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	ANIELI ÅRDSHAMMAR	JOB N° DPC68X0		Doc.: 000-00 Rev: 00 Page: 1/91	0-375-615
		Customer: BARRAMA	NSA		
	R	ROLLING MILL CA	LCULATIO	NS	
		FOR FLA	ATS		
Remark	s:				
- F	For rolling sequence	s see drawing 000-000-36	1-340		
- (Calculations conside	r an average temperature	of 1050°C at fir	st stand entry	
00	07-04-2023	ISSUED	Trevisan M.	Paron L.	
Rev.	Date	Description	Compiled	Checked	Approved



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		Flats from billet 150mm.	
		or utilization diagrams	

Remark:

- R-factor = elongation



1 Gear ratios and motors summarizing table

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT. SPEED CALCULATION FOR HOT ROLLING MILL

07/04/23

JOB NO.: DPC68X01 LAYOUT NO.: 000-000-361-340

STAND	STAND	GEAR	RATIO		M (O T O R	
NO.	TYPE			TYPE	POWER	RPM	
		1^	2^		(kW)	(RPM)	
1H	GCC7555	118.730		AC	450	0 /1000 /2000	
2V	GCC7555	85.673		AC	450	0 /1000 /2000	
3H	GCC7555	118.730		AC	450	0 /1000 /2000	
4H/V	GCC6548	74.409		AC	450	0 /1000 /2000	
5H	GUC8548	87.594		AC	800	0 /1000 /2000	
6H/V	GCC6548	68.825		AC	450	0 /1000 /2000	
7 H	GUC8548	55.247	73.990	AC	800	0 /1000 /2000	
8H/V	GUC8548	43.393	58.768	AC	800	0 /1000 /2000	
9H	GUC8548	37.442	49.768	AC	800	0 /1000 /2000	
10H/V	GUC8548	27.471	37.083	AC	800	0 /1000 /2000	
11H	GCC6548	17.428	26.576	AC	800	0 /1000 /2000	
12H/V	GUC8548	13.852	27.600	AC	800	0 /1000 /2000	
13H	GUC8548	11.734	22.354	AC	800	0 /1000 /2000	
14H/V	GCC6548	9.471	18.603	AC	800	0 /1000 /2000	
15H	GUC8548	9.841	19.250	AC	800	0 /1000 /2000	

^{***}Subject to the confidentiality clause ***



2 Roll pass design calculations

2.1 Flats from billet 180mm

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT. SPEED CALCULATION FOR HOT ROLLING MILL

07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x1/4" Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 4.96 III/5 : 3272.11 mm²m/s AXV BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET 15.0 sPRODUCTION : 80.0 t/h

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT		K WIDTH	AREA	REDUC TION
	(mm)	(mm)		(mm)	(mm)		(mm)	(mm²)	(%)
+			SQUARE		182.30	х	182.30	33147.4	
1H	750.0	20.00	BOX		124.00	Χ	206.79	24635.6	25.7
2V	750.0	18.00	BOX		136.50	Χ	144.56	18539.6	24.7
ЗН	750.0	17.00	R.BOX		93.00	Χ	162.38	13163.3	29.0
4 V	660.0	15.00	ROUND		111.00	Χ	110.68	9671.8	26.5
5H	660.0	12.00	R.OVAL		67.60	Χ	132.54	6962.7	28.0
6V	660.0	12.00	ROUND		82.00	Χ	82.39	5292.0	24.0
7 H	660.0	40.00	FLAT		40.00	Χ	106.11	4038.8	23.7
8V	660.0	8.00	EDGING		78.00	Χ	43.52	3366.0	16.7
9Н	660.0	24.50	FLAT		24.50	Χ	95.19	2326.4	30.9
10H	660.0	15.50	FLAT		15.50	Χ	107.44	1659.1	28.7
11H	590.0	10.60	FLAT		10.60	Χ	115.38	1216.9	26.7
12V	590.0	20.00	EDGING		100.00	Χ	11.17	1112.3	8.6
13H	590.0	7.90	FLAT		7.90	Χ	105.56	831.2	25.3
14V	590.0	35.50	EDGING		100.50	Χ	8.01	802.3	3.5
15H	590.0	6.43	FLAT		6.43	Χ	102.90	660.2	17.7

^{***} Subject to the confidentiality clause *** M

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DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT. SPEED CALCULATION FOR HOT ROLLING MILL

07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 4"x1/4" SECTION ROLLED MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 4.96 m/s AXV $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR		L L I N TORQUE		UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
,	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
3H	0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
4 V	0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
5H	0.47	619.5	14.5	87.594	1269	1.389	40.5	1654.8	168.36	255	31.9
6V	0.62	607.8	19.4	68.825	1337	1.316	52.2	1042.5	118.19	240	53.4
7H	0.81	660.0	23.4	55.247	1295	1.310	0.0	1376.9	142.92	351	43.9
8V	0.97	590.7	31.4	43.393	1364	1.200	69.3	419.7	35.35	116	14.5
9Н	1.41	660.0	40.7	37.442	1524	1.447	0.0	1426.3	108.91	464	58.0
10H	1.97	660.0	57.1	27.471	1568	1.402	0.0	1398.2	73.69	440	55.1
11H	2.69	590.0	87.0	17.428	1517	1.363	0.0	1293.0	47.48	433	54.1
12V	2.94	510.4	110.1	13.852	1525	1.094	79.6	89.0	5.80	67	8.4
13H	3.94	590.0	127.4	11.734	1495	1.338	0.0	1175.0	34.97	467	58.3
14V	4.08	525.4	148.3	9.471	1404	1.036	64.6	35.6	1.42	22	2.8
15H	4.96	590.0	160.4	9.841	1579	1.215	0.0	848.6	17.70	297	37.2

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 4"x5/16" SECTION ROLLED Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 3.96 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT		K WIDTH	AREA	REDUC TION
,	(mm)	(mm)		(mm)	(mm)		(mm)	(mm²)	 (%) +
+			SQUARE		182.30	Х	182.30	33147.4	
1H	750.0	20.00	BOX		124.00	Χ	206.79	24635.6	25.7
2V	750.0	18.00	BOX		136.50	Χ	144.56	18539.6	24.7
3Н	750.0	17.00	R.BOX		93.00	Χ	162.38	13163.3	29.0
4V	660.0	15.00	ROUND		111.00	Χ	110.68	9671.8	26.5
5H	660.0	12.00	R.OVAL		67.60	Χ	132.54	6962.7	28.0
6V	660.0	12.00	ROUND		82.00	Χ	82.39	5292.0	24.0
7 H	660.0	40.00	FLAT		40.00	Χ	106.11	4038.8	23.7
8V	660.0	8.00	EDGING		78.00	Χ	43.52	3366.0	16.7
9Н	660.0	24.50	FLAT		24.50	Χ	95.19	2326.4	30.9
10H	660.0	15.80	FLAT		15.80	Х	106.89	1683.4	27.6
11H	590.0	11.20	FLAT		11.20	Χ	114.04	1272.6	24.4
12V	590.0	21.50	EDGING		101.50	Χ	11.67	1179.5	7.3
13H	590.0	9.00	FLAT		9.00	Χ	105.34	946.1	19.8
14V	590.0	11.10	EDGING		102.10	Χ	9.07	922.5	2.5
15H	590.0	8.04	FLAT		8.04	Х	102.90	825.8	10.5

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x5/16" Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 3.96 m/s

AXV : 3272.11 mm²m/s

BILLET SIZE : 182.3 mm SQUARE

BILLET WEIGHT : 2970 0 '

BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 118.7 s
INTER BILLET : 15.0 s
PRODUCTION : 80.0 t/h

	SPEED		RPM	GEAR RATIO	RPM		FACTOR	R LOAD	L L I N TORQUE	POWER	
		(mm)	(RPM)		(RPM)						
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
3H	0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
4V	0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
5H	0.47	619.5	14.5	87.594	1269	1.389	40.5	1654.8	168.36	255	31.9
6V	0.62	607.8	19.4	68.825	1337	1.316	52.2	1042.5	118.19	240	53.4
7 H	0.81	660.0	23.4	55.247	1295	1.310	0.0	1376.9	142.92	351	43.9
8V	0.97	590.7	31.4	43.393	1364	1.200	69.3	419.7	35.35	116	14.5
9Н	1.41	660.0	40.7	37.442	1524	1.447	0.0	1426.3	108.91	464	58.0
10H	1.94	660.0	56.2	27.471	1545	1.382	0.0	1349.3	70.09	413	51.6
11H	2.57	590.0	83.2	17.428	1450	1.323	0.0	1185.5	42.44	370	46.2
12V	2.77	510.4	103.8	13.852	1438	1.079	79.6	82.9	4.95	54	6.7
13H	3.46	590.0	112.0	11.734	1314	1.247	0.0	948.0	25.84	303	37.9
14V	3.55	499.4	135.6	9.471	1285	1.026	90.6	31.3	1.01	14	1.8
15H	3.96	590.0	128.3	9.841	1262	1.117	0.0	544.1	9.38	126	15.7

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^{***} Subject to the confidentiality clause *** M

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DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT. SPEED CALCULATION FOR HOT ROLLING MILL

07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 4"x3/8" SECTION ROLLED MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 3.30 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT		WIDTH	AREA	REDUC TION
,	(mm)	(mm)		(mm)			(mm)	(mm²)	
+			SQUARE		182.30	Х	182.30	33147.4	+
1H	750.0	20.00	BOX		124.00	Χ	206.79	24635.6	25.7
2V	750.0	18.00	BOX		136.50	Χ	144.56	18539.6	24.7
3Н	750.0	17.00	R.BOX		93.00	Χ	162.38	13163.3	29.0
4 V	660.0	15.00	ROUND		111.00	Χ	110.68	9671.8	26.5
5H	660.0	12.00	R.OVAL		67.60	Χ	132.54	6962.7	28.0
6V	660.0	12.00	ROUND		82.00	Χ	82.39	5292.0	24.0
7 H	660.0	40.00	FLAT		40.00	Χ	106.11	4038.8	23.7
8V	660.0	8.00	EDGING		78.00	Χ	43.52	3366.0	16.7
9Н	660.0	25.50	FLAT		25.50	Χ	93.95	2390.6	29.0
10H	660.0	17.40	FLAT		17.40	Χ	104.14	1808.3	24.4
11H	590.0	13.00	FLAT		13.00	Χ	110.27	1430.7	20.9
12V	590.0	22.00	EDGING		102.00	Χ	13.33	1353.9	5.4
13H	590.0	10.70	FLAT		10.70	Χ	105.22	1123.8	17.0
14V	590.0	30.20	EDGING		102.20	Χ	10.78	1097.1	2.4
15H	590.0	9.65	FLAT		9.65	Χ	102.90	991.3	9.6
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^{***} Subject to the confidentiality clause *** M

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DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT. SPEED CALCULATION FOR HOT ROLLING MILL

07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x3/8" MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 3.30 m/s AXV $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

639.8	3.9 5.3 6.9 11.0		(RPM) 463 451	1.346 1.329	(mm) 	(kN)		(kW) 	(응)
650.9 639.8 685.9 587.6	3.9 5.3 6.9 11.0	118.730 85.673 118.730	463 451	1.346 1.329	99.1	2400.7	330.53	135	'
639.8 685.9 587.6	5.3 6.9 11.0	85.673 118.730	451	1.329					64.8
685.9 587.6	6.9 11.0	118.730			110.2	1853.6	266 81		
587.6	11.0		822	1 100			200.01	147	72.5
		74.409		1.408	64.1	2263.0	292.11	212	57.3
610 5			818	1.361	72.4	1431.4	173.67	200	54.3
013.3	14.5	87.594	1269	1.389	40.5	1654.8	168.36	255	31.9
607.8	19.4	68.825	1337	1.316	52.2	1042.5	118.19	240	53.4
660.0	23.4	55.247	1295	1.310	0.0	1376.9	142.92	351	43.9
590.7	31.4	43.393	1364	1.200	69.3	419.7	35.35	116	14.5
660.0	39.6	37.442	1483	1.408	0.0	1346.6	100.52	417	52.1
660.0	52.4	27.471	1438	1.322	0.0	1196.2	60.50	332	41.5
590.0	74.0	17.428	1290	1.264	0.0	1016.1	36.01	279	34.9
510.4	90.4	13.852	1253	1.057	79.6	74.6	3.71	35	4.4
590.0	94.3	11.734	1106	1.205	0.0	846.1	23.16	229	28.6
518.4	109.9	9.471	1041	1.024	71.6	37.0	1.18	14	1.7
500 0	106.8	9.841	1052	1.107	0.0	519.4	9.45	106	13.2
	510.4 590.0 518.4	510.4 90.4 590.0 94.3 518.4 109.9	510.4 90.4 13.852 590.0 94.3 11.734 518.4 109.9 9.471	510.4 90.4 13.852 1253 590.0 94.3 11.734 1106 518.4 109.9 9.471 1041	510.4 90.4 13.852 1253 1.057 590.0 94.3 11.734 1106 1.205 518.4 109.9 9.471 1041 1.024 590.0 106.8 9.841 1052 1.107	510.4 90.4 13.852 1253 1.057 79.6 590.0 94.3 11.734 1106 1.205 0.0 518.4 109.9 9.471 1041 1.024 71.6 590.0 106.8 9.841 1052 1.107 0.0	510.4 90.4 13.852 1253 1.057 79.6 74.6 590.0 94.3 11.734 1106 1.205 0.0 846.1 518.4 109.9 9.471 1041 1.024 71.6 37.0 590.0 106.8 9.841 1052 1.107 0.0 519.4	510.4 90.4 13.852 1253 1.057 79.6 74.6 3.71 590.0 94.3 11.734 1106 1.205 0.0 846.1 23.16 518.4 109.9 9.471 1041 1.024 71.6 37.0 1.18 590.0 106.8 9.841 1052 1.107 0.0 519.4 9.45	510.4 90.4 13.852 1253 1.057 79.6 74.6 3.71 35 590.0 94.3 11.734 1106 1.205 0.0 846.1 23.16 229 518.4 109.9 9.471 1041 1.024 71.6 37.0 1.18 14

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 100x12 Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 2.66 m/s

AXV : 3272.11 mm²m/s

BILLET SIZE : 182.3 mm SQUARE

BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY: 80.0 t/h
ROLLING TIME: 118.7 s
INTER BILLET: 15.0 s
PRODUCTION: 80.0 t/h

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	OCK WIDTH	AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		182.30	X 182.30		+
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	18.00	BOX		136.50	X 144.56	18539.6	24.7
3Н	750.0	17.00	R.BOX		93.00	X 162.38	13163.3	29.0
4 V	660.0	15.00	ROUND		111.00	X 110.68	9671.8	26.5
5H	660.0	15.00	R.OVAL		70.60	X 130.14	7276.6	24.8
6V	660.0	22.00	ROUND		92.00	X 81.49	6043.3	16.9
7H	660.0	40.00	FLAT		40.00	X 118.13	4509.6	25.4
8V	660.0	26.50	EDGING		96.50	X 41.92	4028.8	10.7
9Н	660.0	25.50	FLAT		25.50	X 111.97	2850.4	29.2
10V	660.0	13.50	EDGING		98.50	X 26.64	2605.8	8.6
11H	590.0	17.50	FLAT		17.50	X 108.39	1890.6	27.4
12V	590.0	19.50	EDGING		99.50	X 17.96	1779.1	5.9
13H	590.0	13.70	FLAT		13.70	X 104.50	1429.0	19.7
14V	590.0	15.00	EDGING		100.00	X 13.86	1380.7	3.4
15H	590.0	12.16	FLAT		12.16	X 101.30	1229.7	10.9

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 100x12 SECTION ROLLED MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 2.66 m/s AXV $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

	SPEED	DIA	RPM	GEAR RATIO	RPM		R FACTOR		TORQUE	POWER	2
		(mm)	(RPM)		(RPM)		(mm)		(kNm)	(kW)	(응)
T	1.20										т
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
3Н	0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
4 V	0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
5Н	0.45	619.1	13.9	87.594	1215	1.329	40.9	1501.0	148.84	216	27.0
6V	0.54	607.8	17.0	68.825	1171	1.204	52.2	863.6	89.88	160	35.6
7н	0.73	660.0	21.0	55.247	1160	1.340	0.0	1601.8	167.67	369	46.1
8V	0.81	590.4	26.3	43.393	1140	1.119	69.6	314.7	22.95	63	7.9
9Н	1.15	660.0	33.2	37.442	1244	1.413	0.0	1604.7	115.25	401	50.1
10V	1.26	575.7	41.7	27.471	1144	1.094	84.3	196.1	13.03	57	7.1
11H	1.73	590.0	56.0	17.428	976	1.378	0.0	1341.8	67.96	399	51.0
12V	1.84	510.4	68.8	13.852	953	1.063	79.6	103.7	5.28	38	5.0
13H	2.29	590.0	74.1	11.734	870	1.245	0.0	992.8	34.64	269	38.6
14V	2.37	505.4	89.6	9.471	848	1.035	84.6	58.1	2.19	21	3.0
15H	2.66	590.0	86.1	9.841	848	1.123	0.0	588.0	13.21	119	17.6
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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x1/2" Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 2.48 m/s

AXV : 3272.11 mm²m/s

BILLET SIZE : 182.3 mm SQUARE

BILLET WEIGHT : 2970.0 kg

BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 118.7 s
INTER BILLET : 15.0 s
PRODUCTION : 80.0 t/h

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		HEIGHT	OCK WIDTH	AREA	REDUC TION
	(mm)	(mm)		(mm)			(mm²)	
+			SQUARE		182.30	x 182.30	33147.4	+
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	18.00	BOX		136.50	X 144.56	18539.6	24.7
3H	750.0	17.00	R.BOX		93.00	X 162.38	13163.3	29.0
4 V	660.0	15.00	ROUND		111.00	X 110.68	9671.8	26.5
5H	660.0	15.00	R.OVAL		70.60	X 130.14	7276.6	24.8
6V	660.0	22.00	ROUND		92.00	X 81.49	6043.3	16.9
7 H	660.0	40.00	FLAT		40.00	X 118.13	4509.6	25.4
8V	660.0	26.50	EDGING		96.50	X 41.92	4028.8	10.7
9н	660.0	25.50	FLAT		25.50	X 111.97	2850.4	29.2
10V	660.0	13.50	EDGING		98.50	X 26.64	2605.8	8.6
11H	590.0	17.50	FLAT		17.50	X 108.39	1890.6	27.4
12V	590.0	20.50	EDGING		100.50	X 17.89	1790.3	5.3
13H	590.0	13.70	FLAT		13.70	X 105.40	1441.3	19.5
14V	590.0	17.80	EDGING		102.80	X 13.78	1410.7	2.1
15H	590.0	12.87	FLAT		12.87	X 102.90	1322.0	6.3
+								+

^{***} Subject to the confidentiality clause *** M

13

JOB NO. : DPC68X01



DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT. SPEED CALCULATION FOR HOT ROLLING MILL

LAYOUT NO. : 000-000-361-340

07/04/23

SECTION ROLLED : Flat 4"x1/2" Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 2.48 m/s

AXV : 3272.11 mm²m/s

BILLET SIZE : 182.3 mm SQUARE

BILLET WEIGHT : 2970 0 1

MAX HEATING CAPABILITY: 80.0 t/h
ROLLING TIME: 118.7 s
INTER BILLET: 15.0 s
PRODUCTION: 80.0 t/h

			RATIO	RPM	FACTOR	R FACTOR		TORQUE	POWER	
				(RPM)		(mm)	(kN)	(kNm)	(kW)	(응)
1.20										
0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
0.45	619.1	13.9	87.594	1215	1.329	40.9	1501.0	148.84	216	27.0
0.54	607.8	17.0	68.825	1171	1.204	52.2	863.6	89.88	160	35.6
0.73	660.0	21.0	55.247	1160	1.340	0.0	1601.8	167.67	369	46.1
0.81	590.4	26.3	43.393	1140	1.119	69.6	314.7	22.95	63	7.9
1.15	660.0	33.2	37.442	1244	1.413	0.0	1604.7	115.25	401	50.1
1.26	575.7	41.7	27.471	1144	1.094	84.3	196.1	13.03	57	7.1
1.73	590.0	56.0	17.428	976	1.378	0.0	1341.8	67.96	399	51.0
1.83	510.4	68.4	13.852	947	1.056	79.6	95.7	4.62	33	4.4
2.27	590.0	73.5	11.734	862	1.242	0.0	993.4	34.40	265	38.4
2.32	505.4	87.7	9.471	830	1.022	84.6	43.2	1.28	12	1.8
2.48	590.0	80.1	9.841	788	1.067	0.0	371.6	6.19	52	8.2
	1.20 0.13 0.18 0.25 0.34 0.45 0.54 0.73 0.81 1.15 1.26 1.73 1.83 2.27 2.32	1.20 0.13 650.9 0.18 639.8 0.25 685.9 0.34 587.6 0.45 619.1 0.54 607.8 0.73 660.0 0.81 590.4 1.15 660.0 1.26 575.7 1.73 590.0 1.83 510.4 2.27 590.0 2.32 505.4	1.20 0.13 650.9 3.9 0.18 639.8 5.3 0.25 685.9 6.9 0.34 587.6 11.0 0.45 619.1 13.9 0.54 607.8 17.0 0.73 660.0 21.0 0.81 590.4 26.3 1.15 660.0 33.2 1.26 575.7 41.7 1.73 590.0 56.0 1.83 510.4 68.4 2.27 590.0 73.5 2.32 505.4 87.7	1.20 0.13 650.9 3.9 118.730 0.18 639.8 5.3 85.673 0.25 685.9 6.9 118.730 0.34 587.6 11.0 74.409 0.45 619.1 13.9 87.594 0.54 607.8 17.0 68.825 0.73 660.0 21.0 55.247 0.81 590.4 26.3 43.393 1.15 660.0 33.2 37.442 1.26 575.7 41.7 27.471 1.73 590.0 56.0 17.428 1.83 510.4 68.4 13.852 2.27 590.0 73.5 11.734 2.32 505.4 87.7 9.471	1.20 0.13 650.9 3.9 118.730 463 0.18 639.8 5.3 85.673 451 0.25 685.9 6.9 118.730 822 0.34 587.6 11.0 74.409 818 0.45 619.1 13.9 87.594 1215 0.54 607.8 17.0 68.825 1171 0.73 660.0 21.0 55.247 1160 0.81 590.4 26.3 43.393 1140 1.15 660.0 33.2 37.442 1244 1.26 575.7 41.7 27.471 1144 1.73 590.0 56.0 17.428 976 1.83 510.4 68.4 13.852 947 2.27 590.0 73.5 11.734 862 2.32 505.4 87.7 9.471 830	1.20 0.13 650.9 3.9 118.730 463 1.346 0.18 639.8 5.3 85.673 451 1.329 0.25 685.9 6.9 118.730 822 1.408 0.34 587.6 11.0 74.409 818 1.361 0.45 619.1 13.9 87.594 1215 1.329 0.54 607.8 17.0 68.825 1171 1.204 0.73 660.0 21.0 55.247 1160 1.340 0.81 590.4 26.3 43.393 1140 1.119 1.15 660.0 33.2 37.442 1244 1.413 1.26 575.7 41.7 27.471 1144 1.094 1.73 590.0 56.0 17.428 976 1.378 1.83 510.4 68.4 13.852 947 1.056 2.27 590.0 73.5 11.734 862 1.242 2.32 505.4 87.7 9.471 830 1.022	1.20 0.13 650.9 3.9 118.730 463 1.346 99.1 0.18 639.8 5.3 85.673 451 1.329 110.2 0.25 685.9 6.9 118.730 822 1.408 64.1 0.34 587.6 11.0 74.409 818 1.361 72.4 0.45 619.1 13.9 87.594 1215 1.329 40.9 0.54 607.8 17.0 68.825 1171 1.204 52.2 0.73 660.0 21.0 55.247 1160 1.340 0.0 0.81 590.4 26.3 43.393 1140 1.119 69.6 1.15 660.0 33.2 37.442 1244 1.413 0.0 1.26 575.7 41.7 27.471 1144 1.094 84.3 1.73 590.0 56.0 17.428 976 1.378 0.0 1.83 510.4 68.4 13.852 947 1.056 79.6 2.27 590.0 73.5 11.734 862 1.242 0.0 2.32 505.4 87.7 9.471 830 1.022 84.6 2.48 590.0 80.1 9.841 788 1.067 0.0	1.20 0.13 650.9 3.9 118.730 463 1.346 99.1 2400.7 0.18 639.8 5.3 85.673 451 1.329 110.2 1853.6 0.25 685.9 6.9 118.730 822 1.408 64.1 2263.0 0.34 587.6 11.0 74.409 818 1.361 72.4 1431.4 0.45 619.1 13.9 87.594 1215 1.329 40.9 1501.0 0.54 607.8 17.0 68.825 1171 1.204 52.2 863.6 0.73 660.0 21.0 55.247 1160 1.340 0.0 1601.8 0.81 590.4 26.3 43.393 1140 1.119 69.6 314.7 1.15 660.0 33.2 37.442 1244 1.413 0.0 1604.7 1.26 575.7 41.7 27.471 1144 1.094 84.3 196.1 1.73 590.0 56.0 17.428 976 1.378 0.0 1341.8 1.83 510.4 68.4 13.852 947 1.056 79.6 95.7 2.27 590.0 73.5 11.734 862 1.242 0.0 993.4 2.32 505.4 87.7 9.471 830 1.022 84.6 43.2 2.48 590.0 80.1 9.841 788 1.067 0.0 371.6	1.20 0.13 650.9 3.9 118.730 463 1.346 99.1 2400.7 330.53 0.18 639.8 5.3 85.673 451 1.329 110.2 1853.6 266.81 0.25 685.9 6.9 118.730 822 1.408 64.1 2263.0 292.11 0.34 587.6 11.0 74.409 818 1.361 72.4 1431.4 173.67 0.45 619.1 13.9 87.594 1215 1.329 40.9 1501.0 148.84 0.54 607.8 17.0 68.825 1171 1.204 52.2 863.6 89.88 0.73 660.0 21.0 55.247 1160 1.340 0.0 1601.8 167.67 0.81 590.4 26.3 43.393 1140 1.119 69.6 314.7 22.95 1.15 660.0 33.2 37.442 1244 1.413 0.0 1604.7 115.25 1.26 575.7 41.7 27.471 1144 1.094 <td< td=""><td>0.13 650.9 3.9 118.730 463 1.346 99.1 2400.7 330.53 135 0.18 639.8 5.3 85.673 451 1.329 110.2 1853.6 266.81 147 0.25 685.9 6.9 118.730 822 1.408 64.1 2263.0 292.11 212 0.34 587.6 11.0 74.409 818 1.361 72.4 1431.4 173.67 200 0.45 619.1 13.9 87.594 1215 1.329 40.9 1501.0 148.84 216 0.54 607.8 17.0 68.825 1171 1.204 52.2 863.6 89.88 160 0.73 660.0 21.0 55.247 1160 1.340 0.0 1601.8 167.67 369 0.81 590.4 26.3 43.393 1140 1.119 69.6 314.7 22.95 63 1.15 660.0 33.2 37.442 1244 1.413 0.0 1604.7 115.25 401</td></td<>	0.13 650.9 3.9 118.730 463 1.346 99.1 2400.7 330.53 135 0.18 639.8 5.3 85.673 451 1.329 110.2 1853.6 266.81 147 0.25 685.9 6.9 118.730 822 1.408 64.1 2263.0 292.11 212 0.34 587.6 11.0 74.409 818 1.361 72.4 1431.4 173.67 200 0.45 619.1 13.9 87.594 1215 1.329 40.9 1501.0 148.84 216 0.54 607.8 17.0 68.825 1171 1.204 52.2 863.6 89.88 160 0.73 660.0 21.0 55.247 1160 1.340 0.0 1601.8 167.67 369 0.81 590.4 26.3 43.393 1140 1.119 69.6 314.7 22.95 63 1.15 660.0 33.2 37.442 1244 1.413 0.0 1604.7 115.25 401

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*** Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 100x16 SECTION ROLLED Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 2.00 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE			OCK WIDTH	AREA	TION
+	(mm)	(mm)		(mm)			(mm²)	(응)
+			SQUARE			X 182.30		
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	18.00	BOX		136.50	X 144.56	18539.6	24.7
3Н	750.0	17.00	R.BOX		93.00	X 162.38	13163.3	29.0
4 V	660.0	15.00	ROUND		111.00	X 110.68	9671.8	26.5
5Н	660.0	15.00	R.OVAL		70.60	X 130.14	7276.6	24.8
6V	660.0	22.00	ROUND		92.00	X 81.49	6043.3	16.9
7H	660.0	40.00	FLAT		40.00	X 118.13	4509.6	25.4
8V	660.0	26.50	EDGING		96.50	X 41.92	4028.8	10.7
9Н	660.0	26.50	FLAT		26.50	X 110.67	2928.1	27.3
10V	660.0	15.50	EDGING		100.50	X 27.32	2724.8	6.9
11H	590.0	20.40	FLAT		20.40	X 106.69	2170.4	20.3
12V	590.0	20.80	EDGING		100.80	X 20.70	2078.6	4.2
13H	590.0	17.20	FLAT		17.20	X 103.87	1783.6	14.2
14V	590.0	21.10	EDGING		101.10	X 17.30	1742.4	2.3
15H	590.0	16.21	FLAT		16.21	X 101.30	1639.2	5.9

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 100x16 SECTION ROLLED MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 2.00 m/s AXV $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM		GROOVE FACTOR		L L I N TORQUE	POWER	
	(m/s)						(mm)		(kNm)	(kW)	(응)
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
3н	0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
4V	0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
5H	0.45	619.1	13.9	87.594	1215	1.329	40.9	1501.0	148.84	216	27.0
6V	0.54	607.8	17.0	68.825	1171	1.204	52.2	863.6	89.88	160	35.6
7H	0.73	660.0	21.0	55.247	1160	1.340	0.0	1601.8	167.67	369	46.1
8V	0.81	590.4	26.3	43.393	1140	1.119	69.6	314.7	22.95	63	7.9
9Н	1.12	660.0	32.3	37.442	1211	1.376	0.0	1507.0	105.40	357	44.6
10V	1.20	575.8	39.8	27.471	1094	1.075	84.2	170.7	10.02	42	5.2
11H	1.51	590.0	48.8	17.428	851	1.255	0.0	1035.8	46.38	237	34.8
12V	1.57	510.4	58.9	13.852	816	1.044	79.6	93.0	3.94	24	3.
13H	1.83	590.0	59.4	11.734	697	1.165	0.0	772.8	24.97	155	27.9
14V	1.88	510.4	70.3	9.471	665	1.024	79.6	56.7	1.74	13	2.4
15H	2.00	590.0	64.6	9.841	636	1.063	0.0	374.4	6.91	47	9.2

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x5/8"
Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.98 m/s

AXV : 3272.11 mm²m/s

BILLET SIZE : 182.3 mm SQUARE

BILLET WEIGHT : 2970.0 kg

BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 118.7 s
INTER BILLET : 15.0 s
PRODUCTION : 80.0 t/h

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	CK WIDTH	AREA	REDUC TION
	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	+ (응) +
1H	750.0	20.00	SQUARE BOX			 X 182.30 X 206.79		
2V 3H	750.0 750.0	18.00 17.00	BOX R.BOX		136.50	X 144.56 X 162.38	18539.6 13163.3	24.7
4V	660.0	15.00	ROUND		111.00	X 110.68	9671.8	26.5
5H 6V	660.0 660.0	15.00 22.00	R.OVAL ROUND			X 130.14 X 81.49	7276.6 6043.3	24.8 16.9
7H 8V	660.0 660.0	40.00 26.50	FLAT EDGING			X 118.13 X 41.92	4509.6 4028.8	25.4 10.7
9H 10V	660.0 660.0	26.50 16.50	FLAT EDGING		26.50	X 110.67 X 27.22	2928.1 2742.3	27.3 6.3
11H	590.0	20.40	FLAT		20.40	X 107.58	2188.7	20.2
12V 13H	590.0 590.0	22.50 17.20	EDGING FLAT			X 20.65 X 105.50	2107.8 1811.6	3.7 14.1
14V 15H	590.0 590.0	22.50 16.08	EDGING FLAT			X 17.31 X 102.90	1767.6 1651.8	
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^{***} Subject to the confidentiality clause *** M

07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x5/8"
Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.98 m/s

AXV : 3272.11 mm²m/s

BILLET SIZE : 182.3 mm SQUARE

BILLET WEIGHT : 2970 0 1

BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 118.7 s
INTER BILLET : 15.0 s
PRODUCTION : 80.0 t/h

	SPEED	DIA	RPM	GEAR RATIO	RPM		R FACTOR	E RO R LOAD	TORQUE	POWER	L
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(응)
+	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
3Н	0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
4 V	0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
5Н	0.45	619.1	13.9	87.594	1215	1.329	40.9	1501.0	148.84	216	27.0
6V	0.54	607.8	17.0	68.825	1171	1.204	52.2	863.6	89.88	160	35.6
7н	0.73	660.0	21.0	55.247	1160	1.340	0.0	1601.8	167.67	369	46.1
8V	0.81	590.4	26.3	43.393	1140	1.119	69.6	314.7	22.95	63	7.9
9Н	1.12	660.0	32.3	37.442	1211	1.376	0.0	1507.0	105.40	357	44.6
10V	1.19	575.7	39.6	27.471	1087	1.068	84.3	159.7	8.96	37	4.6
11H	1.49	590.0	48.4	17.428	843	1.253	0.0	1037.0	46.14	234	34.7
12V	1.55	510.4	58.1	13.852	805	1.038	79.6	84.1	3.33	20	3.2
13H	1.81	590.0	58.5	11.734	686	1.163	0.0	778.7	24.97	153	27.9
14V	1.85	510.4	69.3	9.471	656	1.025	79.6	58.9	1.87	14	2.6
15H	1.98	590.0	64.1	9.841	631	1.070	0.0	414.1	8.09	54	10.8
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*** Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 100x19 Hot rolling

MATERIAL

: Low-med. carbon steel : 1.68 m/s ROLLING SPEED $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	OCK WIDTH	AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		182.30	X 182.30		
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	18.00	BOX		136.50	X 144.56	18539.6	24.7
3Н	750.0	17.00	R.BOX		93.00	X 162.38	13163.3	29.0
4V	660.0	15.00	ROUND		111.00	X 110.68	9671.8	26.5
5H	660.0	15.00	R.OVAL		70.60	X 130.14	7276.6	24.8
6V	660.0	22.00	ROUND		92.00	X 81.49	6043.3	16.9
7 H	660.0	40.00	FLAT		40.00	X 118.13	4509.6	25.4
8V	660.0	25.00	EDGING		95.00	X 42.16	3988.3	11.6
9Н	660.0	26.50	FLAT		26.50	X 109.34	2892.8	27.5
10V	660.0	12.50	EDGING		97.50	X 27.52	2660.5	8.0
11H	590.0	20.40	FLAT		20.40	X 103.87	2112.8	20.6
12V	590.0	21.10	EDGING		101.10	X 20.51	2065.5	2.2
13H	590.0	19.25	FLAT		19.25	X 101.30	1946.5	5.8

^{***} Subject to the confidentiality clause *** M



JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 100x19 MATERIAL Hot rolling

: Low-med. carbon steel : 1.68 m/s MALEKIAL ROLLING SPEED : $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	FACTOR	GROOVE R FACTOR		TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(응)
+	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
3H	0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
4V	0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
5H	0.45	619.1	13.9	87.594	1215	1.329	40.9	1501.0	148.84	216	27.0
6V	0.54	607.8	17.0	68.825	1171	1.204	52.2	863.6	89.88	160	35.6
7 H	0.73	660.0	21.0	55.247	1160	1.340	0.0	1601.8	167.67	369	46.1
8V	0.82	590.4	26.5	43.393	1152	1.131	69.6	334.7	25.37	71	8.8
9Н	1.13	660.0	32.7	37.442	1226	1.379	0.0	1498.0	105.50	362	45.2
10V	1.23	575.8	40.8	27.471	1121	1.087	84.2	188.9	11.84	51	6.3
11H	1.55	590.0	50.1	17.428	874	1.259	0.0	1018.8	46.17	242	34.7
12V	1.58	510.4	59.3	13.852	821	1.023	79.6	59.3	1.78	11	1.7
13H	1.68	590.0	54.4	11.734	639	1.061	0.0	357.6	7.12	41	7.9

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x3/4" MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.65 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	OCK WIDTH	AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		182.30	X 182.30		
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	18.00	BOX		136.50	X 144.56	18539.6	24.7
3Н	750.0	17.00	R.BOX		93.00	X 162.38	13163.3	29.0
4 V	660.0	15.00	ROUND		111.00	X 110.68	9671.8	26.5
5H	660.0	15.00	R.OVAL		70.60	X 130.14	7276.6	24.8
6V	660.0	22.00	ROUND		92.00	X 81.49	6043.3	16.9
7 H	660.0	40.00	FLAT		40.00	X 118.13	4509.6	25.4
8V	660.0	26.50	EDGING		96.50	X 41.92	4028.8	10.7
9Н	660.0	26.50	FLAT		26.50	X 110.67	2928.1	27.3
10V	660.0	14.50	EDGING		99.50	X 27.43	2707.2	7.5
11H	590.0	20.40	FLAT		20.40	X 105.79	2152.1	20.5
12V	590.0	22.70	EDGING		102.70	X 20.53	2099.8	2.4
13H	590.0	19.30	FLAT		19.30	X 102.90	1982.4	5.6

^{***} Subject to the confidentiality clause *** M



JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 4"x3/4" SECTION ROLLED MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.65 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV : BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM		GROOVE FACTOR		L L I N TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
ЗН	0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
4V	0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
5H	0.45	619.1	13.9	87.594	1215	1.329	40.9	1501.0	148.84	216	27.0
6V	0.54	607.8	17.0	68.825	1171	1.204	52.2	863.6	89.88	160	35.6
7H	0.73	660.0	21.0	55.247	1160	1.340	0.0	1601.8	167.67	369	46.1
8V	0.81	590.4	26.3	43.393	1140	1.119	69.6	314.7	22.95	63	7.9
9Н	1.12	660.0	32.3	37.442	1211	1.376	0.0	1507.0	105.40	357	44.6
10V	1.21	575.8	40.1	27.471	1101	1.082	84.2	181.4	11.09	47	5.8
11H	1.52	590.0	49.2	17.428	858	1.258	0.0	1034.3	46.62	240	35.0
12V	1.56	510.4	58.3	13.852	808	1.025	79.6	62.7	1.98	12	1.9
13H	1.65	590.0	53.4	11.734	627	1.059	0.0	357.4	7.03	39	7.8

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x7/8" MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.42 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STC HEIGHT	OCK WIDTH	AREA	REDUC TION
	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	(%)
			SQUARE		182.30	x 182.30		
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	18.00	BOX		136.50	X 144.56	18539.6	24.7
3H	750.0	17.00	R.BOX		93.00	X 162.38	13163.3	29.0
4V	660.0	15.00	ROUND		111.00	X 110.68	9671.8	26.5
5H	660.0	15.00	R.OVAL		70.60	X 130.14	7276.6	24.8
6V	660.0	22.00	ROUND		92.00	X 81.49	6043.3	16.9
7 H	660.0	40.00	FLAT		40.00	X 118.13	4509.6	25.4
8V	660.0	26.50	EDGING		96.50	X 41.92	4028.8	10.7
9Н	660.0	26.50	FLAT		26.50	X 110.67	2928.1	27.3
10V	660.0	18.60	EDGING		103.60	X 27.01	2779.2	5.1
11H	590.0	23.50	FLAT		23.50	X 105.31	2468.0	11.2
12V	590.0	23.00	EDGING		103.00	X 23.59	2420.7	1.9
13H	590.0	22.51	FLAT		22.51	X 102.90	2312.1	4.5

^{***} Subject to the confidentiality clause *** M

23



DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT. SPEED CALCULATION FOR HOT ROLLING MILL

07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x7/8" MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.42 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	FACTOR	GROOVE R FACTOR	LOAD	L L I N TORQUE	POWER	
+	(m/s)	(mm)	(RPM)		(RPM)		(mm)		(kNm)	(kW)	(응)
+	1.20										+
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
3Н	0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
4V	0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
5H	0.45	619.1	13.9	87.594	1215	1.329	40.9	1501.0	148.84	216	27.0
6V	0.54	607.8	17.0	68.825	1171	1.204	52.2	863.6	89.88	160	35.6
7H	0.73	660.0	21.0	55.247	1160	1.340	0.0	1601.8	167.67	369	46.1
8V	0.81	590.4	26.3	43.393	1140	1.119	69.6	314.7	22.95	63	7.9
9Н	1.12	660.0	32.3	37.442	1211	1.376	0.0	1507.0	105.40	357	44.6
10V	1.18	575.7	39.1	27.471	1073	1.054	84.3	135.3	6.78	28	3.5
11H	1.33	590.0	42.9	17.428	748	1.126	0.0	612.7	20.04	90	15.1
12V	1.35	510.4	50.6	13.852	701	1.020	79.6	62.5	1.73	9	1.6
13H	1.42	590.0	45.8	11.734	538	1.047	0.0	313.3	5.83	28	6.5
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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x1" MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.24 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg BILLET SIZE

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	OCK WIDTH	AREA	REDUC TION
	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		182.30	X 182.30		
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	18.00	BOX		136.50	X 144.56	18539.6	24.7
3Н	750.0	17.00	R.BOX		93.00	X 162.38	13163.3	29.0
4V	660.0	15.00	ROUND		111.00	X 110.68	9671.8	26.5
5H	660.0	15.00	R.OVAL		70.60	X 130.14	7276.6	24.8
6V	660.0	25.00	ROUND		95.00	X 80.18	6214.2	14.6
7н	660.0	42.00	FLAT		42.00	X 119.27	4779.6	23.1
8V	660.0	33.00	EDGING		103.00	X 43.15	4421.5	7.5
9н	660.0	33.00	FLAT		33.00	X 110.49	3640.7	17.7
10V	660.0	35.70	EDGING		100.70	X 33.93	3393.4	6.8
11H	590.0	26.80	FLAT		26.80	X 105.71	2826.6	16.7
12V	590.0	38.00	EDGING		103.00	X 26.93	2763.3	2.2
13H	590.0	25.73	FLAT		25.73	X 102.90	2642.9	4.4

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 4"x1" SECTION ROLLED MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.24 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV : BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE R FACTOR		L L I N TORQUE		UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(응)
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
ЗН	0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
4V	0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
5H	0.45	619.1	13.9	87.594	1215	1.329	40.9	1501.0	148.84	216	27.0
6V	0.53	607.5	16.6	68.825	1139	1.171	52.5	795.9	80.46	139	31.0
7H	0.68	660.0	19.8	55.247	1094	1.300	0.0	1541.0	157.01	326	40.7
8V	0.74	590.5	23.9	43.393	1039	1.081	69.5	247.3	15.34	38	4.8
9H	0.90	660.0	26.0	37.442	974	1.214	0.0	1076.9	62.78	171	21.9
10V	0.96	595.7	30.9	27.471	849	1.073	64.3	211.6	12.45	40	5.9
11H	1.16	590.0	37.5	17.428	653	1.200	0.0	929.4	43.06	169	32.3
12V	1.18	525.4	43.0	13.852	596	1.023	64.6	79.3	2.41	11	2.3
13H	1.24	590.0	40.1	11.734	470	1.046	0.0	322.2	6.35	27	7.1

+----+ *** Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x1-1/4" Hot rolling

MATERIAL

: Low-med. carbon steel : 0.99 m/s ROLLING SPEED $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg BILLET SIZE

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	OCK WIDTH	AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		182.30	X 182.30		
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	18.00	BOX		136.50	X 144.56	18539.6	24.7
3Н	750.0	17.00	R.BOX		93.00	X 162.38	13163.3	29.0
4 V	660.0	15.00	ROUND		111.00	X 110.68	9671.8	26.5
5H	660.0	15.00	R.OVAL		70.60	X 130.14	7276.6	24.8
6V	660.0	25.00	ROUND		95.00	X 80.18	6214.2	14.6
7 H	660.0	42.00	FLAT		42.00	X 119.27	4779.6	23.1
8V	660.0	37.00	EDGING		107.00	X 42.70	4549.5	4.8
9Н	660.0	36.00	FLAT		36.00	X 110.96	3988.5	12.3
10V	660.0	40.00	EDGING		105.00	X 36.51	3808.1	4.5
11H	590.0	33.20	FLAT		33.20	X 105.75	3500.9	8.1
12V	590.0	33.10	EDGING		103.10	X 33.34	3424.2	2.2
13H	590.0	32.16	FLAT		32.16	X 102.90	3303.4	3.5

^{***} Subject to the confidentiality clause *** M

07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x1-1/4" Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 0.99 m/s AXV : $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM		GROOVE FACTOR		TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(응)
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
ЗН	0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
4V	0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
5H	0.45	619.1	13.9	87.594	1215	1.329	40.9	1501.0	148.84	216	27.0
6V	0.53	607.5	16.6	68.825	1139	1.171	52.5	795.9	80.46	139	31.0
7H	0.68	660.0	19.8	55.247	1094	1.300	0.0	1541.0	157.01	326	40.7
8V	0.72	590.5	23.3	43.393	1009	1.051	69.5	183.4	10.05	24	3.1
9Н	0.82	660.0	23.7	37.442	889	1.141	0.0	803.9	38.88	97	13.6
10V	0.86	595.7	27.5	27.471	757	1.047	64.3	167.9	7.95	23	3.8
11H	0.93	590.0	30.3	17.428	527	1.088	0.0	528.5	17.08	54	12.8
12V	0.96	520.4	35.1	13.852	486	1.022	69.6	95.5	2.84	10	2.7
13H	0.99	590.0	32.1	11.734	376	1.037	0.0	296.2	5.84	20	6.5

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 5"x1/4"
Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 3.96 m/s

AXV : 3272.11 mm²m/s

BILLET SIZE : 182.3 mm SQUARE

BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY: 80.0 t/h
ROLLING TIME: 118.7 s
INTER BILLET: 15.0 s
PRODUCTION: 80.0 t/h

(mm) + 1H 750. 2V 750. 3H 750. 4V 660. 5H 660. 6V 660. 7H 660. 8V 660. 9H 660. 10H 660.	0 20.00 0 18.00 0 17.00	BOX R.BOX	(mm)	182.30 124.00 136.50 93.00	X X X	(mm) 182.30 206.79 144.56	(mm²) 33147.4 24635.6	+
2V 750. 3H 750. 4V 660. 5H 660. 6V 660. 7H 660. 8V 660. 9H 660.	0 18.00 0 17.00	BOX BOX R.BOX		124.00 136.50 93.00	X X	206.79 144.56	33147.4 24635.6	25.7
2V 750. 3H 750. 4V 660. 5H 660. 6V 660. 7H 660. 8V 660. 9H 660.	0 18.00 0 17.00	BOX R.BOX		136.50 93.00	Χ	144.56		
3H 750. 4V 660. 5H 660. 6V 660. 7H 660. 8V 660. 9H 660.	0 17.00	R.BOX		93.00			18539.6	24.7
4V 660. 5H 660. 6V 660. 7H 660. 8V 660. 9H 660.					Χ	1 ()))		/
5H 660. 6V 660. 7H 660. 8V 660. 9H 660.	15.00) ROUND				162.38	13163.3	29.0
6V 660. 7H 660. 8V 660. 9H 660.				111.00	Χ	110.68	9671.8	26.5
7H 660. 8V 660. 9H 660.	0 55.00) FLAT		55.00	Χ	139.04	7283.7	24.7
8V 660. 9H 660.	0 28.00) EDGING		113.00	Χ	57.49	6392.4	12.2
9н 660.	0 33.00) FLAT		33.00	Χ	131.04	4305.4	32.6
	0 8.00) EDGING		108.00	Χ	35.08	3769.4	12.4
10H 660.	0 20.50) FLAT		20.50	Χ	124.09	2536.6	32.7
	0 13.50) FLAT		13.50	Χ	134.72	1810.8	28.6
11H 590.	0 9.60) FLAT		9.60	Χ	141.42	1350.9	25.4
12V 590.	0 22.00) EDGING		128.00	Χ	9.90	1262.8	6.5
13H 590.	0 7.50) FLAT		7.50	Χ	131.94	987.7	21.8
14V 590.	0 12.20) EDGING		127.20	Χ	7.57	959.4	2.9
15H 590.	0 6.43	B FLAT		6.43	Χ	128.70	826.2	13.9

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 5"x1/4" SECTION ROLLED Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 3.96 m/s AXV $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

				RATIO			R FACTOR	LOAD		POWER	l
		(mm)	(RPM)		(RPM)		(mm)	(kN)		(kW)	(응)
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
3Н	0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
4 V	0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
5H	0.45	660.0	13.0	87.594	1139	1.328	0.0	1734.2	208.29	284	35.4
6V	0.51	576.8	16.9	68.825	1166	1.139	83.2	425.3	34.11	61	13.5
7 H	0.76	660.0	22.0	55.247	1215	1.485	0.0	2046.4	178.03	410	51.3
8V	0.87	560.6	29.6	43.393	1283	1.142	99.4	320.8	26.43	82	10.2
9Н	1.29	660.0	37.3	37.442	1398	1.486	0.0	1914.1	128.27	501	62.7
10H	1.81	660.0	52.3	27.471	1436	1.401	0.0	1796.2	83.45	457	57.1
11H	2.42	590.0	78.4	17.428	1366	1.340	0.0	1606.7	52.68	433	54.1
12V	2.59	484.4	102.2	13.852	1415	1.070	105.6	71.5	4.29	46	5.7
13H	3.31	590.0	107.2	11.734	1258	1.279	0.0	1384.9	35.51	399	49.9
14V	3.41	475.4	137.0	9.471	1298	1.029	114.6	31.7	1.19	17	2.1
15H	3.96	590.0	128.2	9.841	1262	1.161	0.0	941.3	16.79	225	28.2

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 6"x1/4" Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 3.30 m/s

AXV : 3272.11 mm²m/s

BILLET SIZE : 182.3 mm SQUARE

BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY: 80.0 t/h
ROLLING TIME: 118.7 s
INTER BILLET: 15.0 s
PRODUCTION: 80.0 t/h

1	DIA		GROOVE TYPE	STOCK HEIGHT WIDTH		WIDTH	AREA	REDUC TION	
	(mm)	(mm)		(mm)			(mm)	(mm²)	
+			SQUARE		182.30	Х	182.30		
1H	750.0	20.00	BOX		124.00	Χ	206.79	24635.6	25.7
2V	750.0	22.00	BOX		140.50	Χ	142.88	19039.5	22.7
3н	750.0	23.00	R.BOX		99.00	Χ	162.97	14155.8	25.7
4V	660.0	34.00	ROUND		130.00	Χ	109.89	11647.4	17.7
5H	660.0	55.00	FLAT		55.00	Χ	161.39	8494.4	27.1
6V	660.0	57.00	EDGING		142.00	Χ	56.17	7896.1	7.0
7 H	660.0	33.00	FLAT		33.00	Χ	160.18	5266.8	33.3
8V	660.0	28.00	EDGING		128.00	Χ	35.41	4508.6	14.4
9н	660.0	20.50	FLAT		20.50	Χ	144.85	2960.5	34.3
10H	660.0	13.50	FLAT		13.50	Χ	155.62	2091.2	29.4
11H	590.0	9.50	FLAT		9.50	Χ	162.60	1536.6	26.5
12V	590.0	48.00	EDGING		154.00	Χ	9.62	1477.3	3.9
13H	590.0	7.50	FLAT		7.50	Χ	157.36	1178.6	20.2
14V	590.0	38.00	EDGING		153.00	Χ	7.54	1151.1	2.3
15H	590.0	6.43	FLAT		6.43	Χ	154.40	991.5	13.9

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 6"x1/4" Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 3.30 m/s

AXV : 3272.11 mm²m/s

BILLET SIZE : 182.3 mm SQUARE

BILLET WEIGHT : 2970 0 1

BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 118.7 s
INTER BILLET : 15.0 s
PRODUCTION : 80.0 t/h

	SPEED		RPM	GEAR RATIO	RPM		R FACTOR	E RO R LOAD	TORQUE	POWER	
+					(RPM)		(mm)		(kNm)	(kW)	(응)
T	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.17	638.7	5.1	85.673	440	1.294	111.3	1757.6	247.75	133	67.3
3Н	0.23	686.1	6.4	118.730	764	1.345	63.9	2098.8	260.53	176	51.1
4 V	0.28	588.0	9.1	74.409	679	1.215	72.0	1159.7	126.57	121	39.6
5H	0.39	660.0	11.1	87.594	976	1.371	0.0	2133.1	260.12	304	38.9
6V	0.41	576.4	13.7	68.825	945	1.076	83.6	304.1	21.08	30	7.1
7 H	0.62	660.0	18.0	55.247	993	1.499	0.0	2572.0	219.20	413	51.9
8V	0.73	560.7	24.7	43.393	1073	1.168	99.3	389.6	37.50	97	12.1
9Н	1.11	660.0	32.0	37.442	1198	1.523	0.0	2387.9	161.61	541	67.7
10H	1.56	660.0	45.3	27.471	1244	1.416	0.0	2200.9	102.26	485	60.6
11H	2.13	590.0	68.9	17.428	1201	1.361	0.0	2008.4	66.58	481	60.1
12V	2.21	484.4	87.3	13.852	1210	1.040	105.6	50.5	2.46	23	2.8
13H	2.78	590.0	89.9	11.734	1055	1.253	0.0	1638.8	39.68	373	46.7
14V	2.84	475.4	114.2	9.471	1082	1.024	114.6	31.0	1.14	14	1.7
15H	3.30	590.0	106.8	9.841	1051	1.161	0.0	1210.3	21.41	239	29.9
	3.30							LING PO			

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 5"x5/16" Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 3.17 m/s
AXV : 3272.11 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg

BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 118.7 s
INTER BILLET : 15.0 s
PRODUCTION : 80.0 t/h

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STOCK HEIGHT WIDTH		AREA	REDUC TION
+	(mm)	(mm)		(mm)			(mm²)	
+			SQUARE		182.30	X 182.30	33147.4	
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	18.00	BOX		136.50	X 144.56	18539.6	24.7
3н	750.0	17.00	R.BOX		93.00	X 162.38	13163.3	29.0
4 V	660.0	15.00	ROUND		111.00	X 110.68	9671.8	26.5
5Н	660.0	55.00	FLAT		55.00	X 139.04	7283.7	24.7
6V	660.0	28.00	EDGING		113.00	X 57.49	6392.4	12.2
7 H	660.0	33.00	FLAT		33.00	X 131.04	4305.4	32.6
8V	660.0	8.00	EDGING		108.00	X 35.08	3769.4	12.4
9н	660.0	21.00	FLAT		21.00	X 123.33	2583.7	31.5
10H	660.0	14.50	FLAT		14.50	X 132.72	1919.2	25.7
11H	590.0	11.00	FLAT		11.00	X 138.12	1515.2	21.0
12V	590.0	8.50	EDGING		128.50	X 11.22	1437.7	5.1
13H	590.0	9.00	FLAT		9.00	X 131.52	1181.7	17.8
14V	590.0	7.90	EDGING		127.90	X 9.05	1154.4	2.3
15H	590.0	8.04	FLAT		8.04	X 128.70	1033.2	10.5
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^{***} Subject to the confidentiality clause *** M

07/04/23

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DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT. SPEED CALCULATION FOR HOT ROLLING MILL

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 5"x5/16" SECTION ROLLED Hot rolling

: Low-med. carbon steel MATERIAL

ROLLING SPEED : 3.17 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s PRODUCTION : 80.0 t/h

	SPEED	DIA	RPM	GEAR RATIO	RPM		R FACTOF	R O R LOAD	TORQUE	POWER	
		(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(응)
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
3H	0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
4V	0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
5H	0.45	660.0	13.0	87.594	1139	1.328	0.0	1734.2	208.29	284	35.4
6V	0.51	576.8	16.9	68.825	1166	1.139	83.2	425.3	34.11	61	13.5
7 H	0.76	660.0	22.0	55.247	1215	1.485	0.0	2046.4	178.03	410	51.3
V8	0.87	560.6	29.6	43.393	1283	1.142	99.4	320.8	26.43	82	10.2
9H	1.27	660.0	36.6	37.442	1372	1.459	0.0	1844.1	121.77	467	58.4
10H	1.70	660.0	49.3	27.471	1355	1.346	0.0	1618.6	73.01	377	47.2
11H	2.16	590.0	69.9	17.428	1218	1.267	0.0	1336.1	42.07	308	38.5
12V	2.28	470.4	92.4	13.852	1280	1.054	119.6	66.7	3.43	33	4.1
13H	2.77	590.0	89.6	11.734	1052	1.217	0.0	1169.6	29.28	275	34.4
14V	2.83	470.4	115.1	9.471	1090	1.024	119.6	33.7	1.12	14	1.7
15H	3.17	590.0	102.5	9.841	1009	1.117	0.0	753.2	12.92	139	17.3

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 6"x5/16" Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 2.64 m/s

AXV : 3272.11 mm²m/s

BILLET SIZE : 182.3 mm SQUARE

BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY: 80.0 t/h
ROLLING TIME: 118.7 s
INTER BILLET: 15.0 s
PRODUCTION: 80.0 t/h

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	OCK WIDTH	AREA	REDUC TION
	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		182.30	X 182.30		+
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	22.00	BOX		140.50	X 142.88	19039.5	22.7
3Н	750.0	23.00	R.BOX		99.00	X 162.97	14155.8	25.7
4 V	660.0	34.00	ROUND		130.00	X 109.89	11647.4	17.7
5H	660.0	55.00	FLAT		55.00	X 161.39	8494.4	27.1
6V	660.0	57.00	EDGING		142.00	X 56.17	7896.1	7.0
7 H	660.0	33.00	FLAT		33.00	X 160.18	5266.8	33.3
8V	660.0	32.00	EDGING		132.00	X 35.02	4603.6	12.6
9Н	660.0	21.00	FLAT		21.00	X 147.75	3096.1	32.7
10H	660.0	14.50	FLAT		14.50	X 157.29	2274.9	26.5
11H	590.0	11.00	FLAT		11.00	X 162.74	1785.7	21.5
12V	590.0	34.50	EDGING		154.50	X 11.13	1715.8	3.9
13H	590.0	9.00	FLAT		9.00	X 157.37	1414.5	17.6
14V	590.0	33.50	EDGING		153.50	X 9.04	1384.5	2.1
15H	590.0	8.04	FLAT		8.04	X 154.40	1239.8	10.5

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 6"x5/16" Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 2.64 m/s
AXV : 3272.11 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY: 80.0 t/h
ROLLING TIME: 118.7 s
INTER BILLET: 15.0 s
PRODUCTION: 80.0 t/h

NO.	SPEED	DIA	RPM		RPM		R FACTOR	R O R LOAD	TORQUE	POWER	
		(mm)	(RPM)		(RPM)		(mm)		(kNm)	(kW)	(%)
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.17	638.7	5.1	85.673	440	1.294	111.3	1757.6	247.75	133	67.3
3H	0.23	686.1	6.4	118.730	764	1.345	63.9	2098.8	260.53	176	51.1
4 V	0.28	588.0	9.1	74.409	679	1.215	72.0	1159.7	126.57	121	39.6
5H	0.39	660.0	11.1	87.594	976	1.371	0.0	2133.1	260.12	304	38.9
6V	0.41	576.4	13.7	68.825	945	1.076	83.6	304.1	21.08	30	7.1
7 H	0.62	660.0	18.0	55.247	993	1.499	0.0	2572.0	219.20	413	51.9
8V	0.71	560.5	24.2	43.393	1051	1.144	99.5	356.0	32.37	82	10.3
9Н	1.06	660.0	30.6	37.442	1145	1.487	0.0	2345.3	154.65	495	61.9
10H	1.44	660.0	41.6	27.471	1143	1.361	0.0	2048.5	92.42	403	50.4
11H	1.83	590.0	59.3	17.428	1034	1.274	0.0	1684.0	53.03	329	41.2
12V	1.91	470.4	77.4	13.852	1073	1.041	119.6	58.9	2.84	23	2.9
13H	2.31	590.0	74.9	11.734	879	1.213	0.0	1472.1	36.19	284	40.4
14V	2.36	470.4	96.0	9.471	909	1.022	119.6	35.6	1.23	12	1.7
15H	2.64	590.0	85.4	9.841	841	1.117	0.0	972.3	16.62	149	22.1

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 5"x3/8"
Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 2.64 m/s
AXV : 3272.11 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY: 80.0 t/h
ROLLING TIME: 118.7 s
INTER BILLET: 15.0 s
PRODUCTION: 80.0 t/h

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	OCK WIDTH	AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		182.30	X 182.30		+
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	18.00	BOX		136.50	X 144.56	18539.6	24.7
3H	750.0	17.00	R.BOX		93.00	X 162.38	13163.3	29.0
4 V	660.0	15.00	ROUND		111.00	X 110.68	9671.8	26.5
5H	660.0	55.00	FLAT		55.00	X 139.04	7283.7	24.7
6V	660.0	28.00	EDGING		113.00	X 57.49	6392.4	12.2
7 H	660.0	33.00	FLAT		33.00	X 131.04	4305.4	32.6
8V	660.0	8.00	EDGING		108.00	X 35.08	3769.4	12.4
9Н	660.0	22.00	FLAT		22.00	X 121.82	2674.9	29.0
10H	660.0	15.80	FLAT		15.80	X 130.23	2053.8	23.2
11H	590.0	12.50	FLAT		12.50	X 134.81	1682.3	18.1
12V	590.0	15.00	EDGING		130.00	X 12.61	1631.0	3.0
13H	590.0	10.70	FLAT		10.70	X 131.56	1404.4	13.9
14V	590.0	7.80	EDGING		127.80	X 10.76	1371.4	2.4
15H	590.0	9.65	FLAT		9.65	X 128.70	1240.2	9.6

^{***} Subject to the confidentiality clause *** M

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DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT. SPEED CALCULATION FOR HOT ROLLING MILL

07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 5"x3/8" SECTION ROLLED MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 2.64 m/s AXV $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED			GEAR RATIO	MOTOR RPM	FACTOR	GROOVE R FACTOR	LOAD	L L I N TORQUE	POWER	
							(mm)		(kNm)	(kW)	(%)
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
3H	0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
4V	0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
5H	0.45	660.0	13.0	87.594	1139	1.328	0.0	1734.2	208.29	284	35.4
6V	0.51	576.8	16.9	68.825	1166	1.139	83.2	425.3	34.11	61	13.5
7 H	0.76	660.0	22.0	55.247	1215	1.485	0.0	2046.4	178.03	410	51.3
8V	0.87	560.6	29.6	43.393	1283	1.142	99.4	320.8	26.43	82	10.2
9Н	1.22	660.0	35.4	37.442	1325	1.409	0.0	1709.1	109.35	405	50.7
10H	1.59	660.0	46.1	27.471	1266	1.302	0.0	1466.1	65.08	314	39.3
11H	1.95	590.0	63.0	17.428	1097	1.221	0.0	1154.7	35.71	235	29.4
12V	2.01	475.7	80.6	13.852	1116	1.031	114.3	50.6	1.97	17	2.1
13H	2.33	590.0	75.4	11.734	885	1.161	0.0	951.4	22.34	176	24.9
14V	2.39	470.4	96.9	9.471	917	1.024	119.6	40.7	1.37	14	1.9
15H	2.64	590.0	85.4	9.841	840	1.106	0.0	717.4	13.02	116	17.3

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 6"x3/8"
Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 2.20 m/s

AXV : 3272.11 mm²m/s

BILLET SIZE : 182.3 mm SQUARE

BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY: 80.0 t/h
ROLLING TIME: 118.7 s
INTER BILLET: 15.0 s
PRODUCTION: 80.0 t/h

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	CK WIDTH	AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)	(mm)	(mm ²)	(응)
1H 2V 3H 4V 5H 6V 7H 8V 9H 10H 11H	750.0 750.0 750.0 660.0 660.0 660.0 660.0 660.0 590.0	20.00 22.00 23.00 34.00 55.00 57.00 33.00 35.00 22.00 15.80 12.50 41.00	SQUARE BOX BOX R.BOX ROUND FLAT EDGING FLAT EDGING FLAT FLAT FLAT FLAT FLAT EDGING		124.00 2 140.50 2 99.00 2 130.00 2 55.00 2 142.00 2 33.00 2 22.00 2 15.80 2 12.50 2	X 182.30 X 206.79 X 142.88 X 162.97 X 109.89 X 161.39 X 56.17 X 160.18 X 34.73 X 148.94 X 157.51 X 162.14 X 12.61	33147.4	25.7 22.7 25.7 17.7 27.1 7.0 33.3 11.3 30.0 24.1 18.5 3.2
13H 14V 15H	590.0 590.0 590.0	10.70 33.60 9.65	FLAT EDGING FLAT		153.60	X 157.60 X 10.75 X 154.40	1683.0 1647.0 1488.3	14.1 2.1 9.6

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 6"x3/8"
Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 2.20 m/s
AXV : 3272.11 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg

BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 118.7 s
INTER BILLET : 15.0 s
PRODUCTION : 80.0 t/h

	SPEED	DIA	RPM	GEAR RATIO	RPM		R FACTOR	R O R LOAD	TORQUE	POWER	
		(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(응)
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.17	638.7	5.1	85.673	440	1.294	111.3	1757.6	247.75	133	67.3
3H	0.23	686.1	6.4	118.730	764	1.345	63.9	2098.8	260.53	176	51.1
4V	0.28	588.0	9.1	74.409	679	1.215	72.0	1159.7	126.57	121	39.6
5H	0.39	660.0	11.1	87.594	976	1.371	0.0	2133.1	260.12	304	38.9
6V	0.41	576.4	13.7	68.825	945	1.076	83.6	304.1	21.08	30	7.1
7H	0.62	660.0	18.0	55.247	993	1.499	0.0	2572.0	219.20	413	51.9
8V	0.70	560.5	23.9	43.393	1035	1.127	99.5	330.0	28.58	71	8.9
9Н	1.00	660.0	28.9	37.442	1084	1.428	0.0	2199.2	139.18	422	52.7
10H	1.32	660.0	38.1	27.471	1047	1.317	0.0	1901.5	84.43	337	42.1
11H	1.62	590.0	52.3	17.428	912	1.228	0.0	1493.1	46.17	253	34.7
12V	1.67	475.7	67.1	13.852	929	1.033	114.3	58.0	2.53	18	2.4
13H	1.94	590.0	62.9	11.734	738	1.164	0.0	1231.4	28.96	191	32.3
14V	1.99	470.4	80.7	9.471	764	1.022	119.6	42.9	1.49	13	2.1
15H	2.20	590.0	71.2	9.841	700	1.107	0.0	927.8	16.78	125	22.3

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 130x12 SECTION ROLLED MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 2.05 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV : BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE			OCK WIDTH	AREA	REDUC TION
+	(mm)	(mm)		(mm)		(mm)		(응)
+			SQUARE			X 182.30		+
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	18.00	BOX		136.50	X 144.56	18539.6	24.7
3H	750.0	17.00	R.BOX		93.00	X 162.38	13163.3	29.0
4 V	660.0	15.00	ROUND		111.00	X 110.68	9671.8	26.5
5H	660.0	55.00	FLAT		55.00	X 139.04	7283.7	24.7
6V	660.0	36.00	EDGING		121.00	X 56.32	6733.0	7.6
7 H	660.0	34.00	FLAT		34.00	X 137.50	4656.9	30.8
8V	660.0	17.00	EDGING		117.00	X 35.69	4148.3	10.9
9Н	660.0	24.00	FLAT		24.00	X 128.63	3082.5	25.7
10H	660.0	18.50	FLAT		18.50	X 135.21	2498.2	19.0
11H	590.0	15.20	FLAT		15.20	X 139.15	2112.7	15.4
12V	590.0	18.20	EDGING		133.20	X 15.37	2036.3	3.6
13H	590.0	13.20	FLAT		13.20	X 134.73	1774.8	12.8
14V	590.0	13.20	EDGING		131.20	X 13.27	1735.4	2.2
15H	590.0	12.16	FLAT		12.16	X 131.70	1599.5	7.8

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 130×12 Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 2.05 m/s

AXV : 3272.11 mm²m/s

BILLET SIZE : 182.3 mm SQUARE

BILLET WEIGHT : 2970.0 kg

BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 118.7 s
INTER BILLET : 15.0 s
PRODUCTION : 80.0 t/h

	SPEED		RPM	GEAR RATIO	RPM		R FACTOR	R O R LOAD	TORQUE	POWER	
+					(RPM)		(mm)		(kNm)	(kW)	(%)
T	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
3Н	0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
4 V	0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
5H	0.45	660.0	13.0	87.594	1139	1.328	0.0	1734.2	208.29	284	35.4
6V	0.49	576.5	16.1	68.825	1108	1.082	83.5	297.5	19.84	33	7.4
7 H	0.70	660.0	20.3	55.247	1123	1.446	0.0	2053.6	172.17	367	45.8
8V	0.79	560.8	26.9	43.393	1166	1.123	99.2	303.4	23.80	67	8.4
9Н	1.06	660.0	30.7	37.442	1150	1.346	0.0	1647.0	100.31	323	40.3
10H	1.31	660.0	37.9	27.471	1041	1.234	0.0	1314.6	55.81	222	27.7
11H	1.55	590.0	50.1	17.428	874	1.182	0.0	1078.6	33.83	178	25.4
12V	1.61	475.7	64.5	13.852	894	1.038	114.3	71.4	3.07	21	2.9
13H	1.84	590.0	59.7	11.734	700	1.147	0.0	948.2	23.98	150	26.7
14V	1.89	472.4	76.2	9.471	722	1.023	117.6	49.5	1.63	13	2.2
15H	2.05	590.0	66.2	9.841	652	1.085	0.0	642.5	11.82	82	15.7
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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 5"x1/2" Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.98 m/s

AXV : 3272.11 mm²m/s

BILLET SIZE : 182.3 mm SQUARE

BILLET WEIGHT : 2970.0 kg

BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 118.7 s
INTER BILLET : 15.0 s
PRODUCTION : 80.0 t/h

STAND NO.	ROLL DIA	GAP GROOVE TYPE			HEIGHT	OCK WIDTH	AREA	REDUC TION
	(mm)	(mm)		(mm)			(mm²)	
+			SQUARE		182.30	X 182.30		+
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	18.00	BOX		136.50	X 144.56	18539.6	24.7
ЗН	750.0	17.00	R.BOX		93.00	X 162.38	13163.3	29.0
4 V	660.0	15.00	ROUND		111.00	X 110.68	9671.8	26.5
5H	660.0	55.00	FLAT		55.00	X 139.04	7283.7	24.7
6V	660.0	36.00	EDGING		121.00	X 56.32	6733.0	7.6
7 H	660.0	34.00	FLAT		34.00	X 137.50	4656.9	30.8
8V	660.0	16.00	EDGING		116.00	X 35.81	4123.8	11.4
9Н	660.0	24.00	FLAT		24.00	X 127.72	3060.5	25.8
10H	660.0	18.50	FLAT		18.50	X 134.30	2481.2	18.9
11H	590.0	15.50	FLAT		15.50	X 137.73	2132.4	14.1
12V	590.0	15.60	EDGING		130.60	X 15.72	2042.3	4.2
13H	590.0	13.80	FLAT		13.80	X 131.66	1812.9	11.2
14V	590.0	10.30	EDGING		128.30	X 13.87	1773.8	2.2
15H	590.0	12.87	FLAT		12.87	X 128.70	1654.0	6.8
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^{***} Subject to the confidentiality clause *** M

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DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT. SPEED CALCULATION FOR HOT ROLLING MILL

07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 5"x1/2" SECTION ROLLED MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.98 m/s AXV $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED		RPM	GEAR RATIO	RPM	R FACTOR	R FACTOR	R O	TORQUE	POWER	
+					(RPM)		(mm)		(kNm)	(kW)	(%)
T	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.18	639.8	5.3	85.673	451	1.329	110.2	1853.6	266.81	147	72.5
3Н	0.25	685.9	6.9	118.730	822	1.408	64.1	2263.0	292.11	212	57.3
4 V	0.34	587.6	11.0	74.409	818	1.361	72.4	1431.4	173.67	200	54.3
5н	0.45	660.0	13.0	87.594	1139	1.328	0.0	1734.2	208.29	284	35.4
6V	0.49	576.5	16.1	68.825	1108	1.082	83.5	297.5	19.84	33	7.4
7н	0.70	660.0	20.3	55.247	1123	1.446	0.0	2053.6	172.17	367	45.8
8V	0.79	560.8	27.0	43.393	1173	1.129	99.2	313.4	25.12	71	8.9
9н	1.07	660.0	30.9	37.442	1158	1.347	0.0	1640.3	100.28	325	40.6
10H	1.32	660.0	38.2	27.471	1048	1.234	0.0	1303.3	55.33	221	27.6
11H	1.53	590.0	49.7	17.428	866	1.164	0.0	985.6	29.62	154	22.2
12V	1.60	475.7	64.3	13.852	891	1.044	114.3	81.7	3.80	26	3.6
13H	1.80	590.0	58.4	11.734	686	1.127	0.0	824.1	19.70	121	22.0
14V	1.84	472.4	74.6	9.471	706	1.022	117.6	50.3	1.61	13	2.2
15H	1.98	590.0	64.0	9.841	630	1.072	0.0	559.1	9.80	66	13.0
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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 6"x1/2" SECTION ROLLED Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.65 m/s AXV $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

STAND NO.	ROLL DIA	GAP GROOVE TYPE		STOCK HEIGHT WIDTH			AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		182.30	X 182.30		
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	22.00	BOX		140.50	X 142.88	19039.5	22.7
3Н	750.0	23.00	R.BOX		99.00	X 162.97	14155.8	25.7
4 V	660.0	34.00	ROUND		130.00	X 109.89	11647.4	17.7
5H	660.0	55.00	FLAT		55.00	X 161.39	8494.4	27.1
6V	660.0	57.00	EDGING		142.00	X 56.17	7896.1	7.0
7H	660.0	34.00	FLAT		34.00	X 159.01	5387.8	31.8
8V	660.0	40.00	EDGING		140.00	X 35.22	4910.2	8.9
9Н	660.0	24.00	FLAT		24.00	X 151.49	3631.1	26.0
10H	660.0	18.50	FLAT		18.50	X 158.17	2922.8	19.5
11H	590.0	15.50	FLAT		15.50	X 161.65	2503.1	14.4
12V	590.0	41.50	EDGING		156.50	X 15.61	2432.0	2.8
13H	590.0	13.80	FLAT		13.80	X 157.43	2168.6	10.8
14V	590.0	36.10	EDGING		154.10	X 13.85	2128.7	1.8
15H	590.0	12.87	FLAT		12.87	X 154.40	1984.8	6.8

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 6"x1/2" SECTION ROLLED Hot rolling

: Low-med. carbon steel MATERIAL

ROLLING SPEED : 1.65 m/s AXV $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED		ROLL RPM	GEAR RATIO	MOTOR RPM		GROOVE R FACTOR		L L I N TORQUE	POWER	
		(mm)	(RPM)		(RPM)		(mm)		(kNm)	(kW)	(응)
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.17	638.7	5.1	85.673	440	1.294	111.3	1757.6	247.75	133	67.3
3H	0.23	686.1	6.4	118.730	764	1.345	63.9	2098.8	260.53	176	51.1
4V	0.28	588.0	9.1	74.409	679	1.215	72.0	1159.7	126.57	121	39.6
5H	0.39	660.0	11.1	87.594	976	1.371	0.0	2133.1	260.12	304	38.9
6V	0.41	576.4	13.7	68.825	945	1.076	83.6	304.1	21.08	30	7.1
7H	0.61	660.0	17.6	55.247	971	1.466	0.0	2461.8	205.97	379	48.8
8V	0.67	560.6	22.7	43.393	985	1.097	99.4	282.9	21.62	51	6.5
9Н	0.90	660.0	26.1	37.442	976	1.352	0.0	2000.1	119.87	327	41.9
10H	1.12	660.0	32.4	27.471	890	1.242	0.0	1625.1	69.00	234	32.9
11H	1.31	590.0	42.3	17.428	737	1.168	0.0	1228.0	36.91	164	27.7
12V	1.35	475.7	54.0	13.852	748	1.029	114.3	66.2	2.70	15	2.5
13H	1.51	590.0	48.8	11.734	573	1.121	0.0	1013.1	23.59	121	26.3
14V	1.54	472.4	62.1	9.471	589	1.019	117.6	51.1	1.64	11	2.3
15H	1.65	590.0	53.4	9.841	525	1.072	0.0	715.3	12.45	70	16.6

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 130x16 SECTION ROLLED MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.53 m/s AXV $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE			OCK WIDTH	AREA	TION
+	(mm)	(mm)		(mm)			(mm²)	(%)
+			SQUARE			X 182.30		+
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	22.00	BOX		140.50	X 142.88	19039.5	22.7
3Н	750.0	23.00	R.BOX		99.00	X 162.97	14155.8	25.7
4 V	660.0	34.00	ROUND		130.00	X 109.89	11647.4	17.7
5Н	660.0	60.00	FLAT		60.00	X 157.03	8978.1	22.9
6V	660.0	31.00	EDGING		131.00	X 61.94	8089.1	9.9
7H	660.0	39.00	FLAT		39.00	X 148.26	5776.5	28.6
8V	660.0	20.00	EDGING		130.00	X 40.48	5234.8	9.4
9Н	660.0	27.00	FLAT		27.00	X 142.40	3836.9	26.7
10V	660.0	21.00	EDGING		131.00	X 27.64	3601.0	6.1
11H	590.0	20.50	FLAT		20.50	X 137.73	2818.2	21.7
12V	590.0	26.50	EDGING		131.50	X 20.73	2711.7	3.8
13H	590.0	17.20	FLAT		17.20	X 134.28	2304.9	15.0
14V	590.0	13.50	EDGING		131.50	X 17.26	2263.0	1.8
15H	590.0	16.21	FLAT		16.21	X 131.70	2131.9	5.8

^{***} Subject to the confidentiality clause *** M



JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 130x16 SECTION ROLLED MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.53 m/s AXV $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED		ROLL RPM	GEAR RATIO	MOTOR RPM	FACTOR	GROOVE FACTOR	LOAD	L L I N TORQUE	POWER	
					(RPM)		(mm)		(kNm)	(kW)	(%)
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.17	638.7	5.1	85.673	440	1.294	111.3	1757.6	247.75	133	67.3
3H	0.23	686.1	6.4	118.730	764	1.345	63.9	2098.8	260.53	176	51.1
4V	0.28	588.0	9.1	74.409	679	1.215	72.0	1159.7	126.57	121	39.6
5H	0.36	660.0	10.5	87.594	924	1.297	0.0	1890.6	222.49	246	33.2
6V	0.40	560.4	13.8	68.825	949	1.110	99.6	419.3	32.14	46	10.9
7 H	0.57	660.0	16.4	55.247	906	1.400	0.0	2178.2	187.12	321	44.3
8V	0.63	550.7	21.7	43.393	941	1.103	109.3	325.1	24.51	56	7.4
9Н	0.85	660.0	24.7	37.442	924	1.364	0.0	1964.8	129.23	334	45.2
10V	0.91	550.7	31.5	27.471	866	1.066	109.3	182.1	11.11	37	5.3
11H	1.16	590.0	37.6	17.428	655	1.278	0.0	1505.0	68.67	270	51.6
12V	1.21	485.7	47.5	13.852	657	1.039	104.3	97.9	4.31	21	4.1
13H	1.42	590.0	46.0	11.734	539	1.177	0.0	1122.6	36.35	175	40.5
14V	1.45	472.4	58.5	9.471	554	1.019	117.6	56.4	1.66	10	2.3
15H	1.53	590.0	49.7	9.841	489	1.061	0.0	528.8	9.63	50	12.8

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 5"x5/8"
Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.58 m/s

AXV : 3272.11 mm²m/s

BILLET SIZE : 182.3 mm SQUARE

BILLET WEIGHT : 2970.0 kg

BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 118.7 s
INTER BILLET : 15.0 s
PRODUCTION : 80.0 t/h

STAND NO.	ROLL DIA	GAP GROOVE TYPE			STOCK HEIGHT WIDTH		AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)		(mm ²)	
+			SQUARE		182.30	x 182.30	33147.4	+
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	22.00	BOX		140.50	X 142.88	19039.5	22.7
3Н	750.0	23.00	R.BOX		99.00	X 162.97	14155.8	25.7
4 V	660.0	34.00	ROUND		130.00	X 109.89	11647.4	17.7
5Н	660.0	60.00	FLAT		60.00	X 157.03	8978.1	22.9
6V	660.0	31.00	EDGING		131.00	X 61.94	8089.1	9.9
7 H	660.0	39.00	FLAT		39.00	X 148.26	5776.5	28.6
8V	660.0	19.00	EDGING		129.00	X 40.59	5207.7	9.8
9Н	660.0	27.00	FLAT		27.00	X 141.49	3812.3	26.8
10V	660.0	18.00	EDGING		128.00	X 27.80	3539.7	7.2
11H	590.0	20.50	FLAT		20.50	X 134.92	2760.5	22.0
12V	590.0	23.50	EDGING		128.50	X 20.75	2651.8	3.9
13H	590.0	17.20	FLAT		17.20	X 131.30	2253.5	15.0
14V	590.0	10.40	EDGING		128.40	X 17.27	2210.2	1.9
15H	590.0	16.08	FLAT		16.08	X 128.70	2066.6	6.5
+								+

^{***} Subject to the confidentiality clause *** M

07/04/23



DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT. SPEED CALCULATION FOR HOT ROLLING MILL

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 5"x5/8" SECTION ROLLED MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.58 m/s AXV $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

(RPM) 3.9 5.1		(RPM)		(mm)				
	118.730							
	118.730							
5.1		463	1.346	99.1	2400.7	330.53	135	64.8
	85.673	440	1.294	111.3	1757.6	247.75	133	67.3
6.4	118.730	764	1.345	63.9	2098.8	260.53	176	51.1
9.1	74.409	679	1.215	72.0	1159.7	126.57	121	39.6
10.5	87.594	924	1.297	0.0	1890.6	222.49	246	33.2
13.8	68.825	949	1.110	99.6	419.3	32.14	46	10.9
16.4	55.247	906	1.400	0.0	2178.2	187.12	321	44.3
21.8	43.393	946	1.109	109.3	336.5	25.96	59	7.8
24.8	37.442	930	1.366	0.0	1958.1	129.24	336	45.2
32.1	27.471	881	1.077	109.3	203.3	13.35	45	6.4
38.4	17.428	669	1.282	0.0	1488.9	68.68	276	51.6
48.5	13.852	672	1.041	104.3	100.1	4.46	23	4.2
47.0	11.734	552	1.177	0.0	1094.2	35.50	175	39.6
59.9	9.471	567	1.020	117.6	57.6	1.72	11	2.4
	9.841	504						14.3
	59.9 51.3	59.9 9.471	59.9 9.471 567 51.3 9.841 504	59.9 9.471 567 1.020 51.3 9.841 504 1.069	59.9 9.471 567 1.020 117.6 51.3 9.841 504 1.069 0.0	59.9 9.471 567 1.020 117.6 57.6 51.3 9.841 504 1.069 0.0 558.5	59.9 9.471 567 1.020 117.6 57.6 1.72 51.3 9.841 504 1.069 0.0 558.5 10.78	59.9 9.471 567 1.020 117.6 57.6 1.72 11 51.3 9.841 504 1.069 0.0 558.5 10.78 58

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 6"x5/8"
Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.32 m/s
AXV : 3272.11 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY: 80.0 t/h
ROLLING TIME: 118.7 s
INTER BILLET: 15.0 s
PRODUCTION: 80.0 t/h

STAND NO.	ROLL DIA	GAP	TYPE		STOCK HEIGHT WIDTH			AREA	REDUC TION
,	(mm)	(mm)		(mm)	(mm)		(mm)	(mm²)	
+			SQUARE		182.30	Х	182.30		
1H	750.0	20.00	BOX		124.00	Χ	206.79	24635.6	25.7
2V	750.0	22.00	BOX		140.50	Χ	142.88	19039.5	22.7
ЗН	750.0	23.00	R.BOX		99.00	Χ	162.97	14155.8	25.7
4 V	660.0	34.00	ROUND		130.00	Χ	109.89	11647.4	17.7
5Н	660.0	60.00	FLAT		60.00	Χ	157.03	8978.1	22.9
6V	660.0	48.00	EDGING		148.00	Χ	60.28	8896.4	0.9
7н	660.0	39.00	FLAT		39.00	Χ	164.41	6406.7	28.0
87	660.0	41.00	EDGING		151.00	Χ	39.84	5988.7	6.5
9Н	660.0	27.00	FLAT		27.00	Χ	163.02	4394.0	26.6
10V	660.0	44.00	EDGING		154.00	Χ	27.37	4196.1	4.5
11H	590.0	20.50	FLAT		20.50	Χ	160.54	3285.8	21.7
12V	590.0	49.00	EDGING		154.00	Χ	20.69	3171.9	3.5
13H	590.0	17.20	FLAT		17.20	Χ	156.79	2691.9	15.1
14V	590.0	36.10	EDGING		154.10	Χ	17.24	2650.5	1.5
15H	590.0	16.08	FLAT		16.08	Χ	154.40	2479.9	6.4

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 6"x5/8" SECTION ROLLED Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.32 m/s AXV $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

	SPEED	DIA	RPM	GEAR RATIO	RPM		R FACTOR	R LOAD		POWER	}
•		(mm)	(RPM)		(RPM)		(mm)	(kN)		(kW)	(응)
+	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.17	638.7	5.1	85.673	440	1.294	111.3	1757.6	247.75	133	67.3
3н	0.23	686.1	6.4	118.730	764	1.345	63.9	2098.8	260.53	176	51.1
4 V	0.28	588.0	9.1	74.409	679	1.215	72.0	1159.7	126.57	121	39.6
5H	0.36	660.0	10.5	87.594	924	1.297	0.0	1890.6	222.49	246	33.2
6V	0.37	560.4	12.5	68.825	863	1.009	99.6	146.4	6.95	9	2.4
7H	0.51	660.0	14.8	55.247	817	1.389	0.0	2361.2	196.12	304	46.5
8V	0.55	550.7	18.9	43.393	822	1.070	109.3	261.4	17.33	34	5.2
9н	0.74	660.0	21.5	37.442	807	1.363	0.0	2260.1	145.42	328	50.8
10V	0.78	550.7	27.0	27.471	743	1.047	109.3	153.1	8.49	24	4.0
11H	1.00	590.0	32.2	17.428	562	1.277	0.0	1788.7	80.25	271	60.3
12V	1.03	485.7	40.6	13.852	562	1.036	104.3	98.7	4.47	19	4.2
13H	1.22	590.0	39.3	11.734	462	1.178	0.0	1369.9	44.17	182	49.3
14V	1.23	472.4	49.9	9.471	473	1.016	117.6	55.9	1.63	9	2.3
15H	1.32	590.0	42.7	9.841	420	1.069	0.0	704.5	13.51	60	18.0
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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 130x19 MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.29 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT		AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		182.30	X 182.30		
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	22.00	BOX		140.50	X 142.88	19039.5	22.7
3Н	750.0	23.00	R.BOX		99.00	X 162.97	14155.8	25.7
4 V	660.0	34.00	ROUND		130.00	X 109.89	11647.4	17.7
5H	660.0	60.00	FLAT		60.00	X 157.03	8978.1	22.9
6V	660.0	30.00	EDGING		130.00	X 62.08	8045.5	10.4
7H	660.0	39.00	FLAT		39.00	X 147.33	5740.5	28.7
8V	660.0	18.00	EDGING		128.00	X 40.61	5170.0	9.9
9Н	660.0	26.50	FLAT		26.50	X 141.18	3733.2	27.8
10V	660.0	18.00	EDGING		128.00	X 27.27	3471.6	7.0
11H	590.0	20.30	FLAT		20.30	X 134.57	2726.6	21.5
12V	590.0	27.00	EDGING		132.00	X 20.37	2675.5	1.9
13H	590.0	19.25	FLAT		19.25	X 131.70	2529.7	5.5

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 130x19 MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.29 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV : BILLET SIZE BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	FACTOR	GROOVE R FACTOF	R LOAD	L L I N TORQUE	POWER	
+	(m/s)	(mm)	(RPM)		(RPM)		(mm)		(kNm)	(kW)	(응)
+	1.20										+
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.17	638.7	5.1	85.673	440	1.294	111.3	1757.6	247.75	133	67.3
3Н	0.23	686.1	6.4	118.730	764	1.345	63.9	2098.8	260.53	176	51.1
4V	0.28	588.0	9.1	74.409	679	1.215	72.0	1159.7	126.57	121	39.6
5H	0.36	660.0	10.5	87.594	924	1.297	0.0	1890.6	222.49	246	33.2
6V	0.41	560.4	13.9	68.825	954	1.116	99.6	434.9	34.10	49	11.5
7H	0.57	660.0	16.5	55.247	911	1.402	0.0	2169.4	186.88	323	44.3
8V	0.63	550.7	21.9	43.393	952	1.110	109.3	337.8	26.09	60	7.9
9н	0.88	660.0	25.4	37.442	950	1.385	0.0	2010.7	134.90	358	47.2
10V	0.94	550.7	32.7	27.471	898	1.075	109.3	196.5	12.77	44	6.1
11H	1.20	590.0	38.8	17.428	677	1.273	0.0	1446.9	65.26	266	49.0
12V	1.22	485.7	48.1	13.852	666	1.019	104.3	61.2	1.85	9	1.8
13H	1.29	590.0	41.9	11.734	491	1.058	0.0	480.6	8.99	39	10.0
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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 5"x3/4" MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.32 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STC HEIGHT		AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		182.30	X 182.30		
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	22.00	BOX		140.50	X 142.88	19039.5	22.7
3 H	750.0	23.00	R.BOX		99.00	X 162.97	14155.8	25.7
4 V	660.0	34.00	ROUND		130.00	X 109.89	11647.4	17.7
5H	660.0	60.00	FLAT		60.00	X 157.03	8978.1	22.9
6V	660.0	28.00	EDGING		128.00	X 62.37	7958.4	11.4
7 H	660.0	39.00	FLAT		39.00	X 145.49	5668.4	28.8
8V	660.0	15.00	EDGING		125.00	X 40.77	5067.2	10.6
9н	660.0	26.50	FLAT		26.50	X 138.28	3656.3	27.8
10V	660.0	15.40	EDGING		125.40	X 27.27	3400.8	7.0
11H	590.0	20.30	FLAT		20.30	X 131.95	2673.5	21.4
12V	590.0	24.00	EDGING		129.00	X 20.39	2616.6	2.1
13H	590.0	19.30	FLAT		19.30	X 128.70	2478.3	5.3

^{***} Subject to the confidentiality clause *** M

JOB NO. : DPC68X01



DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT. SPEED CALCULATION FOR HOT ROLLING MILL

LAYOUT NO. : 000-000-361-340

07/04/23

SECTION ROLLED

: Flat 5"x3/4" Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.32 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

	POWER	L L I N TORQUE	LOAD	GROOVE R FACTOR		MOTOR RPM	GEAR RATIO	ROLL RPM	WORK DIA	SPEED	STAND NO.
(%)	(kW)	(kNm)	(kN)	(mm)		(RPM)		(RPM)	(mm)	(m/s)	
										1.20	+
64.8	135	330.53	2400.7	99.1	1.346	463	118.730	3.9	650.9	0.13	1H
67.3	133	247.75	1757.6	111.3	1.294	440	85.673	5.1	638.7	0.17	2V
51.1	176	260.53	2098.8	63.9	1.345	764	118.730	6.4	686.1	0.23	3Н
39.6	121	126.57	1159.7	72.0	1.215	679	74.409	9.1	588.0	0.28	4V
33.2	246	222.49	1890.6	0.0	1.297	924	87.594	10.5	660.0	0.36	5H
12.9	56	38.01	465.0	99.6	1.128	964	68.825	14.0	560.4	0.41	6V
44.2	326	186.40	2151.8	0.0	1.404	923	55.247	16.7	660.0	0.58	7H
8.4	65	27.82	351.6	109.3	1.119	972	43.393	22.4	550.7	0.65	8V
46.5	360	132.91	1971.3	0.0	1.386	970	37.442	25.9	660.0	0.89	9Н
5.9	44	12.48	194.2	109.3	1.075	917	27.471	33.4	550.7	0.96	10V
47.8	264	63.65	1411.1	0.0	1.272	690	17.428	39.6	590.0	1.22	11H
2.0	11	2.09	65.2	104.3	1.022	681	13.852	49.2	485.7	1.25	12V
9.4	38	8.41	457.1	0.0	1.056	501	11.734	42.7	590.0	1.32	13H

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 6"x3/4" MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.10 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg BILLET SIZE

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	CK WIDTH	AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		182.30	x 182.30		
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	22.00	BOX		140.50	X 142.88	19039.5	22.7
3H	750.0	23.00	R.BOX		99.00	X 162.97	14155.8	25.7
4 V	660.0	34.00	ROUND		130.00	X 109.89	11647.4	17.7
5H	660.0	60.00	FLAT		60.00	X 157.03	8978.1	22.9
6V	660.0	44.50	EDGING		144.50	X 60.51	8718.5	2.9
7 H	660.0	39.00	FLAT		39.00	X 161.01	6274.2	28.0
8V	660.0	37.00	EDGING		147.00	X 39.92	5841.1	6.9
9Н	660.0	26.50	FLAT		26.50	X 159.76	4225.8	27.7
10V	660.0	41.00	EDGING		151.00	X 26.86	4037.4	4.5
11H	590.0	20.30	FLAT		20.30	x 157.19	3185.9	21.1
12V	590.0	49.80	EDGING		154.80	X 20.35	3136.6	1.5
13H	590.0	19.30	FLAT		19.30	X 154.40	2974.3	5.2

^{***} Subject to the confidentiality clause *** M



JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 6"x3/4" MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.10 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	FACTOR	GROOVE R FACTOR	R LOAD	L L I N TORQUE	POWER	
+	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)		(kW)	(응)
+	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.17	638.7	5.1	85.673	440	1.294	111.3	1757.6	247.75	133	67.3
3н	0.23	686.1	6.4	118.730	764	1.345	63.9	2098.8	260.53	176	51.1
4 V	0.28	588.0	9.1	74.409	679	1.215	72.0	1159.7	126.57	121	39.6
5H	0.36	660.0	10.5	87.594	924	1.297	0.0	1890.6	222.49	246	33.2
6V	0.38	560.4	12.8	68.825	880	1.030	99.6	189.6	10.38	14	3.5
7H	0.52	660.0	15.1	55.247	834	1.390	0.0	2316.3	193.32	306	45.8
8V	0.56	550.7	19.4	43.393	843	1.074	109.3	269.8	18.22	37	5.5
9Н	0.77	660.0	22.4	37.442	839	1.382	0.0	2279.1	149.49	351	52.3
10V	0.81	550.7	28.1	27.471	772	1.047	109.3	147.7	8.08	24	3.8
11H	1.03	590.0	33.2	17.428	579	1.267	0.0	1697.0	74.48	259	55.9
12V	1.04	485.7	41.0	13.852	568	1.016	104.3	59.2	1.76	8	1.7
13H	1.10	590.0	35.6	11.734	418	1.055	0.0	565.5	10.29	38	11.5
+						тс	 DTAL ROI	LING PO	 WER :	1847	kW

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 5"x7/8" MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 1.13 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg BILLET SIZE

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	OCK WIDTH	AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		182.30	X 182.30		
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	22.00	BOX		140.50	X 142.88	19039.5	22.7
3H	750.0	23.00	R.BOX		99.00	X 162.97	14155.8	25.7
4 V	660.0	34.00	ROUND		130.00	X 109.89	11647.4	17.7
5H	660.0	60.00	FLAT		60.00	X 157.03	8978.1	22.9
6V	660.0	28.00	EDGING		128.00	X 62.37	7958.4	11.4
7 H	660.0	40.00	FLAT		40.00	X 144.45	5772.5	27.5
8V	660.0	17.00	EDGING		127.00	X 41.48	5229.8	9.4
9Н	660.0	29.00	FLAT		29.00	X 137.62	3982.8	23.8
10V	660.0	17.00	EDGING		127.00	X 29.64	3743.0	6.0
11H	590.0	23.50	FLAT		23.50	X 131.77	3089.8	17.5
12V	590.0	21.80	EDGING		128.80	X 23.59	3028.9	2.0
13H	590.0	22.51	FLAT		22.51	X 128.70	2892.8	4.5

^{***} Subject to the confidentiality clause *** M

JOB NO. : DPC68X01



DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT. SPEED CALCULATION FOR HOT ROLLING MILL

LAYOUT NO. : 000-000-361-340

07/04/23

: Flat 5"x7/8" SECTION ROLLED Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.13 m/s $3272.11 \text{ mm}^2\text{m/s}$ AXV : BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM		GROOVE R FACTOR		L L I N TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.17	638.7	5.1	85.673	440	1.294	111.3	1757.6	247.75	133	67.3
ЗН	0.23	686.1	6.4	118.730	764	1.345	63.9	2098.8	260.53	176	51.1
4 V	0.28	588.0	9.1	74.409	679	1.215	72.0	1159.7	126.57	121	39.6
5H	0.36	660.0	10.5	87.594	924	1.297	0.0	1890.6	222.49	246	33.2
6V	0.41	560.4	14.0	68.825	964	1.128	99.6	465.0	38.01	56	12.9
7H	0.57	660.0	16.4	55.247	906	1.379	0.0	2064.9	175.65	302	41.6
8V	0.63	550.9	21.7	43.393	941	1.104	109.1	326.1	24.06	55	7.3
9Н	0.82	660.0	23.8	37.442	890	1.313	0.0	1739.0	110.51	275	38.6
10V	0.87	550.7	30.3	27.471	833	1.064	109.3	188.0	11.08	35	5.3
11H	1.06	590.0	34.3	17.428	597	1.211	0.0	1211.2	51.84	186	38.9
12V	1.08	483.4	42.7	13.852	591	1.020	106.6	72.0	2.20	10	2.1
13H	1.13	590.0	36.6	11.734	430	1.047	0.0	427.2	7.99	31	8.9

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 6"x7/8" MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 0.94 m/s : $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg BILLET SIZE

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STC HEIGHT		AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		182.30	X 182.30		
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	22.00	BOX		140.50	X 142.88	19039.5	22.7
ЗН	750.0	23.00	R.BOX		99.00	X 162.97	14155.8	25.7
4 V	660.0	34.00	ROUND		130.00	X 109.89	11647.4	17.7
5H	660.0	60.00	FLAT		60.00	X 157.03	8978.1	22.9
6V	660.0	45.00	EDGING		145.00	X 60.47	8743.5	2.6
7 H	660.0	40.00	FLAT		40.00	X 160.43	6411.7	26.7
8V	660.0	38.50	EDGING		148.50	X 40.75	6022.6	6.1
9н	660.0	29.00	FLAT		29.00	X 158.72	4594.9	23.7
10V	660.0	42.50	EDGING		152.50	X 29.25	4440.5	3.4
11H	590.0	23.50	FLAT		23.50	X 156.95	3681.8	17.1
12V	590.0	47.50	EDGING		154.50	X 23.55	3629.2	1.4
13H	590.0	22.51	FLAT		22.51	X 154.40	3471.3	4.4

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 6"x7/8" SECTION ROLLED MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 0.94 m/s AXV : $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM		GROOVE R FACTOR		TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(응)
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.17	638.7	5.1	85.673	440	1.294	111.3	1757.6	247.75	133	67.3
ЗН	0.23	686.1	6.4	118.730	764	1.345	63.9	2098.8	260.53	176	51.1
4V	0.28	588.0	9.1	74.409	679	1.215	72.0	1159.7	126.57	121	39.6
5H	0.36	660.0	10.5	87.594	924	1.297	0.0	1890.6	222.49	246	33.2
6V	0.37	560.4	12.8	68.825	878	1.027	99.6	183.8	9.88	13	3.3
7H	0.51	660.0	14.8	55.247	816	1.364	0.0	2221.9	181.63	281	43.0
8V	0.54	550.7	18.8	43.393	818	1.065	109.3	249.8	15.71	31	4.7
9Н	0.71	660.0	20.6	37.442	772	1.311	0.0	2005.9	124.36	268	43.5
10V	0.74	550.7	25.6	27.471	702	1.035	109.3	129.5	6.08	16	2.9
11H	0.89	590.0	28.8	17.428	501	1.206	0.0	1444.2	60.06	181	45.1
12V	0.90	483.4	35.6	13.852	493	1.014	106.6	65.3	1.85	7	1.7
13H	0.94	590.0	30.5	11.734	358	1.045	0.0	526.0	9.72	31	10.8

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 5"x1" MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 0.99 m/s : $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	CK WIDTH	AREA	REDUC TION
	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	(%)
			SQUARE		182.30	x 182.30		
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	22.00	BOX		140.50	X 142.88	19039.5	22.7
3H	750.0	23.00	R.BOX		99.00	X 162.97	14155.8	25.7
4V	660.0	34.00	ROUND		130.00	X 109.89	11647.4	17.7
5H	660.0	60.00	FLAT		60.00	X 157.03	8978.1	22.9
6V	660.0	28.00	EDGING		128.00	X 62.37	7958.4	11.4
7 H	660.0	40.00	FLAT		40.00	X 144.45	5772.5	27.5
8V	660.0	18.00	EDGING		128.00	X 41.36	5258.6	8.9
9Н	660.0	31.00	FLAT		31.00	X 136.00	4207.5	20.0
10V	660.0	28.00	EDGING		128.00	X 31.45	4013.0	4.6
11H	590.0	26.70	FLAT		26.70	x 131.19	3498.5	12.8
12V	590.0	22.80	EDGING		128.80	x 26.78	3438.4	1.7
13H	590.0	25.73	FLAT		25.73	X 128.70	3306.7	3.8

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 5"x1" SECTION ROLLED MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 0.99 m/s AXV : $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE R FACTOR		L L I N TORQUE		UTIL
+	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.17	638.7	5.1	85.673	440	1.294	111.3	1757.6	247.75	133	67.3
3H	0.23	686.1	6.4	118.730	764	1.345	63.9	2098.8	260.53	176	51.1
4V	0.28	588.0	9.1	74.409	679	1.215	72.0	1159.7	126.57	121	39.6
5H	0.36	660.0	10.5	87.594	924	1.297	0.0	1890.6	222.49	246	33.2
6V	0.41	560.4	14.0	68.825	964	1.128	99.6	465.0	38.01	56	12.9
7 H	0.57	660.0	16.4	55.247	906	1.379	0.0	2064.9	175.65	302	41.6
8V	0.62	550.9	21.6	43.393	936	1.098	109.1	313.8	22.57	51	6.8
9Н	0.78	660.0	22.5	37.442	843	1.250	0.0	1490.5	87.25	206	30.5
10V	0.82	560.4	27.8	27.471	763	1.048	99.6	165.4	8.55	25	4.1
11H	0.94	590.0	30.3	17.428	528	1.147	0.0	953.0	36.64	116	27.5
12V	0.95	484.4	37.5	13.852	520	1.017	105.6	75.6	2.15	8	2.0
13H	0.99	590.0	32.0	11.734	376	1.040	0.0	399.1	7.41	25	8.3

+----+ *** Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 6"x1" Hot rolling

MATERIAL

: Low-med. carbon steel : 0.82 m/s MAIEKIAL ROLLING SPEED : $3272.11 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT		AREA	REDUC TION
	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		182.30	X 182.30		
1H	750.0	20.00	BOX		124.00	X 206.79	24635.6	25.7
2V	750.0	22.00	BOX		140.50	X 142.88	19039.5	22.7
3Н	750.0	23.00	R.BOX		99.00	X 162.97	14155.8	25.7
4 V	660.0	34.00	ROUND		130.00	X 109.89	11647.4	17.7
5H	660.0	60.00	FLAT		60.00	X 157.03	8978.1	22.9
6V	660.0	45.00	EDGING		145.00	X 60.47	8743.5	2.6
7н	660.0	40.00	FLAT		40.00	X 160.43	6411.7	26.7
8V	660.0	40.00	EDGING		150.00	X 40.63	6065.8	5.4
9н	660.0	31.00	FLAT		31.00	X 157.53	4875.0	19.6
10V	660.0	54.00	EDGING		154.00	X 31.11	4778.6	2.0
11H	590.0	26.70	FLAT		26.70	X 156.93	4185.7	12.4
12V	590.0	48.50	EDGING		154.50	X 26.76	4123.6	1.5
13H	590.0	25.73	FLAT		25.73	X 154.40	3968.0	3.8

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 6"x1" MATERIAL Hot rolling

: Low-med. carbon steel

ROLLING SPEED : 0.82 m/s : AXV $3272.11 \text{ mm}^2\text{m/s}$ BILLET SIZE BILLET SIZE : 182.3 mm SQUARE BILLET WEIGHT : 2970.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 118.7 s INTER BILLET : 15.0 s : 80.0 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM		GROOVE R FACTOR	R LOAD	TORQUE	POWER	
	(m/s)		(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(응)
	1.20										
1H	0.13	650.9	3.9	118.730	463	1.346	99.1	2400.7	330.53	135	64.8
2V	0.17	638.7	5.1	85.673	440	1.294	111.3	1757.6	247.75	133	67.3
ЗН	0.23	686.1	6.4	118.730	764	1.345	63.9	2098.8	260.53	176	51.1
4V	0.28	588.0	9.1	74.409	679	1.215	72.0	1159.7	126.57	121	39.6
5H	0.36	660.0	10.5	87.594	924	1.297	0.0	1890.6	222.49	246	33.2
6V	0.37	560.4	12.8	68.825	878	1.027	99.6	183.8	9.88	13	3.3
7H	0.51	660.0	14.8	55.247	816	1.364	0.0	2221.9	181.63	281	43.0
8V	0.54	550.7	18.7	43.393	812	1.057	109.3	229.0	13.58	27	4.1
9Н	0.67	660.0	19.4	37.442	727	1.244	0.0	1706.3	96.84	197	33.9
10V	0.68	560.4	23.3	27.471	641	1.020	99.6	100.6	3.61	9	1.7
11H	0.78	590.0	25.3	17.428	441	1.142	0.0	1129.8	42.02	111	31.6
12V	0.79	484.4	31.3	13.852	433	1.015	105.6	75.9	2.19	7	2.1
13H	0.82	590.0	26.7	11.734	313	1.039	0.0	495.6	9.17	26	10.2

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*** Subject to the confidentiality clause *** M



2.2 Flats from billet 150mm

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL

07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x1/4" blt150

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 4.95 m/s

AXV : 3269.59 mm²m/s

BILLET SIZE : 152.0 mm SQUARE

BILLET WEIGHT : 2065 0 1

BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 82.6 s
INTER BILLET : 15.0 s
PRODUCTION : 76.2 t/h

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		ST(K WIDTH	AREA	REDUC TION
	(mm)	(mm)		(mm)	(mm)		(mm)	(mm²)	·
1H 2V	750.0 750.0	24.00 18.00	SQUARE BOX BOX		128.00	Χ	151.95 160.30 136.23	23003.0 20518.4	10.8
3H 4V	750.0 660.0	17.00 15.00	R.BOX ROUND		93.00	Χ	161.05 110.52		27.4 26.3
5H 6V	660.0	12.00	R.OVAL ROUND		82.00	Χ	132.53	6962.5 5292.0	28.0
7H 8V 9H	660.0 660.0	40.00 8.00 24.50	FLAT EDGING FLAT		40.00 78.00 24.50	Χ		4038.8 3366.0 2326.4	23.7 16.7 30.9
10H 11H	660.0	15.50 10.60	FLAT FLAT		15.50	Χ	107.44 115.38	1659.1 1216.9	28.7
12V 13H	590.0 590.0	20.00	EDGING FLAT			Χ	11.17 105.56	1112.3 831.2	25.3
14V 15H	590.0 590.0	35.50 6.43	EDGING FLAT				8.01 102.90	802.3	

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 4"x1/4" blt150 SECTION ROLLED

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 4.95 m/s AXV $3269.59 \text{ mm}^2\text{m/s}$ BILLET SIZE : 152.0 mm SQUARE BILLET WEIGHT : 2065.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 82.6 s 15.0 s INTER BILLET : PRODUCTION : 76.2 t/h

	SPEED	DIA	RPM		RPM		R FACTOR	R LOAD	L L I N TORQUE	POWER	
		(mm)	(RPM)		(RPM)		(mm)	(kN)		(kW)	(응)
	1.20										
1H	0.16	646.0	4.7	118.730	559	1.121	104.0	1167.2	112.48	55	22.0
2V	0.18	635.4	5.4	85.673	466	1.136	114.6	1133.6	113.64	65	30.9
3H	0.25	685.6	6.9	118.730	825	1.378	64.4	2178.6	273.30	199	53.6
4V	0.34	587.5	11.0	74.409	818	1.356	72.5	1430.7	172.81	199	54.0
5H	0.47	619.5	14.5	87.594	1268	1.389	40.5	1664.5	169.28	257	32.1
6V	0.62	607.8	19.4	68.825	1336	1.316	52.2	1048.8	118.90	242	53.7
7H	0.81	660.0	23.4	55.247	1294	1.310	0.0	1384.6	143.72	353	44.1
8V	0.97	590.7	31.4	43.393	1363	1.200	69.3	421.9	35.53	117	14.6
9H	1.41	660.0	40.7	37.442	1523	1.447	0.0	1433.2	109.43	466	58.3
10H	1.97	660.0	57.0	27.471	1567	1.402	0.0	1404.2	74.01	442	55.2
11H	2.69	590.0	87.0	17.428	1516	1.363	0.0	1297.9	47.66	434	54.3
12V	2.94	510.4	110.0	13.852	1524	1.094	79.6	89.4	5.83	67	8.4
13H	3.93	590.0	127.3	11.734	1494	1.338	0.0	1178.7	35.09	468	58.5
14V	4.08	525.4	148.1	9.471	1403	1.036	64.6	35.7	1.43	22	2.8
15H	4.95	590.0	160.3	9.841	1578	1.215	0.0	851.0	17.75	298	37.2

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x5/16" blt150

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 3.96 m/s
AXV : 3269.59 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg

BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 82.6 s
INTER BILLET : 15.0 s
PRODUCTION : 76.2 t/h

STAND NO.	ROLL DIA	GAP GROOVE TYPE			STO HEIGHT		WIDTH	AREA	REDUC TION
	(mm)	(mm)		(mm)			(mm)	(mm²)	
+			SQUARE		151.95	Х	151.95		
1H	750.0	24.00	BOX		128.00	Χ	160.30	20518.4	10.8
2V	750.0	18.00	BOX		136.50	Χ	136.23	18063.7	12.0
3H	750.0	17.00	R.BOX		93.00	Χ	161.05	13111.5	27.4
4 V	660.0	15.00	ROUND		111.00	Χ	110.52	9668.5	26.3
5H	660.0	12.00	R.OVAL		67.60	Χ	132.53	6962.5	28.0
6V	660.0	12.00	ROUND		82.00	Χ	82.39	5292.0	24.0
7H	660.0	40.00	FLAT		40.00	Χ	106.11	4038.8	23.7
8V	660.0	8.00	EDGING		78.00	Χ	43.52	3366.0	16.7
9Н	660.0	24.50	FLAT		24.50	Χ	95.19	2326.4	30.9
10H	660.0	15.80	FLAT		15.80	Χ	106.89	1683.4	27.6
11H	590.0	11.20	FLAT		11.20	Χ	114.04	1272.6	24.4
12V	590.0	21.50	EDGING		101.50	Χ	11.67	1179.5	7.3
13H	590.0	9.00	FLAT		9.00	Χ	105.34	946.1	19.8
14V	590.0	11.10	EDGING		102.10	Χ	9.07	922.5	2.5
15H	590.0	8.04	FLAT		8.04	Χ	102.90	825.8	10.5

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x5/16" blt150

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 3.96 m/s

AXV : 3269.59 mm²m/s

BILLET SIZE : 152.0 mm SQUARE

BILLET WEIGHT : 2065.0 kg

MAX HEATING CAPABILITY: 80.0 t/h
ROLLING TIME: 82.6 s
INTER BILLET: 15.0 s
PRODUCTION: 76.2 t/h

	SPEED		RPM		RPM		R FACTOR	R LOAD	L L I N TORQUE	POWER	
		(mm)	(RPM)		(RPM)		(mm)	(kN)		(kW)	(응)
	1.20										
1H	0.16	646.0	4.7	118.730	559	1.121	104.0	1167.2	112.48	55	22.0
2V	0.18	635.4	5.4	85.673	466	1.136	114.6	1133.6	113.64	65	30.9
3H	0.25	685.6	6.9	118.730	825	1.378	64.4	2178.6	273.30	199	53.6
4V	0.34	587.5	11.0	74.409	818	1.356	72.5	1430.7	172.81	199	54.0
5H	0.47	619.5	14.5	87.594	1268	1.389	40.5	1664.5	169.28	257	32.1
6V	0.62	607.8	19.4	68.825	1336	1.316	52.2	1048.8	118.90	242	53.7
7 H	0.81	660.0	23.4	55.247	1294	1.310	0.0	1384.6	143.72	353	44.1
8V	0.97	590.7	31.4	43.393	1363	1.200	69.3	421.9	35.53	117	14.6
9Н	1.41	660.0	40.7	37.442	1523	1.447	0.0	1433.2	109.43	466	58.3
10H	1.94	660.0	56.2	27.471	1544	1.382	0.0	1355.1	70.39	414	51.8
11H	2.57	590.0	83.2	17.428	1449	1.323	0.0	1190.0	42.60	371	46.4
12V	2.77	510.4	103.7	13.852	1437	1.079	79.6	83.2	4.97	54	6.7
13H	3.46	590.0	111.9	11.734	1313	1.247	0.0	951.2	25.92	304	38.0
14V	3.54	499.4	135.5	9.471	1284	1.026	90.6	31.4	1.01	14	1.8
15H	3.96	590.0	128.2	9.841	1261	1.117	0.0	545.7	9.41	126	15.8

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 4"x3/8" blt150 SECTION ROLLED

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 3.30 m/s $3269.59 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 152.0 mm SQUARE BILLET WEIGHT : 2065.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		ST(HEIGHT		WIDTH	AREA	REDUC TION
+	(mm)	(mm)		(mm)			(mm)	(mm²)	
+			SQUARE		151.95	Х	151.95	23003.0	+
1H	750.0	24.00	BOX		128.00	Χ	160.30	20518.4	10.8
2V	750.0	18.00	BOX		136.50	Χ	136.23	18063.7	12.0
3H	750.0	17.00	R.BOX		93.00	Χ	161.05	13111.5	27.4
4 V	660.0	15.00	ROUND		111.00	Χ	110.52	9668.5	26.3
5Н	660.0	12.00	R.OVAL		67.60	Χ	132.53	6962.5	28.0
6V	660.0	12.00	ROUND		82.00	Χ	82.39	5292.0	24.0
7 H	660.0	40.00	FLAT		40.00	Χ	106.11	4038.8	23.7
8V	660.0	8.00	EDGING		78.00	Χ	43.52	3366.0	16.7
9Н	660.0	25.50	FLAT		25.50	Χ	93.95	2390.6	29.0
10H	660.0	17.40	FLAT		17.40	Χ	104.14	1808.3	24.4
11H	590.0	13.00	FLAT		13.00	Χ	110.27	1430.7	20.9
12V	590.0	22.00	EDGING		102.00	Χ	13.33	1353.9	5.4
13H	590.0	10.70	FLAT		10.70	Χ	105.22	1123.8	17.0
14V	590.0	30.20	EDGING		102.20	Χ	10.78	1097.1	2.4
15H	590.0	9.65	FLAT		9.65	Χ	102.90	991.3	
+									

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x3/8" blt150

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 3.30 m/s

AXV : 3269.59 mm²m/s

BILLET SIZE : 152.0 mm SQUARE

BILLET WEIGHT : 2065.0 kg

BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 82.6 s
INTER BILLET : 15.0 s
PRODUCTION : 76.2 t/h

	SPEED	DIA	RPM	GEAR RATIO	RPM		R FACTOR	R O R O LOAD	TORQUE	POWER	
		(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(응)
	1.20										
1H	0.16	646.0	4.7	118.730	559	1.121	104.0	1167.2	112.48	55	22.0
2V	0.18	635.4	5.4	85.673	466	1.136	114.6	1133.6	113.64	65	30.9
3H	0.25	685.6	6.9	118.730	825	1.378	64.4	2178.6	273.30	199	53.6
4V	0.34	587.5	11.0	74.409	818	1.356	72.5	1430.7	172.81	199	54.0
5H	0.47	619.5	14.5	87.594	1268	1.389	40.5	1664.5	169.28	257	32.1
6V	0.62	607.8	19.4	68.825	1336	1.316	52.2	1048.8	118.90	242	53.7
7 H	0.81	660.0	23.4	55.247	1294	1.310	0.0	1384.6	143.72	353	44.1
8V	0.97	590.7	31.4	43.393	1363	1.200	69.3	421.9	35.53	117	14.6
9Н	1.37	660.0	39.6	37.442	1482	1.408	0.0	1353.2	101.01	419	52.3
10H	1.81	660.0	52.3	27.471	1437	1.322	0.0	1201.4	60.76	333	41.6
11H	2.29	590.0	74.0	17.428	1289	1.264	0.0	1020.1	36.15	280	35.0
12V	2.41	510.4	90.4	13.852	1252	1.057	79.6	74.9	3.73	35	4.4
13H	2.91	590.0	94.2	11.734	1105	1.205	0.0	849.0	23.24	229	28.7
14V	2.98	518.4	109.8	9.471	1040	1.024	71.6	37.1	1.19	14	1.7
15H	3.30	590.0	106.8	9.841	1051	1.107	0.0	521.0	9.48	106	13.3

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO.: DPC68X01 LAYOUT NO.: 000-000-361-340

SECTION ROLLED : Flat 4"x1/2" blt150

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 2.47 m/s

AXV : 3269.59 mm²m/s

BILLET SIZE : 152.0 mm SQUARE

BILLET WEIGHT : 2065.0 kg

BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 82.6 s
INTER BILLET : 15.0 s
PRODUCTION : 76.2 t/h

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		HEIGHT	OCK WIDTH	AREA	REDUC TION
	(mm)	(mm)		(mm)	(mm)		(mm²)	
+			SQUARE		151.95	X 151.95	23003.0	+
1H	750.0	24.00	BOX		128.00	X 160.30	20518.4	10.8
2V	750.0	18.00	BOX		136.50	X 136.23	18063.7	12.0
3H	750.0	17.00	R.BOX		93.00	X 161.05	13111.5	27.4
4 V	660.0	15.00	ROUND		111.00	X 110.52	9668.5	26.3
5H	660.0	15.00	R.OVAL		70.60	X 130.13	7276.2	24.7
6V	660.0	22.00	ROUND		92.00	X 81.48	6043.2	16.9
7 H	660.0	40.00	FLAT		40.00	X 118.13	4509.6	25.4
8V	660.0	26.50	EDGING		96.50	X 41.92	4028.8	10.7
9н	660.0	25.50	FLAT		25.50	X 111.97	2850.4	29.2
10V	660.0	13.50	EDGING		98.50	X 26.64	2605.8	8.6
11H	590.0	17.50	FLAT		17.50	X 108.39	1890.6	27.4
12V	590.0	20.50	EDGING		100.50	X 17.89	1790.3	5.3
13H	590.0	13.70	FLAT		13.70	X 105.40	1441.3	19.5
14V	590.0	17.80	EDGING		102.80	X 13.78	1410.7	2.1
15H	590.0	12.87	FLAT		12.87	X 102.90	1322.0	6.3
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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x1/2" blt150

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 2.47 m/s

AXV : 3269.59 mm²m/s

BILLET SIZE : 152.0 mm SQUARE

BILLET WEIGHT : 2065.0 kg

BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 82.6 s
INTER BILLET : 15.0 s
PRODUCTION : 76.2 t/h

	SPEED	DIA	RPM	GEAR RATIO	RPM		R FACTOR	R O R LOAD	TORQUE	POWER	
		(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(응)
	1.20										
1H	0.16	646.0	4.7	118.730	559	1.121	104.0	1167.2	112.48	55	22.0
2V	0.18	635.4	5.4	85.673	466	1.136	114.6	1133.6	113.64	65	30.9
3H	0.25	685.6	6.9	118.730	825	1.378	64.4	2178.6	273.30	199	53.6
4V	0.34	587.5	11.0	74.409	818	1.356	72.5	1430.7	172.81	199	54.0
5H	0.45	619.1	13.9	87.594	1214	1.329	40.9	1509.8	149.64	217	27.2
6V	0.54	607.8	17.0	68.825	1170	1.204	52.2	868.8	90.42	161	35.8
7 H	0.73	660.0	21.0	55.247	1159	1.340	0.0	1610.8	168.62	370	46.3
8V	0.81	590.4	26.3	43.393	1139	1.119	69.6	316.4	23.08	63	7.9
9Н	1.15	660.0	33.2	37.442	1243	1.413	0.0	1612.6	115.82	403	50.3
10V	1.25	575.7	41.6	27.471	1144	1.094	84.3	197.0	13.09	57	7.1
11H	1.73	590.0	56.0	17.428	976	1.378	0.0	1347.6	68.25	400	51.3
12V	1.83	510.4	68.3	13.852	947	1.056	79.6	96.1	4.64	33	4.4
13H	2.27	590.0	73.4	11.734	862	1.242	0.0	997.1	34.53	266	38.5
14V	2.32	505.4	87.6	9.471	829	1.022	84.6	43.3	1.28	12	1.8
15H	2.47	590.0	80.1	9.841	788	1.067	0.0	372.9	6.21	52	8.3

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 4"x5/8" blt150 SECTION ROLLED

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.98 m/s $3269.59 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 152.0 mm SQUARE BILLET WEIGHT : 2065.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE			OCK WIDTH	AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)		(mm²)	•
+			SQUARE		151.95	X 151.95		+
1H	750.0	24.00	BOX		128.00	X 160.30	20518.4	10.8
2V	750.0	18.00	BOX		136.50	X 136.23	18063.7	12.0
3H	750.0	17.00	R.BOX		93.00	X 161.05	13111.5	27.4
4 V	660.0	15.00	ROUND		111.00	X 110.52	9668.5	26.3
5H	660.0	15.00	R.OVAL		70.60	X 130.13	7276.2	24.7
6V	660.0	22.00	ROUND		92.00	X 81.48	6043.2	16.9
7H	660.0	40.00	FLAT		40.00	X 118.13	4509.6	25.4
8V	660.0	26.50	EDGING		96.50	X 41.92	4028.8	10.7
9Н	660.0	26.50	FLAT		26.50	X 110.67	2928.1	27.3
10V	660.0	16.50	EDGING		101.50	X 27.22	2742.3	6.3
11H	590.0	20.40	FLAT		20.40	X 107.58	2188.7	20.2
12V	590.0	22.50	EDGING		102.50	X 20.65	2107.8	3.7
13H	590.0	17.20	FLAT		17.20	X 105.50	1811.6	14.1
14V	590.0	22.50	EDGING		102.50	X 17.31	1767.6	2.4
15H	590.0	16.08	FLAT		16.08	X 102.90	1651.8	6.6

^{***} Subject to the confidentiality clause *** M

07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

: Flat 4"x5/8" blt150 SECTION ROLLED

Hot rolling

: Low-med. carbon steel MATERIAL

ROLLING SPEED : 1.98 m/s $3269.59 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE : 152.0 mm SQUARE BILLET WEIGHT : 2065.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME 82.6 s : INTER BILLET 15.0 s : PRODUCTION 76.2 t/h:

	SPEED	DIA	RPM	GEAR RATIO	RPM		R FACTOR	E RO R LOAD	TORQUE	POWER	
		(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(응)
	1.20										
1H	0.16	646.0	4.7	118.730	559	1.121	104.0	1167.2	112.48	55	22.0
2V	0.18	635.4	5.4	85.673	466	1.136	114.6	1133.6	113.64	65	30.9
3H	0.25	685.6	6.9	118.730	825	1.378	64.4	2178.6	273.30	199	53.6
4V	0.34	587.5	11.0	74.409	818	1.356	72.5	1430.7	172.81	199	54.0
5H	0.45	619.1	13.9	87.594	1214	1.329	40.9	1509.8	149.64	217	27.2
6V	0.54	607.8	17.0	68.825	1170	1.204	52.2	868.8	90.42	161	35.8
7 H	0.73	660.0	21.0	55.247	1159	1.340	0.0	1610.8	168.62	370	46.3
8V	0.81	590.4	26.3	43.393	1139	1.119	69.6	316.4	23.08	63	7.9
9Н	1.12	660.0	32.3	37.442	1210	1.376	0.0	1514.5	105.92	358	44.8
10V	1.19	575.7	39.6	27.471	1086	1.068	84.3	160.5	9.00	37	4.7
11H	1.49	590.0	48.4	17.428	843	1.253	0.0	1041.6	46.34	235	34.8
12V	1.55	510.4	58.0	13.852	804	1.038	79.6	84.5	3.35	20	3.2
13H	1.80	590.0	58.4	11.734	686	1.163	0.0	781.7	25.07	153	28.0
14V	1.85	510.4	69.2	9.471	656	1.025	79.6	59.2	1.88	14	2.6
15H	1.98	590.0	64.1	9.841	631	1.070	0.0	415.6	8.12	55	10.8

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^{***} Subject to the confidentiality clause *** M



07/04/23

LAYOUT NO. : 000-000-361-340 JOB NO. : DPC68X01

SECTION ROLLED : Flat 4"x3/4" blt150

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.65 m/s $3269.59 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	OCK WIDTH	AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		151.95	X 151.95		
1H	750.0	24.00	BOX		128.00	X 160.30	20518.4	10.8
2V	750.0	18.00	BOX		136.50	X 136.23	18063.7	12.0
3Н	750.0	17.00	R.BOX		93.00	X 161.05	13111.5	27.4
4 V	660.0	15.00	ROUND		111.00	X 110.52	9668.5	26.3
5H	660.0	15.00	R.OVAL		70.60	X 130.13	7276.2	24.7
6V	660.0	22.00	ROUND		92.00	X 81.48	6043.2	16.9
7 H	660.0	40.00	FLAT		40.00	X 118.13	4509.6	25.4
8V	660.0	26.50	EDGING		96.50	X 41.92	4028.8	10.7
9Н	660.0	26.50	FLAT		26.50	X 110.67	2928.1	27.3
10V	660.0	14.50	EDGING		99.50	X 27.43	2707.2	7.5
11H	590.0	20.40	FLAT		20.40	X 105.79	2152.1	20.5
12V	590.0	22.70	EDGING		102.70	X 20.53	2099.8	2.4
13H	590.0	19.30	FLAT		19.30	X 102.90	1982.4	5.6

^{***} Subject to the confidentiality clause *** M

07/04/23

DANIELI MORGÅRDSHAMMAR

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT. SPEED CALCULATION FOR HOT ROLLING MILL

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x3/4" blt150

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.65 m/s $3269.59 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE BILLET SIZE : 152.0 mm SQUARE BILLET WEIGHT : 2065.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 82.6 s INTER BILLET : 15.0 s : 76.2 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	FACTOR	GROOVE R FACTOR	R LOAD	L L I N TORQUE	POWER	
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
+	1.20										
1H	0.16	646.0	4.7	118.730	559	1.121	104.0	1167.2	112.48	55	22.0
2V	0.18	635.4	5.4	85.673	466	1.136	114.6	1133.6	113.64	65	30.9
3H	0.25	685.6	6.9	118.730	825	1.378	64.4	2178.6	273.30	199	53.6
4V	0.34	587.5	11.0	74.409	818	1.356	72.5	1430.7	172.81	199	54.0
5H	0.45	619.1	13.9	87.594	1214	1.329	40.9	1509.8	149.64	217	27.2
6V	0.54	607.8	17.0	68.825	1170	1.204	52.2	868.8	90.42	161	35.8
7H	0.73	660.0	21.0	55.247	1159	1.340	0.0	1610.8	168.62	370	46.3
8V	0.81	590.4	26.3	43.393	1139	1.119	69.6	316.4	23.08	63	7.9
9Н	1.12	660.0	32.3	37.442	1210	1.376	0.0	1514.5	105.92	358	44.8
10V	1.21	575.8	40.1	27.471	1100	1.082	84.2	182.3	11.15	47	5.8
11H	1.52	590.0	49.2	17.428	857	1.258	0.0	1038.9	46.83	241	35.2
12V	1.56	510.4	58.3	13.852	807	1.025	79.6	63.0	1.99	12	1.9
13H	1.65	590.0	53.4	11.734	626	1.059	0.0	358.8	7.05	39	7.9

+-----+ *** Subject to the confidentiality clause *** M



07/04/23

LAYOUT NO. : 000-000-361-340 JOB NO. : DPC68X01

SECTION ROLLED : Flat 4"x7/8" blt150

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.41 m/s : $3269.59 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	OCK WIDTH	AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		151.95	X 151.95		+
1H	750.0	24.00	BOX		128.00	X 160.30	20518.4	10.8
2V	750.0	18.00	BOX		136.50	X 136.23	18063.7	12.0
3Н	750.0	17.00	R.BOX		93.00	X 161.05	13111.5	27.4
4 V	660.0	15.00	ROUND		111.00	X 110.52	9668.5	26.3
5H	660.0	15.00	R.OVAL		70.60	X 130.13	7276.2	24.7
6V	660.0	22.00	ROUND		92.00	X 81.48	6043.2	16.9
7 H	660.0	40.00	FLAT		40.00	X 118.13	4509.6	25.4
8V	660.0	26.50	EDGING		96.50	X 41.92	4028.8	10.7
9Н	660.0	26.50	FLAT		26.50	X 110.67	2928.1	27.3
10V	660.0	18.60	EDGING		103.60	X 27.01	2779.2	5.1
11H	590.0	23.50	FLAT		23.50	X 105.31	2468.0	11.2
12V	590.0	23.00	EDGING		103.00	X 23.59	2420.7	1.9
13H	590.0	22.51	FLAT		22.51	X 102.90	2312.1	4.5

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x7/8" blt150

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.41 m/s $3269.59 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg

MAX HEATING CAPABILITY : 80.0 t/h ROLLING TIME : 82.6 s INTER BILLET : 15.0 s : 76.2 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	FACTOR	GROOVE R FACTOR	R LOAD	L L I N TORQUE	POWER	
		(mm)	(RPM)		(RPM)		(mm)		(kNm)	(kW)	(%)
	1.20										
1H	0.16	646.0	4.7	118.730	559	1.121	104.0	1167.2	112.48	55	22.0
2V	0.18	635.4	5.4	85.673	466	1.136	114.6	1133.6	113.64	65	30.9
3H	0.25	685.6	6.9	118.730	825	1.378	64.4	2178.6	273.30	199	53.6
4V	0.34	587.5	11.0	74.409	818	1.356	72.5	1430.7	172.81	199	54.0
5H	0.45	619.1	13.9	87.594	1214	1.329	40.9	1509.8	149.64	217	27.2
6V	0.54	607.8	17.0	68.825	1170	1.204	52.2	868.8	90.42	161	35.8
7H	0.73	660.0	21.0	55.247	1159	1.340	0.0	1610.8	168.62	370	46.3
8V	0.81	590.4	26.3	43.393	1139	1.119	69.6	316.4	23.08	63	7.9
9Н	1.12	660.0	32.3	37.442	1210	1.376	0.0	1514.5	105.92	358	44.8
10V	1.18	575.7	39.0	27.471	1072	1.054	84.3	136.0	6.81	28	3.5
11H	1.32	590.0	42.9	17.428	747	1.126	0.0	615.5	20.13	90	15.1
12V	1.35	510.4	50.5	13.852	700	1.020	79.6	62.8	1.74	9	1.6
13H	1.41	590.0	45.8	11.734	537	1.047	0.0	314.7	5.85	28	6.5

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^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x1" blt150

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.24 m/s $3269.59 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	OCK WIDTH	AREA	REDUC TION
	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	
+			SQUARE		151.95	X 151.95		
1H	750.0	24.00	BOX		128.00	X 160.30	20518.4	10.8
2V	750.0	18.00	BOX		136.50	X 136.23	18063.7	12.0
3H	750.0	17.00	R.BOX		93.00	X 161.05	13111.5	27.4
4 V	660.0	15.00	ROUND		111.00	X 110.52	9668.5	26.3
5H	660.0	15.00	R.OVAL		70.60	X 130.13	7276.2	24.7
6V	660.0	25.00	ROUND		95.00	X 80.18	6214.1	14.6
7н	660.0	42.00	FLAT		42.00	X 119.27	4779.5	23.1
8V	660.0	33.00	EDGING		103.00	X 43.15	4421.4	7.5
9н	660.0	33.00	FLAT		33.00	X 110.49	3640.7	17.7
10V	660.0	35.70	EDGING		100.70	X 33.93	3393.4	6.8
11H	590.0	26.80	FLAT		26.80	X 105.71	2826.6	16.7
12V	590.0	38.00	EDGING		103.00	X 26.93	2763.3	2.2
13H	590.0	25.73	FLAT		25.73	X 102.90	2642.9	4.4

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x1" blt150

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 1.24 m/s $3269.59 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg

MAX HEATING CAPABILITY : 80.0 t/hROLLING TIME : 82.6 s INTER BILLET : 15.0 s : 76.2 t/h PRODUCTION

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE R FACTOR		L L I N TORQUE		
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(응)
	1.20										
1H	0.16	646.0	4.7	118.730	559	1.121	104.0	1167.2	112.48	55	22.0
2V	0.18	635.4	5.4	85.673	466	1.136	114.6	1133.6	113.64	65	30.9
3H	0.25	685.6	6.9	118.730	825	1.378	64.4	2178.6	273.30	199	53.6
4V	0.34	587.5	11.0	74.409	818	1.356	72.5	1430.7	172.81	199	54.0
5H	0.45	619.1	13.9	87.594	1214	1.329	40.9	1509.8	149.64	217	27.2
6V	0.53	607.5	16.5	68.825	1138	1.171	52.5	800.8	80.94	140	31.2
7 H	0.68	660.0	19.8	55.247	1094	1.300	0.0	1549.8	157.90	327	40.9
8V	0.74	590.5	23.9	43.393	1038	1.081	69.5	248.7	15.42	39	4.8
9Н	0.90	660.0	26.0	37.442	973	1.214	0.0	1082.4	63.11	172	22.1
10V	0.96	595.7	30.9	27.471	849	1.073	64.3	212.6	12.52	40	6.0
11H	1.16	590.0	37.4	17.428	653	1.200	0.0	933.7	43.26	170	32.5
12V	1.18	525.4	43.0	13.852	596	1.023	64.6	79.7	2.43	11	2.3
13H	1.24	590.0	40.0	11.734	470	1.046	0.0	323.6	6.38	27	7.1

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^{***} Subject to the confidentiality clause *** M



07/04/23

LAYOUT NO. : 000-000-361-340 JOB NO. : DPC68X01

SECTION ROLLED : Flat 4"x1-1/4" blt150

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 0.99 m/s $3269.59 \text{ mm}^2\text{m/s}$ AXV BILLET SIZE BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg

STAND NO.	ROLL DIA	GAP	GROOVE TYPE		STO HEIGHT	OCK WIDTH	AREA	REDUC TION
+	(mm)	(mm)		(mm)	(mm)	(mm)	(mm²)	·
+			SQUARE		151.95	X 151.95		·
1H	750.0	24.00	BOX		128.00	X 160.30	20518.4	10.8
2V	750.0	18.00	BOX		136.50	X 136.23	18063.7	12.0
3Н	750.0	17.00	R.BOX		93.00	X 161.05	13111.5	27.4
4 V	660.0	15.00	ROUND		111.00	X 110.52	9668.5	26.3
5H	660.0	15.00	R.OVAL		70.60	X 130.13	7276.2	24.7
6V	660.0	25.00	ROUND		95.00	X 80.18	6214.1	14.6
7H	660.0	42.00	FLAT		42.00	X 119.27	4779.5	23.1
8V	660.0	37.00	EDGING		107.00	X 42.70	4549.5	4.8
9Н	660.0	36.00	FLAT		36.00	X 110.96	3988.5	12.3
10V	660.0	40.00	EDGING		105.00	X 36.51	3808.1	4.5
11H	590.0	33.20	FLAT		33.20	X 105.75	3500.9	8.1
12V	590.0	33.10	EDGING		103.10	X 33.34	3424.2	2.2
13Н	590.0	32.16	FLAT		32.16	X 102.90	3303.4	3.5

^{***} Subject to the confidentiality clause *** M



07/04/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-340

SECTION ROLLED : Flat 4"x1-1/4" blt150

Hot rolling

MATERIAL : Low-med. carbon steel

ROLLING SPEED : 0.99 m/s

AXV : 3269.59 mm²m/s

BILLET SIZE : 152.0 mm SQUARE

BILLET WEIGHT : 2065.0 kg

BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 82.6 s
INTER BILLET : 15.0 s
PRODUCTION : 76.2 t/h

	POWER	L L I M		GROOVE R FACTOR		MOTOR RPM	GEAR RATIO	ROLL RPM	WORK DIA	SPEED	STAND NO.
(응)	(kW)	(kNm)	(kN)	(mm)		(RPM)		(RPM)	(mm)	(m/s)	
										1.20	
22.0	55	112.48	1167.2	104.0	1.121	559	118.730	4.7	646.0	0.16	1H
30.9	65	113.64	1133.6	114.6	1.136	466	85.673	5.4	635.4	0.18	2V
53.	199	273.30	2178.6	64.4	1.378	825	118.730	6.9	685.6	0.25	3H
54.0	199	172.81	1430.7	72.5	1.356	818	74.409	11.0	587.5	0.34	4V
27.2	217	149.64	1509.8	40.9	1.329	1214	87.594	13.9	619.1	0.45	5H
31.2	140	80.94	8.008	52.5	1.171	1138	68.825	16.5	607.5	0.53	6V
40.9	327	157.90	1549.8	0.0	1.300	1094	55.247	19.8	660.0	0.68	7 H
3.3	25	10.11	184.5	69.5	1.051	1009	43.393	23.2	590.5	0.72	8V
13.	97	39.08	808.1	0.0	1.141	888	37.442	23.7	660.0	0.82	9Н
3.8	23	7.99	168.7	64.3	1.047	756	27.471	27.5	595.7	0.86	10V
12.9	54	17.16	531.0	0.0	1.088	527	17.428	30.2	590.0	0.93	11H
2.	10	2.85	96.0	69.6	1.022	485	13.852	35.0	520.4	0.95	12V
6.5	20	5.86	297.5	0.0	1.037	376	11.734	32.0	590.0	0.99	13H

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^{***} Subject to the confidentiality clause *** M

3 Motor utilization diagrams











































