



Zertifikat-/Auftrags-Nr.: 0036-SRB-18-05-219-001
 Reference No.:
 N° de référence:

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ZERTIFIKAT - QUALIFIZIERUNG DES SCHWEISSVERFAHRENS(WPQR)

WELDING PROCEDURE QUALIFICATION CERTIFICATE / CERTIFICAT DE QUALIFICATION D'UN MODE OPÉRATOIRE DE SOUDAGE

Zertifizierstelle: TÜV SÜD Industrie Service GmbH
Certification Body: Westendstraße 199
Organisme de certification: D-80686 München

Zeichen: SRB/is
Sign:
Signe:

Hersteller / Anschrift: Todebo d.o.o.
Manufacturer / Address: Rumski Drum 79
Constructeur / Adresse: 22000 Sremska Mitrovica

Beleg-Nr. des Herstellers: pWPS Nr.:
Manufacturer's Reference No.: 135 P BW 1.2 t10
N° de référence du constructeur: PA

Vorschrift/Prüfnorm:
Code/Testing Standard: EN ISO 15614-1 - Level 2
Code/Norme d'essai:

Datum der Schweißung: 26.04.2018.
Date of Welding:
Date du soudage:

GELTUNGSBEREICH - RANGE OF APPROVAL - DOMAINE DE VALIDITÉ

Schweißprozeß: EN ISO 4063-135 (MAG, Teilweise mechanisiert)
Welding Process: EN ISO 4063-135 (MAG, partly mechanized)
Procédé de soudage:

Stoßart / Nahtart: **Stumpfstoß**, mehrlagig, einseitiges Schweißen,
Joint Type/ Type de joint: ohne und mit Schweißbadsicherung,
 beidseitiges Schweißen, **Kehlnaht / Butt joint**, multi-run deposit, one side welding
 without and with backing, both sides welding,
Fillet weld

Werkstoffgruppe: EN 10025-2 – **S355J2+N(1.0577)**, sowie miterfasste Werkstoffe*) der Gruppe 1 mit der festgelegten
Parent Metal Group: Streckgrenze $\leq 355 \text{ N/mm}^2$ nach CEN ISO/TR 15608 /
Matériaux: EN 10025-2 – **S355J2+N(1.0577)**, as well as materials*) of the group 1 with the specified yield
 strength $\leq 355 \text{ N/mm}^2$ acc. to CEN ISO/TR 15608

Dicke des Grundwerkstoffs [mm]: 3,0 – 20,0
Parent Metal Thickness [mm]:
Épaisseur du matériau [mm]:

Außendurchmesser [mm]: >150,0 (PC, PF and PA
Outside Pipe Diameter [mm]: rotated position)
Diamètre extérieur [mm]: >500,0 other position

Schweißgutdicke [mm]: 3,0 – 20,0
Weld Metal Thickness [mm]:
Épaisseur de la soudure [mm]:

Kehlnahtdicke [mm]: Keine Einschränkung/
Throat Thickness [mm]: **No restriction**
Raccord [mm]:

Zusatzwerkstoff / Bezeichn.: EN ISO 14341-A - **G 42 5M G3Si1**
Filler Metal Type/Designation:
Caractéristique du métal d'apport:

Stromart: G / plus (DC+, plus)
Type of Welding Current:
Nature de courant de soudage:

Wärmeeinbringung [kJ/mm]: Wurzellage/Root Pass: 0,247 – 0,412
Heat input Q [kJ/mm]: Füll und Decklage/Filler and Cover
Apport de chaleur [kJ/mm]: Pass: 0,472 – 1,312

Tropfenübergang: Kurzlichtbogen
Mode of Metal Transfer: Impulslichtbogen,
Mode de transfert: Sprühlichtbogen und
 Übergangslichtbogen /
 Short arc, Pulse, spray and
 globular

Schutzgas / Wurzelschutz: EN ISO 14175 – **M21-ArC-18 / -**
Shielding Gas / Backing Gas:
Gaz de protection / Purge:

Pulver: -
Flux:
Flux:

Schweißpositionen: EN ISO 6947 – **PA**
Welding Positions:

Positionen de soudage:

Betriebstemperatur:

Working Temperature:

Température de service:

Wie Grundwerkstoff bzw. Zusatzwerkstoff, jedoch nicht tiefer als -20 °C
 As base material and filler metal respectively, however not lower than -20 °C,
 Comme métal de base et métal d'apport respectivement, pourtant non sous -20 °C

Vorwärmung: -

Preheat Temperature:

Préchauffage:

Wärmenachbehandlung: keine / without

Post Weld Heat Treatment:

Traitement thermique après soudage:

Zwischenlagentemperatur: $\leq 250^\circ\text{C}$

Interpass Temperature:

La température entre les passes:

Gültigkeit der Prüfung: -

Validity of Approval:

Validité du Certificat:

SONSTIGE ANGABEN - OTHER INFORMATION - AUTRES PARAMÈTRES

BILDBEILAGEN ZUR METALLOGRAPHISCHEN UNTERSUCHUNG: siehe Anlage 1

EINZELHEITEN ZUR PRÜFSTÜCKSCHWEISSUNG UND SCHWEISSANWEISUNG (pWPS): siehe Anlage 2

Resultate der zerstörungsfreien Prüfungen / reports on non-destructive testing: siehe Anlage 3 / see annex 3

Hiermit wird bestätigt, daß die Prüfstücke in Übereinstimmung mit den Anforderungen der vorbezeichneten Vorschriften bzw. Prüfnormen zufriedenstellend vorbereitet, geschweißt und geprüft wurden. / Certified that test pieces were prepared, welded and tested satisfactorily in accordance with the requirements of the code or the testing standard indicated above. / Nous certifions que les essais de soudage ont été préparés, soudés et contrôlés avec succès, conformément aux exigences du code ou de la norme d'essai ci-dessus mentionnée(e).

Ort: Belgrade
Location:
Lieu:

Datum der Ausstellung: 08.05.2018.
Date of issue:
Date d'émission:

Name und Unterschrift des Zertifizierers:
Name and Signature:
Nom et signature:
Zertifizierstelle: TÜV SÜD Industrie Service GmbH
Certification Body:
Organisme de certification:

Dipl. Ing. IVAN STOJČIĆ

Anlagen: 3

Annexes:

Annexes:

*) siehe Tabelle(n) für Geltungsbereich Werkstoffe in EN ISO 15614-1

*) see table(s) for range of material qualification in EN ISO 15614-1

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EINZELHEITEN ZUR PRÜFSTÜCKSCHWEISSUNG (1)

DETAILS OF WELD TEST (1) / DEFINITION DU TEMOIN SOUDE (1)

Hersteller: Todebo d.o.o.
 Manufacturer: Rumski Drum 79
 Constructeur: 22000 Sremska Mitrovica

Ort / Datum der Schweißung: Sremska Mitrovica/
 Location / Date of Welding: 26.04.2018.
 Lieu / Date du soudage:

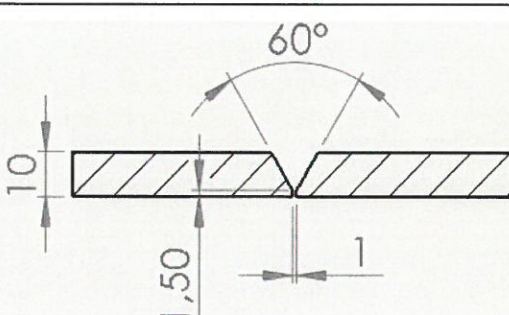
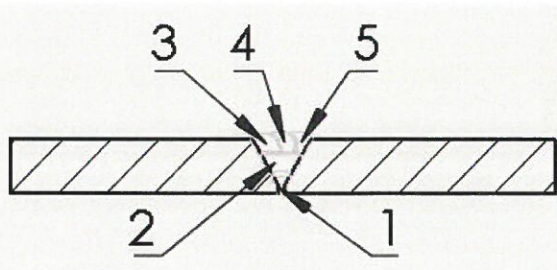
Name des Schweißers: Nemanja Barać (1)
 Welder's Name:
 Nom du soudeur:

Art der Vorbereitung und Schneiden + Schleifen
 Reinigung:
 Method of Preparation and Cleaning:
 Méthode de préparation et nettoyage:

PRÜFSTÜCKE - TEST PIECES - COUPONS

Nr. No. N°	Schweißprozeß Welding Process Procédé de soudage	Dicke Thickness Épaisseur [mm]	Durchmesser Outside Diameter Diamètre extérieur [mm]	Schweißposition Welding Position Pos. du soudage	Nahtart Joint Type Type de joint	Grundwerkstoff (Spezifikation) Parent Metal (Specification) Matériau de base (Spécification) Zeugnis liegt vor/Certific. submitted/Certific. présenté*)
1	135 (MAG)	10,0	-	PA	Stumpfstoß am Blech mit voller Durchschweiß., einseitig, „V-Naht“	S355J2+Nnach/acc. to EN 10025-2 SchmelzeNr./Heat No. 180103-2

NAHTVORBEREITUNG (Zeichnung)* - WELD PREPARATION (Sketch)* - PRÉPARATION DE L'ASSEMBLAGE (croquis)*

Gestaltung der Verbindung / Joint Design / Réalisation de l'assemblage	Schweißfolge / Welding Sequence / Répartition des passes
	

EINZELHEITEN FÜR DAS SCHWEISSEN - WELDING DETAILS - PARAMETRES DE SOUDAGE

Prüfstück/Lage Test Piece/Run Coupon/Passe	Prozeß Process Procédé	Schweißzusatz Filler Metal Métal d'apport Ø [mm]	Stromstärke Current Amperage [A]	Spannung Voltage Tension [V]	Stromart/ Polung Type of current/ Polarity Type de courant/ Polarité	Drahtvorschub/ Schweißgeschwindigkeit Wire Feed/Travel Speed Vitesse de déroulement du fil/ Vitesse d'avance [cm/min] *)	Wärme- einbringu- ng Heat Input Énergie de soudage [kJ/mm] *)	Tropfen- übergang Transfer mode Mode de transfert
1(W)	135	1,00	130	17,5	DC+/ plus	550/33,6	0,33	Kurzlichtbogen
2(F)	135	1,00	198	26,5	DC+/ plus	900/24,1	1,05	Übergangslichtbogen
3(D)	135	1,00	183	22,7	DC+/ plus	900/31,8	0,63	Übergangslichtbogen
4 (D)	135	1,00	190	22,8	DC+/ plus	900/34,2	0,61	Übergangslichtbogen
5 (D)	135	1,00	188	22,8	DC+/ plus	900/31,3	0,66	Übergangslichtbogen

++ W = Wurzellage - Root Pass Weld - Passe de fond
 F = Füllage - Filler Pass Run - Passe de remplissage
 D = Decklage - Cover Pass - Passe de finition

K = Gegenlage - Capping Pass - Passe de reprise à l'envers
 P = Plattierung - Cladding - Placage
 oder Nr. gem. Zeichnung - or No. according sketch - ou N° suivant croquis *)

*) falls erforderlich/ if required / sinécessaire





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INZELHEITEN ZUR PRÜFSTÜCKSCHWEISSUNG (2) **DETAILS OF WELD TEST (2) / DEFINITION DU TEMOIN SOUDE (2)**

Zusatzwerkstoff - Filler Metal - Métal d'apport

Type, Bezeichnung, Handelsbezeichnung: VAC 60, SIJ elektrode, EN ISO 14341-A : G 42 5MG3Si1
 Type, Designation, Trade name:
 Type, Désignation, Marque de fabrique: Ø 1,0 mm, Charge-Nr. 781305

Sondervorschriften für Trocknung oder Lagerung:

Any Special Drying or Baking:

Précautions de séchage ou d'étuvage:

Schutzgas: EN ISO 14175 – M21-ArC-18
 Shielding Gas:
 Gaz de protection:

Gasdurchflußmenge [l/min]: 13
 Gas Flow Rate [l/min]:
 Débit gazeux [l/min]:

Wurzelschutz: -
 Backing Gas:
 Purge:

Gasdurchflußmenge [l/min]: -
 Gas Flow Rate [l/min]:
 Débit gazeux [l/min]:

Pulver: -
 Flux:
 Flux:

Wolframelektrode, Art / Durchmesser: -
 Tungsten Electrode, Type / Size:
 Électrode au tungstène, Type / Dimension:

Einzelheiten über Ausfugen / Badsicherung: -
 Details of Back Gouging / Backing:
 Détails sur la reprise à l'envers:

Vorwärmtemperatur [°C]: -
 Preheat Temperature [°C]:
 Température de préchauffage [°C]:

Zwischenlagentemperatur [°C]: 125-250
 Interpass Temperature [°C]:
 Température entre passes [°C]:

Weitere Informationen *): -
 Other Information *):
 Autres paramètres *):

WÄRMENACHBEHANDLUNG - POST WELD HEAT TREATMENT - TRAITEMENT THERMIQUE APRES SOUDAGE

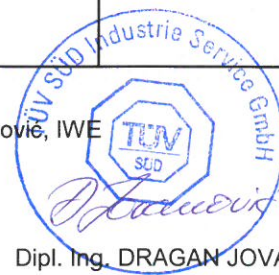
Verfahren / Bemerkungen Method / Remarks Méthode / Remarques	Aufheizrate [°C/h] *) Heating Rate Vitesse de chauffage	Haltezeit [min] Holding Time Temps de maintien	Haltezeittemperatur [°C] Hold Temperature Temp. de maintien	Abkühlrate [°C/h] *) Cooling Rate Vit. de refroidissement
-	-	-	-	-

Das vorbezeichnete Prüfstück wurde geschweißt in Anwesenheit von:
 The above test piece was welded in the presence of:
 Le coupon témoin ci-dessus a été soudé en présence de:

Dipl. Ing. Dragan Jovanović, IWE

Name und Unterschrift des
 Zertifizierers:
 Name and Signature:
 Nom et signature:

Zertifizierstelle:
 Certification Body:
 Organisme de certification:



Dipl. Ing. DRAGAN JOVANOVIĆ

TÜV SÜD Industrie Service GmbH

*) falls erforderlich / if required / sinécessaire

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PRÜFERGEBNISSE (1)

TEST RESULTS (1) / RÉSULTATS DES ESSAIS (1)

Sichtprüfung:
 Visual Examination:
 Examen visuel: 479/VT/18

erfüllt
 satisfactory
 satisfaisant

Durchstrahlungsprüfung *): /
 Radiography *):
 Radiographie *):

Farbeindring- / Magnetpulverprüfung *):
 Penetrant / Magnetic Particle Test *):
 Ressuage / Magnétoscopie *): 479/PT/18

erfüllt
 satisfactory
 satisfaisant

Ultraschallprüfung *): erfüllt
 Ultrasonic Examination *):
 Ultra-sons *): 479/UT/18

ZUGPRÜFUNG EN ISO 4136 - TENSILE TESTS - ESSAIS DE TRACTION

Temperatur [°C]: RT
 Temperature: Tempér

Nr. No. N°	Pos. Loc. Pos.	Art ** Sort ** Nature **	Abmessungen Dimensions Dimensions [mm x mm]	Re [MPa]	Rp 0,2/1,0 [MPa]	Rm [MPa]	A [%] an / on / en L0 [mm]:	Z [%]	Bruchlage *** Fracture Locat. Cassure Posit.	Bemerkungen Remarks Remarques
Anforderungen Requirements / Exigences			1.0577	-	-	470 - 630	-	-	-	-
250.1	PA	TW	10,0 x 25,2	-	-	546	-	-	GW	erfüllt / satisfactory
250.2	PA	TW	10,0 x 25,1	-	-	558	-	-	GW	erfüllt / satisfactory

**) TW = Querzurnäht - Transv. to the Weld - Tranvers soudure
 AW = Schweißgutprobe - All-weld Metal - Métal déposé

***) GW = Grundwerkstoff - Base Material - Métal de base
 WEZ = WEZ - HAZ - ZAT
 SG = Schweißgut - Weld Metal - Métal déposé
 GWL = Bruch auß. L0 - Fracture outside L0 - Cassure hors de L0

BIEGEPRÜFUNG EN ISO 5173 - BEND TEST - ESSAI DE PLIAGE

Biegedorn-Durchmesser: 4 x a - 40 mm
 Former Diameter: Diamètre du

Nr. No. N°	Pos. Loc. Pos.	Art ** Sort ** Nature **	Dicke thickn. epaiss. [mm]	Biegewinkel/-dehnung Bend. angle / Elongation Allongement de pliage	Bemerkung Remark Remarque	Nr. No. N°	Pos. Loc. Pos.	Art ** Sort ** Nature **	Dicke thickn. epaiss. [mm]	Biegewinkel/-dehnung Bend. angle / Elongation Allongement de pliage	Bemerkung Remark Remarque
				◁ L0 [mm] %						◁ L0 [mm] %	
250.1l	PA	D	10,0	180 - -	o. B. / n. o.						
250.2k	PA	W	10,0	180 - -	o. B. / n. o.						
250.3l	PA	D	10,0	180 - -	o. B. / n. o.						
250.4k	PA	W	10,0	180 - -	o. B. / n. o.						

**) D = Decklage in Zugzone - Face - Endroit W = Wurzel/Gegenseite in Zugzone - Root/Back side - Envers S = Seitenbiegeprobe - Side - Cote
 o. B. / n. o. - ohne Beanstandung / no objection

KERBSCHLAGBIEGEPRÜFUNG EN ISO 9016

IMPACT TESTS - ESSAIS DE RÉSILIENCE

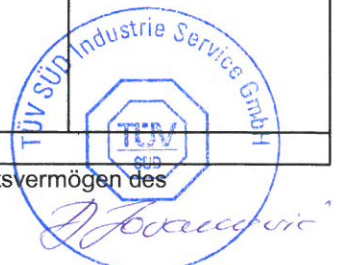
Art: Charpy-V
 Sort: Natur
 e:

Anforderung [J]: VWT ≥ 27 (KV_c)
 Requirements [J]:
 Exigences [J]: VHT ≥ 27 (KV_c)

Nr. No. N°	Position Location Position	Kerblage Notch Location Sens de l'entaille	Größe Size/Dimens. [mm x mm]	Temp. Temp./Temp. [°C]	Werte - Values - Valeurs [J]			Σn/n [J]	Bemerkungen Remarks Remarques
					1	2	3		
250.1s, 2s, 3s	PA	VWT 0/2	7,5 x 10,0	-20	102	98,1	58,9	86,3	erfüllt / satisfactory KV _c = 115
250.1z, 2z, 3z	PA	VHT 2/2	7,5 x 10,0	-20	54,0	46,1	54,0	51,3	erfüllt / satisfactory KV _c = 68,5

- bei Untermaßproben sind die Kerbschlagwerte hochzurechnen
 Pendelschlagwerks: 300 J

Arbeitsvermögen des



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PRÜFERGEBNISSE (2)

TEST RESULTS (2) / RÉSULTATS DES ESSAIS (2)

CHEMISCHE ANALYSE [%]

CHEMICAL COMPOSITION [%] - ANALYSE CHIMIQUE [%]*)

GW = Grundwerkstoff - Base Material - Métal de base
 SG = Schweißgut - Weld Metal - Métal déposé

Nr. No. N°	Art Sort Nature	C	Si	Mn	P	S	Cr	Ni	Mo	Al	Ti	Cu	V	N	Nb
180103-2	S355J2+N	0,17	0,20	1,41	0,019	0,016	0,03	0,02	0,002	0,033	0,018	0,02	0,004	0,005	0,003
781305	VAC 60	0,08	0,90	1,50	<0,025	<0,025	-	-	-	-	-	-	-	-	-

HÄRTEPRÜFUNG EN ISO 9015 *)

HARDNESS TEST *) - ESSAI DE DURETÉ *)

Lage der Messungen (Skizze) *)
 Location of Measurements (Sketch) *)
 Localisation des mesures (croquis) *)



Art / Last: - Type / Load: - Type / Charge:

HV 10 (Anforderung / requirement: max - 380 HV)

Nr. No. N°	Meßreihe Measuring Line Ligne de mesure	Grundwerkstoff Base Material Métal de base			WEZ HAZ ZAT			Schweißgut Weld Metal Métal déposé			WEZ HAZ ZAT			Grundwerkstoff Base Material Métal de base		
250/18	I	191	191	191	221	236	236	221	213	206	213	227	228	185	187	187
250/18	II	181	181	181	193	199	203	221	221	221	203	203	181	177	177	177

GEFÜGEUNTERSUCHUNG EN ISO 17639 - TEXTURE EXAMINATION - EXAMEN DE LA STRUCTURE

Anlage: 1
 Annexes:/Annexes:

Nr. No. N°	Position Location Position	Gefüge Texture/Structure Makro Mikro Macro Micro		Gefügebeurteilung Texture Assessment/Analyse de la structure
250/18	PA	X		fehlerfreier Nahtaufbau und einwandfreie Durchschweißung / without defects, faultless penetration

SONSTIGE PRÜFUNGEN - OTHER TESTS - AUTRES ESSAIS *) / BEMERKUNGEN - REMARKS - REMARQUES

Die Prüfungen wurden ausgeführt in
 Anwesenheit von:

Test carried out in the presence of:
 Les essais ont été effectués en présence de:

Dragan Jovanović

Die Prüfungen wurden entsprechend den Prüfgrundlagen durchgeführt.
 The tests have been performed in accordance with the specifications.
 Les essais ont été effectués selon les spécifications.

Die Prüfergebnisse sind:
 Test Results were:/
 Les résultats des essais sont:

☒ zufriedenstellend
 acceptable /
 acceptables

☐ nicht zufriedenstellend
 not acceptable /
 non acceptables

Name und Unterschrift
 des Zertifizierers:
 Name and Signature:
 Nom et signature:

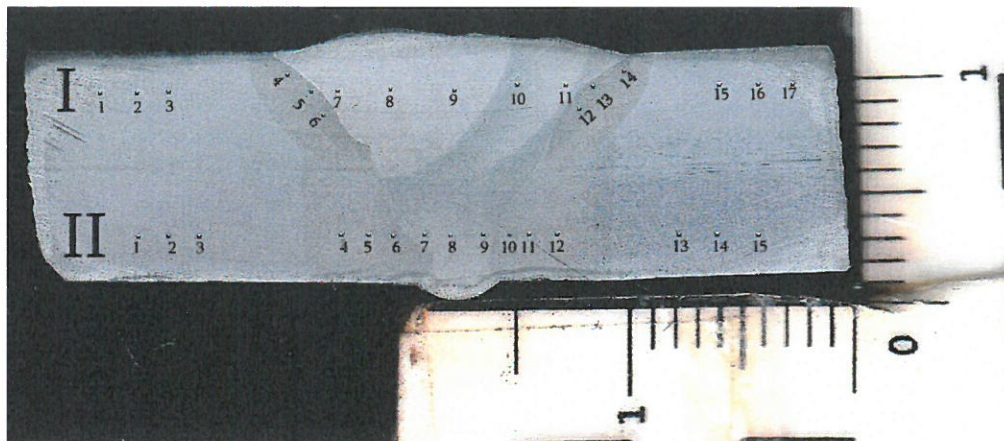
Zertifizierstelle:
 Certification Body:
 Organisme de certification:

Dipl. Ing. DRAGAN JOVANOVIĆ
 TÜV SÜD Industrie Service GmbH

*) falls erforderlich/ if required / sinécessaire



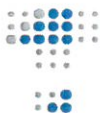
GEFÜGEUNTERSUCHUNG - TEXTURE EXAMINATION - EXAMEN DE LA STRUCTURE



150/18 (PA)

Anlage 1 Seite 1 von 1 zum Untersuchungsbericht des
TÜV SÜD Industrie Service GmbH Prüf-Nr. 0036-SRB-18-05-219-001

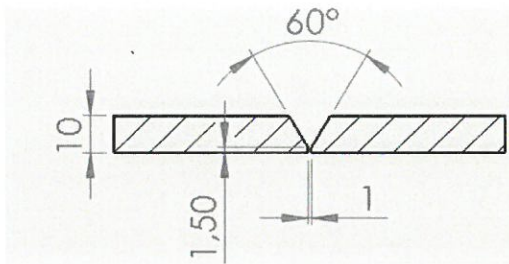
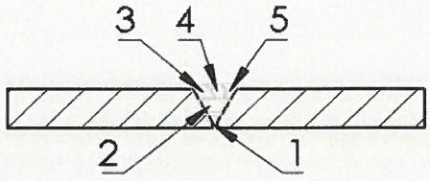




Postupak zavarivanja pWPS 135 P BW 1.2 t10 PA

Opšte:	Kvalifikovanje tehnologije zavarivanja
Osnovni materijal:	S355J2+N
Debljina materijala:	10 [mm]
Spoljašnji prečnik:	/
Priprema:	Brusnje
Vrsta čišćenja:	Brusni kamen

WPQR:	-
Proces zavarivanja:	135
Položaj zavarivanja	PA
Tip spoja:	BW
Zavarivač:	Barac Nemanja
Žig:	1

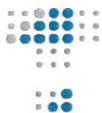
Oblik spoja	Redosled zavarivanja
	

Redosled zavarivanja	Proces	Debljina žice	Amperaža [A]	Napon [V]	Polaritet	Pomak žice [m/min]	Brzina zavarivanja [cm/min]	Unos energije [KJ/mm]
1	135	Ø 1	115-135	17-18	DC+	5-6	-	-
2	135	Ø 1	190-200	26-27	DC+	8-10	-	-
3	135	Ø 1	180-190	22-23	DC+	8-10	-	-
4	135	Ø 1	185-195	22-23	DC+	8-10	-	-
5	135	Ø 1	185-195	22-23	DC+	8-10	-	-

Materijal žice za zavarivanje	Iso 14341-A G3Si1
Gas:	Iso 14175-M21
Priprema radnog komada:	Bez podloske
Predgrevanje:	/
Međuprolazna temperatura:	≤250 °C
Vrsta čišćenja:	Brusilica
Dogrevanje	/
Termička obrada	/

Šarža osnovnog materijala:	
Protok gasa:	13-14 [l/min]
Zastita korena:	-
Wolfram [mm]:	-
Tip wolframa:	-
Sarža dodatnog materijala:	
Njihanje	Ne
Korekcija luka	±1

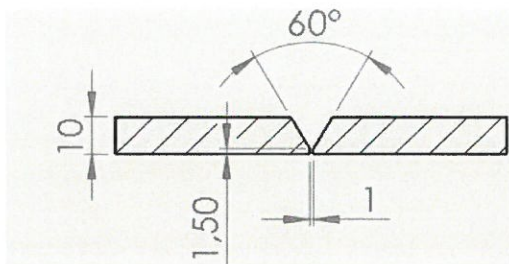
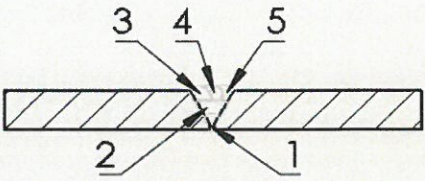




Postupak zavarivanja WPQRp 135 P BW 1.2 t10 PA

Opšte:	Kvalifikovanje tehnologije zavarivanja
Osnovni materijal:	S355J2+N
Debljina materijala:	10 [mm]
Spoljašnji prečnik:	> 150 [mm]
Priprema:	Brusenje
Vrsta čišćenja:	Brusni kamen

WPQR:	-
Proces zavarivanja:	135
Položaj zavarivanja	PA
Tip spoja:	BW
Zavarivač:	Barac Nemanja
Žig:	1

Oblik spoja	Redosled zavarivanja
	

Redosled zavarivanja	Proces	Debljina žice	Amperaža [A]	Napon [V]	Polaritet	Pomak žice [m/min]	Brzina zavarivanja [cm/min]	Unos energije [KJ/mm]
1	135	Ø 1	130	17.5	DC+	5.5	33.6	0.33
2	135	Ø 1	198	26.5	DC+	9	24.1	1.05
3	135	Ø 1	183	22.7	DC+	9	31.8	0.63
4	135	Ø 1	190	22.8	DC+	9	34.2	0.61
5	135	Ø 1	188	22.8	DC+	9	31.3	0.66

Materijal žice za zavarivanje	Iso 14341-A G3Si1
Gas:	Iso 14175-M21
Priprema radnog komada:	Bez podloske
Predgrevanje:	/
Međuprolazna temperatura:	125-250 °C
Vrsta čišćenja:	Brusilica
Dogrevanje	/
Termička obrada	/

Šarža osnovnog materijala:	
Protok gasa:	13 [l/min]
Zastita korena:	-
Wolfram [mm]:	-
Tip wolframa:	-
Sarza dodatnog materijala:	
Njihanje	Ne
Korekcija luka	±1



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LABORATORIJA
ZA ISPITIVANJE
SRPS ISO/IEC 17025:2005IZVEŠTAJ BR.479/VT/18
O VIZUELNOM ISPITIVANJU
VISUAL EXAMINATION TEST REPORT
№.479/VT/18Zavod za ispitivanje i kontrolu
I srpskog ustanka 202
11420 Smed. Palanka

Od / From:	" INSTITUT - GOŠA " Zavod za ZIK - Laboratorija NDT Institute for QT - Laboratory NDT	Rad. Uputstvo/ Work instruction	RU80IK.IN
Naručilac / Purchaser	TODEBO D.O.O., Rumski drum 79 Sremska Mitrovica	Br. Protokola/ Protocol No	479
Objekat ispitivanja/ Object of testing	Kvalifikacija postupka zavarivanja prema pWPS br. 135 P BW 1.2 t10 PA (suđeono zavareni spoj $\neq 10 \times 300 \times 350 \text{ mm}$) Qualification of welding procedure according pWPS No. 135 P BW 1.2 t10 PA (butt welded joint $\neq 10 \times 300 \times 350 \text{ mm}$)	Zahtev br./ Demand No. for testing	43/18
		Br.rad. naloga/ Working order No	/

PODACI O PREDMETU ISPITIVANJA/details of test item

Predmet ispitivanja/ Subject of testing	Zavareni spoj/ Welded joints				
Oznaka uzoraka / Sample mark	1 PA	Materijal/ Material	S355J2+N	Debljina/ Wall Thickness	10mm
Metoda zavarivanja/Br.zavarivača Applied Welding Procedure/Welder No.	135			Geometrija spoja/ Welded Joint Geometry	BW
Crt.broj/ Drawing No.		Broj uzoraka/ Number of samples	/	Obim ispitivanja/ Test Scope	100%

USLOVI I PARAMETRI ISPITIVANJA-conditions and parameters of examination

Datum ispitivanja/ Date of testing	27.04.2018.				
Metoda ispitivanja bez razaranja/ NDT Method	SRPS EN ISO 17637:2017				
Osvetljenje /Illuminacion					
Korišćena oprema i instrumenti/ Used equipment and instruments	Lupa, lampa, multifunkcionalno merilo "Kembridž", fotoaparar				

KRITERIJUM PRIHVATLJIVOSTI/acceptance criterion

Nivo kvaliteta/ Quality level:	"B"	Nivo prihvatljivosti: Acceptance level:	SRPS EN ISO 5817:2015
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Rezultati ispitivanja / Examination Results

Vizuelnim ispitivanjem zavarenog spoja, uočene su nepravilnosti koje su u granicama za nivo kvaliteta „B“ prema standardu SRPS EN ISO 5817:2015.

Visual inspection of welds were irregularities that are within the level of quality „B“ according standard SRPS EN ISO 5817:2015.

Napomena :/Coment: Prilog I./Annex no 1

Primedba:/Note:

Ispitivanje izvršili/ Testing performed by	Overio/ Certified	Odobrio / Approved	Datum izrade izveštaja/ Creation date of the report
Zoran Milić Br.sertifikata Z-SC-25295/VT2	Ruk. Lab. NDT / Head of NDT laboratory	Dir. Zavoda za ZIK Director of QT	04.05.2018.
Bojan Štojanović Br.sertifikata VT2/15/185/A	Saša Rašković dipl.inž.mas	Rade Obradović dipl.masinir	Strana 1 od 1/ Sheet 1 of 1

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REZULTATI ISPITIVANJA/ Test Results:

Red. Broj No.	Vrsta zavarenog spoja/ Types of weld joint.	Oznaka uzorka/ Mark of the sample	Pregled snimka-nalaz/ Inspection of the Photo-finding	Rezultat/ Result
1.	BW	1 PA	5012	Da/Yes
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
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21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				
31.				
32.				
33.				
34.				
35.				
36.				

Korišćeni sistem obeležavanja / Designation System Applied:

Rezultati vizuelnog ispitivanja dati u prilogu br.1 / Examination Results Test Report Annex No.1

Fotografije rasporeda zavara date u prilogu br.2 /Photos Of The Weld Has Given In The Annex No.2

Nivo kvaliteta "B" prema standard SRPS EN ISO 5817:2015./The Required Quality Level "B" According Standard SRPS EN ISO 5817:2015

BN-Bez nalaza

Overio/ Certified:

Ruk./ Lab. NDT/Head of NDT-laboratory

Saša Rašković dipl.inž.mas

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АКРЕДИТОВАНА
ЛАБОРАТОРИЈА
ЗА ИСПИТИВАЊЕ
SRPS ISO/IEC 17025:2005

IZVEŠTAJ BR.479/PT/18
ISPITIVANJE PENETRANTIMA
Report No.479/PT/18 about penetrants testing



Zavod za ispitivanje i kontrolu
i srpskog ustanka 202
11420 Smed. Palanka

OD: / From:	"INSTITUT GOŠA" Zavod za IK - Laboratorija NDT Institute for QT - Laboratory NDT	Rad. Uputstvo/ Work instruction	RU86IK.IN
ZA: / For:	TODEBO D.O.O., Rumski drum 79, Sremska Mitrovica	Br. Protokola/ Protocol No.	479
Datum ispitivanja / Date of testing	27.04.2018.	Zahtev br. Demand No. for testing	43/18
Objekat ispitivanja/ Object of testing	Kvalifikacija postupka zavarivanja prema pWPS br. 135 P BW 1.2 t10 PA (sučono zavareni spoj #10x300x350mm) Qualification of welding procedure according pWPS No. 135 P BW 1.2 t10 PA (butt welded joint #10x300x350mm)	Br.porudzbine Order No.	/
Predmet ispitivanja/ Subject of testing	Zavareni spoj/ Welded joint	Br.rad. naloga Working order No.	/

OPŠTI PODACI O PREDMETU ISPITIVANJA / general data of testing subject

Naziv/ Name	Crtež/ Drawing No.:	Br.dela/ Part number	Količina/ Number of samples	Vrsta zav.spoja/Met.zav./ Br.zav. Type of welded joints /Applied welding procedure / Welder No.	Dimenzije Dimensions (mm)	Materijal/ Material:
1 PA	/	/	1	BW/135	#10x300x350	S355J2+N

PODACI O POSTUPKU ISPITIVANJA / test procedure

Metoda ispitivanja bez razaranja/NDT Method	SRPS EN ISO 3452-1:2017
Obim ispitivanja / Scope of testing	Mesto ispitivanja / Place of testing
1.Po zahtevu standarda za vrstu objekta/ According to standard for type of object	1. U hali / In hall
2.Po zahtevu naručioca / According to client demand	2. Montaži van hale / Assembly outside the hall
100% (MŠ+ZUT)	3. Eksploataciji / In exploitation
100% (WM+HAZ)	4. Sanaciji / In reparation
Priprema površine / Surface preparation	Temperatura ispitivanja / Temperature of testing
1.Odmašćivanje/ Degreasing	2.Čišćenje Cleaning
Stanje površine / Surface state	Etalon kvaliteta površine / Standard of surface quality

UPOTREBLJENI PENETRANTSKI SISTEM: II C d / USED PENETRANT SYSTEM SISTEM: II C d

	Naziv / Name	Tip / Type	Boje / Colours	Proizvođač / Manufacturer
Penetrant/ penetrants	Crick 120	Tečni	Crveni	CRC IND. EUR
Čistač /Cleaner	Crick 110	Tečni	/	CRC IND. EUR
Razvijatelj / Developer	Crick 130	Tečni	Beli	CRC IND. EUR

Način primene/ Application	Vreme penetracije/ Time of penetration	Način primene/ Application	Vreme razvijanja/ Time of development
Sprej / Spray	10 min	Sprej / Spray	15 min
Čišćenje nakon ispitivanja/ Cleaning after testing	Da / Yes		

KRITERIJUM PRIHVATLJIVOSTI/acceptance criterion

Nivo kvaliteta:/ Quality level:	nivo 2x/level2x	Nivo prihvatljivosti: SRPS EN ISO 23277:2016 Acceptance level:
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REZULTATI ISPITIVANJA / RATING OF TESTING RESULTS

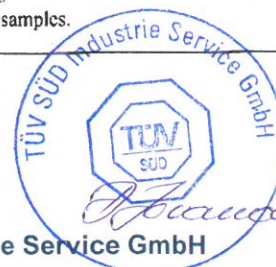
Ispitivanjem penetrantima ustanovljeno je da zavareni spoj zadovoljava zahtevani nivo kvaliteta 2x./
With penetrant testing of welded joint is determined that the welded joint satisfy the required quality level 2x.

Napomena/Comment:

Ispitivanje izvršili / Testing performed by	Overio/ Certified	Odobrio / Approved	Datum izrade izveštaja/ Creation date of the report
Bojan Kolarević Br.certifikata PT2/14/47/A	Ruk. Lab. NDT Head of NDT laboratory	Direktor IK Director of QT	04.05.2018.
Saša Rašković dipl.ing.			Strana 1 od 1/ Sheet 1 to 1

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O ULTRAZVUČNOM ISPITIVANJU
Report No.479/UT/18
about ultraosnic testingZavod za ispitivanje i kontrolu
1 srpskog ustanka 202
11420 Smed. Palanka

Od / From :	"INSTITUT -GOŠA" Zavod za IK - Laboratorija NDT/ Institute for QT - Laboratory NDT	Rad. Uputstvo/ Work instruction	RU84IK.IN
Za / For:	TODEBO D.O.O., Rumski drum 79 Sremska Mitrovica	Br. Protokola/ Protocol No.	479
Datum ispitivanja/ Date of testing	27.04.2018.	Zahtev br. / Demand No. for testing	43/18
Objekat ispitivanja/ Object of testing	Kvalifikacija postupka zavarivanja prema pWPS br. 135 P BW 1.2 t10 PA (sučeno zavareni spoj $\neq 10 \times 300 \times 350$ mm) Qualification of welding procedure according pWPS No. 135 P BW 1.2 t10 PA (butt welded joint $\neq 10 \times 300 \times 350$ mm)	Br.porudžbine / Order No.	/
Predmet ispitivanja/ Subject of testing	Zavareni spoj / Welded joint	Br.rad. naloga/ Working order No.	/

OPŠTI PODACI O PREDMETU ISPITIVANJA/ general data of testing subject

Crtež/ Drawing No.:	Materijal/ Material	Br.sarže/ No. charge Broj probe/ No. of sample	Oznaka/Postupak zav. Mark/ Welding Procedure	Dimenzije/ Dimensions (mm)	Količina/ Number of samples
/	S355J2+N	/	1 PA / 135	$\neq 10 \times 300 \times 350$	1

PODACI O POSTUPKU ISPITIVANJA/ test procedure

PARAMETRI KALIBRACIJE / Calibration parameters

Metoda ispitivanja bez razaranja/NDT Method			SRPS EN ISO 17640:2017		
Pozicija/ Position	Ispitna sonda/ Testing probe	Opseg merenja Measurement range(mm)	Dužina kalibracije/ Calibration timebase(mm)	Baždarno pojačanje/ Calibrated increasing(dB)	Ispitno pojačanje/ Testing mplifikation(dB)
/	MWB 70-4	100	/	28	56

ULTRAZVUČNI SISTEM/ ultrasonic system

Ultrazvučni aparat/ Ultrasonic device	USM 35S	Ultrazvučne sonde/Ultrasonic probes	MWB 70-4
Kabli / cable	/	AVG skale/ scales	/
Kalibracioni blok / Calibration block	V2,UZORAK	Kontaktno sredstvo/Contact medium	ulje/oil

KRITERIJUM PRIHVATLJIVOSTI/ acceptance criterion

Nivo kvaliteta:/ Quality level:	Nivo 2/Level 2	Nivo prihvatljivosti: Acceptance level:	SRPS EN ISO 11666:2012
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REZULTATI ISPITIVANJA / rating of testing result

Pozicija/ pos.	Br.spoja/ weld no	Vrsta spoja/ Weld type	Dužina/ length	Dubina/ depth	Položaj/ location	Zadovoljava acceptable	Ne zadovolj. not acecep.	Napomena/ note
/	1 PA	BW	350 mm	10 mm	/	X	/	/

Napomena /Comment:

Ispitivanje izvršili / Testing performed by	Overio / Certified	Odobrio / Approved	Datum izrade izveštaja/ Creation date the report
Bojan Polarević Br.sertifikata UT2/14/11/A	Rukovodilac lab. NDT/ Head of NDT laboratory	Dirktor IK/ Director of QT	04.05.2018.
Zoran Milić Br.sertifikata B 114-5499-14	Saša Rašković dipl. inž.	Radoslav Obradović dipl. inž.	

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