TEST REPORT

EN 14889-1:2006

Fibres for concrete

Part 1 : Steel fibres – Definitions, specifications and conformity

Report

Reference No.	SCC(21)-30326A-10
Compiled by (+ signature)	Jing Xingcan
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Date of issue	May.31, 2021
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Testing laboratory

Name	CHINA CEPREI（SICHUAN）LABORATORY.
Address	No.45 Wen Ming Dong Road Longquanyi Chengdu 610100 P.R.China
Testing location	As above

Client

Name	Tengzhou Star Smith Metal Products Co., Ltd.
Address	No.397, Shunhe Road, Tengzhou Economic Development Zone, Zaozhuang City, Shandong Province, China.

Manufacturer :

Name	Tengzhou Star Smith Metal Products Co., Ltd.
Address	No.397, Shunhe Road, Tengzhou Economic Development Zone, Zaozhuang City, Shandong Province, China.

Test specification

Standard	EN 14889-1:2006
Test procedure	N.A.
Procedure deviation	N.A.
Non-standard test method	N.A.

Test Report Form/blank test report

Test Report Form No.	14889__D
TRF originator.	CHINA CEPREI (SICHUAN) LABORATORY
Master TRF	Reference No. 14889
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.Test item	
Description ……..:	Steel Fiber For Concrete
Trademark ……..……..:	/
Model and/or type reference ……..:	SDS-80/60, SDS-75/50, SDS-45/35, SDS-55/50 SDS-50/10, SDS-65/13, SDS-80/16, SDS-72/16 SDS-60/13, SDS18-23/13, SDS18-35/13
Manufacturer……..:	Tengzhou Star Smith Metal Products Co., Ltd.
Address……..:	No.397, Shunhe Road, Tengzhou Economic Development Zone, Zaozhuang City, Shandong Province, China.
Equipment mobility ……..:	Fixed
Operating condition ……..:	N.A.
Protection against ingress of water ……:	N.A.
Test case verdicts	
Test case does not apply to the test object.....:	N/A.
Test object was not evaluated for the requirements.:	N/E (Collateral standards only)
Test object does meet the requirement .....:	P(Pass)
Test object does not meet the requirement .....:	F(Fail)
Testing	
Date of receipt of test item .....:	May.20, 2021
Date(s) of performance of test .....:	May.20, 2021 – May.31, 2021

General remarks:

"(see remark #)" refers to a remark appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a comma is used as the decimal separator.

The test results presented in this report relate only to the object tested.

This report shall not be reproduced except in full without the written approval of the testing laboratory.

Brief description of the tested sample(s):

Ambient temperature: (21-23)℃ humidity: (55-59)%

Complete test was conducted on **SDS-80/60, SDS-75/50, SDS-45/35, SDS-55/50, SDS-50/10, SDS-65/13, SDS-80/16, SDS-72/16, SDS-60/13, SDS18-23/13, SDS18-35/13**

All tests are carried out in according to the **EN 14889-1** and the test results meet the requirements specified in the above-mentioned standards.

Difference description :

Glued hooked end steel fiber

Model	material	specifications	Use	Dosage
SDS-80/60	Q195	Diameter: 0.75±0.015mm Length:60±1.5mm	It is widely used in industrial floors,warehouse,logistics,real estate,tunnel and bridge.	20-40kg/m3
SDS-55/35	Q195	Diameter: 0.65±0.015mm Length:35±1.5mm		
SDS-64/35	Q195	Diameter:0.55±0.015mm Length: 35±1.5mm		
SDS-55/50	Q195	Diameter:0.90±0.015mm Length: 50±1.5mm		
SDS-75/55	Q195	Diameter:0.75±0.015mm Length: 55±1.5mm		

Steel fiber

Model	material	specifications	use	Dosage
SDS-38/25	Q195	Diameter: 0.65±0.015mm Length:25±1.5mm	It is widely used in industrial floors,warehouse,logistics,real estate,tunnel and bridge.	20-40kg/m3
SDS-55/35	Q195	Diameter: 0.65±0.015mm Length:35±1.5mm		
SDS-40/30	Q195	Diameter:0.75±0.015mm Length: 30±1.5mm		
SDS-47/35	Q195	Diameter:0.75±0.015mm Length: 35±1.5mm		

High strength copper plated micro wire steel fiber

Model	material	specifications	use	Dosage
SDS-50/10	High carbon steel wire rod（72A 82A 90A）	Diameter: 0.20±0.015mm Length:10±1mm Tensile strength:>2850MPa	It is widely used in High-speed railway, RPC cover plate, UHPC box girder, wet connection of precast girder	120-200kg/m^3
SDS-65/13	High carbon steel wire rod（72A 82A 90A）	Diameter: 0.20±0.015mm Length:35±1mm Tensile strength:>2850MPa		
SDS-80/16	High carbon steel wire rod（72A 82A 90A）	Diameter:0.20±0.015mm Length: 16±1mm Tensile strength:>2850MPa		
SDS18-23/13	High carbon steel wire rod（72A 82A 90A）	Diameter:0.18-0.23mm Length: 13±1mm Tensile strength:>2850MPa		
SDS18-35/13	High carbon steel wire rod（72A 82A 90A）	Diameter:0.18-0.35mm Length: 13±1mm Tensile strength:>2850MPa		
SDS-72/16	High carbon steel wire rod（72A 82A 90A）	Diameter:0.22±0.015mm Length: 16±1mm Tensile strength:>2850MPa		
SDS-59/13	High carbon steel wire rod（72A 82A 90A）	Diameter:0.22±0.015mm Length: 13±1mm Tensile strength:>2850MPa		

EN 14889-1 :2006			
Clause	**Requirement-Test**	**Result-Remark**	**Verdict**
1	**Scope**		**P**
	This Part 1 of EN 14889 specifies requirements for steel fibres for structural or non-structural use in concrete, mortar and grout.	Comply with the requirements	P
5	**Requirements**		**P**
5.1	General		P
	The steel fibres shall conform to one of the groups or one of the shapes listed below:		P
	a) group Steel fibres shall be classified into one of the following groups, in accordance with the basic material used for the production of the fibres. Group I : cold-drawn wire Group II : cut sheet Group III : melt extracted Group IV : shaved cold drawn wire Group V : milled from blocks	Group I : cold-drawn wire	P
	b) Shape		P
	Fibres shall be either straight or deformed. The manufacturer shall declare the shape of the fibre. The control and tolerances on the shape shall be specified for each different shape separately, and may be performed using optical equipment.	Pass Comply with the requirements	P
5.2	Dimensions and tolerances		P
5.2.1	General		P
	For fibres of group I and II, the length, equivalent diameter and aspect ratio shall be declared. The tolerances shall be as given in Table 1. Specimens of fibres, when sampled in accordance with 6.2.2 and measured in accordance with 5.2.2 and 5.2.3 shall not deviate from the declared value by more than the tolerances given in Table 1. At least 95 % of the individual specimens shall meet the specified tolerances in both cases.	Pass Glued hooked end steel fiber: pass Steel fiber: pass High strength copper plated micro wire steel fiber: pass	P
	For fibres of group III, IV and V, the range of lengths, equivalent diameters and aspect ratio's shall be declared. Specimens of fibres, when sampled in accordance with 6.2.2 and measured in accordance with 5.2.2 and 5.2.3 shall be within the specified range. At least 90 % of the individual specimen fibres shall meet the specified tolerances in both cases	Group I	N/A
5.2.2	Determination of length		P
	The length shall be measured with a marking gauge (callipers) with an accuracy of 0,1 mm.	Comply with the requirements	P

EN 14889-1 :2006			
Clause	**Requirement-Test**	**Result-Remark**	**Verdict**
	In the case of an irregular cross section, the developed length of the fibre shall also be determined to calculate the equivalent diameter. If straightening of the fibre is necessary, it shall be done by hand or, if this is not possible, by hammering on a level of wood, plastic material or copper using a hammer of similar material. During the straightening the cross section should not be changed.	See the table 5.2.2	P
5.2.3	Determination of (equivalent) diameter		P
5.2.3.1	Round wire fibres		P
	The diameter of the fibre shall be measured with a micrometer, in two directions, approximately at right angles, to an accuracy of 0,01 mm. The fibre diameter shall be the mean of the two diameters.	Pass See the table 5.2.2	P
5.3	Tensile strength of fibres		P
	The tensile strength (R m) shall be determined in accordance with EN 10002-1, except as indicated below, and shall be declared.	Comply with the requirements	P
	For Group I (cold drawn wire), the tensile strength shall be determined from the source wire before deformation. The acceptable tolerance on the declared value of R m shall be 15 % for individual values and 7,5 % for the mean value. At least 95 % of the individual specimens shall meet the specified tolerance.	Pass Comply with the requirements High strength copper plated micro wire steel fiber > >2850MPa	P
5.4	Modulus of elasticity		P
	The manufacturer shall declare the modulus of elasticity of the fibres.	Pass. Modulus of elasticity: 2.06×10 5 MPa.	P
	The modulus of elasticity may be determined for Groups I and II fibres using the tensile test as described in EN 10002-1. The test shall be done on the basic material before deformation of the fibre and the modulus of elasticity shall be calculated using the stress and the deformation at 10 % and 30 % of R m	Comply with the requirements	P
5.5	Ductility of fibres		P
	If applicable, the manufacturer may declare a value for the ductility which shall be determined according to EN 0218-1 where the test is performed on the end diameter before deformation. The material shall be bent over a cylindrical support with a radius of maximum 2,5 mm. The average number of bends shall be declared.	Pass. 30%-35%.	P
5.6	Mixing		P
	Mixing instructions shall be supplied by the manufacturer which recommend the mixing sequence to be adopted when introducing the fibre into both a centrally mixed concrete plant and for a dry batch truck mixed plant.	See the manufacturer instruction.	P

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Clause	**Requirement-Test**	**Result-Remark**	**Verdict**
5.7	Effect on consistence of concrete		P
	The effect of fibres on the consistence of a reference concrete conforming to prEN 14845-1 shall be determined.	Comply with the requirements	P
	The consistence according to EN 12350-3 shall be determined on the reference concrete without fibres and then on an identical mix with fibres. The effect on consistence shall be declared.	Comply with the requirements	P
	The amount of fibres added shall be declared by the manufacturer and shall be the minimum amount of fibres needed to obtain the required strength specified in 5.8. If a plasticiser or superplasticer is needed in order to meet the consistence requirements when determining the required addition level of fibres, the amount and type shall also be declared by the manufacturer.		P
	The fibre manufacturer may additionally declare the consistence for the reference concrete with a range of dosages of fibres	Comply with the requirements	P
5.8	Effect on strength of concrete		P
	The effect on strength shall be determined according to EN 14845-2 using a reference concrete conforming to prEN 14845-1. The unit volume of fibres in kg/m³ shall be declared by the manufacturer that achieves a residual flexural strength of 1,5 MPa at 0,5 mm CMOD (equivalent to 0,47 mm central deflection) and a residual flexural strength of 1MPa at 3,5 mm CMOD (equivalent to 3,02 mm central deflection).	Comply with the requirements	P
5.9	Release of dangerous substances		P
	Materials used in products shall not release any dangerous substances in excess of the maximum permitted levels specified in a relevant European Standard for the material or permitted in the national regulations of the member state of destination.	Pass Not release any dangerous substances in excess of the maximum permitted levels.	P

Table 5.2.2 : Determination of length						**P**
Model	**Length(mm)**			**Diameter(mm)**		
	1	**2**	**3**	**1**	**2**	**3**
SDS-80/60	60.5	61.1	60.7	0.751	0.750	0.751
SDS-55/35	36.1	35.9	35.7	0.652	0.651	0.652

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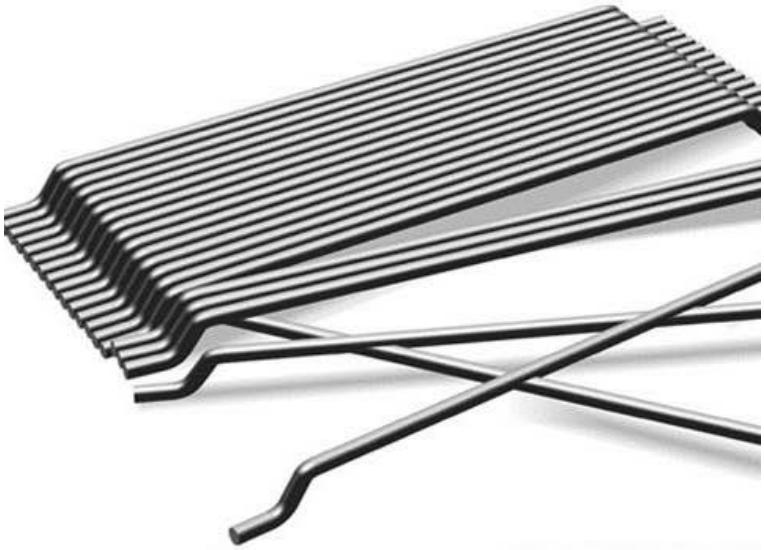
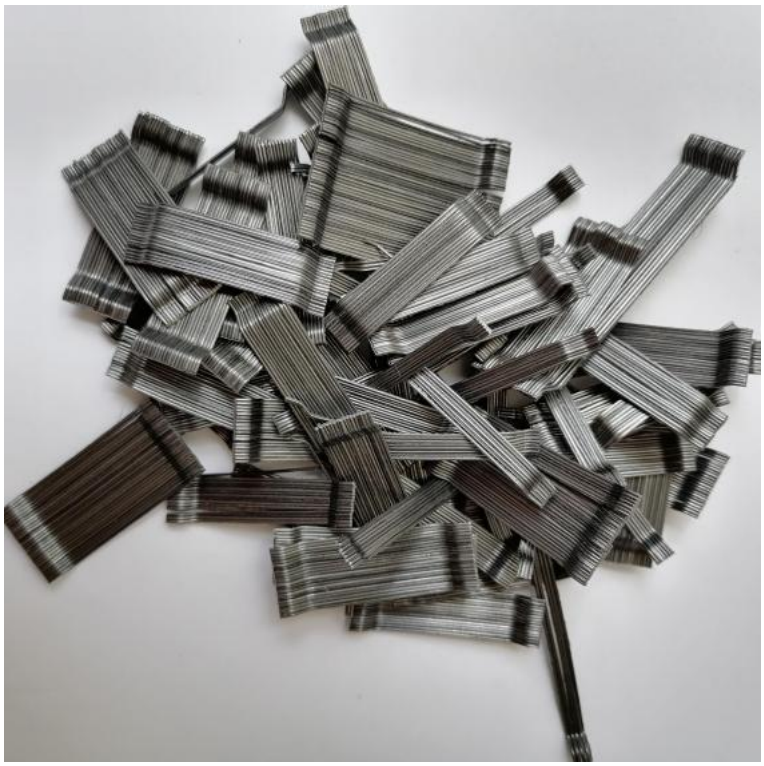
Clause	**Requirement-Test**			**Result-Remark**		**Verdict**
SDS-64/35	35.2	35.7	36.0	0.554	0.554	0.551
SDS-55/50	49.2	50.2	51.7	0.907	0.904	0.892
SDS-75/55	56.2	55.9	55.7	0.756	0.756	0.761
SDS-38/25	25.2	25.1	24.6	0.649	0.657	0.652
SDS-55/35	34.9	35.2	34.6	0.650	0.657	0.647
SDS-40/30	29.9	30.5	30.4	0.749	0.752	0.748
SDS-47/35	34.5	35.6	35.7	0.745	0.752	0.744
SDS-50/10	10.9	10.5	10.7	0.201	0.204	0.200
SDS-65/13	34.8	35.6	34.5	0.207	0.205	0.206
SDS-80/16	15.2	15.9	16.0	0.207	0.210	0.208
SDS18-23/13	12.8	12.7	12.9	0.197	0.207	0.215
SDS18-35/13	12.9	13.0	12.8	0.275	0.321	0.267
SDS-72/16	15.7	15.6	15.7	0.227	0.230	0.234
SDS-59/13	12.4	12.6	13.2	0.226	0.227	0.2278

Photos of the sample



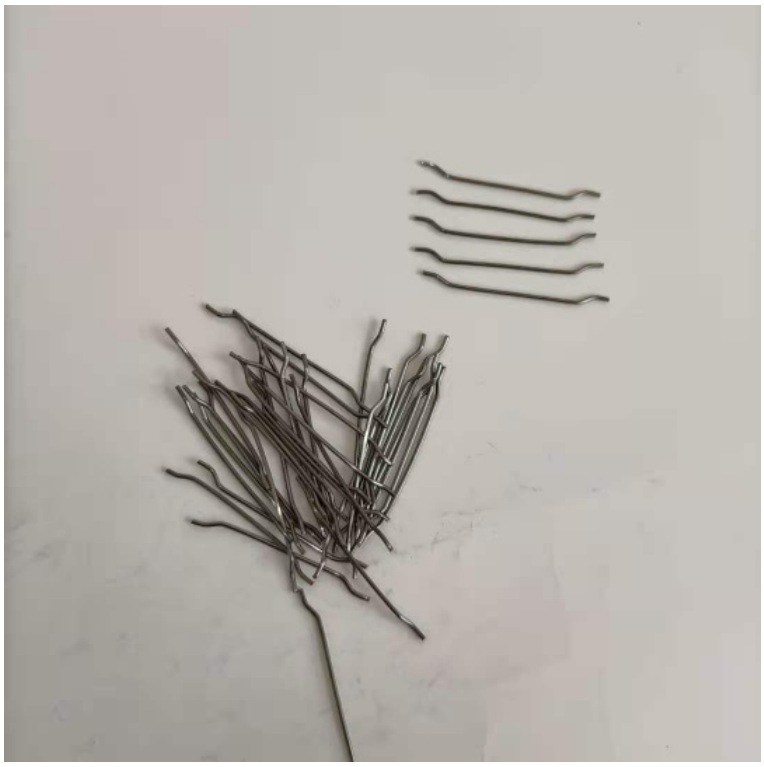
Picture 1



Picture 2

Photos of the sample

Picture 3



Picture 4

Photos of the sample

Picture 5

Picture 6

Notice

1. **This Test Report shall be invalid without the stamp of the testing laboratory.**
2. **Anycopy of this Report shall be invalid without the seal of the testing laboratory.**
3. **This Report shall be invalid without Tester, Reviewer and Approver signature.**
4. **Any alteration of this Report shall invalidate the entire Report.**
5. **Client shall put forward any objections to the contents of this Report within 15 (fifteen) days of receipt. Thereafter the Report contents and conclusions remain accepted and agreed and no further changes will be considered.**
6. **The test results presented in this report relate only to the object tested.**

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