

Documents regarding Approval of

CNG Receptacle of class 0
Of BMT Co. Ltd. Make

Approval number: **E4-110R-000310-00**

Report No: **IN110-A0-120037** Dated **16-July-2012**

Name of technical service

TÜV NORD Mobilität GmbH & Co. KG
Institut für Fahrzeugtechnik und
Mobilität
Adlerstr. 7
D-45307 Essen

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RDW

Vehicle Technology Division

THE NETHERLANDS
(N E D E R L A N D)



COMMUNICATION

Concerning ⁽¹⁾:

- approval granted
- ~~- approval extended~~
- ~~- approval refused~~
- ~~- approval withdrawn~~
- ~~- production definitely discontinued~~

of a type of CNG component pursuant to Regulation number 110.

Approval number: E4-110R-000310

Extension number: 00

1. CNG component considered:

- ~~Container(s) or cylinder(s)~~⁽¹⁾
- ~~Pressure indicator~~
- ~~Pressure relief valve~~
- ~~Automatic valve(s)~~
- ~~Excess flow valve~~
- ~~Gas tight housing~~
- ~~Pressure regulator(s)~~
- ~~Non return valve(s)~~
- ~~Pressure relief device~~
- ~~Manual valve~~
- ~~Flexible fuel lines~~
- Filling unit or receptacle
- ~~Gas injector(s)~~
- ~~Gas flow adjuster~~
- ~~Gas/air mixer~~
- ~~Electronic control unit~~
- ~~Pressure and temperature sensor(s)~~
- ~~CNG filter(s)~~

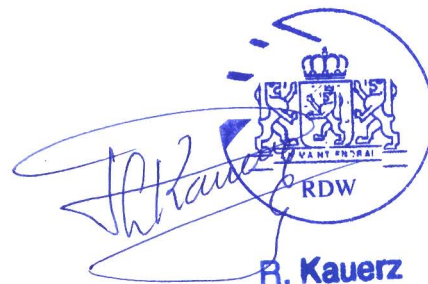
2. Trade name or mark

:  **SUPERLOK T&S VALVES**
Receptacle
SRCT Series



Approval number: E4-110R-000310

Extension number: 00

- Manufacturer's name and address : BMT CO., LTD
21-1, Bukjeong-dong, Yangsan-si,
Gyeongsangnam-do,
626-110 S.Korea
4. If applicable, name and address of manufacturer's representative : NA
5. Submitted for approval on : December'2011
6. Technical service responsible for conducting approval tests : TÜV NORD Mobilität GmbH & Co. KG
Institut für Fahrzeugtechnik und Mobilität
Adlerstr. 7
D-45307 Essen
7. Date of report issued by that service : 16-July-2012
8. Number of report issued by that service : IN110-A0-120037
9. Approval : granted/~~refused/extended/withdrawn~~⁽¹⁾
10. Reason(s) of extension (if applicable) : NA
11. Place : ZOETERMEER
12. Date : 06-NOV-2012
13. Signature : 
14. The documents filed with the application or extension of approval can be obtained upon request.

⁽¹⁾ Strike out what does not apply.

ADDENDUM

1. Additional information concerning the type-approval of a type of CNG components pursuant to Regulation number 110.

- | | | |
|---------|--|-----------------------|
| 1.1. | Container(s) or cylinder(s) | |
| 1.1.1. | Dimensions | : Not Applicable |
| 1.1.2. | Material | : Not Applicable |
| 1.2. | Pressure indicator | |
| 1.2.1. | Working pressure(s) ⁽²⁾ | : Not Applicable |
| 1.2.2. | Material | : Not Applicable |
| 1.3. | Pressure relief valve (discharge valve) | |
| 1.3.1. | Working pressure(s) ⁽²⁾ | : Not Applicable |
| 1.3.2. | Material | : Not Applicable |
| 1.4. | Automatic valve(s) | |
| 1.4.1. | Working pressure(s) ⁽²⁾ | : Not Applicable |
| 1.4.2. | Material | : Not Applicable |
| 1.5. | Excess flow valve | |
| 1.5.1. | Working pressure(s) ⁽²⁾ | : Not Applicable |
| 1.5.2. | Material | : Not Applicable |
| 1.6. | Gas-tight housing | |
| 1.6.1. | Working pressure(s) ⁽²⁾ | : Not Applicable |
| 1.6.2. | Material | : Not Applicable |
| 1.7. | Pressure regulator(s) | |
| 1.7.1. | Working pressure(s) ⁽²⁾ | : Not Applicable |
| 1.7.2. | Material | : Not Applicable |
| 1.8. | Check valve(s) or non-return valve(s) | |
| 1.8.1. | Working pressure(s) ⁽²⁾ | : Not Applicable |
| 1.8.2. | Material | : Not Applicable |
| 1.9. | Pressure relief device (temperature triggered) | |
| 1.9.1. | Working pressure(s) ⁽²⁾ | : Not Applicable |
| 1.9.2. | Material | : Not Applicable |
| 1.10. | Manual valve | |
| 1.10.1. | Working pressure(s) ⁽²⁾ | : Not Applicable |
| 1.10.2. | Material | : Not Applicable |
| 1.11. | Flexible fuel lines | |
| 1.11.1. | Working pressure(s) ⁽²⁾ | : Not Applicable |
| 1.11.2. | Material | : Not Applicable |
| 1.12. | Filling unit or receptacle | |
| 1.12.1. | Working pressure(s) ⁽²⁾ | : 250 bar |
| 1.12.2. | Material | : 316 Stainless steel |



1.13.	Gas injector(s)	
1.13.1.	Working pressure(s) ⁽²⁾	: Not Applicable
1.13.2.	Material	: Not Applicable
1.14.	Gas flow adjuster	
1.14.1.	Working pressure(s) ⁽²⁾	: Not Applicable
1.14.2.	Material	: Not Applicable
1.15.	Gas/air mixer	
1.15.1.	Working pressure(s) ⁽²⁾	: Not Applicable
1.15.2.	Material	: Not Applicable
1.16.	Electronic control unit (CNG-fuelling)	
1.16.1.	Basic software principles	: Not Applicable
1.17.	Pressure and temperature sensor(s)	
1.17.1.	Working pressure(s) ⁽²⁾	: Not Applicable
1.17.2.	Material	: Not Applicable
1.18.	CNG filter(s)	
1.18.1.	Working pressure(s) ⁽²⁾	: Not Applicable
1.18.2.	Material	: Not Applicable

⁽²⁾ Specify the tolerance





21-1, Bukjeong-dong, Yangsan-si, Gyeongsangnam-do, 626-110 S.Korea

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PAGE 1 OF 6

This is for Type Approval of ECE Regulation 110 (CNG) for Specific Components of Vehicles

INFORMATION DOCUMENT No : BMT-CNG-120717-04

Essential Characteristics of the CNG Component

- 1.1 Trade Name or Mark :  SUPERLOK T&S VALVES
- 1.2 Maker name and Address: BMT CO., LTD
21-1, Bukjeong-dong, Yangsan-si, Gyeongsangnam-do, 626-110 South Korea
- 1.3 Type/General commercial description:
SRCT SERIESE / RECEPTACLE
- 1.4 Working Pressure(s) :

Valve Name	Working Pressure for ECE R110 TYPE
Receptacle	250 bar

- 1.5 Description and Drawings: See attached document
- 1.6 Material: 316 Stainless steel
- 1.7 Operating temperatures: -40°C to 120°C

Valve Name	Temperature rating
Receptacle	-40°C to 120°C

- 1.8 Remarks: Filling Unit or Receptacle



Vehicle / Component Model	: RECEPTACLE (SRCT Series)
Information Document No.	: BMT-CNG-120717-04
Date	: 01-12-2011
Description	: CNG Component approval as per ECE R110
Attachment 01 to Approval No.	: E4-110R-000310



21-1, Bukjeong-dong, Yangsan-si, Gyeongsangnam-do, 626-110 S.Korea
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PAGE 2 OF 6

3. Features of Receptacles

Receptacle

- Receptacle designs to meet the NGV1 profiles and delivered with integrated non-contact check valve
- Receptacle complies with NGV1 in dimension and performance

4. Description

Receptacle

	SRCT SERIES
Working Pressure for ECE R110 TYPE	250bar
Temperature rating	-40℃ to 120℃
Body material	316 Stainless Steel
Port Connection	1/4" to 1/2" and 6mm to 12mm
Rate Flow	1500 scfm
Internal Orifice Area	0.48cm ²

5. Working Pressure and MAWP

Valve Name	Working Pressure for ECE R110 TYPE
Receptacle	250 bar

6. Material Standard

Material Grade	Bar Stock	Forgings
316 Stainless Steel	ASTM A276, A479 ASME SA479	ASTM A182 ASME SA182



Vehicle / Component Model : RECEPTACLE (SRCT Series)
 Information Document No. : BMT-CNG-120717-04
 Date : 01-12-2011
 Description : CNG Component approval as per ECE R110
 Attachment 01 to Approval No. : E4-110R-000310



21-1, Bukjeong-dong, Yangsan-si, Gyeongsangnam-do, 626-110 S.Korea

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PAGE 3 OF 6

8. Non-Metallic Materials

8.1 O-ring

Elastomer base	EPDM
Hardness Shore A Durometer	70 +/-5
Tensile Strength	7.5 MPa

8.2 Seat & Packing

Chemical Designation	Tensile Strength
Polyterafluoroethylene (PTFE)	20MPa
Poly ether ether ketone (PEEK)	80MPa

Vehicle / Component Model	: RECEPTACLE (SRCT Series)
Information Document No.	: BMT-CNG-120717-04
Date	: 01-12-2011
Description	: CNG Component approval as per ECE R110
Attachment 01 to Approval No.	: E4-110R-000310



BMT CO., LTD

21-1, Bukjeong-dong, Yangsan-si, Gyeongsangnam-do, 626-110 S.Korea

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PAGE 4 OF 6

9. Manufacturer's Statement

The samples, which have been presented for evaluation, are made during mass production according to the presented documents.

We, as the producer of SUPERLOK T&S VALVE, carry on our own responsibility - the production process guarantees the parameter stability & unchanging and outlet inspection guarantee. SUPERLOK T&S VALVE will accomplish permanently the requirements which are specified by our instruction.

10. Pictures of Receptacles



Picture 1. Receptacle

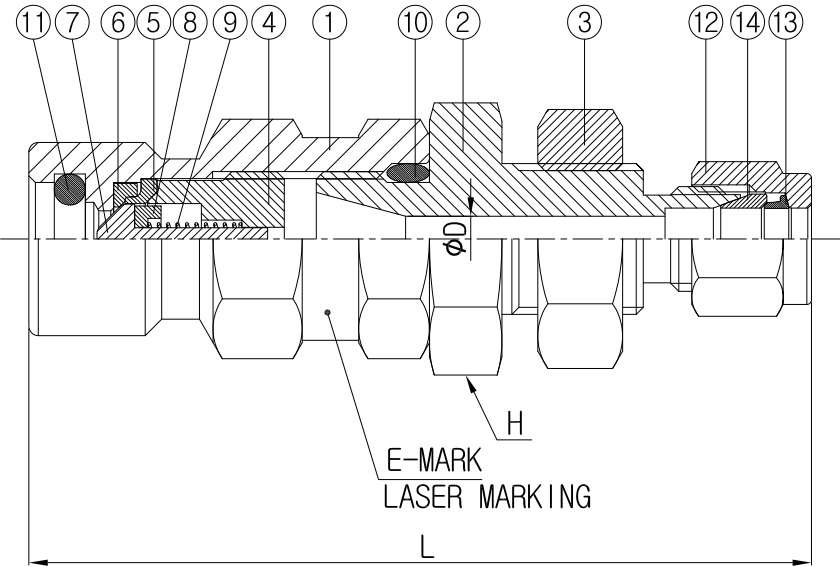
11. Drawings

NO	TITLE	DWG No.
1	Receptacle	111124-01-114-05 (Rev.A)
2	Type Approval Mark	111124-01-114-07 (Rev.A)

Vehicle / Component Model
Information Document No.
Date
Description
Attachment 01 to Approval No.

: RECEPTACLE (SRCT Series)
: BMT-CNG-120717-04
: 01-12-2011
: CNG Component approval as per ECE R110
: E4-110R-000310






Unit : mm							
PART NO.	END CONNECTION	L	H (HEX)	D	Q'TY	WORKING PRESSURE for ECE R110 TYPE	MAX WORKING PRESSURE
SRCT-S4	1/4" SUPERLOK	83.0	25.0	4.8	6 EA	250 bar	250 bar
SRCT-S8	1/2" SUPERLOK	87.3	25.0	7.5	6 EA	250 bar	250 bar

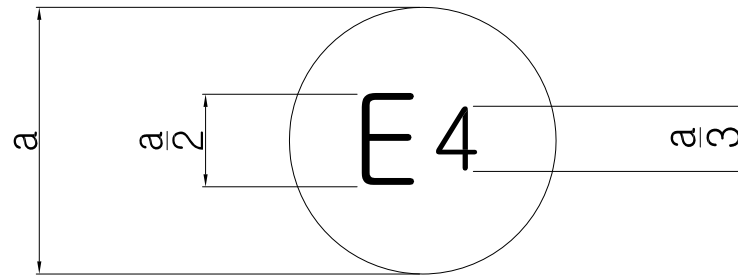
NO	DESCRIPTION	MATERIAL	Q'TY	REMARK
1	BODY	SS 316	1	
2	EMD CONNECTOR	SS 316	1	
3	LCOK NUT	SS 316	1	
4	INSERT	BRASS	1	
5	GALND	BRASS	1	
6	SEAT	EPDM	1	
7	POPPET	SS 316	1	
8	POPPET STOPPER	SS 316	1	
9	SPRING	SS 304	1	
10	O-RING	EPDM	1	
11	O-RING	EPDM	1	
12	NUT	SS 316	1	
13	FRONT FERRULE	SS 316	1	
14	BACK FERRULE	SS 316	1	

SPECIFICATIONS

1. SRCT series Receptacle complies with NGV1 in dimension and performance.
2. Maximum pressure rating : 3600 psig (250 bar)
3. Temperature rating : -40 to 250° F (-40 to 121° C)

A	24.NOV.11	Issued for Approval	C.S.RA	S.M.LEE	J.H.LIM
Rev.	Issue Data	Description	Originator	Checked	Approved
PURCHASER					
CLIENT					
PROJECT NAME		-			
PROJECT NO.		-			
PO. NO.		-			
MFR. MODEL/TYPE VALVE NAME		SRCT SERIES RECEPTACLE			
TAG NO.		-			
DRAWING NO.		111124-01-114-05			
GENERAL ARRANGEMENT DRAWING for RECEPTACLE			 BMT Co., Ltd.		

NO.	DESCRIPTION	MATERIAL	Q'TY	REMARK



Approval mark Drawing

110 R-XXXXXX

$a \geq 8\text{mm}$



A	24.NOV.11	Issued for Approval	C.S.RA	S.M.LEE	J.H.LIM
Rev.	Issue Data	Description	Originator	Checked	Approved
PURCHASER					
CLIENT					
PROJECT NAME		-			
PROJECT NO.		-			
PO. NO.		-			
MFR. MODEL/TYPE		-			
VALVE NAME		-			
TAG NO.		-			
DRAWING NO.		111124-01-114-07			
GENERAL ARRANGEMENT DRAWING for VALVE			BMT Co., Ltd.		

Test Report
No.: IN110-A0-120037

Dated: 16/07/2012
 ECE Regulation No.110



Type : Receptacle-SRCT Series
 Manufacturer : BMT CO., LTD

Test Report

AGREEMENT CONCERNING THE ADOPTION OF UNIFORM TECHNICAL PRESCRIPTIONS FOR WHEELED VEHICLES, EQUIPMENT AND PARTS WHICH CAN BE FITTED AND/OR BE USED ON WHEELED VEHICLES AND THE CONDITIONS FOR RECIPROCAL RECOGNITION OF APPROVALS GRANTED ON THE BASIS OF THESE PRESCRIPTIONS

**UNIFORM PROVISIONS CONCERNING THE APPROVAL OF:
 SPECIFIC COMPONENTS OF MOTOR VEHICLES USING COMPRESSED NATURAL
 GAS (CNG) IN THEIR PROPULSION SYSTEM**

ECE-R 110

as last amended

Revision 1 – Amendment 1 - Amendment 2
 Including Supplement 9 to Regulation No.
 110 – Date of entry into force: 19 August
 2010

Approval status	
	Number of approval
ECE	Previous Approval: Nil
	Current Approval No. E4-110R-000310

Test Report

No.: IN110-A0-120037

Dated: 16/07/2012
ECE Regulation No.110



Type : Receptacle-SRCT Series
Manufacturer : BMT CO., LTD

- 0.0 General
- 0.1 Make :  SUPERLOK T&S VALVES
- 0.2 Manufacturer's name and address : BMT CO., LTD
21-1, Bukjeong-dong, Yangsan-si,
Gyeongsangnam-do,
626-110 S.Korea
- 0.3 Type and commercial Description : Receptacle
SRCT Series
- 0.4 Working Pressure : 250 bar
Class 0
- 1.0 Test information
- 1.1 Test Objects : Receptacle
- 1.2 Test dates : May'2012-June'2012
- 1.3 Equipment /facilities used : The test equipment and facilities used were in compliance with the requirements of the Standards

2.0 Equipment used

	Equipment	Make/Model	Calibration Validity
2.1	Salt Chamber	CM Enviro	Jan'13
2.2	Over Pressure Test	Praj	Dec'12
2.3	Hot Chamber	S A Electrical	Feb'13
2.4	Cold Chamber	Praj	Dec'12
2.5	Ammonia Chamber	Praj	Dec'12
2.6	Temperature cyclic test setup	ARAI	Dec'12

Test Report

No.: IN110-A0-120037

Dated: 16/07/2012

ECE Regulation No.110



Type : Receptacle-SRCT Series
 Manufacturer : BMT CO., LTD

Receptacle:

PART NO.	END CONNECTION	L	H (HEX)	D	Q'TY	WORKING PRESSURE for ECE R110 TYPE	MAX WORKING PRESSURE
SRCT-S4	1/4" SUPERLOK	83.0	25.0	4.8	6 EA	250 bar	250 bar
SRCT-S8	1/2" SUPERLOK	87.3	25.0	7.5	6 EA	250 bar	250 bar

Conclusion of matrix:

BMT produces Receptacles as provided in the matrix. Based on the above information and analyzing, both SRCT-S8 and SRCT-S4 are taken for testing.

List of enclosures:

Enclosure 1: Information document and drawing.
 Enclosure 2: Results of Test.

Test Report
No.: IN110-A0-120037

Dated: 16/07/2012
 ECE Regulation No.110



Type : Receptacle-SRCT Series
 Manufacturer : BMT CO., LTD

3.0 Statement of conformity:

The type described in this test report and the appendices attached are in compliance with the Test Specification mentioned above.

The Test Report comprises pages 1 to 7.

The Test Report shall be reproduced and published in full only and by the client only. It shall be reproduced partially with the written permission of the Test Laboratory only.

TEST LABORATORY

TÜV NORD Mobilität GmbH & Co. KG
 IFM - Institut für Fahrzeugtechnik und Mobilität,
 Adlerstr. 7, 45307 Essen

Designated Technical Service
 RDW No. 99050016

Pune, India. 16.07.2012

A handwritten signature in blue ink, appearing to read "Yeshwant".

Yeshwant Ambure
 Project Leader

A handwritten signature in blue ink, appearing to read "Msogale".

M. S. Ogale
 Head Homologation



Test Report
No.: IN110-A0-120037

Dated: 16/07/2012
 ECE Regulation No.110



Type : Receptacle-SRCT Series
 Manufacturer : BMT CO., LTD

List of modifications

Appendix 1

More details for application of : **Date** :

Correction of : -

Modification of : -

Addition of : -

Deletion of : -



21-1, Bukjeong-dong, Yangsan-si, Gyeongsangnam-do, 626-110 S.Korea

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PAGE 1 OF 6

This is for Type Approval of ECE Regulation 110 (CNG) for Specific Components of Vehicles

INFORMATION DOCUMENT No : BMT-CNG-120717-04

Essential Characteristics of the CNG Component

- 1.1 Trade Name or Mark :  SUPERLOK T&S VALVES
- 1.2 Maker name and Address: BMT CO., LTD
21-1, Bukjeong-dong, Yangsan-si, Gyeongsangnam-do, 626-110 South Korea
- 1.3 Type/General commercial description:
SRCT SERIESE / RECEPTACLE
- 1.4 Working Pressure(s) :

Valve Name	Working Pressure for ECE R110 TYPE
Receptacle	250 bar

- 1.5 Description and Drawings: See attached document
- 1.6 Material: 316 Stainless steel
- 1.7 Operating temperatures: -40℃ to 120℃

Valve Name	Temperature rating
Receptacle	-40℃ to 120℃

- 1.8 Remarks: Filling Unit or Receptacle

Vehicle / Component Model	: RECEPTACLE (SRCT Series)
Information Document No.	: BMT-CNG-120717-04
Date	: 01-12-2011
Description	: CNG Component approval as per ECE R110
Enclosure 01 to Report No.	: IN110-A0-120037



21-1, Bukjeong-dong, Yangsan-si, Gyeongsangnam-do, 626-110 S.Korea
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3. Features of Receptacles

Receptacle

- Receptacle designs to meet the NGV1 profiles and delivered with integrated non-contact check valve
- Receptacle complies with NGV1 in dimension and performance

4. Description

Receptacle

	SRCT SERIES
Working Pressure for ECE R110 TYPE	250bar
Temperature rating	-40℃ to 120℃
Body material	316 Stainless Steel
Port Connection	1/4" to 1/2" and 6mm to 12mm
Rate Flow	1500 scfm
Internal Orifice Area	0.48cm ²

5. Working Pressure and MAWP

Valve Name	Working Pressure for ECE R110 TYPE
Receptacle	250 bar

6. Material Standard

Material Grade	Bar Stock	Forgings
316 Stainless Steel	ASTM A276, A479 ASME SA479	ASTM A182 ASME SA182

Vehicle / Component Model	: RECEPTACLE (SRCT Series)
Information Document No.	: BMT-CNG-120717-04
Date	: 01-12-2011
Description	: CNG Component approval as per ECE R110
Enclosure 01 to Report No.	: IN110-A0-120037



21-1, Bukjeong-dong, Yangsan-si, Gyeongsangnam-do, 626-110 S.Korea

Tel: 82-55-783-1000 Fax: 82-55-783-1110

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8. Non-Metallic Materials

8.1 O-ring

Elastomer base	EPDM
Hardness Shore A Durometer	70 +/-5
Tensile Strength	7.5 MPa

8.2 Seat & Packing

Chemical Designation	Tensile Strength
Polyterafluoroethylene (PTFE)	20MPa
Poly ether ether ketone (PEEK)	80MPa

Vehicle / Component Model	: RECEPTACLE (SRCT Series)
Information Document No.	: BMT-CNG-120717-04
Date	: 01-12-2011
Description	: CNG Component approval as per ECE R110
Enclosure 01 to Report No.	: IN110-A0-120037

BMT CO., LTD

21-1, Bukjeong-dong, Yangsan-si, Gyeongsangnam-do, 626-110 S.Korea

Tel: 82-55-783-1000 Fax: 82-55-783-1110

<http://www.superlok.com>

PAGE 4 OF 6

9. Manufacturer's Statement

The samples, which have been presented for evaluation, are made during mass production according to the presented documents.

We, as the producer of SUPERLOK T&S VALVE, carry on our own responsibility - the production process guarantees the parameter stability & unchanging and outlet inspection guarantee. SUPERLOK T&S VALVE will accomplish permanently the requirements which are specified by our instruction.

10. Pictures of Receptacles



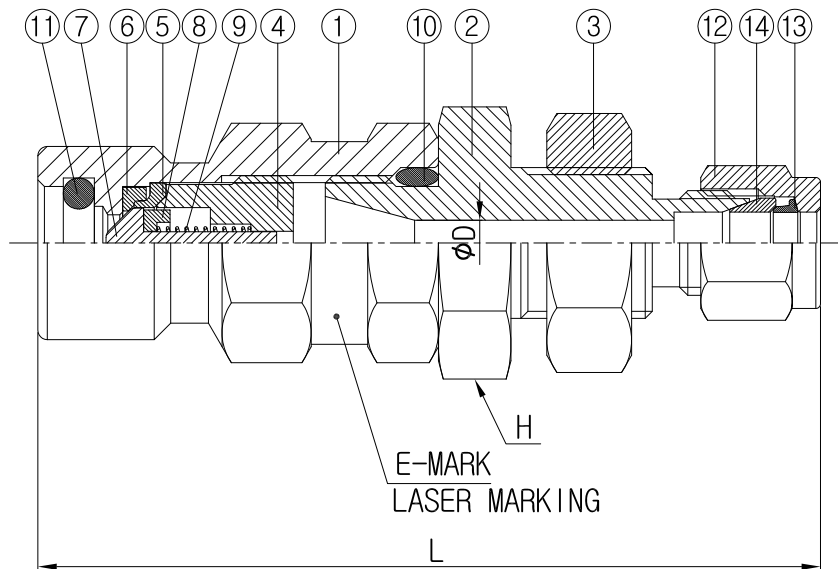
Picture 1. Receptacle

11. Drawings

NO	TITLE	DWG No.
1	Receptacle	111124-01-114-05 (Rev.A)
2	Type Approval Mark	111124-01-114-07 (Rev.A)

Vehicle / Component Model
Information Document No.
Date
Description
Enclosure 01 to Report No.


: RECEPTACLE (SRCT Series)
: BMT-CNG-120717-04
: 01-12-2011
: CNG Component approval as per ECE R110
: IN110-A0-120037



NO	DESCRIPTION	MATERIAL	Q'TY	REMARK
1	BODY	SS 316	1	
2	EMD CONNECTOR	SS 316	1	
3	LOCK NUT	SS 316	1	
4	INSERT	BRASS	1	
5	GALND	BRASS	1	
6	SEAT	EPDM	1	
7	POPPET	SS 316	1	
8	POPPET STOPPER	SS 316	1	
9	SPRING	SS 304	1	
10	O-RING	EPDM	1	
11	O-RING	EPDM	1	
12	NUT	SS 316	1	
13	FRONT FERRULE	SS 316	1	
14	BACK FERRULE	SS 316	1	

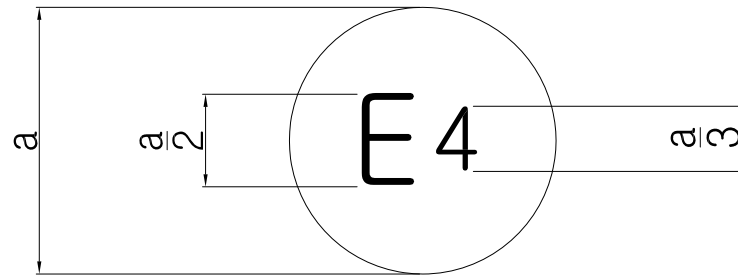
SPECIFICATIONS

1. SRCT series Receptacle complies with NGV1 in dimension and performance.
2. Maximum pressure rating : 3600 psig (250 bar)
3. Temperature rating : -40 to 250° F (-40 to 121° C)

A	24.NOV.11	Issued for Approval	C.S.RA	S.M.LEE	J.H.LIM
Rev.	Issue Data	Description	Originator	Checked	Approved
PURCHASER					
CLIENT					
PROJECT NAME		-			
PROJECT NO.		-			
PO. NO.		-			
MFR. MODEL/TYPE		SRCT SERIES			
VALVE NAME		RECEPTACLE			
TAG NO.		-			
DRAWING NO.		111124-01-114-05			
GENERAL ARRANGEMENT DRAWING for RECEPTACLE			 BMT Co., Ltd.		

PART NO.	END CONNECTION	L	H (HEX)	D	Q'TY	WORKING PRESSURE for ECE R110 TYPE	Unit : mm MAX WORKING PRESSURE
SRCT-S4	1/4" SUPERLOK	83.0	25.0	4.8	6 EA	250 bar	250 bar
SRCT-S8	1/2" SUPERLOK	87.3	25.0	7.5	6 EA	250 bar	250 bar


NO.	DESCRIPTION	MATERIAL	Q'TY	REMARK



Approval mark Drawing

110 R-XXXXXX

$a \geq 8\text{mm}$

A	24.NOV.11	Issued for Approval	C.S.RA	S.M.LEE	J.H.LIM
Rev.	Issue Data	Description	Originator	Checked	Approved
PURCHASER					
CLIENT					
PROJECT NAME		-			
PROJECT NO.		-			
PO. NO.		-			
MFR. MODEL/TYPE		-			
VALVE NAME		-			
TAG NO.		-			
DRAWING NO.		111124-01-114-07			
GENERAL ARRANGEMENT DRAWING for VALVE					


Manufacturer: BMT CO., LTD

Test Report No
IN110-A0-120037
Technical Report
Enclosure 2
Page 1 of 7

Component type: Receptacles
SRCT Series



RECORD OF TEST ON
CNG Receptacle as regards to
Test and performance requirements, as per standard ECE R 110

0.1	Observer: Mr. M.S. Ogale Mr. Yeshwant Ambure	Place : ARAI, Pune and Praj Lab
0.2	Operator :- Mr. Dekate, ARAI Ashok Bhagat, Praj Lab	Test date:- May'2012-June'2012
0.3	Customer	BMT CO., LTD 21-1, Bukjeong-dong, Yangsan-si, Gyeongsangnam-do, 626-110 S.Korea
1.0	Component under test	Receptacle SRCT-S8(D20.5mm) and SRCT-S4(D20.5mm)
2.0	Manufacturer's Specification	
2.1	Trademark or Trade name	 SUPERLOK T&S VALVES
2.2	Model name and number	Receptacle SRCT Series
2.3	Manufacturers Specification	As attached at Enclosure 1
3.0	Results of Tests	
	General Requirements of standard	Observations
3.1	Filling units designed in accordance with ISO 14469-1 first edition 2004-11-01 1/ or ISO 14469-2:2007 2/ and meeting all the requirements therein are deemed to fulfill the requirements of paragraphs 3. and 4. of this annex.	Meets the Requirement Satisfactory
3.2	The filling unit shall conform to the requirements of Class 0 and follow the test procedures in Annex 5 with the following specific requirements.	Meets the Requirement Satisfactory
3.3	The material constituting the filling unit which is in contact with the CNG when the device is in service shall be compatible with the CNG. In order to verify this compatibility, the procedure of Annex 5D shall be used.	Meets the Requirement Satisfactory

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3.4	The filling unit shall be free from leakage at a pressure of 1.5 times the working pressure (MPa) (see Annex 5B).	Meets the Requirement Satisfactory
3.5	The filling unit shall withstand a pressure of 33 MPa.	Meets the Requirement Satisfactory
3.6	The filling unit shall be so designed as to operate at temperatures as specified in Annex 5O.	Meets the Requirement Satisfactory
3.7	The filling unit shall withstand a number of 10,000 cycles in the durability test specified in Annex 5L.	Meets the Requirement Satisfactory

4.0	Specific test requirements			
4.1	Overpressure Test:			
	A CNG containing component shall withstand without any visible evidence of rupture or permanent distortion a hydraulic pressure of 1.5 times the working pressure (MPa) during minimal 3 minutes at room temperature with the outlet of the high-pressure part plugged. Water or any other suitable hydraulic fluid may be used as a test medium.		Observations: Water used as test medium. No leakage observed at 1.5 times working pressure of 375 bar Meets the Requirement Satisfactory	
	Class	Working pressure		Test pressure
	Class 0	3000<P<26000		1.5times working pressure
	1. Working pressure: 250 bar 2. Test Pressure: 375 bar			

4.2	EXTERNAL LEAKAGE TEST	
	A component shall be free from leakage through stem or body seals or other joints, and shall not show evidence of porosity in casting when tested as described in the tests below.	
	The test shall be performed at the following conditions: (a) at room temperature at pressure of 375 bar (b) at the minimum operating temperature: -40°C at pressure of 375 bar (c) at the maximum operating temperature: +120°C at pressure of 375 bar	
	Equipment under test will be connected to a source of aerostatic pressure. An automatic valve and a pressure gauge having a pressure range of not less than 1.5 times nor more than 2 times the test pressure is to be installed in the pressure supply piping. The sample is subjected to the gas pressure equal to working pressure. The sample should be submerged in water to detect leakage or any other equivalent test method Test carried out under following conditions	

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	The external leakage must be lower than the requirements stated in the annexes or if no requirements are mentioned the external leakage shall be lower than 15 cm ³ /hour.	
4.2.1	Room temperature test	
	Requirements: A CNG containing component shall not leak more than 15 cm ³ /hour with the outlet plugged when submitted to a gas pressure, at room temperature	Observations: No leakage observed Meets the requirement Satisfactory
4.2.2	Maximum operating temperature test	
	Requirements: A CNG containing component shall not leak more than 15 cm ³ /hour with the outlet plugged when submitted to a gas pressure at the maximum operating temp of 120°C, after conditioning the component for 8 hours at 120°C	Observations: No Leakage Observed. Meets the Requirement Satisfactory
4.2.3	Minimum operating temperature test	
	Requirements: A CNG containing component shall not leak more than 15 cm ³ /hour with the outlet plugged when submitted to a gas pressure, at the minimum operating temp of -40°C , after conditioning the component for 8 hours at -40°C	Observations: No Leakage Observed. Meets the Requirement Satisfactory
4.3	Durability Test	
	The component shall be connected to a source of pressurized dry air or nitrogen by means of a suitable fitting and subjected to the number of cycles specified for that specific component. A cycle shall consist of one opening and one closing of the component within a period of not less than 10±2 seconds.	
4.3.1	Room temperature cycling:	
	Requirements: The component shall be operated through 96 percent of the total cycles at room temperature and at rated service pressure. During the off cycle the downstream pressure of the test fixture should be allowed to decay to 50 per cent of the test pressure. After that, the components shall comply with the leakage test of Annex 5B at room temperature. It is allowed to interrupt this part of the test at 20 per cent intervals for leakage testing.	Observations: No leakage Observed Meets the requirement Satisfactory

4.4	CNG Compatibility Test																																						
	<p>A synthetic part in contact with CNG shall not show excessive volume change or loss of weight. Resistance to n-pentane according to ISO 1817 with the following conditions:</p> <p>(a) medium: n-pentane (b) temperature: 23 °C (tolerance acc. to ISO 1817) (c) immersion period: 72 hours</p>				<p>Requirements: maximum change in volume 20 percent After storage in air with a temperature of 40 °C for a period of 48 hours the mass compared to the original value may not decrease more than 5 percent.</p>																																		
	<p>Observations:</p> <table border="1"> <thead> <tr> <th rowspan="2">Sr. No.</th><th rowspan="2">Sample Identification Mark</th><th colspan="2">Change in Volume in %</th><th colspan="2">Change in Mass in %</th><th rowspan="2">Remark</th></tr> <tr> <th>Specified Value</th><th>Observed Value</th><th>Specified Value</th><th>Observed Value</th></tr> </thead> <tbody> <tr> <td>1</td><td>PTFE</td><td>20 Max.</td><td>0.06</td><td>- 5 % Max</td><td>-0.2</td><td>OK</td></tr> <tr> <td>2</td><td>PEEK</td><td>20 Max</td><td>0.07</td><td>- 5 % Max</td><td>-0.01</td><td>OK</td></tr> <tr> <td>3</td><td>'O' ring</td><td>20 Max</td><td>2.5</td><td>- 5 % Max</td><td>- 3.48</td><td>OK</td></tr> </tbody> </table> <p>Meets the requirements Satisfactory</p>							Sr. No.	Sample Identification Mark	Change in Volume in %		Change in Mass in %		Remark	Specified Value	Observed Value	Specified Value	Observed Value	1	PTFE	20 Max.	0.06	- 5 % Max	-0.2	OK	2	PEEK	20 Max	0.07	- 5 % Max	-0.01	OK	3	'O' ring	20 Max	2.5	- 5 % Max	- 3.48	OK
Sr. No.	Sample Identification Mark	Change in Volume in %		Change in Mass in %		Remark																																	
		Specified Value	Observed Value	Specified Value	Observed Value																																		
1	PTFE	20 Max.	0.06	- 5 % Max	-0.2	OK																																	
2	PEEK	20 Max	0.07	- 5 % Max	-0.01	OK																																	
3	'O' ring	20 Max	2.5	- 5 % Max	- 3.48	OK																																	

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4.5	CORROSION RESISTANCE TEST			
4.5.1	Requirements: A metal CNG containing component shall comply with the leakage tests, after submitting it to 144 hours salt spray test with all connections closed. Solution: 5% NaCl in 95% distilled water by weight. External leakage test carried out at room temp/ at 120°C / at -40°C and internal leakage test carried out at room temperature		Observations: No corrosion observed. Meets the Requirement Satisfactory	
4.5.2	Requirements: A copper or brass CNG containing component shall comply with the leakage tests mentioned in Annexes 5B and 5C and after having been submitted to 24 hours immersion in ammonia according to ISO CD 15500-2 with all connections closed.		Observations: No cracks observed at 25X Meets the Requirement Satisfactory	
4.5.3	External leakage test after corrosion resistance test.			
	Test Conditions	Room Temp 30° C at 375 bar	Low Temp -40° C at 375 bar	High Temp +120°C at 375 bar
	Observations	No Leakage Observed	No Leakage Observed	No Leakage Observed
		Meets the Requirement Satisfactory		

4.6	Resistance to dry heat					
<div>1. The test has to be done in compliance with ISO 188. The test piece has to be exposed to air at a temperature equal to the maximum operating temperature for 168 hours.</div> <div>2. The allowable change in tensile strength should not exceed 25 per cent. The allowable change in ultimate elongation shall not exceed the following values: -Maximum increase 10 per cent -Maximum decrease 30 per cent</div>						
Observations:						
Sr. No.	Sample	Change in Tensile strength in %		Change in elongation %		Remark
		Specified Value	Observed Value	Specified Value	Observed Value	
1	PTFE	+25 Max	9.20	+10 -30	-0.64	OK
2	PEEK		2.61		- 27.3	OK
3	O-Ring EPDM		12.37		-17.50	OK
Meets the requirements Satisfactory						

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4.7	Temperature cyclic test			
	Requirements: A non metallic part containing CNG shall comply with the leakage tests mentioned in Annexes 5B and 5C after having been submitted to 96 hours temperature cycle from the minimum operating temperature up to the maximum operating temperature with a cycle time of 120 minutes, under maximum working pressure			
	Observations:			
	EXTERNAL LEAKAGE TEST			
	Test conditions	Room Temp	Low Temp	High Temp
		30°C at 375 bar	-40° C at 375 bar	+120°C at 375 bar
	Observations	No Leakage Observed	No Leakage Observed	No Leakage Observed
		Meets the Requirement Satisfactory		

4.8	Vibration Resistance:			
	All components with moving parts shall remain undamaged, continue to operate, and comply with the component's leakage tests after 6 hours of vibration in accordance with the following test method. Test method The component shall be secured in an apparatus and vibrated for 2 hours at 17 Hz with an amplitude of 1.5 mm (0,06 in.) in each of three orientation axes. On completion of 6 hours of vibration the component shall comply with Annex 5C.		Observations: No Leakage observed. Meets the requirements. Satisfactory.	
4.8.1	External leakage test			
	Test Conditions	Room Temp	Low Temp	High Temp
		30° C at 375 bar	-40° C at 375 bar	+120°C at 375 bar
	Observations	No Leakage Observed	No Leakage Observed	No Leakage Observed
		Meets the Requirement Satisfactory		

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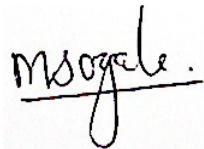
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4.9	OZONE TEST		
	Medium : Ozone	Duration: 72 Hours	Ref Standard: ISO 1431-1
	Test Temp: 40°C		
	Requirement of Standard		
	The test piece, which has to be stressed to 20 per cent elongation, shall be exposed to air at 40C with an ozone concentration of 50 parts per hundred million during 72 hours. No cracking of the test piece is allowed.		Observation: No cracks observed at 10X Magnification. Satisfactory.

4.10	The operating temperatures of the Receptacle shall be classified as per the table given below ANNEX 50 - OPERATING TEMPERATURES <table border="1"> <thead> <tr> <th></th><th>Engine compartment</th><th>Assembled on the engine</th><th>On board</th></tr> </thead> <tbody> <tr> <td>Moderate</td><td>- 20 ° C ÷ 105 ° C</td><td>- 20 ° C ÷ 120 ° C</td><td>- 20 ° C ÷ 85 ° C</td></tr> <tr> <td>Cold</td><td>- 40 ° C ÷ 105 ° C</td><td>- 40 ° C ÷ 120 ° C</td><td>- 40 ° C ÷ 85 ° C</td></tr> </tbody> </table>				Engine compartment	Assembled on the engine	On board	Moderate	- 20 ° C ÷ 105 ° C	- 20 ° C ÷ 120 ° C	- 20 ° C ÷ 85 ° C	Cold	- 40 ° C ÷ 105 ° C	- 40 ° C ÷ 120 ° C	- 40 ° C ÷ 85 ° C
	Engine compartment	Assembled on the engine	On board												
Moderate	- 20 ° C ÷ 105 ° C	- 20 ° C ÷ 120 ° C	- 20 ° C ÷ 85 ° C												
Cold	- 40 ° C ÷ 105 ° C	- 40 ° C ÷ 120 ° C	- 40 ° C ÷ 85 ° C												
	Requirement: The Receptacle should meet operating temperature require as given in the table annex 50		Observation: The Receptacle Type: SRCT-S8(D20.5mm) and SRCT-S4(D20.5mm) has the temperature range of - 40°C to +120°C. The Receptacle meets the test requirements when subjected to all relevant tests with this temperature.												

5.0	Conclusion: Receptacle SRCT series as described in the information document as above meets the requirement of Regulation ECE R110.		
	 Yeshwant Ambure Project Leader	 M. S. Ogale Head Homologation	