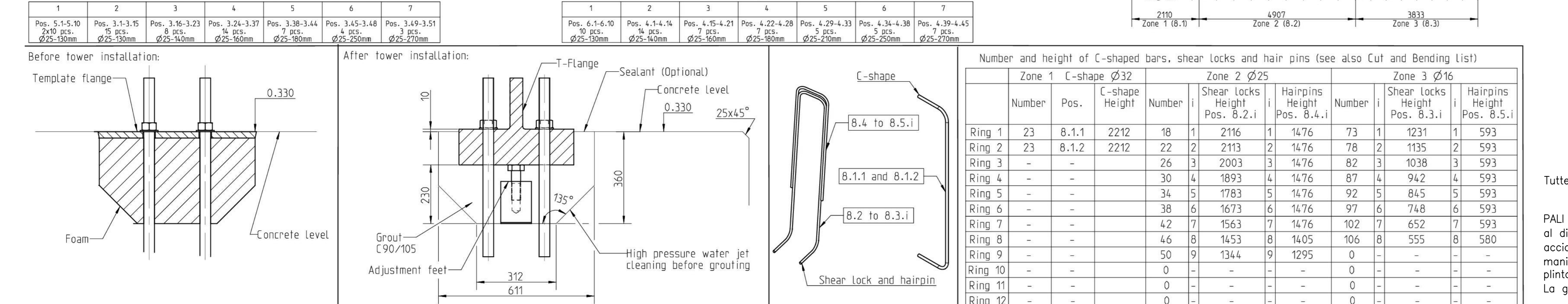
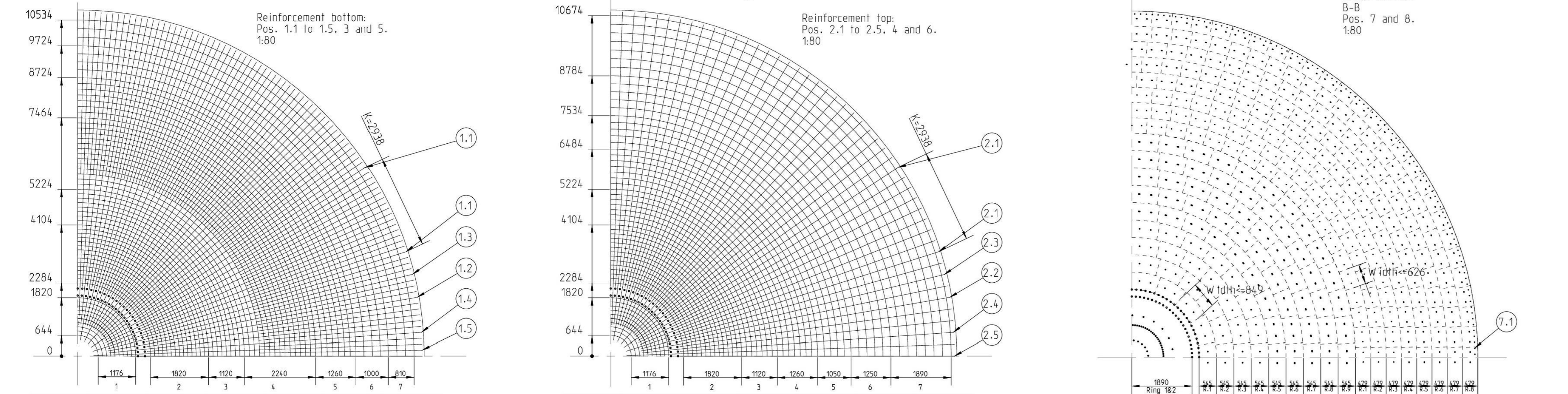
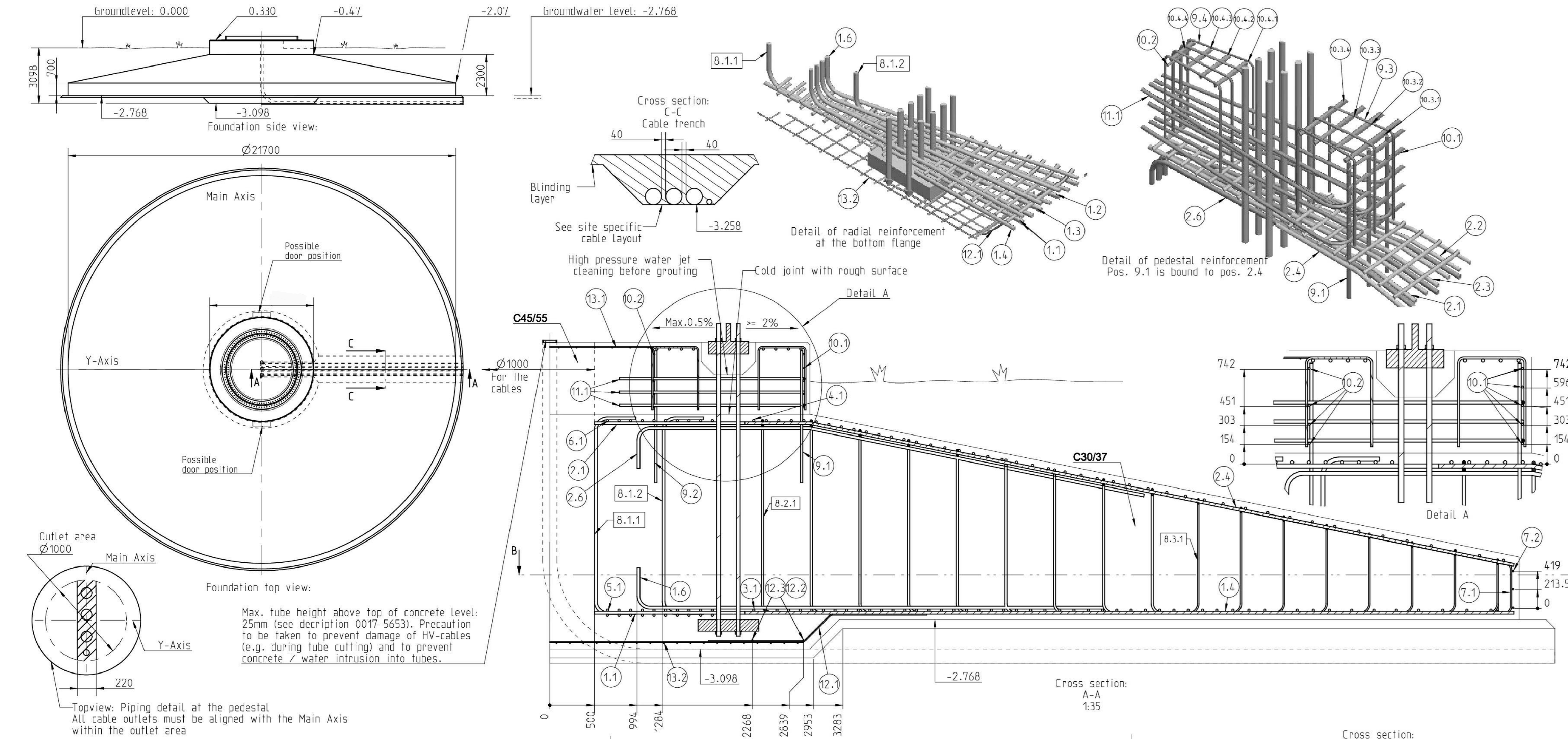


PARTICOLARE DEI SISTEMI DI ANCORAGGIO
(SCALE VARIE)



Information for design approver:
Loads: 0074-8846, calculation: 0075-1449.V02

Soil condition to be fulfilled:
Assumed characteristic soil parameters: friction angle 30° or undrained shear strength 55 kN/m². Min. density of soil 18 / 8 kN/m³, density of back filling 18 / 8 kN/m³. Weight of backfilling is included in stability and shall not be removed. Max. ground water level: -2.768 m under terrain. No drainage required. Required rotational stiffness: min. 100 kNm/rad according to load report 0074-8846. Max. allowable filling of the foundation due to permanent settlements: 3 mm/m. Max. plastic design soil pressure: 193 kN/m², constant over substitute area, with a SF of 1.35 on wind, 0.9 on tower weight and backfilling, 1.0 on foundation weight. Max. elastic soil pressure 223 kN/m² with SF equal to 1.0 for all loads. Soil investigations of the site shall be in accordance with EN 1997-1:2004, section 2-4, and must show compliance with the design assumption.

Specifications:
All works carried out acc. to EN 1992-1-1/AC:2010 Design of Concrete Structures, EN 1997-1/AC:2009 Geotechnical Design, general rules, EN 1997-2/AC:2010 Geotechnical Design, investigation and testing. General description: 0003-8491, Design life time: 20 years.

Anchor cage, approval drawing 0074-9552.V01:
The anchor cage incl. adjustment feet is provided by Vestas as loose parts or assembled. The anchor cage shall be set upon the blinding layer and adjusted to the correct position vertically and horizontally by using the adjustment feet at the lower flange. During casting, which must be done simultaneously inside and outside the cage, great care must be taken to ensure that the cage does not displace and that the lower flange is in full contact with compacted concrete, below and above flange. Max. vertical deviation after concreting +/- 4 mm. Weight of anchor cage, app. 19000 kg total. Anchors shall be post tensioned according to approval drawing 0074-9552.V01

Concrete:
Concrete works acc. to EN 12601:2008 "Execution of concrete structures". The concrete must be composed, mixed and prepared according to EN 206-1 in the strength class: C30/37 for pile, C45/55 for pedestal. Exposure class: XC4 / XD1 / XS1 / XF3 / XA1. Maximum aggregate size in the area of the bottom and top reinforcement: 16mm (in other areas max. 32mm). Blinding layer min. 100 mm and dimension is not represented in the drawing. Low-creeping and low-shrink concrete for exterior buildings units, low heat of hydration. Min. required density of concrete due to stability: 2350 kg/m³. Covering: Ccm = 60 mm against form work or blinding layer, Ccm = 110 mm against soil (no formwork). Concrete quality control according to EN 206-1.

Reinforcement:
Steel bars S500 ductility class B or C according to EN 10080 with min Fyk = 500 N/mm².

Grout:
Max. shrink grout, min. compression strength C30/105. Min. compression strength at time of post tension 64 N/mm² and after 1 day: 10 N/mm². Post tension force: 628 kN equal to 56% of Fyk for the Ø 10.9 anchors and an elongation of 7.4 to 9.7 mm.

Cable conduits (PVC tubes) - NOT a Vestas delivery:
See general description in "Switchgear installation vs foundation tubes" 0017-5653. See site specific cable layout for actual number and size of conduits.

Earthing:
See "Vestas Earthing System", esp. description 0019-2575 "Earthing on anchor cage foundation" incl. copper conductors, bolts, nuts and washers delivered with the anchor cage.

Reinforcement Cut and Bending List: 0075-1456.V02

Radial bars, bottom part:
1.1 23 pcs. Ø32 x 10290 mm, through anchors.
1.2 23 pcs. Ø32 x 9816 mm, through anchors.
1.3 46 pcs. Ø32 x 9311 mm, through anchors.
1.4 92 pcs. Ø32 x 8806 mm, outside anchors.
1.5 184 pcs. Ø32 x 8309 mm, outside anchors.
1.6 92 pcs. Ø32 x 5593 mm, above 1.1-1.3.

Radial bars, top part:
2.1 23 pcs. Ø32 x 14440 mm, through anchors.
2.2 23 pcs. Ø32 x 9074 mm, through anchors.
2.3 46 pcs. Ø32 x 1469 mm, through anchors.
2.4 92 pcs. Ø32 x 8764 mm, outside anchors.
2.5 184 pcs. Ø32 x 8269 mm, outside anchors.
2.6 92 pcs. Ø32 x 6110 mm, below 2.1-2.3.

Concentric bars outside anchors, bottom part:
3.1 #25 ring Ø4508, 3 pcs. L:5143 mm, outer ring no. 1.
3.51 #25 ring Ø21068, 0 pcs. L:11850 mm, outer ring no. 51.
See table in Cut & Bending List.

Concentric bars outside anchors, top part:
4.1 #25 ring Ø4508, 3 pcs. L:1154 mm, outer ring no. 1.
4.45 #25 ring Ø21348, 1 pcs. L:10951 mm, outer ring no. 45.
See table in Cut & Bending List.

Concentric bars inside anchors, bottom part, 1 layer below and 1 layer above pos. 1:
5.1 #25 ring Ø1288, 2 x 1 = 2 pcs. L:5035 mm, ring no. 1.
5.10 #25 ring Ø3639, 2 x 2 = 4 pcs. L:1704 mm, ring no. 10.
5.1 #25 ring Ø1027 x 261 x 1, 1 = 1-10, ring no. 1. Total number of rings: 20. See Cut & Bending List.

Concentric bars inside anchors, top part, 1 layer above pos. 2:
6.1 #25 ring Ø1288, 2 x 1 = 2 pcs. L:5488 mm, ring no. 1.
6.10 #25 ring Ø3639, 1 x 3 = 3 pcs. L:5222 mm, ring no. 10.
6.1 #25 ring Ø1027 x 261 x 1, 1 = 1-10, ring no. 1. Total number of rings: 10. See Cut & Bending List.

Vertical bars at edge:
7.1 388 pcs ø10 x 932 mm, vertical bars at outer edge.
7.2 3 rings ø16 x Ø21564, 3 x 6 = 18 pcs L:11851 mm, horizontal rings at outer edge (at pos. 7.1).

Shear locks and hair pins - see Cut and Bending List for correct lengths:
8.1 46 pcs ø32 x 2964 mm, shear locks inside anchor cage (zone 1) - C-shaped.
8.2 308 pcs ø25 x approx. 4671 mm (mean value), shear locks in punching zone (zone 2).
8.3 717 pcs ø16 x approx. 2987 mm (mean value), shear locks in shear zone (zone 3).
8.4 308 pcs ø25 x approx. 2910 mm (mean value), hair pins for all zone 2.
8.5 717 pcs ø16 x approx. 1469 mm (mean value), hair pins for zone 3.

Vertical bars and bows in pedestal:
9.1 92 pcs ø25 x 1474 mm, vertical bar outside anchors.
9.2 23 pcs ø25 x 1474 mm, vertical bar inside anchors.
9.3 92 pcs ø20 x 1896 mm, outer bows, see Cut & Bending List.
9.4 92 pcs ø20 x 1796 mm, inner bows, see Cut & Bending List.

Horizontal rings in pedestal:
10.1 4 rings ø20 x Ø5383, 3 x 3 = 15 pcs L:6952 mm, at outer vertical bars pos 9.1.
10.2 4 rings ø20 x Ø2338, 4 x 1 = 4 pcs L:8346 mm, at inner vertical bars pos 9.2.
10.3.1 1 ring ø25 x Ø5429, 1 x 3 = 3 pcs L:7300 mm, ring under bow pos 9.3.
10.3.2 1 ring ø25 x Ø5342, 1 x 3 = 3 pcs L:7096 mm, ring 2 under bow pos 9.3.
10.3.3 1 ring ø25 x Ø5162, 1 x 3 = 3 pcs L:6872 mm, ring 3 under bow pos 9.3.
10.3.4 1 ring ø25 x Ø4781, 1 x 3 = 3 pcs L:6418 mm, ring 4 under bow pos 9.3.
10.4.1 1 ring ø25 x Ø3219, 1 x 2 = 2 pcs L:6468 mm, ring 1 under bow pos 9.4.
10.4.2 1 ring ø25 x Ø2545, 1 x 2 = 2 pcs L:5608 mm, ring 2 under bow pos 9.4.
10.4.3 1 ring ø25 x Ø2672, 1 x 2 = 2 pcs L:5608 mm, ring 3 under bow pos 9.4.
10.4.4 1 ring ø25 x Ø2398, 1 x 1 = 1 pcs L:5384 mm, ring 4 under bow pos 9.4.

Hooks under grout trench (splitting bars):
11.1 138 pcs ø25 x 3889 mm, banded 184.2 deg., see Cut & Bending List.

Z-Bars under the anchor flange:
12.1 92 pcs ø12 x 2587 mm, under base flange, see Cut & Bending List for detailed geometry.
12.2 1 ring ø12 x Ø8781, 1 x 3 = 3 pcs. L:6366 mm, ring placed on Z-bows pos. 12.1.
12.3 1 ring ø12 x Ø7465, 1 x 3 = 3 pcs. L:5411 mm, ring placed on Z-bows pos. 12.1.

Shrinkage mesh, cut to match cable conduits and adjustment feet:
13.1 #2383 mm top reinforcement mesh ø10 / 150 mm or equivalent with min. 524 mm²/m.
13.2 #3176 mm bottom reinforcement mesh ø10 / 150 mm or equivalent with min. 524 mm²/m.

Tolerances:
All not specified tolerances: +/- 10 mm

Remarks:
Dimension in mm. Reinforcement shall be tied with steel wire per 500 mm minimum, no welding permitted. The anchor cage is rotated to place the door in the right direction. Basic anchorage length for C30/37: Lb = 35.74 x Ø for good conditions. Basic anchorage length for C45/55: Lb = 51.08 x Ø for other conditions. Lap length: Ls = 1.4 x Lb. Bending diameters: 7 x Ø for Ø > 20 mm, 4 x Ø for Ø < 20 mm. All over lap of bars shall be staggered.

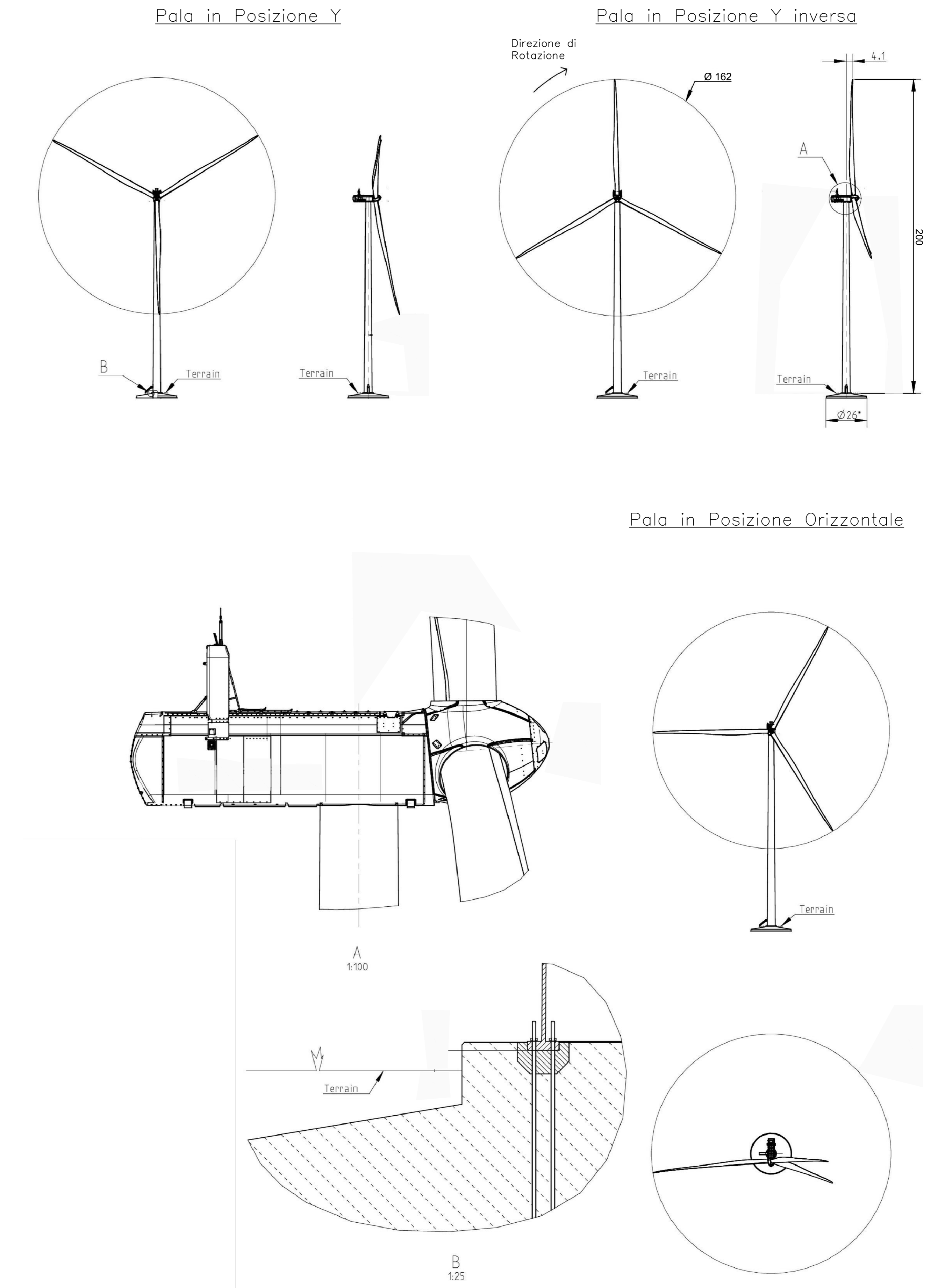
Bonding- and overlap lengths, bending diameters:

Size	Anchor	Overlap	Bending Ø	Remark
Ø32	1031	1443		Bottom radial bar (pos 1)
Ø32	1472	2061	740	Top radial bar (pos 2)
Ø25	685	959		Bottom concentric ring outside anchors (pos 3)
Ø25	978	1370	N/A	Top concentric ring outside anchors (pos 4)
Ø25	106	888	N/A	Bottom concentric ring inside anchors (pos 5)
Ø25	1008	1412	N/A	Top concentric ring inside anchors (pos 6)
Ø20	715	1001	N/A	Concentric ring in pedestal (pos 10)
Ø20	500	701		Rings at foundation edge (pos 1-2)

Blinding layer 40 mm, concrete 553 m³, grout 1.75 m³, reinforcement 68 t, reinforcement ratio 123 kg/m³

SEZIONE TIPO DEGLI AEROGENERATORI
(SCALE 1:1500)

Tutte le dimensioni sono espresse in metri.



Il diametro della fondazione è indicativo e dipende dalle effettive condizioni del sito.

Tutte le dimensioni sono espresse in mm.

PAU DI FONDAZIONE:
al di sotto del plinto è prevista la realizzazione di n. 12 pali trivellati in c.a. (cls tipo C25/30, acciaio tipo B450C), di diametro pari a 1,00 m e lunghezza 15,00 m; essi saranno disposti in maniera circolare (un palo ogni 30°), la distanza tra l'asse dei pali ed il bordo esterno del plinto sarà pari a 1,00 m.
La gabbia di armatura sarà composta da n. 12F20, spirale F8/20 cm.

REGIONE BASILICATA
PROVINCIA DI MATERA
COMUNI DI MONTESCAGLIOSO E POMARICO

AUTORIZZAZIONE UNICA EX D.LGS. 387/2003

Progetto Definitivo
Parco eolico "Piana dell'Imperatore" e opere connesse

TITOLO ELABORATO	COMMESSA	FASE	ELABORATO	REV.
A.16.b.2. Sezioni tipo degli aerogeneratori;	F0355	A	T22	B

Redazione a cura di: perito ed. arch. GIUSEPPE MANZI

SCALA: varie

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giugno 2021	emissione per revisione parti di consesso	ISA	QDS	DMA
luglio 2020	Prima emissione	ISA	QDS	DMA

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Il Direttore Tecnico
(Ing. Giuseppe Manzi)

Società certificata secondo la norma UNI-EN ISO 9001:2015 per erogazione di servizi di ingegneria nei settori: civile, idraulica, acustica, energia, ambiente (settore IAF 34).