



**MILL TEST CERTIFICATE**

**Test Certificate No. 0000155113**

**Date : 27.08.2020**

To, M/s AK-SEL SELULOZ KAGIT SAN. VE TIC. TURKEY  
 A.S-TOZKOPARAN MAH.HALDUN TANER SOK.ALPARSLAN IS MRK.NO:27/1,TURKEY,PIN-00000

Page 1 of 9

**TEST RESULTS**

**Process of Manufacture : EAF->LRF->VD->CCM->RHF->Hot rolling**

(EAF - Electric Arc Furnace / LRF: Ladle Refining Furnace / VD : Vaccum Degassing / CCM : Continuous Casting Machine/ RHF : Re-Heating Furnace)

**Supply Condition:QUENCHED AND TEMPERED**

**Deoxidation : Fully Killed**

Material Grade : <b>ROCKHARD 450</b> Plate Dimension -Thickness x Width x Length : <b>8.000mm x 1500mm x 6800mm</b>																												
Heat No	Plate No	No.of Pcs.	Wt. MT	Chemical Analysis														Mechanical Properties										
				L/P	%C	%Mn	%S	%P	%Si	%Cu	%V	%Nb	%Mo	%Ni	%B	%Cr	N2	CE	YS	UTS	%EL*	Bend Test	Impact Value at(J)				Hardness	
																ppm		Mpa	Mpa		Mand. Rad.	I	II	III	Avg	Temp <sub>C</sub>	Orien	BHN
A01135/01G0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)							455
A01135/01G0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42										
A01135/03D0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)							455
A01135/03D0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42										
A01135/04B0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)							455
A01135/04B0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42										
A01135/04G0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)							455
<b>Sub Total</b>		<b>4</b>	<b>2.564</b>																									

Chemical and mechanical properties of the above heats conform to the grade mentioned.

**The above material supplied conforms to the specified dimensions and tolerances as per specifications and as per mutually agreed Technical delivery conditions.**

Purchase Order No. & Date: PROV/EXP/PLT/9067 20.03.2020  
 Despatch Advice No: 61963144  
 Truck/Wagon No. OD142249  
 \* Gauge Length: .

Prepared by SANGRAM\_APLATE  
 Preparation Date :27.08.2020 23:37:36  
 Printing Date 10.09.2020 & Time 10:11:20



**Authorised Signatory**  
**TSD PlateMill**  
**For, JINDAL STEEL & POWER LIMITED**



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**Test Certificate No. 0000155113**

**Date : 27.08.2020**

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Page 2 of 9

**TEST RESULTS**

**Process of Manufacture : EAF->LRF->VD->CCM->RHF->Hot rolling**

(EAF - Electric Arc Furnace / LRF: Ladle Refining Furnace / VD : Vaccum Degassing / CCM : Continuous Casting Machine/ RHF : Re-Heating Furnace)

**Supply Condition:QUENCHED  
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**Deoxidation : Fully Killed**

Material Grade : <b>ROCKHARD 450</b> Plate Dimension -Thickness x Width x Length : <b>8.000mm x 1500mm x 6800mm</b>																													
Heat No	Plate No	No.of Pcs.	Wt. MT	Chemical Analysis														Mechanical Properties											
				L/P	%C	%Mn	%S	%P	%Si	%Cu	%V	%Nb	%Mo	%Ni	%B	%Cr	N2	CE	YS	UTS	%EL*	Bend Test	Impact Value at(J)				Hardness		
																ppm		Mpa	Mpa		Mand. Rad.	I	II	III	Avg	Temp C	Orien	BHN	
A01135/04G0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
A01135/06A0	1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42				OK(4.0 T)							455	
A01135/06A0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
A01135/06G0	1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42				OK(4.0 T)							455	
A01135/06G0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
A01135/08F0	1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42				OK(4.0 T)							455	
A01135/08F0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
<b>Sub Total</b>	<b>7</b>	<b>4.487</b>																											

Chemical and mechanical properties of the above heats conform to the grade mentioned.  
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**TEST RESULTS**

**Process of Manufacture : EAF->LRF->VD->CCM->RHF->Hot rolling**

(EAF - Electric Arc Furnace / LRF: Ladle Refining Furnace / VD : Vaccum Degassing / CCM : Continuous Casting Machine/ RHF : Re-Heating Furnace)

**Supply Condition:QUENCHED  
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**Deoxidation : Fully Killed**

Material Grade : <b>ROCKHARD 450</b> Plate Dimension -Thickness x Width x Length : <b>8.000mm x 1500mm x 6800mm</b>																													
Heat No	Plate No	No.of Pcs.	Wt. MT	Chemical Analysis														Mechanical Properties											
				L/P	%C	%Mn	%S	%P	%Si	%Cu	%V	%Nb	%Mo	%Ni	%B	%Cr	N2	CE	YS	UTS	%EL*	Bend Test	Impact Value at(J)				Hardness		
																ppm		Mpa	Mpa		Mand. Rad.	I	II	III	Avg	Temp C	Orien	BHN	
A01135/09D0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)								455
A01135/09D0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
A01135/10E0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)								455
A01135/10E0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
A01135/11H0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)								455
A01135/11H0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
A01135/12I0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)								455
<b>Sub Total</b>		11	7.051																										

Chemical and mechanical properties of the above heats conform to the grade mentioned.  
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To, M/s AK-SEL SELULOZ KAGIT SAN. VE TIC. TURKEY  
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**TEST RESULTS**

**Process of Manufacture : EAF->LRF->VD->CCM->RHF->Hot rolling**

(EAF - Electric Arc Furnace / LRF: Ladle Refining Furnace / VD : Vaccum Degassing / CCM : Continuous Casting Machine/ RHF : Re-Heating Furnace)

**Supply Condition:QUENCHED  
AND TEMPERED**

**Deoxidation : Fully Killed**

Material Grade : <b>ROCKHARD 450</b> Plate Dimension -Thickness x Width x Length : <b>8.000mm x 1500mm x 6800mm</b>																													
Heat No	Plate No	No.of Pcs.	Wt. MT	Chemical Analysis														Mechanical Properties											
				L/P	%C	%Mn	%S	%P	%Si	%Cu	%V	%Nb	%Mo	%Ni	%B	%Cr	N2	CE	YS	UTS	%EL*	Bend Test		Impact Value at(J)				Hardness	
																ppm		Mpa	Mpa		Mand. Rad.	I	II	III	Avg	Temp C	Orien	BHN	
A01135/12I0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
A01135/13A0	1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42				OK(4.0 T)							455	
A01135/13A0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
A01135/14B0	1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42				OK(4.0 T)							455	
A01135/14B0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
A01135/15B0	1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42				OK(4.0 T)							455	
A01135/15B0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
<b>Sub Total</b>	14	8.974																											

Chemical and mechanical properties of the above heats conform to the grade mentioned.  
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**TEST RESULTS**

**Process of Manufacture : EAF->LRF->VD->CCM->RHF->Hot rolling**

(EAF - Electric Arc Furnace / LRF: Ladle Refining Furnace / VD : Vaccum Degassing / CCM : Continuous Casting Machine/ RHF : Re-Heating Furnace)

**Supply Condition:QUENCHED AND TEMPERED**

**Deoxidation : Fully Killed**

Material Grade : <b>ROCKHARD 450</b> Plate Dimension -Thickness x Width x Length : <b>8.000mm x 1500mm x 6800mm</b>																												
Heat No	Plate No	No.of Pcs.	Wt. MT	Chemical Analysis														Mechanical Properties										
				L/P	%C	%Mn	%S	%P	%Si	%Cu	%V	%Nb	%Mo	%Ni	%B	%Cr	N2	CE	YS	UTS	%EL*	Bend Test	Impact Value at(J)				Hardness	
																ppm		Mpa	Mpa		Mand. Rad.	I	II	III	Avg	Temp C	Orien	BHN
A01135/15D0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)							455
A01135/15D0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42										
A01135/18F0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)							455
A01135/18F0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42										
A01135/18J0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)							455
A01135/18J0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42										
A01135/24J0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)							455
<b>Sub Total</b>		18	11.538																									

Chemical and mechanical properties of the above heats conform to the grade mentioned.  
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Purchase Order No. & Date: PROV/EXP/PLT/9067 20.03.2020  
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**TEST RESULTS**

**Process of Manufacture : EAF->LRF->VD->CCM->RHF->Hot rolling**

(EAF - Electric Arc Furnace / LRF: Ladle Refining Furnace / VD : Vaccum Degassing / CCM : Continuous Casting Machine/ RHF : Re-Heating Furnace)

**Supply Condition:QUENCHED AND TEMPERED**

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Material Grade : <b>ROCKHARD 450</b> Plate Dimension -Thickness x Width x Length : <b>8.000mm x 1500mm x 6800mm</b>																													
Heat No	Plate No	No.of Pcs.	Wt. MT	Chemical Analysis														Mechanical Properties											
				L/P	%C	%Mn	%S	%P	%Si	%Cu	%V	%Nb	%Mo	%Ni	%B	%Cr	N2	CE	YS	UTS	%EL*	Bend Test		Impact Value at(J)				Hardness	
																ppm		Mpa	Mpa		Mand. Rad.	I	II	III	Avg	Temp C	Orien	BHN	
A01135/24J0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
A01135/26B0	1	0.641		L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42				OK(4.0 T)							455
A01135/26B0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
A01135/26E0	1	0.641		L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42				OK(4.0 T)						455	
A01135/26E0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
A01135/27D0	1	0.641		L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42				OK(4.0 T)						455	
A01135/27D0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
<b>Sub Total</b>		21	13.461																										

Chemical and mechanical properties of the above heats conform to the grade mentioned.  
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To, M/s AK-SEL SELULOZ KAGIT SAN. VE TIC. TURKEY  
 A.S-TOZKOPARAN MAH.HALDUN TANER SOK.ALPARSLAN IS MRK.NO:27/1,TURKEY,PIN-00000

**TEST RESULTS**

**Process of Manufacture : EAF->LRF->VD->CCM->RHF->Hot rolling**

(EAF - Electric Arc Furnace / LRF: Ladle Refining Furnace / VD : Vaccum Degassing / CCM : Continuous Casting Machine/ RHF : Re-Heating Furnace)

**Supply Condition:QUENCHED  
AND TEMPERED**

**Deoxidation : Fully Killed**

Material Grade : <b>ROCKHARD 450</b> Plate Dimension -Thickness x Width x Length : <b>8.000mm x 1500mm x 6800mm</b>																												
Heat No	Plate No	No.of Pcs.	Wt. MT	Chemical Analysis														Mechanical Properties										
				L/P	%C	%Mn	%S	%P	%Si	%Cu	%V	%Nb	%Mo	%Ni	%B	%Cr	N2	CE	YS	UTS	%EL*	Bend Test	Impact Value at(J)				Hardness	
																ppm		Mpa	Mpa		Mand. Rad.	I	II	III	Avg	Temp C	Orien	BHN
A01135/27F0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)							455
A01135/27F0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42										
A01135/28H0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)							455
A01135/28H0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42										
A01135/28J0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)							455
A01135/28J0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42										
A01135/29A0		1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42			OK(4.0 T)							455
<b>Sub Total</b>		25	16.025																									

Chemical and mechanical properties of the above heats conform to the grade mentioned.  
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**Date : 27.08.2020**

To, M/s AK-SEL SELULOZ KAGIT SAN. VE TIC. TURKEY  
 A.S-TOZKOPARAN MAH.HALDUN TANER SOK.ALPARSLAN IS MRK.NO:27/1,TURKEY,PIN-00000

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**TEST RESULTS**

**Process of Manufacture : EAF->LRF->VD->CCM->RHF->Hot rolling**

(EAF - Electric Arc Furnace / LRF: Ladle Refining Furnace / VD : Vaccum Degassing / CCM : Continuous Casting Machine/ RHF : Re-Heating Furnace)

**Supply Condition:QUENCHED AND TEMPERED**

**Deoxidation : Fully Killed**

Material Grade : <b>ROCKHARD 450</b> Plate Dimension -Thickness x Width x Length : <b>8.000mm x 1500mm x 6800mm</b>																													
Heat No	Plate No	No.of Pcs.	Wt. MT	Chemical Analysis														Mechanical Properties											
				L/P	%C	%Mn	%S	%P	%Si	%Cu	%V	%Nb	%Mo	%Ni	%B	%Cr	N2	CE	YS	UTS	%EL*	Bend Test	Impact Value at(J)				Hardness		
																ppm		Mpa	Mpa		Mand. Rad.	I	II	III	Avg	Temp C	Orien	BHN	
A01135/29A0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
A01135/29J0	1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42				OK(4.0 T)							455	
A01135/29J0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
A01135/30B0	1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42				OK(4.0 T)							455	
A01135/30B0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
A01135/30H0	1	0.641	L	0.210	1.27	0.0030	0.022	0.2850	0.004	0.002	0.018	0.0010	0.006	0.0018	0.019	54	0.42				OK(4.0 T)							455	
A01135/30H0				P	0.202	1.30	0.002	0.019	0.31	0.006	0.002	0.020	0.0010	0.003	0.0021	0.016	58	0.42											
<b>Sub Total</b>	28	17.948																											
<b>G Total</b>	28	17.948																											

Chemical and mechanical properties of the above heats conform to the grade mentioned.  
**The above material supplied conforms to the specified dimensions and tolerances as per specifications and as per mutually agreed Technical delivery conditions.**

Purchase Order No. & Date: PROV/EXP/PLT/9067 20.03.2020  
 Despatch Advice No: 61963144  
 Truck/Wagon No. OD142249  
 \* Gauge Length: .

Prepared by SANGRAM\_APLATE  
 Preparation Date :27.08.2020 23:37:36  
 Printing Date 10.09.2020 & Time 10:11:20



**Authorised Signatory  
 TSD PlateMill  
 For, JINDAL STEEL & POWER LIMITED**





**MILL TEST CERTIFICATE**

**Test Certificate No. 0000155113**

**Date : 27.08.2020**

To, M/s AK-SEL SELULOZ KAGIT SAN. VE TIC. TURKEY

A.S-TOZKOPARAN MAH.HALDUN TANER SOK.ALPARSLAN IS MRK.NO:27/1,TURKEY,PIN-00000

Page 9 of 9

**TEST RESULTS**

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**Supply Condition:QUENCHED  
AND TEMPERED**

**Deoxidation : Fully Killed**

**Remarks :**

1. Test Certificate as per EN 10204, 2004 Type 3. 1
2. TDC reference: JSPL/ANGUL/TDC: M03714A; REV 02, Dtd.19.03.2020
3. Dimensional Tolerance as per class D of EN 10029
4. Surface Inspection as per EN 10163 class B sub class 3
5. Flatness satisfactory as per EN 10029 Class N (Type H)
6. Orientation of Sample: Tensile & Bend is Transverse & Impact is Longitudinal to rolling direction.
7. Tensile & Impact Test Result Required Only For 20mm Thickness Plates.
8. Percentage of Elongation, Gauge Length at 50 mm Only For 20mm Thickness Plates

Chemical and mechanical properties of the above heats conform to the grade mentioned.

**The above material supplied conforms to the specified dimensions and tolerances as per specifications and as per mutually agreed Technical delivery conditions.**

Purchase Order No. & Date: PROV/EXP/PLT/9067 20.03.2020

Despatch Advice No: 61963144

Truck/Wagon No. OD142249

\* Gauge Length: .

REC-PM-TSD-14-47, Rev 00,Dt 14.05.2020

Prepared by SANGRAM\_APLATE  
Preparation Date :27.08.2020 23:37:36  
Printing Date 10.09.2020 & Time 10:11:20



**Authorised Signatory  
TSD PlateMill**

**For, JINDAL STEEL & POWER LIMITED**