

## Grouting Instruction VL4 FIRST GROUT FAN

Tunnel	VL4 (W=6,9-H=6,9)
Instruction N°	General instruction 572

Chainage	1+701.5
Total Inflow face (L/s)	1
Total Inflow Probe holes (L/s)	10
Water pressure measured	-

Mark additional holes with x and number

Erase holes not to be used

## 1-DRILL PROBEHOLES IN POSITIONS:

2, 4, 6, 8, 10, 12, 14 AND INSTALL STAND-PIPES L=2 m. MEASURE WATER INFLOW AND PRESSURE (AT LEAST ONE OF THESE HOLES SHALL BE USED FOR GEOLOGICAL MAPPING). IF INFLOW IS > 5 L/s THEN INSTALL STAND-PIPES IN NEIGHBOURS HOLES OF FIRST CURTAIN. IF WATER INFLOW > 15 L/s IMMEDIATELY INSTALL STAND-PIPES IN SPLIT-SPACED NEIGHBOURS HOLES (NOT SHOWN IN SKETCH). GROUT ALL HOLES.

## 2-DRILL REMAINING HOLES IN ORDER:

7, 5, 9, 3, 11, 1, 15, 13. MEASURE WATER INFLOW AND PRESSURE AND GROUT.

3- IN PLACES OF HIGHER GROUT TAKES, DRILL 6 CONTROL HOLES OF 24 m DEPTH, MEASURE WATER INFLOW AND PRESSURE. IF TRIGGER VALUES FROM SI N° 0572 ARE REACHED, A SPLIT-CURTAIN SHALL BE CARRIED OUT IN THE NEIGHBOUR LOCATIONS (NOT SHOWN IN SKETCH).

Design Mix (Type A,B,C, D or E)	A
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WCR	0.45 if water inflow > 2.5 L/s 0.65 if water inflow < 2.5 L/s
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## Closure criteria

Pmax	25*
Vmax (L/m borehole)	85
GIN	1000

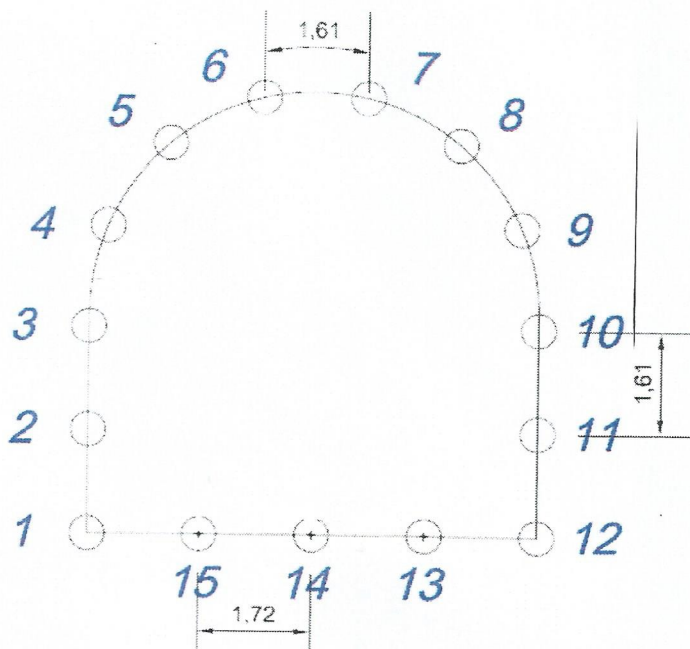
\*IF GROUNDWATER PRESSURE IS HIGHER THAN 10 BAR THEN APPLY GROUT PRESSURE OF 2,5 TIMES GROUNDWATER PRESSURE

Instructed by:	Andrés Tapia Pardo
Instruction date:	26-05-2016

HOLES 1-15

N° of Grout holes first curtain	15
Grout holes length (m)	27
Grout hole angle ref Tunnel axis	15°

Position of Grout holes 1st grout round:



## NOTES:

- 1-DRILL GROUTING HOLES TO THE FULL DEPTH AS INSTRUCTED. STOP DRILLING AND GROUT IF WATER INFLOW > 10 L/s. RE-DRILL TO FULL DEPTH AND GROUT AFTER 4 HOURS.
- 2- THE MAXIMUM INCREASE OF GROUTING PRESSURE SHALL BE NOT MORE THAN 2,5 BAR PER MINUTE.
- 3- DRY HOLES SHALL NOT BE RE-DRILLED.
- 4- THE VOLUME CLOSURE CRITERIA OF 1000 L SHALL APPLY IF NOT SIGNIFICANT PRESSURE INCREASE IS OBSERVED. CONTINUE WITH PRESSURE CRITERIA 4 HOURS LATER.

STRABAG

ANTONIA DEJMAN A. Dejman 26/05/2016 11:30h

Name

Signature

SAM

Andrés Tapia Pardo

Name

Signature

CONTRACTOR COMMENTS:

GROUTING SEQUENCE IS VARIABLE AND DEPENDING ON CONDITIONS!