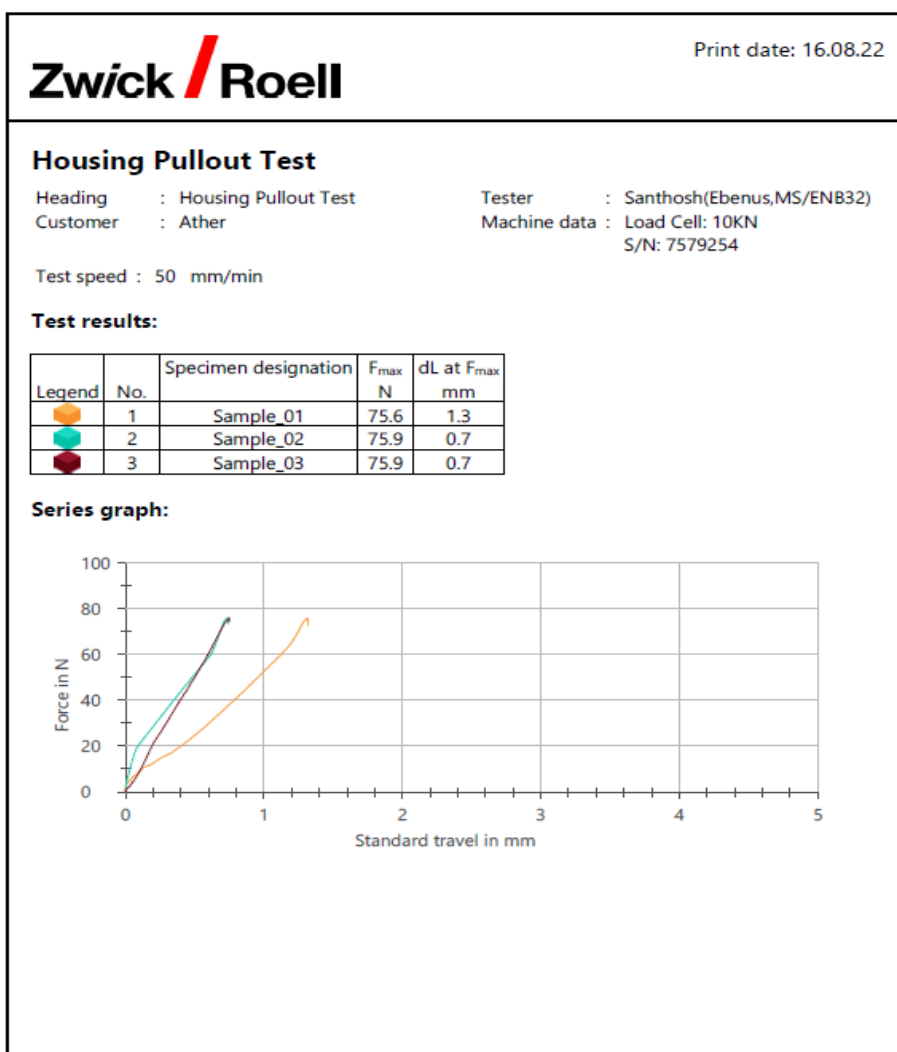
During the test the electrical continuity shall be maintained.

After the test, the switched socket-outlet or vehicle connector with interlock shall show no damage or deformation which may impair the function of the product.

6. Enclosure

6.1 Characteristic curves for withdrawal force test

Test to check withdrawal force (75N force is applied)



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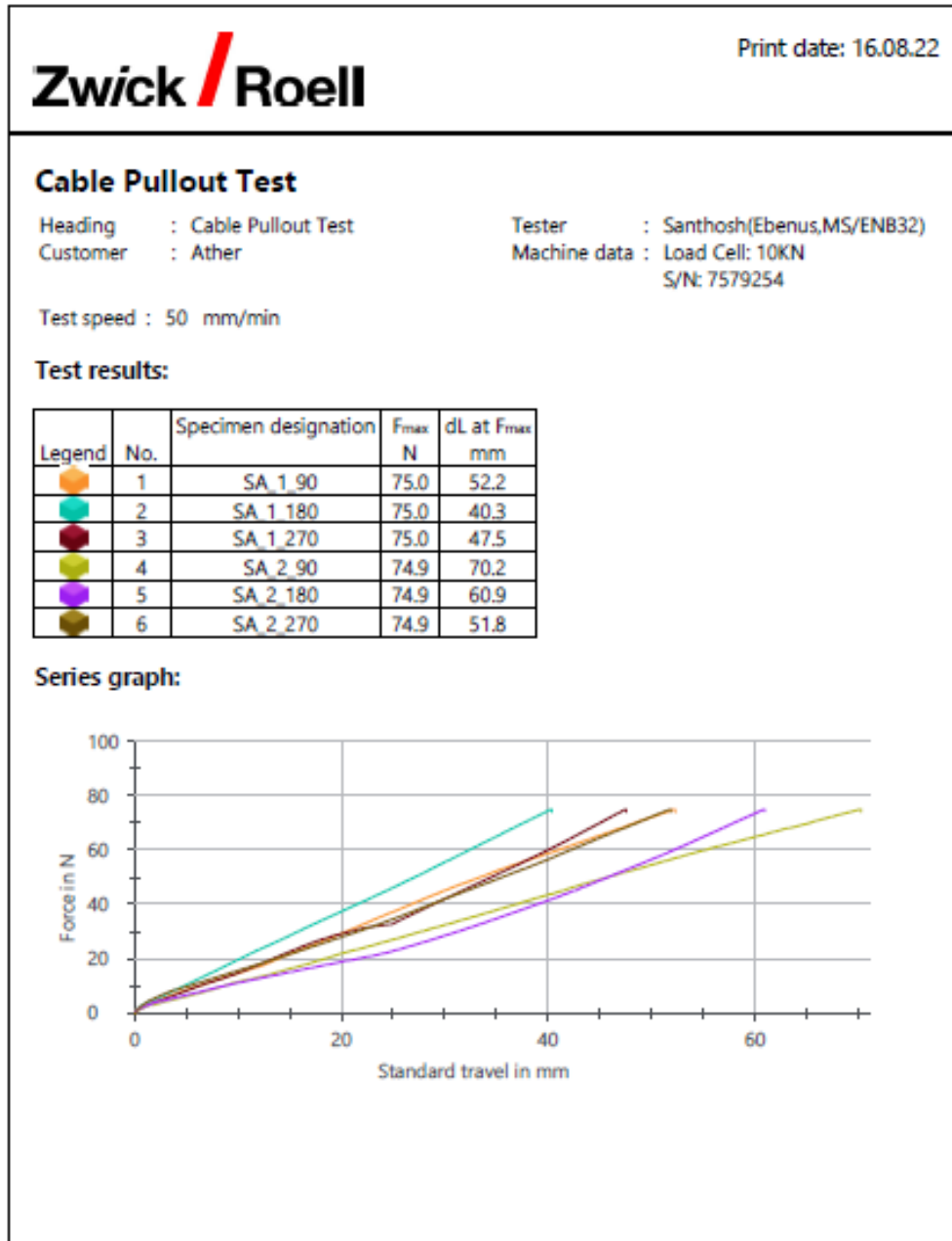
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Withdrawal test with 90-degree rotation (Vehicle connector and inlet assembly) -75 N applied



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6.2 Pictures

Pic 1: Test set up with withdrawal force test



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Pic 1: Test set up Withdrawal test with 90-degree rotation (Vehicle connector and inlet assembly)

