

CC 220 – List of equipment and production flow

2015

Steel shop material flow

2

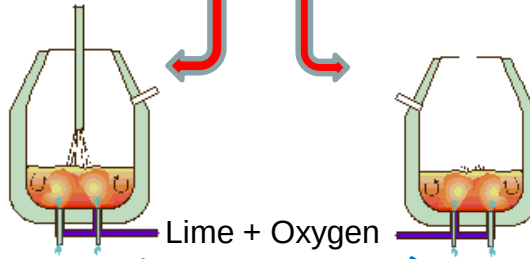
Hot metal from AMO



Scrap 40 % home, 60 %
scrap processors

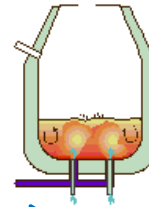
K2 – combined blowing converter

- up to 35 % of scrap
- 65 % hot metal
- 80 t



K1 – bottom blown converter

- 30 % scrap
- 70 % hot metal
- 80 t



Lime + Oxygen

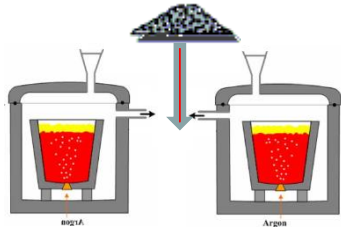
Lime+Alloys+Fluxes



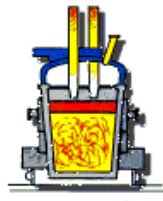
Ladle 75 t

Lime+Alloys+Fluxes+Wires

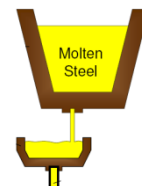
Lime+Alloys+Fluxes+Wires



Production routes:
LF-CCM
LF-ISSM-CCM
ISSM-LF-CCM



LF



Slabs

- Thickness 145, 180, 250 mm
- Width 800 – 1580 mm
- length 4,5 - 9 m

Scarifying machine



CCM

- 1 strand
- 8 m radius
- conical mould
- mechanical oscillations
- 22,067 m metallurgical length

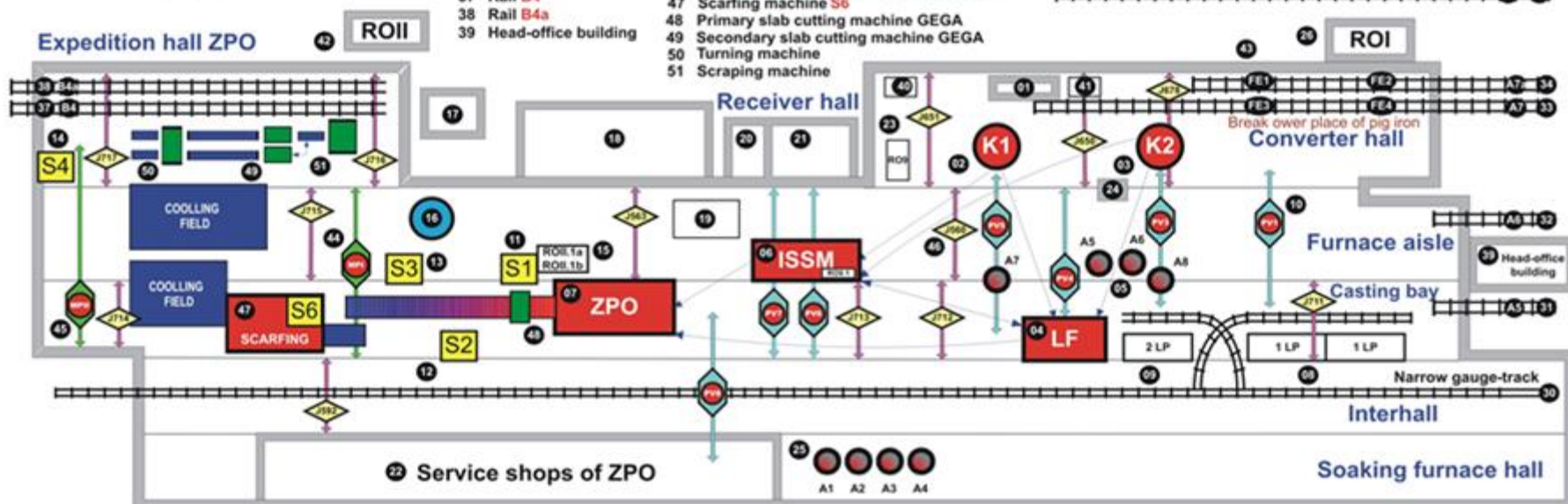
Degassing station ISSM

- 2 positions
- steam pumps, 100 Pa vacuum
- 2 ppm hydrogen content in steel

Layout of the Steel Plant

- 01 Control room of converters
- 02 Converter K1
- 03 Converter K2
- 04 Ladle furnace LF
- 05 Intermediate warming up of ladles A5-A8
- 06 Integrated system of secondary metallurgy ISSM
- 07 Continuous casting unit ZPO
- 08 Casting platform No.1 1LP
- 09 Casting platform No.2 2LP
- 10 Transporting cars PV1-8
- 11 Control room of ZPO S1
- 12 Flame cutting of slabs S2
- 13 Manipulator I for slab transport S3
- 14 Expeditionary line ZPO S4
- 15 Electrical equipment building of ZPO ROII.1a,ROII.1b
- 16 Hydrocyclone
- 17 Baumann test-room
- 18 Filtration and pumping station of water service

- 19 Tundish service
- 20 Compressor room
- 21 Gas dedusting and collection of K1
- 22 Service shops of ZPO
- 23 Electrical equipment building of ISSM RO9,RO9.1
- 24 Pumping station
- 25 Intermediate warming up of ladles A1-A4
- 26 Electrical equipment building ROI
- 27 Dolomite Station
- 28 Electrical equipment building RO11
- 29 Lime grinding room
- 30 Narrow-gauge track
- 31 Rail A5
- 32 Rail A6
- 33 Rail A7
- 34 Rail A7a
- 35 Rail A8
- 36 Rail A9
- 37 Rail B4
- 38 Rail B4a
- 39 Head-office building
- 40 Scrap iron troughs for K1
- 41 Scrap iron troughs for K2
- 42 Electrical equipment building ROII
- 43 Break over place of pig iron,FE1,FE2,FE3,FE4
- 44 Manipulator I MPI
- 45 Manipulator II MP2
- 46 Cranes J560,J563,J592,J650,J651,J678,J711,J712,J713,J714,J715,J716,J717
- 47 Scarfing machine S6
- 48 Primary slab cutting machine GEGA
- 49 Secondary slab cutting machine GEGA
- 50 Turning machine
- 51 Scraping machine



The steel shop production capacity/limitations:

- Maximal production capacity dependant on the CCM mould dimension/production mix.
- Every 3500 heats (K1) and 5000 heats (K2) the BOFs must be relined – 10 days repair
- The biggest volume produced in 2003 – 986 200 t of steel.
- The biggest K1 production in 1990 – 628 110 t
- The biggest K2 production in 2011 – 519 285 t

Year	K1		K2		Total	
	Production volume		Production volume			
	Year	Progress	Year	Progress	Year	Progress
1981	4 050	4 050			4 050	4 050
1982	104 660	108 710			104 660	108 710
1983	273 800	382 510			273 800	382 510
1984	401 500	784 010			401 500	784 010
1985	475 800	1 259 810			475 800	1 259 810
1986	514 260	1 774 070			514 260	1 774 070
1987	534 510	2 308 580			534 510	2 308 580
		2 308 580			0	2 308 580
		2 308 580			0	2 308 580
1988	551 460	2 860 040			551 460	2 860 040
1989	575 200	3 435 240			575 200	3 435 240
1990	628 110	4 063 350			628 110	4 063 350
1991	598 100	4 661 450	10 530	10 530	608 630	4 671 980
1992	276 580	4 938 030	281 960	292 490	558 540	5 230 520
1993	294 500	294 500	417 790	710 280	712 290	5 942 810
1994	398 120	692 620	479 080	1 189 360	877 200	6 820 010
1995	395 700	1 088 320	440 700	1 630 060	836 400	7 656 410
1996	367 400	1 455 720	441 100	2 071 160	808 500	8 464 910
1997	416 960	1 872 680	484 140	2 555 300	901 100	9 366 010
1998	400 690	2 273 370	452 610	3 007 910	853 300	10 219 310
1999	314 750	2 588 120	262 150	3 270 060	576 900	10 796 210
2000	427 250	3 015 370	441 250	3 711 310	868 500	11 664 710
2001	459 700	3 475 070	466 300	4 177 610	926 000	12 590 710
2002	468 100	3 943 170	440 200	4 617 810	908 300	13 499 010
2003	487 170	4 430 340	499 030	5 116 840	986 200	14 485 210
2004	480 560	4 910 900	484 440	5 601 280	965 000	15 450 210
2005	442 900	5 353 800	354 100	5 955 380	797 000	16 247 210
2006	406 170	5 759 970	390 030	6 345 410	796 200	17 043 410
2007	455 400	6 215 370	435 800	6 781 210	891 200	17 934 610
2008	372 130	6 587 500	411 070	7 192 280	783 200	18 717 810
2009	202 380	6 789 880	267 720	7 460 000	470 100	19 187 910
2010	72 620	6 862 500	274 580	7 734 580	347 200	19 535 110
2011	241 115	7 103 615	519 285	8 253 865	760 400	20 295 510
2012	133 260	7 236 875	312 370	8 566 235	445 630	20 741 140
2013	23 500	7 260 375	357 400	8 923 635	380 900	21 122 040
2014	9 073	7 269 448	477 572	9 401 207	486 645	21 608 685

BOFs



Identification
location according to scheme
technology
manufactured by
erection

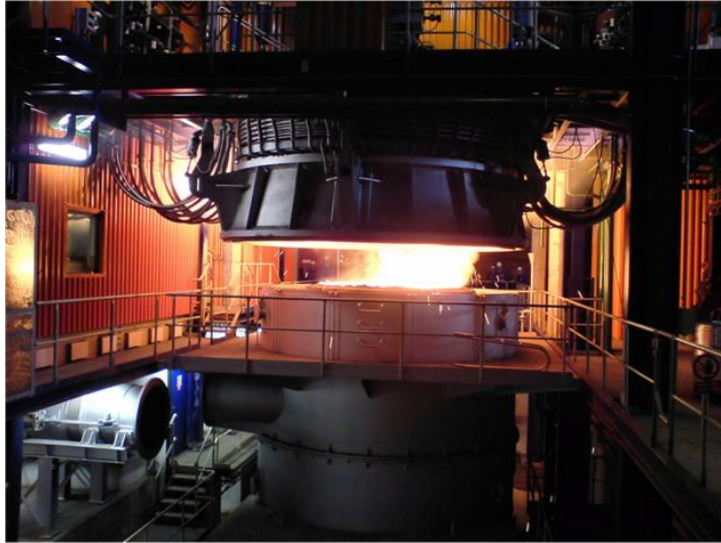
K1
02
OXYVIT
Vítkovice
1981, overhaul 1992

K2
03
OXYVIT
Vítkovice
1991

bottom blowing of oxygen and powdered lime, post combustion of CO with use of two lateral ceramic nozzles (K1) or with water cooled lance (K2)
hot metal (pig iron) charging amounts over 70 % of metallic charge

heat size 75 t
tap to tap time 40 – 45 min
time of flow oxygen 13 – 17 min
time of taping 3 – 7 min

carburizing additives, alloying additions and deoxidation agents are dosed automatically into ladle from the containers during taping (as the first steps of deoxidation and alloying)



VACUUM STATION VD-VOD (ISSM)

location according to scheme
technology
manufactured by
erection

06
VD, VOD
VÍTKOVICE HEAVY MACHINERY
2006

modern two-caisson equipment usable for: vacuum degassing under 1 mbar, chemical reheating, decarburization, desulphurization, removal of non-metallic inclusions, fine adjustment of chemical composition, thermal and chemical homogenization and inclusions modification

alloying device

6 storage bins system
four core wire and tube feeder

works on both caissons in simultaneous regime

equipment ensures reliable production of micro-alloyed and special steel grades with special requirements including deep dehydrogenization and desulphurization of steel and precise alloying in the required time and with minimum heat losses



LADLE FURNACE (LF)

location according to scheme
manufactured by
erected

04

VAI

1995

transformer

12 MVA

electrodes

graphite with diameter 300 mm

dedusting system

dry

argon station

50 – 200 NI/min

alloying device

6 storage bins system

two core wire and tube feeder

measuring and sampling device with manual probe changing

LF is used for heating, purging and alloying steel



CONTINUOUS CASTING MACHINE (CCM)

location according to scheme
manufactured by
erected
annual slab production
slab sizes

mould length
machine radius
metallurgical length
casting speed
tundish capacity
number of segments
soft reduction
operating system (2nd level)
operating system (1st level)
slab torch cutter
slab marker

07
VÍTKOVICE, a.s. in corporation with MANNESMANN DEMAG
1995
950 000 t
thickness: 145, 180 and 250 mm
width: 800 – 1 580 mm
mother slab length: 4,5 – 9 m
904 mm
8 m
22,067 m
0,2 – 2 m/min
15 t
12 (segment no. 0 plus segments no. 1 – 11)
segments no. 8 – 11
system VAX made by VAI
PCIM made by MDH
GEGA
STOMMEL & VOOS



SCARFING MACHINE

location according to scheme
manufactured by

type

function

erected

type of the machine

sizes and weights of slabs

47

Gega Lotz GmbH

K 7137

one side /one pass scarfing

2009

scarfing machine with slab transport car and tool carriage

thickness: 145, 180 and 250 mm

width: 800 – 1 580 mm

length: 6 000 – 9 000 mm

weight: 9,36 – 27,73 t

carbon equivalent: 0,02 – 0,30 %

temperature: 20 – 600 °C

scarfing machine is used for removing shell defects of slabs

Cranes



	Crane #	Commisioning date	Load capacity
Casting bay	560	2 006	130/30/12,5 tony
	711	1 993	130/40/12,5 tony
	712	1 993	130/40/12,5 tony
	713	1 993	130/40 tun
Slabs handling	714	1 994	32/12,5 tony
	715	1 994	32/12,5 tony
	716	1 994	32/12,5 tony
	717	1 994	32/12,5 tony
BOFs charging	650	1 980	100 / 50 / 5 tun
	651	1 979	40 / 5 tun
	678	1 989	100/50/5 tun