

මාර්ග සංවර්ධන අධිකාරිය
වීதி அபிவிருத்தி அதிகாரசபை
Road Development Authority

"මගනෙගුම මහමෙදුර", ඩෙන්සිල් කොච්චිකඩුව මාවත,
කොස්වත්ත, බත්තරමුල්ල, ශ්‍රී ලංකාව.

"மகநெகும மஹமெதூர்", டென்சில் கொப்பேகடுவ மாவத்தை,
கொஸ்வத்தை, பத்தரமுல்லை, இலங்கை.

"Maganeeguma Mahamedura", Denzil Kobbekaduwa Mawatha,
Koswatta, Battaramulla, Sri Lanka.

මගේ අංකය
எனது இல.
My No.

LR/2021/0060

ඔබේ අංකය
உமது இல.
Your No.

දිනය
திகதி
Date

17-Feb-2021

RESEARCH & DEVELOPMENT DIVISION

Borupana Road, Rathmalana, Sri Lanka

Tel: 2634701 Fax: 2632649

Email: researchrda@gmail.com

Quality Manager,
Captain Steel Pvt Ltd,
No.249/3, Waikkiyawatta Road,
Pahala Bomiriya,
Kaduwela.

Dear Sir,

QUALITY CONTROL TESTS FOR STEEL REINFORCEMENTS.

Approval of "CAPTAIN" Brand Ribbed Steel Bar (RB 500) after Testing for Tensile Properties, Bending, Re- Bending and Chemical Testing.

This refers to your letter dated 19-Jan-2021 regarding the above subject.

The samples of "CAPTAIN" brand ribbed steel bars (RB-500) 8mm to 32mm steel bars which were handed over to this office by you on the 20-Jan-2021 was tested by Research and Development Division, RDA and University of Moratuwa (UOM) for Physical Composition and by University of Moratuwa (UOM) for Chemical Composition. It was found that the test results satisfy requirements of BS 4449:2005+A2:2009 and SLS 375:2009 which are requirements for the steel in Standard Specification for Construction and Maintenance of Roads and Bridges (SSCM). Hence, it can be recommended to use the "CAPTAIN" Brand Steel Bars (RB-500) 8mm to 32mm for projects. However the steel shall be checked for conformity with the specifications at the time of delivery to the site where necessary.

Thanking you
Yours truly


Director

RESEARCH & DEVELOPMENT

Director
Research & Development Division
Road Development Authority
Borupana Road,
Ratmalana.

Telephones:-

Chairman 2862767, Director General 2862795, Working Director 2887257, General Number ++94-11-2046200

Additional Director Generals {Projects 2862485, AO&M 2864804, CD 2882194, NP 2886923}

Directorates {Administration 2865245, Construction 2864388, Engineering Services 2864803, EO&M 038-2291373, ESD 2187165, Finance 2864799, Highway Designs 2874024, Internal Audit 2872661, Lands 2889350, Legal 2186044, Mechanical 2872273, MM 2882196, Planning 2882995, Procurement 2886863, QA&PM 2887235, R&D 2632649, Rural Bridges 2623896, Training 2869342}



ROAD DEVELOPMENT AUTHORITY (RDA)

Concrete Laboratory
Research & Development Division
P.O. Box 14, Borupana Road, Ratmalana, Sri Lanka.
Tel: 0112 634701 Fax: 0112632649



TEST REPORT

Reference No: LR/2021/0060

Issued To : Quality Manager,
Captain Steel Pvt Ltd,
No.249/3, Waikkiyawatta Road,
Pahala Bomiriya,
Kaduwela.

Project/Road Name : Not Mentioned

Test Location/Road Section : Not Mentioned

Invoice No. : IV/2021/0053

Test Item(s)/Material(s) : 1 test Items
i Steel Physical Test - BS4449:2005

Test Details : Following tests were done by R & D Division Laboratory staff of
i Steel Physical Test - BS4449:2005 - 07 Nos¹

Tested Date(s) : 12-Feb-2021

Issue Date : 17-Feb-2021

**ROAD DEVELOPMENT AUTHORITY (RDA)****Concrete Laboratory**

Research & Development Division

P.O. Box 14, Borupana Road, Ratmalana, Sri Lanka.

Tel: 0112 650684 Fax: 01125656056



Source : Not Mentioned

Lab Ref. No: LR/2021/0060

Brand : CAPTAIN RB 500

Sample No : S/2021/0216 - 08 mm
S/2021/0217 - 10 mm
S/2021/0218 - 12 mm
S/2021/0219 - 16 mm
S/2021/0220 - 20 mm
S/2021/0221 - 25 mm
S/2021/0222 - 32 mm

Sample Size		Test Result		Specification for Mass per Metre (kg)
		Cross Sectional Area (mm ²)	Mass per Metre (kg)	
- 08 mm S/2021/0216	1	49.3	0.386	0.371- 0.419
	2	49.2	0.386	
	3	49.1	0.385	
- 10 mm S/2021/0217	1	77.5	0.608	0.589 - 0.645
	2	78.3	0.614	
	3	77.7	0.610	
- 12 mm S/2021/0218	1	113.3	0.888	0.848 - 0.928
	2	112.8	0.885	
	3	113.0	0.886	

Conclusion:

Tensile properties and mass per metre of all specimens comply with BS 4449:2005+A2:2009 standards.

1. Samples were handed over to R&D by - Quality Manager, Captain Steel (Pvt) Ltd,
No.249/3, Waikkiyawatta Road, Pahala
Bomiriya, Kaduwela.

2. Results of the test valid only for the sample sent to the laboratory.

Tested by:

Name: U.K.M.Viduranga
Designation: Research Assistant
Date: 12-Feb-2021

Checked by:

Name: J.K.B.P.Jayasooriya
Designation: Research Assistant
Date: 17-Feb-2021

Authorized by:

Name: A.W.C.Chamkara
Designation: Material Engineer
Date: 17-Feb-2021



ROAD DEVELOPMENT AUTHORITY (RDA)

Concrete Laboratory

Research & Development Division
P.O. Box 14, Borupana Road, Ratmalana, Sri Lanka.
Tel: 0112 650684 Fax: 01125656056



Source : Not Mentioned

Lab Ref. No: LR/2021/0060

Brand : CAPTAIN RB 500

Sample No : S/2021/0216 - 08 mm
S/2021/0217 - 10 mm
S/2021/0218 - 12 mm
S/2021/0219 - 16 mm
S/2021/0220 - 20 mm
S/2021/0221 - 25 mm
S/2021/0222 - 32 mm

Sample Size		Test Result		Specification for Mass per Metre
		Cross Sectional Area (mm ²)	Mass per Metre (kg)	
- 16 mm S/2021/0219	1	202.1	1.585	1.508 - 1.651
	2	203.0	1.592	
	3	203.4	1.595	
- 20 mm S/2021/0220	1	309.0	2.423	2.358 - 2.581
	2	308.8	2.422	
	3	309.4	2.426	
- 25 mm S/2021/0221	1	491.0	3.851	3.676 - 4.023
	2	491.9	3.858	
	3	493.3	3.869	
32 mm S/2021/0222	1	793.6	6.224	6.026 - 6.593
	2	789.5	6.192	
	3	793.8	6.226	

Conclusion:

Tensile properties and mass per metre of all specimens comply with BS 4449:2005+A2:2009 standards.

1. Samples were handed over to R&D by - Quality Manager, Captain Steel (Pvt) Ltd,
No.249/3, Waikkiyawatta Road, Pahala
Bomiriya, Kaduwela.

2. Results of the test valid only for the sample sent to the laboratory.

Tested by: *for U.K.M. Viduranga*
Name: U.K.M. Viduranga
Designation: Research Assistant
Date: 12-Feb-2021

Checked by: *J.K.B.P. Jayasooriya*
Name: J.K.B.P. Jayasooriya
Designation: Research Assistant
Date: 17-Feb-2021

Authorized by: *A.W.C. Chamikara*
Name: A.W.C. Chamikara
Designation: Material Engineer
Date: 17-Feb-2021



ROAD DEVELOPMENT AUTHORITY (RDA)

Concrete Laboratory

Research & Development Division

P.O. Box 14, Borupana Road, Ratmalana, Sri Lanka.

Tel: 0112 650684 Fax: 01125656056



Source : Not Mentioned

Lab Ref. No: LR/2021/0060

Brand : CAPTAIN RB 500

Sample No : S/2021/0216 - 08 mm
S/2021/0217 - 10 mm
S/2021/0218 - 12 mm
S/2021/0219 - 16 mm
S/2021/0220 - 20 mm
S/2021/0221 - 25 mm
S/2021/0222 - 32 mm

Sample Size		Tensile Strength (MPa)	Yield Strength (MPa)	Strength Ratio (Tensile Strength/Yield Strength)	Elongation After Fracture (%)	Elongation at Maximum Force (%)
- 08 mm S/2021/0216	1	619.2	532.3	1.16	15.0	13.3
	2	615.9	528.9	1.16	16.0	14.0
	3	619.3	540.4	1.15	16.0	13.9
- 10 mm S/2021/0217	1	678.5	602.9	1.13	17.0	13.5
	2	674.3	592.1	1.14	16.0	13.3
	3	668.9	577.2	1.16	15.0	12.2
- 12 mm S/2021/0218	1	647.1	551.9	1.17	17.0	14.0
	2	658.8	567.0	1.16	20.0	15.8
	3	650.6	560.6	1.16	19.0	16.1
Specified Absolute Values		-	485 - 650	>1.06	-	>4.0

Conclusion:

Tensile properties and mass per metre of all specimens comply with BS 4449:2005+A2:2009 standards.

1. Samples were handed over to R&D by - Quality Manager, Captain Steel (Pvt) Ltd, No.249/3, Waikkiyawatta Road, Pahala Bomiriya, Kaduwela.
2. Results of the test valid only for the sample sent to the laboratory.

tested by:

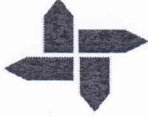
Name: U.K.M.Viduranga
Designation: Research Assistant
Date: 12-Feb-2021

Checked by:

Name: J.K.B.P.Payasooriya
Designation: Research Assistant
Date: 17-Feb-2021

Authorized by:

Name: A.W.C.Chamikara
Designation: Material Engineer
Date: 17-Feb-2021



ROAD DEVELOPMENT AUTHORITY (RDA)

Concrete Laboratory

Research & Development Division

P.O. Box 14, Borupana Road, Ratmalana, Sri Lanka.

Tel: 0112 650684 Fax: 01125656056



Source : Not Mentioned

Sample No : S/2021/0216 - 08 mm
S/2021/0217 - 10 mm
S/2021/0218 - 12 mm
S/2021/0219 - 16 mm
S/2021/0220 - 20 mm
S/2021/0221 - 25 mm
S/2021/0222 - 32 mm

Lab Ref. No: LR/2021/0060

Brand : CAPTAIN RB 500

Sample Size		Tensile Strength (MPa)	Yield Strength (MPa)	Strength Ratio (Tensile Strength/Yield Strength)	Elongation After Fracture (%)	Elongation at Maximum Force (%)
- 16 mm S/2021/0219	1	730.4	636.0	1.15	18.0	14.2
	2	724.7	630.1	1.15	18.0	14.4
	3	722.8	632.0	1.14	17.0	13.1
- 20 mm S/2021/0220	1	704.2	599.1	1.18	17.0	13.2
	2	712.8	609.4	1.17	19.0	14.7
	3	703.1	599.5	1.17	18.0	13.5
- 25 mm S/2021/0221	1	662.9	559.6	1.18	25.0	18.7
	2	661.9	559.0	1.18	26.0	19.7
	3	658.4	554.7	1.19	25.0	18.6
- 32 mm S/2021/0222	1	704.2	523.3	1.35	33.0	24.5
	2	667.6	510.3	1.31	30.0	23.0
	3	701.5	503.5	1.39	31.0	24.3
Specified Absolute Values		-	485 - 650	>1.06	-	>4.0

Conclusion:

Tensile properties and mass per metre of all specimens comply with BS 4449:2005+A2:2009 standards.

1. Samples were handed over to R&D by - Quality Manager, Captain Steel (Pvt) Ltd,
No.249/3, Waikkiyawatta Road, Pahala
Bomiriya, Kaduwela.

2. Results of the test valid only for the sample sent to the laboratory.

Tested by:

Name: U.K.M. Viduranga
Designation: Research Assistant
Date: 12-Feb-2021

Checked by:

Name: J.K.B.P. Jayasooriya
Designation: Research Assistant
Date: 17-Feb-2021

Authorized by:

Name: A.W.C. Chamikara
Designation: Material Engineer
Date: 17-Feb-2021



DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING

University of Moratuwa

Moratuwa, Sri Lanka

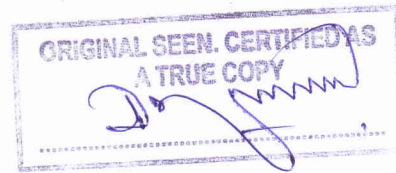
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Fax: +94 11 2650622

Direct Tel / Fax: +94 11 2650465

www.mrt.ac.lk/material/

**TESTING OF "Captain" BRAND REINFORCEMENT
STEEL BARS**
Report No: UM/MT/132/01/21

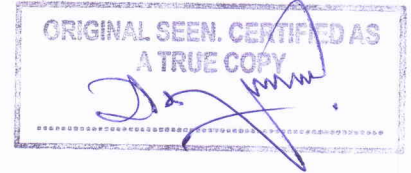


Date : 08th February 2021

Client : Director,
Research & Development,
Research & Development Division,
Road Development Authority,
Borupana Road,
Rathmalana.

TESTING OF "Captain" BRAND REINFORCEMENT STEEL BARS

Report No : UM/MT/132/01/21
Client : Director,
Research & Development,
Research & Development Division,
Road Development Authority,
Borupana Road,
Rathmalana.



Client's reference : Letters Dated 27th January and 02nd February 2021
Particulars of Samples : Samples of 8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm and 32mm "Captain" Brand Reinforcement Steel Bars.

Type of Test	Diameter	Lab Sample No's
Chemical Composition	8 mm	S/2021/0216
	10mm	S/2021/0217
	12mm	S/2021/0218
	16mm	S/2021/0219
	20mm	S/2021/0220
	25mm	S/2021/0221
	32mm	S/2021/0222

Tests Performed : Chemical composition as per BS 4449: 2005+A2:2009 Standards

Results :

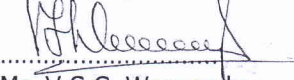
Chemical Composition :

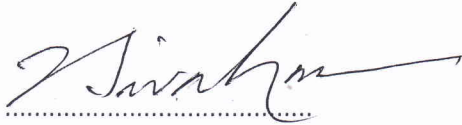
Sample Size	Element (%) by Mass				
	C	S	P	Cu	Carbon Equivalent
8 mm	0.197	0.030	0.032	0.276	0.34
10 mm	0.196	0.014	0.018	0.007	0.33
12 mm	0.194	0.025	0.015	0.006	0.33
16 mm	0.209	0.041	0.021	0.006	0.35
20 mm	0.206	0.043	0.020	0.007	0.35
25 mm	0.218	0.028	0.014	0.007	0.35
32 mm	0.217	0.033	0.020	0.006	0.35
Specification (Maximum)	0.240	0.055	0.055	0.850	0.52

Conclusion :

Chemical compositions of all specimens comply with BS 4449: 2005+A2:2009 standards.

Report prepared by:


Mr. V.S.C. Weragoda
Senior Lecturer,
Department of Materials Science and Engineering


Mr. V. Sivahar,
Head, Department of Materials Science and Engineering,
University of Moratuwa.

This report refers specifically to the samples submitted for testing to the Department of Materials Science and Engineering at University of Moratuwa.



DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING

University of Moratuwa

Moratuwa, Sri Lanka

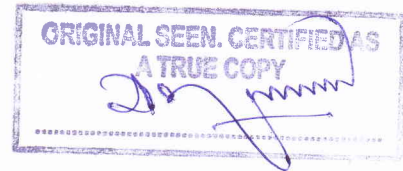
Tele: +94 11 2640440, +94 11 2650301 Ext : 5100

Fax: +94 11 2650622

Direct Tel / Fax: +94 11 2650465

www.mrt.ac.lk/material/

TESTING OF "Captain" BRAND REINFORCEMENT
STEEL BARS
Report No: UM/MT/127/01/21



Date : 08th February 2021

Client : Director,
Research & Development,
Research & Development Division,
Road Development Authority,
Borupana Road,
Rathmalana.

TESTING OF "Captain" BRAND REINFORCEMENT STEEL BARS

Report No : UM/MT/127/01/21

Client : Director,
Research & Development,
Research & Development Division,
Road Development Authority,
Borupana Road,
Rathmalana.

Client's reference : Letters Dated 27th January and 02nd February 2021

Particulars of Samples : Samples of 8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm and 32mm "Captain" Brand Reinforcement Steel Bars.
(Grade RB500 as per SLS 375)

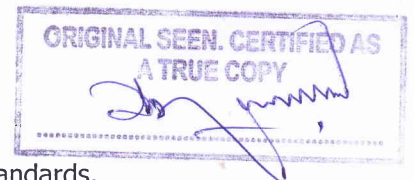
Type of Test	Diameter	Quantity	Lab Sample No's
Bend Test	8 mm	35 Nos.	S/2021/0216
	10mm		S/2021/0217
	12mm		S/2021/0218
Re – bend Test	16mm		S/2021/0219
	20mm		S/2021/0220
	25mm		S/2021/0221
	32mm	S/2021/0222	

Tests Performed : Bend and re-bend tests as per SLS: 375: 2009 Standards

Results :

Sample Size	Test Result	
	Bend Test	Re – bend Test
8 mm	Pass*	Pass*
10 mm	Pass*	Pass*
12 mm	Pass*	Pass*
16 mm	Pass*	Pass*
20 mm	Pass*	Pass*
25 mm	Pass*	Pass*
32 mm	Pass*	Pass*

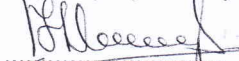
* All 05 specimens



Conclusion :

Bend and re-bend properties of all specimens comply with SLS 375:2009 standards.

Report prepared by:


.....

Mr. V.S.C. Weragoda
Senior Lecturer,
Department of Materials Science and Engineering


.....

Mr. V. Sivahar,
Head, Department of Materials Science and Engineering,
University of Moratuwa.

This report refers specifically to the samples submitted for testing to the Department of Materials Science and Engineering at University of Moratuwa.