

Revisions marked yellow.

T1 LOCAL CONDITIONS

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APPENDIX I Wind Rose

1 GENERAL

This technical specification describes site conditions and utilities.

Pressure unit for overpressure is bar (bar). The unit for air and gas flow pressure and differential pressure is Pascal (Pa).

2 LOCAL CONDITIONS AND UTILITY VALUES

2.1 Mill Location

The mill is located in Paso de los Toros, Uruguay (~ +90.000).

2.2 Local Conditions

Outdoor temperature:	-5...+45 °C
Dry bulb:	-5...+45 °C
Wet bulb:	xx...+27 °C
Humidity during warmest month, average	73 % RH
Mean temperature:	+18 °C

Wind, max 43.9 m/s, see Uruguayan code UNIT 50:84

Wind rose, see appendix 1

Annual rainfall	1400 mm
- Daily, max.	400 mm
- Peak 15 min	70 mm

UV radiation index UVIEF:

- Mean:	7.3
- Max:	15.6

The mill site does not belong to earthquake areas.

2.3 Utility Values (pressure values refer to overpressure)

2.3.1 Voltages

Voltage Systems

The available electrical power supply system is a typical industrial network and the quality of the power supply will be of corresponding standard. The equipment shall be suitable for operation in these conditions and with voltage variation of -15... +10%.

Constant Speed motor Voltages

Motor ratings:	Voltages:
≤ 800 kW	690 V, 50 Hz (TN-S system)

The voltage of large motors > 800 kW shall always be confirmed with the Purchaser.

The terminal box connection of 0.25 kW ... 800 kW squirrel cage motors is 690V Y/ 400 VΔ.

Variable Speed Drives Voltage

- 690 V, 50 Hz distribution system, provided with solidly earthed neutral.

Other Loads

Other loads such as tools, lighting, cranes, heaters, etc. will be connected to the distribution system of 400/230 V, 50 Hz; with solidly earthed neutral point.

Control Voltages

The control voltages will be:

- Binary sensors	24 VDC
- Solenoid valves,	24 VDC
- MCC starter, internal	230 VAC
- Safety devices on field	24 VDC

- Auxiliary voltage HV switchgear 110 VDC

Generally the control voltage is a solidly -earthed voltage of 230 V 50 Hz. Normally it is supplied from 690/230 V or 400/230 voltage transformers. For automation and electronic equipment an operational-earthed 400/230 V, 50 Hz voltage secured with UPS equipment will be used. In equipment connected to control systems, 24 V DC is used as field voltage.

2.3.2 Compressed air

Mill and instrument air, pressure 600-700 kPa

Instrument air quality: According to ISO 8573-1

Solid particles: Class 5

Humidity: Class 1

Dew point: -20°C,

Oil class: 3 (or< 1ppm)

2.3.3 Mill water / Cooling water

Mill water / Cooling water characteristics:

- TSS (Total Suspended Solids)	≤ 1 mg/l
- TDS (Total Dissolved Solids)	≤ 200 mg/l
- pH	6.5 - 8.0
- Temperature	
- normal	28-32 °C
- minimum	25 °C
- maximum	34 °C
- Total Hardness, as CaCO ₃	≤ 70 mg/l
- COD _{Mn}	≤ 5.0 mg/l
- Iron, (as Fe)	≤ 0.1 mg/l
- Chlorides	≤ 20 mg/l
- Total silica, (as SiO ₂)	≤ 15 mg/l
- Manganese	≤ 0.05 mg/l
- Residual chlorine	≤ 0.5 mg/l
- True color	≤ 10 mg Pt/l
- Turbidity	≤ 1.0 NTU
- Conductivity	≤ 110 μS/cm
- Pathogens	absent

Pressure on ground level (~ +90.000)

Sealing water filtration 4 bar <50μm

2.3.4 Demineralized Water

Demineralized water characteristics:

- pH	6 - 8
- SiO ₂	< 0.02 mg/kg
- Na + K	< 0.01 mg/kg
- Fe	< 0.01 mg/kg
- Cu	< 0.003 mg/kg
- Conductivity	< 0.2 μS/cm
- TOC	< 0.2 mg/kg

2.3.5 Steam

	<u>Operation</u>	<u>Design</u>
Low-pressure steam lines		
- pressure, bar	3.5 – 5.0	6
- temperature, °C	150 – 170	220
Flange connections PN 10, EN 1092-1 Type 11.		

Rated values for heat transfer based on an operating pressure of 3.5 bar.

	<u>Operation</u>	<u>Design</u>
Medium pressure 1 lines		
- pressure, bar	10 – 12	14.5
- temperature, °C	195 – 240	250
Flange connections PN 25, EN 1092-1 Type 11.		

Rated values for heat transfer based on an operating pressure of 10 bar.

	Operation	Design
Medium pressure 2 lines		
- pressure, bar	30	40
- temperature, °C	290 – 320	400
Flange connections PN 63, EN 1092-1 Type 11.		

	Operation	Design
High pressure lines		
- pressure, bar	102	117
- temperature, °C	505	520
Flange connections PN160, PN250 or PN320, EN 1092-1 Type 11.		

2.3.6 Secondary condensates

Secondary condensate available at the fibre line:

- temperature, °C	86 C
- methanol content, mg/l	150 mg/l

Secondary condensate available at the White Liquor Plant:

- temperature, °C	64 C
- methanol content, mg/l	850 mg/l

2.3.7 Sulfuric Acid

Storage concentration and Distribution concentration

Sulphuric acid	(H ₂ SO ₄)
Liquid	98 % w/w
Specific gravity:	1 823 kg/m ³ , 20 C
Concentration	1786.7 g/l, 20 C
pH	≤ 1
Freezing point	+4.4 C
Boiling point (atm)	338 C
Viscosity	28.8 mPas, 20 C
Molecular weight	98 g/mol
Purity:	
Fe	< 15 ppm
Cr	< 1 ppm
Ni	< 0.7ppm
Mn	< 0.3 ppm
SO ₂	< 15 ppm
Cl	< 1 ppm
As	< 0.2 ppm
Cu	< 0.1 ppm
Cd	< 0.01 ppm
Pb	< 0.1 ppm
Zn	< 0.1 ppm
Hg	< 0.08 ppm
Ca	< 3 ppm
Se	< 1 ppm

2.3.8 Methanol

Storage concentration/Distribution concentration to ClO₂-plant

Methanol	(MeOH)
Liquid	99.8 % w/w
Specific gravity:	787,3 kg/m ³ , 20 C
Concentration	785,8 g/l, 20 C
pH	-
Freezing point	-97.6 C
Boiling point (atm)	64.7 C
Viscosity	0.545 mPas, 20 C
Molecular weight	34 g/mol
Purity:	
Ethanol	max. 50 mg/kg
Cl ⁻	max.0.5 mg/kg
Sulphur	max. 0.5 mg/kg

Carbonisable substances

Acetic acid

Total Iron

Non volatile matter

max. 30 mg/kg
max. 30 mg/kg
max. 0.5 mg/kg
max. 8 mg/1000 ml

2.3.9 Sodium Hydroxide

Storage concentration

Sodium Hydroxide	(NaOH)
Liquid	50 % w/w
Specific gravity:	1 550 kg/m ³ , 20 C
Concentration	775 g/l, 20 C
pH	14
Freezing point	14 C
Boiling point (atm)	145 C

Viscosity 78 mPas, 20 C

Molecular weight 40 g/mol

Purity:

Cl	≤ 100 mg/kg
SO ₄	≤ 25 mg/kg
Fe	≤ 5 mg/kg
Pb	≤ 1 mg/kg

Cr	≤ 0.32 mg/kg
Heav metals (tot)	≤ 10 mg/kg

Distribution concentration

Sodium Hydroxide	(NaOH)
Liquid	20 % w/w
Specific gravity:	1 220 kg/m ³ , 20 C
Concentration	244 g/l, 20 C
pH	10
Freezing point	-25 C
Boiling point (atm)	109 C

Viscosity 7.1 mPas, 20 C

Molecular weight 40 g/mol

Purity:

Cl	≤ 20 mg/kg
SO ₄	≤ 5 mg/kg
Fe	≤ 1 mg/kg
Pb	≤ 0.2 mg/kg

Cr	≤ 0.06 mg/kg
Heav metals (tot)	≤ 2 mg/kg

2.3.10 Hydrogen Peroxide

Storage concentration and Transportation concentration

Hydrogen Peroxide	(H ₂ O ₂)
Liquid	50 % w/w
Specific gravity:	1 200 kg/m ³ , 20 C
Concentration	600 g/l, 20 C
pH	< 3
Freezing point	-52 C
Boiling point (atm)	113.9 C

Viscosity 1.1 mPas, 20 C

Molecular weight 34 g/mol

Purity:

PO ₄	250 mg/l (from stabilizer)
NO ₃	167 mg/l (from stabilizer)
SO ₄	< 0.8 mg/l

Cl	< 0.3 mg/l
Zn	< 0.3 mg/l
Al	< 0.17 mg/l
As	< 0.17 mg/l
Fe	< 0.17 mg/l
Pb	< 0.08 mg/l
Cr	0.05 mg/l
Ni	< 0.05 mg/l
Cu	< 0.03 mg/l
Mn	< 0.02 mg/l
TOC	< 190 mg/l

Distribution concentration

Hydrogen Peroxide (H ₂ O ₂)	
Liquid	20 -35 % w/w
Specific gravity:	1080 -1140 kg/m ³ , 20 C
Concentration	216-399 g/l, 20 C
pH	< 3
Freezing point	-15 C
Boiling point (atm)	108 C

Viscosity	1.07 mPas, 20 C
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Molecular weight	34 g/mol
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Purity :	
PO ₄	86 mg/l (from stabilizer)
NO ₃	57 mg/l (from stabilizer)
SO ₄	< 0.3 mg/l
Cl	< 0.1 mg/l
Zn	< 0.1 mg/l
Al	< 0.06 mg/l
As	< 0.06 mg/l
Fe	< 0.06 mg/l
Pb	< 0.03 mg/l
Cr	0.02 mg/l
Ni	< 0.02 mg/l
Cu	< 0.01 mg/l
Mn	< 0.005 mg/l
TOC	< 80 mg/l

2.3.11 Sodium Chlorate

Wet crystals

Sodium Chlorate (NaClO ₃)	
NaClO ₃	min. 98 % w/w
Specific gravity:	1 640 kg/m ³ , 20 C
Concentration	700 g/l, 20 C
pH	7-9
Crystallization point	-8 C

Purity:	
NaCl	max. 0.09 % w/w
Moisture (H ₂ O)	max. 1.9 % w/w
Insoluble in water	5 ppm
Iron	5 ppm
Cr	2 ppm

Distribution concentration to ClO₂-plant

Sodium Chlorate (NaClO ₃)	
Water solution	42,7 % w/w
Specific gravity:	1 640 kg/m ³ , 20 C
Concentration	700 g/l, 20 C
pH	2-4
Crystallization point	-8 C
Boiling point (atm)	102-108 C

Viscosity	2.07 mPas
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Molecular weight	106,5 g/mol, 20 C
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Purity:	
NaCl	1.0 g/l
Cr	3.0 mg/l

2.3.12 Sodium Bisulphite

Sodium BiSulphite (NaHSO ₃)	
Water solution	20%,w/w
Specific gravity:	1 258 kg/m ³ , 20 C
Concentration	251,6 g/l, 20 C
pH	5
Crystallization point	
Viscosity	4.3 mPas, 20 C

Molecular weight	104 g/mol
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2.3.13 Magnesium Sulphate

Distribution concentration

Magnesium sulphate (MgSO ₄)	
Water solution	20 % w/w
Specific gravity:	1 332 kg/m ³ , 20 C
Concentration	266,4 g/l, 20 C
pH	8.5

Molecular weight	120,4 g/mol
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MgSO ₄ crystals:	
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Purity:	
MgSO ₄	98.4% w/w
K ₂ SO ₄	0.6 % w/w
CaSO ₄	0.5 % w/w
Others (mainly water)	0.5 % w/w

Granulometry	
< 0.8 mm	95% w/w

2.3.14 Chlorine dioxide

Distribution concentration

Chlorine dioxide (ClO ₂)	
Water solution	1 % w/w
Temperature	10 °C
Specific gravity:	1 003,6 kg/m ³
Concentration	10 g/l
pH	3
Freezing point	0 C

Molecular weight	67.5 g/mol
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2.3.15 Hydrogen

Distribution concentration

Hydrogen (H ₂)	
Gaseous	
Hydrogen	98.8 % V/V
Specific gravity:	0.0899 kg/m ³ , 20 C
Temperature	20-40 C
Pressure	4.0 bar

Purity:	
Moisture	Saturated
O ₂	mx. 100 ppm
Cl	max. 1 ppm
CO	max. 1 ppm

2.3.16 Oxygen

Oxygen	(O ₂)
Gaseous	
Purity	93 % w/w
Specific gravity:	1.43 kg/m ³ , 20 C
Molecular weight	16 g/mol

T1 Appendix I

WIND ROSE

WIND ROSE

The wind rose deduced from historical series in Paso de los Toros, Pampa and Peralta that covers 1999 to 2017 is shown in the Figure below. Prevailing wind directions are from East and North East.

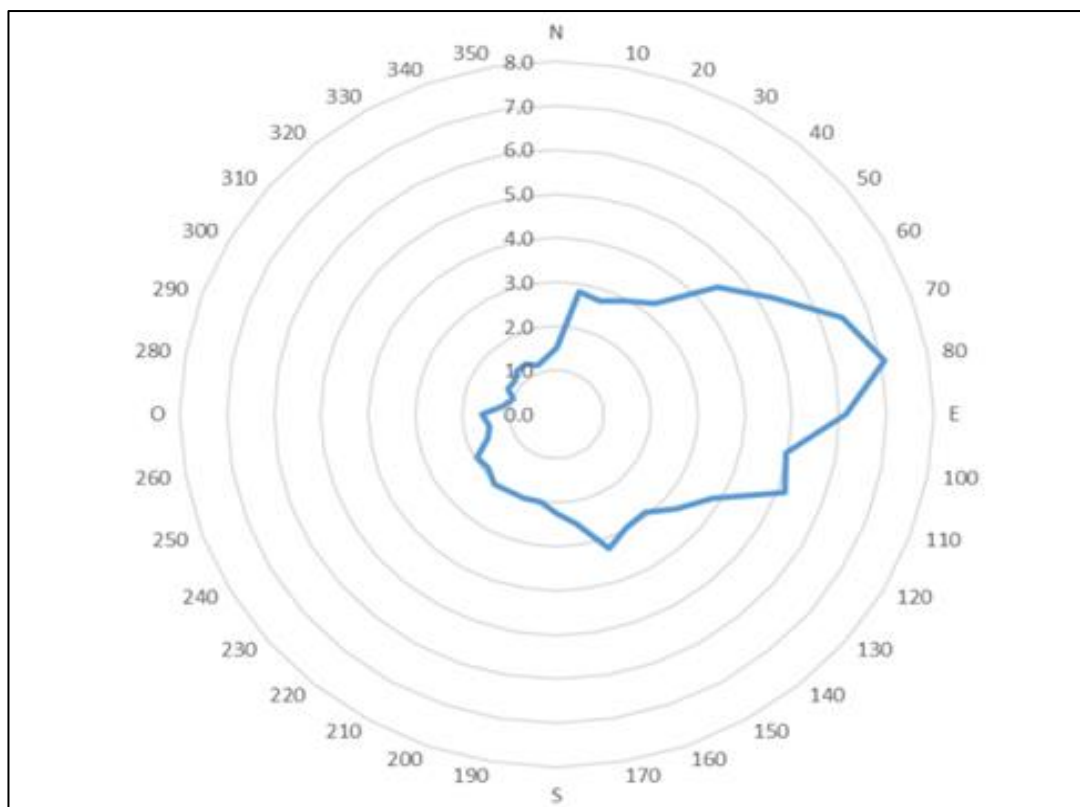


Figure 1 Wind Rose