



Vallourec Soluções Tubulares do Brasil S.A.
Distrito Industrial, s/n - Jeceaba - MG - ZIP: 35498-000 - Brasil

Inspection Certificate

EN 10204 3.2

Nº: 0030042897 / 00

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Trading Company: Sumitomo Corporation
NIPPON STEEL CORPORATION work No.: JYYSI8940000
Buyer: NIPPON STEEL CORPORATION
Buyer Order No.: 0845N355PV6U-01
Customer:
Customer Order No./Item: 20-0
Inspection Company: Intertek-Moody

Destination Country: Belgium
Work Order: 565973 / 10
Material Number: 606354

DESCRIPTION OF PRODUCTS: SEAMLESS HOT FINISHED STEEL CASING WITH VAM 21 Heat Treatment: QUENCHED+ TEMPERED , VAM 21 THREAD AND COUPLING
SIZE (O.D. X W.T.): 9-5/8 inch X 53.50 lb/l GRADE: L80 Type 1
MINIMUM ALLOWED TEMPERING: PIPE : 1202 °F COUPLING : 1292 °F
STANDARD: API SPEC 5CT, 06 2018, 10TH EDITION - PSL 2
SUPPLEMENTARY REQUIREMENTS: SR16
MANUFACTURING PROCEDURE SPECIFICATION: VGP21L80HA - R8 Inspection Plan: VQP0063 - R0
SURFACE PROTECTION: EXTERNAL: UV-VARNISH PIPE ENDS PROTECTOR: MET/PLA-CEL VENTED 5MM
TOLERANCES: OUTSIDE DIAMETER (PIPE BODY): - 0.50 % / + 1.00 % WALL THICKNESS: - 12.5 %
LENGTH: RANDOM 40.0 FT - 43.30 FT
STANDARD MARKING: PIPE BODY, PAINT STENCILED: VSB API 5CT LICENSE API MONOGRAM YEAR/QUARTER SF 9 5/8 53.50 L S S16 13 32F L2 P7200 VAM 21 DA8.500 NIPPON STEEL JYYSI8940000
HEAT NUMBER LENGTH NET WEIGHT PIPE TALLY NO HEAT TREATMENT LOT MADE IN BRAZIL
COUPLING, PAINT STENCILED: VSB API 5CT LICENSE API MONOGRAM YEAR/QUARTER SF L L2 VAM 21
SHIPPING MARKING: P.O. NO. 20-6 CONTRACT NO. 20-MSCT-12-125198 PIECE NO. 9-5/8 X 53.50 X 40.0-43.3 PO36A0017-F000014

Heat	Heat Treatment Lot	Pieces	Lengths(ft)	Weight (Lbf)
183393	A	3	124.2	6349
183394	A	10	408.4	21655
	B	3	123.8	6551
186197	A	59	2503.2	133463
186204	A	81	3432.1	183015
	B	50	2119.3	112777
186205	A	18	754.1	40199
	B	52	2191.8	116774
	C	35	1481.8	78842
	Total	311	13138.7	699825

PIPES

THE PRODUCT IS SATISFACTORY IN THE FOLLOWING TESTS / INSPECTIONS: DIMENSIONAL # VISUAL # HYDROSTATIC TEST: 7200.0 PSI 5 S # ULTRASONIC TEST : API 5CT,L2(N5),LONG/TRANS,O/I # ULTRASONIC TEST FOR WALL THICKNESS MEASUREMENT: MINIMUM COVER RATIO 25% # DRIFT TEST: DIAMETER 8.500 IN LENGTH 12.000 IN # HARDENABILITY 90% MART.-HRC MIN= 58X(%) + 27 #



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Chemical Composition (%)

Process: Electric Arc Furnace (EAF), heats fully killed

DI:		C	Mn	P	S	Si	Ni	Cr	Mo	Al	Cu
Ladle Analysis	Min										
	Max	0.43	1.90	0.030	0.030	0.45	0.25				0.35
Product Analysis	Min										
	Max	0.43	1.90	0.030	0.030	0.45	0.25				0.35
Heat	IPPN										
183393	Ladle	0.24	0.99	0.010	0.002	0.18	0.05	0.23	0.011	0.029	0.10
Check 1	402021	0.24	1.01	0.010	0.002	0.18	0.05	0.23	0.012	0.030	0.10
Check 2	203033	0.24	1.00	0.010	0.003	0.18	0.05	0.23	0.012	0.030	0.10
183394	Ladle	0.24	0.98	0.014	0.002	0.18	0.06	0.24	0.013	0.027	0.14
Check 1	104033	0.24	0.97	0.013	0.002	0.18	0.05	0.24	0.012	0.027	0.11
Check 2	201031	0.25	0.99	0.012	0.003	0.18	0.05	0.24	0.013	0.028	0.14
186197	Ladle	0.24	1.00	0.012	0.002	0.20	0.03	0.24	0.009	0.030	0.05
Check 1	403011	0.24	1.00	0.014	0.001	0.20	0.03	0.24	0.009	0.030	0.05
Check 2	403013	0.26	1.02	0.014	0.003	0.21	0.04	0.24	0.009	0.033	0.05
186204	Ladle	0.24	0.98	0.012	0.002	0.20	0.03	0.23	0.007	0.029	0.05
Check 1	504021	0.24	0.98	0.013	0.003	0.20	0.03	0.23	0.007	0.029	0.05
Check 2	304013	0.25	1.01	0.011	0.004	0.21	0.04	0.24	0.011	0.029	0.08
186205	Ladle	0.24	0.97	0.009	0.002	0.20	0.04	0.24	0.010	0.026	0.07
Check 1	302023	0.24	0.98	0.010	0.002	0.20	0.04	0.24	0.010	0.027	0.07
Check 2	402021	0.25	0.98	0.012	0.003	0.20	0.03	0.23	0.007	0.032	0.05



Tensile Test

S. Direction: Longitudinal

Temperature: Room Temperature

Type of Specimen STRIP 1.5" WIDTH

Wall Thickness: 0.545"

Gauge Length: L0= 2"

Method:Elong.Total Under Load 0.50 %

YS TS E
(PSI) (PSI) (%)

Required: Min 80000 95000 20
Max 95000

Heat	Heat Treatment Lot	IPPN	Position	YS (PSI)	TS (PSI)	E (%)
183393	A	402021	Top(loading)	83400	98300	34



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Tensile Test

S. Direction: Longitudinal

Gauge Length: L0= 2"

Temperature: Room Temperature

Method:Elong.Total Under Load 0.50 %

Type of Specimen STRIP 1.5" WIDTH

Wall Thickness: 0.545"

				YS	TS	E
				(PSI)	(PSI)	(%)
Required: Min				80000	95000	20
Max				95000		
Heat	Heat Treatment Lot	IPPN	Position			
183394	A	402031	Botton(trailing)	83500	98600	34
	A	101013	Botton(trailing)	89600	104700	35
	A	104033	Top(leading)	87600	102000	33
	A	401033	Botton(trailing)	90400	105000	33
	A	505033	Top(leading)	90600	105900	32
186197	B	201011	Top(leading)	84400	99100	34
	B	201031	Botton(trailing)	83800	99800	35
	A	403011	Top(leading)	84700	100400	34
	A	504023	Botton(trailing)	86600	101700	34
	186204	A	504021	Botton(trailing)	84100	98800
186205	A	505011	Top(leading)	85100	100500	35
	B	101023	Botton(trailing)	81100	96300	36
	B	503023	Top(leading)	86000	100800	35
	A	302021	Top(leading)	86600	101500	35
	A	302023	Botton(trailing)	88200	101400	36
	B	101031	Botton(trailing)	83000	98600	34
	B	205023	Top(leading)	83100	97000	36
	C	104013	Top(leading)	86300	100700	34
	C	303021	Botton(trailing)	85700	99500	36

YS-Yield Strength; TS-Tensile Strength; E-Elongation;

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As Quenched Hardness

Formula: 90% Mart.-HRC min= 58x(%C)+ 27

Scale: HRC

Heat	Heat Treatment Lot	IPP	Position		OW1	OW2	OW3	Avg	MW1	MW2	MW3	Avg	IW1	IW2	IW3	Avg
183393	A	402033	Botton(trailing)	Q1	45.6	46.1	46.4	46.0	46.2	46.3	46.8	46.4	47.1	47.2	47.1	47.1
				Q2	46.1	46.0	46.2	46.1	46.8	47.3	47.1	47.1	47.5	48.0	47.9	47.8
				Q3	45.3	44.9	45.2	45.1	45.8	46.3	46.0	46.0	46.5	46.9	46.8	46.7
				Q4	45.2	45.5	46.1	45.6	46.0	47.2	46.4	46.5	46.0	45.8	46.4	46.1
183394	A	404033	Botton(trailing)	Q1	45.3	45.8	46.3	45.8	46.7	47.2	47.2	47.0	46.8	46.8	46.3	46.6
				Q2	46.4	46.6	46.6	46.5	47.4	47.4	47.0	47.3	47.0	47.0	47.2	47.1
				Q3	46.3	45.9	45.8	46.0	47.1	47.0	46.9	47.0	47.6	47.2	47.7	47.5
				Q4	46.0	46.2	46.2	46.1	47.1	47.4	47.0	47.2	47.3	47.7	47.4	47.5
186197	A	403013	Botton(trailing)	Q1	44.4	44.5	45.3	44.7	46.1	46.0	46.8	46.3	46.3	46.4	47.2	46.6
				Q2	45.0	45.2	46.0	45.4	45.8	46.4	46.2	46.1	45.8	46.0	46.4	46.1
				Q3	45.0	45.5	46.0	45.5	46.1	46.5	46.8	46.5	46.0	45.9	45.9	45.9
				Q4	44.8	45.2	45.3	45.1	46.8	47.2	46.8	46.9	47.1	47.4	47.3	47.3
186204	A	304013	Botton(trailing)	Q1	43.2	44.4	44.3	44.0	46.4	46.2	47.1	46.6	47.1	47.5	47.7	47.4
				Q2	44.2	44.8	44.9	44.6	46.2	46.4	46.4	46.3	46.0	46.1	46.1	46.1
				Q3	45.1	45.4	45.2	45.2	46.8	46.7	47.0	46.8	45.3	45.9	46.1	45.8
				Q4	45.1	45.6	45.6	45.4	47.1	48.0	47.8	47.6	47.1	47.5	48.0	47.5
186205	A	402021	Botton(trailing)	Q1	44.8	45.4	45.2	45.1	46.4	46.2	47.3	46.6	46.7	47.1	47.2	47.0
				Q2	44.7	45.3	45.4	45.1	46.5	46.8	47.1	46.8	46.5	46.9	47.1	46.8
				Q3	45.1	45.0	45.2	45.1	45.7	46.3	47.0	46.3	45.7	45.7	46.0	45.8
				Q4	44.9	45.3	45.6	45.3	46.2	46.4	46.4	46.3	45.5	46.0	46.1	45.9

OW - Outer Wall; MW - Middle Wall; IW - Inner Wall;

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Hardness Test Through Wall

Scale: HRC

				Individual	Average											
Required: Min																
Max				24.0	23.0											
					OW1	OW2	OW3	Avg	MW1	MW2	MW3	Avg	IW1	IW2	IW3	Avg
Heat	Heat Treatment Lot	IPPN	Position													
183393	A	402021	Top(leading)	QI	17.6	17.7	17.5	17.6	17.5	17.4	17.8	17.6	17.6	17.7	17.6	17.6
	A	402031	Botton(trailing)	QI	17.3	17.2	16.3	16.9	18.0	17.9	17.8	17.9	17.7	17.5	17.6	17.6
183394	A	101013	Botton(trailing)	QI	17.6	18.2	18.0	17.9	19.0	18.6	18.3	18.6	18.6	18.8	19.0	18.8
	A	104033	Top(leading)	QI	17.6	17.4	18.0	17.7	18.3	18.2	18.0	18.2	18.5	18.5	18.5	18.5
	A	401033	Botton(trailing)	QI	20.6	20.7	20.8	20.7	21.1	21.7	21.1	21.3	20.9	21.0	20.7	20.9
	A	505033	Top(leading)	QI	18.4	18.7	18.8	18.6	21.2	21.3	21.2	21.2	20.1	20.5	20.7	20.4
	B	201011	Top(leading)	QI	16.1	16.4	16.1	16.2	16.6	17.2	16.4	16.7	16.0	16.3	16.0	16.1
	B	201031	Botton(trailing)	QI	15.9	16.2	15.7	15.9	18.3	18.3	17.6	18.1	18.3	18.1	18.1	18.2
186197	A	403011	Top(leading)	QI	15.4	16.0	16.0	15.8	17.4	18.2	18.2	17.9	17.2	17.5	18.0	17.6
	A	504023	Botton(trailing)	QI	14.0	14.8	15.7	14.8	16.2	17.1	17.4	16.9	15.1	15.9	16.3	15.8
186204	A	504021	Botton(trailing)	QI	13.2	13.0	13.4	13.2	14.9	14.9	15.0	14.9	13.9	14.2	14.2	14.1
	A	505011	Top(leading)	QI	14.5	13.5	14.3	14.1	15.4	16.2	15.8	15.8	15.5	14.8	15.9	15.4
	B	101023	Botton(trailing)	QI	14.6	14.8	15.0	14.8	17.2	17.4	17.8	17.5	15.0	15.8	16.3	15.7
	B	503023	Top(leading)	QI	15.0	14.8	15.1	15.0	16.5	16.7	17.2	16.8	16.0	16.1	15.9	16.0
186205	A	302021	Top(leading)	QI	14.8	15.0	15.6	15.1	16.6	17.6	17.5	17.2	16.1	15.8	16.6	16.2
	A	302023	Botton(trailing)	QI	14.6	15.1	15.4	15.0	17.1	17.4	17.8	17.4	15.7	16.2	14.1	15.3
	B	101031	Botton(trailing)	QI	16.3	17.2	17.3	16.9	18.0	18.5	18.3	18.3	17.0	17.2	16.0	16.7
	B	205023	Top(leading)	QI	12.8	13.2	13.3	13.1	15.7	16.3	16.2	16.1	14.4	15.3	14.3	14.7
	C	104013	Top(leading)	QI	14.7	14.7	14.6	14.7	17.2	18.1	18.0	17.8	16.6	16.0	15.2	15.9
	C	303021	Botton(trailing)	QI	14.7	15.1	15.1	15.0	16.9	17.2	17.5	17.2	15.9	16.8	16.7	16.5

OW - Outer Wall; MW - Middle Wall; IW - Inner Wall;



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Impact Test

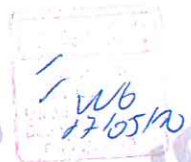
Test Specimen: CHARPY 10X55X7.5 V NOTCH
Striker radius: 0.315"

Direction: Transverse

Temperature: 32°F

				AE1	AE2	AE3	AE Avg	SA1	SA2	SA3	SA Avg
				(Ftlb)	(Ftlb)	(Ftlb)	(Ftlb)	(%)	(%)	(%)	(%)
Required: Min				7	7	7	10	75	75	75	
Max											
Heat	Heat Treatment Lot	IPPN	Position								
183393	A	402021	Top(leading)	87	94	88	89	100	100	100	
183394	A	104033	Top(leading)	83	89	82	85	100	100	100	
	B	201031	Bottom(trailing)	91	94	92	92	100	100	100	
186197	A	403011	Top(leading)	113	122	122	119	100	100	100	
186204	A	504021	Bottom(trailing)	99	102	108	103	100	100	100	
	B	503023	Top(leading)	111	116	103	110	100	100	100	
186205	A	302023	Bottom(trailing)	115	116	111	114	100	100	100	
	B	205023	Top(leading)	109	108	103	106	100	100	100	
	C	303021	Bottom(trailing)	111	114	112	112	100	100	100	

AE - Absorbed Energy; SA - Shear Area;



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COUPLINGS

THE PRODUCT IS SATISFACTORY IN THE FOLLOWING TESTS / INSPECTIONS: DIMENSIONAL VISUAL MPI ON COUPLING: API 5CT WET MPI LONG,OUT/INSID HARDENABILITY 90%
MART.-HRC MIN= 58X(%C)+ 27 #

Chemical Composition (%) Process: Electric Arc Furnace (EAF), heats fully killed

		C	Mn	P	S	Si	Ni	Cr	Mo	Al	Cu
Ladle Analysis	Min										
	Max	0.43	1.90	0.030	0.030	0.45	0.25				0.35
Product Analysis	Min										
	Max	0.43	1.90	0.030	0.030	0.45	0.25				0.35
Heat	IPPN										
184413	Ladle	0.24	0.47	0.012	0.001	0.21	0.05	0.92	0.275	0.029	0.09
Check 1	401011	0.24	0.46	0.011	0.001	0.21	0.05	0.93	0.275	0.026	0.09
Check 2	101011	0.24	0.47	0.012	0.002	0.21	0.05	0.92	0.275	0.028	0.09
185444	Ladle	0.25	0.48	0.008	0.000	0.21	0.05	0.91	0.275	0.033	0.07
Check 1	202021	0.25	0.48	0.008	0.000	0.21	0.05	0.92	0.282	0.030	0.07
Check 2	403011	0.25	0.48	0.008	0.000	0.21	0.05	0.92	0.280	0.031	0.07

Tensile Test

S. Direction: Longitudinal

Temperature: Room Temperature

Type of Specimen ROUND BAR 0.5" DIAMETER

Gauge Length: L0= 2"

Method:Elong.Total Under Load 0.50 %

	YS	TS	E
	(PSI)	(PSI)	(%)
Required: Min	80000	95000	15
Max	95000		

Heat	Heat Treatment	IPPN	Position	YS (PSI)	TS (PSI)	E (%)
184413	M	101011	Bottom(trailing)	87600	103000	25
	M	401011	Top(leading)	86000	102500	22
185444	B	202021	Bottom(trailing)	86600	103600	24
	B	403021	Top(leading)	88200	104600	25

YS-Yield Strength; TS-Tensile Strength; E-Elongation;

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As Quenched Hardness

Formula: 90% Mart.-HRC min= 58x(%C)+ 27

Scale: HRC

Heat	Heat Treatment Lot	IPPN	Position		OW				Avg	MW			Avg	IW			Avg
					OW1	OW2	OW3			MW1	MW2	MW3		IW1	IW2	IW3	
184413	M	101011	Botton(trailing)	Q1	46.0	47.7	47.2	47.0	45.2	45.5	46.1	45.6	46.8	48.0	47.5	47.4	
				Q2	47.5	47.2	47.1	47.3	45.2	46.0	44.8	45.3	47.0	46.6	47.5	47.0	
				Q3	47.4	47.7	47.6	47.6	46.6	47.0	47.0	46.9	46.8	46.6	47.6	47.0	
				Q4	48.6	47.3	47.4	47.8	47.6	46.9	48.6	47.7	47.2	48.6	48.4	48.1	
185444	B	403011	Botton(trailing)	Q1	47.0	47.1	47.2	47.1	47.3	47.5	48.1	47.6	46.3	46.4	47.1	46.6	
				Q2	46.5	46.9	47.3	46.9	47.3	47.8	46.8	47.3	46.6	46.7	47.2	46.8	
				Q3	46.6	47.6	47.4	47.2	47.0	47.3	47.9	47.4	46.6	47.0	47.0	46.9	
				Q4	47.1	47.4	46.8	47.1	47.6	47.0	46.9	47.2	46.7	46.9	47.2	46.9	

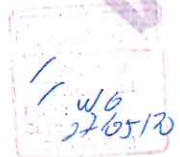
OW - Outer Wall; MW - Middle Wall; IW - Inner Wall;

Hardness Test Through Wall

Scale: HRC

Heat	Heat Treatment Lot	IPPN	Position		Required: Min Max		Individual		Average		OW1	OW2	OW3	Avg	MW1	MW2	MW3	Avg	IW1	IW2	IW3	Avg
							24.0		23.0													
184413	M	101011	Botton(trailing)	Q1	19.7	19.0	19.7	19.5	21.0	21.8	21.7	21.5	21.1	21.4	22.1	21.5						
				Q1	14.3	15.0	14.8	14.7	16.1	16.3	16.2	16.2	15.4	14.8	14.4	14.9						
185444	B	202021	Botton(trailing)	Q1	15.6	16.4	16.4	16.1	17.7	17.7	18.0	17.8	17.0	15.8	16.4	16.4						
				Q1	15.1	15.0	15.4	15.2	17.8	18.0	17.8	17.9	15.6	16.2	16.0	15.9						

OW - Outer Wall; MW - Middle Wall; IW - Inner Wall;



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Impact Test

Test Specimen: CHARPY 10X55X10 V NOTCH

Direction: Transverse

Temperature: 32°F

Coupling critical thickness: 0.00 "

Striker radius: 0.315"

				AE1	AE2	AE3	AE Avg	SA1	SA2	SA3	SA Avg
				(Ftlb)	(Ftlb)	(Ftlb)	(Ftlb)	(%)	(%)	(%)	(%)
Required: Min				13	13	13	19	75	75	75	
Max											
Heat	Heat Treatment Lot	IPPN	Position								
184413	M	101011	Bottom(trailing)	163	172	156	164	100	100	100	
185444	B	202021	Bottom(trailing)	162	164	159	162	100	100	100	

AE - Absorbed Energy; SA - Shear Area;

Remarks:

1 TMS CONTRACT NO. 20-MSCT-12-125198

We hereby certify that this product has been manufactured and examined in accordance with all requirements of the standards and specifications and all the results are found to be satisfactory. This testimonial and certificate respectively is recorded by a computer system and is valid without signature. Alteration or use for others products are regarded as falsification of documents and will be subject to criminal jurisdiction.

QUALITY CONTROL DEPARTMENT

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DATE

05.16.2020

AGNALDO VASCONCELOS SILVA
TECHNICAL RESPONSIBLE

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