TCR ENGINEERING

ISO/IEC 17025 : 2017
Accredited Testing Laboratory by
NABL
Vide Certificate No. TC - 6905
TC-6905

TCR Engineering Services Pvt. Ltd.
VKB House, EL-182 MIDC-TTC
Electronic Zone, Mahape
Navi Mumbai - 400 710, India
T: +91-9022137295 | W: www.tcreng.com

TEST REPORT

ULR - TC690523000010862F

T.C. No. : **CK9756** **Date:** 13-04-2023

Issued To. : **M/s DD Enterprises**
32, Madhuban Sai City, Talegaon Chakan Road, Talegaon, Dabhade, Pune-410507
Contact No.:9767164152,Email Id:ddgroup787@gmail.com

Party Ref.	:	Email	**Condition of Sample**	:	Test Piece
Ref. Date	:	28-03-2023	**Sample Received on**	:	30-03-2023
Description of Sample	:	Coupler with TMT Bars.			
Specification	:	IS 16172:2014 Grade 550D /EN 8D	**Testing Started on**	:	05-04-2023
Sample Drawn By	:	Party	**Date of Completion**	:	05-04-2023
Test Location	:	TCR Navi Mumbai	**Enclosure**	:	Annexure B
Test	:	Low Cycle Fatigue.			

Size 16mm

I. Mechanical Testing

1. Mechanical Properties of Metals

Low Cycle Fatigue Test. **Test Method : IS 16172 : 2014 (Amd.1-2019)**

Equipment : 250KN UTM ; Calibration Due Dt:01-12-2023 Test performed on : 05-04-2023

Rebar nominal diameter (mm).	16.00
Nominal cross-sectional area (mm^2).	201.20
Upper Stress (N/mm^2).	+173
Lower Stress (N/mm^2).	-173
Upper Load (kN).	+34.80
Lower Load (kN).	-34.80
Test frequency (Hz).	0.35
Wave form.	Sinusoidal
Specified minimum number of cycles to be Sustain.	10000
Sustained no. of cycles.	10000
Visual observation.	The specimen does not fail at the end of 10000 cycles.
Ultimate Tensile Load (N) After 10000 cycles	126790
U.T.S (N/mm^2) After 10000 cycles.	630.17

******END OF REPORT******

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(HEAD - Corrosion)

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Navi Mumbai - 400 710, India
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TEST REPORT

ULR - TC690523000010863F
Date: 13-04-2023

T.C. No. : **CK9757**
Issued To. : **M/s DD Enterprises**
32, Madhuban Sai City, Talegaon Chakan Road, Talegaon, Dabhade, Pune-410507
Contact No.:9767164152,Email Id:ddgroup787@gmail.com

Party Ref.	:	Email	**Condition of Sample**	:	Test Piece
Ref. Date	:	28-03-2023	**Sample Received on**	:	30-03-2023
Description of Sample	:	Coupler with TMT Bars.			
Specification	:	IS 16172:2014 Grade 550D /EN 8D	**Testing Started on**	:	06-04-2023
Sample Drawn By	:	Party	**Date of Completion**	:	06-04-2023
Test Location	:	TCR Navi Mumbai	**Enclosure**	:	Annexure B
Test	:	Low Cycle Fatigue.			

Size 16mm

I. Mechanical Testing

1. Mechanical Properties of Metals

Low Cycle Fatigue Test. **Test Method : IS 16172 : 2014 (Amd.1-2019)**
Equipment : 250KN UTM ; Calibration Due Dt:01-12-2023 Test performed on : 06-04-2023

Rebar nominal diameter (mm).	16.00
Nominal cross-sectional area (mm^2).	201.20
Upper Stress (N/mm^2).	+173
Lower Stress (N/mm^2).	-173
Upper Load (kN).	+34.80
Lower Load (kN).	-34.80
Test frequency (Hz).	0.35
Wave form.	Sinusoidal
Specified minimum number of cycles to be Sustain.	10000
Sustained no. of cycles.	10000
Visual observation.	The specimen does not fail at the end of 10000 cycles.
Ultimate Tensile Load (N) After 10000 cycles	133310
U.T.S (N/mm^2) After 10000 cycles.	662.57

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TEST REPORT

ULR - TC690523000010864F
Date: 13-04-2023

T.C. No. : **CK9758**
Issued To. : **M/s DD Enterprises**
32, Madhuban Sai City, Talegaon Chakan Road, Talegaon, Dabhade, Pune-410507
Contact No.:9767164152,Email Id:ddgroup787@gmail.com

Party Ref.	:	Email	**Condition of Sample**	:	Test Piece
Ref. Date	:	28-03-2023	**Sample Received on**	:	30-03-2023
Description of Sample	:	Coupler with TMT Bars.			
Specification	:	IS 16172:2014 Grade 550D /EN 8D	**Testing Started on**	:	06-04-2023
Sample Drawn By	:	Party	**Date of Completion**	:	06-04-2023
Test Location	:	TCR Navi Mumbai	**Enclosure**	:	Annexure B
Test	:	Low Cycle Fatigue.			

Size 16mm

I. Mechanical Testing

1. Mechanical Properties of Metals

Low Cycle Fatigue Test. **Test Method : IS 16172 : 2014 (Amd.1-2019)**

Equipment : 250KN UTM ; Calibration Due Dt:01-12-2023 Test performed on : 06-04-2023

Rebar nominal diameter (mm).	16.00
Nominal cross-sectional area (mm^2).	201.20
Upper Stress (N/mm^2).	+173
Lower Stress (N/mm^2).	-173
Upper Load (kN).	+34.80
Lower Load (kN).	-34.80
Test frequency (Hz).	0.35
Wave form.	Sinusoidal
Specified minimum number of cycles to be Sustain.	10000
Sustained no. of cycles.	10000
Visual observation.	The specimen does not fail at the end of 10000 cycles.
Ultimate Tensile Load (N) After 10000 cycles	138110
U.T.S (N/mm^2) After 10000 cycles.	686.43

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TEST REPORT

ULR - TC690523000010865F

T.C. No. : **CK9762** **Date:** 13-04-2023

Issued To. : **M/s DD Enterprises**
32, Madhuban Sai City, Talegaon Chakan Road, Talegaon, Dabhade, Pune-410507
Contact No.:9767164152,Email Id:ddgroup787@gmail.com

Party Ref.	:	Email	**Condition of Sample**	:	Test Piece
Ref. Date	:	28-03-2023	**Sample Received on**	:	30-03-2023
Description of Sample	:	Coupler with TMT Bars.			
Specification	:	IS 16172:2014 Grade 550D /EN 8D	**Testing Started on**	:	06-04-2023
Sample Drawn By	:	Party	**Date of Completion**	:	06-04-2023
Test Location	:	TCR Navi Mumbai	**Enclosure**	:	Annexure B
Test	:	Low Cycle Fatigue.			

Size 25mm

I. Mechanical Testing

1. Mechanical Properties of Metals

Low Cycle Fatigue Test. **Test Method : IS 16172 : 2014 (Amd.1-2019)**

Equipment : 250KN UTM ; Calibration Due Dt:01-12-2023 Test performed on : 06-04-2023

Rebar nominal diameter (mm).	25.00
Nominal cross-sectional area (mm^2).	491.10
Upper Stress (N/mm^2).	+173
Lower Stress (N/mm^2).	-173
Upper Load (kN).	+84.96
Lower Load (kN).	-84.96
Test frequency (Hz).	0.35
Wave form.	Sinusoidal
Specified minimum number of cycles to be Sustain.	10000
Sustained no. of cycles.	10000
Visual observation.	The specimen does not fail at the end of 10000 cycles.
Ultimate Tensile Load (N) After 10000 cycles	331870
U.T.S (N/mm^2) After 10000 cycles.	675.77

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TEST REPORT

ULR - TC690523000010866F

Date: 13-04-2023

T.C. No. : **CK9763**

Issued To. : **M/s DD Enterprises**
32, Madhuban Sai City, Talegaon Chakan Road, Talegaon, Dabhade, Pune-410507
Contact No.:9767164152,Email Id:ddgroup787@gmail.com

Party Ref.	:	Email	**Condition of Sample**	:	Test Piece
Ref. Date	:	28-03-2023	**Sample Received on**	:	30-03-2023
Description of Sample	:	Coupler with TMT Bars.			
Specification	:	IS 16172:2014 Grade 550D /EN 8D	**Testing Started on**	:	07-04-2023
Sample Drawn By	:	Party	**Date of Completion**	:	07-04-2023
Test Location	:	TCR Navi Mumbai	**Enclosure**	:	Annexure B
Test	:	Low Cycle Fatigue.			

Size 25mm

I. Mechanical Testing

1. Mechanical Properties of Metals

Low Cycle Fatigue Test. **Test Method : IS 16172 : 2014 (Amd.1-2019)**

Equipment : 250KN UTM ; Calibration Due Dt:01-12-2023 Test performed on : 07-04-2023

Rebar nominal diameter (mm).	25.00
Nominal cross-sectional area (mm^2).	491.10
Upper Stress (N/mm^2).	+173
Lower Stress (N/mm^2).	-173
Upper Load (kN).	+84.96
Lower Load (kN).	-84.96
Test frequency (Hz).	0.35
Wave form.	Sinusoidal
Specified minimum number of cycles to be Sustain.	10000
Sustained no. of cycles.	10000
Visual observation.	The specimen does not fail at the end of 10000 cycles.
Ultimate Tensile Load (N) After 10000 cycles	362260
U.T.S (N/mm^2) After 10000 cycles.	737.65

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TEST REPORT

ULR - TC690523000010867F

T.C. No. : **CK9764** **Date:** 13-04-2023

Issued To. : **M/s DD Enterprises**
32, Madhuban Sai City, Talegaon Chakan Road, Talegaon, Dabhade, Pune-410507
Contact No.:9767164152,Email Id:ddgroup787@gmail.com

Party Ref.	:	Email	**Condition of Sample**	:	Test Piece
Ref. Date	:	28-03-2023	**Sample Received on**	:	30-03-2023
Description of Sample	:	Coupler with TMT Bars.			
Specification	:	IS 16172:2014 Grade 550D /EN 8D	**Testing Started on**	:	07-04-2023
Sample Drawn By	:	Party	**Date of Completion**	:	07-04-2023
Test Location	:	TCR Navi Mumbai	**Enclosure**	:	Annexure B
Test	:	Low Cycle Fatigue.			

Size 25mm

I. Mechanical Testing

1. Mechanical Properties of Metals

Low Cycle Fatigue Test. **Test Method : IS 16172 : 2014 (Amd.1-2019)**

Equipment : 250KN UTM ; Calibration Due Dt:01-12-2023 Test performed on : 07-04-2023

Rebar nominal diameter (mm).	25.00
Nominal cross-sectional area (mm^2).	491.10
Upper Stress (N/mm^2).	+173
Lower Stress (N/mm^2).	-173
Upper Load (kN).	+84.96
Lower Load (kN).	-84.96
Test frequency (Hz).	0.35
Wave form.	Sinusoidal
Specified minimum number of cycles to be Sustain.	10000
Sustained no. of cycles.	10000
Visual observation.	The specimen does not fail at the end of 10000 cycles.
Ultimate Tensile Load (N) After 10000 cycles	355600
U.T.S (N/mm^2) After 10000 cycles.	724.09

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TEST REPORT

ULR - TC690523000010868F
Date: 13-04-2023

T.C. No. : **CK9765**
Issued To. : **M/s DD Enterprises**
32, Madhuban Sai City, Talegaon Chakan Road, Talegaon, Dabhade, Pune-410507
Contact No.:9767164152,Email Id:ddgroup787@gmail.com

Party Ref.	:	Email	**Condition of Sample**	:	Test Piece
Ref. Date	:	28-03-2023	**Sample Received on**	:	30-03-2023
Description of Sample	:	Coupler with TMT Bars.			
Specification	:	IS 16172:2014 Grade 550D /EN 8D	**Testing Started on**	:	08-04-2023
Sample Drawn By	:	Party	**Date of Completion**	:	08-04-2023
Test Location	:	TCR Navi Mumbai	**Enclosure**	:	Annexure B
Test	:	Low Cycle Fatigue.			

Size 32mm

I. Mechanical Testing

1. Mechanical Properties of Metals

Low Cycle Fatigue Test. **Test Method : IS 16172 : 2014 (Amd.1-2019)**

Equipment : 250KN UTM ; Calibration Due Dt:01-12-2023 Test performed on : 08-04-2023

Rebar nominal diameter (mm).	32.00
Nominal cross-sectional area (mm^2).	804.60
Upper Stress (N/mm^2).	+173
Lower Stress (N/mm^2).	-173
Upper Load (kN).	+139.19
Lower Load (kN).	-139.19
Test frequency (Hz).	0.35
Wave form.	Sinusoidal
Specified minimum number of cycles to be Sustain.	10000
Sustained no. of cycles.	10000
Visual observation.	The specimen does not fail at the end of 10000 cycles.
Ultimate Tensile Load (N) After 10000 cycles	580340
U.T.S (N/mm^2) After 10000 cycles.	721.28

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TEST REPORT

ULR - TC690523000010869F

Date: 13-04-2023

T.C. No.	:	**CK9766**
Issued To.	:	**M/s DD Enterprises** 32, Madhuban Sai City, Talegaon Chakan Road, Talegaon, Dabhade, Pune-410507 Contact No.:9767164152,Email Id:ddgroup787@gmail.com

Party Ref.	:	Email	**Condition of Sample**	:	Test Piece
Ref. Date	:	28-03-2023	**Sample Received on**	:	30-03-2023
Description of Sample	:	Coupler with TMT Bars.			
Specification	:	IS 16172:2014 Grade 550D /EN 8D	**Testing Started on**	:	08-04-2023
Sample Drawn By	:	Party	**Date of Completion**	:	08-04-2023
Test Location	:	TCR Navi Mumbai	**Enclosure**	:	Annexure B
Test	:	Low Cycle Fatigue.			

Size 32mm

I. Mechanical Testing

1. Mechanical Properties of Metals

Low Cycle Fatigue Test. **Test Method : IS 16172 : 2014 (Amd.1-2019)**

Equipment : 250KN UTM ; Calibration Due Dt:01-12-2023 Test performed on : 08-04-2023

Rebar nominal diameter (mm).	32.00
Nominal cross-sectional area (mm^2).	804.60
Upper Stress (N/mm^2).	+173
Lower Stress (N/mm^2).	-173
Upper Load (kN).	+139.19
Lower Load (kN).	-139.19
Test frequency (Hz).	0.35
Wave form.	Sinusoidal
Specified minimum number of cycles to be Sustain.	10000
Sustained no. of cycles.	10000
Visual observation.	The specimen does not fail at the end of 10000 cycles.
Ultimate Tensile Load (N) After 10000 cycles	552610
U.T.S (N/mm^2) After 10000 cycles.	686.81

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TEST REPORT

ULR - TC690523000010870F

Date: 13-04-2023

T.C. No. : **CK9767**

Issued To. : **M/s DD Enterprises**
32, Madhuban Sai City, Talegaon Chakan Road, Talegaon, Dabhade, Pune-410507
Contact No.:9767164152,Email Id:ddgroup787@gmail.com

Party Ref.	:	Email	**Condition of Sample**	:	Test Piece
Ref. Date	:	28-03-2023	**Sample Received on**	:	30-03-2023
Description of Sample	:	Coupler with TMT Bars.			
Specification	:	IS 16172:2014 Grade 550D /EN 8D	**Testing Started on**	:	10-04-2023
Sample Drawn By	:	Party	**Date of Completion**	:	10-04-2023
Test Location	:	TCR Navi Mumbai	**Enclosure**	:	Annexure B
Test	:	Low Cycle Fatigue.			

Size 32mm

I. Mechanical Testing

1. Mechanical Properties of Metals

Low Cycle Fatigue Test. **Test Method : IS 16172 : 2014 (Amd.1-2019)**

Equipment : 250KN UTM ; Calibration Due Dt:01-12-2023 Test performed on : 10-04-2023

Rebar nominal diameter (mm).	32.00
Nominal cross-sectional area (mm^2).	804.60
Upper Stress (N/mm^2).	+173
Lower Stress (N/mm^2).	-173
Upper Load (kN).	+139.19
Lower Load (kN).	-139.19
Test frequency (Hz).	0.35
Wave form.	Sinusoidal
Specified minimum number of cycles to be Sustain.	10000
Sustained no. of cycles.	10000
Visual observation.	The specimen does not fail at the end of 10000 cycles.
Ultimate Tensile Load (N) After 10000 cycles	566030
U.T.S (N/mm^2) After 10000 cycles.	703.49

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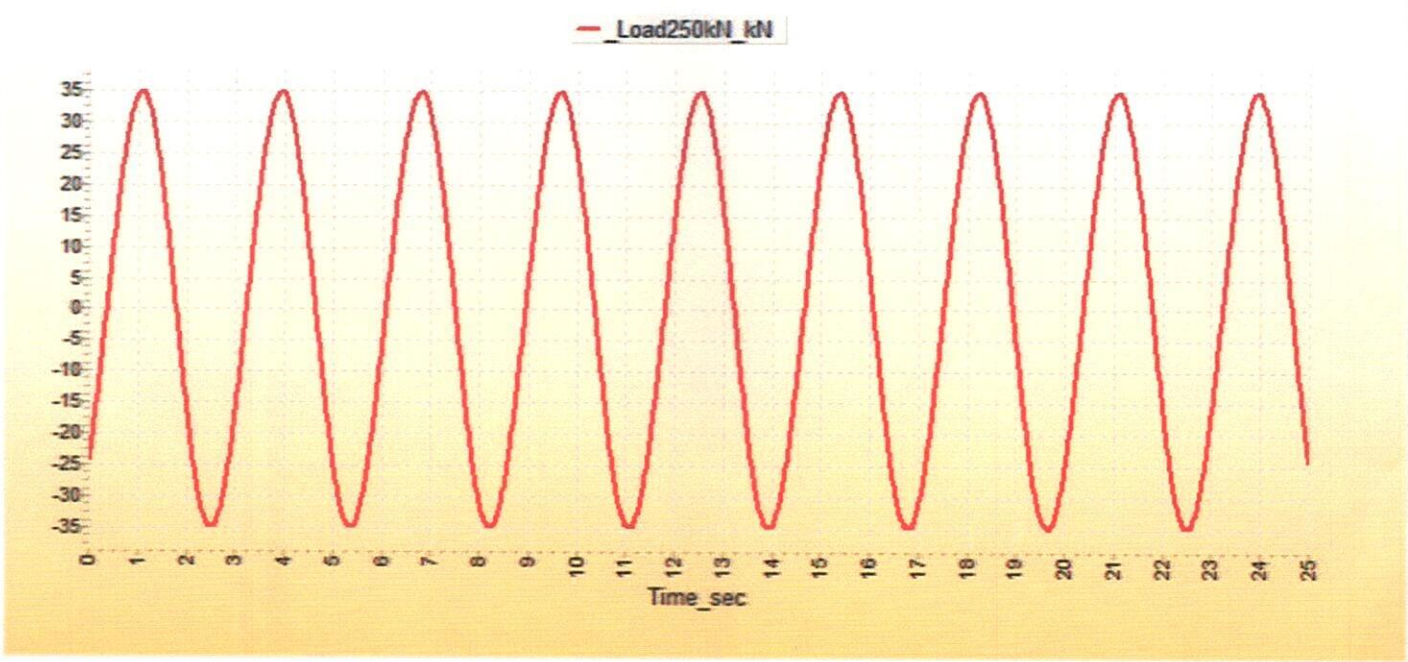
(HEAD - Corrosion)

TEST REPORT

Annexure B

Low Cycle Fatigue Test (IS 16172:2014)	
TC No. : CK9756	Date: 05-04-2023



Load [kN] Vs Time [sec]

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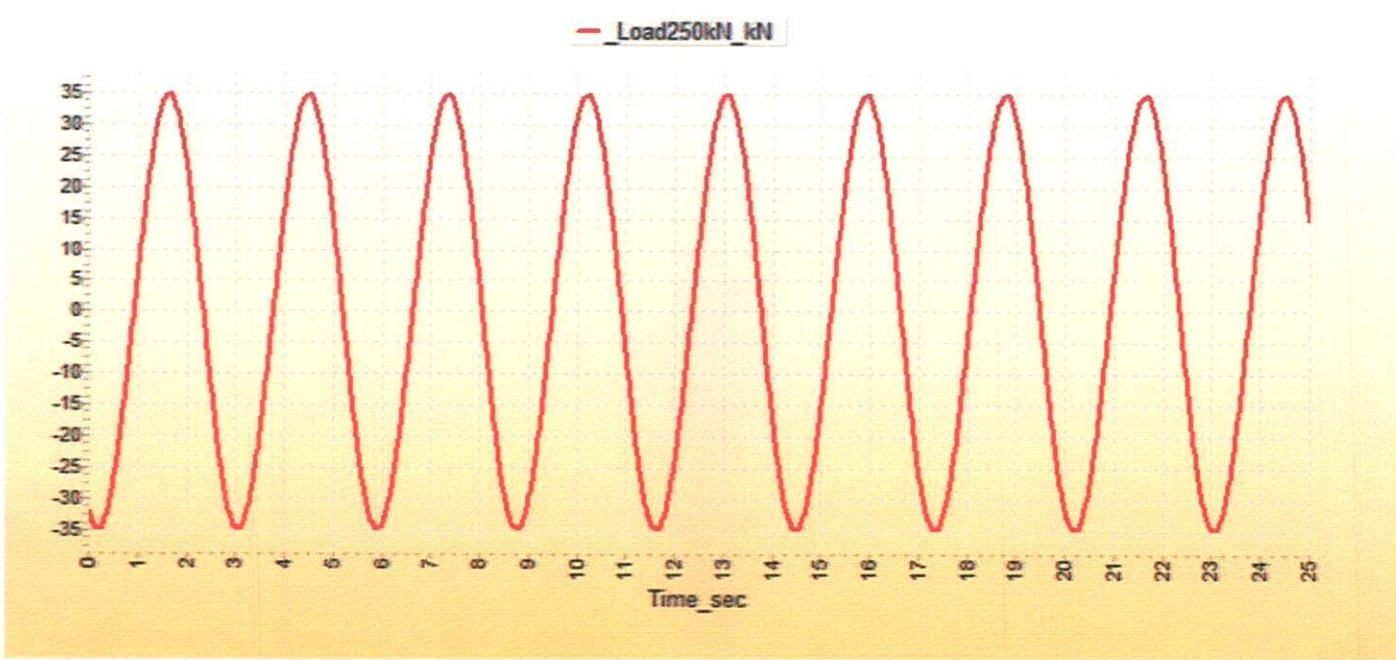
TEST REPORT

Annexure B

Low Cycle Fatigue Test (IS 16172:2014)	
TC No. : CK9757	Date: 06-04-2023



Load [kN] Vs Time [sec]

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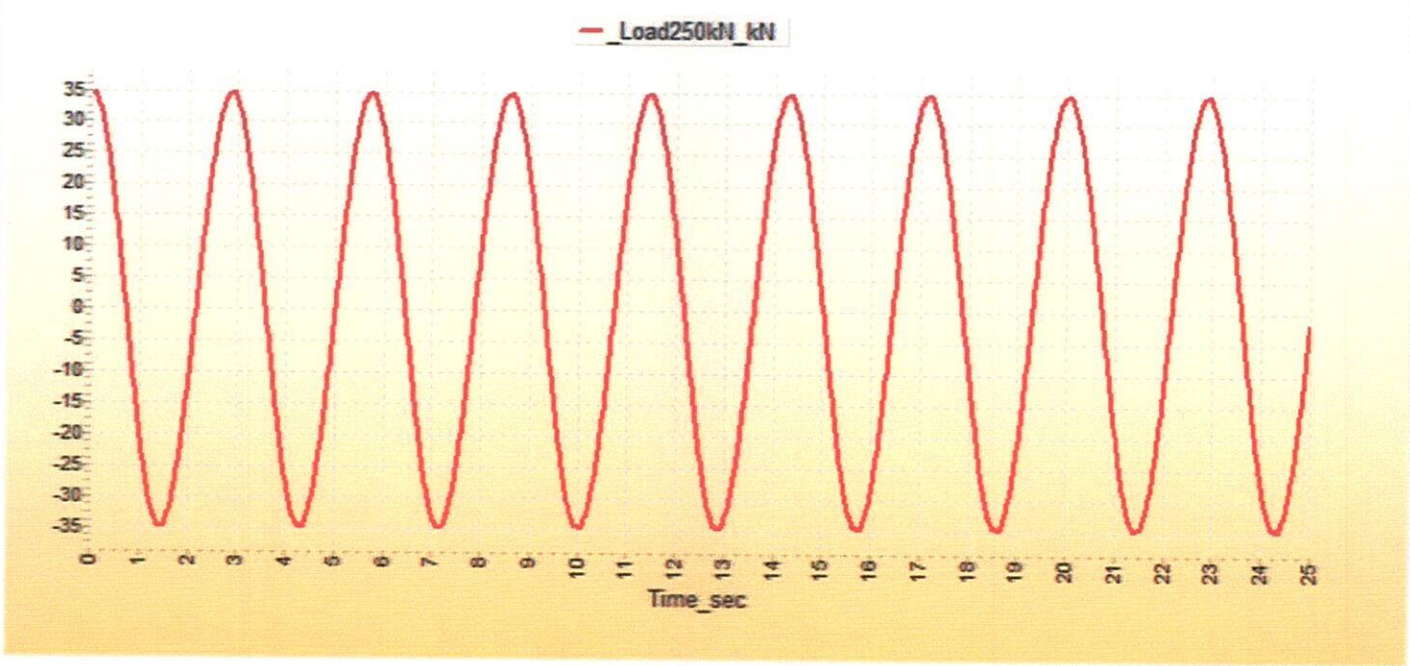
TEST REPORT

Annexure B

Low Cycle Fatigue Test (IS 16172:2014)

TC No. : CK9758 | Date: 06-04-2023



Load [kN] Vs Time [sec]

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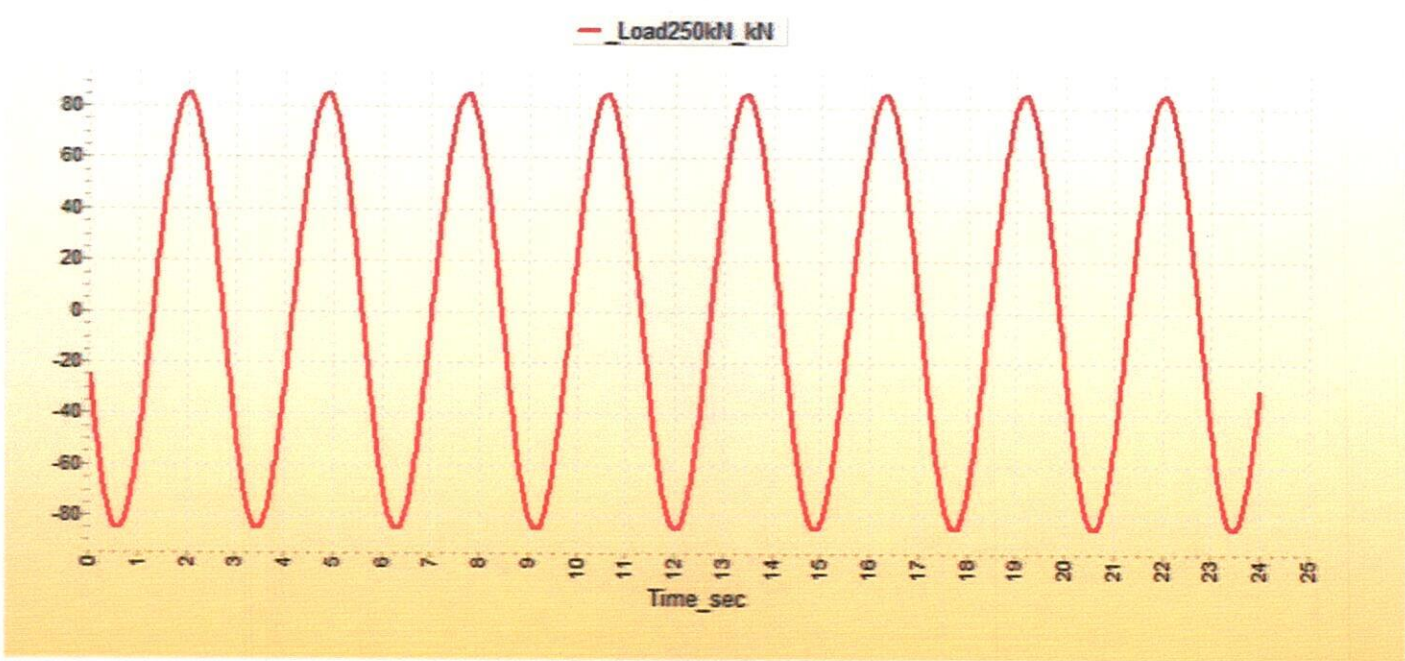
TEST REPORT

Annexure B

Low Cycle Fatigue Test (IS 16172:2014)

TC No. : CK9762 | Date: 06-04-2023



Load [kN] Vs Time [sec]

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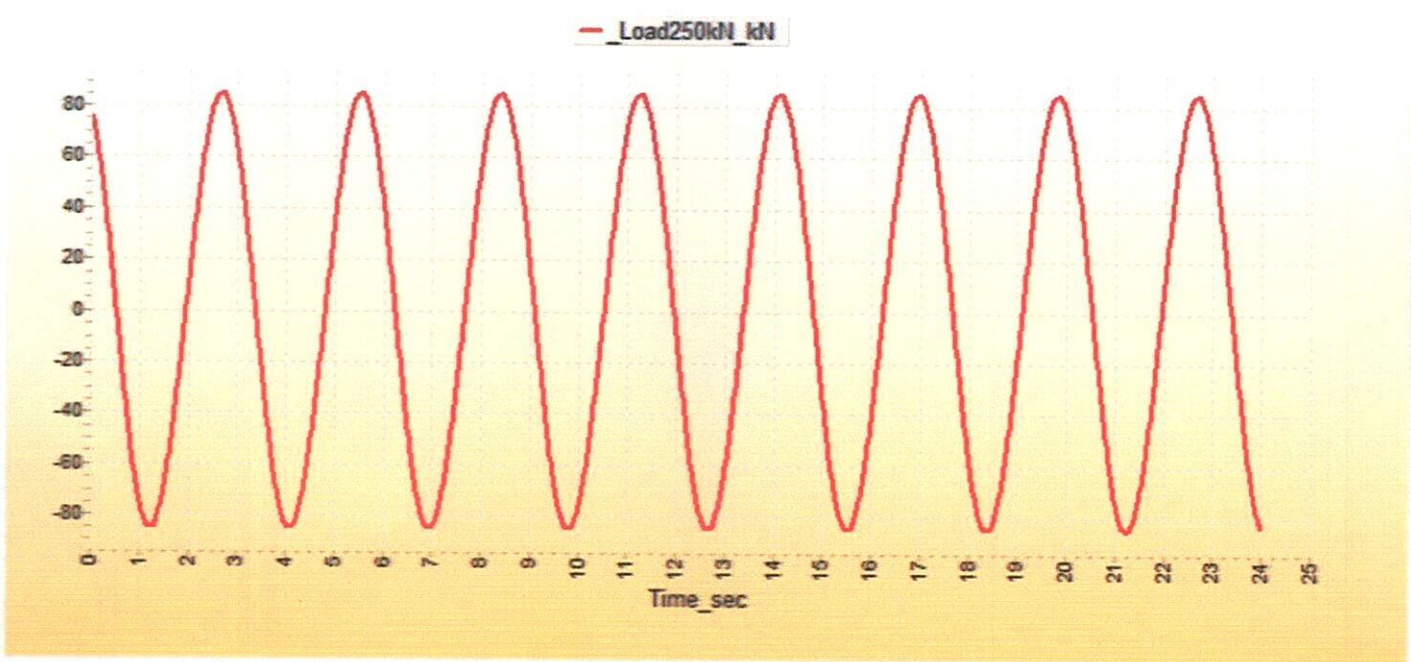
TEST REPORT

Annexure B

Low Cycle Fatigue Test (IS 16172:2014)

TC No. : CK9763 | Date: 07-04-2023



Load [kN] Vs Time [sec]

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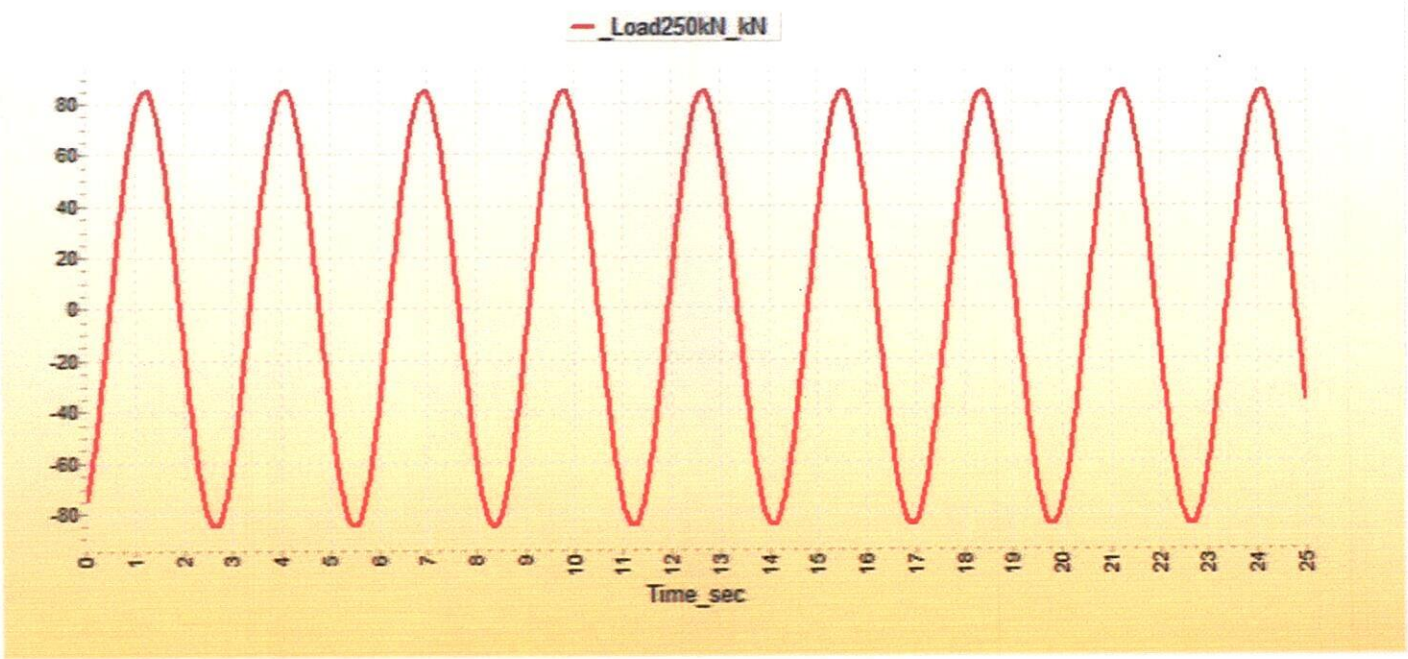
TEST REPORT

Annexure B

Low Cycle Fatigue Test (IS 16172:2014)	
TC No. : CK9764	Date: 07-04-2023



Load [kN] Vs Time [sec]

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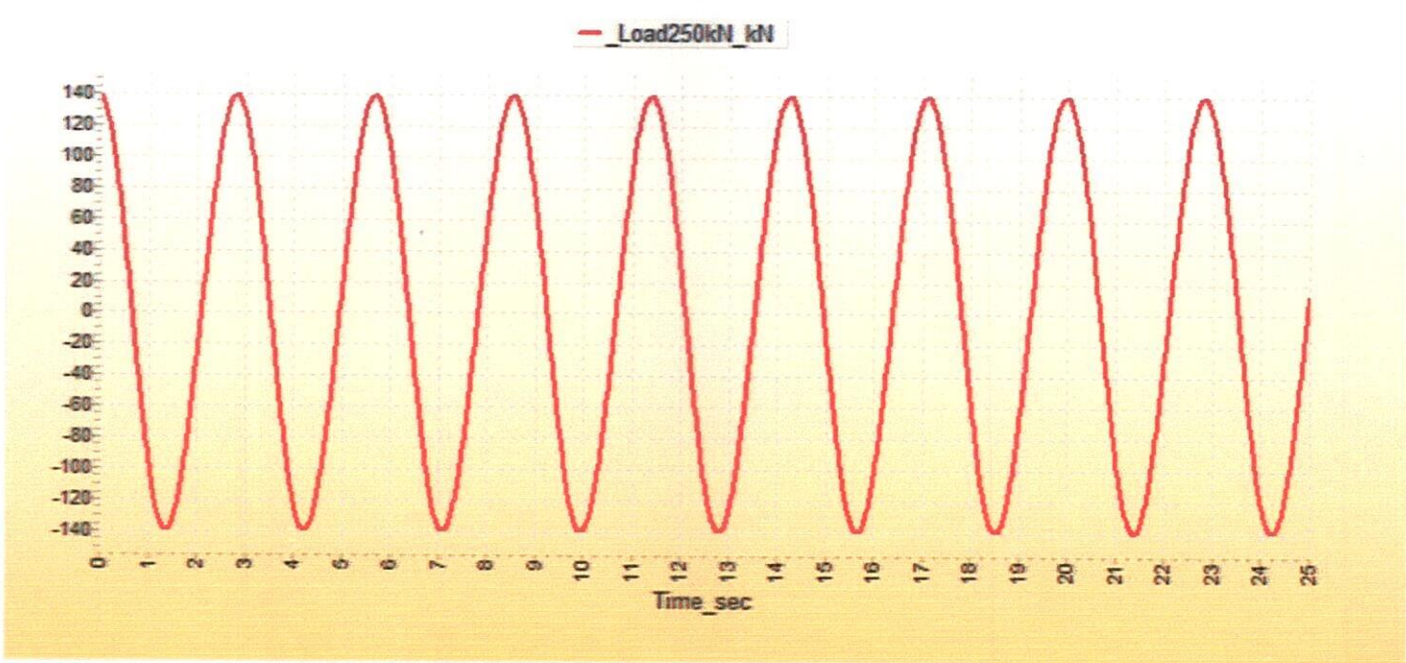
TEST REPORT

Annexure B

Low Cycle Fatigue Test (IS 16172:2014)	
TC No. : CK9765	Date: 08-04-2023



Load [kN] Vs Time [sec]

Checked by

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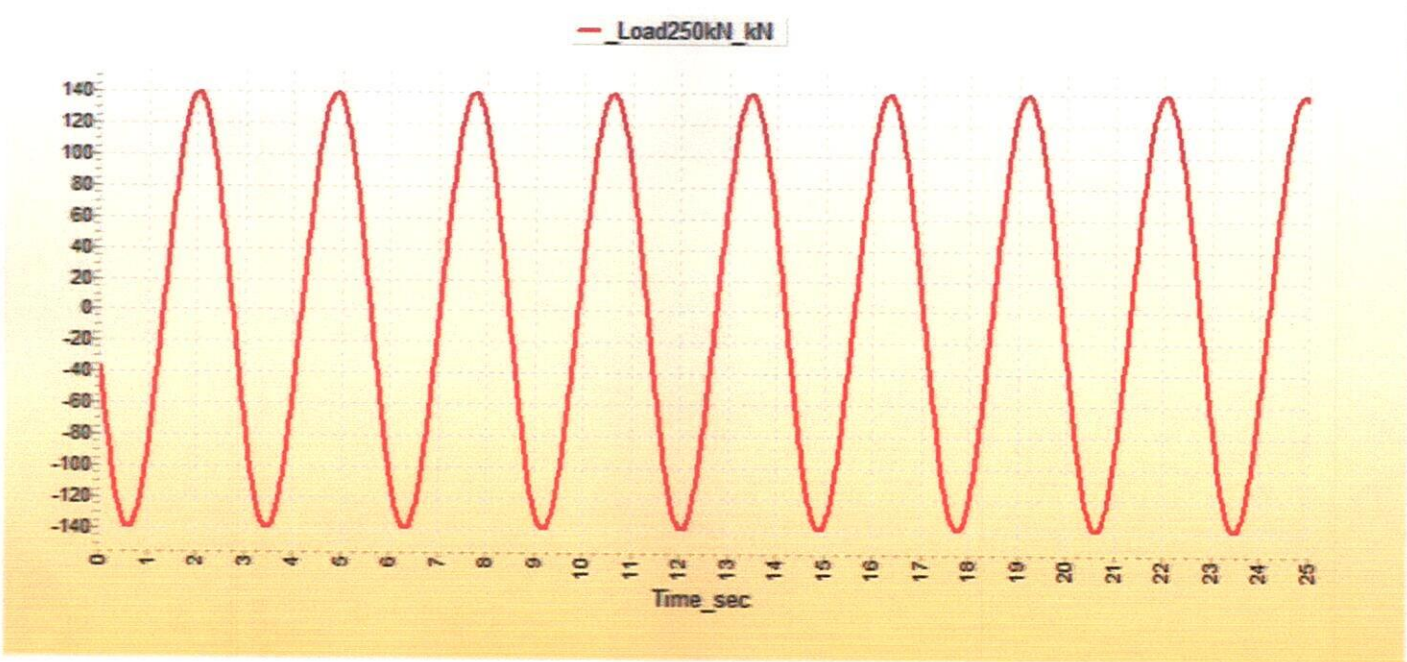
Electronic Zone, Mahape
Navi Mumbai - [illegible] India
T: +91-[illegible] W: www.tcreng.com

TEST REPORT

Annexure B

Low Cycle Fatigue Test (IS 16172:2014)

TC No. : CK9766 | Date: 08-04-2023



Load [kN] Vs Time [sec]

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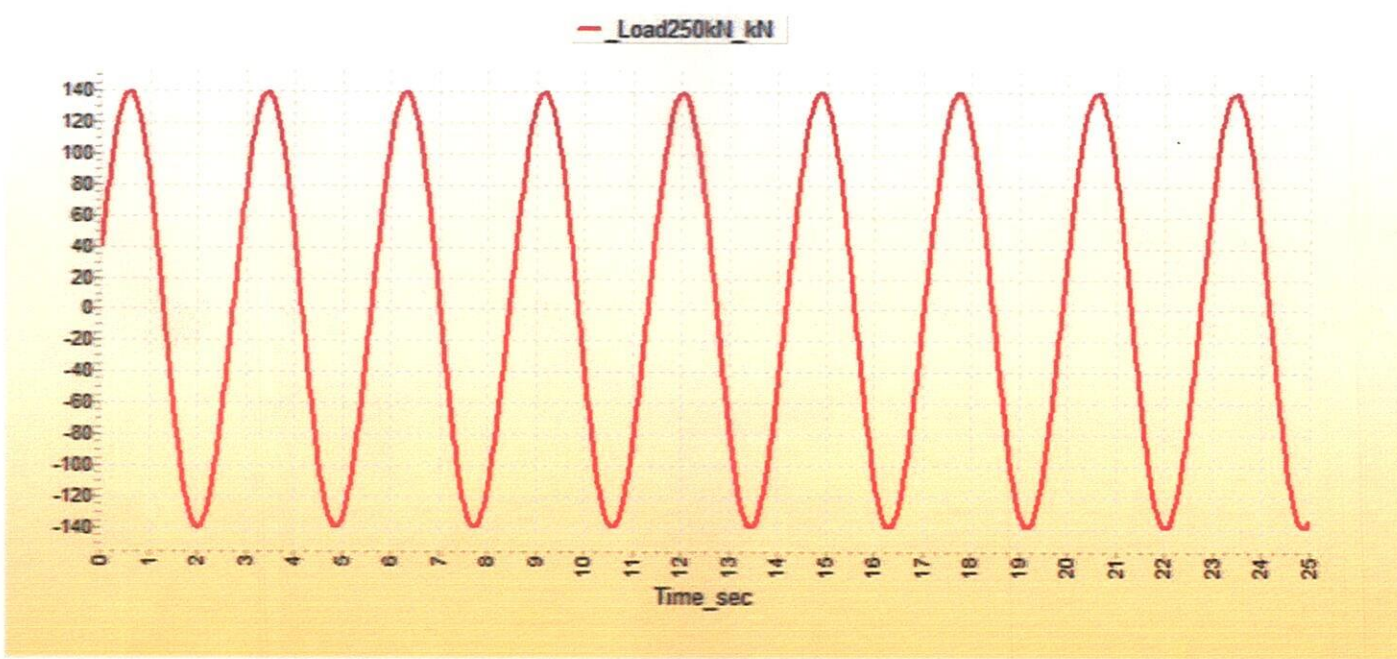
TEST REPORT

Annexure B

Low Cycle Fatigue Test (IS 16172:2014)	
TC No. : CK9767	Date: 10-04-2023



Load [kN] Vs Time [sec]

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