

## Verification Report

No. SHAEC1824294201

Date: 21 Nov 2018

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Changzhou Fulling Motor Co.,Ltd

No.69, Kunlun Rd., Xinbei District, Changzhou City, Jiangsu Province, 213022, P. R. China

Sample Name : motor  
SGS Job No. : SP18-036290 - SUZ  
Tested Basic Model No. : FL42STH33-0956A-03 Hybrid stepping motor  
Client Ref. Information : 20、25、28、35、39、42、57、60、86、110Hybrid stepping motor  
Date of Sample Received : 31 Oct 2018  
Verification Period : 31 Oct 2018 - 20 Nov 2018  
Verification Requested : With reference to RoHS Directive (EU) 2015/863 amending 2011/65/EU.  
Verification Method : Please refer to next page(s).  
Verification Result : Please refer to next page(s).  
Verification Conclusion : Based on the verification results of the submitted samples, the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP) , Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) , and Diisobutyl phthalate (DIBP) comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.  
Note : The test results are related only to the tested items. The report shall not be reproduced except in full without the written approval of the testing laboratory.

Signed for and on behalf of  
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.



Peter Fang  
Approved Signatory



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Verification Method :

1. With reference to IEC 62321-2:2013, review was performed for the samples disjointed from the submitted articles.
2. With reference to IEC 62321-1:2013, tests were performed for the samples indicated by the photos in this report
  - (1) With reference to IEC 62321-3-1:2013, screening by EDXRF spectroscopy
  - (2) Wet chemical test method
    - a. With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES
    - b. With reference to IEC 62321-5:2013, determination of Lead by ICP-OES
    - c. With reference to IEC 62321-4:2013, determination of Mercury by ICP-OES
    - d. With reference to IEC 62321-7-1:2015, IEC 62321-7-2:2017 & ISO 17075-1:2017, determination of Hexavalent chromium by Colorimetric method using UV-Vis.
    - e. With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS
3. With reference to IEC 62321-8:2017, determination of phthalates by GC-MS.



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Part No.	Part Description	Restricted Substances	Results of EDXRF(1)	Screening Result of PHTH(2)	Result of Wet Chemical Testing(3) (mg/kg)	Conclusion on EU RoHS	Sample Submitted / Resubmitted Date
1	FL42STH33-0956A-03-W hite plastic (jacket) (wire)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	BL	---	---	Comply	
		PBBs	BL	---	---	Comply	
		PBDEs	BL	---	---	Comply	
		DBP	---	IN	ND	Comply	
		BBP	---	IN	ND	Comply	
		DEHP	---	IN	ND	Comply	
		DIBP	---	IN	ND	Comply	
2	FL42STH33-0956A-03-Ye llow plastic (jacket) (wire)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	BL	---	---	Comply	
		PBBs	BL	---	---	Comply	
		PBDEs	BL	---	---	Comply	
		DBP	---	IN	ND	Comply	
		BBP	---	IN	ND	Comply	
		DEHP	---	IN	ND	Comply	
		DIBP	---	IN	ND	Comply	



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3	FL42STH33-0956A-03-BI ack plastic (jacket) (wire)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	BL	---	---	Comply	
		PBBs	BL	---	---	Comply	
		PBDEs	BL	---	---	Comply	
		DBP	---	IN	ND	Comply	
		BBP	---	IN	ND	Comply	
		DEHP	---	IN	ND	Comply	
DIBP	---	IN	ND	Comply			
4	FL42STH33-0956A-03-Gr een plastic (jacket) (wire)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	BL	---	---	Comply	
		PBBs	BL	---	---	Comply	
		PBDEs	BL	---	---	Comply	
		DBP	---	IN	ND	Comply	
		BBP	---	IN	ND	Comply	
		DEHP	---	IN	ND	Comply	
DIBP	---	IN	ND	Comply			



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5	FL42STH33-0956A-03-Blue plastic (jacket) (wire)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	BL	---	---	Comply	
		PBBs	BL	---	---	Comply	
		PBDEs	BL	---	---	Comply	
		DBP	---	IN	ND	Comply	
		BBP	---	IN	ND	Comply	
		DEHP	---	IN	ND	Comply	
		DIBP	---	IN	ND	Comply	
6	FL42STH33-0956A-03-Red plastic (jacket) (wire)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	BL	---	---	Comply	
		PBBs	BL	---	---	Comply	
		PBDEs	BL	---	---	Comply	
		DBP	---	IN	ND	Comply	
		BBP	---	IN	ND	Comply	
		DEHP	---	IN	ND	Comply	
		DIBP	---	IN	ND	Comply	



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Part No.	Part Description	Restricted Substances	Results of EDXRF(1)	Screening Result of PHTH(2)	Result of Wet Chemical Testing(3) (mg/kg)	Conclusion on EU RoHS	Sample Submitted / Resubmitted Date
7	FL42STH33-0956A-03-BI ack metal (screw)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	BL	---	---	Comply	
		PBBs	---	---	---	---	
		PBDEs	---	---	---	---	
		DBP	---	---	---	---	
		BBP	---	---	---	---	
		DEHP	---	---	---	---	
		DIBP	---	---	---	---	
8	FL42STH33-0956A-03-BI ack coating (end cover)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	BL	---	---	Comply	
		PBBs	BL	---	---	Comply	
		PBDEs	BL	---	---	Comply	
		DBP	---	IN	ND	Comply	
		BBP	---	IN	ND	Comply	
		DEHP	---	IN	ND	Comply	
		DIBP	---	IN	ND	Comply	



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Part No.	Part Description	Restricted Substances	Results of EDXRF(1)	Screening Result of PHTH(2)	Result of Wet Chemical Testing(3) (mg/kg)	Conclusion on EU RoHS	Sample Submitted / Resubmitted Date
9	FL42STH33-0956A-03-Silvery metal (substrate) (end cover)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	BL	---	---	Comply	
		PBBs	---	---	---	---	
		PBDEs	---	---	---	---	
		DBP	---	---	---	---	
		BBP	---	---	---	---	
		DEHP	---	---	---	---	
		DIBP	---	---	---	---	
10	FL42STH33-0956A-03-BIack metal (elastic washer)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	IN	---	ND	Comply	
		PBBs	---	---	---	---	
		PBDEs	---	---	---	---	
		DBP	---	---	---	---	
		BBP	---	---	---	---	
		DEHP	---	---	---	---	
		DIBP	---	---	---	---	



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11	FL42STH33-0956A-03-Beige plastic (fixed block)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	BL	---	---	Comply	
		PBBs	BL	---	---	Comply	
		PBDEs	BL	---	---	Comply	
		DBP	---	IN	ND	Comply	
		BBP	---	IN	ND	Comply	
		DEHP	---	IN	ND	Comply	
DIBP	---	IN	ND	Comply			
12	FL42STH33-0956A-03-Beige plastic (bracket) (stator)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	BL	---	---	Comply	
		PBBs	BL	---	---	Comply	
		PBDEs	BL	---	---	Comply	
		DBP	---	IN	ND	Comply	
		BBP	---	IN	ND	Comply	
		DEHP	---	IN	ND	Comply	
DIBP	---	IN	ND	Comply			



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Part No.	Part Description	Restricted Substances	Results of EDXRF(1)	Screening Result of PHTH(2)	Result of Wet Chemical Testing(3) (mg/kg)	Conclusion on EU RoHS	Sample Submitted / Resubmitted Date
13	FL42STH33-0956A-03-BI ack coating (silicon plate) (stator)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	BL	---	---	Comply	
		PBBs	BL	---	---	Comply	
		PBDEs	BL	---	---	Comply	
		DBP	---	IN	ND	Comply	
		BBP	---	IN	ND	Comply	
		DEHP	---	IN	ND	Comply	
		DIBP	---	IN	ND	Comply	
14	FL42STH33-0956A-03-Sil very metal (substrate) (silicon plate) (stator)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	IN	---	ND	Comply	
		PBBs	---	---	---	---	
		PBDEs	---	---	---	---	
		DBP	---	---	---	---	
		BBP	---	---	---	---	
		DEHP	---	---	---	---	
		DIBP	---	---	---	---	



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Part No.	Part Description	Restricted Substances	Results of EDXRF(1)	Screening Result of PHTH(2)	Result of Wet Chemical Testing(3) (mg/kg)	Conclusion on EU RoHS	Sample Submitted / Resubmitted Date
15	FL42STH33-0956A-03-Silver metal (shaft) (rotor)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	IN	---	ND	Comply	
		PBBs	---	---	---	---	
		PBDEs	---	---	---	---	
		DBP	---	---	---	---	
		BBP	---	---	---	---	
		DEHP	---	---	---	---	
		DIBP	---	---	---	---	
16	FL42STH33-0956A-03-Silver metal (dustproof cap) (bearing) (shaft) (rotor)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	IN	---	ND	Comply	
		PBBs	---	---	---	---	
		PBDEs	---	---	---	---	
		DBP	---	---	---	---	
		BBP	---	---	---	---	
		DEHP	---	---	---	---	
		DIBP	---	---	---	---	



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Part No.	Part Description	Restricted Substances	Results of EDXRF(1)	Screening Result of PHTH(2)	Result of Wet Chemical Testing(3) (mg/kg)	Conclusion on EU RoHS	Sample Submitted / Resubmitted Date
17	FL42STH33-0956A-03-Silver metal (outer ring) (bearing) (shaft) (rotor)	Pb	BL	---	---	Comply	31 Oct 2018
		Cd	BL	---	---	Comply	
		Hg	BL	---	---	Comply	
		Cr(VI)▼	IN	---	ND	Comply	
		PBBs	---	---	---	---	
		PBDEs	---	---	---	---	
		DBP	---	---	---	---	
		BBP	---	---	---	---	
		DEHP	---	---	---	---	
		DIBP	---	---	---	---	



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Remark :

- (1) (a) There are the results on total Br while test items on restricted substances are PBBs and PBDEs. There is the result on total Cr while test item on restricted substances is Cr(VI).
- (b) Results are obtained by EDXRF for primary screening, and further chemical testing by ICP-OES (for Cd, Pb, Hg), UV-Vis (for Cr(VI)) and GC-MS (for PBBs, PBDEs) is recommended to be performed, if the concentration exceeds the below warning value according to IEC62321-3-1:2013 (unit: mg/kg).

Element	Polymer	Metal	Composite Materials
Cd	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$LOD < X < (150+3\sigma) \leq OL$
Pb	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Hg	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Br	$BL \leq (300-3\sigma) < X$	--	$BL \leq (250-3\sigma) < X$
Cr	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X$	$BL \leq (500-3\sigma) < X$

(c) BL = Below Limit, OL = Over Limit, IN = Inconclusive, LOD = Limit of Detection, -- = Not regulated.

(d) The XRF screening test for RoHS elements - The reading may be different to the actual content in the sample be of non-uniformity composition.

- (2) Screening results of PHTH are for primary screening, and further chemical testing by GC-MS (for DBP, BBP, DEHP and DIBP) are recommended to be performed if the concentration exceeds the below warning value (unit: mg/kg)

Compound	Polymer
DBP	$BL \leq 600 < X$
BBP	$BL \leq 600 < X$
DEHP	$BL \leq 600 < X$
DIBP	$BL \leq 600 < X$

- (3) (a) mg/kg = 0.0001%, MDL=Method detection Limit, ND = Not Detected (<MDL), --- = Not conducted, - = Without BOM.

(b) Unit and MDL in wet chemical test

Test Item	Pb	Cd	Hg	DBP	BBP	DEHP	DIBP
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
MDL	10	10	10	100	100	100	100



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The MDL for single compound of PBBs and PBDEs is 100 mg/kg,  
 MDL of Cr(VI) for polymer, composite and leather sample is 10 mg/kg,  
 MDL of Cr(VI) for metal sample is 0.10µg/cm<sup>2</sup>.

- (c) ▼ =Metal sample
  - a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 µg/cm<sup>2</sup>.  
 The sample coating is considered to contain CrVI
  - b. The sample is negative for CrVI if CrVI is ND (concentration less than 0.10 µg/cm<sup>2</sup>).  
 The coating is considered a non-CrVI based coating
  - c. The result between 0.10 µg/cm<sup>2</sup> and 0.13 µg/cm<sup>2</sup> is considered to be inconclusive  
 - unavoidable coating variations may influence the determination

Information on storage conditions and production date of the tested sample is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.

IEC 62321 series is equivalent to EN 62321 series

[http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1258637,25](http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25)

(4) According to the declaration from applicant, the materials of Model "FL42STH33-0956A-03 Hybrid stepping motor" are the same as those in Model "20、25、28、35、39、42、57、60、86、110 Hybrid stepping motor" and its results for support the results of Model "20、25、28、35、39、42、57、60、86、110 Hybrid stepping motor". The applicant will take the responsibility of all discrepancy and risk.



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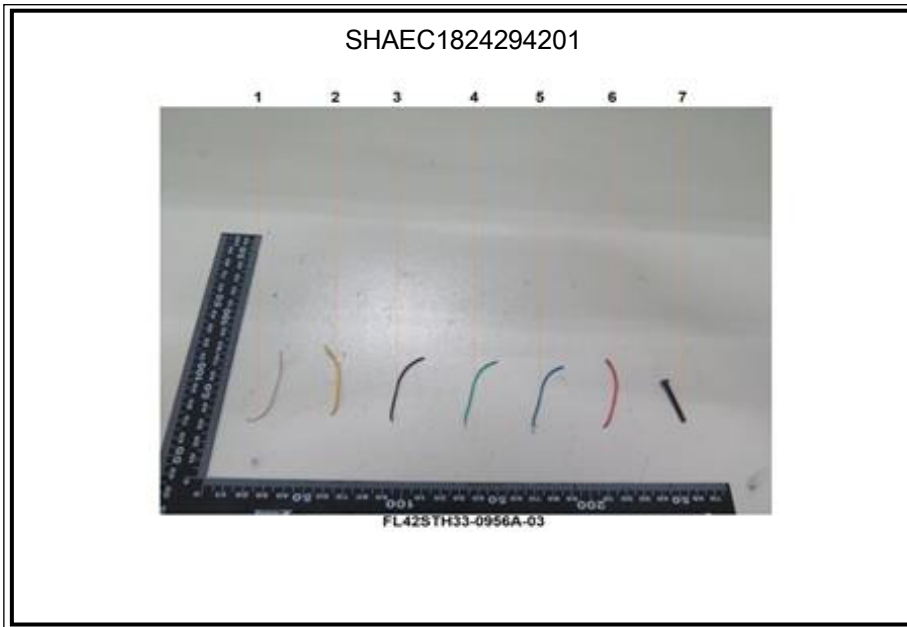
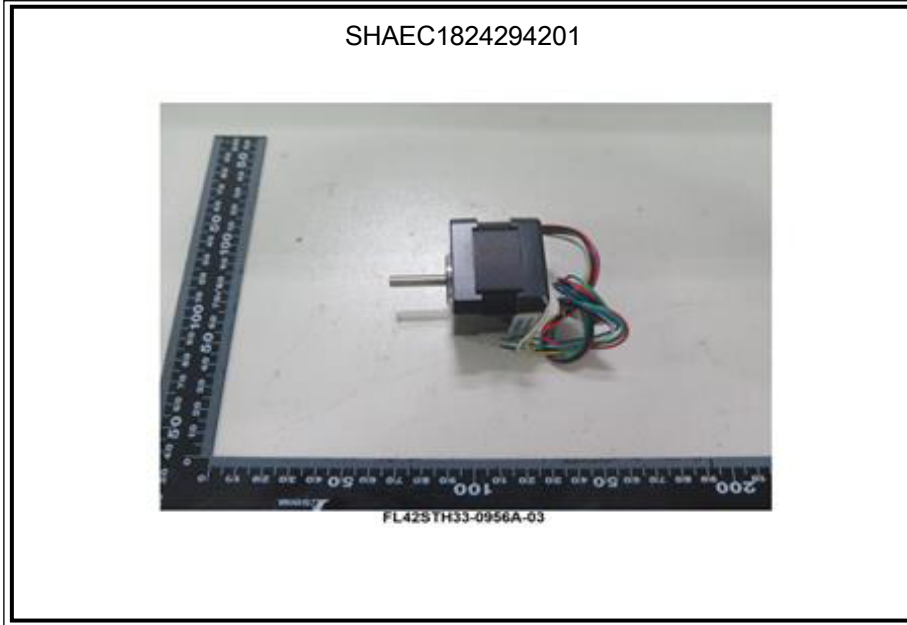
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