DANIELI MORGÅRDSHAMMAR	JOB N° DPC68X01	Doc.: 000-000-375-618 Rev: 00 Page: 1/51
	Customer: BARRAMANSA	

ROLLING MILL CALCULATIONS

FOR CHANNELS

Remarks:

- For rolling sequences see drawing 000-000-361-343
- Calculations consider an average temperature of 1170°C at first stand entry.
- Billet lengths according to sequences 000-000-375-618.

Rev.	Date	Description	Compiled	Checked	Approved
00	25-05-2023	Issued	Baggio M.	Paron L.	

DOCUMENT CONTENTS

1 Gear ratios and motors summarizing table 3
2 Roll pass design calculations for channels 4”÷6” from billet 180x180 4
3 Roll pass design calculations for channels 4”÷6” from billet 150x150 20
4 Roll pass design calculations for channels 8” (billet 180x180) 36
5 Motor utilization diagrams 39

Remark:

- R-factor = elongation

1 Gear ratios and motors summarizing table

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 28/03/23

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

STAND NO.	STAND TYPE	GEAR RATIO 1^	GEAR RATIO 2^	MOTOR TYPE	MOTOR POWER (kW)	MOTOR RPM (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
7H	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 ***

TERMINATED AT 17:50:15

2 Roll pass design calculations for channels 4”÷6” from billet 180x180

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 4x4.5
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 5.00 m/s
AXV : 4149.00 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2228.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 70.2 s
INTER BILLET : 36.7 s
PRODUCTION : 75.0 t/h
TOTAL ROLLING POWER : 4931 kW

STAND NO.	ROLL DIA	GAP	GROOVE TYPE	STOCK HEIGHT	STOCK WIDTH	AREA	REDUC TION
	(mm)	(mm)		(mm)	(mm)	(mm²)	(%)
			SQUARE		182.30 X 182.30	33147.4	
1H	750.0	25.00	BOX		129.00 X 204.05	25558.6	22.9
2V	750.0	18.00	BOX		136.50 X 150.22	18723.9	26.7
3H	750.0	18.00	R.BOX		94.00 X 162.09	13314.0	28.9
4V	660.0	17.00	ROUND		113.00 X 111.02	9889.5	25.7
5H	660.0	60.00	FLAT		60.00 X 137.43	7815.1	21.0
6V	660.0	14.00	EDGING		125.00 X 60.48	7484.3	4.2
7H	660.0	44.00	FLAT		44.00 X 136.14	5899.5	21.2
8H	654.0	4.00	CHANNEL	25.5	42.20 X 144.40	4172.7	29.3
9H	654.0	4.00	CHANNEL	18.5	42.00 X 143.40	3220.5	22.8
10H	655.0	2.50	CHANNEL	12.0	45.30 X 138.50	2333.7	27.5
11H	585.0	2.30	CHANNEL	7.90	48.20 X 124.20	1737.7	25.5
12H	585.0	2.40	CHANNEL	5.70	48.20 X 118.80	1283.0	26.2
13H	585.0	2.40	CHANNEL	4.60	42.10 X 113.10	1096.6	14.5
14H	586.5	3.50	CHANNEL	3.80	41.30 X 106.90	930.0	15.2
15H	587.0	3.00	CHANNEL	3.35	39.70 X 104.30	829.8	10.8

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 4x4.5
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 5.00 m/s
AXV : 4149.00 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2228.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 70.2 s
INTER BILLET : 36.7 s
PRODUCTION : 75.0 t/h
TOTAL ROLLING POWER : 4931 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	R O L L I N G LOAD	TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.16	649.7	4.8	118.730	567	1.297	100.3	1436.8	192.12	96	37.7
2V	0.22	643.4	6.6	85.673	564	1.365	106.6	1302.7	187.38	129	50.9
3H	0.31	685.9	8.7	118.730	1030	1.406	64.1	1533.7	198.91	181	40.2
4V	0.42	587.9	13.6	74.409	1014	1.346	72.1	980.0	117.83	168	37.4
5H	0.53	660.0	15.4	87.594	1346	1.265	0.0	1114.9	129.67	209	26.1
6V	0.55	550.3	19.2	68.825	1324	1.044	109.7	138.7	6.29	13	2.8
7H	0.70	660.0	20.4	55.247	1124	1.269	0.0	1097.7	80.65	172	21.5
8H	0.99	629.1	30.2	43.393	1310	1.414	24.9	1739.6	124.96	395	49.4
9H	1.29	635.5	38.7	37.442	1450	1.296	18.5	1399.8	77.27	313	39.2
10H	1.78	640.7	53.0	27.471	1456	1.380	14.3	1640.5	83.07	461	57.6
11H	2.39	573.3	79.5	17.428	1386	1.343	11.7	1604.1	70.92	591	73.8
12H	3.23	576.6	107.1	13.852	1484	1.354	8.4	1609.9	65.52	735	91.9
13H	3.78	577.7	125.1	11.734	1468	1.170	7.3	1023.4	28.30	371	46.3
14H	4.46	581.3	146.6	9.471	1388	1.179	5.2	579.4	42.74	656	82.0
15H	5.00	582.0	164.1	9.841	1615	1.121	5.0	444.2	25.74	442	55.3

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 4x5.4
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 4.74 m/s
AXV : 4852.94 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 80.0 s
INTER BILLET : 53.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4562 kW

STAND NO.	ROLL DIA	GAP	GROOVE TYPE	STOCK HEIGHT	STOCK WIDTH	AREA	REDUCTION
	(mm)	(mm)		(mm)	(mm)	(mm²)	(%)
			SQUARE	182.30 X	182.30	33147.4	
1H	750.0	25.00	BOX	129.00 X	204.05	25558.6	22.9
2V	750.0	18.00	BOX	136.50 X	150.22	18723.9	26.7
3H	750.0	18.00	R.BOX	94.00 X	162.09	13314.0	28.9
4V	660.0	17.00	ROUND	113.00 X	111.02	9889.5	25.7
5H	660.0	60.00	FLAT	60.00 X	137.43	7815.1	21.0
6V	660.0	14.00	EDGING	125.00 X	60.48	7484.3	4.2
7H	660.0	44.00	FLAT	44.00 X	136.14	5899.5	21.2
8H	654.0	5.00	CHANNEL 26.5	43.20 X	144.40	4328.5	26.6
9H	654.0	5.00	CHANNEL 19.5	43.00 X	143.40	3351.0	22.6
10H	655.0	3.50	CHANNEL 13.0	46.30 X	138.50	2469.9	26.3
11H	585.0	3.10	CHANNEL 8.70	49.00 X	124.20	1848.1	25.2
12H	585.0	3.20	CHANNEL 6.50	49.00 X	118.80	1404.0	24.0
13H	585.0	3.20	CHANNEL 5.40	42.90 X	113.10	1181.8	15.8
14H	585.0	3.20	CHANNEL 4.60	40.60 X	107.00	1033.7	12.5
15H	585.0	4.60	CHANNEL 4.60	47.60 X	102.90	1023.5	1.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 4x5.4
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 4.74 m/s
AXV : 4852.94 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 80.0 s
INTER BILLET : 53.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4562 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	ROLLING LOAD	ROLLING TORQUE	ROLLING POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.19	649.7	5.6	118.730	663	1.297	100.3	1488.2	199.00	116	39.0
2V	0.26	643.4	7.7	85.673	659	1.365	106.6	1331.3	191.51	154	52.0
3H	0.36	685.9	10.1	118.730	1205	1.406	64.1	1553.0	201.42	214	47.6
4V	0.49	587.9	15.9	74.409	1186	1.346	72.1	984.8	118.41	198	43.9
5H	0.62	660.0	18.0	87.594	1574	1.265	0.0	1114.5	129.62	244	30.5
6V	0.65	550.3	22.5	68.825	1549	1.044	109.7	137.7	6.24	15	3.3
7H	0.82	660.0	23.8	55.247	1315	1.269	0.0	1079.0	79.27	198	24.7
8H	1.12	629.0	34.0	43.393	1477	1.363	25.0	1659.2	113.67	405	50.7
9H	1.45	635.6	43.5	37.442	1629	1.292	18.4	1418.4	79.33	362	45.2
10H	1.96	640.7	58.6	27.471	1609	1.357	14.3	1635.2	82.54	506	63.3
11H	2.63	573.2	87.5	17.428	1525	1.336	11.8	1638.3	73.98	678	84.7
12H	3.46	576.4	114.5	13.852	1587	1.316	8.6	1590.8	63.97	767	95.9
13H	4.11	577.8	135.7	11.734	1593	1.188	7.2	885.2	21.08	300	37.5
14H	4.69	578.5	155.0	9.471	1468	1.143	6.5	887.9	22.51	365	45.7
15H	4.74	579.7	156.2	9.841	1537	1.010	5.3	140.5	2.46	40	5.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 4x7.25
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 3.47 m/s
AXV : 4852.94 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 80.0 s
INTER BILLET : 53.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 3911 kW

STAND NO.	ROLL DIA	GAP	GROOVE TYPE	STOCK HEIGHT	STOCK WIDTH	AREA	REDUCTION
	(mm)	(mm)		(mm)	(mm)	(mm²)	(%)
			SQUARE	182.30	X 182.30	33147.4	
1H	750.0	25.00	BOX	129.00	X 204.05	25558.6	22.9
2V	750.0	18.00	BOX	136.50	X 150.22	18723.9	26.7
3H	750.0	18.00	R.BOX	94.00	X 162.09	13314.0	28.9
4V	660.0	17.00	ROUND	113.00	X 111.02	9889.5	25.7
5H	660.0	60.00	FLAT	60.00	X 137.43	7815.1	21.0
6V	660.0	14.00	EDGING	125.00	X 60.48	7484.3	4.2
7H	660.0	44.00	FLAT	44.00	X 136.14	5899.5	21.2
8H	654.0	7.00	CHANNEL	28.5 45.20	X 144.40	4617.3	21.7
9H	654.0	7.00	CHANNEL	21.5 45.00	X 143.40	3638.1	21.2
10H	655.0	6.50	CHANNEL	16.0 49.30	X 138.50	2885.4	20.7
11H	585.0	6.90	CHANNEL	12.5 52.80	X 124.20	2320.1	19.6
12H	585.0	6.80	CHANNEL	10.1 52.60	X 118.80	1806.7	22.1
13H	585.0	6.80	CHANNEL	9.00 46.50	X 113.10	1589.0	12.0
14H	585.0	6.80	CHANNEL	8.20 44.20	X 107.00	1412.0	11.1
15H	585.0	8.20	CHANNEL	8.20 51.20	X 102.90	1398.0	1.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 4x7.25
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 3.47 m/s
AXV : 4852.94 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 80.0 s
INTER BILLET : 53.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 3911 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	R O L L I N G LOAD	TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.19	649.7	5.6	118.730	663	1.297	100.3	1488.2	199.00	116	39.0
2V	0.26	643.4	7.7	85.673	659	1.365	106.6	1331.3	191.51	154	52.0
3H	0.36	685.9	10.1	118.730	1205	1.406	64.1	1553.0	201.42	214	47.6
4V	0.49	587.9	15.9	74.409	1186	1.346	72.1	984.8	118.41	198	43.9
5H	0.62	660.0	18.0	87.594	1574	1.265	0.0	1114.5	129.62	244	30.5
6V	0.65	550.3	22.5	68.825	1549	1.044	109.7	137.7	6.24	15	3.3
7H	0.82	660.0	23.8	55.247	1315	1.269	0.0	1079.0	79.27	198	24.7
8H	1.05	629.0	31.9	43.393	1385	1.278	25.0	1498.9	92.78	310	38.8
9H	1.33	635.6	40.1	37.442	1501	1.269	18.4	1419.6	79.47	334	41.7
10H	1.68	640.7	50.1	27.471	1377	1.261	14.3	1511.4	70.51	370	46.3
11H	2.09	573.2	69.7	17.428	1215	1.244	11.8	1562.1	67.26	491	61.4
12H	2.69	576.6	89.0	13.852	1232	1.284	8.4	1710.7	73.98	689	86.2
13H	3.05	577.8	101.0	11.734	1185	1.137	7.2	876.2	20.65	218	27.3
14H	3.44	578.6	113.4	9.471	1074	1.125	6.4	970.8	26.91	320	40.0
15H	3.47	579.6	114.4	9.841	1126	1.010	5.4	164.6	3.38	41	5.1

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 5x6.7
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 4.26 m/s
AXV : 5546.22 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 70.0 s
INTER BILLET : 63.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4781 kW

STAND NO.	ROLL DIA	GAP	GROOVE TYPE	STOCK HEIGHT	STOCK WIDTH	AREA	REDUCTION
	(mm)	(mm)		(mm)	(mm)	(mm²)	(%)
			SQUARE	182.30	X 182.30	33147.4	
1H	750.0	25.00	BOX	129.00	X 204.05	25558.6	22.9
2V	750.0	35.00	BOX	153.50	X 143.06	20907.9	18.2
3H	750.0	30.00	FLAT	95.00	X 170.71	15904.2	23.9
4V	660.0	10.00	EDGING	150.00	X 97.09	14336.0	9.9
5H	660.0	60.00	FLAT	60.00	X 170.82	10079.7	29.7
6V	660.0	45.00	EDGING	156.00	X 60.96	9439.5	6.4
7H	654.0	6.00	CHANNEL	42.0 53.10	X 172.60	7493.2	20.6
8H	654.0	6.00	CHANNEL	28.1 49.00	X 177.70	5611.0	25.1
9H	655.0	4.40	CHANNEL	17.2 48.80	X 179.00	3944.0	29.7
10H	655.0	3.70	CHANNEL	12.1 51.40	X 162.80	2845.0	27.9
11H	585.0	3.40	CHANNEL	8.60 52.70	X 150.90	2166.0	23.9
12H	585.0	3.40	CHANNEL	6.50 52.90	X 141.00	1679.0	22.5
13H	585.0	3.40	CHANNEL	5.50 46.60	X 141.90	1423.0	15.2
14H	585.0	3.40	CHANNEL	5.00 45.00	X 133.00	1314.0	7.7
15H	585.0	5.00	CHANNEL	5.00 45.00	X 128.60	1301.0	1.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 5x6.7
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 4.26 m/s
AXV : 5546.22 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 70.0 s
INTER BILLET : 63.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4781 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	R O L L I N G LOAD	TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.22	649.7	6.4	118.730	757	1.297	100.3	1506.7	201.48	135	39.5
2V	0.27	638.9	7.9	85.673	679	1.222	111.1	1056.5	136.86	114	37.2
3H	0.35	717.5	9.3	118.730	1102	1.315	32.5	1344.7	161.64	157	34.9
4V	0.39	522.3	14.1	74.409	1053	1.109	137.7	390.9	28.94	43	9.5
5H	0.55	660.0	15.9	87.594	1395	1.422	0.0	1648.6	176.97	295	36.9
6V	0.59	550.2	20.4	68.825	1404	1.068	109.8	223.0	14.31	31	6.8
7H	0.74	616.6	22.9	55.247	1267	1.260	37.4	1725.5	136.34	327	40.9
8H	0.99	628.4	30.0	43.393	1304	1.335	25.6	1884.0	133.51	420	52.5
9H	1.41	637.4	42.1	37.442	1578	1.423	17.6	2103.9	132.80	586	73.2
10H	1.95	641.2	58.1	27.471	1595	1.386	13.8	2109.4	105.70	643	80.3
11H	2.56	574.0	85.2	17.428	1485	1.313	11.0	1775.2	73.07	652	81.5
12H	3.30	576.5	109.4	13.852	1516	1.290	8.5	1702.4	66.23	759	94.9
13H	3.90	578.4	128.7	11.734	1510	1.180	6.6	957.7	24.92	336	42.0
14H	4.22	578.5	139.3	9.471	1320	1.083	6.5	673.9	16.32	238	29.8
15H	4.26	579.9	140.4	9.841	1382	1.010	5.1	177.3	3.14	46	5.8

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 5x9.0
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 3.20 m/s
AXV : 5546.22 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 70.0 s
INTER BILLET : 63.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4099 kW

STAND NO.	ROLL DIA	GAP	GROOVE TYPE	STOCK HEIGHT	STOCK WIDTH	AREA	REDUCTION
	(mm)	(mm)		(mm)	(mm)	(mm²)	(%)
			SQUARE	182.30	X 182.30	33147.4	
1H	750.0	25.00	BOX	129.00	X 204.05	25558.6	22.9
2V	750.0	35.00	BOX	153.50	X 143.06	20907.9	18.2
3H	750.0	30.00	FLAT	95.00	X 170.71	15904.2	23.9
4V	660.0	10.00	EDGING	150.00	X 97.09	14336.0	9.9
5H	660.0	60.00	FLAT	60.00	X 170.82	10079.7	29.7
6V	660.0	45.00	EDGING	156.00	X 60.96	9439.5	6.4
7H	654.0	6.00	CHANNEL	42.0 53.10	X 172.60	7493.2	20.6
8H	654.0	6.00	CHANNEL	28.1 49.00	X 177.70	5611.0	25.1
9H	655.0	5.60	CHANNEL	18.4 50.00	X 179.00	4258.0	24.1
10H	655.0	6.20	CHANNEL	14.6 53.90	X 162.80	3252.0	23.6
11H	585.0	6.70	CHANNEL	11.9 56.00	X 150.90	2664.0	18.1
12H	585.0	6.70	CHANNEL	9.80 56.20	X 141.00	2144.0	19.5
13H	585.0	6.70	CHANNEL	8.80 49.90	X 141.90	1891.0	11.8
14H	585.0	6.70	CHANNEL	8.30 48.30	X 133.00	1749.3	7.5
15H	585.0	8.30	CHANNEL	8.30 48.30	X 128.60	1732.0	1.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 5x9.0
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 3.20 m/s
AXV : 5546.22 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 70.0 s
INTER BILLET : 63.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4099 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	R O L L I N G LOAD	TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.22	649.7	6.4	118.730	757	1.297	100.3	1506.7	201.48	135	39.5
2V	0.27	638.9	7.9	85.673	679	1.222	111.1	1056.5	136.86	114	37.2
3H	0.35	717.5	9.3	118.730	1102	1.315	32.5	1344.7	161.64	157	34.9
4V	0.39	522.3	14.1	74.409	1053	1.109	137.7	390.9	28.94	43	9.5
5H	0.55	660.0	15.9	87.594	1395	1.422	0.0	1648.6	176.97	295	36.9
6V	0.59	550.2	20.4	68.825	1404	1.068	109.8	223.0	14.31	31	6.8
7H	0.74	616.6	22.9	55.247	1267	1.260	37.4	1725.5	136.34	327	40.9
8H	0.99	628.4	30.0	43.393	1304	1.335	25.6	1884.0	133.51	420	52.5
9H	1.30	636.8	39.1	37.442	1463	1.318	18.2	1894.6	107.69	441	55.1
10H	1.71	641.2	50.8	27.471	1395	1.309	13.8	2018.2	96.76	515	64.3
11H	2.08	574.0	69.3	17.428	1207	1.221	11.0	1652.0	63.27	459	57.4
12H	2.59	576.5	85.7	13.852	1187	1.243	8.5	1759.1	70.72	635	79.3
13H	2.93	578.4	96.8	11.734	1136	1.134	6.6	952.1	24.63	250	31.2
14H	3.17	578.5	104.7	9.471	991	1.081	6.5	768.4	21.21	232	29.3
15H	3.20	579.8	105.5	9.841	1038	1.010	5.2	204.5	4.18	46	5.8

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 6x8.2
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 3.58 m/s
AXV : 5709.34 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 68.0 s
INTER BILLET : 65.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4698 kW

STAND NO.	ROLL DIA	GAP	GROOVE TYPE	STOCK HEIGHT	STOCK WIDTH	AREA	REDUCTION
	(mm)	(mm)		(mm)	(mm)	(mm²)	(%)
			SQUARE		182.30 X 182.30	33147.4	
1H	750.0	25.00	BOX		129.00 X 204.05	25558.6	22.9
2V	750.0	60.00	BOX		178.50 X 133.86	23482.7	8.1
3H	750.0	30.00	FLAT		95.00 X 194.60	18161.0	22.7
4			DUMMY				
5H	660.0	69.00	FLAT		69.00 X 208.84	14258.9	21.5
6V	660.0	45.00	EDGING		195.00 X 69.99	13332.6	6.5
7H	654.0	6.00	CHANNEL	47.0	60.10 X 207.70	10168.7	23.7
8H	654.0	6.00	CHANNEL	32.2	54.40 X 213.70	7505.0	26.2
9H	654.0	4.50	CHANNEL	20.5	54.70 X 213.50	5375.0	28.4
10H	654.0	4.00	CHANNEL	14.1	57.80 X 197.90	3795.0	29.4
11H	584.0	3.40	CHANNEL	10.0	58.00 X 180.10	2783.0	26.7
12H	584.0	3.20	CHANNEL	7.30	57.60 X 169.20	2108.0	24.3
13H	584.0	2.20	CHANNEL	5.95	50.00 X 169.90	1749.0	17.0
14H	584.0	3.20	CHANNEL	5.30	49.50 X 159.50	1608.9	8.0
15H	582.0	5.30	CHANNEL	5.30	49.50 X 154.40	1593.0	1.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 6x8.2
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 3.58 m/s
AXV : 5709.34 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 68.0 s
INTER BILLET : 65.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4698 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	R O L L I N G LOAD	TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.22	649.7	6.6	118.730	780	1.297	100.3	1511.1	202.05	139	39.6
2V	0.24	634.6	7.3	85.673	627	1.088	115.4	653.1	62.99	48	17.1
3H	0.31	717.5	8.4	118.730	994	1.293	32.5	1456.2	166.20	146	32.6
4			DUMMY								
5H	0.40	660.0	11.6	87.594	1015	1.274	0.0	1576.8	148.10	180	22.5
6V	0.43	514.5	15.9	68.825	1094	1.069	145.5	261.9	17.97	30	6.6
7H	0.56	611.0	17.5	55.247	970	1.311	43.0	2160.7	191.01	351	45.3
8H	0.76	624.9	23.3	43.393	1009	1.355	29.1	2292.6	168.13	409	51.2
9H	1.06	633.3	32.0	37.442	1199	1.396	20.7	2485.4	159.01	533	66.7
10H	1.50	638.8	45.0	27.471	1236	1.416	15.2	2522.6	139.71	658	82.3
11H	2.05	571.9	68.5	17.428	1194	1.364	12.1	2211.8	97.94	703	87.8
12H	2.71	574.7	90.0	13.852	1247	1.320	9.3	2118.6	84.67	798	99.7
13H	3.26	575.9	108.3	11.734	1270	1.205	8.1	1386.7	37.00	419	52.4
14H	3.55	577.1	117.4	9.471	1112	1.087	6.9	921.4	19.45	239	29.9
15H	3.58	577.0	118.6	9.841	1167	1.010	5.0	214.3	3.60	45	5.6

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 6x10.5
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 2.94 m/s
AXV : 5972.85 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 65.0 s
INTER BILLET : 68.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4287 kW

STAND NO.	ROLL DIA	GAP	GROOVE TYPE	STOCK HEIGHT	STOCK WIDTH	AREA	REDUCTION
	(mm)	(mm)		(mm)	(mm)	(mm²)	(%)
			SQUARE		182.30 X 182.30	33147.4	
1H	750.0	25.00	BOX		129.00 X 204.05	25558.6	22.9
2V	750.0	60.00	BOX		178.50 X 133.86	23482.7	8.1
3H	750.0	30.00	FLAT		95.00 X 194.60	18161.0	22.7
4			DUMMY				
5H	660.0	69.00	FLAT		69.00 X 208.84	14258.9	21.5
6V	660.0	45.00	EDGING		195.00 X 69.99	13332.6	6.5
7H	654.0	6.00	CHANNEL	47.0	60.10 X 207.70	10168.7	23.7
8H	654.0	6.00	CHANNEL	32.2	54.40 X 213.70	7505.0	26.2
9H	654.0	5.00	CHANNEL	21.0	55.20 X 213.50	5482.0	27.0
10H	654.0	6.00	CHANNEL	16.1	59.80 X 197.90	4191.0	23.5
11H	584.0	6.00	CHANNEL	12.6	60.60 X 180.10	3251.0	22.4
12H	584.0	6.00	CHANNEL	10.1	60.40 X 169.20	2582.0	20.6
13H	584.0	5.00	CHANNEL	8.75	52.80 X 169.90	2225.0	13.8
14H	584.0	6.00	CHANNEL	8.10	52.30 X 159.50	2050.3	7.9
15H	582.0	8.10	CHANNEL	8.10	52.30 X 154.40	2030.0	1.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 6x10.5
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 2.94 m/s
AXV : 5972.85 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 65.0 s
INTER BILLET : 68.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4287 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	R O L L I N G LOAD	TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.23	649.7	6.9	118.730	816	1.297	100.3	1518.0	202.98	146	39.8
2V	0.25	634.6	7.7	85.673	656	1.088	115.4	654.3	63.11	51	17.1
3H	0.33	717.5	8.8	118.730	1039	1.293	32.5	1456.3	166.21	152	33.9
4			DUMMY								
5H	0.42	660.0	12.1	87.594	1062	1.274	0.0	1572.0	147.65	187	23.4
6V	0.45	514.5	16.6	68.825	1145	1.069	145.5	260.6	17.87	31	6.9
7H	0.59	611.0	18.4	55.247	1014	1.311	43.0	2160.7	191.01	367	45.9
8H	0.80	624.9	24.3	43.393	1055	1.355	29.1	2292.6	168.13	428	53.5
9H	1.09	633.3	32.9	37.442	1230	1.369	20.7	2422.2	151.02	520	65.0
10H	1.43	638.8	42.6	27.471	1170	1.308	15.2	2280.3	114.16	509	63.7
11H	1.84	571.9	61.3	17.428	1069	1.289	12.1	2131.7	90.97	584	73.1
12H	2.31	574.7	76.9	13.852	1065	1.259	9.3	2109.2	83.92	676	84.4
13H	2.68	575.9	89.0	11.734	1045	1.160	8.1	1382.8	36.82	343	42.9
14H	2.91	577.1	96.4	9.471	913	1.085	6.9	1028.9	24.25	245	33.5
15H	2.94	577.0	97.4	9.841	958	1.010	5.0	242.2	4.59	47	6.1

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 6x13.0
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 2.41 m/s
AXV : 5972.85 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 65.0 s
INTER BILLET : 68.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 3781 kW

STAND NO.	ROLL DIA	GAP	GROOVE TYPE	STOCK HEIGHT	STOCK WIDTH	AREA	REDUCTION
	(mm)	(mm)		(mm)	(mm)	(mm²)	(%)
			SQUARE	182.30	X 182.30	33147.4	
1H	750.0	25.00	BOX	129.00	X 204.05	25558.6	22.9
2V	750.0	60.00	BOX	178.50	X 133.86	23482.7	8.1
3H	750.0	30.00	FLAT	95.00	X 194.60	18161.0	22.7
4			DUMMY				
5H	660.0	69.00	FLAT	69.00	X 208.84	14258.9	21.5
6V	660.0	45.00	EDGING	195.00	X 69.99	13332.6	6.5
7H	654.0	6.00	CHANNEL	47.0	60.10 X 207.70	10168.7	23.7
8H	654.0	6.00	CHANNEL	32.2	54.40 X 213.70	7505.0	26.2
9H	654.0	6.00	CHANNEL	22.0	56.20 X 213.50	5696.0	24.1
10H	654.0	7.80	CHANNEL	17.9	61.60 X 197.90	4547.0	20.2
11H	584.0	8.60	CHANNEL	15.2	63.20 X 180.10	3719.0	18.2
12H	584.0	8.80	CHANNEL	12.9	63.20 X 169.20	3056.0	17.8
13H	584.0	7.50	CHANNEL	11.2	55.30 X 169.90	2645.0	13.4
14H	584.0	8.90	CHANNEL	11.0	55.20 X 159.50	2506.8	5.2
15H	582.0	11.00	CHANNEL	11.0	55.20 X 154.40	2482.0	1.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:37

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 6x13.0
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 2.41 m/s
AXV : 5972.85 mm²m/s
BILLET SIZE : 182.3 mm SQUARE
BILLET WEIGHT : 2970.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 65.0 s
INTER BILLET : 68.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 3781 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	R O L L I N G LOAD	TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.23	649.7	6.9	118.730	816	1.297	100.3	1518.0	202.98	146	39.8
2V	0.25	634.6	7.7	85.673	656	1.088	115.4	654.3	63.11	51	17.1
3H	0.33	717.5	8.8	118.730	1039	1.293	32.5	1456.3	166.21	152	33.9
4			DUMMY								
5H	0.42	660.0	12.1	87.594	1062	1.274	0.0	1572.0	147.65	187	23.4
6V	0.45	514.5	16.6	68.825	1145	1.069	145.5	260.6	17.87	31	6.9
7H	0.59	611.0	18.4	55.247	1014	1.311	43.0	2160.7	191.01	367	45.9
8H	0.80	624.9	24.3	43.393	1055	1.355	29.1	2292.6	168.13	428	53.5
9H	1.05	633.3	31.6	37.442	1184	1.318	20.7	2290.5	135.05	447	55.9
10H	1.31	638.8	39.3	27.471	1079	1.253	15.2	2151.2	101.60	418	52.2
11H	1.61	572.0	53.6	17.428	935	1.223	12.0	2000.6	80.14	450	60.2
12H	1.95	574.7	64.9	13.852	900	1.217	9.3	2099.7	83.16	566	78.6
13H	2.26	575.9	74.9	11.734	879	1.155	8.1	1483.7	42.39	332	47.3
14H	2.38	577.2	78.8	9.471	747	1.055	6.8	915.2	19.19	158	26.5
15H	2.41	576.9	79.7	9.841	784	1.010	5.1	267.7	5.61	47	7.5

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

3 Roll pass design calculations for channels 4”÷6” from billet 150x150

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED	:	Channel 4x4.5 blt150 Hot rolling
MATERIAL	:	Rebar Steel
ROLLING SPEED	:	5.00 m/s
AXV	:	4149.00 mm²m/s
BILLET SIZE	:	152.0 mm SQUARE
BILLET WEIGHT	:	2065.0 kg
MAX HEATING CAPABILITY	:	80.0 t/h
ROLLING TIME	:	65.1 s
INTER BILLET	:	27.9 s
PRODUCTION	:	80.0 t/h
TOTAL ROLLING POWER	:	4797 kW

STAND NO.	ROLL DIA (mm)	GAP (mm)	GROOVE TYPE	STOCK HEIGHT (mm)	STOCK WIDTH (mm)	AREA (mm²)	REDUCTION (%)
			SQUARE		151.95 X 151.95	23003.0	
1H	750.0	25.00	BOX		129.00 X 159.81	20615.2	10.4
2V	750.0	18.00	BOX		136.50 X 137.14	18133.4	12.0
3H	750.0	18.00	R.BOX		94.00 X 160.59	13252.2	26.9
4V	660.0	17.00	ROUND		113.00 X 110.82	9886.3	25.4
5H	660.0	60.00	FLAT		60.00 X 137.42	7814.5	21.0
6V	660.0	14.00	EDGING		125.00 X 60.48	7484.1	4.2
7H	660.0	44.00	FLAT		44.00 X 136.14	5899.4	21.2
8H	654.0	4.00	CHANNEL	25.5	42.20 X 144.40	4172.7	29.3
9H	654.0	4.00	CHANNEL	18.5	42.00 X 143.40	3220.5	22.8
10H	655.0	2.50	CHANNEL	12.0	45.30 X 138.50	2333.7	27.5
11H	585.0	2.30	CHANNEL	7.90	48.20 X 124.20	1737.7	25.5
12H	585.0	2.40	CHANNEL	5.70	48.20 X 118.80	1283.0	26.2
13H	585.0	2.40	CHANNEL	4.60	42.10 X 113.10	1096.6	14.5
14H	586.5	3.50	CHANNEL	3.80	41.30 X 106.90	930.0	15.2
15H	587.0	3.00	CHANNEL	3.35	39.70 X 104.30	829.8	10.8

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 4x4.5 blt150
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 5.00 m/s
AXV : 4149.00 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 65.1 s
INTER BILLET : 27.9 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4797 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	ROLLING LOAD	ROLLING TORQUE	ROLLING POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.20	646.0	6.0	118.730	706	1.116	104.0	751.4	71.18	44	14.0
2V	0.23	635.8	6.9	85.673	589	1.137	114.2	760.9	75.86	55	20.6
3H	0.31	685.5	8.7	118.730	1036	1.368	64.5	1474.8	184.58	169	37.5
4V	0.42	587.8	13.6	74.409	1015	1.340	72.2	984.7	117.73	168	37.4
5H	0.53	660.0	15.4	87.594	1346	1.265	0.0	1128.8	131.23	211	26.4
6V	0.55	550.3	19.2	68.825	1324	1.044	109.7	140.4	6.36	13	2.8
7H	0.70	660.0	20.4	55.247	1124	1.269	0.0	1109.9	81.54	174	21.7
8H	0.99	629.1	30.2	43.393	1310	1.414	24.9	1739.6	124.96	395	49.4
9H	1.29	635.5	38.7	37.442	1450	1.296	18.5	1399.8	77.27	313	39.2
10H	1.78	640.7	53.0	27.471	1456	1.380	14.3	1640.5	83.07	461	57.6
11H	2.39	573.3	79.5	17.428	1386	1.343	11.7	1604.1	70.92	591	73.8
12H	3.23	576.6	107.1	13.852	1484	1.354	8.4	1609.9	65.52	735	91.9
13H	3.78	577.7	125.1	11.734	1468	1.170	7.3	1023.4	28.30	371	46.3
14H	4.46	581.3	146.6	9.471	1388	1.179	5.2	579.4	42.74	656	82.0
15H	5.00	582.0	164.1	9.841	1615	1.121	5.0	444.2	25.74	442	55.3

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 4x5.4 blt150
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 4.74 m/s
AXV : 4852.76 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 55.6 s
INTER BILLET : 37.3 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4388 kW

STAND NO.	ROLL DIA	GAP	GROOVE TYPE	STOCK HEIGHT	STOCK WIDTH	AREA	REDUCTION
	(mm)	(mm)		(mm)	(mm)	(mm²)	(%)
			SQUARE		151.95 X 151.95	23003.0	
1H	750.0	25.00	BOX		129.00 X 159.81	20615.2	10.4
2V	750.0	18.00	BOX		136.50 X 137.14	18133.4	12.0
3H	750.0	18.00	R.BOX		94.00 X 160.59	13252.2	26.9
4V	660.0	17.00	ROUND		113.00 X 110.82	9886.3	25.4
5H	660.0	60.00	FLAT		60.00 X 137.42	7814.5	21.0
6V	660.0	14.00	EDGING		125.00 X 60.48	7484.1	4.2
7H	660.0	44.00	FLAT		44.00 X 136.14	5899.4	21.2
8H	654.0	5.00	CHANNEL	26.5	43.20 X 144.40	4328.5	26.6
9H	654.0	5.00	CHANNEL	19.5	43.00 X 143.40	3351.0	22.6
10H	655.0	3.50	CHANNEL	13.0	46.30 X 138.50	2469.9	26.3
11H	585.0	3.10	CHANNEL	8.70	49.00 X 124.20	1848.1	25.2
12H	585.0	3.20	CHANNEL	6.50	49.00 X 118.80	1404.0	24.0
13H	585.0	3.20	CHANNEL	5.40	42.90 X 113.10	1181.8	15.8
14H	585.0	3.20	CHANNEL	4.60	40.60 X 107.00	1033.7	12.5
15H	585.0	4.60	CHANNEL	4.60	47.60 X 102.90	1023.5	1.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 4x5.4 blt150
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 4.74 m/s
AXV : 4852.76 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 55.6 s
INTER BILLET : 37.3 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4388 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	R O L L I N G LOAD	TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.24	646.0	7.0	118.730	826	1.116	104.0	762.4	72.23	53	14.2
2V	0.27	635.8	8.0	85.673	689	1.137	114.2	764.3	76.20	64	20.7
3H	0.37	685.5	10.2	118.730	1211	1.368	64.5	1470.9	184.10	197	43.7
4V	0.49	587.8	15.9	74.409	1187	1.340	72.2	976.0	116.70	195	43.3
5H	0.62	660.0	18.0	87.594	1574	1.265	0.0	1114.2	129.53	244	30.5
6V	0.65	550.3	22.5	68.825	1549	1.044	109.7	137.7	6.23	15	3.3
7H	0.82	660.0	23.8	55.247	1315	1.269	0.0	1079.6	79.31	198	24.7
8H	1.12	629.0	34.0	43.393	1477	1.363	25.0	1659.1	113.67	405	50.6
9H	1.45	635.6	43.5	37.442	1629	1.292	18.4	1418.4	79.33	361	45.2
10H	1.96	640.7	58.6	27.471	1609	1.357	14.3	1635.2	82.54	506	63.3
11H	2.63	573.2	87.5	17.428	1525	1.336	11.8	1638.3	73.98	678	84.7
12H	3.46	576.4	114.5	13.852	1586	1.316	8.6	1590.8	63.97	767	95.9
13H	4.11	577.8	135.7	11.734	1593	1.188	7.2	885.2	21.08	300	37.5
14H	4.69	578.5	155.0	9.471	1468	1.143	6.5	887.9	22.51	365	45.7
15H	4.74	579.7	156.2	9.841	1537	1.010	5.3	140.5	2.46	40	5.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 4x7.25 blt150
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 3.47 m/s
AXV : 4852.76 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 55.6 s
INTER BILLET : 37.3 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 3737 kW

STAND NO.	ROLL DIA	GAP	GROOVE TYPE	STOCK HEIGHT	STOCK WIDTH	AREA	REDUCTION
	(mm)	(mm)		(mm)	(mm)	(mm²)	(%)
			SQUARE		151.95 X 151.95	23003.0	
1H	750.0	25.00	BOX		129.00 X 159.81	20615.2	10.4
2V	750.0	18.00	BOX		136.50 X 137.14	18133.4	12.0
3H	750.0	18.00	R.BOX		94.00 X 160.59	13252.2	26.9
4V	660.0	17.00	ROUND		113.00 X 110.82	9886.3	25.4
5H	660.0	60.00	FLAT		60.00 X 137.42	7814.5	21.0
6V	660.0	14.00	EDGING		125.00 X 60.48	7484.1	4.2
7H	660.0	44.00	FLAT		44.00 X 136.14	5899.4	21.2
8H	654.0	7.00	CHANNEL	28.5	45.20 X 144.40	4617.3	21.7
9H	654.0	7.00	CHANNEL	21.5	45.00 X 143.40	3638.1	21.2
10H	655.0	6.50	CHANNEL	16.0	49.30 X 138.50	2885.4	20.7
11H	585.0	6.90	CHANNEL	12.5	52.80 X 124.20	2320.1	19.6
12H	585.0	6.80	CHANNEL	10.1	52.60 X 118.80	1806.7	22.1
13H	585.0	6.80	CHANNEL	9.00	46.50 X 113.10	1589.0	12.0
14H	585.0	6.80	CHANNEL	8.20	44.20 X 107.00	1412.0	11.1
15H	585.0	8.20	CHANNEL	8.20	51.20 X 102.90	1398.0	1.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 4x7.25 blt150
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 3.47 m/s
AXV : 4852.76 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 55.6 s
INTER BILLET : 37.3 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 3737 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	ROLLING LOAD	ROLLING TORQUE	ROLLING POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.24	646.0	7.0	118.730	826	1.116	104.0	762.4	72.23	53	14.2
2V	0.27	635.8	8.0	85.673	689	1.137	114.2	764.3	76.20	64	20.7
3H	0.37	685.5	10.2	118.730	1211	1.368	64.5	1470.9	184.10	197	43.7
4V	0.49	587.8	15.9	74.409	1187	1.340	72.2	976.0	116.70	195	43.3
5H	0.62	660.0	18.0	87.594	1574	1.265	0.0	1114.2	129.53	244	30.5
6V	0.65	550.3	22.5	68.825	1549	1.044	109.7	137.7	6.23	15	3.3
7H	0.82	660.0	23.8	55.247	1315	1.269	0.0	1079.6	79.31	198	24.7
8H	1.05	629.0	31.9	43.393	1385	1.278	25.0	1498.9	92.77	310	38.8
9H	1.33	635.6	40.1	37.442	1501	1.269	18.4	1419.6	79.47	334	41.7
10H	1.68	640.7	50.1	27.471	1377	1.261	14.3	1511.4	70.51	370	46.3
11H	2.09	573.2	69.7	17.428	1215	1.244	11.8	1562.1	67.26	491	61.4
12H	2.69	576.6	89.0	13.852	1232	1.284	8.4	1710.7	73.98	689	86.2
13H	3.05	577.8	101.0	11.734	1185	1.137	7.2	876.2	20.65	218	27.3
14H	3.44	578.6	113.4	9.471	1074	1.125	6.4	970.8	26.91	320	40.0
15H	3.47	579.6	114.4	9.841	1126	1.010	5.4	164.6	3.38	41	5.1

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 5x6.7 blt150
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 4.26 m/s
AXV : 5545.65 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 48.7 s
INTER BILLET : 44.3 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4574 kW

STAND NO.	ROLL DIA	GAP	GROOVE TYPE	STOCK HEIGHT	STOCK WIDTH	AREA	REDUCTION
	(mm)	(mm)		(mm)	(mm)	(mm²)	(%)
			SQUARE	151.95	X 151.95	23003.0	
1H	750.0	20.00	BOX	124.00	X 162.34	20129.7	12.5
2			DUMMY				
3H	750.0	30.00	FLAT	95.00	X 174.60	16287.7	19.1
4V	660.0	10.00	EDGING	150.00	X 97.64	14389.7	11.7
5H	660.0	60.00	FLAT	60.00	X 171.01	10091.2	29.9
6V	660.0	45.00	EDGING	156.00	X 60.98	9442.1	6.4
7H	654.0	6.00	CHANNEL	42.0 53.10	X 172.60	7493.2	20.6
8H	654.0	6.00	CHANNEL	28.1 49.00	X 177.70	5611.0	25.1
9H	655.0	4.40	CHANNEL	17.2 48.80	X 179.00	3944.0	29.7
10H	655.0	3.70	CHANNEL	12.1 51.40	X 162.80	2845.0	27.9
11H	585.0	3.40	CHANNEL	8.60 52.70	X 150.90	2166.0	23.9
12H	585.0	3.40	CHANNEL	6.50 52.90	X 141.00	1679.0	22.5
13H	585.0	3.40	CHANNEL	5.50 46.60	X 141.90	1423.0	15.2
14H	585.0	3.40	CHANNEL	5.00 45.00	X 133.00	1314.0	7.7
15H	585.0	5.00	CHANNEL	5.00 45.00	X 128.60	1301.0	1.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 5x6.7 blt150
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 4.26 m/s
AXV : 5545.65 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 48.7 s
INTER BILLET : 44.3 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4574 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	ROLLING LOAD	ROLLING TORQUE	ROLLING POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.28	646.0	8.1	118.730	967	1.143	104.0	876.0	89.74	77	17.6
2			DUMMY								
3H	0.34	717.5	9.1	118.730	1076	1.236	32.5	1157.0	119.25	113	25.2
4V	0.39	522.6	14.1	74.409	1048	1.132	137.4	437.1	35.28	52	11.6
5H	0.55	660.0	15.9	87.594	1393	1.426	0.0	1640.9	176.92	295	36.8
6V	0.59	550.2	20.4	68.825	1403	1.069	109.8	223.0	14.41	31	6.8
7H	0.74	616.6	22.9	55.247	1266	1.260	37.4	1726.7	136.52	328	41.0
8H	0.99	628.4	30.0	43.393	1303	1.335	25.6	1884.0	133.51	420	52.5
9H	1.41	637.4	42.1	37.442	1578	1.423	17.6	2103.9	132.80	586	73.2
10H	1.95	641.2	58.1	27.471	1595	1.386	13.8	2109.4	105.70	643	80.3
11H	2.56	574.0	85.2	17.428	1485	1.313	11.0	1775.2	73.07	652	81.5
12H	3.30	576.5	109.4	13.852	1516	1.290	8.5	1702.4	66.23	759	94.9
13H	3.90	578.4	128.7	11.734	1510	1.180	6.6	957.7	24.92	336	42.0
14H	4.22	578.5	139.3	9.471	1320	1.083	6.5	673.9	16.32	238	29.8
15H	4.26	579.9	140.4	9.841	1382	1.010	5.1	177.3	3.14	46	5.8

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 5x9.0 blt150
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 3.20 m/s
AXV : 5545.65 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 48.7 s
INTER BILLET : 44.3 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 3892 kW

STAND NO.	ROLL DIA	GAP	GROOVE TYPE	STOCK HEIGHT	STOCK WIDTH	AREA	REDUCTION
	(mm)	(mm)		(mm)	(mm)	(mm²)	(%)
			SQUARE		151.95 X 151.95	23003.0	
1H	750.0	20.00	BOX		124.00 X 162.34	20129.7	12.5
2			DUMMY				
3H	750.0	30.00	FLAT		95.00 X 174.60	16287.7	19.1
4V	660.0	10.00	EDGING		150.00 X 97.64	14389.7	11.7
5H	660.0	60.00	FLAT		60.00 X 171.01	10091.2	29.9
6V	660.0	45.00	EDGING		156.00 X 60.98	9442.1	6.4
7H	654.0	6.00	CHANNEL	42.0	53.10 X 172.60	7493.2	20.6
8H	654.0	6.00	CHANNEL	28.1	49.00 X 177.70	5611.0	25.1
9H	655.0	5.60	CHANNEL	18.4	50.00 X 179.00	4258.0	24.1
10H	655.0	6.20	CHANNEL	14.6	53.90 X 162.80	3252.0	23.6
11H	585.0	6.70	CHANNEL	11.9	56.00 X 150.90	2664.0	18.1
12H	585.0	6.70	CHANNEL	9.80	56.20 X 141.00	2144.0	19.5
13H	585.0	6.70	CHANNEL	8.80	49.90 X 141.90	1891.0	11.8
14H	585.0	6.70	CHANNEL	8.30	48.30 X 133.00	1749.3	7.5
15H	585.0	8.30	CHANNEL	8.30	48.30 X 128.60	1732.0	1.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 5x9.0 blt150
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 3.20 m/s
AXV : 5545.65 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 48.7 s
INTER BILLET : 44.3 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 3892 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	R O L L I N G LOAD	TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.28	646.0	8.1	118.730	967	1.143	104.0	876.0	89.74	77	17.6
2			DUMMY								
3H	0.34	717.5	9.1	118.730	1076	1.236	32.5	1157.0	119.25	113	25.2
4V	0.39	522.6	14.1	74.409	1048	1.132	137.4	437.1	35.28	52	11.6
5H	0.55	660.0	15.9	87.594	1393	1.426	0.0	1640.9	176.92	295	36.8
6V	0.59	550.2	20.4	68.825	1403	1.069	109.8	223.0	14.41	31	6.8
7H	0.74	616.6	22.9	55.247	1266	1.260	37.4	1726.7	136.52	328	41.0
8H	0.99	628.4	30.0	43.393	1303	1.335	25.6	1884.0	133.51	420	52.5
9H	1.30	636.8	39.1	37.442	1463	1.318	18.2	1894.6	107.69	440	55.1
10H	1.71	641.2	50.8	27.471	1395	1.309	13.8	2018.2	96.76	515	64.3
11H	2.08	574.0	69.3	17.428	1207	1.221	11.0	1652.0	63.27	459	57.4
12H	2.59	576.5	85.7	13.852	1187	1.243	8.5	1759.1	70.72	635	79.3
13H	2.93	578.4	96.8	11.734	1136	1.134	6.6	952.1	24.63	250	31.2
14H	3.17	578.5	104.7	9.471	991	1.081	6.5	768.4	21.21	232	29.3
15H	3.20	579.8	105.5	9.841	1038	1.010	5.2	204.5	4.18	46	5.8

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 6x8.2 blt150
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 3.58 m/s
AXV : 5709.88 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 47.3 s
INTER BILLET : 45.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4501 kW

STAND NO.	ROLL DIA	GAP	GROOVE TYPE	STOCK HEIGHT	STOCK WIDTH	AREA	REDUCTION
	(mm)	(mm)		(mm)	(mm)	(mm²)	(%)
			SQUARE		151.95 X 151.95	23003.0	
1H	750.0	27.00	SHAPE	95.9	145.50 X 171.00	20845.0	9.4
2			DUMMY				
3H	750.0	30.00	FLAT		95.00 X 192.80	17830.2	14.5
4			DUMMY				
5H	660.0	69.00	FLAT		69.00 X 206.81	14050.3	21.2
6V	660.0	45.00	EDGING		195.00 X 69.75	13292.8	5.4
7H	654.0	6.00	CHANNEL	47.0	60.10 X 207.70	10168.7	23.5
8H	654.0	6.00	CHANNEL	32.2	54.40 X 213.70	7505.0	26.2
9H	654.0	4.50	CHANNEL	20.5	54.70 X 213.50	5375.0	28.4
10H	654.0	4.00	CHANNEL	14.1	57.80 X 197.90	3795.0	29.4
11H	584.0	3.40	CHANNEL	10.0	58.00 X 180.10	2783.0	26.7
12H	584.0	3.20	CHANNEL	7.30	57.60 X 169.20	2108.0	24.3
13H	584.0	2.20	CHANNEL	5.95	50.00 X 169.90	1749.0	17.0
14H	584.0	3.20	CHANNEL	5.30	49.50 X 159.50	1608.9	8.0
15H	582.0	5.30	CHANNEL	5.30	49.50 X 154.40	1593.0	1.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 6x8.2 blt150
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 3.58 m/s
AXV : 5709.88 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 47.3 s
INTER BILLET : 45.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4501 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	R O L L I N G LOAD	TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.27	655.1	8.0	118.730	948	1.104	94.9	712.9	51.35	43	10.1
2			DUMMY								
3H	0.32	717.5	8.5	118.730	1012	1.169	32.5	1195.5	119.15	106	23.6
4			DUMMY								
5H	0.41	660.0	11.8	87.594	1030	1.269	0.0	1534.0	143.64	177	22.1
6V	0.43	514.4	15.9	68.825	1098	1.057	145.6	224.8	14.00	23	5.2
7H	0.56	611.0	17.6	55.247	970	1.307	43.0	2147.1	188.61	347	44.7
8H	0.76	624.9	23.3	43.393	1009	1.355	29.1	2292.6	168.13	409	51.2
9H	1.06	633.3	32.0	37.442	1199	1.396	20.7	2485.4	159.01	533	66.7
10H	1.50	638.8	45.0	27.471	1236	1.416	15.2	2522.6	139.71	658	82.3
11H	2.05	571.9	68.5	17.428	1194	1.364	12.1	2211.8	97.94	703	87.8
12H	2.71	574.7	90.0	13.852	1247	1.320	9.3	2118.6	84.67	798	99.8
13H	3.26	575.9	108.3	11.734	1270	1.205	8.1	1386.7	37.00	420	52.4
14H	3.55	577.1	117.4	9.471	1112	1.087	6.9	921.4	19.45	239	29.9
15H	3.58	577.0	118.6	9.841	1168	1.010	5.0	214.3	3.60	45	5.6

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 6x10.5 blt150
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 2.94 m/s
AXV : 5972.67 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 45.2 s
INTER BILLET : 47.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4080 kW

STAND NO.	ROLL DIA	GAP	GROOVE TYPE	STOCK HEIGHT	STOCK WIDTH	AREA	REDUCTION
	(mm)	(mm)		(mm)	(mm)	(mm²)	(%)
			SQUARE		151.95 X 151.95	23003.0	
1H	750.0	27.00	SHAPE	95.9	145.50 X 171.00	20845.0	9.4
2			DUMMY				
3H	750.0	30.00	FLAT		95.00 X 192.80	17830.2	14.5
4			DUMMY				
5H	660.0	69.00	FLAT		69.00 X 206.81	14050.3	21.2
6V	660.0	45.00	EDGING		195.00 X 69.75	13292.8	5.4
7H	654.0	6.00	CHANNEL	47.0	60.10 X 207.70	10168.7	23.5
8H	654.0	6.00	CHANNEL	32.2	54.40 X 213.70	7505.0	26.2
9H	654.0	5.00	CHANNEL	21.0	55.20 X 213.50	5482.0	27.0
10H	654.0	6.00	CHANNEL	16.1	59.80 X 197.90	4191.0	23.5
11H	584.0	6.00	CHANNEL	12.6	60.60 X 180.10	3251.0	22.4
12H	584.0	6.00	CHANNEL	10.1	60.40 X 169.20	2582.0	20.6
13H	584.0	5.00	CHANNEL	8.75	52.80 X 169.90	2225.0	13.8
14H	584.0	6.00	CHANNEL	8.10	52.30 X 159.50	2050.3	7.9
15H	582.0	8.10	CHANNEL	8.10	52.30 X 154.40	2030.0	1.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 6x10.5 blt150
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 2.94 m/s
AXV : 5972.67 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 45.2 s
INTER BILLET : 47.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 4080 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	R O L L I N G LOAD	TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.29	655.1	8.4	118.730	992	1.104	94.9	716.6	51.61	45	10.1
2			DUMMY								
3H	0.33	717.5	8.9	118.730	1059	1.169	32.5	1196.2	119.23	111	24.7
4			DUMMY								
5H	0.43	660.0	12.3	87.594	1077	1.269	0.0	1530.1	143.28	185	23.1
6V	0.45	514.4	16.7	68.825	1148	1.057	145.6	223.7	13.93	24	5.4
7H	0.59	611.0	18.4	55.247	1014	1.307	43.0	2147.1	188.61	363	45.3
8H	0.80	624.9	24.3	43.393	1055	1.355	29.1	2292.6	168.13	428	53.5
9H	1.09	633.3	32.9	37.442	1230	1.369	20.7	2422.2	151.02	520	65.0
10H	1.43	638.8	42.6	27.471	1170	1.308	15.2	2280.3	114.16	509	63.7
11H	1.84	571.9	61.3	17.428	1069	1.289	12.1	2131.7	90.97	584	73.1
12H	2.31	574.7	76.9	13.852	1065	1.259	9.3	2109.2	83.92	675	84.4
13H	2.68	575.9	89.0	11.734	1045	1.160	8.1	1382.8	36.82	343	42.9
14H	2.91	577.1	96.4	9.471	913	1.085	6.9	1028.9	24.25	245	33.5
15H	2.94	577.0	97.4	9.841	958	1.010	5.0	242.2	4.59	47	6.1

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 6x13.0 blt150
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 2.41 m/s
AXV : 5972.67 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 45.2 s
INTER BILLET : 47.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 3574 kW

STAND NO.	ROLL DIA	GAP	GROOVE TYPE	STOCK HEIGHT	STOCK WIDTH	AREA	REDUCTION
	(mm)	(mm)		(mm)	(mm)	(mm²)	(%)
			SQUARE		151.95 X 151.95	23003.0	
1H	750.0	27.00	SHAPE	95.9	145.50 X 171.00	20845.0	9.4
2			DUMMY				
3H	750.0	30.00	FLAT		95.00 X 192.80	17830.2	14.5
4			DUMMY				
5H	660.0	69.00	FLAT		69.00 X 206.81	14050.3	21.2
6V	660.0	45.00	EDGING		195.00 X 69.75	13292.8	5.4
7H	654.0	6.00	CHANNEL	47.0	60.10 X 207.70	10168.7	23.5
8H	654.0	6.00	CHANNEL	32.2	54.40 X 213.70	7505.0	26.2
9H	654.0	6.00	CHANNEL	22.0	56.20 X 213.50	5696.0	24.1
10H	654.0	7.80	CHANNEL	17.9	61.60 X 197.90	4547.0	20.2
11H	584.0	8.60	CHANNEL	15.2	63.20 X 180.10	3719.0	18.2
12H	584.0	8.80	CHANNEL	12.9	63.20 X 169.20	3056.0	17.8
13H	584.0	7.50	CHANNEL	11.2	55.30 X 169.90	2645.0	13.4
14H	584.0	8.90	CHANNEL	11.0	55.20 X 159.50	2506.8	5.2
15H	582.0	11.00	CHANNEL	11.0	55.20 X 154.40	2482.0	1.0

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

DANIELI-MORGARDSHAMMAR PASS DESIGN DEPT.
SPEED CALCULATION FOR HOT ROLLING MILL 24/05/23 AT 14:38

JOB NO. : DPC68X01 LAYOUT NO. : 000-000-361-343

SECTION ROLLED : Channel 6x13.0 blt150
Hot rolling
MATERIAL : Rebar Steel
ROLLING SPEED : 2.41 m/s
AXV : 5972.67 mm²m/s
BILLET SIZE : 152.0 mm SQUARE
BILLET WEIGHT : 2065.0 kg
MAX HEATING CAPABILITY : 80.0 t/h
ROLLING TIME : 45.2 s
INTER BILLET : 47.7 s
PRODUCTION : 80.0 t/h
TOTAL ROLLING POWER : 3574 kW

STAND NO.	SPEED	WORK DIA	ROLL RPM	GEAR RATIO	MOTOR RPM	R FACTOR	GROOVE FACTOR	R O L L I N G LOAD	TORQUE	POWER	UTIL
	(m/s)	(mm)	(RPM)		(RPM)		(mm)	(kN)	(kNm)	(kW)	(%)
	1.20										
1H	0.29	655.1	8.4	118.730	992	1.104	94.9	716.6	51.61	45	10.1
2			DUMMY								
3H	0.33	717.5	8.9	118.730	1059	1.169	32.5	1196.2	119.23	111	24.7
4			DUMMY								
5H	0.43	660.0	12.3	87.594	1077	1.269	0.0	1530.1	143.28	185	23.1
6V	0.45	514.4	16.7	68.825	1148	1.057	145.6	223.7	13.93	24	5.4
7H	0.59	611.0	18.4	55.247	1014	1.307	43.0	2147.1	188.61	363	45.3
8H	0.80	624.9	24.3	43.393	1055	1.355	29.1	2292.6	168.13	428	53.5
9H	1.05	633.3	31.6	37.442	1184	1.318	20.7	2290.5	135.05	447	55.9
10H	1.31	638.8	39.3	27.471	1079	1.253	15.2	2151.2	101.60	418	52.2
11H	1.61	572.0	53.6	17.428	935	1.223	12.0	2000.6	80.14	450	60.2
12H	1.95	574.7	64.9	13.852	900	1.217	9.3	2099.7	83.16	566	78.6
13H	2.26	575.9	74.9	11.734	879	1.155	8.1	1483.7	42.39	332	47.3
14H	2.38	577.2	78.8	9.471	747	1.055	6.8	915.2	19.19	158	26.5
15H	2.41	576.9	79.7	9.841	784	1.010	5.1	267.7	5.61	47	7.5

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

ROLLING SETUP FOR CHANNEL C8x11.5

STAND n.	GROOVE n.	ROLL DIA.		ACTIVE GAP	AVERAGE THICKNESS	GROOVE TYPE	STOCK DIMENSION WIDTH	STOCK DIMENSION HEIGHT	AREA	RED.	SPEED	WORK DIA.	ROLLS RPM	GEAR POS.	GEAR RATIO	MOTOR RPM	ROLLING LOAD	ROLLING TORQUE	ROLLING POWER	MOTOR DATA Min.	MOTOR DATA Base	MOTOR DATA Max.	MOTOR DATA POWER	MOTOR UTILIZ.		STAND n.
		mm		mm	mm		mm	mm	mm^2	%	m/s	mm	r.p.m.			r.p.m.	kN	kNm	kW	r.p.m.	r.p.m.	r.p.m.	kW	%		
						Billet	**182.0**	**182.0**	**33093.1**		**0.19**														**9.0**	
1 H		**750**		**18.0**		**SHAPE**	**210.7**	**160.0**	**27516.0**	**16.9**	**0.23**	**637**	**7.0**		**118.730**	**830.5**	**1448**	**215.9**	**158.1**	**0**	**1000**	**2000**	**450**	**42.3**	**10.6**	**1 H**
2 V		**750**		**50.0**		**EDGER**	**190.9**	**163.3**	**26711.0**	**2.9**	**0.24**	**636**	**7.2**		**85.673**	**618.3**	**398**	**35.6**	**26.9**	**0**	**1000**	**2000**	**450**	**9.7**	**10.9**	**2 V**
3 H		**750**		**25.0**		**SHAPE**	**219.7**	**140.0**	**23088.0**	**13.6**	**0.28**	**670**	**7.9**		**118.730**	**941.7**	**1676**	**213.6**	**177.4**	**0**	**1000**	**2000**	**450**	**41.9**	**12.6**	**3 H**
4 V		**660**		**31.5**		**EDGER**	**176.3**	**145.5**	**20368.0**	**11.8**	**0.32**	**552**	**10.9**		**74.409**	**812.6**	**873**	**105.9**	**121.1**	**0**	**1000**	**2000**	**450**	**33.1**	**14.3**	**4 V**
5 H		**665**		**7.0**		**SHAPE**	**197.4**	**120.9**	**17730.0**	**13.0**	**0.36**	**582**	**11.9**		**87.594**	**1041.1**	**1455**	**145.5**	**181.0**	**0**	**1000**	**2000**	**800**	**22.6**	**16.4**	**5 H**
6 H		**655**		**7.0**		**SHAPE**	**207.4**	**113.6**	**14278.0**	**19.5**	**0.45**	**593**	**14.5**		**68.825**	**997.0**	**2152**	**217.7**	**330.2**	**0**	**1000**	**2000**	**450**	**73.6**	**20.4**	**6 H**
7 H		**655**		**7.0**		**SHAPE**	**214.8**	**102.8**	**11981.0**	**16.1**	**0.54**	**606**	**16.9**	**2**	**73.990**	**1249.8**	**2141**	**181.9**	**321.8**	**0**	**1000**	**2000**	**800**	**40.2**	**24.3**	**7 H**
8 H		**665**		**7.0**		**SHAPE**	**217.5**	**84.0**	**9750.6**	**18.6**	**0.66**	**627**	**20.1**	**2**	**58.768**	**1179.0**	**2226**	**152.5**	**320.3**	**0**	**1000**	**2000**	**800**	**40.0**	**29.9**	**8 H**
9 H		**675**		**7.0**		**SHAPE**	**216.6**	**77.1**	**7415.5**	**23.9**	**0.87**	**648**	**25.5**	**2**	**49.768**	**1271.1**	**3080**	**215.5**	**576.3**	**0**	**1000**	**2000**	**800**	**72.0**	**39.3**	**9 H**
10 H		**669**		**7.0**		**SHAPE**	**219.4**	**70.8**	**5637.6**	**24.0**	**1.14**	**651**	**33.5**	**2**	**37.083**	**1240.5**	**3188**	**191.6**	**671.1**	**0**	**1000**	**2000**	**800**	**83.9**	**51.7**	**10 H**
11 H		**650**		**7.0**		**SHAPE**	**219.0**	**66.9**	**4358.8**	**22.7**	**1.47**	**637**	**44.2**	**2**	**26.576**	**1173.7**	**2954**	**167.2**	**773.2**	**0**	**1000**	**2000**	**800**	**96.7**	**66.8**	**11 H**
12 H		**645.2**		**5.0**		**Shape**	**218.6**	**64.2**	**3404.0**	**21.9**	**1.89**	**635**	**56.8**	**2**	**26.576**	**1509.2**	**2797**	**150.2**	**893.3**	**0**	**1000**	**2000**	**800**	**111.7**	**85.6**	**12 H**
						Web	171.8	9.1	1563.4																	
						Flange	64.2	28.7	1840.6																	
13 U		**853**		**7.4**		**Shape**	**208.4**	**64.3**	**2813.8**	**17.3**	**2.28**			**2**	**22.354**	**1151.4**		**105.2**	**567.2**	**0**	**1000**	**2000**	**800**	**70.9**	**103.5**	**13 U**
		550		**1.50**	**10.80**	Web	176.1	7.4	1294.3			**846**	**51.5**				**2447**	47.9								
						Flange	64.3	23.6	1519.5			**550**	**79.3**				**646**	57.2								
14 H		**655**		**5.0**		**Shape**	**215.8**	**59.3**	**2510.4**	**10.8**	**2.56**	**648**	**75.4**	**2**	**18.603**	**1402.2**	**1699**	**44.5**	**351.5**	**0**	**1000**	**2000**	**800**	**43.9**	**116.0**	**14 H**
						Web	177.1	6.4	1124.6																	
						Flange	59.3	23.4	1385.8																	
15 U		**854**		**5.6**		**Channel**	**207.3**	**59.1**	**2230.4**	**11.2**	**2.88**			**2**	**19.250**	**1246.8**		**45.8**	**310.3**	**0**	**1000**	**2000**	**800**	**38.8**	**130.6**	**15 U**
		550		**1.50**	**10.00**	Web	178.5	5.6	999.6			**849**	**64.8**				**1515**	20.4								
						Flange	59.1	20.8	1230.8			**550**	**100.0**				**363**	25.3								
																			5779.7	**TOTAL POWER**						

BILLET		THEORETICAL PRODUCTION		
LENGTH	WEIGHT	Ton/h	ROLLING TIME	INTERBILLET
9.0	2228	75.0	45.3	61.6

ROLLING SETUP FOR CHANNEL C8x13.75

STAND n.	GROOVE n.	ROLL DIA.		ACTIVE GAP	AVERAGE THICKNESS	GROOVE TYPE	STOCK DIMENSION WIDTH	STOCK DIMENSION HEIGHT	AREA	RED.	SPEED	WORK DIA.	ROLLS RPM	GEAR POS.	GEAR RATIO	MOTOR RPM	ROLLING LOAD	ROLLING TORQUE	ROLLING POWER	MOTOR DATA Min.	MOTOR DATA Base	MOTOR DATA Max.	MOTOR DATA POWER	MOTOR UTILIZ.		STAND n.
		mm		mm	mm		mm	mm	mm^2	%	m/s	mm	r.p.m.			r.p.m.	kN	kNm	kW	r.p.m.	r.p.m.	r.p.m.	kW	%		
						Billet	**182.0**	**182.0**	**33093.1**		**0.22**														**9.0**	
1 H		**750**		**18.0**		**SHAPE**	**210.7**	**160.0**	**27516.0**	**16.9**	**0.27**	**637**	**7.9**		**118.730**	**943.7**	**1448**	**215.9**	**179.7**	**0**	**1000**	**2000**	**450**	**42.3**	**10.6**	**1 H**
2 V		**750**		**50.0**		**EDGER**	**190.9**	**163.3**	**26711.0**	**2.9**	**0.27**	**636**	**8.2**		**85.673**	**702.5**	**398**	**35.6**	**30.5**	**0**	**1000**	**2000**	**450**	**9.7**	**10.9**	**2 V**
3 H		**750**		**25.0**		**SHAPE**	**219.7**	**140.0**	**23088.0**	**13.6**	**0.32**	**670**	**9.0**		**118.730**	**1070.1**	**1676**	**213.6**	**201.6**	**0**	**1000**	**2000**	**450**	**44.8**	**12.6**	**3 H**
4 V		**660**		**31.5**		**EDGER**	**176.3**	**145.5**	**20368.0**	**11.8**	**0.36**	**552**	**12.4**		**74.409**	**923.4**	**873**	**105.9**	**137.6**	**0**	**1000**	**2000**	**450**	**33.1**	**14.3**	**4 V**
5 H		**665**		**7.0**		**SHAPE**	**197.4**	**120.9**	**17730.0**	**13.0**	**0.41**	**582**	**13.5**		**87.594**	**1182.9**	**1455**	**145.5**	**205.7**	**0**	**1000**	**2000**	**800**	**25.7**	**16.4**	**5 H**
6 H		**655**		**7.0**		**SHAPE**	**207.4**	**113.6**	**14278.0**	**19.5**	**0.51**	**593**	**16.5**		**68.825**	**1132.8**	**2152**	**217.7**	**375.2**	**0**	**1000**	**2000**	**450**	**83.4**	**20.4**	**6 H**
7 H		**655**		**7.0**		**SHAPE**	**214.8**	**102.8**	**11981.0**	**16.1**	**0.61**	**606**	**19.2**	**2**	**73.990**	**1420.0**	**2141**	**181.9**	**365.6**	**0**	**1000**	**2000**	**800**	**45.7**	**24.3**	**7 H**
8 H		**665**		**7.0**		**SHAPE**	**217.5**	**84.0**	**9750.6**	**18.6**	**0.75**	**627**	**22.8**	**2**	**58.768**	**1339.6**	**2210**	**152.9**	**365.0**	**0**	**1000**	**2000**	**800**	**45.6**	**29.9**	**8 H**
9 H		**675**		**7.0**		**SHAPE**	**216.6**	**77.1**	**7415.5**	**23.9**	**0.98**	**648**	**29.0**	**2**	**49.768**	**1444.3**	**2836**	**211.9**	**644.0**	**0**	**1000**	**2000**	**800**	**80.5**	**39.3**	**9 H**
10 H		**669**		**7.8**		**SHAPE**	**220.6**	**71.0**	**5799.6**	**21.8**	**1.26**	**651**	**36.9**	**2**	**37.083**	**1369.8**	**2814**	**167.6**	**648.1**	**0**	**1000**	**2000**	**800**	**81.0**	**50.2**	**10 H**
11 H		**665**		**8.3**		**SHAPE**	**220.4**	**67.5**	**4634.5**	**20.1**	**1.57**	**652**	**46.1**	**2**	**26.576**	**1225.1**	**2559**	**151.4**	**730.6**	**0**	**1000**	**2000**	**800**	**91.3**	**62.8**	**11 H**
12 H		**660.2**		**6.7**		**Shape**	**219.1**	**63.2**	**3751.9**	**19.0**	**1.95**	**650**	**57.2**	**2**	**26.576**	**1519.6**	**2427**	**148.9**	**891.5**	**0**	**1000**	**2000**	**800**	**111.4**	**77.6**	**12 H**
						Web	171.8	10.8	1855.4																	
						Flange	63.2	30.0	1896.5																	
13 U		**853**		**9.6**		**Shape**	**208.4**	**64.7**	**3262.9**	**13.0**	**2.24**			**2**	**22.354**	**1128.2**		**104.7**	**553.2**	**0**	**1000**	**2000**	**800**	**69.1**	**89.3**	**13 U**
		550		**1.50**	**10.80**	Web	176.1	9.6	1681.8			**846**	**50.5**				**1665**	37.2								
						Flange	64.7	24.4	1581.1			**550**	**77.7**				**825**	67.5								
14 H		**655**		**7.2**		**Shape**	**207.8**	**60.5**	**2979.1**	**8.7**	**2.45**	**648**	**72.2**	**1**	**9.470**	**684.0**	**1068**	**36.5**	**276.1**	**0**	**1000**	**2000**	**800**	**50.5**	**97.8**	**14 H**
						Web	176.1	8.6	1505.7																	
						Flange	60.5	24.4	1473.4																	
15 U		**854**		**7.8**		**Channel**	**207.3**	**60.2**	**2683.4**	**9.9**	**2.72**			**2**	**19.250**	**1177.5**		**59.0**	**377.7**	**0**	**1000**	**2000**	**800**	**47.2**	**108.5**	**15 U**
		550		**1.50**	**10.00**	Web	178.5	7.8	1392.3			**849**	**61.2**				**1237**	22.6								
						Flange	60.2	21.4	1291.1			**550**	**94.5**				**527**	36.4								
																			5982.1	**TOTAL POWER**						

BILLET		THEORETICAL PRODUCTION		
LENGTH	**WEIGHT**	**Ton/h**	**ROLLING TIME**	**INTERBILLET**
9.0	**2228**	**75.0**	**39.9**	**67.0**

ROLLING SETUP FOR CHANNEL C8x18.75

STAND n.	GROOVE n.	ROLL DIA.		ACTIVE GAP	AVERAGE THICKNESS	GROOVE TYPE	STOCK DIMENSION WIDTH	STOCK DIMENSION HEIGHT	AREA	RED.	SPEED	WORK DIA.	ROLLS RPM	GEAR POS.	GEAR RATIO	MOTOR RPM	ROLLING LOAD	ROLLING TORQUE	ROLLING POWER	MOTOR DATA Min.	MOTOR DATA Base	MOTOR DATA Max.	MOTOR DATA POWER	MOTOR UTILIZ.		STAND n.
		mm		mm	mm		mm	mm	mm^2	%	m/s	mm	r.p.m.			r.p.m.	kN	kNm	kW	r.p.m.	r.p.m.	r.p.m.	kW	%		
						Billet	**182.0**	**182.0**	**33093.1**		**0.22**														**9.0**	
1 H		**750**		**18.0**		**SHAPE**	**210.7**	**160.0**	**27516.0**	**16.9**	**0.26**	**637**	**7.9**		**118.730**	**942.2**	**1448**	**215.9**	**179.4**	**0**	**1000**	**2000**	**450**	**42.3**	**10.6**	**1 H**
2 V		**750**		**50.0**		**EDGER**	**190.9**	**163.3**	**26711.0**	**2.9**	**0.27**	**636**	**8.2**		**85.673**	**701.4**	**398**	**35.6**	**30.5**	**0**	**1000**	**2000**	**450**	**9.7**	**10.9**	**2 V**
3 H		**750**		**25.0**		**SHAPE**	**219.7**	**140.0**	**23088.0**	**13.6**	**0.32**	**670**	**9.0**		**118.730**	**1068.4**	**1676**	**213.6**	**201.2**	**0**	**1000**	**2000**	**450**	**44.7**	**12.6**	**3 H**
4 V		**660**		**31.5**		**EDGER**	**176.3**	**145.5**	**20368.0**	**11.8**	**0.36**	**552**	**12.4**		**74.409**	**921.9**	**873**	**105.9**	**137.4**	**0**	**1000**	**2000**	**450**	**33.1**	**14.3**	**4 V**
5 H		**665**		**7.0**		**SHAPE**	**197.4**	**120.9**	**17730.0**	**13.0**	**0.41**	**582**	**13.5**		**87.594**	**1181.1**	**1455**	**145.5**	**205.4**	**0**	**1000**	**2000**	**800**	**25.7**	**16.4**	**5 H**
6 H		**655**		**7.0**		**SHAPE**	**207.4**	**113.6**	**14278.0**	**19.5**	**0.51**	**593**	**16.4**		**68.825**	**1131.1**	**2152**	**217.7**	**374.6**	**0**	**1000**	**2000**	**450**	**83.2**	**20.4**	**6 H**
7 H		**655**		**7.0**		**SHAPE**	**214.8**	**102.8**	**11981.0**	**16.1**	**0.61**	**606**	**19.2**	**2**	**73.990**	**1417.8**	**2141**	**181.9**	**365.0**	**0**	**1000**	**2000**	**800**	**45.6**	**24.3**	**7 H**
8 H		**665**		**7.5**		**SHAPE**	**217.7**	**84.8**	**9853.7**	**17.8**	**0.74**	**627**	**22.5**	**2**	**58.768**	**1323.4**	**2144**	**146.2**	**344.8**	**0**	**1000**	**2000**	**800**	**43.1**	**29.6**	**8 H**
9 H		**675**		**10.6**		**SHAPE**	**217.2**	**78.5**	**8126.9**	**17.5**	**0.90**	**648**	**26.4**	**2**	**49.768**	**1314.9**	**2232**	**154.2**	**426.6**	**0**	**1000**	**2000**	**800**	**53.3**	**35.8**	**9 H**
10 H		**669**		**11.1**		**SHAPE**	**219.6**	**72.6**	**6480.1**	**20.3**	**1.12**	**651**	**33.0**	**2**	**37.083**	**1223.8**	**2597**	**164.0**	**566.7**	**0**	**1000**	**2000**	**800**	**70.8**	**44.9**	**10 H**
11 H		**665**		**12.1**		**SHAPE**	**220.0**	**70.4**	**5443.6**	**16.0**	**1.34**	**653**	**39.2**	**2**	**26.576**	**1041.3**	**2126**	**134.8**	**552.9**	**0**	**1000**	**2000**	**800**	**69.1**	**53.5**	**11 H**
12 H		**660.2**		**10.8**		**Shape**	**219.0**	**68.8**	**4655.6**	**14.5**	**1.57**	**650**	**46.0**	**2**	**26.576**	**1222.8**	**2035**	**135.1**	**650.8**	**0**	**1000**	**2000**	**800**	**81.4**	**62.6**	**12 H**
						Web	171.8	14.9	2559.8																	
						Flange	68.8	30.5	2095.8																	
13 U		**853**		**13.9**		**Shape**	**208.4**	**71.8**	**4185.6**	**10.1**	**1.74**			**2**	**22.354**	**878.2**		**117.4**	**483.1**	**0**	**1000**	**2000**	**800**	**68.8**	**69.6**	**13 U**
		550		**1.50**	**10.80**	Web	176.1	13.9	2439.0			**846**	**39.3**				**1137**	30.2								
						Flange	71.8	24.3	1746.6			**550**	**60.5**				**1118**	87.2								
14 H		**655**		**11.7**		**Shape**	**215.7**	**64.9**	**3899.9**	**6.8**	**1.87**	**649**	**55.0**	**1**	**9.470**	**521.1**	**924**	**31.6**	**182.3**	**0**	**1000**	**2000**	**800**	**43.7**	**74.7**	**14 H**
						Web	177.1	13.0	2302.3																	
						Flange	64.9	24.6	1597.6																	
15 U		**854**		**12.4**		**Channel**	**207.3**	**65.7**	**3643.7**	**6.6**	**2.00**			**2**	**19.250**	**865.8**		**60.3**	**284.1**	**0**	**1000**	**2000**	**800**	**41.0**	**79.9**	**15 U**
		550		**1.50**	**10.00**	Web	178.5	12.4	2213.4			**849**	**45.0**				**913**	20.9								
						Flange	65.7	21.8	1430.3			**550**	**69.4**				**657**	39.4								
																			4984.9	**TOTAL POWER**						

BILLET		THEORETICAL PRODUCTION		
LENGTH	WEIGHT	Ton/h	ROLLING TIME	INTERBILLET
9.0	2228	75.0	40.0	67.0

4 Motor utilization diagrams