



Project Materials
Canada Inc.

April 29th, 2020

Pipe Material Test Results

Client : Chevron Via Gas Liquids Engineering.

PO No. : **19130-5130-03**

Project: : High Pressure Pipe and Fittings Supply (CW171514)

Attention : Scott King

PM Ref: 19-1110-PM

Description : Vallourec MTR

Rev: 1

Vallourec Deutschland GmbH (A01) Werk Mülheim Rohrkontiststraße Schützenstrasse 124 45476 MÜLHEIM AN DER RUHR GERMANY	 	INSPECTION CERTIFICATE (A02) ABNAHMEPRUEFZEUGNIS 3.2 EN 10204:2004 No. / Nr. : 38179Mu20 (A03) Page/Seite: 1 / 9 Date/Datum: 27.03.2020
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(A01) Vallourec Deutschland GmbH	(A08.1) Vallourec-Order-No. / Vallourec-Auftrags-Nr./ 257971 (A08.2) Suborder / Unterauftrag 85681796
(A06.1) Consignee / Empfänger Project Materials B.V Tussendonk 1 4878 AM ETTEN-LEUR NIEDERLANDE	
(A06.2) Orderer / Besteller PROJECT MATERIALS GMBH / 40549 DUESSELDORF	(A07.2) Orderer Order-No. / Senderbestellnummer 4609-1985 18.10.2019 Project name / Projektname TCO
(B01, B02, B04) Description of the product Erzeugnisbeschreibung	Hot finished seamless Steel pipes Sour service (as define by API 5L) API 5L, PSL 2, April 2018 Rev. 46 (E1) NACE standard MR0175 / ISO 15156-2, 2003 API 5L Annex B, C, E, G, H, K API 5L Annex A, O, API Monogram Chevron, PPL-SU-1051-TCO, October 2013 Technical Agreement between Chevron/TCO/VM Tubes & PM Piping, May 11-2016 X60 QS, API 5L PSL 2 - Annex H Ends bevelled, angle 30° (+5 % -0), root face 1.6 mm (± 0.8 mm) Inside surface aspect : Free of loose scale Outside surface aspect : Free of loose scale Outside with dry varnish Without inside rust protection Tube ends closed by plastic plugs Nahtlos warmgefertigt Stahlrohre Sour service (gemäß der Definition in der API 5L)# API 5L, PSL 2, April 2018 Rev. 46 (E1) NACE standard MR0175 / ISO 15156-2, 2003 API 5L Annex B, C, E, G, H, K API 5L Annex A, O, API Monogram Chevron, PPL-SU-1051-TCO, October 2013 Technical Agreement between Chevron/TCO/VM Tubes & PM Piping, May 11-2016 X60 QS, API 5L PSL 2 - Annex H Enden abgeschrägt, Winkel 30° (+5 % -0), Steghöhe 1.6 mm (± 0.8 mm) Oberflächenzustand # innen : Frei von losem Zunder Oberflächenzustand # außen : Frei von losem Zunder Klarlack außen Ohne Rostschutz innen Rohrenden mit Kunststoffstopfen verschlossen
(A10) Inspection by / Abnahme durch BUREAU VERITAS	
(B03)  30 MAR 2020	

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(B03)
FULLY KILLED-FINE GRAINED
VOLLBERUHIGT-FEINKOERNIG

(A13) Vallourec Item Position	(A09) Orderer Item Position	(B14) Item text Positionstext	(B09) Dimensions Abmessung	(B10) Single length Einzellänge
1	69		API 5L OD 88.9 x WT 17.81 mm OD Tol $\pm 0.75\%$ WT Tol : + 15 % -12.5 % API 5L AD 88.9 x WD 17.81 mm AD Toleranz $\pm 0.75\%$ Wanddickentoleranz : + 15 % -12.5 %	Limited length from 10000 to 11800 mm Without short length Längen von 10000 bis 11800 mm Ohne Unterlängen

(A13) Vallourec Item Position	(A09) Orderer Item Position	(B08) Quantity Stück P	(B11) Total length Gesamtlänge m	(B13) Weight Gewicht kg
1	69	46	530.27	16 498

(C71)

HEAT CHEMICAL ANALYSIS / SCHMELZANALYSE

(B07.1) Heat Schmelze	(B15) Process Erschmelz.	Steel plant -	C %	Si %	Mn %	P %	S %	Al %	Cu %	Cr %	Ni %
min	-	-	0.060	-	-	-	-	-	-	-	-
max	-	-	0.110	0.450	1.65	0.018	0.0030	0.060	0.350	0.300	0.300
334223	Oxygen (BOF)	HK	0.080	0.240	1.22	0.016	0.0010	0.018	0.170	0.040	0.160



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(C71)

HEAT CHEMICAL ANALYSIS / SCHMELZANALYSE

(B07.1) Heat Schmelze	Mo %	V %	Ti %	Nb(Cb) %	N %	B %	Ca %	CQ 03 %	CQ 08 %	EF 02 %	EF 40 -	
min	-	-	-	-	-	-	-	-	-	-	0.4	
max	0.150	0.010	0.025	0.035	0.0120	0.0005	0.0060	.38	.19	0.07	3.0	
334223	0.090	0.002	0.003	0.024	0.0038	0.0003	0.0013	.33	.17	0.03	1.3	

Steel plant	HK HKM, Duisburg
CQ 03	$CEV/CE = C + MN/6 + (CR+MO+V)/5 + (NI+CU)/15$
CQ 08	$CE(PCM) = C + SI/30 + (MN+CU+CR)/20 + NI/60 + MO/15 + V/10 + 5B$
EF 02	$EF = V + TI + NB$
EF 40	$EF = CA : S$

Heats fully killed
Beruhigter Stahl

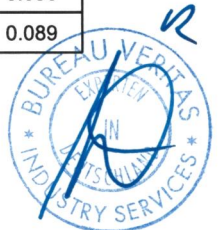
AL >= 2 X N

SAMPLES STARTING WITH "F" ARE THE FIRST DAY PRODUCTION TESTS
PROBEN DIE MIT "F" BEGINNEN SIND FIRST DAY PRODUCTION PROBEN

(C72)

PRODUCT CHEMICAL ANALYSIS / PRODUKT CHEMISCHE ANALYSE

(B07.1) Heat Schmelze	(C00.1) Test Piece Prüfstück	C %	Si %	Mn %	P %	S %	Al %	Cu %	Cr %	Ni %	Mo %
min		0.060	-	-	-	-	-	-	-	-	-
max		0.110	0.450	1.65	0.018	0.0030	0.060	0.350	0.300	0.300	0.150
334223	F90345J	0.076	0.245	1.22	0.014	0.0006	0.017	0.166	0.033	0.167	0.089
334223	F90346	0.079	0.247	1.23	0.014	0.0008	0.019	0.170	0.034	0.168	0.089
334223	V90347J	0.077	0.247	1.23	0.015	0.0008	0.017	0.169	0.033	0.169	0.090
334223	V90348A	0.077	0.248	1.23	0.014	0.0006	0.018	0.166	0.032	0.169	0.089



30 MAR 2020

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(C72)

PRODUCT CHEMICAL ANALYSIS / PRODUKT CHEMISCHE ANALYSE

(B07.1) Heat Schmelze	(C00.1) Test Piece Prüfstück	V %	Ti %	Nb(Cb) %	N %	B %	Ca %	CQ 03 %	CQ 08 %	EF 02 %	EF 40 -
min		-	-	-	-	-	-	-	-	-	0.4
max		0.010	0.025	0.035	0.0120	0.0005	0.0060	.38	.19	0.07	3.0
334223	F90345J	0.003	0.002	0.022	0.0031	0.0001	0.0018	.33	.16	0.03	3.0
334223	F90346	0.003	0.002	0.023	0.0035	0.0002	0.0022	.33	.17	0.03	2.8
334223	V90347J	0.003	0.002	0.023	0.0034	0.0001	0.0017	.33	.17	0.03	2.1
334223	V90348A	0.003	0.002	0.023	0.0034	0.0001	0.0018	.33	.17	0.03	3.0

CQ 03	$CEV/CE = C + MN/6 + (CR+MO+V)/5 + (NI+CU)/15$
CQ 08	$CE(PCM) = C + SI/30 + (MN+CU+CR)/20 + NI/60 + MO/15 + V/10 + 5B$
EF 02	$EF = V + Ti + NB$
EF 40	$EF = CA : S$

TENSILE TEST RESULTS / ERGEBNISSE DES ZUGVERSUCHS

Type / Form (C10.1)	TUBE STRIP TEST SPECIMEN / ROHRSTREIFENPROBE
Test temperature / Prüftemperatur (C03)	ROOM TEMPERATURE / RAUMTEMPERATUR
Direction / Richtung (C02)	longitudinal / längs

(B07.1) Heat Schmelze	(C00.1) Test Piece Prüfstück	(C10) Dimension Abmessung	(C11) YS Streckgr.	(C12) TS Zugfest.	(C13) Elong. Dehnung	(C14.1) Ratio Verhältn.				
		mm	$R_{10.5}$ MPa	R_m MPa	2" %	R/R_m -				
min		-	415	520	22.5	-				
max		-	565	760	-	-				
334223	F90345J	19.15X17.05	456	581	35.5	0.78				
334223	F90345K 1)	19.16X17.09	463	551	41.5	0.84				
334223	F90346	19.18X17.46	451	564	37.5	0.80				
334223	V90347J	19.17X17.57	486	573	37.5	0.85				

SAMPLES STARTING WITH "F" ARE THE FIRST DAY PRODUCTION TESTS

SAMPLE MARKED BY 1) IS THE PWHT TEST AND

SIMULATED HEAT TREATED AS FOLLOWS:

620 DEGREES C / HOLDING TIME 180 MIN.

PROBEN DIE MIT "F" BEGINNEN SIND FIRST DAY PRODUCTION PROBEN

PROBEN MARKIERT MIT 1) SIND DIE PWHT PROBEN UND

SIMULIEREND WAERMEBEHANDELT WIE FOLGT:

620 GRAD C / HALTEZEIT 180 MIN.



30 MAR 2020

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IMPACT TEST RESULTS / ERGEBNISSE DES KERBSCHLAGBIEGEVERSUCHS

Type / Form (C40)	Charpy-V / Charpy-V
Test temperature / Prüftemperatur (C03)	- 10 DEGREES C
Direction / Richtung (C02)	longitudinal / längs

(B07.1) Heat Schmelze	(C00.1) Test Piece Prüfstück	(C41)	(C42.1) Impact1 Arbeit1	(C42.1) Impact2 Arbeit2	(C42.1) Impact3 Arbeit3	(C43.3) Mean Mittelw.	(C42.2) Shear fr1 Scherbr1	(C42.2) Shear fr2 Scherbr2	(C42.2) Shear fr3 Scherbr3		
		qcm	J	J	J	J	%	%	%		
min		-	45.0	45.0	45.0	60.0	-	-	-		
max		-	-	-	-	-	-	-	-		
334223	F90345J	0.800	422	429	423	425	100	100	100		
334223	F90346	0.800	414	424	420	419	100	100	100		
334223	V90347J	0.800	421	420	424	422	100	100	100		

IMPACT TEST RESULTS / ERGEBNISSE DES KERBSCHLAGBIEGEVERSUCHS

Type / Form (C40)	Charpy-V / Charpy-V
Test temperature / Prüftemperatur (C03)	- 40 DEGREES C
Direction / Richtung (C02)	longitudinal / längs

(B07.1) Heat Schmelze	(C00.1) Test Piece Prüfstück	(C41)	(C42.1) Impact1 Arbeit1	(C42.1) Impact2 Arbeit2	(C42.1) Impact3 Arbeit3	(C43.3) Mean Mittelw.	(C42.2) Shear fr1 Scherbr1	(C42.2) Shear fr2 Scherbr2	(C42.2) Shear fr3 Scherbr3		
		qcm	J	J	J	J	%	%	%		
min		-	45.0	45.0	45.0	60.0	-	-	-		
max		-	-	-	-	-	-	-	-		
334223	F90345K	0.800	433	433	425	430	100	100	100		
334223	F90346A	0.800	423	428	429	427	100	100	100		
334223	V90348J	0.800	420	426	430	425	100	100	100		

SAMPLES STARTING WITH "F" ARE THE FIRST DAY PRODUCTION TESTS
PROBEN DIE MIT "F" BEGINNEN SIND FIRST DAY PRODUCTION PROBEN



HARDNESS TEST RESULTS / ERGEBNISSE DER HAERTEPRUEFUNG

Location / Lage (C01.1)	INSIDE CONCERNING WALL / INNEN BEZOGEN AUF DIE ROHRWAND
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HARDNESS TEST RESULTS / ERGEBNISSE DER HAERTEPRUEFUNG

(B07.1) Heat Schmelze	(C00.1) Test Piece Prüfstück	(C31) Value Value	(C31) Value Value	(C31) Value Value	(C31) Value Value						
		HV 10	HV 10	HV 10	HV 10						
min		-	-	-	-						
max		250.0	250.0	250.0	250.0						
334223	F90345J	218.0	224.0	221.0	224.0						
334223	F90346	206.0	203.0	207.0	199.0						
334223	V90347J	208.0	214.0	213.0	215.0						
334223	V90348	190.0	202.0	196.0	197.0						
334223	V90349J	206.0	210.0	203.0	215.0						
334223	V90350	188.0	182.0	189.0	192.0						

HARDNESS TEST RESULTS / ERGEBNISSE DER HAERTEPRUEFUNG

Location / Lage (C01.1)	MIDDLE CONCERNING WALL / MITTE BEZOGEN AUF DIE ROHRWAND
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(B07.1) Heat Schmelze	(C00.1) Test Piece Prüfstück	(C31) Value Value	(C31) Value Value	(C31) Value Value	(C31) Value Value						
		HV 10	HV 10	HV 10	HV 10						
min		-	-	-	-						
max		250.0	250.0	250.0	250.0						
334223	F90345J	170.0	173.0	171.0	173.0						
334223	F90346	170.0	173.0	174.0	170.0						
334223	V90347J	172.0	171.0	171.0	176.0						
334223	V90348	168.0	168.0	170.0	168.0						
334223	V90349J	177.0	172.0	174.0	175.0						
334223	V90350	168.0	172.0	171.0	178.0						

HARDNESS TEST RESULTS / ERGEBNISSE DER HAERTEPRUEFUNG

Location / Lage (C01.1)	OUTSIDE CONCERNING WALL / AUSSEN BEZOGEN AUF DIE ROHRWAND
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HARDNESS TEST RESULTS / ERGEBNISSE DER HAERTEPRUEFUNG

(B07.1) Heat Schmelze	(C00.1) Test Piece Prüfstück	(C31) Value HV 10	(C31) Value HV 10	(C31) Value HV 10	(C31) Value HV 10						
min		-	-	-	-						
max		250.0	250.0	250.0	250.0						
334223	F90345J	174.0	180.0	187.0	188.0						
334223	F90346	165.0	174.0	189.0	185.0						
334223	V90347J	169.0	167.0	174.0	182.0						
334223	V90348	186.0	181.0	177.0	181.0						
334223	V90349J	205.0	212.0	207.0	213.0						
334223	V90350	184.0	179.0	179.0	177.0						

SAMPLES STARTING WITH "F" ARE THE FIRST DAY PRODUCTION TESTS
PROBEN DIE MIT "F" BEGINNEN SIND FIRST DAY PRODUCTION PROBEN

(D55)

OTHER TESTS ON PIPE / SONSTIGE PRUEFUNGEN

Test Prüfung	Conditions Prüfbedingungen	Test rate Prüfumfang	Result Ergebnis
HEAT TREATMENT WAERMEBEHANDLUNG		2 MIN 950 DEGREES C WATER 2 MIN 950 GRAD C WASSER	
HEAT TREATMENT WAERMEBEHANDLUNG		20 MIN 660 DEGREES C AIR 20 MIN 660 GRAD C LUFT	
HEAT TREATMENT WAERMEBEHANDLUNG	WASSERVERGUETET	WATER QUENCHED AND TEMPERED	
APPEARANCE AND DIMENSIONS (D01) OBERFLAECHEBESCHAFFEN- HEIT UND MASSE (D01)		EACH PIPE/ TUBE JE ROHR	SATISFACTORY BESTANDEN

ELECTROMAGNETIC TESTING FOR LONGITUDINAL AND TRANSVERSE
DEFECTS, OUTSIDE: SATISFACTORY.
ULTRASONIC TESTING FOR LONGITUDINAL AND TRANSVERSE DEFECTS,
INSIDE AND OUTSIDE: SATISFACTORY.
ULTRASONIC TESTING FOR LAMINATIONS: SATISFACTORY.
ULTRASONIC TESTING FOR MIN. AND MAX. WALLTHICKNESS:
SATISFACTORY.
UNINSPECTED ENDS CUT OFF OR MANUAL ULTRASONIC TESTING.
MPI OF PIPE ENDS, LONGITUDINAL AND TRANSVERSE DEFECTS,
OUTSIDE LENGTH 100MM: SATISFACTORY.
MPI OF BEVEL: SATISFACTORY.
RESIDUAL MAGNETISM MAX. 20 GAUSS.
HYDROSTATIC TEST 1455 BAR (1BAR=100KPA),
HOLDING TIME 10 SEC. EACH PIPE/ TUBE: NO LEAKAGE.



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(D55)

OTHER TESTS ON PIPE / SONSTIGE PRUEFUNGEN

ELEKTROMAGNETISCHE PRUEFUNG AUF LAENGs- UND QUERFEHLER,
AUSSEN: BESTANDEN.
ULTRASCHALLPRUEFUNG AUF LAENGs- UND QUERFEHLER, INNEN UND
AUSSEN: BESTANDEN.
ULTRASCHALLPRUEFUNG AUF DOPPLUNGEN: BESTANDEN.
ULTRASCHALLPRUEFUNG AUF MIN. UND MAX. WANDDICKE: BESTANDEN.
UNGEPRUEFTE ROHRENDEN WURDEN ABGESCHNITTEN ODER MANUELL
ULTRASCHALL GEPRUEFT.
MP PRUEFUNG DER ENDEN, AUSSEN, LAENGs- UND QUER (100MM):
BESTANDEN.
MP PRUEFUNG DER FASE: BESTANDEN.
RESTMAGNETISMUS MAX. 20 GAUSS: BESTANDEN.
WASSERDRUCKPRUEFUNG 1455 BAR (1BAR=100KPA),
HALTEZEIT 10 SEK. JE ROHR: BESTANDEN.

(A04, B06)

MARKING, IDENTIFICATION / KENNZEICHNUNG, IDENTIFIKATION

 VALLOUREC	DIE STAMPED ON ONE SIDE HEAT-NO. PIPE NO. (TALLY-NR.) PAINT STENCILED ON ONE SIDE VALLOUREC LOGO VALLOUREC API SPEC 5L 0302.1 API-MONOGRAM MONTH/YEAR 88.9 17.81 X60QS PSL2G PROCESS OF MANUFACTURE SMLS INSPECTOR'S SIGN HEAT-NO. TESTED TEST PRESSURE MPA PIPE NO. (TALLY-NR.) SOUR TUBE/PIPE LENGTH M TUBE/PIPE WEIGHT KG CUSTOMER ORDER-NO. 4609-1985 257971 VLR ITEM-NO 1 CUSTOMER ITEM NO 69 PROJECT TCO SHIPPING LABELS VALLOUREC LOGO VALLOUREC API SPEC 5L 88.9 17.81 X60QS PSL2G HEAT-NO. ORDER LENGTH 10000 - 11800 WEIGHT PER BUNDLE KG METER PER BUNDLE PIECE PER BUNDLE BUNDLE NO. CUSTOMER ORDER-NO. 4609-1985 257971 VLR ITEM-NO 1 PROJECT MATERIALS GMBH NL COUNTRY OF ORIGIN GERMANY TENGIZCHEVROIL
 VALLOUREC	EINSEITIG STAHLGESTEMPELT SCHMELZEN-NR. LFD. ROHR-NR. EINSEITIG SCHABLONIERT VALLOUREC LOGO VALLOUREC API SPEC 5L 0302.1 API-MONOGRAMM MONAT/JAHR 88.9 17.81 X60QS PSL2G HERSTELLVERFAHREN SMLS ZEICHEN DES ABNEHMERS SCHMELZEN-NR. TESTED KWP IN MPA LFD. ROHR-NR. SOUR ROHREINZELLAENGE M ROHREINZELGEWICHT KG BESTELL-NR. BESTELLER 4609-1985 257971 POSITIONS-NR. 1 KUNDEN-ITEM-NO. 69 OBJEKT TCO VERSANDETICKETTEN VALLOUREC LOGO VALLOUREC API SPEC 5L 88.9 17.81 X60QS PSL2G SCHMELZEN-NR. BESTELLAENGE 10000 - 11800 GEWICHT JE BUND IN KG METER JE BUND STUECK JE BUND BUND-NR. BESTELL-NR. BESTELLER 4609-1985 257971 POSITIONS-NR. 1 PROJECT MATERIALS GMBH NL URSPRUNGSLAND GERMANY TENGIZCHEVROIL



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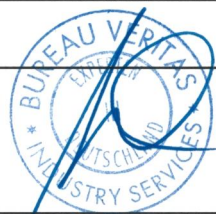
Enclosures / Anlagen

HIC TEST SEE APPENDIX
SSC TEST RESULTS ANNEXED
HIC-TEST SIEHE ANLAGE
SSC PRUEFERGEBNISSE SIEHE ANLAGE

(Z01)

The supplied products are in compliance with the requirements of the order
Die gelieferten Erzeugnisse stimmen mit den Anforderungen des Auftrages überein

(A05, Z02, Z03, Z04)

Date / Datum	27.03.2020	30 MAR 2020
Validated by Bestätigt durch	Inspection Representative Abnahmebeauftragter	Third Party Representative Beauftragter Fremdadnehmer
	DEYMANN 	
	(0208) 810-4650	
	(0208) 810-5629	
@	DIETER.DEYMANN@VALLOUREC.COM	
Stamp / Stempel		

Indication in parentheses correspond to attributes according to EN 10168

Die Bezeichnungen in Klammern entsprechen den Kennnummern gemäss EN 10168

This testimonial and certification respectively may neither be modified nor used for other products. Offences are regarded as falsification of documents and will be subject to criminal prosecution.
Dieses Zeugnis bzw. diese Bescheinigung darf weder verändert noch für andere Erzeugnisse verwendet werden. Zuwiderhandlungen werden als Urkundenfälschung und Betrug strafrechtlich verfolgt.

Vallourec Deutschland GmbH (A01) Werk Mülheim Rohrkontistraße Schützenstrasse 124 45476 MÜLHEIM AN DER RUHR GERMANY	 	INSPECTION CERTIFICATE (A02) ABNAHMEPRUEFZEUGNIS 3.2 EN 10204:2004 No. / Nr. : 38180Mu20 (A03) Page/Seite: 1 / 9 Date/Datum: 27.03.2020
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(A01) Vallourec Deutschland GmbH	(A08.1) Vallourec-Order-No. / Vallourec-Auftrags-Nr./ 257971 (A08.2) Suborder / Unterauftrag 85681796
(A06.1) Consignee / Empfänger Project Materials B.V Tussendonk 1 4878 AM ETTEN-LEUR NIEDERLANDE	
(A06.2) Orderer / Besteller PROJECT MATERIALS GMBH / 40549 DUESSELDORF	(A07.2) Orderer Order-No. / Senderbestellnummer 4609-1985 18.10.2019 Project name / Projektname TCO
(B01, B02, B04) Description of the product Erzeugnisbeschreibung	Hot finished seamless Steel pipes Sour service (as define by API 5L) API 5L, PSL 2, April 2018 Rev. 46 (E1) NACE standard MR0175 / ISO 15156-2, 2003 API 5L Annex B, C, E, G, H, K API 5L Annex A, O, API Monogram Chevron, PPL-SU-1051-TCO, October 2013 Technical Agreement between Chevron/TCO/VM Tubes & PM Piping, May 11-2016 X60 QS, API 5L PSL 2 - Annex H Ends plain, square to tube axis Inside surface aspect : Free of loose scale Outside surface aspect : Free of loose scale Outside with dry varnish Without inside rust protection Tube ends closed by plastic plugs Nahtlos warmgefertigt Stahlrohre Sour service (gemäß der Definition in der API 5L)# API 5L, PSL 2, April 2018 Rev. 46 (E1) NACE standard MR0175 / ISO 15156-2, 2003 API 5L Annex B, C, E, G, H, K API 5L Annex A, O, API Monogram Chevron, PPL-SU-1051-TCO, October 2013 Technical Agreement between Chevron/TCO/VM Tubes & PM Piping, May 11-2016 X60 QS, API 5L PSL 2 - Annex H Enden glatt, senkrecht zur Rohrachse abgeschnitten Oberflächenzustand # innen : Frei von losem Zunder Oberflächenzustand # außen : Frei von losem Zunder Klarlack außen Ohne Rostschutz innen Rohrenden mit Kunststoffstopfen verschlossen
(A10) Inspection by / Abnahme durch BUREAU VERITAS	
(B03)	30 MAR 2020

Vallourec Deutschland GmbH (A01) Werk Mülheim Rohrkontistraße Schützenstrasse 124 45476 MÜLHEIM AN DER RUHR GERMANY	 	INSPECTION CERTIFICATE (A02) ABNAHMEPRUEFZEUGNIS 3.2 EN 10204:2004
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(B03) FULLY KILLED-FINE GRAINED VOLLBERUHIGT-FEINKOERNIG
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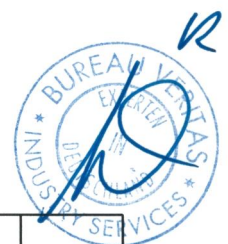
(A13) Vallourec Item Position	(A09) Orderer Item Position	(B14) Item text Positionstext	(B09) Dimensions Abmessung	(B10) Single length Einzellänge
2	70		API 5L OD 60.3 x WT 12.70 mm OD Tol $\pm 0.75\%$ WT Tol : + 15 % -12.5 % API 5L AD 60.3 x WD 12.70 mm AD Toleranz $\pm 0.75\%$ Wanddickentoleranz : + 15 % -12.5 %	Limited length from 10000 to 11800 mm Without short length Längen von 10000 bis 11800 mm Ohne Unterlängen

(A13) Vallourec Item Position	(A09) Orderer Item Position	(B08) Quantity Stück P	(B11) Total length Gesamtlänge m	(B13) Weight Gewicht kg
2	70	78	856.21	12 986

(C71)

HEAT CHEMICAL ANALYSIS / SCHMELZANALYSE

(B07.1) Heat Schmelze	(B15) Process Erschmelz.	Steel plant -	C %	Si %	Mn %	P %	S %	Al %	Cu %	Cr %	Ni %
min	-	-	0.060	-	-	-	-	-	-	-	-
max	-	-	0.110	0.450	1.65	0.018	0.0030	0.060	0.350	0.300	0.300
334223	Oxygen (BOF)	HK	0.080	0.240	1.22	0.016	0.0010	0.018	0.170	0.040	0.160



30 MAR 2022

Vallourec Deutschland GmbH (A01) Werk Mülheim Rohrkontistraße Schützenstrasse 124 45476 MÜLHEIM AN DER RUHR GERMANY	 	INSPECTION CERTIFICATE (A02) ABNAHMEPRUEFZEUGNIS 3.2 EN 10204:2004
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(C71)

HEAT CHEMICAL ANALYSIS / SCHMELZANALYSE

(B07.1)	Mo	V	Ti	Nb(Cb)	N	B	Ca	CQ 03	CQ 08	EF 02	EF 40	
Heat	%	%	%	%	%	%	%	%	%	%	-	
Schmelze												
min	-	-	-	-	-	-	-	-	-	-	0.4	
max	0.150	0.010	0.025	0.035	0.0120	0.0005	0.0060	.38	.19	0.07	3.0	
334223	0.090	0.002	0.003	0.024	0.0038	0.0003	0.0013	.33	.17	0.03	1.3	

Steel plant	HK HKM, Duisburg
CQ 03	$CEV/CE = C + Mn/6 + (Cr+Mo+V)/5 + (Ni+Cu)/15$
CQ 08	$CE(PCM) = C + Si/30 + (Mn+Cu+Cr)/20 + Ni/60 + Mo/15 + V/10 + 5B$
EF 02	$EF = V + Ti + Nb$
EF 40	$EF = CA : S$

Heats fully killed
Beruhigter Stahl

AL >= 2 X N

SAMPLES STARTING WITH "F" ARE THE FIRST DAY PRODUCTION TESTS
PROBEN DIE MIT "F" BEGINNEN SIND FIRST DAY PRODUCTION PROBEN



(C72)

PRODUCT CHEMICAL ANALYSIS / PRODUKT CHEMISCHE ANALYSE

(B07.1)	(C00.1)	C	Si	Mn	P	S	Al	Cu	Cr	Ni	Mo
Heat	Test Piece	%	%	%	%	%	%	%	%	%	%
Schmelze	Prüfstück										
min		0.060	-	-	-	-	-	-	-	-	-
max		0.110	0.450	1.65	0.018	0.0030	0.060	0.350	0.300	0.300	0.150
334223	F90397J	0.076	0.252	1.24	0.014	0.0006	0.017	0.170	0.034	0.167	0.090
334223	F90398	0.076	0.251	1.24	0.015	0.0008	0.017	0.170	0.034	0.167	0.090
334223	V90399J	0.076	0.250	1.24	0.014	0.0008	0.017	0.171	0.034	0.169	0.092
334223	V90400A	0.076	0.245	1.23	0.014	0.0007	0.016	0.167	0.033	0.168	0.090

30 MAR 2020

Vallourec Deutschland GmbH (A01) Werk Mülheim Rohrkontistraße Schützenstrasse 124 45476 MÜLHEIM AN DER RUHR GERMANY	 	INSPECTION CERTIFICATE (A02) ABNAHMEPRUEFZEUGNIS 3.2 EN 10204:2004 No. / Nr. : 38180Mu20 (A03) Page/Seite: 4 / 9 Date/Datum: 27.03.2020
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(C72)

PRODUCT CHEMICAL ANALYSIS / PRODUKT CHEMISCHE ANALYSE

(B07.1) Heat Schmelze	(C00.1) Test Piece Prüfstück	V %	Ti %	Nb(Cb) %	N %	B %	Ca %	CQ 03 %	CQ 08 %	EF 02 %	EF 40 -
min		-	-	-	-	-	-	-	-	-	0.4
max		0.010	0.025	0.035	0.0120	0.0005	0.0060	.38	.19	0.07	3.0
334223	F90397J	0.003	0.002	0.024	0.0034	0.0001	0.0018	.33	.17	0.03	3.0
334223	F90398	0.003	0.002	0.024	0.0034	0.0001	0.0018	.33	.17	0.03	2.3
334223	V90399J	0.003	0.002	0.024	0.0032	0.0001	0.0020	.33	.17	0.03	2.5
334223	V90400A	0.003	0.002	0.023	0.0039	0.0001	0.0017	.33	.17	0.03	2.4

CQ 03	$CEV/CE = C + Mn/6 + (Cr+Mo+V)/5 + (Ni+Cu)/15$
CQ 08	$CE(PCM) = C + Si/30 + (Mn+Cu+Cr)/20 + Ni/60 + Mo/15 + V/10 + 5B$
EF 02	$EF = V + Ti + Nb$
EF 40	$EF = CA : S$

TENSILE TEST RESULTS / ERGEBNISSE DES ZUGVERSUCHS

Type / Form (C10.1)	TUBE STRIP TEST SPECIMEN / ROHRSTREIFENPROBE
Test temperature / Prüftemperatur (C03)	ROOM TEMPERATURE / RAUMTEMPERATUR
Direction / Richtung (C02)	longitudinal / längs

(B07.1) Heat Schmelze	(C00.1) Test Piece Prüfstück	(C10) Dimension Abmessung	(C11) YS Streckgr.	(C12) TS Zugfest.	(C13) Elong. Dehnung	(C14.1) Ratio Verhältn.					
		mm	R _{10.5} MPa	R _m MPa	2" %	R/R _m -					
min		-	415	520	21.0	-					
max		-	565	760	-	-					
334223	F90397J	19.12X12.61	488	606	32.0	0.81					
334223	F90397K 1)	19.13X12.87	462	561	36.5	0.82					
334223	F90398	19.13X12.67	461	560	36.0	0.82					
334223	V90399J	19.11X12.87	459	579	37.0	0.79					

SAMPLES STARTING WITH "F" ARE THE FIRST DAY PRODUCTION TESTS

SAMPLE MARKED BY 1) IS THE PWHT TEST AND

SIMULATED HEAT TREATED AS FOLLOWS:

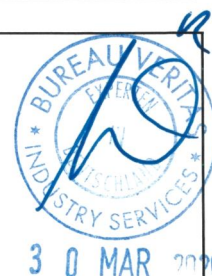
620 DEGREES C / HOLDING TIME 180 MIN.

PROBEN DIE MIT "F" BEGINNEN SIND FIRST DAY PRODUCTION PROBEN

PROBEN MARKIERT MIT 1) SIND DIE PWHT PROBEN UND

SIMULIEREND WAERMEBEHANDELT WIE FOLGT:

620 GRAD C / HALTEZEIT 180 MIN.



Vallourec Deutschland GmbH (A01) Werk Mülheim Rohrkontiststraße Schützenstrasse 124 45476 MÜLHEIM AN DER RUHR GERMANY	 	INSPECTION CERTIFICATE (A02) ABNAHMEPRUEFZEUGNIS 3.2 EN 10204:2004
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IMPACT TEST RESULTS / ERGEBNISSE DES KERBSCHLAGBIEGEVERSUCHS

Type / Form (C40)	Charpy-V / Charpy-V
Test temperature / Prüftemperatur (C03)	- 10 DEGREES C
Direction / Richtung (C02)	longitudinal / längs

(B07.1) Heat Schmelze	(C00.1) Test Piece Prüfstück	(C41)	(C42.1) Impact1 Arbeit1	(C42.1) Impact2 Arbeit2	(C42.1) Impact3 Arbeit3	(C43.3) Mean Mittelw.	(C42.2) Shear fr1 Scherbr1	(C42.2) Shear fr2 Scherbr2	(C42.2) Shear fr3 Scherbr3		
		qcm	J	J	J	J	%	%	%		
min		-	45.0	45.0	45.0	60.0	-	-	-		
max		-	-	-	-	-	-	-	-		
334223	F90397J	0.800	416	420	433	423	100	100	100		
334223	F90398	0.800	413	415	412	413	100	100	100		
334223	V90399J	0.800	426	435	420	427	100	100	100		

IMPACT TEST RESULTS / ERGEBNISSE DES KERBSCHLAGBIEGEVERSUCHS

Type / Form (C40)	Charpy-V / Charpy-V
Test temperature / Prüftemperatur (C03)	- 40 DEGREES C
Direction / Richtung (C02)	longitudinal / längs

(B07.1) Heat Schmelze	(C00.1) Test Piece Prüfstück	(C41)	(C42.1) Impact1 Arbeit1	(C42.1) Impact2 Arbeit2	(C42.1) Impact3 Arbeit3	(C43.3) Mean Mittelw.	(C42.2) Shear fr1 Scherbr1	(C42.2) Shear fr2 Scherbr2	(C42.2) Shear fr3 Scherbr3		
		qcm	J	J	J	J	%	%	%		
min		-	45.0	45.0	45.0	60.0	-	-	-		
max		-	-	-	-	-	-	-	-		
334223	F90397K	0.800	422	438	433	431	100	100	100		
334223	F90398A	0.800	410	418	419	416	100	100	100		
334223	V90400J	0.800	408	423	423	418	100	100	100		

SAMPLES STARTING WITH "F" ARE THE FIRST DAY PRODUCTION TESTS
PROBEN DIE MIT "F" BEGINNEN SIND FIRST DAY PRODUCTION PROBEN

HARDNESS TEST RESULTS / ERGEBNISSE DER HAERTEPRUEFUNG

Location / Lage (C01.1)	INSIDE CONCERNING WALL / INNEN BEZOGEN AUF DIE ROHRWAND
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30 MAR 2020

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HARDNESS TEST RESULTS / ERGEBNISSE DER HAERTEPRUEFUNG

(B07.1) Heat Schmelze	(C00.1) Test Piece Prüfstück	(C31) Value	(C31) Value	(C31) Value	(C31) Value						
		HV 10	HV 10	HV 10	HV 10						
min		-	-	-	-						
max		250.0	250.0	250.0	250.0						
334223	F90397J	211.0	212.0	208.0	215.0						
334223	F90398	168.0	171.0	173.0	172.0						
334223	V90399J	200.0	196.0	199.0	192.0						
334223	V90400	171.0	173.0	173.0	174.0						
334223	V90401J	198.0	200.0	197.0	193.0						
334223	V90402	163.0	166.0	162.0	165.0						

HARDNESS TEST RESULTS / ERGEBNISSE DER HAERTEPRUEFUNG

Location / Lage (C01.1)	MIDDLE CONCERNING WALL / MITTE BEZOGEN AUF DIE ROHRWAND
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(B07.1) Heat Schmelze	(C00.1) Test Piece Prüfstück	(C31) Value	(C31) Value	(C31) Value	(C31) Value						
		HV 10	HV 10	HV 10	HV 10						
min		-	-	-	-						
max		250.0	250.0	250.0	250.0						
334223	F90397J	183.0	183.0	183.0	184.0						
334223	F90398	169.0	173.0	171.0	173.0						
334223	V90399J	180.0	184.0	185.0	181.0						
334223	V90400	171.0	170.0	169.0	172.0						
334223	V90401J	186.0	189.0	191.0	182.0						
334223	V90402	173.0	174.0	172.0	174.0						



HARDNESS TEST RESULTS / ERGEBNISSE DER HAERTEPRUEFUNG

Location / Lage (C01.1)	OUTSIDE CONCERNING WALL / AUSSEN BEZOGEN AUF DIE ROHRWAND
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Vallourec Deutschland GmbH (A01) Werk Mülheim Rohrkontistraße Schützenstrasse 124 45476 MÜLHEIM AN DER RUHR GERMANY	 	INSPECTION CERTIFICATE (A02) ABNAHMEPRUEFZEUGNIS 3.2 EN 10204:2004 No. / Nr. : 38180Mu20 (A03) Page/Seite: 7 / 9 Date/Datum: 27.03.2020
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HARDNESS TEST RESULTS / ERGEBNISSE DER HAERTEPRUEFUNG

(B07.1) Heat Schmelze	(C00.1) Test Piece Prüfstück	(C31) Value Value	(C31) Value Value	(C31) Value Value	(C31) Value Value						
		HV 10	HV 10	HV 10	HV 10						
min		-	-	-	-						
max		250.0	250.0	250.0	250.0						
334223	F90397J	189.0	184.0	185.0	188.0						
334223	F90398	178.0	181.0	181.0	188.0						
334223	V90399J	180.0	179.0	180.0	187.0						
334223	V90400	173.0	174.0	169.0	173.0						
334223	V90401J	183.0	178.0	179.0	184.0						
334223	V90402	189.0	180.0	181.0	198.0						

SAMPLES STARTING WITH "F" ARE THE FIRST DAY PRODUCTION TESTS
PROBEN DIE MIT "F" BEGINNEN SIND FIRST DAY PRODUCTION PROBEN

(D55)

OTHER TESTS ON PIPE / SONSTIGE PRUEFUNGEN

Test Prüfung	Conditions Prüfbedingungen	Test rate Prüfumfang	Result Ergebnis
HEAT TREATMENT WAERMEBEHANDLUNG		2 MIN 950 DEGREES C WATER 2 MIN 950 GRAD C WASSER	
HEAT TREATMENT WAERMEBEHANDLUNG		20 MIN 660 DEGREES C AIR 20 MIN 660 GRAD C LUFT	
HEAT TREATMENT WAERMEBEHANDLUNG	WASSERVERGUETET	WATER QUENCHED AND TEMPERED	
APPEARANCE AND DIMENSIONS (D01) OBERFLAECHEBESCHAFFEN- HEIT UND MASSE (D01)		EACH PIPE/ TUBE JE ROHR	SATISFACTORY BESTANDEN

ELECTROMAGNETIC TESTING FOR LONGITUDINAL AND TRANSVERSE DEFECTS, OUTSIDE: SATISFACTORY.
ULTRASONIC TESTING FOR LONGITUDINAL AND TRANSVERSE DEFECTS, INSIDE AND OUTSIDE: SATISFACTORY.
ULTRASONIC TESTING FOR LAMINATIONS: SATISFACTORY.
ULTRASONIC TESTING FOR MIN. AND MAX. WALLTHICKNESS: SATISFACTORY.
UNINSPECTED ENDS CUT OFF OR MANUAL ULTRASONIC TESTING.
MPI OF PIPE ENDS, LONGITUDINAL AND TRANSVERSE DEFECTS, OUTSIDE LENGTH 100MM: SATISFACTORY.
MPI OF BEVEL: SATISFACTORY.
RESIDUAL MAGNETISM MAX. 20 GAUSS.
HYDROSTATIC TEST 1500 BAR (1BAR=100KPA),
HOLDING TIME 10 SEC. EACH PIPE/ TUBE: NO LEAKAGE.



30 MAR 2020

Vallourec Deutschland GmbH (A01) Werk Mülheim Rohrkontiststraße Schützenstrasse 124 45476 MÜLHEIM AN DER RUHR GERMANY	 	INSPECTION CERTIFICATE (A02) ABNAHMEPRUEFZEUGNIS 3.2 EN 10204:2004 No. / Nr. : 38180Mu20 (A03) Page/Seite: 8 / 9 Date/Datum: 27.03.2020
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(D55)

OTHER TESTS ON PIPE / SONSTIGE PRUEFUNGEN

ELEKTROMAGNETISCHE PRUEFUNG AUF LAENGs- UND QUERFEHLER,
AUSSEN: BESTANDEN.
ULTRASCHALLPRUEFUNG AUF LAENGs- UND QUERFEHLER, INNEN UND
AUSSEN: BESTANDEN.
ULTRASCHALLPRUEFUNG AUF DOPPLUNGEN: BESTANDEN.
ULTRASCHALLPRUEFUNG AUF MIN. UND MAX. WANDDICKE: BESTANDEN.
UNGEPRUEFTE ROHRENDEN WURDEN ABGESCHNITTEN ODER MANUELL
ULTRASCHALL GEPRUEFT.
MP PRUEFUNG DER ENDEN, AUSSEN, LAENGs- UND QUER (100MM):
BESTANDEN.
MP PRUEFUNG DER FASE: BESTANDEN.
RESTMAGNETISMUS MAX. 20 GAUSS: BESTANDEN.
WASSERDRUCKPRUEFUNG 1500 BAR (1BAR=100KPA),
HALTEZEIT 10 SEK. JE ROHR: BESTANDEN.



(A04, B06)

MARKING, IDENTIFICATION / KENNZEICHNUNG, IDENTIFIKATION

 VALLOUREC	DIE STAMPED ON ONE SIDE HEAT-NO. PIPE NO. (TALLY-NR.) PAINT STENCILED ON ONE SIDE VALLOUREC LOGO VALLOUREC API SPEC 5L 0302.1 API-MONOGRAM MONTH/YEAR 60.3 12.70 X60QS PSL2G PROCESS OF MANUFACTURE SMLS INSPECTOR'S SIGN HEAT-NO. TESTED TEST PRESSURE MPA PIPE NO. (TALLY-NR.) SOUR TUBE/PIPE LENGTH M TUBE/PIPE WEIGHT KG CUSTOMER ORDER-NO. 4609-1985 257971 VLR ITEM-NO 2 CUSTOMER ITEM NO 70 PROJECT TCO SHIPPING LABELS VALLOUREC LOGO VALLOUREC API SPEC 5L 60.3 12.70 X60QS PSL2G HEAT-NO. ORDER LENGTH 10000 - 11800 WEIGHT PER BUNDLE KG METER PER BUNDLE PIECE PER BUNDLE BUNDLE NO. CUSTOMER ORDER-NO. 4609-1985 257971 VLR ITEM-NO 2 PROJECT MATERIALS GMBH NL COUNTRY OF ORIGIN GERMANY TENGIZCHEVROIL
 VALLOUREC	EINSEITIG STAHLGESTEMPELT SCHMELZEN-NR. LFD. ROHR-NR. EINSEITIG SCHABLONIERT VALLOUREC LOGO VALLOUREC API SPEC 5L 0302.1 API-MONOGRAMM MONAT/JAHR 60.3 12.70 X60QS PSL2G HERSTELLVERFAHREN SMLS ZEICHEN DES ABNEHMERS SCHMELZEN-NR. TESTED KWP IN MPA LFD. ROHR-NR. SOUR ROHREINZELLAENGE M ROHREINZELGEWICHT KG BESTELL-NR. BESTELLER 4609-1985 257971 POSITIONS-NR. 2 KUNDEN-ITEM-NO. 70 OBJEKT TCO VERSANDETICKETTEN VALLOUREC LOGO VALLOUREC API SPEC 5L 60.3 12.70 X60QS PSL2G SCHMELZEN-NR. BESTELLAENGE 10000 - 11800 GEWICHT JE BUND IN KG METER JE BUND STUECK JE BUND BUND-NR. BESTELL-NR. BESTELLER 4609-1985 257971 POSITIONS-NR. 2 PROJECT MATERIALS GMBH NL URSPRUNGSLAND GERMANY TENGIZCHEVROIL

Vallourec Deutschland GmbH (A01) Werk Mülheim Rohrkontistraße Schützenstrasse 124 45476 MÜLHEIM AN DER RUHR GERMANY	 	INSPECTION CERTIFICATE (A02) ABNAHMEPRUEFZEUGNIS 3.2 EN 10204:2004 No. / Nr. : 38180Mu20 (A03) Page/Seite: 9 / 9 Date/Datum: 27.03.2020
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Enclosures / Anlagen

HIC TEST SEE APPENDIX SSC TEST RESULTS ANNEXED HIC-TEST SIEHE ANLAGE SSC PRUEFERGEBNISSE SIEHE ANLAGE
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(Z01) The supplied products are in compliance with the requirements of the order Die gelieferten Erzeugnisse stimmen mit den Anforderungen des Auftrages überein
--

(A05, Z02, Z03, Z04)

Date / Datum	27.03.2020	30 MAR 2020
Validated by Bestätigt durch	Inspection Representative Abnahmebeauftragter	Third Party Representative Beauftragter Fremdadnehmer
	DEYMANN 	
	(0208) 810-4650	
	(0208) 810-5629	
@	DIETER.DEYMANN@VALLOUREC.COM	
Stamp / Stempel		

Indication in parentheses correspond to attributes according to EN 10168

Die Bezeichnungen in Klammern entsprechen den Kennnummern gemäss EN 10168

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Vallourec Deutschland GmbH
Werk Mülheim
Rohrkontrollstraße
Schützenstrasse 124
45476 MÜLHEIM AN DER RUHR
GERMANY
(A06.1)

Consignee / Empfänger
Project Materials B.V
Tussendonk 1
4878 AM ETTEN-LEUR
NIEDERLANDE

(A06.2)

Orderer / Besteller
PROJECT MATERIALS GMBH / 40549 DUESSELDORF



INSPECTION CERTIFICATE
ABNAHMEPRUEFZEUGNIS
3.2 EN 10204:2004

Datum: 27.04.2020

(A07.2)

Orderer Order-No. / Senderbestellnummer 4609-1985 18.10.2019
Project name / Projektname TCO

Summary Sheet

Clarifications to Client Comments

"The MTRs state compliance with NACE MR0175/ISO15156 2003 edition. Why it is not compliant with the latest edition of MR0175?"

PPL-SU-1051-TCO is an API 5L based Specification. For the manufacture of this API 5L based order Vallourec is obliged to apply the latest API 5L Standard, which is the 46th edition. By default, when using the latest API 5L edition also the referenced edition of ISO 15156-2 in this standard has to be used which in this case is the 2003 edition. This is the reason why the 2003 edition is referenced in the MTR.

"The impact test results did not report lateral expansion. Please add it to the MTR? This is B31.3 Chapter IX requirement".

PPL-SU-1051-TCO specification is an amendment to API 5L specification and as such clearly defines material property requirements for CVN testing such as Test Temperature, Energy Values and Shear Area Requirements which differ from Material Requirements for Charpy Testing as described in ASME B31.3 and which are even more severe.

Secondly, X60 material does not fall under a material class for which lateral expansion as per ASME B31.3 is requested.

Finally, it can be stated that in hundreds of deliveries based on PPL-SU-1051-TCO specification the requirement of lateral expansion has never been discussed nor requested.

"All Impact tests used longitudinal samples. From the fitting MTRs it shows that it was possible to get transverse samples from 3" pipe. Can we confirm it was not physically possible to prepare transverse samples? Longitudinal is acceptable when the pipe size and wt doesn't permit transverse samples to be prepared."

PPL-SU-TCO-1051 does not overrule the conditions for test piece extraction regarding the CVN test:

§ 10.2.3.3 in combination with Table 22 of API 5L, 46th edition does not require any CVN test for pipes of dimension OD<114.3mm.

By default, for pipe dimensions with OD below 114.3mm, the Mill performs CVN Impact test in longitudinal direction. Feasibility of transverse CVN Impact Test Specimens will not be considered in such cases.

"HIC/SSC test results are not included. It is referenced in the document but the actual reports are not included. Please include them."

Please find attached the full set of HIC and SSC test results, we have been waiting for the release after 720h as we have permission from TCO to ship after successful 96 testing – anyway here is now the full set.

HIC (hydrogen induced cracking) test report

Specification: NACE TM 0284			Customer: Vallourec MH TKS-VGT		
Order no.	Material	Heat no.	Working no.	Dimensions [mm]	System no.
085681796.002	X60QS	334223		60,30 x 12,70	0410060
Test piece no.	Direction	Location	Specimen size [mm]		
F90397L	longitudinal	0°	Width	Thickness	Length
			20,00	9,70	100,00

Hydrogen charging conditions										
NACE TM0284 - 2011, test solution							A:	X	B:	
Others:										
Test conditions		Temperature		25	°C	test duration		96	[h]	
pH value of test solution		before H ₂ S saturation			2,7	Test start		3,0	End of test	
									3,9	
Diffusible hydrogen content :		ml/100g of weight								
H ₂ S concentration		Test start		2844	[ppm]	End of test		2708	[ppm]	
Remarks :										
Laboratory:		Received on:			Completed on:			Signature SZMF:		
SZMF		18.02.2020			25.02.2020			Boenke		

Surface blistering (see attached photos)			not observed	X	moderate		strong		Microcrack formation not observed			X
Subsection A			Subsection B			Subsection C						
L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]				
CLR	CTR	CSR	CLR	CTR	CSR	CLR	CTR	CSR				
average of 3 subsections			CLR = 0,00%			CTR = 0,00%			CSR = 0,00%			

Remarks:			
Laboratory: MGB	Received on: 25.02.2020	Completed on: 28.02.2020	Signature MGB: Kniffka

Inspection:  W/R

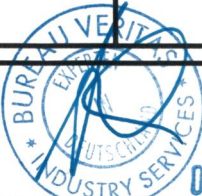
Approved:

HIC (hydrogen induced cracking) test report

Specification: NACE TM 0284		Customer: Vallourec MH TKS-VGT			
Order no.	Material	Heat no.	Working no.	Dimensions [mm]	System no.
085681796.002	X60QS	334223		60,30 x 12,70	0410061
Test piece no.	Direction	Location	Specimen size [mm]		
F90397L	longitudinal	120°	Width	Thickness	Length
			20,00	9,70	100,00

Hydrogen charging conditions					
NACE TM0284 - 2011, test solution				A:	X
Others:				B:	
Test conditions	Temperature	25 °C	test duration	96 [h]	
pH value of test solution	before H ₂ S saturation	2,7	Test start	3,0	End of test 3,9
Diffusible hydrogen content : ml/100g of weight					
H₂S concentration	Test start	2844 [ppm]	End of test	2708 [ppm]	
Remarks :					
Laboratory:	Received on:	Completed on:	Signature SZMF:		
SZMF	18.02.2020	25.02.2020	Boenke		

Surface blistering (see attached photos)		not observed	X	moderate		strong		Microcrack formation not observed	X
Subsection A			Subsection B			Subsection C			
L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]	
CLR	CTR	CSR	CLR	CTR	CSR	CLR	CTR	CSR	
average of 3 subsections			CLR = 0,00%			CTR = 0,00%			
			CSR = 0,00%						

Remarks:			
Laboratory:	Received on:	Completed on:	Signature MGB:
MGB	25.02.2020	28.02.2020	Kniffka
Inspection:			Approved:
 w/R			
02 MAR 2020			

HIC (hydrogen induced cracking) test report

Specification: NACE TM 0284			Customer: Vallourec MH TKS-VGT		
Order no.	Material	Heat no.	Working no.	Dimensions [mm]	System no.
085681796.002	X60QS	334223		60,30 x 12,70	0410062
Test piece no.	Direction	Location	Specimen size [mm]		
F90397L	longitudinal	240°	Width	Thickness	Length
			20,00	9,70	100,00

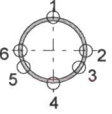
Hydrogen charging conditions											
NACE TM0284 - 2011, test solution								A:	X	B:	
Others:											
Test conditions		Temperature	25	°C	test duration	96	[h]				
pH value of test solution		before H ₂ S saturation			2,7	Test start	3,0	End of test	3,9		
Diffusible hydrogen content :		ml/100g of weight									
H ₂ S concentration		Test start	2844	[ppm]	End of test	2708	[ppm]				
Remarks :											
Laboratory:		Received on:			Completed on:			Signature SZMF:			
SZMF		18.02.2020			25.02.2020			Boenke			

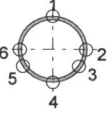
Surface blistering (see attached photos)			not observed			X	moderate				strong				Microcrack formation not observed			X
Subsection A			Subsection B						Subsection C									
L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]	
CLR	CTR	CSR	CLR	CTR	CSR	CLR	CTR	CSR	CLR	CTR	CSR	CLR	CTR	CSR	CLR	CTR	CSR	
average of 3 subsections			CLR = 0,00%			CTR = 0,00%			CSR = 0,00%									

Remarks:			
Laboratory: MGB	Received on: 25.02.2020	Completed on: 28.02.2020	Signature MGB: Kniffka

Inspection:  WIR 02 MAR 2020

Approved: _____

Customer	TEST PROTOCOL						Order no.																																
Vallourec	(Sulphide Stress Cracking Test - 4 Point Bend Test)						856.8179.6.02																																
Plant	Material		Heat no.			Dimensions [mm]																																	
Mülheim an der Ruhr Mill	L60E		334223			60,30x12,70																																	
Tube no.	Specimen no.		Specimen size [mm]			Work no.																																	
	F90397M		Width	Thickness	Length	EDWK 2020-021																																	
	1-3		15,0	5,0	140,0																																		
Specification	NACE-Standard TM0177-2016 ASTM G 39 - 99																																						
	Specimen location in pipe circumference	Specimen 1	3	Longitudinal specimens	Specimen 1	X	Transverse specimens	Specimen 1																															
		Specimen 2	5		Specimen 2	X		Specimen 2																															
		Specimen 3	1		Specimen 3	X		Specimen 3																															
Hydrogen charging conditions																																							
NACE-Standard TM0177-2016, test solution A																																							
Test conditions	Temperature	241 °C			Test period	96	[h]																																
H ₂ S concentration ppm (mg/L)				Test start	2725	Test end	2623																																
pH of test solution	Before H ₂ S saturation	2,7		Test start	3,2	Test end	3,9																																
Remarks																																							
4 - point bend beam specimen : ASTM G 39																																							
<table border="1"> <tr> <th colspan="2">Yield strength (MPa)</th> </tr> <tr> <td>Specified minimum</td> <td>Actual</td> </tr> <tr> <td></td> <td>488</td> </tr> </table>										Yield strength (MPa)		Specified minimum	Actual		488																								
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Applied stress : 80% SMYS																																							
Test results																																							
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Corrosion laboratory		NDT dept.		Inspector																																			
Received on	02.03.2020																																						
Completed on	06.03.2020	06.03.2020																																					
Operator	Boenke	Richter																																					
Signature																																							
Approved on	06.03.2020																																						
Name	Dr. Haase																																						
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		Specimen 3	1		Specimen 3	X		Specimen 3																															
Hydrogen charging conditions																																							
NACE-Standard TM0177-2016, test solution A																																							
Test conditions	Temperature	241 °C				Test period	720	[h]																															
H ₂ S concentration ppm (mg/L)					Test start	2623	Test end	2520																															
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Remarks																																							
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HIC (hydrogen induced cracking) test report

Specification: NACE TM 0284			Customer: Vallourec MH TKS-VGT		
Order no.	Material	Heat no.	Working no.	Dimensions [mm]	System no.
085681796.001	X60QS	334223		88,90 x 17,81	0410020
Test piece no.	Direction	Location	Specimen size [mm]		
F90345L	longitudinal	0°	Width	Thickness	Length
			20,00	14,80	100,00

Hydrogen charging conditions					
NACE TM0284 - 2011, test solution				A:	X
Others:				B:	
Test conditions	Temperature	25 °C	test duration	96	[h]
pH value of test solution	before H ₂ S saturation	2,7	Test start	3,0	End of test
					3,9
Diffusible hydrogen content : ml/100g of weight					
H₂S concentration	Test start	2844 [ppm]	End of test	2708 [ppm]	
Remarks :					
Laboratory:	Received on:	Completed on:	Signature SZMF:		
SZMF	18.02.2020	25.02.2020	Boenke		

Surface blistering (see attached photos)			not observed	X	moderate		strong		Microcrack formation not observed	X
Subsection A			Subsection B			Subsection C				
L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]		
CLR	CTR	CSR	CLR	CTR	CSR	CLR	CTR	CSR		
average of 3 subsections			CLR =	0,00%	CTR =	0,00%	CSR =	0,00%		

Remarks:			
Laboratory:	Received on:	Completed on:	Signature MGB:
MGB	25.02.2020	28.02.2020	Klein

Inspection:	Approved:
	

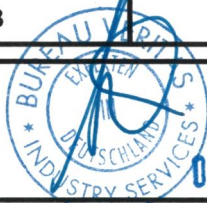
HIC (hydrogen induced cracking) test report

Specification: NACE TM 0284			Customer: Vallourec MH TKS-VGT		
Order no.	Material	Heat no.	Working no.	Dimensions [mm]	System no.
085681796.001	X60QS	334223		88,90 x 17,81	0410021
Test piece no.	Direction	Location	Specimen size [mm]		
F90345L	longitudinal	120°	Width	Thickness	Length
			20,00	14,80	100,00

Hydrogen charging conditions					
NACE TM0284 - 2011, test solution				A:	X
Others:				B:	
Test conditions	Temperature	25 °C	test duration	96	[h]
pH value of test solution	before H ₂ S saturation	2,7	Test start	3,0	End of test 3,9
Diffusible hydrogen content : ml/100g of weight					
H₂S concentration	Test start	2844 [ppm]	End of test	2708	[ppm]
Remarks :					
Laboratory:	Received on:		Completed on:		Signature SZMF:
SZMF	18.02.2020		25.02.2020		Boenke

Surface blistering (see attached photos)			not observed	X	moderate		strong		Microcrack formation not observed		X
Subsection A			Subsection B			Subsection C					
L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]
CLR	CTR	CSR	CLR	CTR	CSR	CLR	CTR	CSR	CLR	CTR	CSR
average of 3 subsections			CLR =	0,00%	CTR =	0,00%	CSR =	0,00%			

Remarks:					
Laboratory:	Received on:		Completed on:		Signature MGB:
MGB	25.02..2020		28.02.2020		Klein

Inspection:	Approved:
	

HIC (hydrogen induced cracking) test report

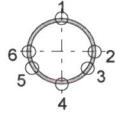
Specification: NACE TM 0284			Customer: Vallourec MH TKS-VGT		
Order no.	Material	Heat no.	Working no.	Dimensions [mm]	System no.
085681796.001	X60QS	334223		88,90 x 17,81	0410022
Test piece no.	Direction	Location	Specimen size [mm]		
F90345L	longitudinal	240°	Width	Thickness	Length
			20,00	14,80	100,00

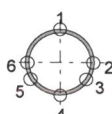
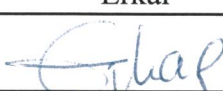
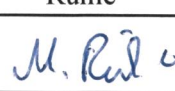
Hydrogen charging conditions										
NACE TM0284 - 2011, test solution							A:	X	B:	
Others:										
Test conditions		Temperature	25	°C	test duration	96	[h]			
pH value of test solution		before H ₂ S saturation			2,7	Test start	3,0	End of test	3,9	
Diffusible hydrogen content :		ml/100g of weight								
H ₂ S concentration		Test start	2844	[ppm]	End of test	2708	[ppm]			
Remarks :										
Laboratory:		Received on:			Completed on:			Signature SZMF:		
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L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]	L [mm]	W [mm]	A [mm ²]
CLR	CTR	CSR	CLR	CTR	CSR	CLR	CTR	CSR	CLR	CTR	CSR	CLR	CTR	CSR	CLR	CTR	CSR
average of 3 subsections			CLR = 0,00%			CTR = 0,00%			CSR = 0,00%								

Remarks:			
Laboratory: MGB	Received on: 25.02.2020	Completed on: 28.02.2020	Signature MGB: Klein

Inspection:  W/R Approved: 02 MAR 2020

Customer	TEST PROTOCOL						Order no.								
Vallourec	(Sulphide Stress Cracking Test - 4 Point Bend Test)						856.8179.6.01								
Plant	Material			Heat no.			Dimensions [mm]								
Mülheim an der Ruhr Mill	L60E			334223			88,90x17,81								
Tube no.	Specimen no.		Specimen size [mm]			Work no.									
	F90345M		Width	Thickness	Length	EDWK 2020-020									
	1-3		15,0	5,0	140,0										
Specification	NACE-Standard TM0177-2016 ASTM G 39 - 99														
	Specimen location in pipe circumference	Specimen 1	3	Longitudinal specimens	Specimen 1	X	Transverse specimens	Specimen 1							
		Specimen 2	5		Specimen 2	X		Specimen 2							
		Specimen 3	1		Specimen 3	X		Specimen 3							
Hydrogen charging conditions															
NACE-Standard TM0177-2016, test solution A															
Test conditions	Temperature	241 °C				Test period	96 [h]								
H ₂ S concentration ppm (mg/L)					Test start	2725	Test end	2623							
pH of test solution	Before H ₂ S saturation 2,7				Test start	3,2	Test end	3,9							
Remarks															
4 - point bend beam specimen : ASTM G 39															
<table border="1"> <tr> <th colspan="2">Yield strength (MPa)</th> </tr> <tr> <td>Specified minimum</td> <td>Actual</td> </tr> <tr> <td></td> <td>456</td> </tr> </table>										Yield strength (MPa)		Specified minimum	Actual		456
Yield strength (MPa)															
Specified minimum	Actual														
	456														
Applied stress : 80% SMYS															
Test results															
Results of visual inspection (10x)						Results of magnetic particle inspection									
Specimen no.	No cracks	Cracks		Specimen no.	No cracks	Cracks									
1	X			1	X										
2	X			2	X										
3	X			3	X										
				Inspector											
Received on	Corrosion laboratory		NDT dept.												
Completed on	02.03.2020		06.03.2020												
Operator	Boenke		Richter												
Signature															
Approved on	06.03.2020														
Name	Dr. Haase														
Signature															

Customer		TEST PROTOCOL					Order no.																																
Vallourec		(Sulphide Stress Cracking Test - 4 Point Bend Test)					856.8179.6.01																																
Plant		Material		Heat no.		Dimensions [mm]																																	
Mülheim an der Ruhr Mill		L60E		334223		88,90x17,81																																	
Tube no.		Specimen no.		Specimen size [mm]			Work no.																																
		F90345		Width	Thickness	Length	EDWK 2020-020																																
		1-3		15,0	5,0	140,0																																	
Specification		NACE-Standard TM0177-2016 ASTM G 39 - 99																																					
	Specimen location in pipe circumference	Specimen 1	3	Longitudinal specimens	Specimen 1	X	Transverse specimens	Specimen 1																															
		Specimen 2	5		Specimen 2	X		Specimen 2																															
		Specimen 3	1		Specimen 3	X		Specimen 3																															
Hydrogen charging conditions																																							
NACE-Standard TM0177-2016, test solution A																																							
Test conditions		Temperature		24 °C		Test period		720 [h]																															
H ₂ S concentration ppm (mg/L)				Test start		2623		Test end 2520																															
pH of test solution		Before H ₂ S saturation		2,7		Test start		3,2 Test end 3,9																															
Remarks																																							
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Operator		Erkal		Rühle																																			
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