

Appendices

Appendix A

Welding parameters of the RS4 specimens

Specimen	#	I [A]	U [V]	v [mm/s]	q [kJ/mm]	t [s]
RS4-700A	1	220	19.50	7.45	0.58	94
	2	205	19.00	7.78	0.50	90
	3	192.5	18.50	7.78	0.46	90
	4	200	18.50	8.14	0.45	86
RS4-700B	1	200	20.25	9.59	0.42	73
	2	225	21.25	10.77	0.44	65
	3	215	20.75	10.14	0.44	69
	4	215	20.25	10.00	0.44	70
RS4-H0	1	215	20.75	10.61	0.42	66
	2	215	20.75	12.28	0.36	57
	3	215	20.75	10.61	0.42	66
	4	207.5	20.25	9.86	0.43	71

Welding parameters of the RS6 specimens

Specimen	#	I [A]	U [V]	v [mm/s]	q [kJ/mm]	t [s]
RS6-355	1	215	20.50	6.25	0.71	128
	2	210	20.25	6.20	0.69	129
	3	222.5	19.25	6.61	0.65	121
	4	225	20.75	6.72	0.69	119
RS6-700	1	215	19.50	5.59	0.75	143
	2	215	20.00	6.50	0.66	123
	3	215	19.75	6.11	0.70	131
	4	225	20.00	6.40	0.70	125
RS6-H0	1	222.5	23.25	7.77	0.67	103
	2	215	22.75	7.55	0.65	106
	3	225	22.75	7.69	0.67	104
	4	222.5	22.75	7.41	0.68	108

Welding parameters of the RS8 specimens

Specimen	#	I [A]	U [V]	v [mm/s]	q [kJ/mm]	t [s]
RS8-700A	1	197.5	18.50	9.33	0.39	75
	2	197.5	18.50	9.59	0.38	73
	3	187.5	18.75	10.94	0.32	64
	4	195	18.50	8.54	0.42	82
	5	225	20.50	7.00	0.66	100
	6	230	20.50	7.22	0.65	97
	7	235	21.75	7.87	0.65	89
	8	235	22.50	8.24	0.64	85
RS8-700B	1	200	20.25	12.73	0.32	55
	2	202.5	20.25	11.86	0.35	59
	3	205	20.25	9.86	0.42	71
	4	195	20.25	11.29	0.35	62
	5	222.5	24.25	8.14	0.66	86
	6	227.5	24.25	7.69	0.72	91
	7	1232.5	24.25	8.43	3.54	83
	8	225	24.75	7.22	0.77	97
RS8-H0	1	215	21.75	12.96	0.36	54
	2	205	20.75	11.11	0.38	63
	3	205	20.25	11.48	0.36	61
	4	205	20.25	10.61	0.39	66
	5	205	23.75	7.53	0.65	93
	6	220	24.25	7.61	0.70	92
	7	220	24.75	8.05	0.68	87
	8	232.5	24.25	8.14	0.69	86

Appendix B

Dimensions of RS4 specimens

Specimen	L [mm]	L_{av} [mm]	t_1 [mm]	$t_{1,av}$ [mm]	t_2 [mm]	$t_{2,av}$ [mm]	a_1 [mm]	a_2 [mm]
RS4-700A	698	698.75	4.24	4.17	4.19	4.11	199	200
	699		4.12		4.10			
	698		4.13		4.10			
	700		4.17		4.06			
RS4-700B	700	699.50	4.11	4.10	4.10	4.10	200	200
	699		4.10		4.13			
			4.09		4.11			
			4.08		4.06			
RS4-H0	698	698.50	4.16	4.11	4.14	4.16	198	199
	699		4.14		4.19			
			4.11		4.15			
			4.01		4.16			

Dimensions of RS6 specimens

Specimen	L [mm]	L_{av} [mm]	t_1 [mm]	$t_{1,av}$ [mm]	t_2 [mm]	$t_{2,av}$ [mm]	a_1 [mm]	a_2 [mm]
RS6-355	799	799.00	6.19	6.20	6.21	6.19	219	220
	799		6.22		6.21			
			6.15		6.17			
			6.23		6.17			
RS6-700	799	798.50	6.13	6.10	6.17	6.17	220	219
	798		6.05		6.11			
			6.11		6.19			
			6.11		6.21			
RS6-H0	799	798.50	6.13	6.21	6.08	6.15	218	219
	798		6.24		6.22			
			6.22		6.06			
			6.25		6.24			

Dimensions of RS8 specimens

Specimen	L [mm]	L_{av} [mm]	t_1 [mm]	$t_{1,av}$ [mm]	t_2 [mm]	$t_{2,av}$ [mm]	a_1 [mm]	a_2 [mm]
RS8-700A	698	697.75	8.06	8.07	7.96	7.97	200	199
	698		8.11		7.97			
	697		8.05		7.97			
	698		8.06		7.99			
RS8-700B	698	698.50	8.03	7.98	7.93	8.00	198	199
	699		7.97		8.04			
			7.93		8.00			
			7.99		8.03			
RS8-H0	699	698.50	8.10	7.94	8.01	7.94	200	199
	698		7.85		7.82			
			7.95		8.02			
			7.87		7.90			

Appendix C

Dimensions of weld pool - RS4 specimens

Specimen	a_{mean} [mm]	$C_f.\text{mean}$ [mm]	$C_r.\text{mean}$ [mm]
RS4-700A	4.19	3.5	14.01
	3.91	3.54	14.14
	3.85	3.59	14.35
	4.47	3.43	13.7
RS4-700B	4.53	3.27	13.09
	4.64	3.61	14.43
	4.12	3.04	12.16
	4.01	4.17	16.66
RS4-H0	3.87	3.48	13.91
	4.33	3.28	13.11
	3.58	2.92	11.67
	4.12	3.41	13.65

Dimensions of weld pool - RS6 specimens

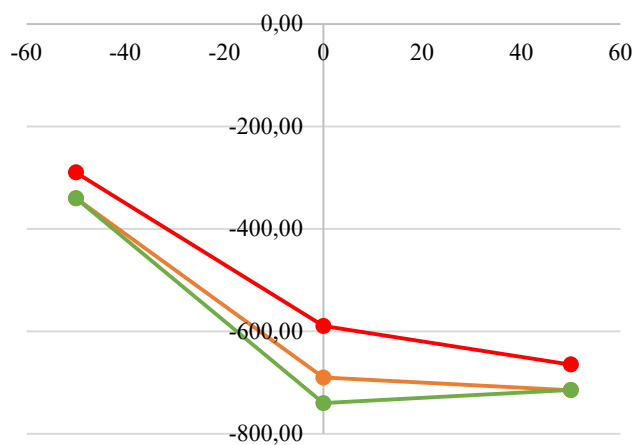
Specimen	#	a_{mean} [mm]	$C_f.\text{mean}$ [mm]	$C_r.\text{mean}$ [mm]
RS6-355	1	5.06	3.85	15.39
	2	5.64	4.19	16.75
	3	5.45	3.97	15.88
	4	4.82	4.09	16.37
RS6-700	1	5.29	3.58	14.31
	2	6.11	4.37	17.47
	3	5.44	4.09	16.34
	4	4.88	4.19	16.75
RS6-H0	1	4.93	3.82	15.26
	2	5.06	3.94	15.76
	3	5.23	3.77	15.09
	4	5.27	3.58	14.32

Dimensions of weld pool - RS8 specimens

Specimen	#	a_{mean} [mm]	$C_{\text{f.mean}}$ [mm]	$C_{\text{r.mean}}$ [mm]
RS8-700A	5	5.52	3.65	14.62
	6	5.67	3.64	14.55
	7	5.53	3.21	12.83
	8	5.76	3.32	13.3
RS8-700B	5	4.93	3.6	14.38
	6	5.55	4.03	16.13
	7	4.91	3.83	15.33
	8	5.39	3.78	15.11
RS8-H0	5	4.52	2.75	10.99
	6	5.02	3.58	14.33
	7	5.34	2.78	11.14
	8	5.08	3.14	12.56

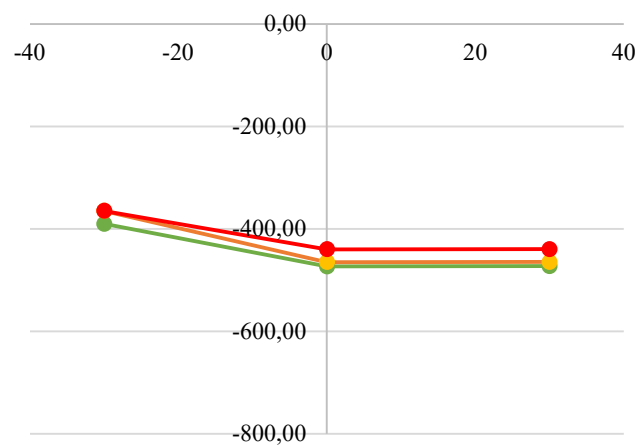
Appendix D

RS4-700A - Flange



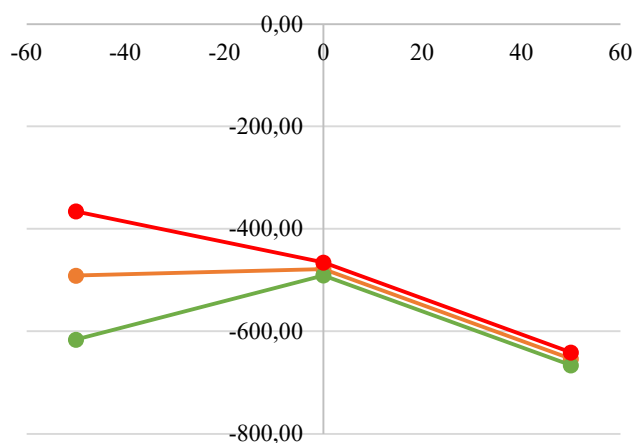
a)

RS4-700A - Web



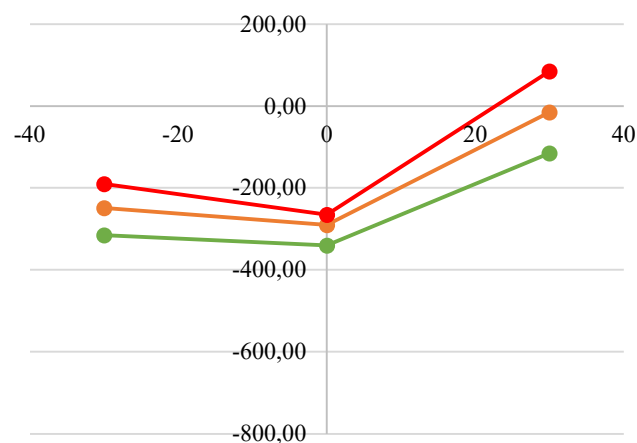
b)

RS4-700B - Flange



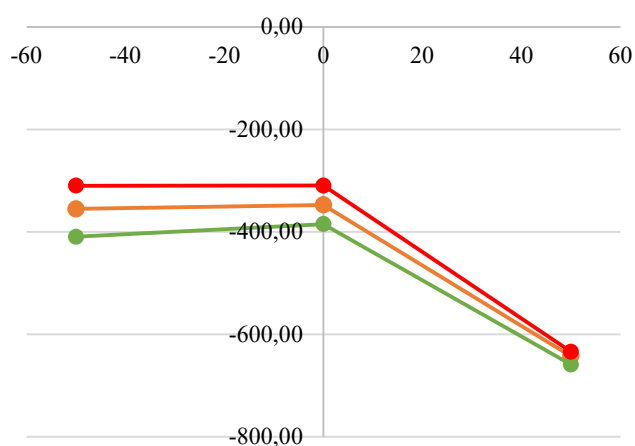
c)

RS4-700B - Web



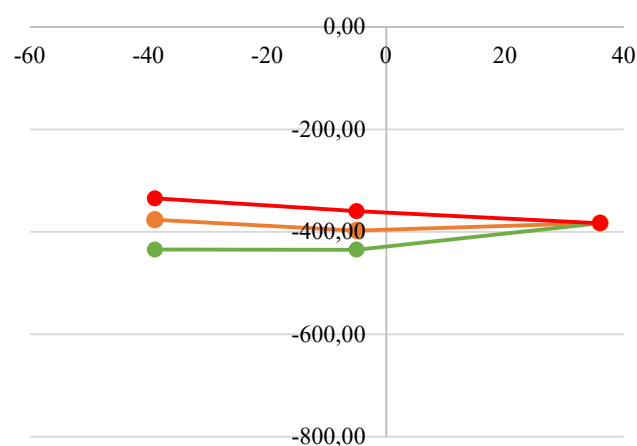
d)

RS4-H0 - Flange



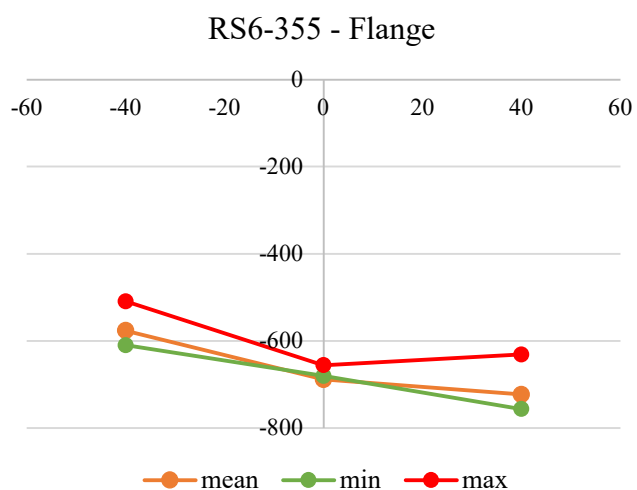
e)

RS4-H0 - Web

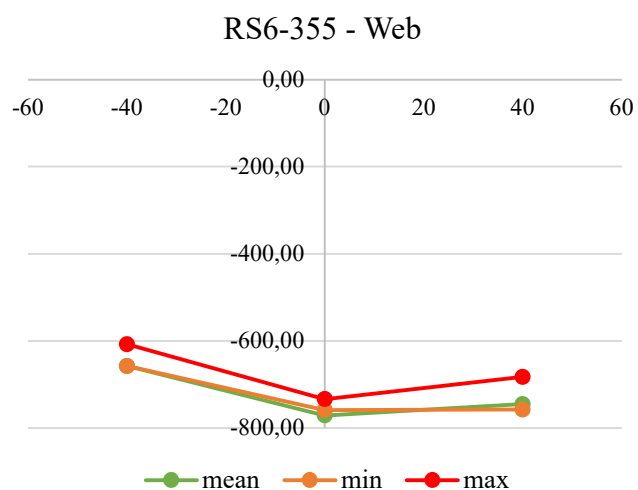


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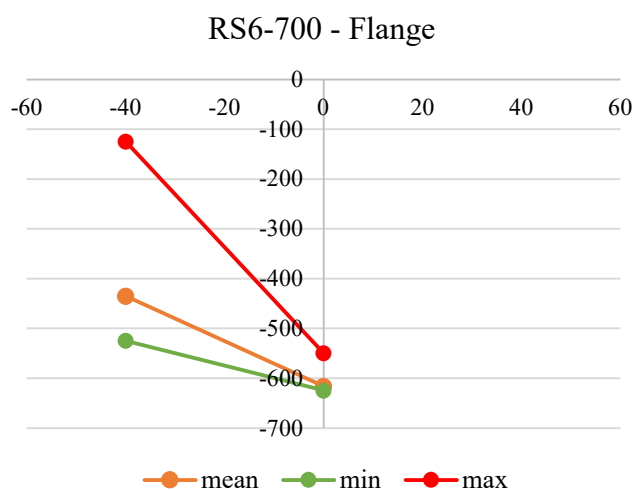
Axial strains with BAM strain-measuring extensometer – RS4 specimens



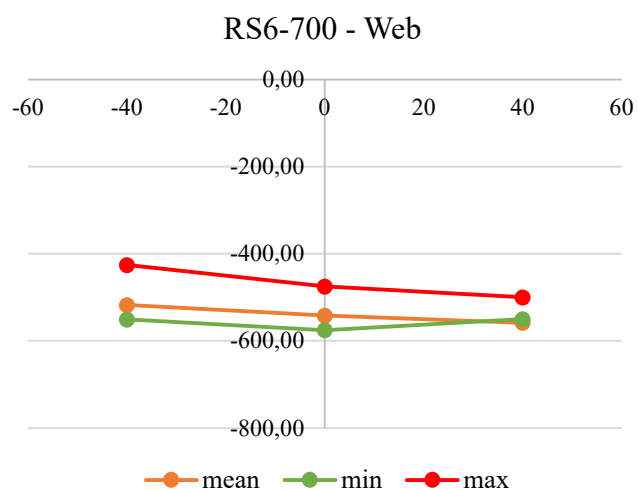
a) RS6-355 flange



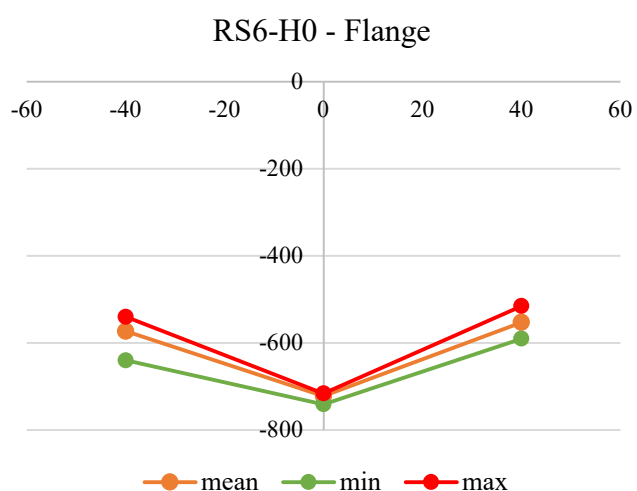
b) RS6-355 web



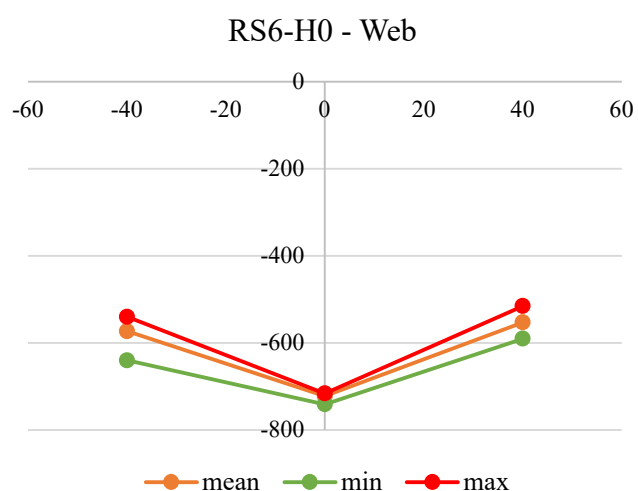
c) RS6-700 flange



d) RS6-700 flange

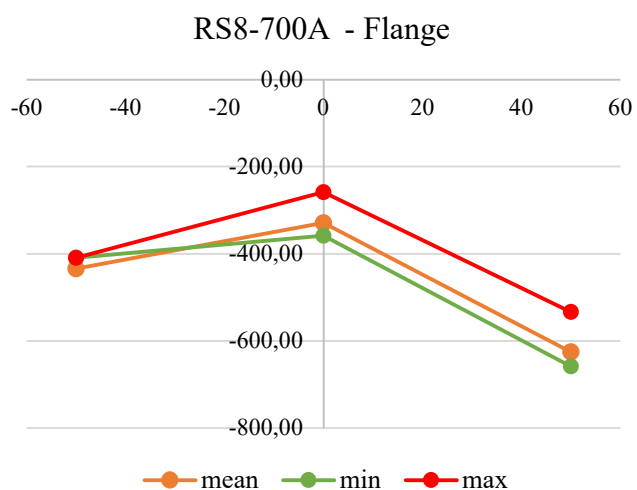


e) RS6-H0 flange

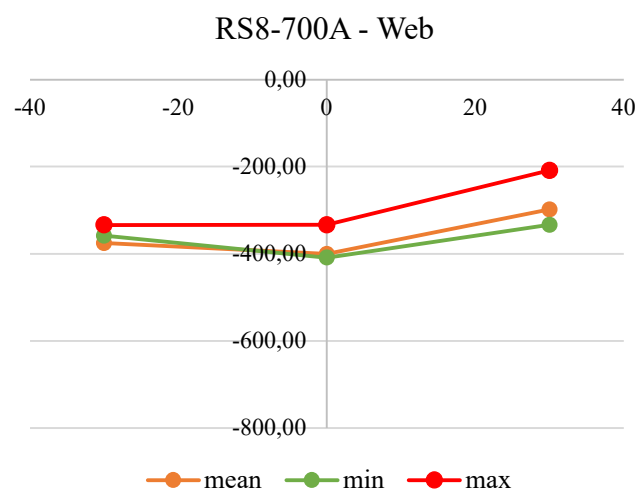


f) RS6-H0 flange

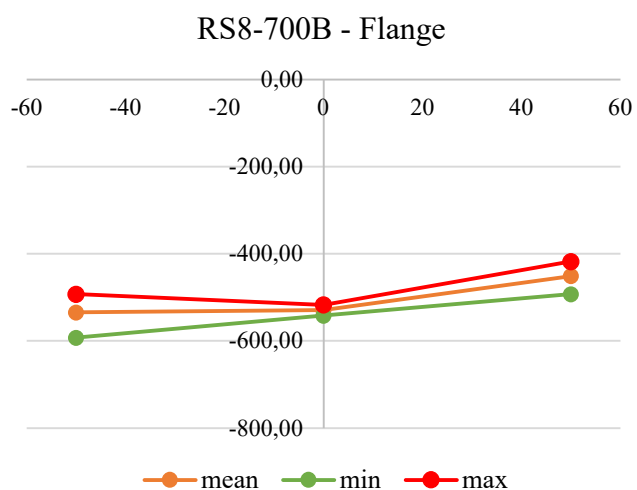
Axial strains with BAM strain-measuring extensometer – RS6 specimens



a)



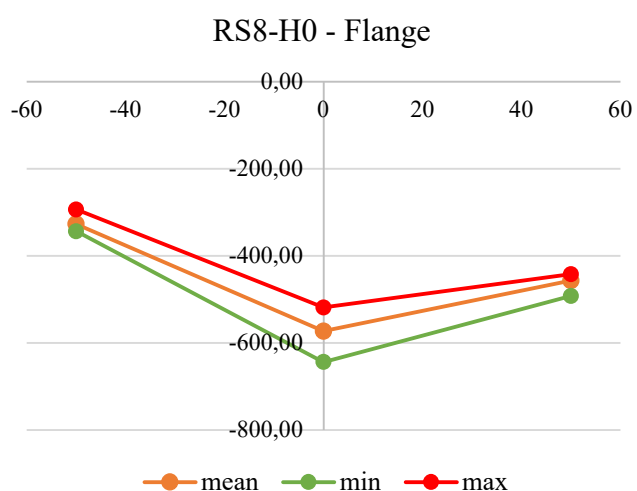
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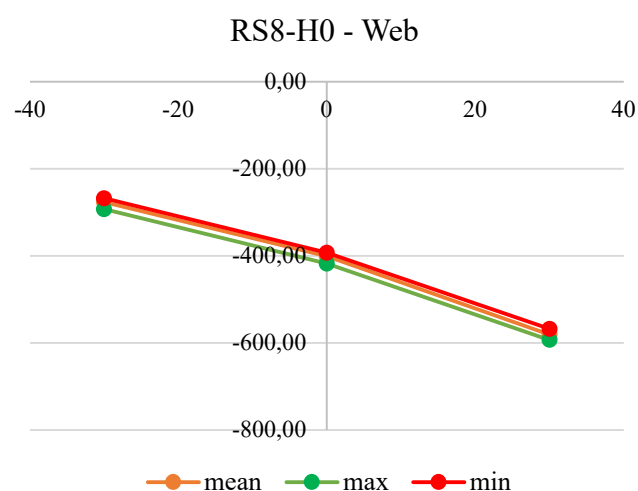
c)



d)

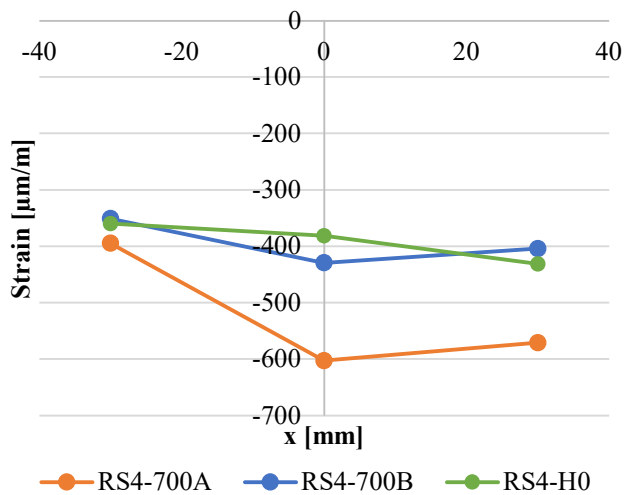


e)

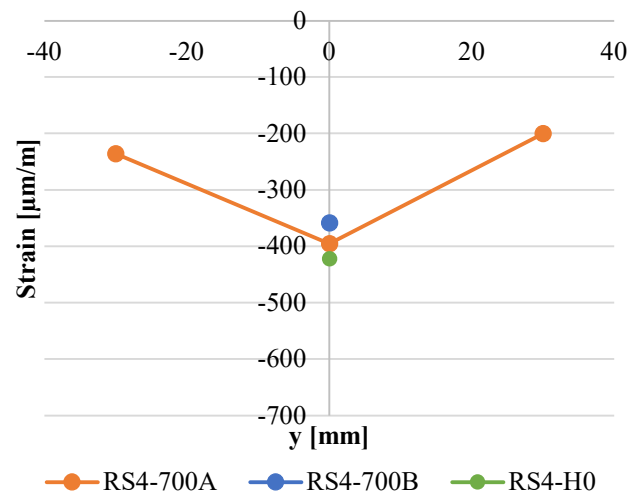


f)

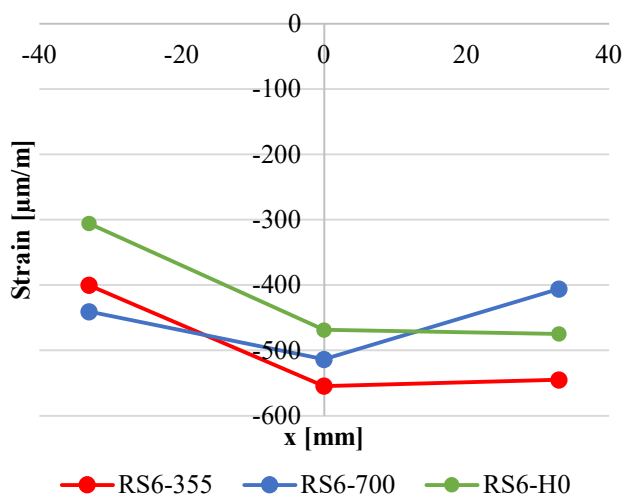
Axial strains with BAM strain-measuring extensometer – RS8 specimens



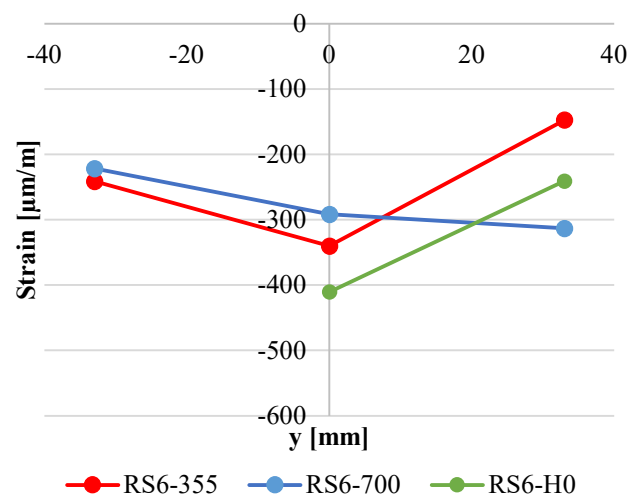
a) Strains of flange



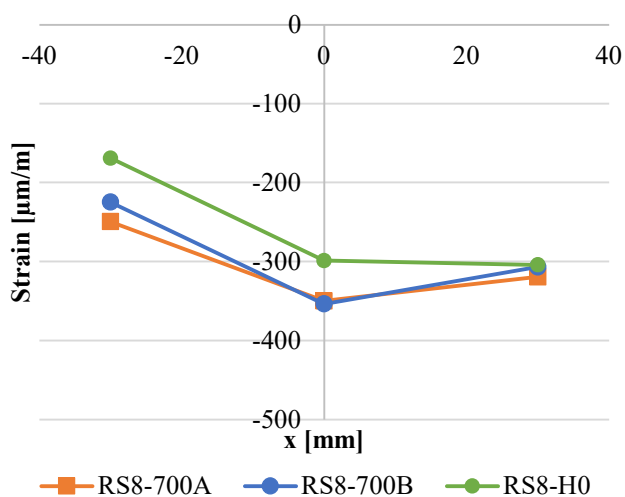
b) Strains of web



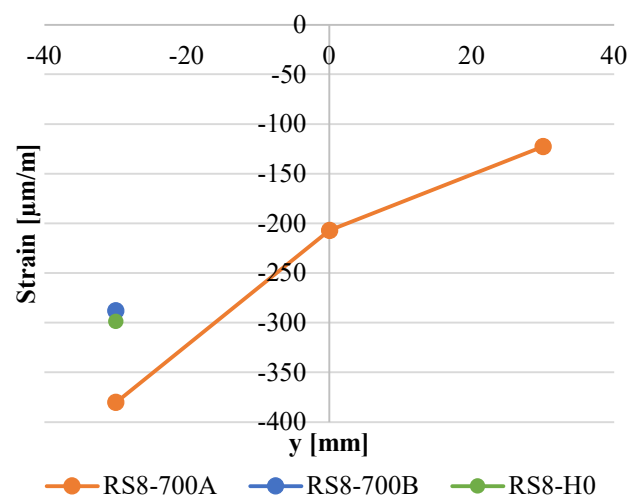
c) Strains of flange



d) Strains of web

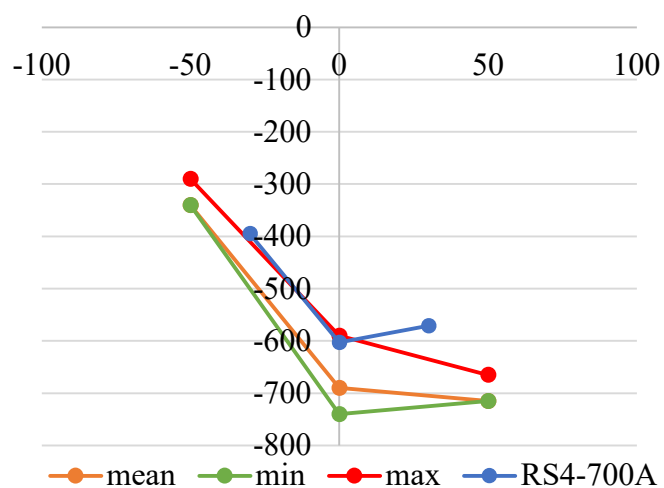


e) Strains of flange

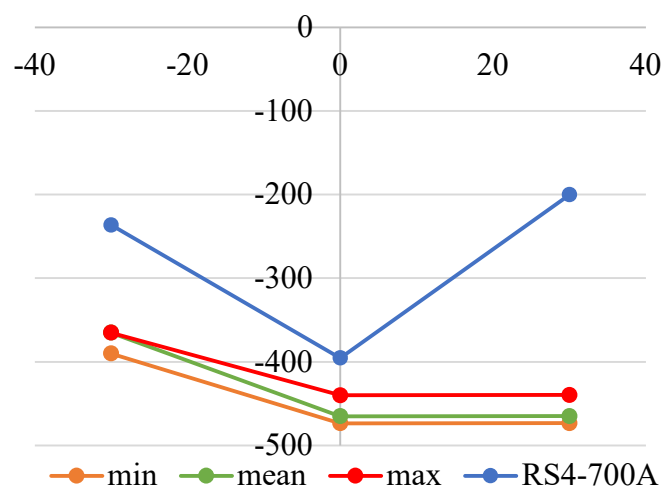


f) Strains of web

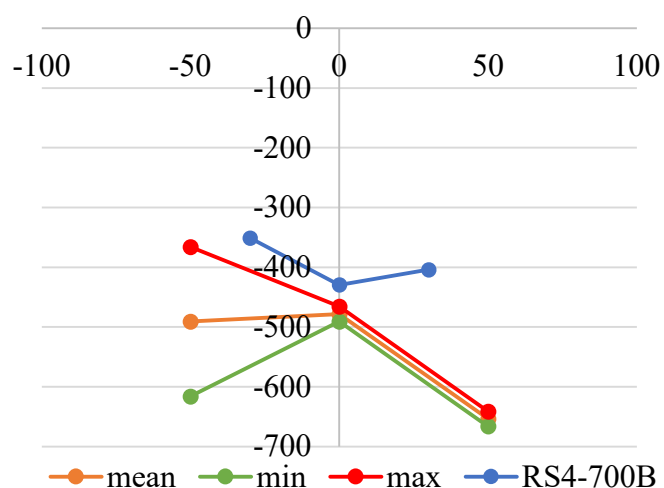
Results of strain gauge-based measurements



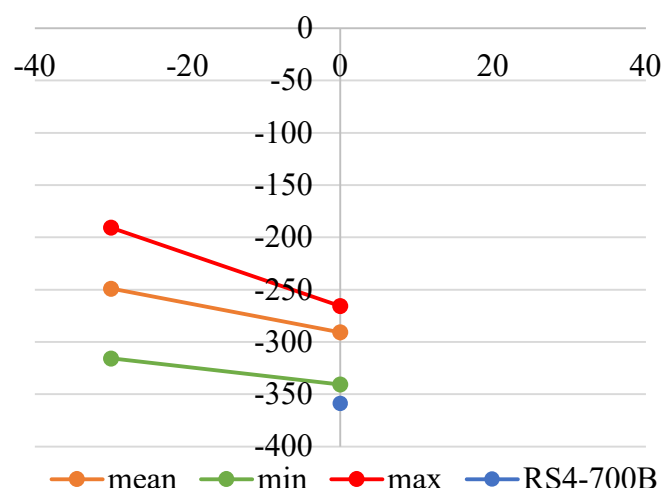
a) RS4-700A-Flange



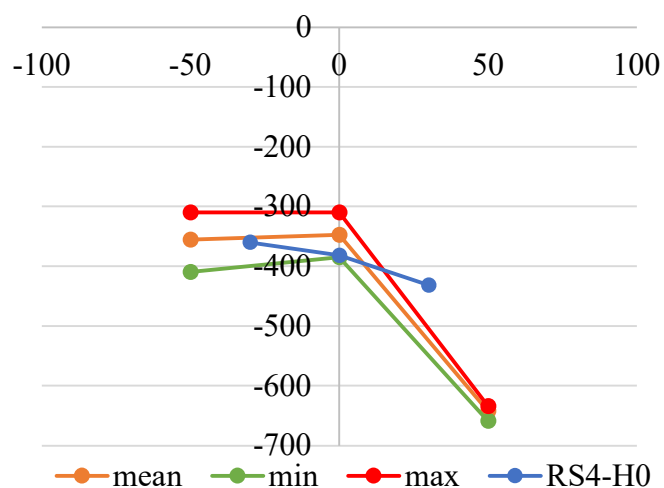
b) RS4-700A-Web



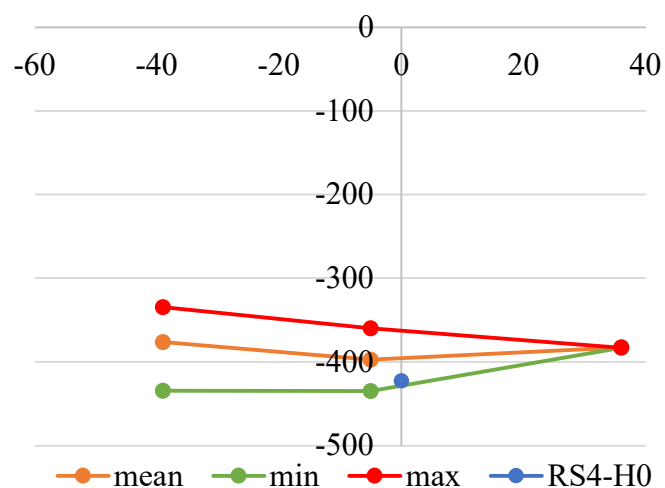
c) RS4-700B-Flange



a) RS4-700B-Web

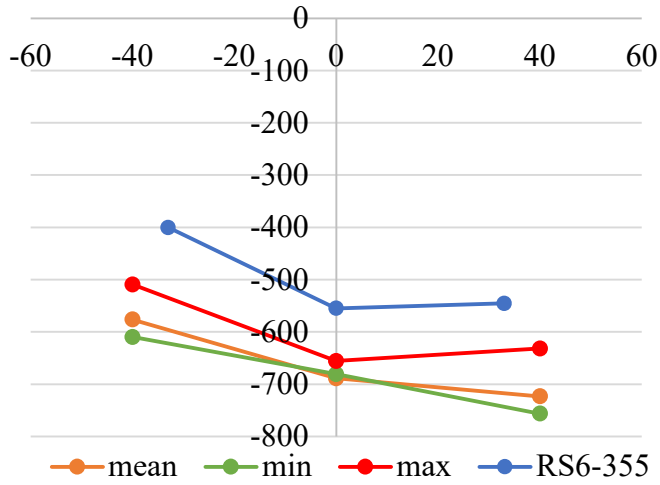


b) RS4-H0-Flange

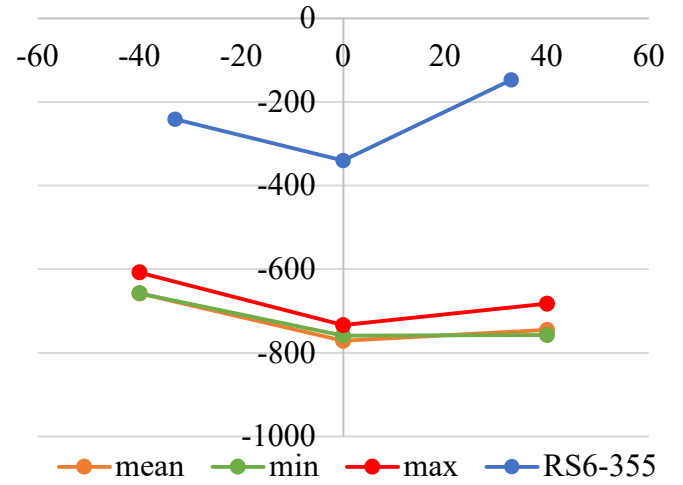


c) RS4-H0-Web

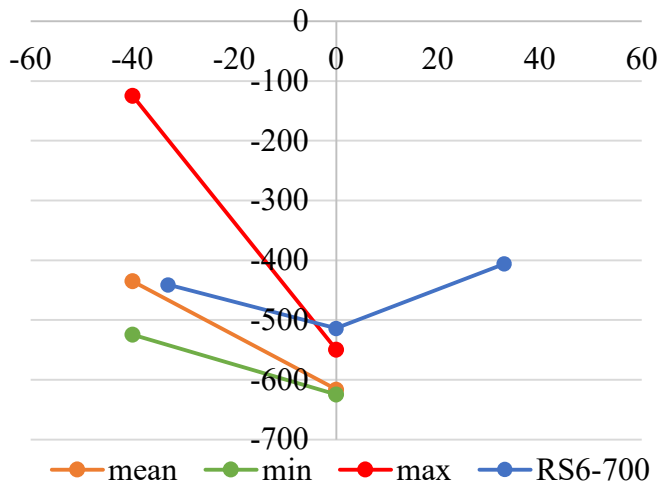
Result correlation of BAM extensometer measurement with strain gauges measurement - RS4 specimens



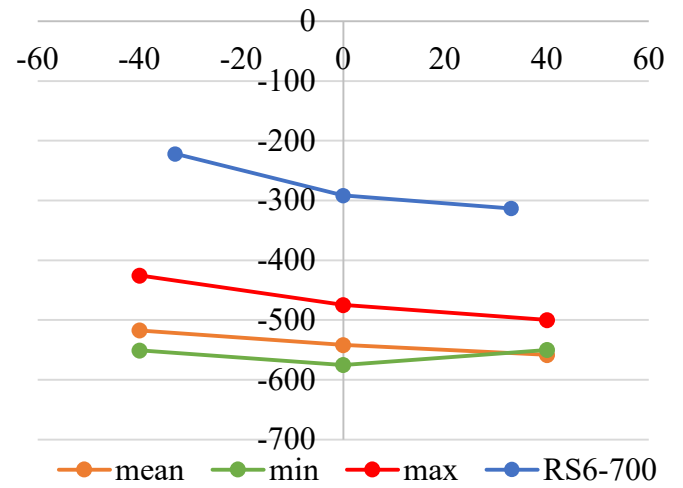
d) RS6-355-Flange



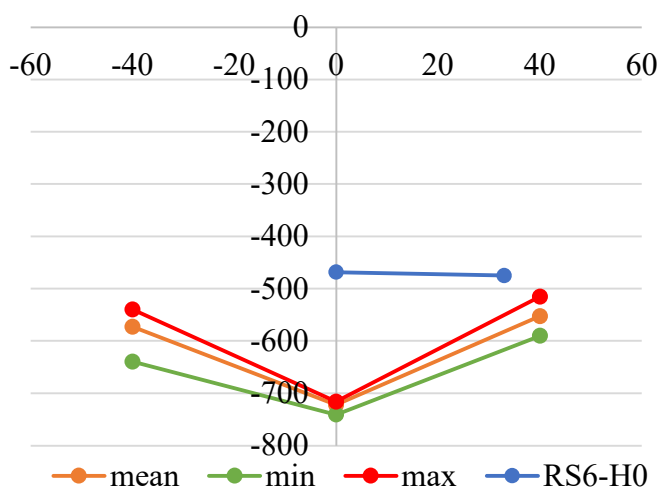
e) RS6-355-Web



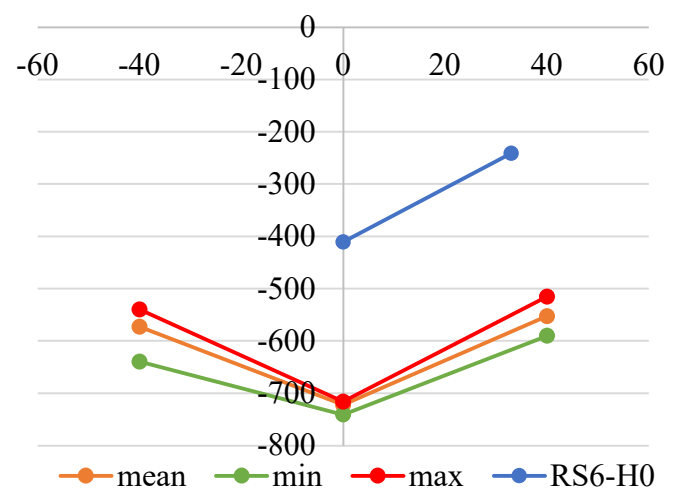
f) R6-700-Flange



d) RS6-700-Web

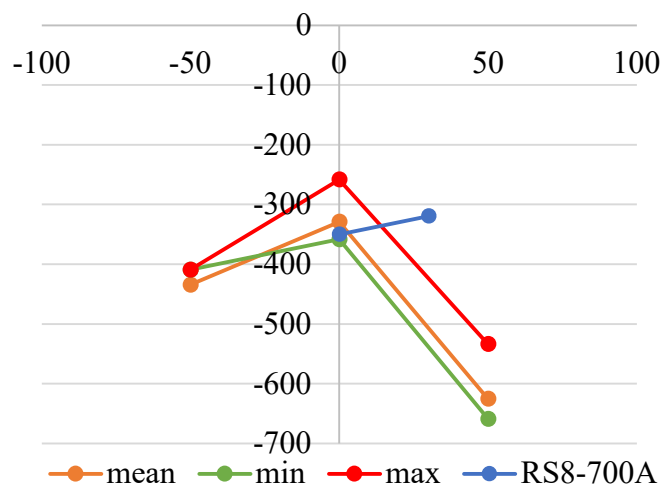


e) RS6-H0-Flange

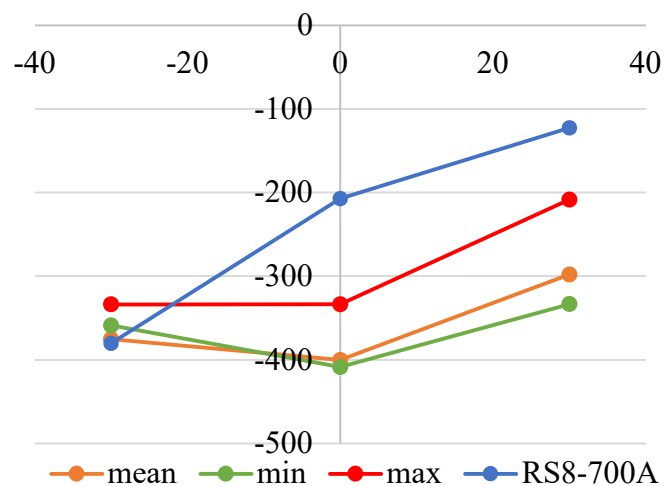


f) RS6-H0-Web

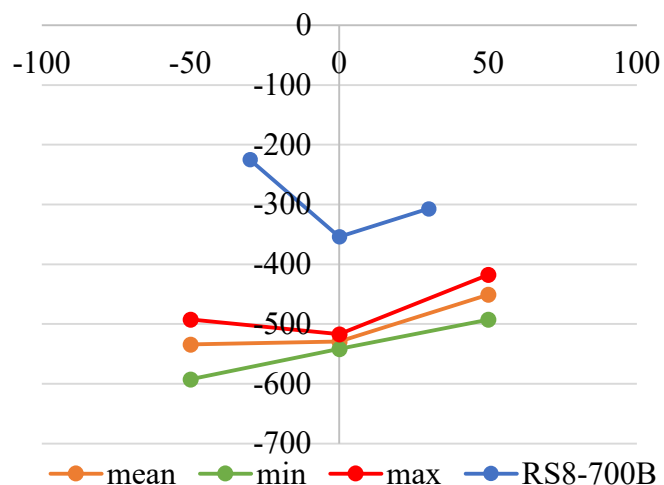
Result correlation of BAM extensometer measurement with strain gauges measurement – RS6 specimens



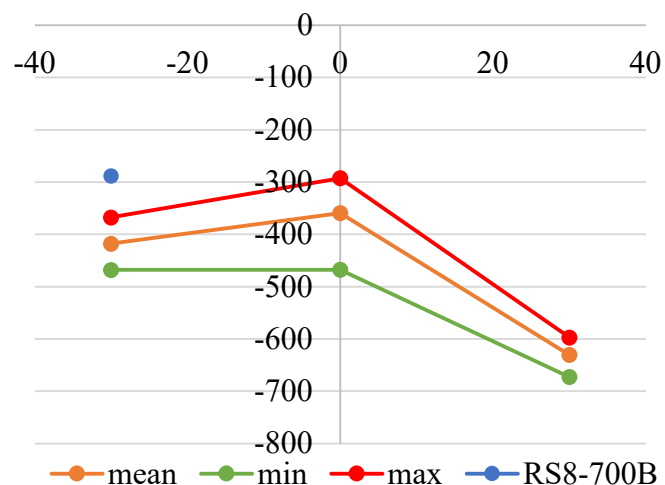
g) RS8-700A-Flange



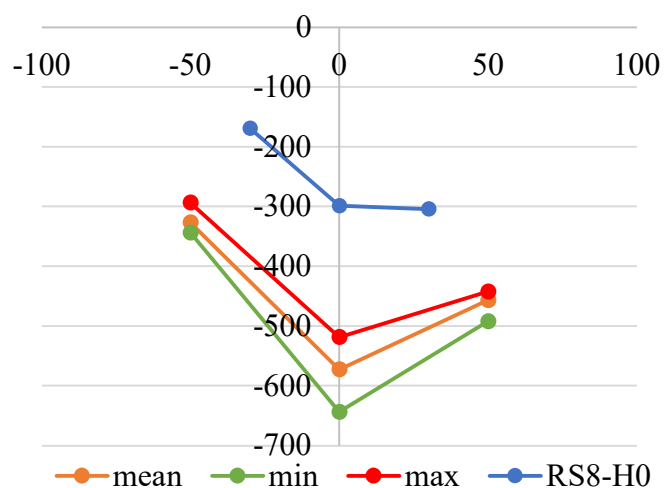
h) RS8-700A-Web



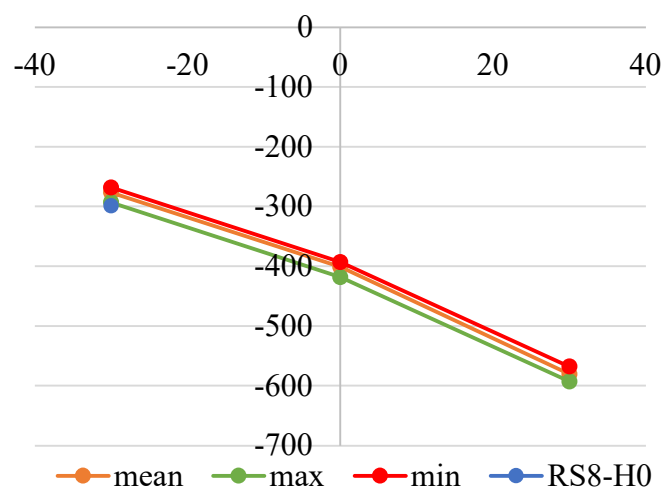
i) R8-700B-Flange



g) RS8-700B-Web

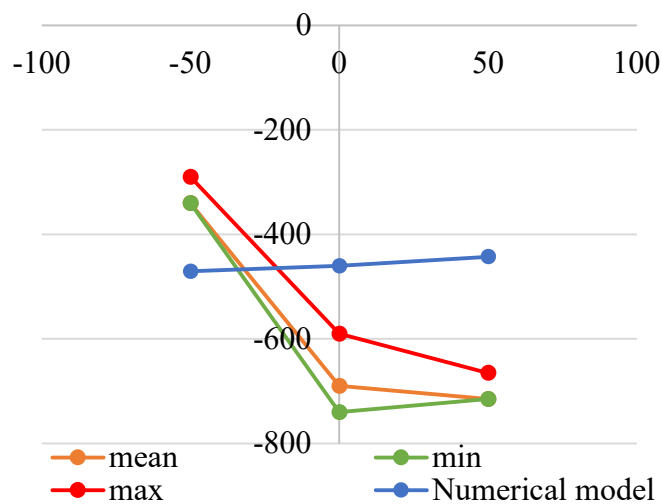


h) RS8-H0-Flange

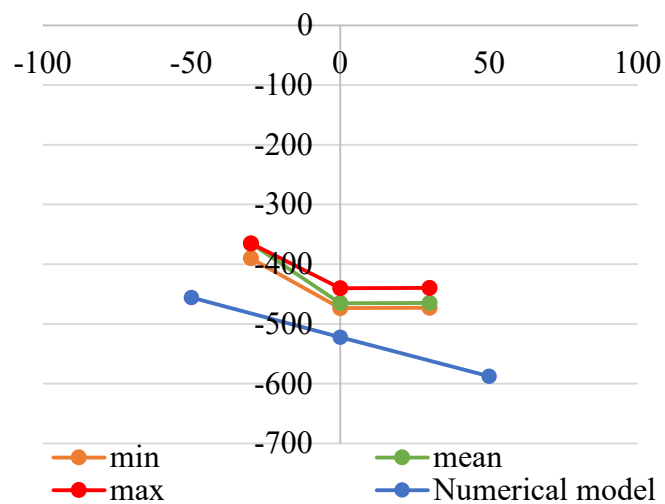


i) RS8-H0-Web

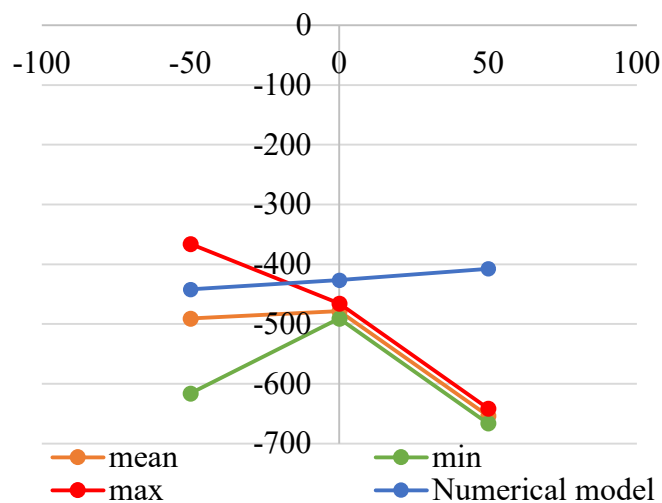
Result correlation of BAM extensometer measurement with strain gauges measurement – RS8 specimen



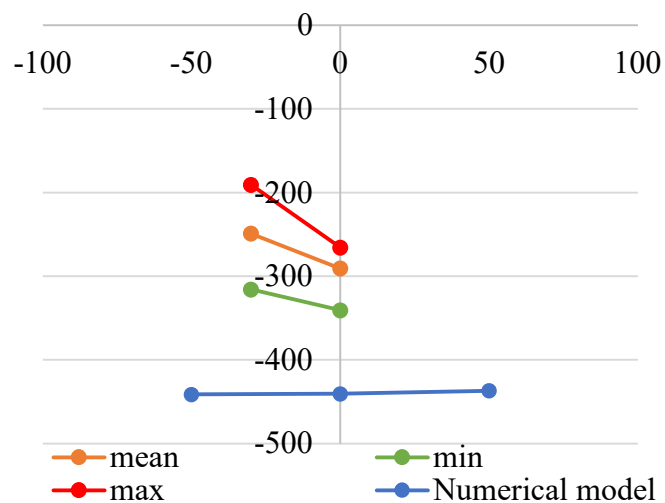
a) RS4-700A-Flange



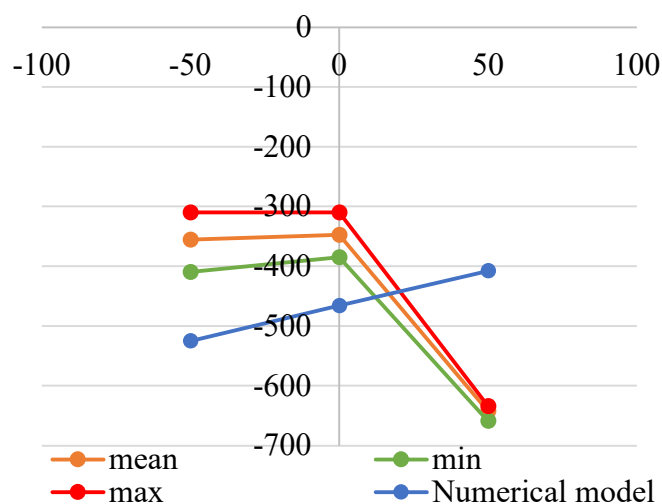
b) RS4-700A-Web



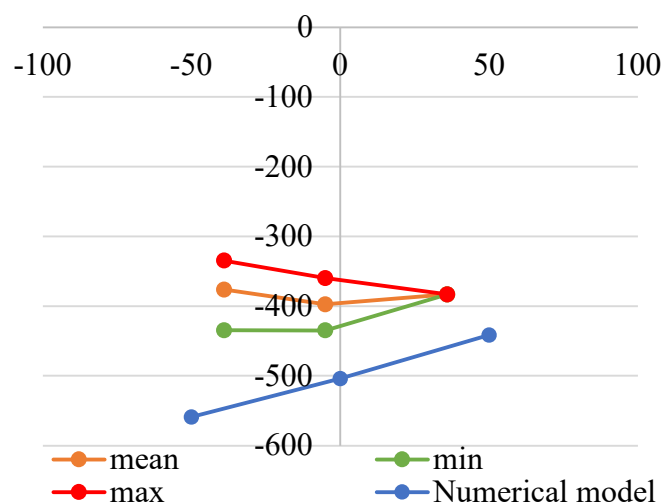
c) RS4-700B-Flange



d) RS4-700B-Web

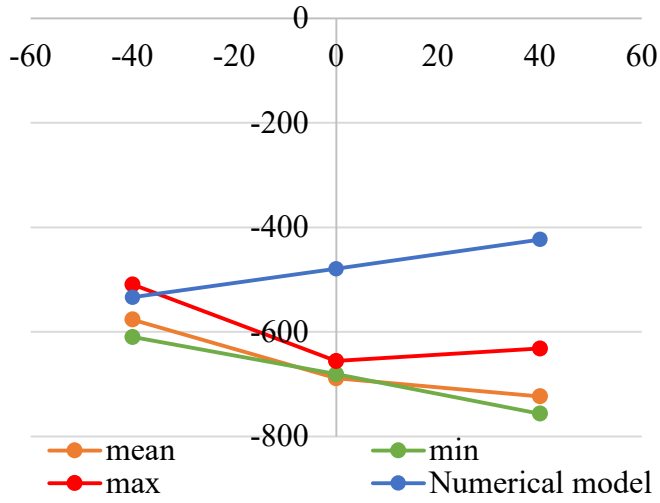


e) RS4-H0-Flange

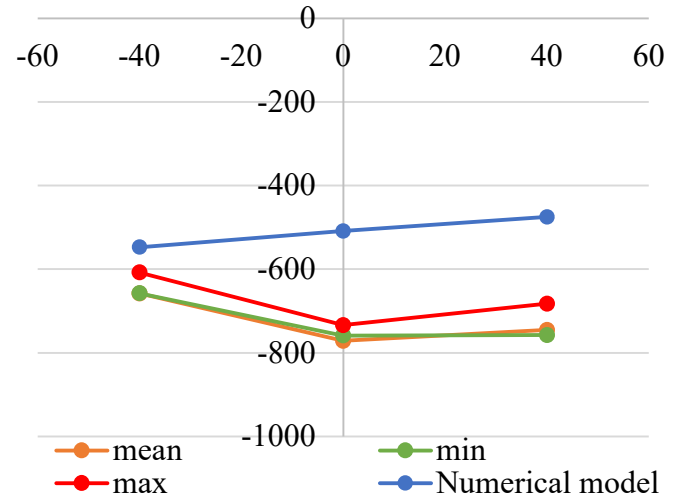


f) RS4-H0-Web

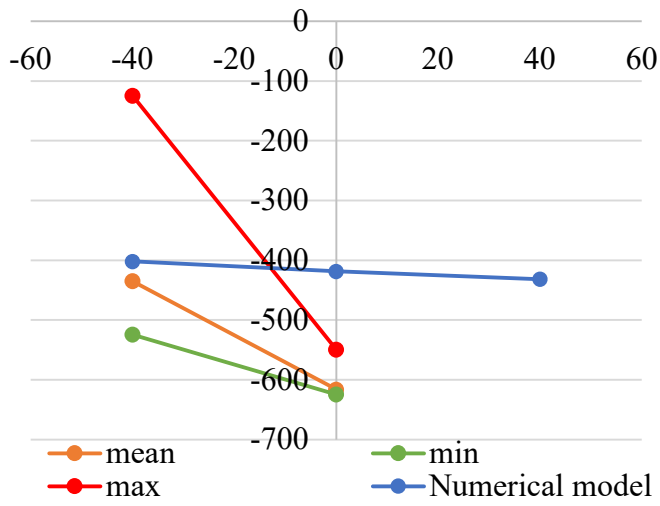
Fig. 71 – Axial strains of RS4 specimens based on BAM strain-measuring extensometer with numerical result



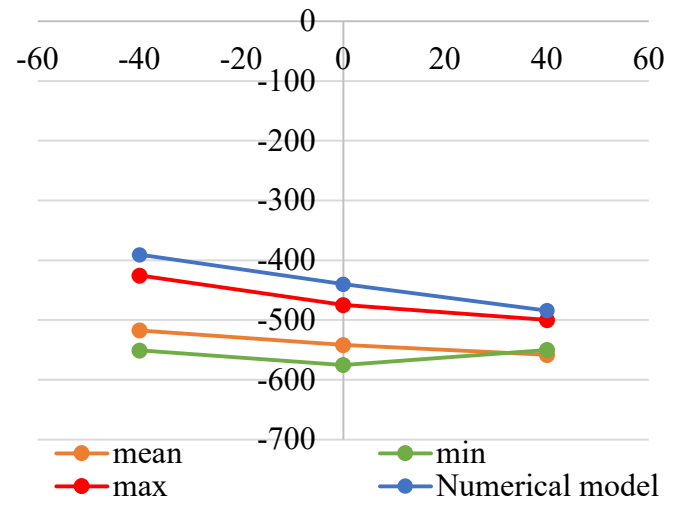
j) RS6-355-Flange



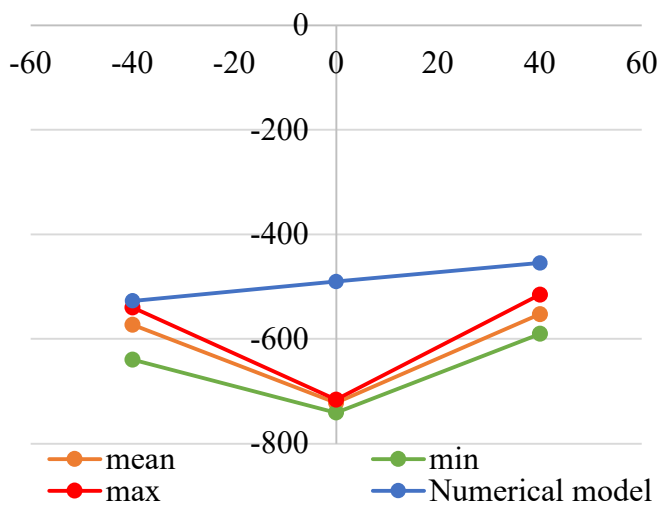
k) RS6-355-Web



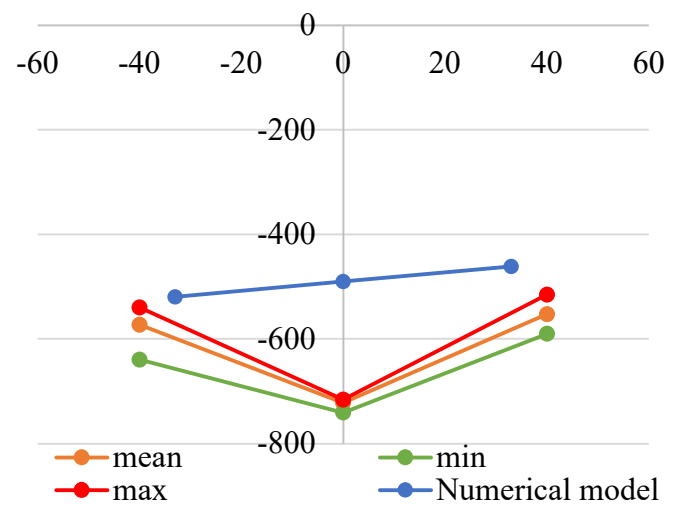
l) RS6-700-Flange



d) RS6-700B-Web

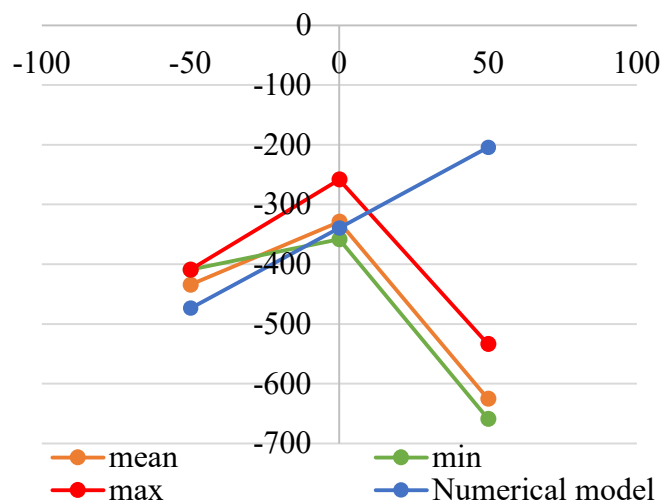


e) RS6-H0-Flange

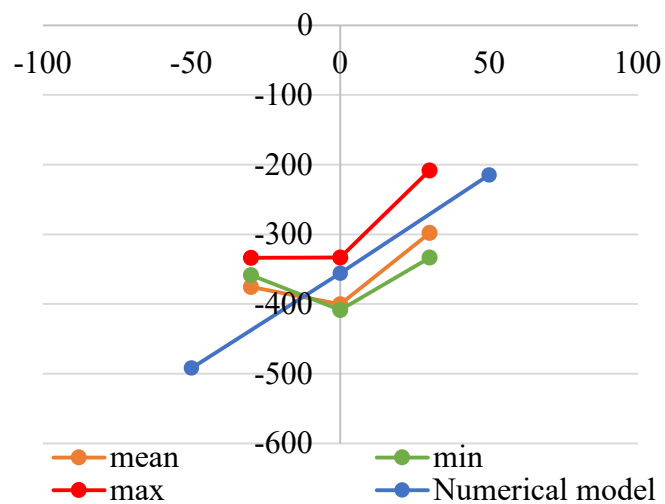


f) RS6-H0-Web

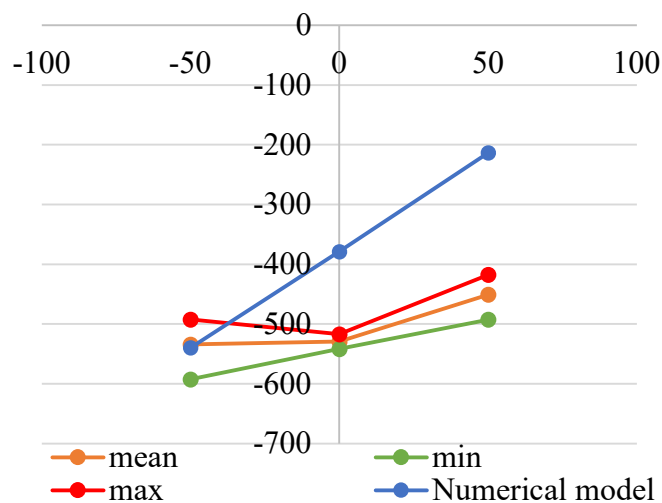
Fig. 71 – Axial strains of RS6 specimens based on BAM strain-measuring extensometer with numerical result



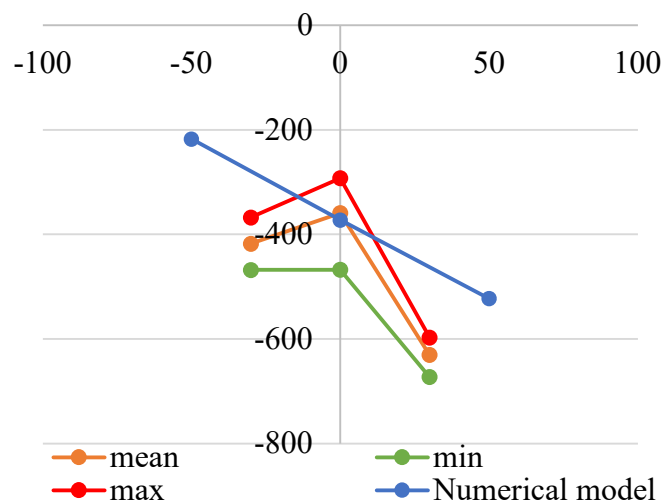
j) RS8-700A-Flange



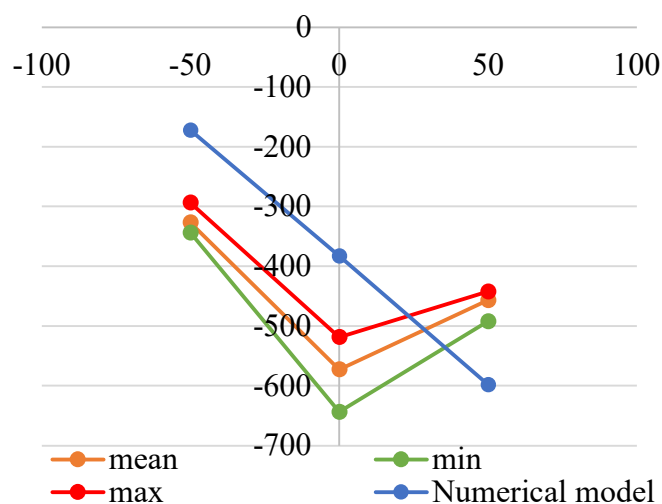
k) RS4-700A-Web



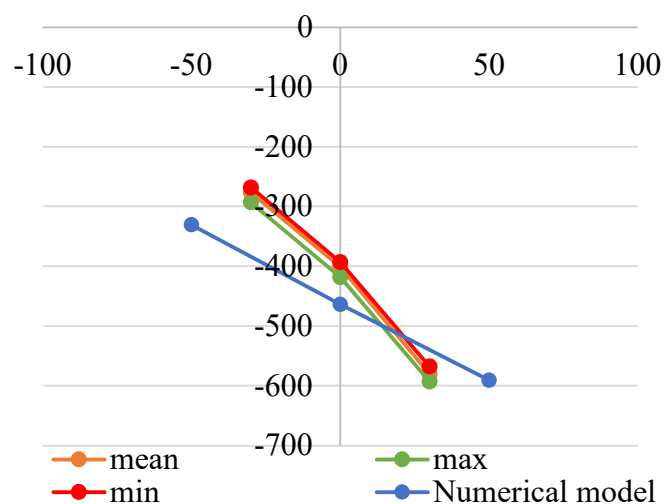
l) RS8-700B-Flange



d) RS8-700B-Web

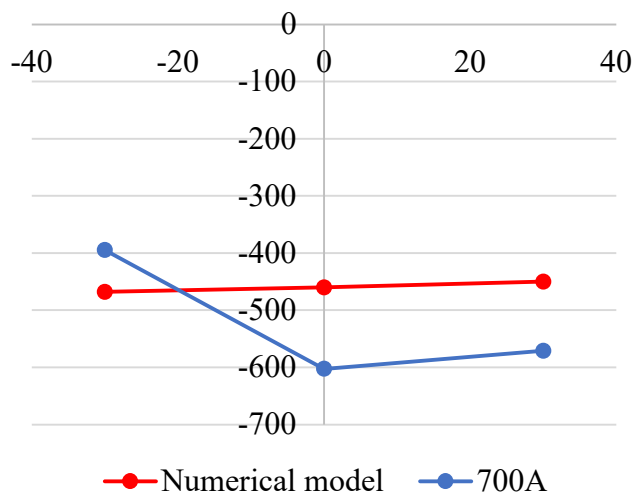


e) RS8-H0-Flange

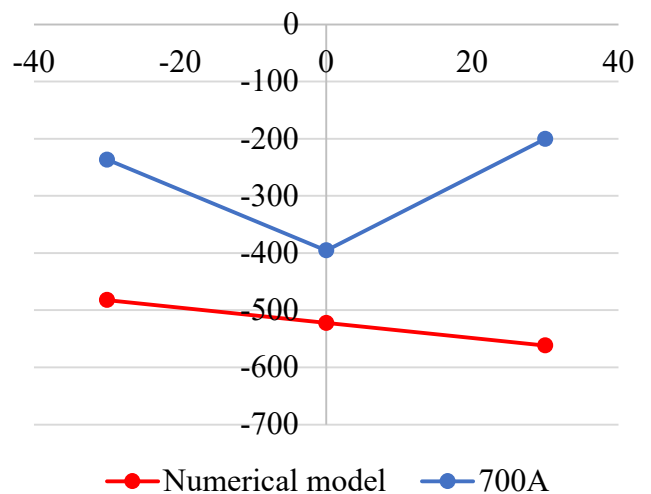


f) RS8-H0-Web

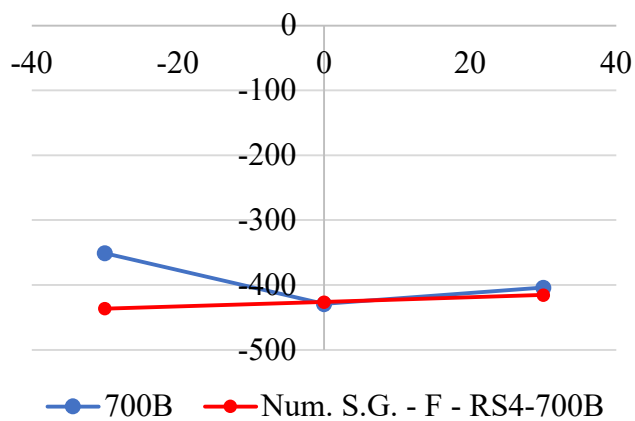
Fig. 71 – Axial strains of RS8 specimens based on BAM strain-measuring extensometer with numerical result



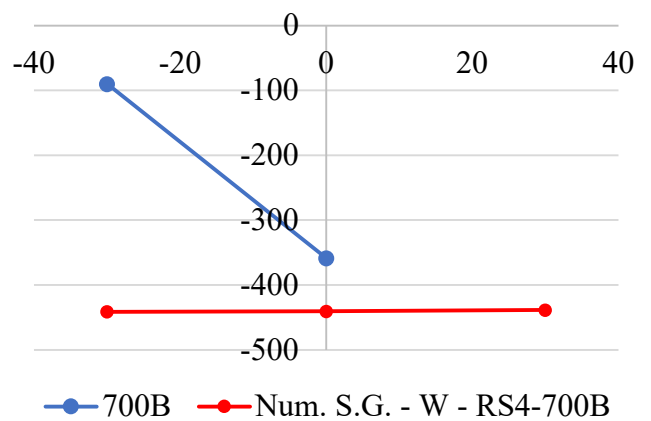
m) RS4-700A-Flange



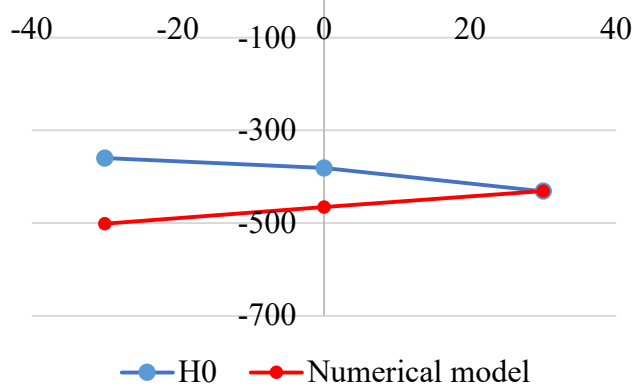
n) RS4-700A-Web



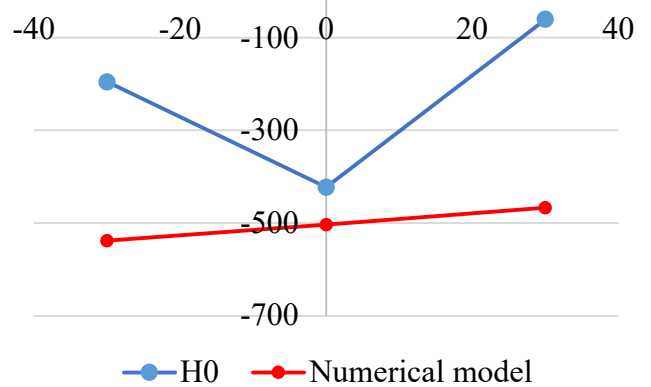
o) RS4-700B-Flange



m) RS4-700B-Web

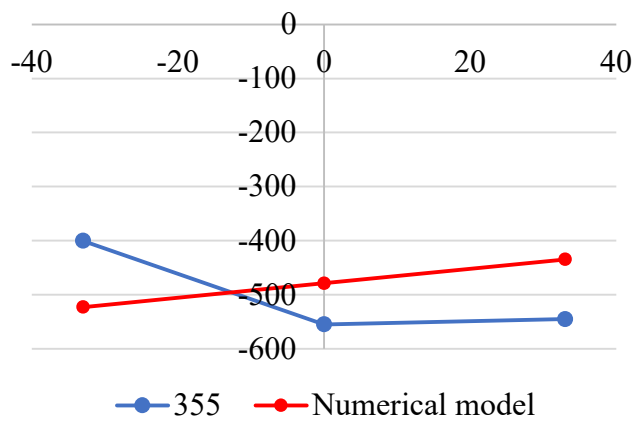


n) RS4-H0-Flange

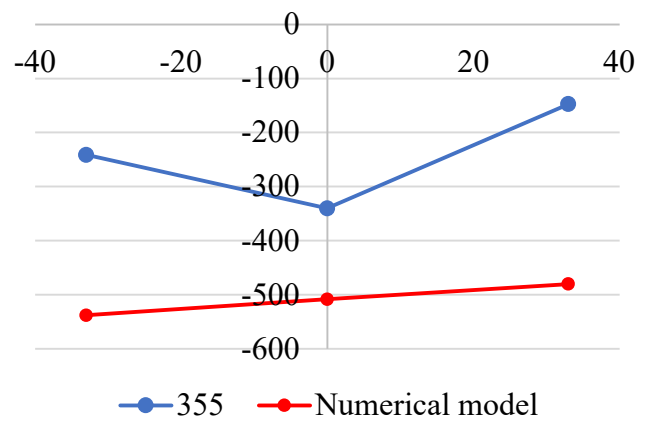


o) RS4-H0-Web

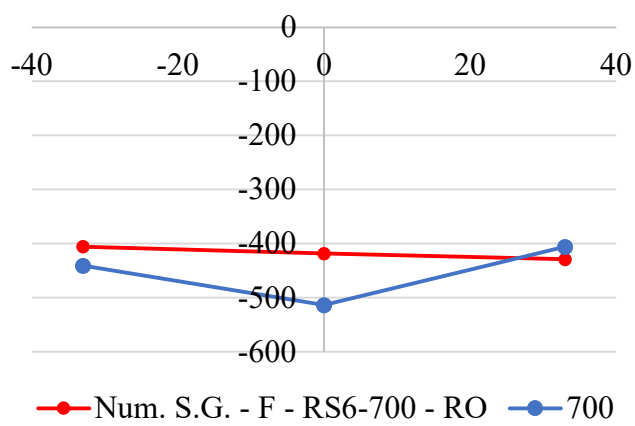
Axial strains of RS4 specimens based on strain gauge measurements with numerical result



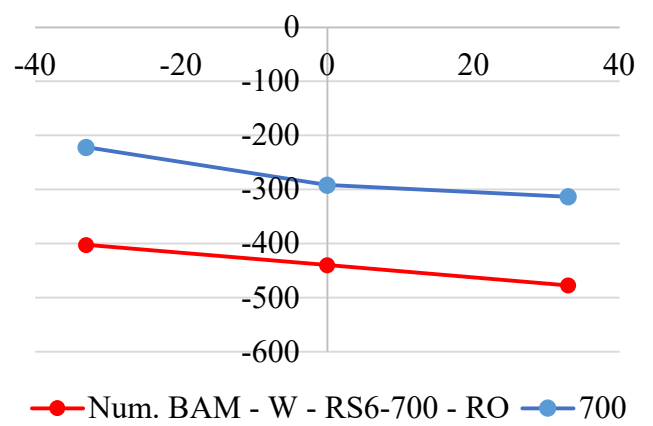
a) RS6-355-Flange



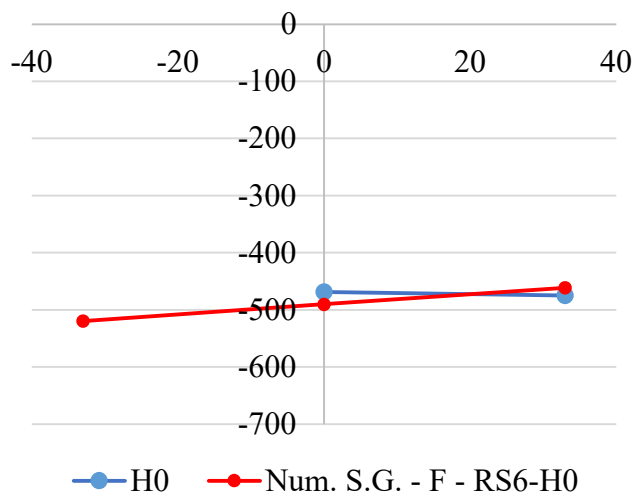
b) RS6-355-Web



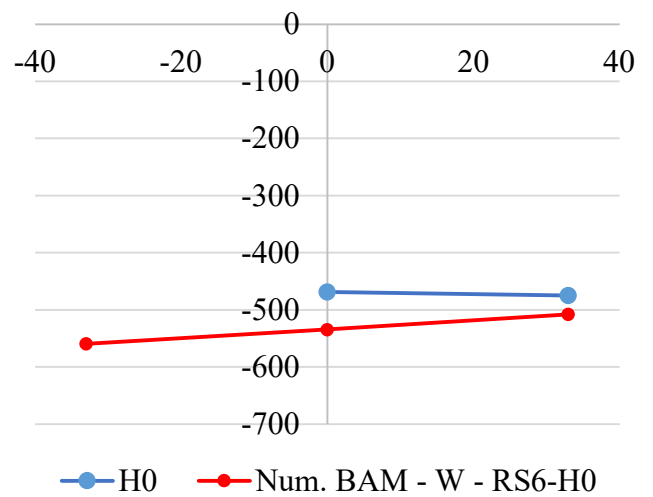
c) RS6-700-Flange



d) RS6-700-Web

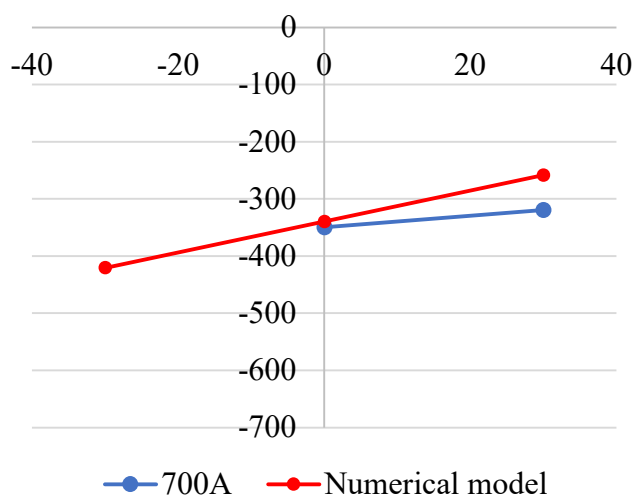


e) RS6-H0-Flange

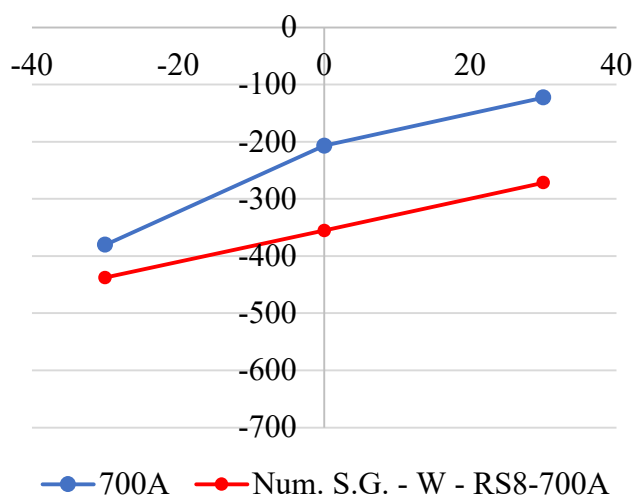


f) RS6-H0-Web

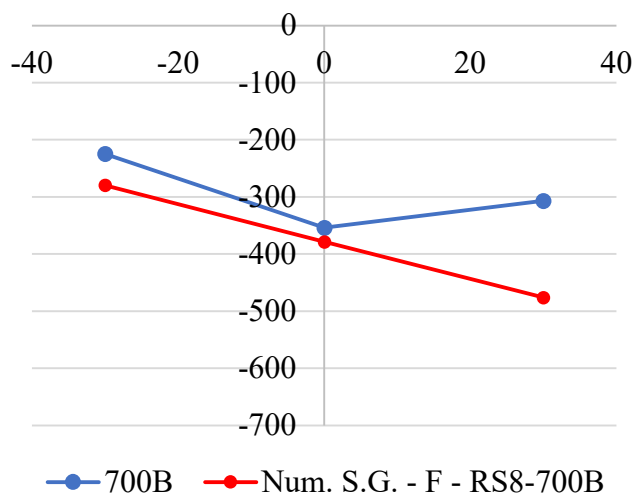
Axial strains of RS6 specimens based on strain gauge measurements with numerical result



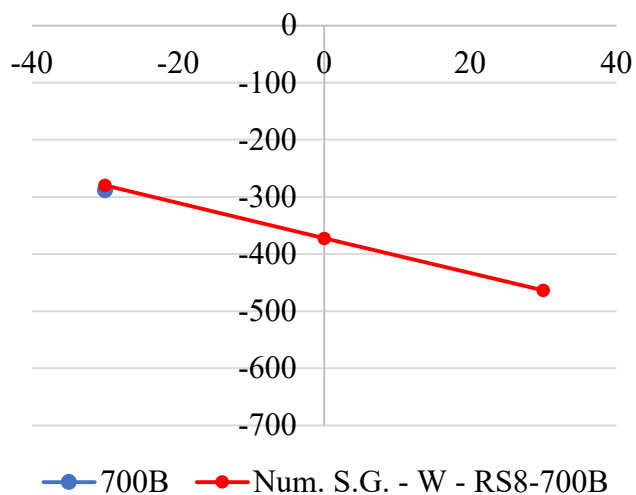
p) RS8-700A-Flange



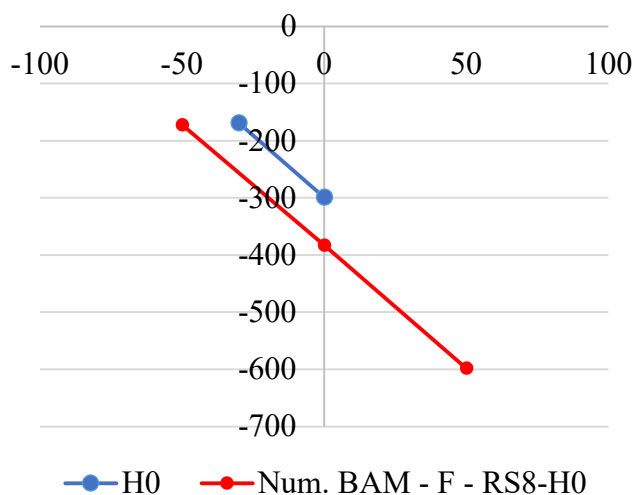
q) RS8-700A-Web



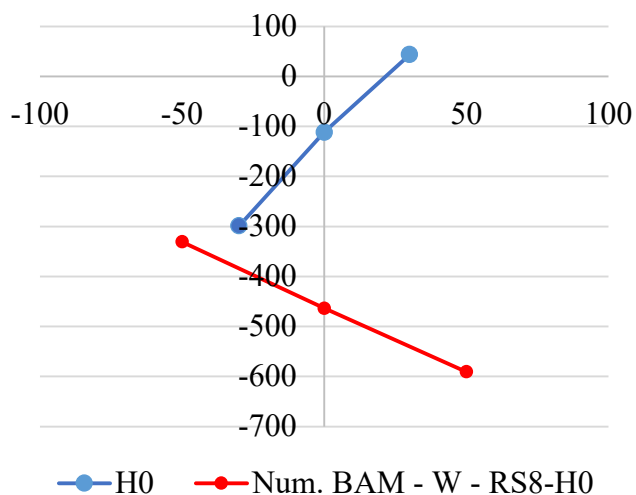
r) RS8-700B-Flange



p) RS8-700B-Web



q) RS8-H0-Flange



r) RS8-H0-Web

Axial strains of RS8 specimens based on strain gauge measurements with numerical result

Yield strength and tensile strength of the steel materials

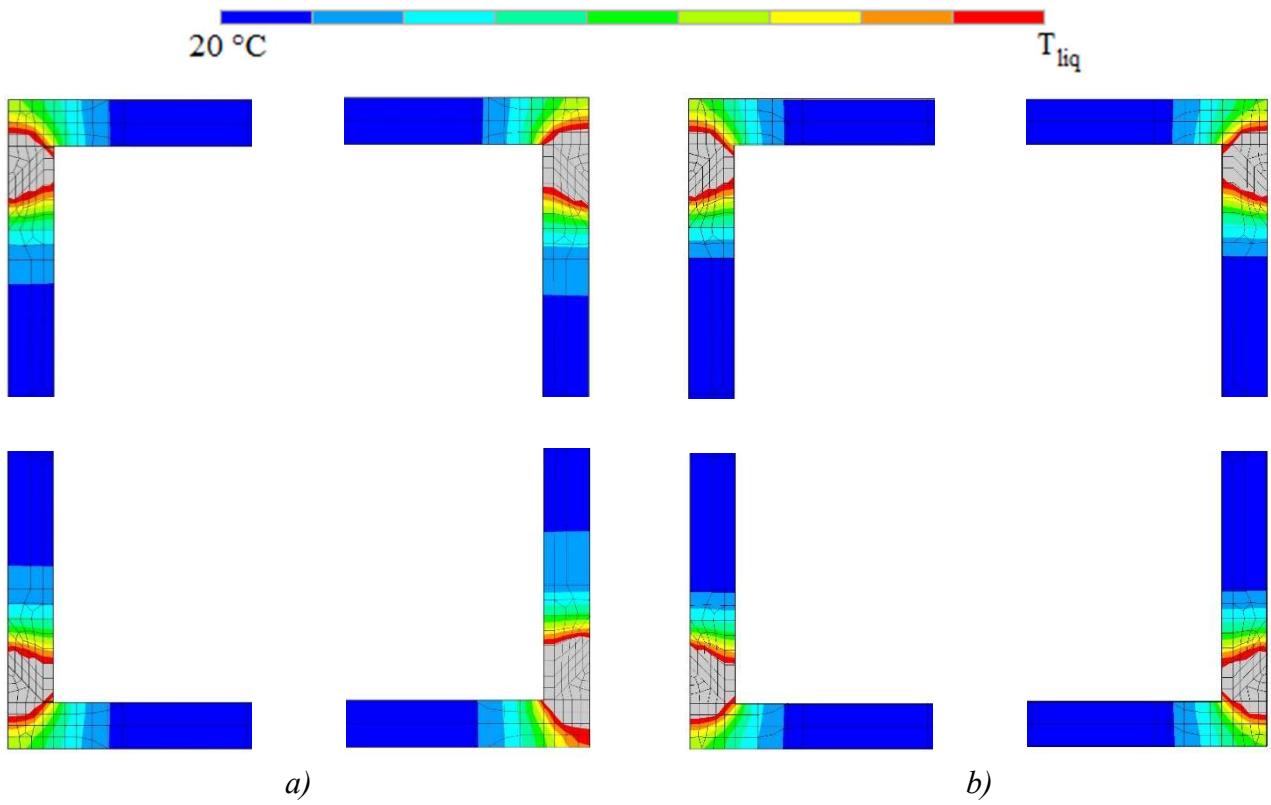
Appendix E

Specimens	Steel grade	ReH [MPa]	R_m [MPa]
RS4-700A	S700MC E	753	829
	S700MC E	753	829
RS4-700B	S700MC E	753	829
	S700MC E	753	829
RS4-H0	S355MC	402	469
	S700MC E	746	797
RS6-355	S355J2+N	355	470/630 (min/max)
	S355J2+N	355	470/630 (min/max)
RS6-700	S700MC E	749 ($R_{p0.2}$)	833
	S700MC E	749 ($R_{p0.2}$)	833
RS6-H0	S355J2+N	355	470/630 (min/max)
	S700MC E	749 ($R_{p0.2}$)	833
RS8-700A	S700MC E	738	827
	S700MC E	738	827
RS8-700B	S700MC E	738	827
	S700MC E	738	827
RS8-H0	S355MC	400 ($R_{p0.2}$)	486
	S700MC E	738	827

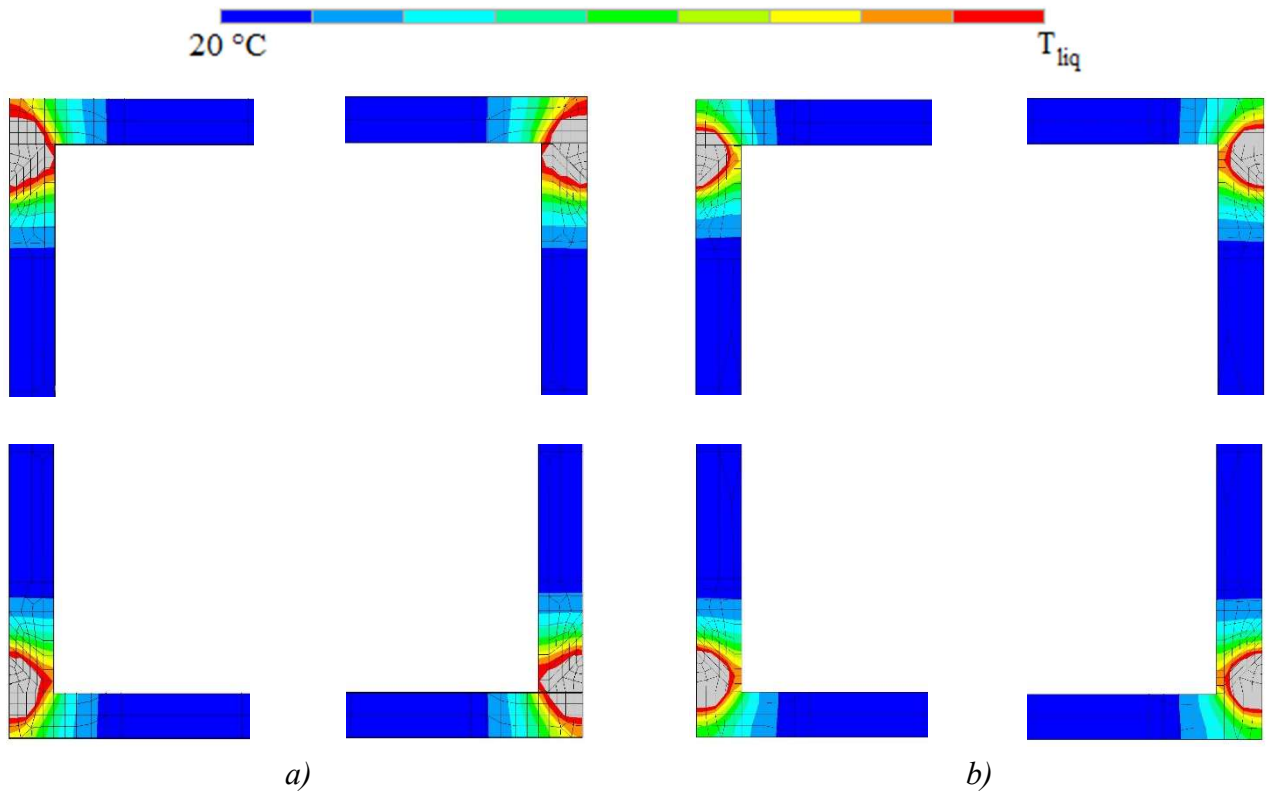
Chemical composition of according to inspection certificate.

	C%	SI%	MN%	P%	S%	AL%	NB%	CEV
S355J2+N	0.19	0.21	1	0.015	0.007	0.036	0.002	0.4
S355MC	0.061	0.01	0.69	0.011	0.004	0.028	0.027	0.2
S700MC E	0.055-	0.02-	1.83-	0.009-	0.002-	0.039-	0.052-	0.4
	0.062	0.03	1.93	0.014	0.002	0.058	0.063	
	V%	TI%	CU%	CR%	NI%	MO%	N%	T_s [°C]
S355J2+N	0.001	0.001	0.016	0.018	0.01	0.006	0.006	1514.69
S355MC	0.006	0	0.011	0.05	0.03	0.003	0.005	1513.48
S700MC E	0.01-	0.099-	0.01-	0.02-	0.03-	0-0.1	0.004-	1505.66-1505.78
	0.05	0.11	0.2	0.5	0.04		0.005	

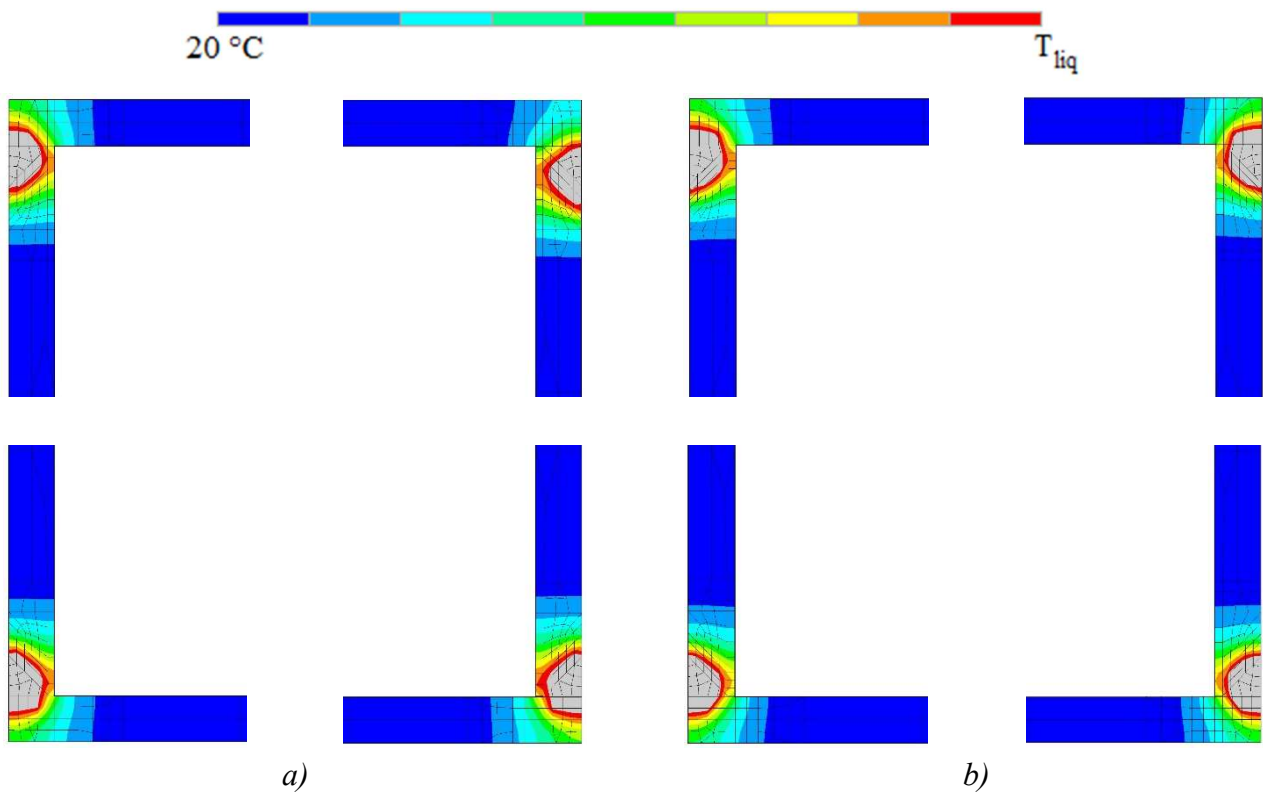
Appendix F



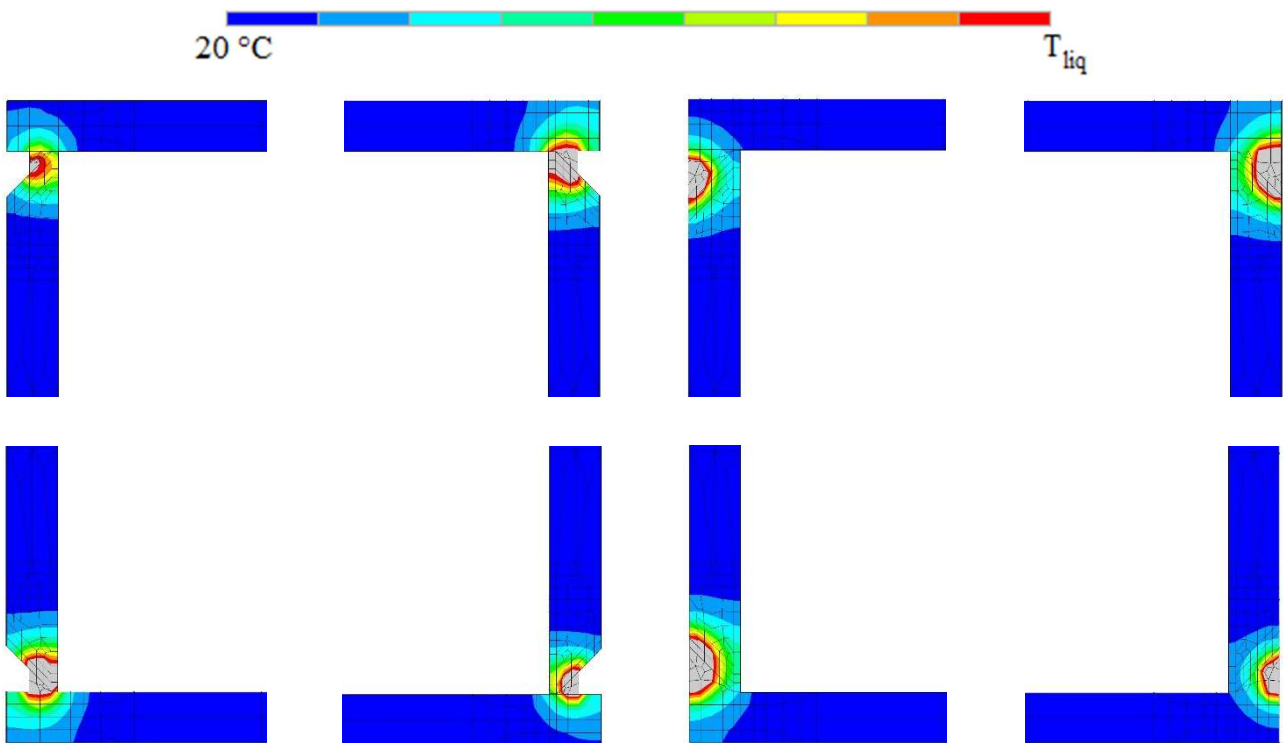
Cross-section of the a) RS4-700A and b) RS4-700B specimen's cross-section at the passing of the heat source model



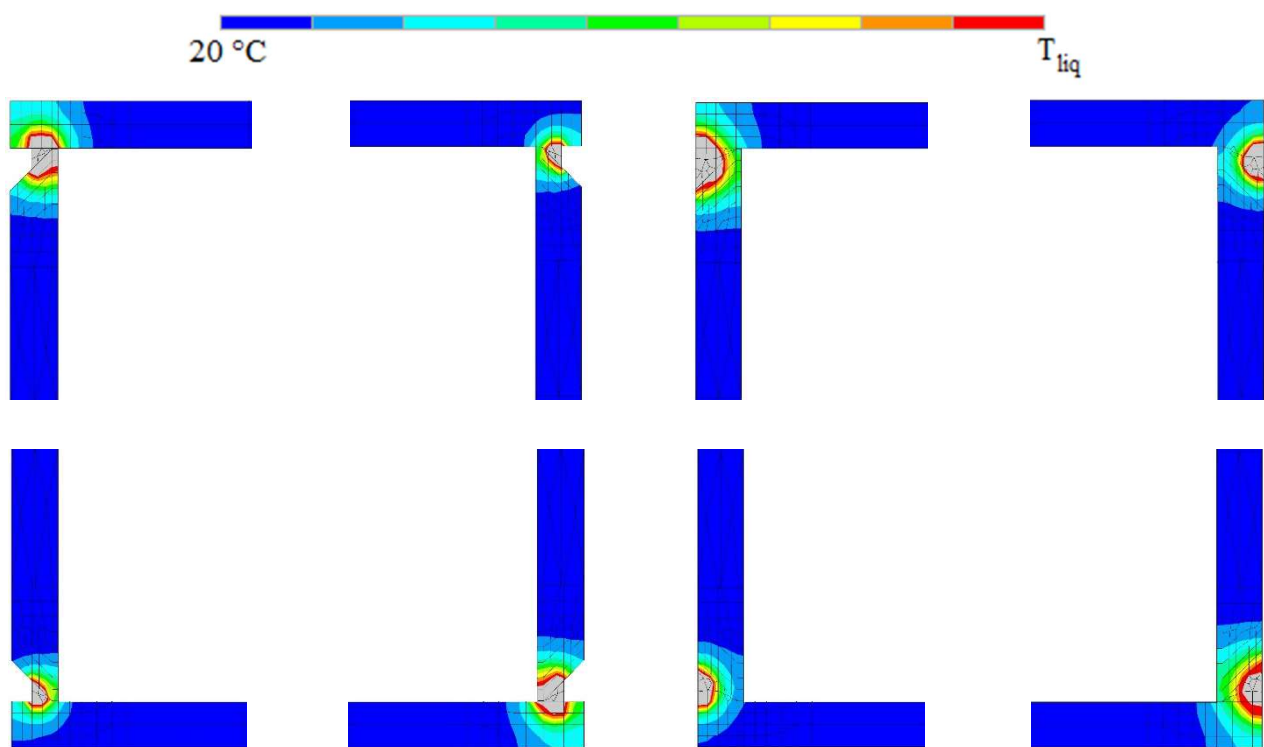
Cross-section of the a) RS4-H0 and b) RS6-355 specimen's cross-section at the passing of the heat source model



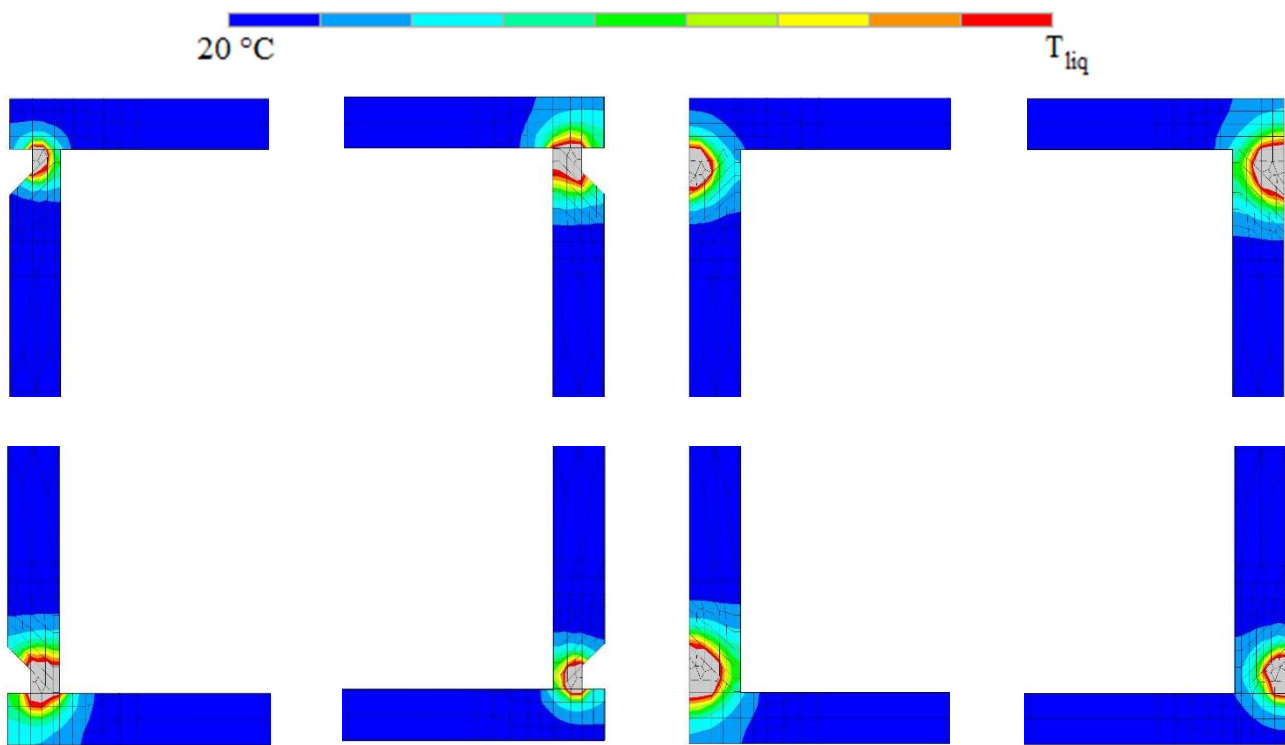
Cross-section of the a) RS6-700 and b) RS6-H0 specimen's cross-section at the passing of the heat source model

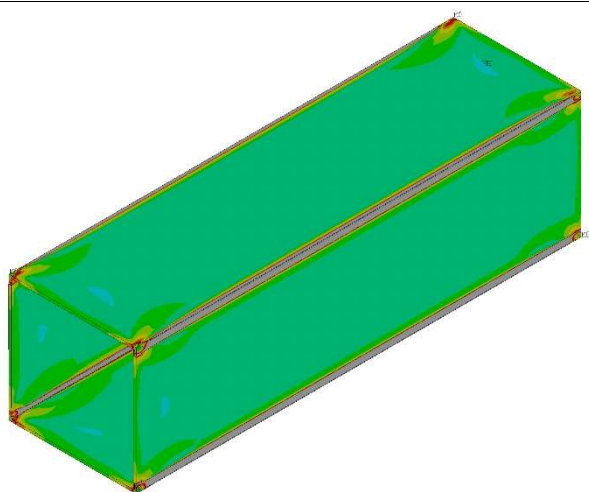


Cross-section of the RS8-700A specimen's cross-section at the passing of the heat source model

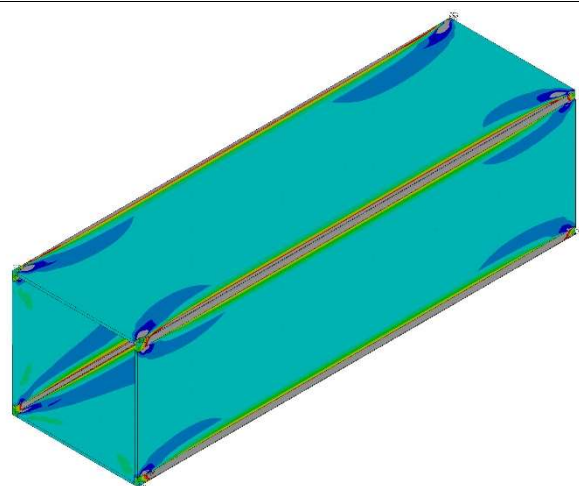


Cross-section of the RS8-700B specimen's cross-section at the passing of the heat source model

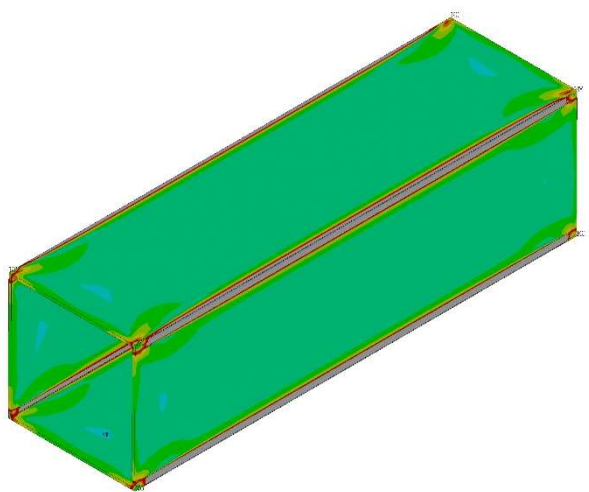




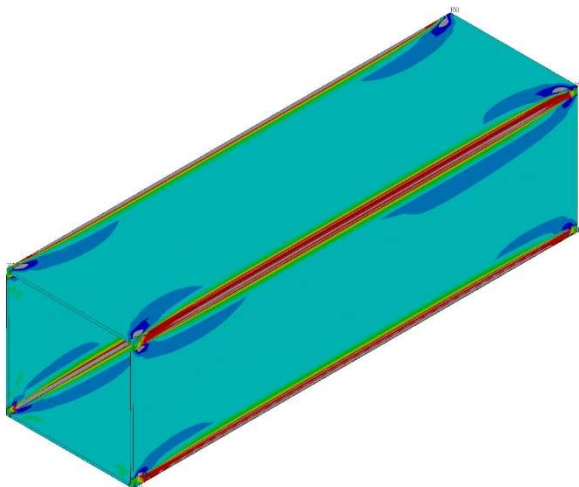
a) RS4-700A – Von-Mises stress



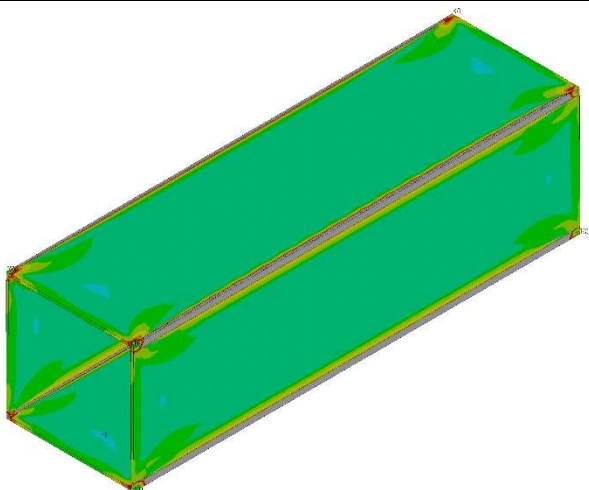
b) RS4-700A – stress z



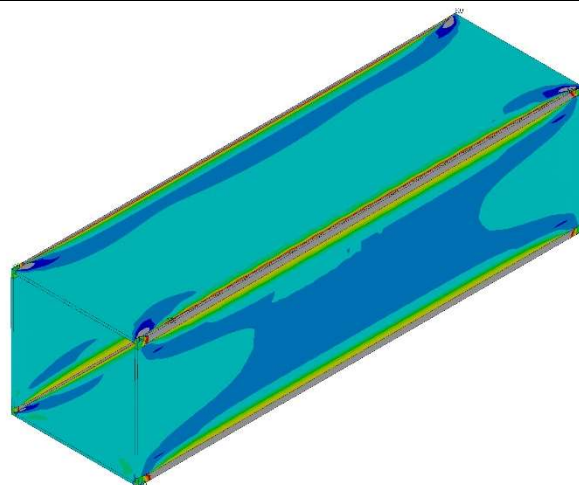
c) RS4-700B – Von-Mises stress



d) RS4-700B – stress z

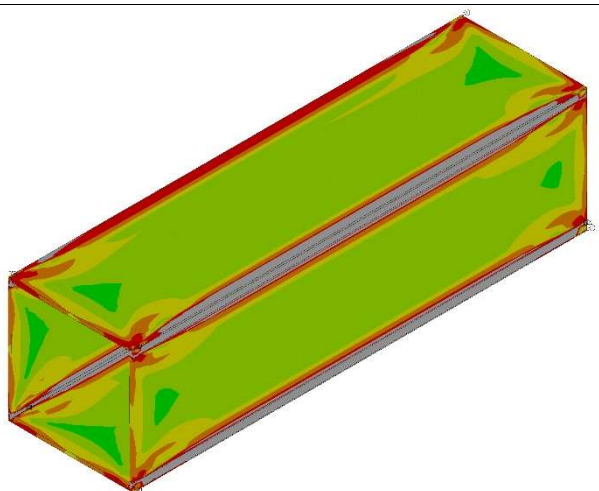


e) RS4-H0 – Von-Mises stress

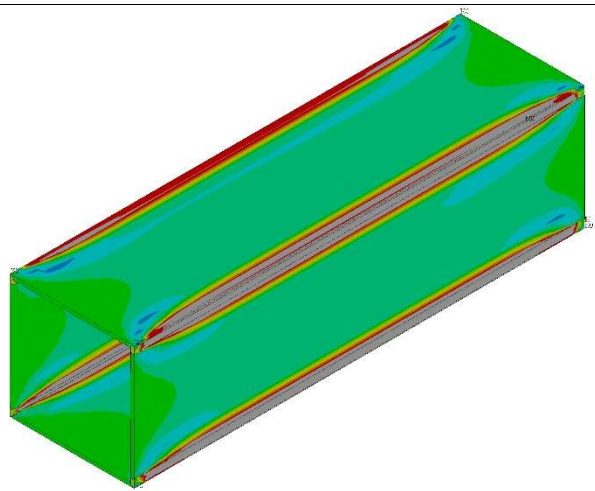


f) RS4-H0 – stress z

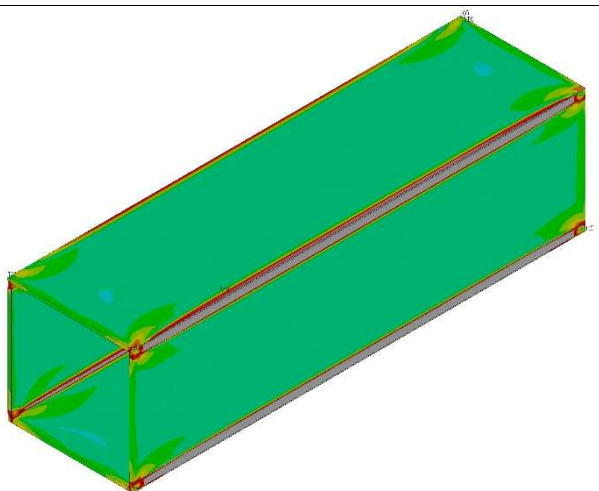
Numerical model stress distribution – RS4 specimen



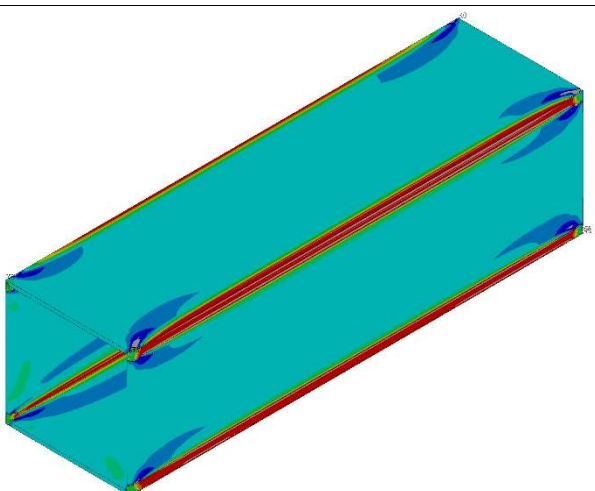
a) RS6-355 – Von-Mises stress



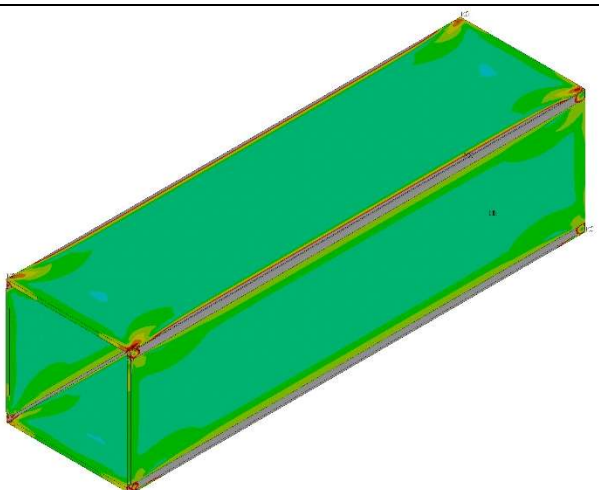
b) RS6-355 – stress z



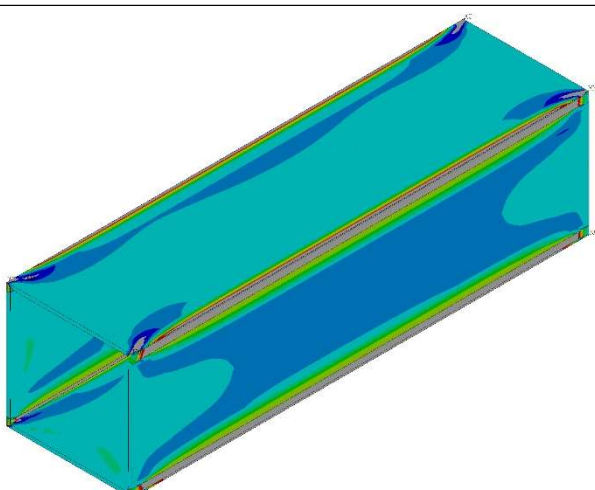
c) RS6-700 – Von-Mises stress



d) RS6-700 – stress z

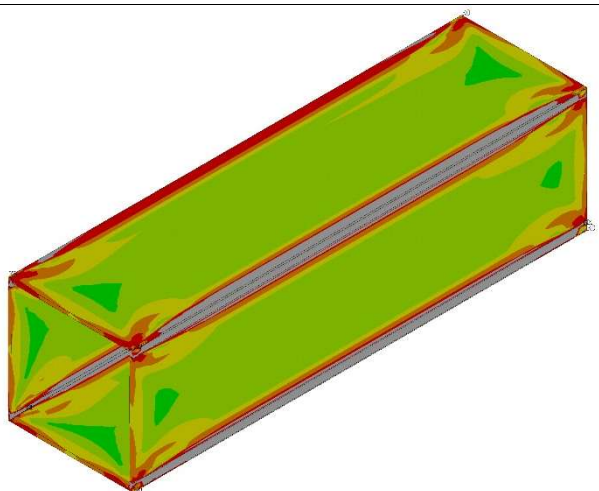


e) RS6-H0 – Von-Mises stress

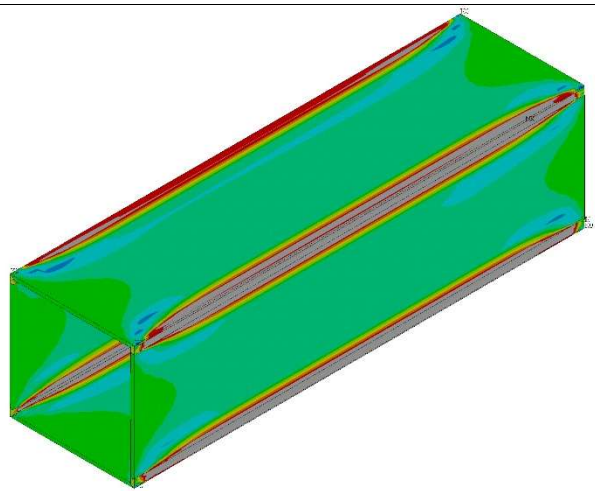


f) RS6-H0 – stress z

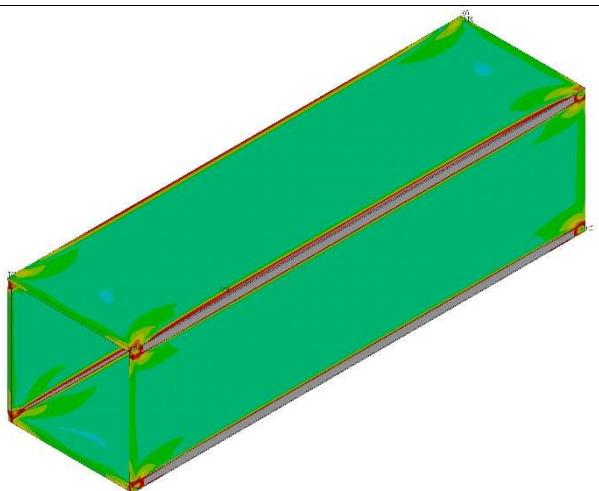
Numerical model stress distribution – RS6 specimen



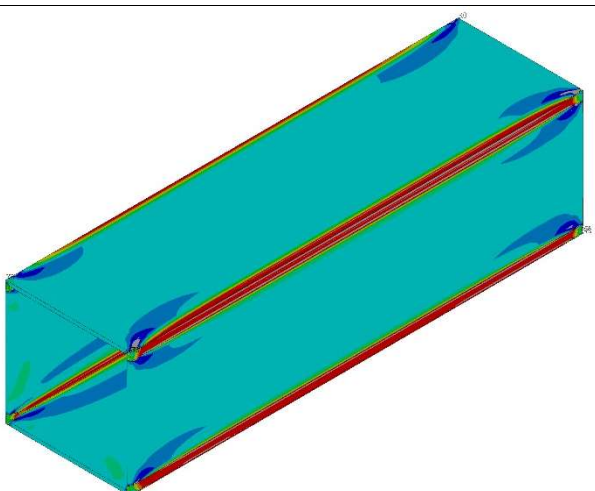
a) RS6-355 – Von-Mises stress



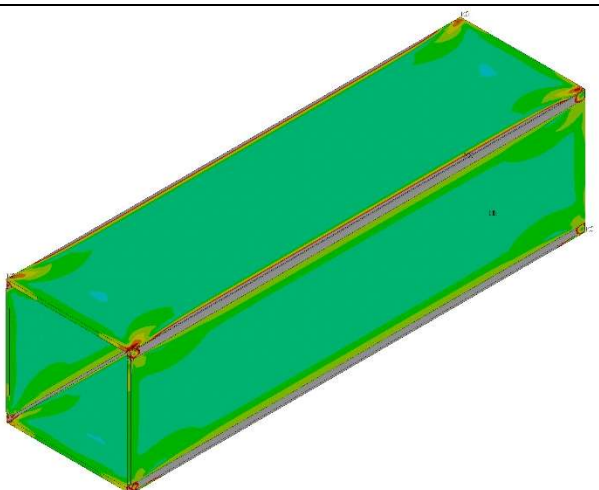
b) RS6-355 – stress z



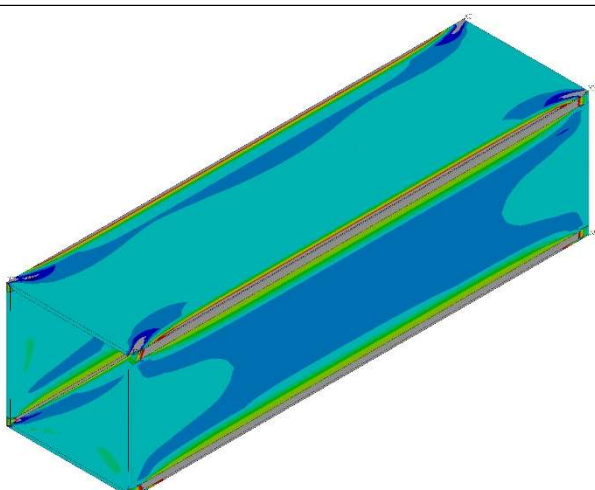
c) RS6-700 – Von-Mises stress



d) RS6-700 – stress z

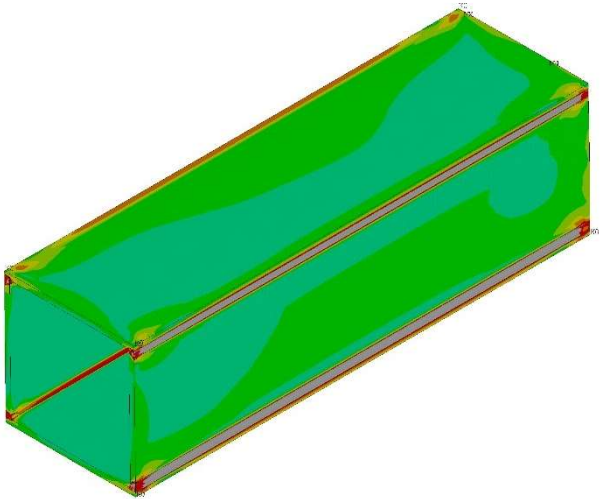


e) RS6-H0 – Von-Mises stress

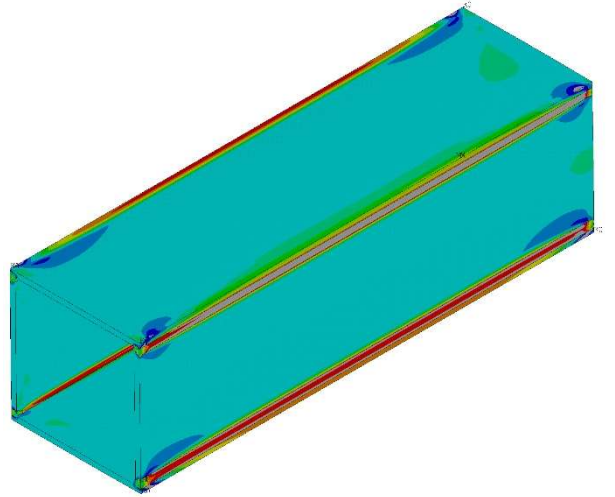


f) RS6-H0 – stress z

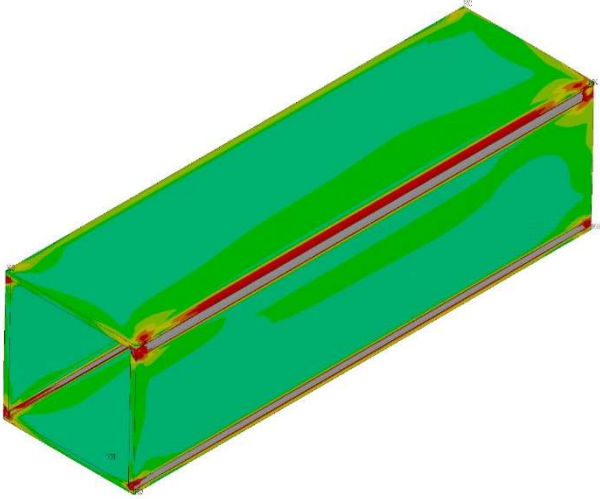
Numerical model stress distribution – RS6 specimen



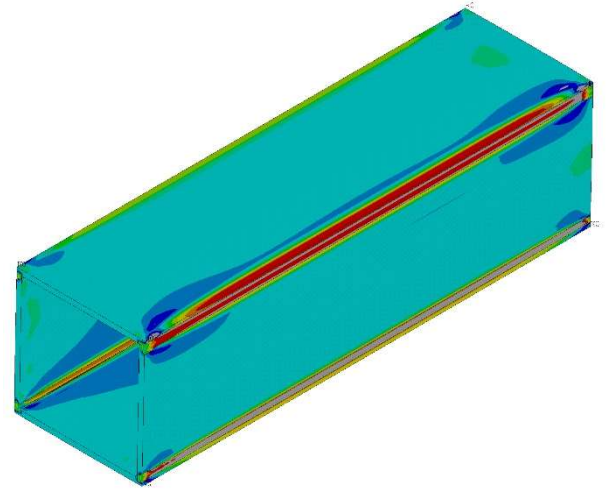
a) RS8-700A – Von-Mises stress



b) RS8-700A – stress z



c) RS8-700B – Von-Mises stress



d) RS8-700B – stress z

e) RS8-H0 – Von-Mises stress

f) RS8-H0 – stress z

Numerical model stress distribution – RS8 specimen

Appendix G

Id. number	Thickness [mm]	Width [mm]	Length [mm]	Material grade
RS6-355				
160-151	6	208		S355J2+N
160-152	6	220		S355J2+N
RS6-700				
160-161	6	208		S700MC E
160-162	6	220		S700MC E
RS6-H0				
160-171	6	208		S355J2+N
160-172	6	220		S700MC E
RS8-700				
160-181	8	184		S700MC E
160-182	8	200		S700MC E
RS8-H0				
160-191	8	184		S355MC
160-192	8	200		S700MC E
RS4-700				
160-201	4	192		S700MC E
160-202	4	200		S700MC E
RS4-H0				
160-211	4	192		S355MC
160-212	4	200		S700MC E

Tilaja Purchaser
SSAB POLAND SP. Z O.O.
UL. KOLEJOWA 15
55-020 ZORAWINA POLAND
Tilauksen nro Order No.
4501327042

Vastaanottaja Consignee
SSAB POLAND SP. Z O.O.
UL. KOLEJOWA 15
55-020 ZORAWINA POLAND
Asiakkaan merkki Shipping mark

Päivämäärä Date
24.01.2022
Valmistajan merkki
Mark of the Manufacturer



Toimitus Certificate
31 Laivaus Shipping
FERROMAR

Laatumerkintä Quality Marking
STRENX 700 MC E

Tarkastajan leima
Stamp of Inspector
Vastaanottajan leima
Stamp of Surveyor
Muut leimaukset
Other Stamps

Mxx

Toimitustyyppi Delivery type
PART DELIVERY

Tuote Product

CUT LENGTHS

Laji Grade

STRENX 700 MC E

Laatuvaatimukset Quality Specifications

HIGH STRENGTH FORMABLE STEEL MEETS REQ. OF EN10149-2 S700MC

Posiio Item
Mitat mm
Dimensions mm

Merkit
Mark

HOT ROLLED STEEL IN BUNDLES CUT LENGTHS MILL EDGES

OPTION 7 GALV.CAT.A: SI MAX 0.03, SI+2.5P <= 0.09%, IMPACT TEST -40C MIN 27J LONGIT.

010 6.00 X 1500 X 6000 4501327042 A009.A01135 STD

OPTION 7 GALV.CAT.A: SI MAX 0.03, SI+2.5P <= 0.09%, IMPACT TEST -40C MIN 27J LONGIT.

020 8.00 X 1500 X 3000 4501327042 A009.A01138 ST

OPTION 7 GALV.CAT.A: SI MAX 0.03, SI+2.5P <= 0.09%, IMPACT TEST -40C MIN 27J LONGIT.

030 5.00 X 1500 X 3000 4501327042 A009.A01130 ST

OPTION 7 GALV.CAT.A: SI MAX 0.03, SI+2.5P <= 0.09%, IMPACT TEST -40C MIN 27J LONGIT.

040 10.00 X 1500 X 3000 4501327042 A009.A01796 ST

Sulatus nro levy nro Cast No. Plate No.
XXXXX XXX XX XXX

Toleranssit Tolerances
SSAB TOLERANCE EN10051, THICKN. 1/2 CAT D

Tekniset vaatimukset ja/tai viralliset määräykset Technical terms of Delivery and/or Official Regulations

Sulatus levy nro Cast plate No.

Kpl Pcs

Paino kg Weight kg

SP nro SP No

UT MT

Turvamerkki Safety mark

*** 306 91618

Raabe Steel Works

Testaus ja tarkastus Testing and Inspection

Minna Valkama

MINNA VALKAMA

Valtuutettu tarkastaja Authorized inspection representative

Yhtiön nimi Company Name: SSAB Europe Oy

Kotipaikka Registered Office: HÄMEENLINNA

Osoite Address:

PL 93, P.O. Box 93

FIN-92101 RAAHE, FINLAND

Puhelin Telephone:

020 5911

+358 20 5911

Y-tunnus Business ID: 2389445-7

Täten todistamme, että toimitus on tilausvahvistuksen mukainen.
We hereby certify that the material described above has been tested and complies with the terms of the order confirmation.

Tilaaja SSAB POLAND SP. Z O.O. UL. KOLEJOWA 15 55-020 ZORAWINA POLAND Tilausvahvistus Order Confirmation 78916K	Vastaanottaja SSAB POLAND SP. Z O.O. UL. KOLEJOWA 15 55-020 ZORAWINA POLAND Asiakkaan merkki Shipping mark	Päivämäärä Date 24.01.2022 Valmistajan merkki Mark of the Manufacturer
4501327042		

Laji Grade STRENX 700 MC E	Lisävaatimukset Additional requirements	Laatuvalettu happiterästä Oxygen steel, continuous casting Fully killed, Fine grain practiced
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HIGH STRENGTH FORMABLE STEEL, MEETS REQ. OF EN10149-2 S700MC

Pos. Item	Sulatus, k. erä nro Cast. test No	T-tila Cond	Velokoe Tensile test			REH MPa	REL MPa	RT05 MPa	RP02 MPa	K2 °C	RM MPa			A %	RAZ %			Keskiarvo Average	K5	D = X t	Huom Nb	Päästö Tempering °C
			1	2	3	1	2	3	1	2	1	2	3	50	80	200	1	2	3			
010	87572	021	TM	32					749		833			20					32	2.0		
020	87952	041	TM	32					752		838			20					32	2.0		
030	87569	041	TM	32					770		838			20					32	2.0		
040	87572	011	TM	32					738		821			20					32	2.0		

TM-THERMOMECH. TREATED																						
K2: 32-CENTRE, LONGITUDINAL K5: 32= 120 MM WIDE BEND TEST																						
Pos. Item	Sulatus k. erä nro Cast. test No	Isukoe Impact test	FA %						LE (mm)						*Specimen Unbroken			Erikoiskoeet Special tests			Huom Nb	Päästö Tempering °C
			1	2	3	Keskiaivo Average	W (mm)	1	2	3	Keskiaivo Average	1	2	3	Keskiaivo Average	K4 °C	1	2	Keskiaivo Average			
LE = Sitkeämurtuman osuus Shear fracture appearance LE = Polkitettainen laalenema Lateral Expansion																						

010	87572	021	133	-040			37															
020	87952	041	133	-040			37															
030	87569	041	137	-040			37															
040	87572	011	135	-040			63															

K3: 133=CH-V/ISO-V(U), 5X10.CENTRE, LONGIT. KV600 137=CH-V(U), TX10.CENTRE, LONGIT. KV600 135=CH-V/ISO-V(U), 7.5X10.CENTRE, LONGIT. KV600

Raabe Steel Works

Testaus ja tarkastus Testing and Inspection

MINNA VALKAMA
Valtuutettu tarkastaja Authorized inspection representativeYhtiön nimi Company Name: SSAB Europe Oy
Kotipaikka Registered Office: HAMEENLINNAOsoite Address: PL 93, P.O. Box 93
FIN-92101 RAAHE, FINLANDPuhelin Telephone: 020 5911
+358 20 5911

Y-tunnus Business ID: 2389445-7

Täten todistamme, että toimitus on tilausvahvistuksen mukainen.
We hereby certify that the material described above has been tested and complies with the terms of the order confirmation.



ANALYYSITODISTUS ANALYSIS CERTIFICATE
ANALYSEBESCHEINIGUNG COMPOSITIO CHIMIQUE CERTIFICAT
СЕРТИФИКАТ АНАЛИЗА

3/3
78916K-001
22.01.2022

Sulatus nro Cast No Schmelzen Nr. No de coulée № Плавки	Koe nro Test No Prüf Nr. Essai No № Проб	Positio Item Pos. Poste Поз.	Cekv Ceq Câq Câq Ceqv	Analys % Chemical composition % Chemisch Zusammensetzung % Composition Chimique % Анализ сплава %	C	SI	MN	P	S	AL	NB	V	TI	CU	CR	NI	MO	B
87572		010	.40	.055	.03	1.93	.014	.002	.039	.052	.051	.099	.019	0.05	0.03	.007	.0002	
87952		020	.41	.060	.03	1.94	.012	.001	.037	.052	.051	.097	.013	0.05	0.04	.004	.0003	
87569		030	.40	.055	.02	1.91	.014	.002	.040	.049	.052	.099	.014	0.05	0.03	.005	.0002	
87572		040	.40	.055	.03	1.93	.014	.002	.039	.052	.051	.099	.019	0.05	0.03	.007	.0002	

Päivämäärä Date Datum Date Data
24.01.2022

AMH

CEQ=C-Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15

Raabe Steel Works

Testaus ja tarkastus
Testing and Inspection
Essais et Contrôle

Steel manufactured and supplied by Raabe Steel Works is free from radiation.
Продукция на металлургическом комбинате «Raabe Steel Works» и поставляемая
заказчику сталь не содержит радиации.

Valtuutettu tarkastaja
Sachverständiger
Inspector autorisé

MINNA VALKAMA

Authorized inspection representative

Yhtiön nimi Company Name: SSAB Europe Oy

Kotipaikka Registered Office: HAMMENLINNA

Osoite Address: PL 93, P.O. Box 93
FIN-92101 RAABE, FINLAND

Puhelin Telephone: 020 5911
+358 20 5911

Y-tunnus Business ID: 2389445-7

EN 10 204-3.1 (2004)

Tilaja Purchaser
SSAB POLAND SP. Z O.O.
UL. KOLEJOWA 15
55-020 ZORAWINA POLAND

Tilaus nro Order No.
4501327042

Tilauksen vahvistus Order Confirmation
78916K

Vastaanottaja Consignee
SSAB POLAND SP. Z O.O.
UL. KOLEJOWA 15
55-020 ZORAWINA POLAND

Asiakkaan merkki Shipping mark

Päivämäärä Date
24.01.2022

Valmistajan merkki
Mark of the Manufacturer



Todistus Certificate

Laivaus Shipping
FERROMAR

Laatumerkintä Quality Marking
STREX 700 MC E

Tarkastajan leima
Stamp of Inspector
Vastaanottajan leima
Stamp of Surveyor
Muut leimaukset
Other Stamps

Mxx

Toimitustyyppi Delivery type

PART DELIVERY

Tuote Product

CUT LENGTHS

Laji Grade

STREX 700 MC E
Laatuvaatimukset Quality Specifications
HIGH STRENGTH FORMABLE STEEL MEETS REQ. OF EN10149-2 S700MC

Positio Item

Mitat mm Dimensions mm

Merkki Mark

Maarke

HOT ROLLED STEEL IN BUNDLES CUT LENGTHS MILL EDGES

OPTION 7 GALV.CAT.A: SI MAX 0.03, SI+2.5P <= 0.09%, IMPACT TEST -40C MIN 27J LONGIT.	60	25440	87572	021	021
010 6.00 X 1500 X 6000 4501327042 A009.A01135 STD	60	25440	87572	021	021
OPTION 7 GALV.CAT.A: SI MAX 0.03, SI+2.5P <= 0.09%, IMPACT TEST -40C MIN 27J LONGIT.	94	26602	87952	041	041
020 8.00 X 1500 X 3000 4501327042 A009.A01138 ST	94	26602	87952	041	041
OPTION 7 GALV.CAT.A: SI MAX 0.03, SI+2.5P <= 0.09%, IMPACT TEST -40C MIN 27J LONGIT.	80	14160	87569	041	041
030 5.00 X 1500 X 3000 4501327042 A009.A01130 ST	80	14160	87569	041	041
OPTION 7 GALV.CAT.A: SI MAX 0.03, SI+2.5P <= 0.09%, IMPACT TEST -40C MIN 27J LONGIT.	72	25416	87572	011	011
040 10.00 X 1500 X 3000 4501327042 A009.A01796 ST	72	25416	87572	011	011

*** 306 91618

Raabe Steel Works

Testaus ja tarkastus Testing and Inspection

Minna Valkama

MINNA VALKAMA

Vahvistettu tarkastaja Authorized inspection representative

Yhtiön nimi Company Name: SSAB Europe Oy

Kotipaikka Registered Office: HAMMENLINNA

Osoite Address: PL 93, P.O. Box 93

FIN-92101 RAAHE, FINLAND

Puhelin Telephone: 020 5911

+358 20 5911

Y-lunnus Business ID: 2389445-7

Täten todistamme, että toimintu on tilauvahuistuksen mukainen.
We hereby certify that the material described above has been tested and complies with the terms of the order confirmation.

Tilaaja Purchaser SSAB POLAND SP. Z O.O. UL. KOLEJOWA 15 55-020 ZORAWINA POLAND Tilaus nro Order No. 4501327042	Tilausvahvistus Order Confirmation 78916K	Vastaanottaja Consignee SSAB POLAND SP. Z O.O. UL. KOLEJOWA 15 55-020 ZORAWINA POLAND Asiakkaan merkki Shipping mark	Päivämäärä Date 24.01.2022
Laji Grade STRENGTH 700 MC E		Valmistajan merkki Mark of the Manufacturer	AMH
Laatuselitys Quality Specifications HIGH STRENGTH FORMABLE STEEL, MEETS REQ. OF EN10149-2 S700MC		Jatkuvavalettua happoterästä Oxygen steel, continuous casting Fully killed, Fine grain practiced	



Pos. Item	Sulatus, k. erä nro Cast. test No	T-tila Cond	Velokoe Tensile test				REH MPa	REL MPa	RT05 MPa	RM MPa		A %			RE / RM	RM * A5	RAZ %			Keskiarvo Average	Taivutuskoe Bend test	Huom Nb	Päästö Tempering °C
			K2	°C	R902 MPa	1				2	3	50	80	200			1	2	3				
010	87572	021	TM	32	749	833					20									32	2.0		
020	87952	041	TM	32	752	838					20									32	2.0		
030	87569	041	TM	32	770	838					20									32	2.0		
040	87572	011	TM	32	738	821					20									32	2.0		
K2: 32=CENTRE, LONGITUDINAL K5: 32=120 MM WIDE BEND TEST TM= THERMOMECH. TREATED																							
Pos. Item	Sulatus, k. erä nro Cast. test No	Isukoe Impact test	FA %			W (mm)	Keskiarvo Average	*Specimen Unbroken			K4 °C	Special tests	Huom Nb	Päästö Tempering °C									
			1	2	3			1	2	3													
010	87572	021	133	-040	32	40	39	37															
020	87952	041	133	-040	32	36	44	37															
030	87569	041	137	-040	37	37	40	38															
040	87572	011	135	-040	66	68	55	63															
K3: 133=CH-V/ISO-V(J), 5X10, CENTRE, LONGIT. KV600 137=CH-V(J), TX10, CENTRE, LONGIT. KV600															LE = Poikkittainen laajenema Lateral Expansion								

Raabe Steel Works

Testaus ja tarkastus Testing and Inspection

MINNA VALKAMA

Valtuutettu tarkastaja Authorized inspection representative

Yhtiön nimi Company Name: SSAB Europe Oy
Kotipaikka Registered Office: HAMEENLINNAOsoite Address: PL 93, P.O. Box 93,
FIN-32101 RAAHE, FINLANDPuhelin Telephone: 020 5911
+358 20 5911

Y-tunnus Business ID: 2389445-7

Täten todistamme, että toimitus on tilausvahvistuksen mukainen.
We hereby certify that the material described above has been tested and complies with the terms of the order confirmation.



ANALYYSITODISTUS ANALYSIS CERTIFICATE
ANALYSEBESCHEINIGUNG COMPOSITIO CHIMIQUE CERTIFICAT
СЕРТИФИКАТ АНАЛИЗА

3/3
78916K-001
22.01.2022

Sulatus nro Cast No Schmelzen Nr. No de coulée № Плавки	Koe nro Test No Prüf Nr. Essai No № Проб	Positio Item Pos. Poste Поз.	Cekv Ceq Câq Cég Сэкв	Analysi % Chemical composition % Chemisch Zusammensetzung % Composition Chimique % Анализ пробы % (* = ppm)										Päivämäärä Date Datum Date Дата	
C	SI	MN	P	S	AL	NB	V	TI	CU	CR	NI	MO	B		

87572	.40	.055	.03	1.93	.014	.002	.039	.052	.051	.099	.019	0.05	0.03	.007	.0002
87952	.41	.060	.03	1.94	.012	.001	.037	.052	.051	.097	.013	0.05	0.04	.004	.0003
87569	.40	.055	.02	1.91	.014	.002	.040	.049	.052	.099	.014	0.05	0.03	.005	.0002
87572	.40	.055	.03	1.93	.014	.002	.039	.052	.051	.099	.019	0.05	0.03	.007	.0002

CEO=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15

Raabe Steel Works

Testaus ja tarkastus
Prüfung und Kontrolle

Испытание и контроль качества

Minna Valkama

MINNA VALKAMA

Valtuutettu tarkastaja
Sachverständiger

Authorized inspection representative

Уполномоченный инспектор

Yhtiön nimi Company Name: SSAB Europe Oy
Kotipaikka Registered Office: HAMENLINNA

Osote Address: PL 93, P.O. Box 93
FIN-92101 RAAHE, FINLAND

Puhelin Telephone: 020 5911
+358 20 5911

Y-tunnus Business ID: 2389445-7

Steel manufactured and supplied by Raabe Steel Works is free from radiation.
Прокатная на металлургическом комбинате «Raabe Steel Works» и поставляемая заказчику сталь не излучает радиацию.

A2020/0733

A02

160-171

U.S. Steel Košice, s.r.o. A01 Vstupný areál U.S. Steel 044 54 Košice SLOVAK REPUBLIC	Purchaser Art. No: 7H7SLBM0/04 A09 Works Order No: XC021836 A08 Advice No: 20/315495 01 A10 Your order: SR-2020/211 A07	SALZGITTER MANNESMANN A06 ACELKERESKEDELM KFT. Horváth utca 14-24 HU-1027 BUDAPEST Hungary
METALLURGICAL CERTIFICATE NO: 20/315495 01 A03		B09
Desc. of goods: HOT ROLLED SHEETS B01		Size: 6,000 x 1500,0 x 6000,0 mm EN 10051/10
Standard: EN 10025-2/04 B02	B03	Pcs: 18 B08
Quality: S355J2C+N B02	Delivery Note: 30254203 A10	Net Weight: 7 560 kg B13 WeightT: 7 629 kg B12

Unit No	Coil No	Heat	B07	Unit No	Coil No	Heat	B07
382060701	3820607	38206		382060703	3820607	38206	
382060702	3820607	38206					

MECHANICAL TEST RESULTS

	Min. / Max.	Coil No 3820607
C12 Rm C03 +20°C(T) (MPa)	470/630	570
C11 ReH C03 +20°C(T) (MPa)	355/	446
C13 A5 C03 +20°C(T) (%)	20,0/	27,0
C43 KV C03 -20°C avr. (L) (J)	13/	85
C42 KV1 C03 -20°C(L) (J)	/	83
C42 KV2 C03 -20°C(L) (J)	/	86
C42 KV3 C03 -20°C(L) (J)	/	86

C02 Direction: (T)-transversal; (L)-longitudinal; KV test pieces th.: 5.0

C70 Proces of steel production: LD-PROCES; Continuous casting; Controlled rolling mode.
D01 Inspection of surface appearance, shape and dimensions was conducted.
The results meet the requirements.

C71

CHEMICAL COMPOSITION, %

Min. / Max.	Heat No 38206	Min. / Max.	Heat No 38206
C	/	0,19	
Si	0,15/0,25	0,21	
Al	0,020/	0,036	
S	/	0,007	
Cu	/	0,016	
Mo	/	0,006	
Ni	/	0,010	
V	/	0,001	
Mn	/	1,00	
P	/	0,015	
N	/0,0100	0,0062	
Cr	/	0,018	
CEV	/	0,364	
Nb	/	0,002	
Ti	/	0,001	

THE MATERIAL IS IN COMPLIANCE WITH ORDER REQUIREMENTS. Z01

The measured weight-based activity of Co60 + Cs137 + Am241 radionuclide
is not higher than 100 Bq/kg. D02

216 Last Page: 1
F-USM/0063-04/10-01-12

Z04	Z05	Z02	Z03
 06 1015-CPR-E-30-20419-15 DoP USSK-06/2017 www.ussk.sk	Jozef Červenák j.cervenak@sk.uss.com Digitally signed by Jozef Červenák Date: 2020.07.31 10:24:00 CET Reason: zabezpečuje vierohodnosť pôvodu,	U. S. Steel Košice, s.r.o. Vstupný areál U. S. STEEL Odbor Analýzy kvality a špecifikácie Uvoľňovanie výrobkov a Hutné atesty 044 54 Košice	02
Košice: 10.03.2020, 7:32:16 JOZEF ČERVENÁK, AUTHORIZED INSPECTION REPRESENTATIVE. e-mail: j.cervenak@sk.uss.com, tel.: +421-55-6737464 DARINA BERNATOVÁ, AUTHORIZED INSPECTION REPRESENTATIVE. e-mail: d.bernatova@sk.uss.com, tel.: +421-55-6732373			

Z02

Tilaaja Purchaser
SSAB POLAND SP. Z O.O.
UL. KOLEJOWA 15
55-020 ZORAWINA POLAND

Tilaus no. Order No.
4501327042

Tilauksen vahvistus Order Confirmation
78916K

Vastaanottaja Consignee
SSAB POLAND SP. Z O.O.
UL. KOLEJOWA 15
55-020 ZORAWINA POLAND

Asiakkaan merkki Shipping mark

Päivämäärä Date
24.01.2022

Valmistajan merkki
Mark of the Manufacturer



Todistus Certificate
31

Laivaus Shipping
FERROMAR

Laatu- ja laatu-merkintä Quality Marking
STRENX 700 MC E

Tarkastajan leima
Stamp of Inspector
Vastaanottajan leima
Stamp of Surveyor
Muut leimaukset
Other Stamps

Mxx

Toimitustyyppi Delivery type
PART DELIVERY

Tuote Product
CUT LENGTHS

Laji Grade
STRENX 700 MC E

Laatu- ja laatu-merkintä Quality Specifications
HIGH STRENGTH FORMABLE STEEL MEETS REQ. OF EN10149-2 S700MC

Sulatus nro levy nro Cast No. Plate No.
X X X X X X X X X X X X X X X

Toleranssit Tolerances
SSAB TOLERANCE EN10051, THICKN. 1/2 CAT D

Tekniset vaatimukset ja/tai viralliset määräykset Technical terms of Delivery and/or Official Regulations

Positio Item	Mitat mm Dimensions mm	Merkki Mark	Kpl Pcs	Paino kg Weight kg	Sulatus levy nro Cast plate No	SP nro SP No	UT UT	MT MT	Turvamerkki Safety mark
HOT ROLLED STEEL IN BUNDLES CUT LENGTHS MILL EDGES									
OPTION 7 GALV.CAT.A: SI MAX 0.03, SI+2.5P <= 0.09%, IMPACT TEST -40C MIN 27J LONGIT.									
010	6.00 X 1500 X	6000 4501327042 A009.A01135 STD	60	25440	87572 021	021			
OPTION 7 GALV.CAT.A: SI MAX 0.03, SI+2.5P <= 0.09%, IMPACT TEST -40C MIN 27J LONGIT.									
020	8.00 X 1500 X	3000 4501327042 A009.A01138 ST	94	26602	87952 041	041			
OPTION 7 GALV.CAT.A: SI MAX 0.03, SI+2.5P <= 0.09%, IMPACT TEST -40C MIN 27J LONGIT.									
030	5.00 X 1500 X	3000 4501327042 A009.A01130 ST	80	14160	87569 041	041			
OPTION 7 GALV.CAT.A: SI MAX 0.03, SI+2.5P <= 0.09%, IMPACT TEST -40C MIN 27J LONGIT.									
040	10.00 X 1500 X	3000 4501327042 A009.A01796 ST	72	25416	87572 011	011			

*** 306 91618

Raabe Steel Works

Testaus ja tarkastus Testing and Inspection

Minna Valkama

MINNA VALKAMA

Vahvistettu tarkastaja Authorized inspection representative

Yhtiön nimi Company Name: SSAB Europe Oy
Kotipaikka Registered Office: HAMEENLINNA

Osoite Address: PL 93, P.O. Box 93
FIN-92101 RAAHE, FINLAND

Puhelin Telephone: 020 5911
+358 20 5911

Y-tunnus Business ID: 2389445-7

Täten todistamme, että toimitus on tilausvahvistuksen mukainen.
We hereby certify that the material described above has been tested and complies with the terms of the order confirmation.



AINESTODISTUS TEST REPORT

2/3
78916K-001
22.01.2022

EN 10 204-3.1 (2004)

Tilaaaja Purchaser
SSAB POLAND SP. Z O.O.
UL. KOLEJOWA 15
55-020 ZORAWINA POLAND
Tilauksen nro Order No.
4501327042

Vastaanottaja Consignee
SSAB POLAND SP. Z O.O.
UL. KOLEJOWA 15
55-020 ZORAWINA POLAND
Asiakkaan merkki Shipping mark



Valmistajan merkki
Mark of the Manufacturer

Laji Grade

STRENX 700 MC E

Laatuselvitys Quality Specifications

HIGH STRENGTH FORMABLE STEEL, MEETS REQ. OF EN10149-2 S700MC

Lisävaatimukset Additional requirements

Jatkuvavalettua happiterästä
Oxygen steel, continuous casting
Fully killed, Fine grain practiced

Pos. Item	Sulatus, k. erä nro Cast. test No	T-tila Cond	Veikokoe Tensile test			REL MPa	REH MPa	1	RM MPa		A %	RAZ %			Keskiarvo Average	Taivutuskoe Bend test		Huom Nb	Päästö Tempering °C
			K2	°C	RP02 MPa	RT05 MPa			2	3		50	80	200		K5	D = X 1		
010	87572	021	TM	32	749			833			20					32	2.0		
020	87952	041	TM	32	752			838			20					32	2.0		
030	87569	041	TM	32	770			838			20					32	2.0		
040	87572	011	TM	32	738			821			20					32	2.0		

K2: 32-CENTRE, LONGITUDINAL
K5: 32=120 MM WIDE BEND TEST

TM= THERMOMECH. TREATED

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)			Keskianvo Average			Erikoiskokeet Special tests			Huom Nb	Päästö Tempering °C
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		

FA = Silkeämurtuman osuus Shear fracture appearance
LE = Polkittainen laajenema Lateral Expansion

Pos. Item	Sulatus, k. erä nro Cast. test No	K3	°C	Isäkkö Impact test			FA %			W (mm)		
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ANALYYSITODISTUS ANALYSIS CERTIFICATE
ANALYSEBESCHEINIGUNG COMPOSITIO CHIMIQUE CERTIFICAT
СЕРТИФИКАТ АНАЛИЗА

3/3
78916K-001
22.01.2022

Sulatus nro Cast No No de coulée № Плавки	Koe nro Test No Schmelzen Nr Prüf Nr Essai No № Проб	Positio Item Pos. Poste Поз.	Cekv Ceq Cqg Ceqv	Analys % Chemical composition % Chemisch Zusammensetzung % Composition Chimique %	Анализ пробы % (*-ppm)											Päivämäärä Date Datum Date Дата		AMH	
					C	SI	MN	P	S	AL	NB	V	TI	CU	CR	NI	MO	B	
87572		010	.40	.055	.03	1.93	.014	.002	.039	.052	.051	.099	.019	0.05	0.03	.007	.0002		
87952		020	.41	.060	.03	1.94	.012	.001	.037	.052	.051	.097	.013	0.05	0.04	.004	.0003		
87569		030	.40	.055	.02	1.91	.014	.002	.040	.049	.052	.099	.014	0.05	0.03	.005	.0002		
87572		040	.40	.055	.03	1.93	.014	.002	.039	.052	.051	.099	.019	0.05	0.03	.007	.0002		

CEQ=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15

Raabe Steel Works

Testaus ja tarkastus
Prüfung und Kontrolle
Essais et Contrôle

Испытание и контроль качества

Minna Valkama

MINNA VALKAMA

Valtuutettu tarkastaja
Sachverständiger
Authorized inspection representative
Inspektor autorisé

Уполномоченный инспектор

Yhtiön nimi Company Name: SSAB Europa Oy
Kotipaikka Registered Office: HAMMENLINNA

Osoite Address: PL 93, P.O. Box 93
FIN-92101 RAABE, FINLAND

Puhelin Telephone: 020 5911
+358 20 5911

Y-tunnus Business ID: 2389445-7

Steel manufactured and supplied by Raabe Steel Works is free from radiation.
Производимая на металлургическом комбинате «Raabe Steel Works» и поставляемая
заказчику сталь не содержит радиации.

Inspection certificate EN 10 204 - 3.1		A02	Issuing department Quality inspection		A05	Purchaser order no 4501334061		A07	Our order no 291534-1		A08	Invoice no 3309853		A19	Certificate no and date 20269426 2022-03-11		SSAB EMEA AB, SE-781 84 BORLÅNGE, Sweden		A01		
Purchaser SSAB POLAND SP. Z O.O. KOLEJOWA 15 PL-55-020 ZORAWINA POLEN		A11 11084		Product Hot rolled sheets		B01		Marking Manufacturer, MATERIAL ID		B06		Customer marks		B15							
Quantity 13		B08		Dimensions [mm] T 8 W 1500 L 9630		B09-B11		Weight [kg] 11740		B12		Deliv. Cond.		B04		Internal code		B16			
Consignee SSAB POLAND SP. Z O.O. KOLEJOWA 15 PL-55-020 POLEN		A06 ZORAWINA		Standard/rules SSAB Steel grade STRENX 700 MC E		B02															
MATERIAL ID 53-3075-650007-02 , 53-3075-650007-04 , 53-3075-650007-05																				B07	
Chemical composition																					
Heat no 53-3075		C	Si	Mn	P	S	Cr	Ni	Mo	V	Ti	Cu	Al	Nb	B	N	CEV	C93-C99 Carbon equivalent etc CEV = C + Mn/6 + (Ni + Cu)/15 + (Cr + Mo + V)/5			
53-3075		.062	.02	1.83	.011	.002	.02	.03	.10	.01	.10	.01	.058	.063	.0001	.004	.40				
Testtype		C04	Millcode	C00	Specimen position	C01	Direction	C02	Treatment	B05	Specimen type	C10	Temp [degr C]	C03	Test results						
Tensile test		HHF427	Top end	Longitudinal	Delivery condition	Rectangular 380x40	-40	C11 *ReH [MPa] 738	C12 Rm [MPa] 827	C13 A5 [%] 22.0											
Impact test		HHF428	Top end	Longitudinal	Delivery condition	Charpy-V 10x7.5	-40	C42 E [J] 59	C43 Ave [J] 55												
Bend test		HHF429	Top end	Transverse	Delivery condition			C50 The test is satisfactory													
No yield point extension Ae detected. Measured value for *ReH/ReL replaced by *Rp02																					
Production time: 2022-03-11																					
Customer article no: A009.A01106																					
This certificate is produced with EDP and valid without signature		Z02		Z01		A22		A04													
Material Testing/ H Leu / M Modig Ernksson / V Esbelani / M Stolpe		Z02		Z01		A22		A04													

Inspection certificate EN 10 204 - 3.1		A02	Issuing department Quality inspection		A05	Purchaser order no 4501334061		A07	Our order no 291534-1		A08	Invoice no 3309853		A19	Certificate no and date 20269426 2022-03-11		SSAB EMEA AB, SE-781 84 BORLÄNGE, Sweden A01		
Purchaser SSAB POLAND SP. Z O.O. KOLEJOWA 15 PL-55-020 ZORAWINA POLEN		A11 11084		Product Hot rolled sheets		B01	Marking Manufacturer, MATERIAL ID		B06		Customer marks		B15						
Quantity 13		Dimensions [mm] T 8 W 1500 L 9630		B09-B11 Weight [kg] 11740		B12		Deliv. Cond.		B04		Internal code		B16					
Consignee SSAB POLAND SP. Z O.O. KOLEJOWA 15 PL-55-020 ZORAWINA POLEN		A06 ZORAWINA		Standard/rules SSAB Steel grade STRENGTH 700 MC E		B02													
MATERIAL ID 53-3075-650007-02 , 53-3075-650007-04 , 53-3075-650007-05																		B07	
Chemical composition																			
Heat no 53-3075		C	Si	Mn	P	S	Cr	Ni	Mo	V	Ti	Cu	Al	Nb	B	N	CEV	C93-C99 Carbon equivalent etc CEV = C + Mn/6 + (Ni + Cu)/15 + (Cr + Mo + V)/5	
.062 .02		.183	.011	.002	.02	.03	.10	.01	.10	.01	.058	.063	.0001	.004	.40				
Testtype		C04	Millcode	C00	Specimen position	C01	Direction	C02	Treat-ment	B05	Specimen type	C10	Temp [degr C]	C03	Test results				
Tensile test		HHF427		Top end		Longitudinal		Delivery condition		Rectangular 380x40		C11 *ReH [MPa] 738		C12 Rm [MPa] 827		C13 A5 [%] 22.0			
Impact test		HHF428		Top end		Longitudinal		Delivery condition		Charpy-V 10x7.5		C42 E [J] 59		C43 E [J] 55		C43 Ave [J] 55			
Bend test		HHF429		Top end		Transverse		Delivery condition				C50 The test is satisfactory							
No yield point extension Ae detected. Measured value for *ReH/ReL replaced by *Rp02																			
Production time: 2022-03-11																			
Customer article no: A009.A01106																			
This certificate is produced with EDP and valid without signature		Z02		Z01		A22		A04											
Material Testing/ H Leu / M Modig Eriksson / V Esbelani / M Stolpe		It is hereby certified that the material described above complies with the requirements of the order.		www.strenx.com															

Tilaaja Purchaser SSAB POLAND SP. Z O.O. UL. KOLEJOWA 15 55-020 ZORAWINA POLAND	Vastaanottaja Consignee SSAB POLAND SP. Z O.O. LUKOWSKA 7/9 64-600 OBORNKI POLAND	Päivämäärä Date 10.01.2022
Tilaus nro Order No. 4501320675	Tilausvahvistus Order Confirmation 78423K	Valmistajan merkki Mark of the Manufacturer
Todistus Certificate 31	Laivaus Shipping ELENA L	

Toimitustyyppi Delivery type PART DELIVERY	Laatumerkintä Quality Marking S355MC	Tarkastajan leima Stamp of Inspector
Tuote Product CUT LENGTHS	Sulatus nro levy nro Cast No. Plate No. X X X X X X X X X X X X	Vastaanottajan leima Stamp of Surveyor
Laji Grade S355MC EN 10149-2:2013	Toleranssit Tolerances EN 10051:2010	Muut leimaukset Other Stamps

Laatuselitys Quality Specifications
HIGH YIELD STRENGTH FORMABLE FINE-GRAIN STEEL

Positio Item	Mitat mm Dimensions mm	Merkki Mark	Kpl Pcs	Paino kg Weight kg	Sulatus levy nro Cast plate No	SP nro SP No	UT UT	MT MT	Turvamerkki Safetymark		
HOT ROLLED STEEL IN BUNDLES CUT LENGTHS MILL EDGES											
OPTION 7 CLASS A SI MAX 0.03%, SI+2.5P <= 0.09%.											
010	8.00 X 1300	X	5300	4501320675	A009.A07059	HIAB	23	9959	83814	040	040
OPTION 7 CLASS A SI MAX 0.03%, SI+2.5P <= 0.09%.											
020	8.00 X 1300	X	5600	4501320675	A009.A06685	HIAB	9	4113	83814	040	040
OPTION 7 CLASS A SI MAX 0.03%, SI+2.5P <= 0.09%.											
030	8.00 X 1300	X	6200	4501320675	A009.A06686	HIAB	47	23782	86309	031	031
030	8.00 X 1300	X	6200	4501320675	A009.A06686	HIAB	32	16192	86309	051	051
OPTION 7 CLASS A SI MAX 0.03%, SI+2.5P <= 0.09%.											
040	8.00 X 1300	X	6500	4501320675	A009.A06684	HIAB	17	9027	81732	010	010
040	8.00 X 1300	X	6500	4501320675	A009.A06684	HIAB	30	15930	84255	050	050

* 158 79003

Raahe Steel Works

Testaus ja tarkastus Testing and Inspection



MINNA VALKAMA

Valtuutettu tarkastaja Authorized inspection representative
Yhtiön nimi Company Name: SSAB Europe Oy
Kotipaikka Registered Office: HAMEENLINNAOsoite Address: PL 93, P.O. Box 93
FIN-92101 RAAHE, FINLANDPuhelin Telephone: 020 5911
+358 20 5911

Y-tunnus Business ID: 2389445-7

Täten todistamme, että toimitus on tilausvahvistuksen mukainen.
We hereby certify that the material described above has been tested and complies with the terms of the order confirmation.



VASTAANOTTOTODISTUS INSPECTION CERTIFICATE

EN 10 204-3.1 (2004)

2/6
78423K-001 A
07.01.2022

Tilaja Purchaser SSAB POLAND SP. Z O.O. UL. KOŁEJOWA 15 55-020 ZORAWINA POLAND	Tilauksen vahvistus Order Confirmation 78423K	Vastaanottaja Consignee SSAB POLAND SP. Z O.O. LUKOWSKA 7/9 64-600 OBORNIKI POLAND	Päivämäärä Date 10.01.2022
Tilauksen nro Order No. 4501320675	Tilauksen nro Order No. 4501320675	Asiakkaan merkki Shipping mark G.P. 3.11	Valmistajan merkki Mark of the Manufacturer
Todistus Certificate 31	Laivaus Shipping ELENA L	Laatumerkintä Quality Marking DOMEX 500MCD	Tarkastajan leima Stamp of Inspector



Mxx

Toimitustyyppi Delivery type PART DELIVERY	Sulatus nro levy nro Cast No. Plate No. XXXXX XXXX XXXX	Tarkastajan leima Stamp of Inspector
Tuote Product CUT LENGTHS	Toleranssit Tolerances SSAB TOLERANCE EN10051, THICKN. 2/3 CAT D	Vastaanottajan leima Stamp of Surveyor
Laji Grade SSAB DOMEX 500MC D		Muut leimaukset Other Stamps
Laatusekitys Quality Specifications HIGH STRENGTH FORMABLE STEEL, MEETS REQ. OF EN10149-2 S500MC		Tekniset vaatimukset ja/tai viralliset määräykset Technical terms of Delivery and/or Official Regulations

Posiio Item	Mitat mm Dimensions mm	Merkki Mark	Kpl Pcs	Paino kg Weight kg	Sulatus levy nro Cast plate No	SP nro SP No	UT UT	MT MT	Turvamerkki Safety mark
HOT ROLLED STEEL IN BUNDLES CUT LENGTHS MILL EDGES									
OPTION 7 GALV. CAT. A: SI MAX 0.03%, SI+2.5P <= 0.09%									
050	8.00 X 1500 X	5650	44	23408	86664	041	041		
050	8.00 X 1500 X	5650	48	25536	86666	021	021		
			*	92	48944				
			**	250	127947				
			***	250	127947				

Raahe Steel Works

Testaus ja tarkastus Testing and Inspection

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AINESTODISTUS TEST REPORT

3/6
78423K-001 A
07.01.2022

EN 10 204-3.1 (2004)

Tilaaja Purchaser SSAB POLAND SP. Z O.O. UL. KOLEJOWA 15 55-020 ZORAWINA POLAND Tilaus nro Order No. 4501320675	Tilauksen vahvistus Order Confirmation 78423K	Vastaanottaja Consignee SSAB POLAND SP. Z O.O. LUKOWSKA 7/9 64-600 OBORNIKI POLAND Asiakkaan merkki Shipping mark G.P. 3.11	Päivämäärä Date 10.01.2022
Laji Grade S355MC	Lisävaatimukset Additional requirements	Valmistajan merkki Mark of the Manufacturer	AMH
Laatusehtitys Quality Specifications		Jatkuvavalettua happiterästä Oxygen steel, continuous casting	
		Fully killed, Fine grain practiced	

Pos. Item	Sulatus, k. erä nro Cast. test No	T-tila Cond	Veikot Tensile test		REH MPa	REL MPa	RT05 MPa	RM MPa	A %	RE / RM	RM * A5	RAZ %	Keskiarvo Average	Taivutuskoe Bend test		Huom Nb	Päästö Tempering °C
			K2	°C										K5	D = X 1		
010	83814	040	TM	32	396			469	33					32	0.5		
020	83814	040	TM	32	396			469	33					32	0.5		
030	86309	031	TM	32	400			486	30					32	0.5		
030	86309	051	TM	32	395			479	30					32	0.5		
040	81732	010	TM	32	403			476	31					32	0.5		
040	84255	050	TM	32	401			473	32					32	0.5		
K2: 32-CENTRE LONGITUDINAL K5: 32=120 MM WIDE BEND TEST TM=THERMOMECH. TREATED																	

Raabe Steel Works

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Tilaaja Purchaser SSAB POLAND SP. Z O.O. UL. KOLEJOWA 15 55-020 ZORAWINA POLAND Tilaus nro Order No. 4501320675	Tilausvahvistus Order Confirmation 78423K	Vastaaottaja Consignee SSAB POLAND SP. Z O.O. LUKOWSKA 7/9 64-600 OBORNKI POLAND Asiakkaan merkki Shipping mark G.P. 3.11	Päivämäärä Date 10.01.2022 Valmistajan merkki Mark of the Manufacturer
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Laji Grade SSAB DOMEX 500MC D	Lisävaatimukset Additional requirements	Jatkuvavalettua happiterästä Oxygen steel, continuous casting Fully killed, Fine grain practiced
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HIGH STRENGTH FORMABLE STEEL, MEETS REQ. OF EN10149-2 S500MC

Pos. Item	Sulatus, k. erä nro Cast. test No		T-tila Cond		Vetokoe Tensile test		K2 °C		K3 °C		Isukoe Impact test		K2 °C		K3 °C		Taitutuskoe Bend test		Huom Nb		Päästö Tempering °C	
	K1		K1		K1		K1		K1		K1		K1		K1		K1		K1		K1	
050 86664 041 TM 32	529		515		604		584		25		27		32		32		1.0		1.0		1.0	
050 86666 021 TM 32	515		515		584		515		27		27		32		32		1.0		1.0		1.0	

TM=THERMOMECH. TREATED

Pos. Item	Sulatus, k. erä nro Cast. test No		T-tila Cond		Vetokoe Tensile test		K2 °C		K3 °C		Isukoe Impact test		K2 °C		K3 °C		Taitutuskoe Bend test		Huom Nb		Päästö Tempering °C	
	K1		K1		K1		K1		K1		K1		K1		K1		K1		K1		K1	
050 86664 041 133 -020 83 85 84	529		515		604		584		25		27		32		32		1.0		1.0		1.0	
050 86666 021 133 -020 96 93 109 99	515		515		584		515		27		27		32		32		1.0		1.0		1.0	

K3: 133=CH-VISO-V(J), 5X10, CENTRE, LONGIT. KV800

Raabe Steel Works

Testaus ja tarkastus Testing and Inspection

Minna Valkama

MINNA VALKAMA

Valtuutettu tarkastaja Authorized inspection representative

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Kotipaikka Registered Office: HAMEENLINNAOsoite Address: PL 93, P.O. Box 93
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ANALYYSITODISTUS ANALYSIS CERTIFICATE
ANALYSEBESCHEINIGUNG COMPOSITIO CHIMIQUE CERTIFICAT
СЕРТИФИКАТ АНАЛИЗА

5/6
78423K-001 A
07.01.2022

Päivämäärä Date Datum Date Дата
10.01.2022

AMH

Sulatus nro Cast No Schmelzen Nr. No de coulee № Печи				Koe nro Test No Prüf Nr. Essai No № Проб	Positio Item Pos. Poste №	Cekv Ceq Ceq Ceq Ceq	Analysti % Chemical composition % Chemisch Zusammensetzung % Composition Chimique % Анализ пробы %														(*-ppm)		Päivämäärä Date Datum Date Дата 10.01.2022		AMH	
							C	SI	MN	P	S	AL	NB	V	TI	CU	CR	NI	MO	N	B					
83814							010	.19	.056	.01	0.70	.009	.004	.036	.029	.006	.000	.011	0.04	0.03	.003	.003	.0002			
83814							020	.19	.056	.01	0.70	.009	.004	.036	.029	.006	.000	.011	0.04	0.03	.003	.003	.0002			
86309							030	.19	.061	.01	0.69	.011	.004	.028	.027	.006	.000	.011	0.05	0.03	.003	.005	.0001			
81732							040	.19	.058	.02	0.69	.008	.005	.035	.027	.005	.001	.014	0.04	0.03	.002	.004	.0000			
84255							040	.19	.058	.01	0.70	.008	.005	.034	.026	.008	.000	.014	0.04	0.04	.004	.004	.0000			

CEQ=C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15

Raah Steel Works

Testaus ja tarkastus
Prüfung und Kontrolle
Essais et Contrôle

Испытание и контроль качества

Minna Valkama

MINNA VALKAMA

Valtuutettu tarkastaja
Sachverständiger
Authorized inspection representative
Urkundenerannter Inspektor

Yhtiön nimi Company Name:
Kotipaikka Registered Office:

Osote Address:
FIN-92101 RAAHE, FINLAND

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020 5911
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Y-tunnus Business ID:
2389445-7

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Solutus nro	Koe No Tutkimus N:o	Pos. Paik.	Cekv Cäqk	Analysti % Kemialinen %	Chemical composition % Kemialisch Zusammensetzung %	Avaruus maasiki % Composition Chimique %	Päivämäärä Date Datum Date						
Schmelzen Nr.	Prüf Nr.	Poste	Cég	C	SI	MN	P	S	AL	NB	V	TI	AMH
No de coulées	Essai No	№ Пробы	Цекв										10.01.2022
86664	050	.29	.055	.02	1.22	.012	.003	.060	.046	.082	.017		
86666	050	.28	.052	.02	1.21	.012	.002	.059	.043	.079	.016		

$$CEQ = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15$$

Raahe Steel Works

Testaus ja tarkastus Prüfung und Kontrolle	Testing and Inspection Essais et Contrôle	Испытание и контроль качества
---	--	-------------------------------

Steel manufactured and supplied by Raabe Steel Works is free from radiation.
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MINNA VALKAMA

MINNA VALKANIA
Valtuutettu tarkastaja
Authorized inspection representative
Inspector authorised
Уполномоченный инспектор

Yhtiön nimi Company Name: SSAB Europe Oy
 Kotipaikka Registered Office: HAMEENLINNA

Osloite Address: PL 93, P.O Box 93
FIN-92101 RAAHE, FINLAND

Puhelin Telephone: 020 5911
+358 20 5911

Y-tunnus Business ID: 2389445-7

Inspection certificate EN 10 204 - 3.1	A02	Issuing department Quality inspection	A05	Purchaser order no 4501334061	A07	Our order no 291534-1	A08	Invoice no 3309853	A19	Certificate no and date 20269426 2022-03-11	A03
SSAB EMEA AB, SE-781 84 BORLÄNGE, Sweden A01											

Purchaser SSAB POLAND SP. Z O.O. KOLEJOWA 15 PL-55-020 ZORAWINA POLEN	A11 11084		Product Hot rolled sheets				B01	Marking Manufacturer, MATERIAL ID		B06	Customer marks		B15
	Quantity 13	B08	Dimensions [mm] T 8 W 1500 L 9630		B09-B11	Weight [kg] 11740		B12	Deliv. Cond.	B04	Internal code		B16
	Consignee SSAB POLAND SP. Z O.O. KOLEJOWA 15 PL-55-020 ZORAWINA POLEN			A06 ZORAWINA		Standard/rules SSAB Steel grade STRENX 700 MC E						B02	

MATERIAL ID
53-3075-650007-02 , 53-3075-650007-04 , 53-3075-650007-05

Chemical composition																	C71-C92					Carbon equivalent etc	C93-C99
Heat no	C	Si	Mn	P	S	Cr	Ni	Mo	V	Ti	Cu	Al	Nb	B	N	CEV							
53-3075	.062	.02	1.83	.011	.002	.02	.03	.10	.01	.10	.01	.058	.063	.0001	.004	.40	CEV = C + Mn/6 + (Ni + Cu)/15 + (Cr + Mo + V)/5						

Testtype	C04	C00 Millicode	C01 Specimen position	C02 Direc- tion	C05 Treat- ment	C10 Specimen type	C03 Temp [degr C]	Test results
Tensile test		HHF-427	Top end	Longitudinal	Delivery condition	Rectangular 380x40		C11 *Reh [MPa] 738 C12 Rm [MPa] 827 C13 A5 [%] 22.0
Impact test		HHF-428	Top end	Longitudinal	Delivery condition	Charpy-V 10x7.5	-40	C42 E [J] 59 C43 E [J] 55 C42 E [J] 55 C43 Ave [J] 55
Bend test		HHF-429	Top end	Transverse	Delivery condition			C50 The test is satisfactory

No yield point extension Ae detected. Measured value for *ReH/ReL replaced by *Rp02

Production time: 2022-03-11

Customer article no: A009.A01106

Z02	This certificate is produced with EDP and valid without signature Material Testing/ H Leu / M Modig Eriksson / V Esbelani / M Stolpe	Z01	It is hereby certified that the material described above complies with the requirements of the order.	A22	A04 STRENX™ PERFORMANCE STEEL www.strenx.com
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Inspection certificate EN 10 204 - 3.1		A02	Issuing department Quality inspection		A05	Purchaser order no 4501298127		A07	SSAB EMEA AB, SE-781 84 BORLÄNGE, Sweden A01								
Purchaser SSAB POLAND SP. Z O.O. KOLEJOWA 15 PL-55-020 ZORAWINA POLEN		A11 11084		Product Hot rolled sheets		B01	Marking Manufacturer, MATERIAL ID		B06		Customer marks		B15				
Quantity 40		B08	Dimensions [mm] T 4 W 1500 L 6000		B09-B11	Weight [kg] 11440		B12	Deliv. Cond.		B04	Internal code		B16			
Consignee SSAB POLAND SP. Z O.O. KOLEJOWA 15 PL-55-020 ZORAWINA POLEN		A06		Standard/rules SSAB Steel grade STRENGTH 700 MC E*)		B02											
MATERIAL ID 53-0835-617189-05 , 53-0835-617189-06 , 53-0835-617189-07 , 53-0835-617189-08																	
Chemical composition																	
Heat no 53-0835	C	Si	Mn	P	S	Cr	Ni	Mo	V	Ti	Cu	Al	Nb	B	N	CEV	C93-C99
	.059	.02	1.84	.009	.002	.03	.04	.01	.01	.11	.01	.050	.061	.0001	.005	.38	Carbon equivalent etc CEV = C + Mn/6 + (Ni + Cu)/15 + (Cr + Mo + V)/5
Test type	C04	Millcode	C00	Specimen position	C01	Direction	C02	Treatment	B05	Specimen type	C10	Temp [deg C]	C03	Test results			
Tensile test		GZA878		Top end		Longitudinal		Delivery condition		Rectangular 380x40				C11	C12	C13	
														*ReH [MPa] 753	Rm [MPa] 829	A5 [%] 20.0	
Bend test		GZA879		Top end		Transverse		Delivery condition						C50	The test is satisfactory		
*) S700MC EN 10149-2.																	
No yield point extension Ae detected. Measured value for *ReH/ReL replaced by *Rp02																	
Production time: 2021-11-05																	
Customer article no: A009.A01133																	

This certificate is produced with EDP and valid without signature		Z02	Z01		A22	A04
Material Testing/ H Leu / M Modig Eriksson / V Esbelani / M Stolpe		It is hereby certified that the material described above complies with the requirements of the order.		STRENGTH PERFORMANCE STEEL www.strenx.com		

Inspection certificate EN 10 204 - 3.1		A02	Issuing department Quality inspection		A05	Purchaser order no 4501298127		A07	Our order no 277541-3		A08	Invoice no 3278845		A19	Certificate no and date 19956260 2021-11-05		SSAB EMEA AB, SE-781 84 BORLÅNGE, Sweden		A01														
Purchaser SSAB POLAND SP. Z O.O. KOLEJOWA 15 PL-55-020 ZORAWINA POLEN		A11 11084		Product Hot rolled sheets		B01		Marking Manufacturer, MATERIAL ID		B06		Customer marks		B15																			
Quantity 40		B08		Dimensions [mm] T 4 W 1500 L 6000		B09-B11		Weight [kg] 11440		B12		Deliv. Cond.		B04		Internal code		B16															
Consignee SSAB POLAND SP. Z O.O. KOLEJOWA 15 PL-55-020 ZORAWINA POLEN		A05		Standard/rules SSAB Steel grade STRENGTH 700 MC E*)		B02																											
MATERIAL ID 53-0835-617189-05 , 53-0835-617189-06 , 53-0835-617189-07 , 53-0835-617189-08		B07																															
Chemical composition		C71-C92		Carbon equivalent etc CEV = C + Mn/6 + (Ni + Cu)/15 + (Cr + Mo + V)/5		C93-C99																											
Heat no 53-0835		C		Si		Mn		P		S		Cr		Ni		Mo		V		Ti		Cu		Al		Nb		B		N		CEV	
53-0835		.059		.02		1.84		.009		.002		.03		.04		.01		.01		.11		.01		.050		.061		.0001		.005		.38	
Testtype		C04		Millcode		C00		Specimen position		C01		Direc- tion		C02		Treat- ment		B05		Specimen type		C10		Temp [degr C]		C03		Test results					
Tensile test		GZA878		Top end		Longitudinal		Delivery condition		Rectangular 380x40		C11		C12		C13		A5 [%]		20.0													
Bend test		GZA879		Top end		Transverse		Delivery condition		The test is satisfactory																							

*) S700MC EN 10149-2.

No yield point extension Ae detected. Measured value for *ReH/Rel replaced by *Rp02

Production time: 2021-11-05

Customer article no: A009.A01133

This certificate is produced with EDP and valid without signature		Z02	Z01		A22		A04	
Material Testing/ H Leu / M Modig Eriksson / V Esbelani / M Stolpe		It is hereby certified that the material described above complies with the requirements of the order.		www.strenx.com				

Inspection certificate EN 10 204 - 3.1										A02		Issuing department Quality inspection		A05		Purchaser order no 4501294202		A07		Our order no 275828-2		A08		Invoice no 3269405		A19		Certificate no and date 19868284 2021-09-30		A03																			
Purchaser SSAB POLAND SP. Z O.O. KOLEJOWA 15 PL-55-020 ZORAWINA POLEN										A11 11084		Product Hot rolled coils		B01		Marking Manufacturer, MATERIAL ID		B06		Customer marks		B15																											
Quantity		B08		Dimensions [mm]		B09-B11		Weight [kg]		B12		Deliv. Cond.		B04		Internal code		B16																															
1				T 4 W 1500 L 0				23080																																									
Consignee		SSAB POLAND SP. Z O.O. KOLEJOWA 15 PL-55-020 ZORAWINA		A06		Standard/rules		EN 10149-2:2013		Steel grade		S355MC		EN 10149-2		B02																																	
MATERIAL ID 24-4280-603280A										B07																																							
Chemical composition										C71-C92										Carbon equivalent etc CEV = C + Mn/6 + (Ni + Cu)/15 + (Cr + Mo + V)/5																													
Heat no 24-4280		C		Si		Mn		P		S		Cr		Ni		Mo		V		Ti		Cu		Al		Nb		B		N		CEV																	
		.062		.01		.59		.009		.003		.03		.04		.00		.00		.00		.01		.042		.025		.0001		.002		.17																	
Test type		C04		Mtl code		C00		Specimen position		C01		Direction		C02		Treatment		B05		Specimen type		C10		Temp [deg C]		C03		Test results																					
Tensile test		GWP938		Top end						Longitudinal		Delivery condition		Rectangular 380x40		C11		Reh [MPa]		402		C12		Rm [MPa]		469		C13		A5 [%]		37.0																	
Bend test		GWP939		Top end		Transverse		Delivery condition																																									
Production time: 2021-09-30																																																	
Customer article no: A001.A17931																																																	
This certificate is produced with EDP and valid without signature										Z02										Z01										A22										A04									
Material Testing/ H Leu / M Modig Eriksson / V Esbelani / M Stolpe																																																	

Inspection certificate EN 10 204 - 3.1		A02		Issuing department Quality inspection		A05		Purchaser order no 4501305218		A07		Our order no 280217-1		A08		Invoice no 3284335		A19		Certificate no and date 20006763 2021-11-25		A03															
SSAB EMEA AB, SE-781 84 BORLÄNGE, Sweden A01																																					
Purchaser SSAB POLAND SP. Z O.O. KOLEJOWA 15 PL-55-020 ZORAWINA POLEN		A11 11084		Product Hot rolled sheets		B01		Marking Manufacturer, MATERIAL ID		B06		Customer marks		B15																							
Quantity B08 26		Dimensions [mm] T 4 W 1250 L 9200		B09-B11 Weight [kg] 9510		B12		Deliv. Cond. B04		Internal code		B16																									
Consignee SSAB POLAND SP. Z O.O. KOLEJOWA 15 PL-55-020 ZORAWINA POLEN		A06 ZORAWINA		Standard/rules SSAB Steel grade STRENX 700 MC E		B02																															
MATERIAL ID 24-5746-622819-01 , 24-5746-622819-02																																					
Chemical composition																																					
Heat no 24-5746		C		Si		Mn		P		S		Cr		Ni		Mo		V		Ti		Cu		Al		Nb		B		N		CEV		C93-C99 Carbon equivalent etc CEV = C + Mn/6 + (Ni + Cu)/15 + (Cr + Mo + V)/5			
C04		C00		C01		C02		C03		C10		C05		C06		C07		C08		C09		C11		C12		C13		C14		C15		C16		C17			
Testtype		Millcode		Specimen position		Direction		Treatment		Specimen type		Temp [deg C]		Test results		Reh [MPa]		Rm [MPa]		A5 [%]		22.0		746		797		22.0		746		797		22.0			
Tensile test		HAT758		Top end		Longitudinal		Delivery condition		Rectangular 380x40		C50		The test is satisfactory		C11		C12		C13		A5 [%]		22.0		746		797		22.0		746		797		22.0	
Bend test		HAT759		Top end		Transverse		Delivery condition		Rectangular 380x40		C50		The test is satisfactory		C11		C12		C13		A5 [%]		22.0		746		797		22.0		746		797		22.0	
Production time: 2021-11-25																																					
Customer article no: A009.A02669																																					
This certificate is produced with EDP and valid without signature		Z02		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01	
Material Testing/ H Leu / M Modig Eriksson / V Esbelani / M Stölpe		Z02		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01		Z01	
A04 STRENX PERFORMANCE STEEL www.strenx.com																																					



www.wdi.de

Deutsche Bank AG

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Aufsichtsratsvorsitzender: Werner Rampus
Geschäftsführer: Katja Rampus (Vorsitzende), Klaus Lehmann
Wulf-Hendrik Husterius

Gerichtsstand:

Amtsgericht Hamm HRB 241
Steuer-Nr.: 322 / 5776 / 1587
USt.-Id.-Nr.: DE 811 122 857

WESTFÄLISCHE DRAHTINDUSTRIE GMBH Werk Hamm

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Abholzeiten: Mo.-Fr. 8.00-20.00 Uhr

Hegpont Kft.

Grassalkovich ut. 255

H 1239 Budapest

Ihre Bestellung vom : 18.06.2014 Per Mail!

Lieferadresse : Hegpont Kft.
Grassalkovich ut. 255
H 1239 Budapest

ABNAHMEPRÜFZEUGNIS nach EN 10204/3.1

Datum : 25.07.2014
Kunden-Nr. 1320160
Abnahmebeauftragter Loecke
Telefon: 02381-276472

Auftrags-Nr. : 187963 Pos. : 8,0 LS-Nr.: 757350 L-Menge : 2.250 kg

Artikel : 107972 SG-Draht VDG MoNi
verkupfert 01,20 mm
Korbspule 15 kg lage-präzis
Dressur: MIN. 2000 mm

Chemische Analyse in %

Charge: 834901 conform: A1026

C	Si	Mn	P	S	Cr	Ni	Mo	Cu-Steel	Al
,09	,78	1,76	,006	,007	,15	1,17	,359	,02	,001

As	Ti	Sn	V	N
,004	,008	,001	,001	,0040

Drahtelektrode: EN ISO 16834 – A G 69 4 M Mn3Ni1Mo / AWS A 5.28 ER100 S-G

Mechanisch-technologische Werte einer typischen Charge nach EN ISO 16834

Festigkeit(MPa) 770
Streckgrenze(MPa) 690
Bruchdehnung(%) 17
Kerbschlagarbeit(J) 47
bei -40 °C

Westfälische Drahtindustrie GmbH
Schweißtechnik
Qualitätswesen

Abnahmebeauftragter

Dieses Dokument wurde durch ein DV-System erstellt und ist gemäß DIN EN 10204, Abschn. 5 ohne Unterschrift gültig.

A2020/0733

A02

160-151

U.S. Steel Košice, s.r.o. A01 Vstupný areál U.S. Steel 044 54 Košice SLOVAK REPUBLIC	Purchaser Art. No: 7H7SLBM0/04 Works Order No: XC021836 Advice No: 20/315495 01 Your order: SR-2020/211	A09 A08 A10 A07	SALZGITTER MANNESMANN ACELKERESKEDELM KFT. Horváth utca 14-24 HU-1027 BUDAPEST Hungary	A06
METALLURGICAL CERTIFICATE NO: 20/315495 01		A03	B09	
Desc. of goods: HOT ROLLED SHEETS		B01	Size: 6,000 x 1500,0 x 6000,0 mm EN 10051/10	
Standard: EN 10025-2/04	B02	B03	Pcs: 18 B08	
Quality: S355J2C+N	B02	Delivery Note: 30254203	A10	Net Weight: 7 560 kg B13 WeightT: 7 629 kg B12

Unit No	Coil No	Heat	B07	Unit No	Coil No	Heat	B07
382060701	3820607	38206		382060703	3820607	38206	
382060702	3820607	38206					

MECHANICAL TEST RESULTS

			Coil No 3820607
	Min. / Max.		
C12 Rm C03 +20°C(T)	(MPa)	470/630	570
C11 ReH C03 +20°C(T)	(MPa)	355/	446
C13 A5 C03 +20°C(T)	(%)	20,0/	27,0
C43 KV C03 -20°C avr. (L)	(J)	13/	85
C42 KV1 C03 -20°C(L)	(J)	/	83
C42 KV2 C03 -20°C(L)	(J)	/	86
C42 KV3 C03 -20°C(L)	(J)	/	86

C02 Direction: (T)-transversal; (L)-longitudinal; KV test pieces th.: 5.0

C70 Proces of steel production: LD-PROCES; Continuous casting; Controlled rolling mode.

D01 Inspection of surface appearance, shape and dimensions was conducted.
The results meet the requirements.

C71

CHEMICAL COMPOSITION, %

		Heat No			Heat No
Min. / Max.		38206	Min. / Max.		38206
C	/	0,19	Mn	/	1,00
Si	0,15/0,25	0,21	P	/	0,015
Al	0,020/	0,036	N	/0,0100	0,0062
S	/	0,007	Cr	/	0,018
Cu	/	0,016	CEV	/	0,364
Mo	/	0,006	Nb	/	0,002
Ni	/	0,010	Ti	/	0,001
V	/	0,001			

THE MATERIAL IS IN COMPLIANCE WITH ORDER REQUIREMENTS.

Z01

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The measured weight-based activity of Co60 + Cs137 + Am241 radionuclide is not higher than 100 Bq/kg.

D02

F-USM/0063-04/10-01-12

 06 1015-CPR-E-30-20419-15 DoP USSK-06/2017 www.ussk.sk	Z04	Z05	Z02 Jozef Červenák j.cervenak@sk.uss.com Digitally signed by Jozef Červenák Date: 2020.07.31 10:24:00 CET Reason: zabezpečuje vierohodnosť pôvodu,	Z03 U. S. Steel Košice, s.r.o. Vstupný areál U. S. STEEL Odbor Analýzy kvality a špecifikácie Uvoľňovanie výrobkov a Hutné atesty 044 54 Košice
--	-----	-----	---	--

Košice: 10.03.2020, 7:32:16
 JOZEF ČERVENÁK, AUTHORIZED INSPECTION REPRESENTATIVE. e-mail: j.cervenak@sk.uss.com, tel.: +421-55-6737464
 DARINA BERNÁTOVÁ, AUTHORIZED INSPECTION REPRESENTATIVE. e-mail: d.bernatovala@sk.uss.com, tel.: +421-55-6732373

U.S. Steel Košice, s.r.o. A01 Vstupný areál U.S. Steel 044 54 Košice SLOVAK REPUBLIC	Purchaser Art. No: 7H7SLEB0/04 A09 Works Order No: XC021836 A08 Advice No: 20/315495 01 A10 Your order: SR-2020/211 A07	SALZGITTER MANNESMANN A06 ACELKERESKEDELMI KFT. Horváth utca 14-24 HU-1027 BUDAPEST Hungary
METALLURGICAL CERTIFICATE NO: 20/315495 01 A03		B09
Desc. of goods: HOT ROLLED SHEETS B01		Size: 6,000 x 1500,0 x 6000,0 mm EN 10051/10
Standard: EN 10025-2/04 B02	B03	Pcs: 18 B08
Quality: S355J2C+N B02	Delivery Note: 30254203 A10	Net Weight: 7 560 kg B13 WeightT: 7 629 kg B12

Unit No	Coil No	Heat	B07	Unit No	Coil No	Heat	B07
382060701	3820607	38206		382060703	3820607	38206	
382060702	3820607	38206					

MECHANICAL TEST RESULTS

		Coil No 3820607	
		Min. / Max.	
C12 Rm	C03 +20°C(T) (MPA)	470/630	570
C11 ReH	C03 +20°C(T) (MPA)	355/	446
C13 A5	C03 +20°C(T) (%)	20,0/	27,0
C43 KV	C03 -20°C avr. (L) (J)	13/	85
C42 KV1	C03 -20°C(L) (J)	/	83
C42 KV2	C03 -20°C(L) (J)	/	86
C42 KV3	C03 -20°C(L) (J)	/	86

C02 Direction: (T)-transversal; (L)-longitudinal; KV test pieces th.: 5.0

C70 Proces of steel production: LD-PROCES; Continuous casting; Controlled rolling mode.

D01 Inspection of surface appearance, shape and dimensions was conducted.
The results meet the requirements.

C71

CHEMICAL COMPOSITION, %

		Heat No 38206	
		Min. / Max.	
C	/	0,19	
Si	0,15/0,25	0,21	
Al	0,020/	0,036	
S	/	0,007	
Cu	/	0,016	
Mo	/	0,006	
Ni	/	0,010	
V	/	0,001	

		Heat No 38206	
		Min. / Max.	
Mn	/	1,00	
P	/	0,015	
N	/0,0100	0,0062	
Cr	/	0,018	
CEV	/	0,364	
Nb	/	0,002	
Ti	/	0,001	

THE MATERIAL IS IN COMPLIANCE WITH ORDER REQUIREMENTS. Z01

The measured weight-based activity of Co60 + Cs137 + Am241 radionuclide is not higher than 100 Bq/kg. D02

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F-USM/0063-04/10-01-12

 06 1015-CPR-E-30-20419-15 DoP USSK-06/2017 www.usske.sk		Jozef Červenák jozef.cervanak@ussk.us.com Digitally signed by Jozef Červenák Date: 2020.03.10 10:24:11 CET Reason: zabezpečuje vierohodnosť pôvodu,	U. S. Steel Košice, s.r.o. 02 Vstupný areál U. S. STEEL Oddor Analýzy kvality a špecifikácie Uvoľňovanie výrobkov a Hutné atesty 044 54 Košice
Košice: 10.03.2020, 7:32:16 JOZEF ČERVENÁK, AUTHORIZED INSPECTION REPRESENTATIVE. e-mail: jczervanak@sk.uss.com, tel.: +421-55-6737464 DARINA BERNÁTOVÁ, AUTHORIZED INSPECTION REPRESENTATIVE. e-mail: dbernatovala@sk.uss.com, tel.: +421-55-6732373			