

Test Report No.: 48.400.23.1087.01-00/07

Rev.: 00

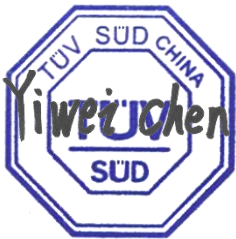
Dated: 2023-10-30



Applicant: Jiangsu Acrel Electrical Manufacturing. Co., Ltd.
Address: No. 5, Dongmeng Road, Nanzha Street, Jiangyin, Jiangsu, P. R. China
Attn: Han Zhonghua
Sample Description: BD Series electric transmitters
Model No.: BD100
Sample Received Date: 2023-10-12
Test Period: 2023-10-12~2023-10-27
Test Location: TÜV SÜD Certification and Testing (China) Co., Ltd.
Shanghai Branch, SHA Chemical Lab.
Purpose of examination: Verification of RoHS (Restriction of Hazardous Substances) directive 2011/65/EU and its amendment (EU) 2015/863 on submitted samples
Test Results: Refer to following page(s)
Remark:
- The result relates only to the items tested.
- The reference model(s) was declared by client.
- The test sample(s) and item(s) was specified by client.

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TÜV SÜD Certification and Testing (China) Co., Ltd.
TÜV SÜD Group
Prepared by:



Mr. Yiwei CHEN

Reviewed by:



Mr. Feng ZHANG

Disclaimer Measurement Uncertainty: Unless otherwise agreed upon, Pass or Fail verdicts are given base on the measured values without any considerations of measurement uncertainties. Please note, every test method has a measurement uncertainty which has been evaluated by the laboratory according to ISO/IEC 17025 requirements. By taking measurement uncertainties into account it might happen that measured values can neither be assessed as Pass nor as Fail. Any use for advertising purposes must be granted in writing. This test report may only be quoted in full. This report is the result of a single examination of the object in question and is not generally applicable evaluation of the quality of other products in regular production. For further details, please see testing and certification regulation, chapter A-3.4.

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SUMMARY OF TEST RESULTS

No.	Test Requested	Conclusion	Remarks
1.	Heavy Metal (Pb, Cd, Hg and Cr VI) Content	PASS	
2.	Polybrominated Biphenyls (PBBs) and Polybrominated Diphenyl Ethers (PBDEs) Content	PASS	
3.	Phthalates (DEHP, BBP, DBP and DIBP) Content	PASS	

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1. TESTED SUBJECT DESCRIPTION

Sample No.	Description (Material, colour)	Photograph/Location
01	Gray hard plastic shell	
02	Yellow paper label	
03	Silvery soft plastic label	
04	Colour soft plastic label	
05	Black hard plastic bracket	

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Sample No.	Description (Material, colour)	Photograph/Location
06	Green hard PCB	
07	Silver metal solder	
08	White paper label	
09	Green hard PCB	
10	Silver metal solder	

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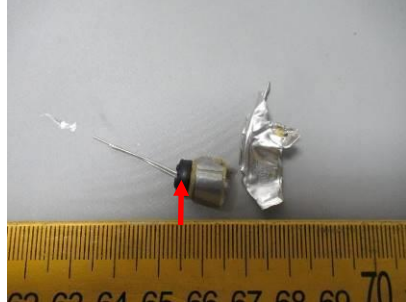
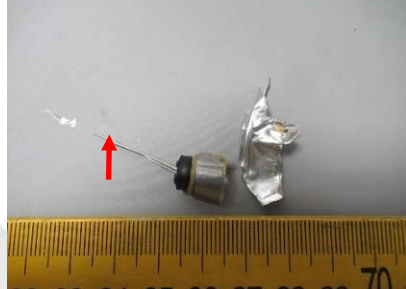
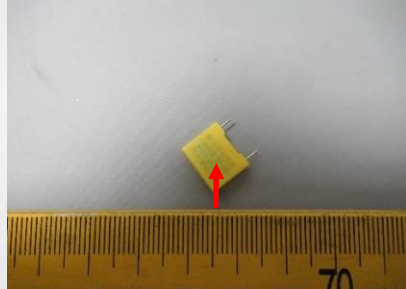
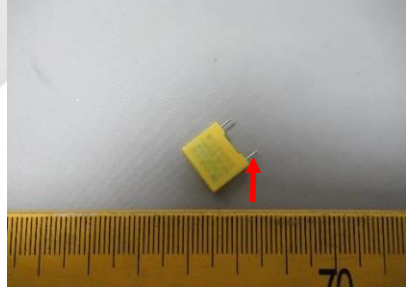
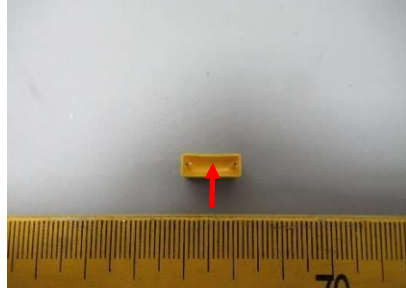


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Sample No.	Description (Material, colour)	Photograph/Location
11	Black resistance	
12	Brown capacitor	
13	Blue soft plastic sheath	
14	Silvery metal shell	
15	Gray paper film	






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Sample No.	Description (Material, colour)	Photograph/Location
16	Black rubber cushion	
17	Silvery metal pin	
18	Yellow hard plastic shell	
19	Silvery metal pin	
20	Yellow potting compound	




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Sample No.	Description (Material, colour)	Photograph/Location
21	Silvery soft plastic film	
22	Silvery metal shell	
23	Black hard plastic piece	
24	Gray paper film	
25	Black rubber cushion	



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Sample No.	Description (Material, colour)	Photograph/Location
26	Silvery metal pin	
27	Black diode	
28	Black hard IC	
29	Silvery metal pin	
30	Black metal magnet	



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Sample No.	Description (Material, colour)	Photograph/Location
31	Silver metal solder	
32	Golden metal wire	
33	Black hard plastic shell	
34	Silvery metal pin	
35	Black hard plastic bracket	



Sample No.	Description (Material, colour)	Photograph/Location
36	Green metal magnet	
37	Golden metal wire	
38	Black hard IC	
39	Silvery metal pin	
40	Black capacitor	

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Sample No.	Description (Material, colour)	Photograph/Location
41	Black crystal oscillator	
42	Silvery metal pin	
43	Black hard IC	
44	Silvery metal piece	
45	Silvery metal pin	



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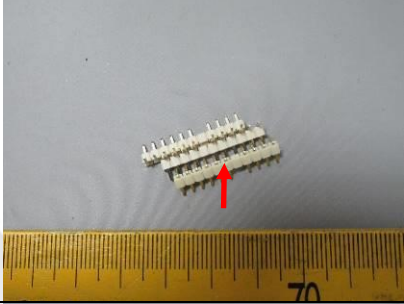
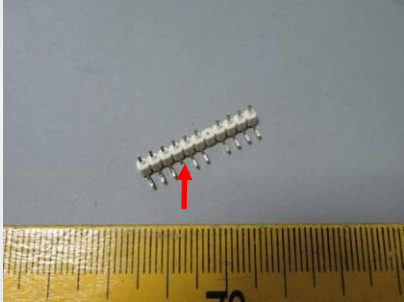
Sample No.	Description (Material, colour)	Photograph/Location
46	Black triode	
47	Black triode	
48	Black resistance	
49	Silvery metal pin	
50	Yellow soft plastic adhesive tape	



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Sample No.	Description (Material, colour)	Photograph/Location
51	Silvery metal pin	
52	Black metal magnet	
53	Black hard plastic base	
54	Golden metal wire	
55	Gray hard plastic socket	



Sample No.	Description (Material, colour)	Photograph/Location
56	Silvery metal pin	
57	Beige hard plastic bracket	
58	Golden metal pin	

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2. TEST RESULT(S)

2.1 SCREENING TEST

Test method: With reference to EN 62321-1:2013, EN IEC 62321-2:2021, EN 62321-3-1:2014 and EN 62321-8:2017.

For Heavy Metals and Flame Retardants, analyzed by Energy Dispersive X-ray Fluorescence Spectrometer (XRF); for phthalates, analyzed by Gas Chromatography and Mass Spectrometer (GC-MS).

Sample No.	Heavy Metals and Flame Retardants					Phthalates			
	Cd	Pb	Hg	Cr	Br	DEHP	BBP	DBP	DIBP
01	BL	BL	BL	BL	BL	BL	BL	BL	BL
02	BL	BL	BL	BL	BL	BL	BL	BL	BL
03	BL	BL	BL	BL	BL	BL	BL	BL	BL
04	BL	BL	BL	BL	BL	BL	BL	BL	BL
05	BL	BL	BL	BL	BL	BL	BL	BL	BL
06	BL	BL	BL	BL	Inc. ^(a)	BL	BL	BL	BL
07	BL	BL	BL	BL	NA	NA	NA	NA	NA
08	BL	BL	BL	BL	BL	BL	BL	BL	BL
09	BL	BL	BL	BL	Inc. ^(a)	BL	BL	BL	BL
10	BL	BL	BL	BL	NA	NA	NA	NA	NA
11	BL	Inc. ^(a)	BL	BL	BL	BL	BL	BL	BL
12	BL	BL	BL	BL	BL	BL	BL	BL	BL
13	BL	BL	BL	BL	BL	BL	BL	BL	BL
14	BL	BL	BL	BL	NA	NA	NA	NA	NA
15	BL	BL	BL	BL	BL	BL	BL	BL	BL
16	BL	BL	BL	BL	BL	BL	BL	BL	BL
17	BL	BL	BL	BL	NA	NA	NA	NA	NA
18	BL	BL	BL	BL	Inc. ^(a)	BL	BL	BL	BL
19	BL	BL	BL	BL	NA	NA	NA	NA	NA
20	BL	BL	BL	BL	Inc. ^(a)	BL	BL	BL	BL

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Sample No.	Heavy Metals and Flame Retardants					Phthalates			
	Cd	Pb	Hg	Cr	Br	DEHP	BBP	DBP	DIBP
21	BL	BL	BL	BL	BL	BL	BL	BL	BL
22	BL	BL	BL	BL	NA	NA	NA	NA	NA
23	BL	BL	BL	BL	BL	BL	BL	BL	BL
24	BL	BL	BL	BL	BL	BL	BL	BL	BL
25	BL	BL	BL	BL	BL	BL	BL	BL	BL
26	BL	BL	BL	BL	NA	NA	NA	NA	NA
27	BL	BL	BL	BL	BL	BL	BL	BL	BL
28	BL	BL	BL	BL	BL	BL	BL	BL	BL
29	BL	BL	BL	BL	NA	NA	NA	NA	NA
30	BL	BL	BL	BL	NA	NA	NA	NA	NA
31	BL	BL	BL	BL	NA	NA	NA	NA	NA
32	BL	BL	BL	BL	NA	NA	NA	NA	NA
33	BL	BL	BL	BL	Inc. ^(a)	BL	BL	BL	BL
34	BL	BL	BL	BL	NA	NA	NA	NA	NA
35	BL	BL	BL	BL	BL	BL	BL	BL	BL
36	BL	BL	BL	BL	NA	NA	NA	NA	NA
37	BL	BL	BL	BL	NA	NA	NA	NA	NA
38	BL	BL	BL	BL	BL	BL	BL	BL	BL
39	BL	BL	BL	BL	NA	NA	NA	NA	NA
40	BL	BL	BL	BL	BL	BL	BL	BL	BL
41	BL	BL	BL	BL	BL	BL	BL	BL	BL
42	BL	BL	BL	BL	NA	NA	NA	NA	NA
43	BL	BL	BL	BL	BL	BL	BL	BL	BL
44	BL	BL	BL	BL	NA	NA	NA	NA	NA

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Sample No.	Heavy Metals and Flame Retardants					Phthalates			
	Cd	Pb	Hg	Cr	Br	DEHP	BBP	DBP	DIBP
45	BL	BL	BL	BL	NA	NA	NA	NA	NA
46	BL	BL	BL	BL	BL	BL	BL	BL	BL
47	BL	BL	BL	BL	BL	BL	BL	BL	BL
48	BL	BL	BL	BL	BL	BL	BL	BL	BL
49	BL	BL	BL	Inc. ^(a)	NA	NA	NA	NA	NA
50	BL	BL	BL	BL	BL	BL	BL	BL	BL
51	BL	BL	BL	BL	NA	NA	NA	NA	NA
52	BL	BL	BL	BL	NA	NA	NA	NA	NA
53	BL	BL	BL	BL	BL	BL	BL	BL	BL
54	BL	BL	BL	BL	NA	NA	NA	NA	NA
55	BL	BL	BL	BL	BL	BL	BL	BL	BL
56	BL	BL	BL	BL	NA	NA	NA	NA	NA
57	BL	BL	BL	BL	Inc. ^(a)	BL	BL	BL	BL
58	BL	BL	BL	BL	NA	NA	NA	NA	NA



Remark:

- "BL" denotes below limit
- "OL" denotes over limit
- "Inc." denotes inconclusive
- "NA" denotes not applicable
- "(a)" denotes further confirmation test was conducted, results are listed in 2.2 and 2.3.
- XRF screening limits in mg/kg for regulated elements in various matrices

ELEMENT	POLYMER		
	BL	INCONCLUSIVE	OL
Cd	$X \leq (70-3\sigma)$	$(70-3\sigma) < X < (130+3\sigma)$	$X \geq (130+3\sigma)$
Pb	$X \leq (700-3\sigma)$	$(700-3\sigma) < X < (1300+3\sigma)$	$X \geq (1300+3\sigma)$
Hg	$X \leq (700-3\sigma)$	$(700-3\sigma) < X < (1300+3\sigma)$	$X \geq (1300+3\sigma)$
Br	$X \leq (300-3\sigma)$	$X > (300-3\sigma)$	NA
Cr	$X \leq (700-3\sigma)$	$X > (700-3\sigma)$	NA

ELEMENT	METAL		
	BL	INCONCLUSIVE	OL
Cd	$X \leq (70-3\sigma)$	$(70-3\sigma) < X < (130+3\sigma)$	$X \geq (130+3\sigma)$
Pb	$X \leq (700-3\sigma)$	$(700-3\sigma) < X < (1300+3\sigma)$	$X \geq (1300+3\sigma)$
Hg	$X \leq (700-3\sigma)$	$(700-3\sigma) < X < (1300+3\sigma)$	$X \geq (1300+3\sigma)$
Cr	$X \leq (700-3\sigma)$	$X > (700-3\sigma)$	NA

ELEMENT	COMPLEX MATERIAL		
	BL	INCONCLUSIVE	OL
Cd	$X \leq (50-3\sigma)$	$(50-3\sigma) < X < (150+3\sigma)$	$X \geq (150+3\sigma)$
Pb	$X \leq (500-3\sigma)$	$(500-3\sigma) < X < (1500+3\sigma)$	$X \geq (1500+3\sigma)$
Hg	$X \leq (500-3\sigma)$	$(500-3\sigma) < X < (1500+3\sigma)$	$X \geq (1500+3\sigma)$
Br	$X \leq (250-3\sigma)$	$X > (250-3\sigma)$	NA
Cr	$X \leq (500-3\sigma)$	$X > (500-3\sigma)$	NA

- Screening limits in mg/kg for regulated phthalates in various matrices

PHTHALATES	BL	INCONCLUSIVE
DEHP	$X < 600$	$X \geq 600$
BBP	$X < 600$	$X \geq 600$
DBP	$X < 600$	$X \geq 600$
DIBP	$X < 600$	$X \geq 600$

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2.2 HEAVY METAL CONTENT

Test method: With reference to EN 62321-4:2014 /A1:2017, EN 62321-5:2014, EN 62321-7-1:2015 and EN 62321-7-2:2017, analyzed by Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES) and Ultraviolet-visible spectrophotometer (UV-Vis).

[Reporting Limit: 2.0 mg/kg for Cadmium; 5.0 mg/kg or 0.10 µg/cm² for Hexavalent Chromium, 10.0 mg/kg for Lead and Mercury.]

Sample No.	Result(s)				
	Total Cadmium	Hexavalent Chromium	Hexavalent Chromium	Total Mercury	Total Lead
11	--	--	--	--	1625.0 ^(d)
49	--	/	Negative	--	--
Unit	mg/kg	mg/kg	µg/cm²	mg/kg	mg/kg
RoHS Requirement	100	1000	Negative [#]	1000	1000

Remark:

- "mg/kg" denotes milligram per kilogram
- "µg/cm²" denotes micrograms per square centimeter
- "<" denotes less than
- "Positive" denotes the absorbance value of sample is > 0.13 µg/cm², the sample is considered to be positive for Hexavalent Chromium.
- "Inconclusive" denotes the absorbance value of sample is ≥ 0.10 µg/cm² and ≤ 0.13 µg/cm², the sample is considered to be Inconclusive for Hexavalent Chromium.
- "Negative" denotes the absorbance value of sample is < 0.10 µg/cm², the sample is considered to be negative for Hexavalent Chromium.
- "[#]" According to DIRECTIVE 2011/65/EU Article 4(1) and Annex II. While, positive means the presence of CrVI on tested areas and the result(s) was (were) regarded as in conflict with European Parliament and Council Directive 2011/65/EU, Article 4(1) and Annex II.
- "--" denotes tested by XRF, result is listed in 2.1
- "^(d)" denotes the exempt item according to DIRECTIVE 2011/65/EU Annex III item 7(c)-I "Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound".

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2.3 POLYBROMINATED BIPHENYLS (PBBs) AND POLYBROMINATED DIPHENYL ETHERS (PBDEs) CONTENT

Test Method: With reference to EN 62321-6:2015, extracted by toluene and analyzed by Gas Chromatography and Mass Spectrometer (GC-MS). [Reporting Limit : 5 mg/kg]

Test Item		Result(s) [mg/kg]			RoHS Requirement [mg/kg]
		06	09	18	
PBBs	Monobromobiphenyl	<5	<5	<5	-
	Dibromobiphenyl	<5	<5	<5	-
	Tribromobiphenyl	<5	<5	<5	-
	Tetrabromobiphenyl	<5	<5	<5	-
	Pentabromobiphenyl	<5	<5	<5	-
	Hexabromobiphenyl	<5	<5	<5	-
	Heptabromobiphenyl	<5	<5	<5	-
	Octabromobiphenyl	<5	<5	<5	-
	Nonabromobiphenyl	<5	<5	<5	-
	Decabromobiphenyl	<5	<5	<5	-
	Sum of detected PBBs	<50	<50	<50	1000
PBDEs	Monobromodiphenyl ether	<5	<5	<5	-
	Dibromodiphenyl ether	<5	<5	<5	-
	Tribromodiphenyl ether	<5	<5	<5	-
	Tetrabromodiphenyl ether	<5	<5	<5	-
	Pentabromodiphenyl ether	<5	<5	<5	-
	Hexabromodiphenyl ether	<5	<5	<5	-
	Heptabromodiphenyl ether	<5	<5	<5	-
	Octabromodiphenyl ether	<5	<5	<5	-
	Nonabromodiphenyl ether	<5	<5	<5	-
	Decabromodiphenyl ether	<5	<5	<5	-
	Sum of detected PBDEs	<50	<50	<50	1000

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2.3 POLYBROMINATED BIPHENYLS (PBBs) AND POLYBROMINATED DIPHENYL ETHERS (PBDEs) CONTENT

Test Method: With reference to EN 62321-6:2015, extracted by toluene and analyzed by Gas Chromatography and Mass Spectrometer (GC-MS). [Reporting Limit : 5 mg/kg]

Test Item		Result(s) [mg/kg]			RoHS Requirement [mg/kg]
		20	33	57	
PBBs	Monobromobiphenyl	<5	<5	<5	-
	Dibromobiphenyl	<5	<5	<5	-
	Tribromobiphenyl	<5	<5	<5	-
	Tetrabromobiphenyl	<5	<5	<5	-
	Pentabromobiphenyl	<5	<5	<5	-
	Hexabromobiphenyl	<5	<5	<5	-
	Heptabromobiphenyl	<5	<5	<5	-
	Octabromobiphenyl	<5	<5	<5	-
	Nonabromobiphenyl	<5	<5	<5	-
	Decabromobiphenyl	<5	<5	<5	-
	Sum of detected PBBs	<50	<50	<50	1000
PBDEs	Monobromodiphenyl ether	<5	<5	<5	-
	Dibromodiphenyl ether	<5	<5	<5	-
	Tribromodiphenyl ether	<5	<5	<5	-
	Tetrabromodiphenyl ether	<5	<5	<5	-
	Pentabromodiphenyl ether	<5	<5	<5	-
	Hexabromodiphenyl ether	<5	<5	<5	-
	Heptabromodiphenyl ether	<5	<5	<5	-
	Octabromodiphenyl ether	<5	<5	<5	-
	Nonabromodiphenyl ether	<5	<5	<5	-
	Decabromodiphenyl ether	<5	<5	<5	-
	Sum of detected PBDEs	<50	<50	<50	1000

Remark:

- "mg/kg" denotes milligram per kilogram
- "<" denotes less than

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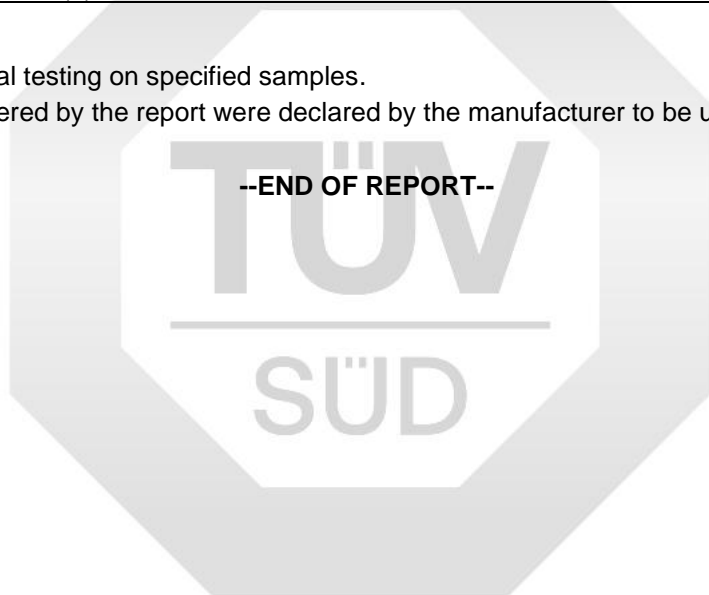
APPENDIX I: Product Model

Product: BD Series electric transmitters	Test model: BD100
	
<p>Additional models: BD-AI, BD-AV, BD-AI2, BD-AV2, BD-DI, BD-DV, BD-3I3, BD-3V3, BD-4V3, BD-3P, BD-3Q, BD-3P/Q/I, BD-4P, BD-4Q, BD-4P/Q/I, BD-3E, BD-4E, BD-4EA, BM-DI(S), BM-DV, BM-AI, , BM-AV, BM-TR, BM-R, BM-VR, BA05, BA10, BA20, BA50, BA50L, BM100-DI, BM100-DV, BM100-TR, BM100-VR, BM200-DI, BM200-DV, BM200-TR, BM200-VR, BD100-AI, BD100-AV, BD100-DI, BD100-DV, BD100-P, BD100-F, BD100-PF, BA20(II)-AI, BA50(II)-AI, BA50L(II)-AI</p>	

Remark:

1. The report covers material testing on specified samples.
2. The tested materials covered by the report were declared by the manufacturer to be used on the additional model.

--END OF REPORT--



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