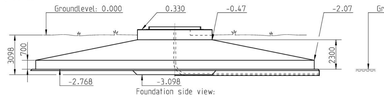
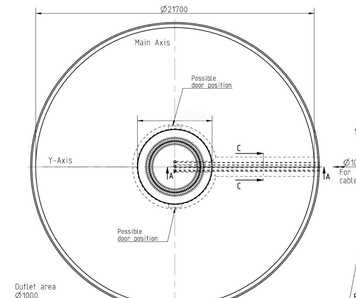
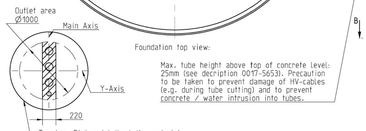
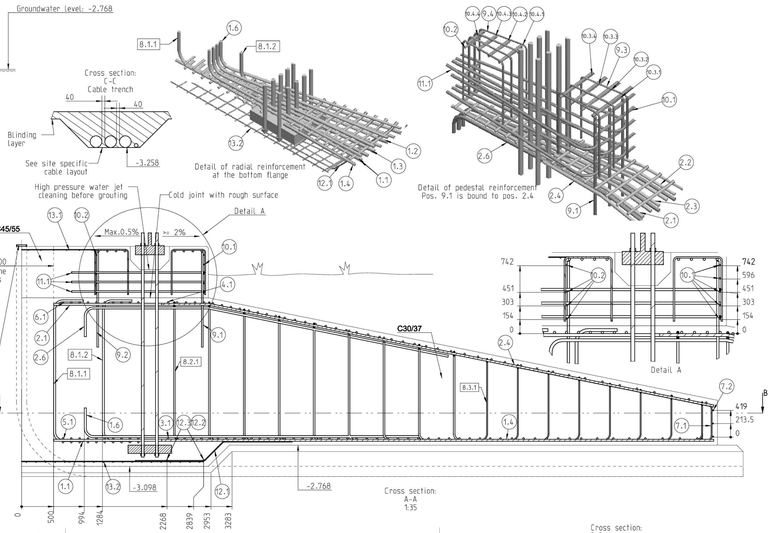
PARTICOLARE DEI SISTEMI DI ANCORAGGIO

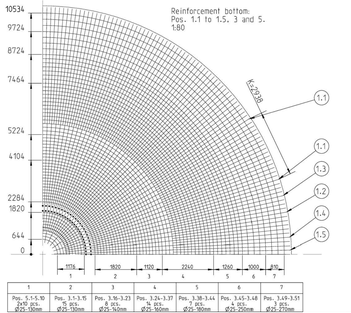
(SCALE VARIE)

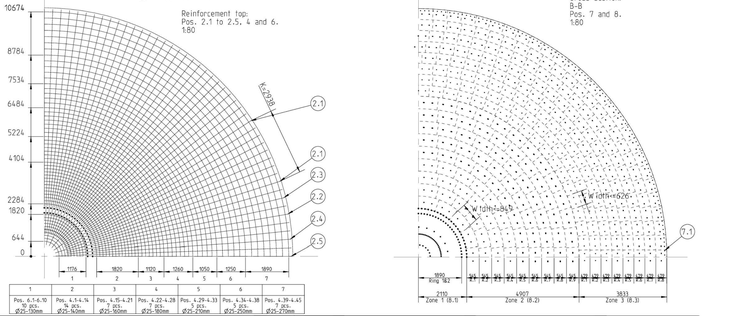


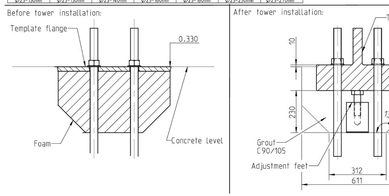


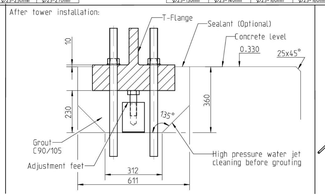


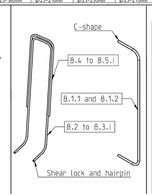












Number and height of C-shaped bars, shear locks and hair pins (see also Cut and Bending List)

	Zone 1 C-shape Ø32			Zone 2 Ø25				Zone 3 Ø16			
	Number	C-shape Height	Number	i	Shear locks Height Pos. 8.2.i	i	Hairpins Height Pos. 8.4.i	Number	i	Shear locks Height Pos. 8.3.i	i	Hairpins Height Pos. 8.5.i
Ring 1	23	8.1.1	2212	18	1	2116	1	1476	73	1	1231	1	593
Ring 2	23	8.1.2	2212	22	2	2113	2	1476	78	2	1135	2	593
Ring 3	-	-		26	3	2003	3	1476	82	3	1038	3	593
Ring 4	-	-		30	4	1893	4	1476	87	4	942	4	593
Ring 5	-	-		34	5	1783	5	1476	92	5	845	5	593
Ring 6	-	-		38	6	1673	6	1476	97	6	748	6	593
Ring 7	-	-		42	7	1563	7	1476	102	7	652	7	593
Ring 8	-	-		46	8	1453	8	1405	106	8	555	8	580
Ring 9	-	-		50	9	1344	9	1295	0	-	-	-	-
Ring 10	-	-		0	-	-	-	-	0	-	-	-	-
Ring 11	-	-		0	-	-	-	-	0	-	-	-	-
Ring 12	-	-		0	-	-	-	-	0	-	-	-	-

Tutte le dimensioni sono espresse in mm.

PALI 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.

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 10 / 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 GNm/rad according to load report 0074-8846
Max. allowable fitting of the foundation due to permanent settlements: 3 mm/m
Max. global EC design soil pressure: 193 KN/m², constant over substitute area, with a
Max. elastic soil pressure 223 KN/m² (weight of concrete, backfilling, and foundation weight
Max. elastic soil pressure 223 KN/m² to be PDF equivalent for ULS loadings
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: D005-8491. Design life time: 20 years.

Anchor cage, approval drawing D0076-9532_V04:
The anchor cage includes adjustment feet (4 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 +/- 6 mm.
Weight of anchor cage, app. 19000 kg total.
Anchors shall be post tensioned according to approval drawing D074-9532_V01

Concrete:
Concrete works acc. to EN 13670:2009 "Execution of concrete structures".
The concrete must be composed, mixed and prepared according to EN 206-1 in the strength
classes: C30/37 for plate, C45/55 for pedestal. Exposure class: XC4 + XD1 + XA1 / XF3 / XA1
Maximum aggregate size: to be determined for the bottom and top reinforcement mesh (in other areas max. 32mm)
Blinding layer: 40 mm, concrete class: to be determined, see approval drawing.
Low-creeping and low-shrink concrete for exterior buildings with low heat of hydration
Min. required density of concrete due to stability: 2338 Kg/m3.
Covering: Cnom = 60 mm against form work or blinding layer, Cnom = 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:
Non-shrink grout, min. compression strength C90/105
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 Fuk for the Gr 10.9 anchors and an elongation of 7.4 to 9.7 mm.

Cable conduits (PVC tubes) – NOT a Vestas delivery:
See general discription in "Zwischgear installation vs foundation tubes" 0017-5653.
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 parts
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 8606 mm, outside anchors.
1.5 184 pcs. Ø20 x 5070 mm, outside anchors.
1.6 92 pcs. Ø32 x 5393 mm, above 1.1-1.3.

Radial bars, top parts
2.1 23 pcs. Ø32 x 10448 mm, through anchors.
2.2 23 pcs. Ø32 x 9934 mm, through anchors.
2.3 46 pcs. Ø32 x 9429 mm, through anchors.
2.4 92 pcs. Ø32 x 8764 mm, outside anchors.
2.5 N/A
2.6 92 pcs. Ø32 x 6110 mm, below 2.1-2.3.

Concentric bars outside anchors, bottom part:
3.1 ø25 ring Ø4568, 3 pcs. L=5743 mm, outer ring no. 1.
3.51 ø25 ring Ø21068, 6 pcs. L=11990 mm, outer ring no. 51.
See table in Cut & Bending List.

Concentric bars outside anchors, top part:
4.1 ø25 ring Ø4568, 3 pcs. L=6154 mm, outer ring no. 1.
4.45 ø25 ring Ø21348, 7 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 ø25 ring Ø1384, 2 x 2 = 4 pcs. L=5035 mm, ring no. 1.
5.10 ø25 ring Ø3839, 2 x 2 = 4 pcs. L=8704 mm, ring no. 10.
5.i ø25 ring Ø1027 + 261 * i, i = 1-10, ring no. i. Total number of rings: 20. See Cut & Bending list.

Concentric bars inside anchors, top part, 1 layer above pos 2:
6.1 ø25 ring Ø1384, 2 x 2 = 4 pcs. L=5035 mm, ring no. 1.
6.10 ø25 ring Ø3839, 1 x 3 = 3 pcs. L=5222 mm, ring no. 10.
6.i ø25 ring Ø1027 + 261 * i, i = 1-10, ring no. i. Total number of rings: 10. See Cut & Bending list.

Vertical bars at edge
7.1 368 pcs ø16 x 532 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 x 2366 mm, shear locks inside anchor cage (zone 1), C-shaped.
8.2 368 pcs x 2116 x approx. 4877 mm (mean value), shear locks in punching zone (zone 2).
8.3 717 pcs ø16 x approx. 2697 mm (mean value), shear locks in shear zone (zone 3).
8.4 356 pcs x 2025 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 1806 mm, outer bows, see Cut & Bending list.
9.4 92 pcs ø20 x 1786 mm, inner bows, see Cut & Bending list.

Horizontal rings in pedestal
10.1 5 rings ø20 x Ø5683, 5 x 3 = 15 pcs L=8552 mm, at outer vertical bars pos 9.1.
10.2 4 rings ø20 x Ø3338, 4 x 1 = 4 pcs L=8348 mm, at inner vertical bars pos 9.2.
10.3.1 1 ring ø25 x Ø5823, 1 x 3 = 3 pcs L=17303 mm, ring 1 under bow pos 9.3.
10.3.2 1 ring ø25 x Ø5347, 1 x 3 = 3 pcs L=17006 mm, ring 2 under bow pos 9.3.
10.3.3 1 ring ø25 x Ø5082, 1 x 3 = 3 pcs L=16712 mm, ring 3 under bow pos 9.3.
10.3.4 1 ring ø25 x Ø4781, 1 x 3 = 3 pcs L=16418 mm, ring 4 under bow pos 9.3.
10.3.5 1 ring ø25 x Ø4516, 1 x 3 = 3 pcs L=16124 mm, ring 5 under bow pos 9.3.
10.4.1 1 ring ø25 x Ø2965, 1 x 2 = 2 pcs L=16538 mm, ring 1 under bow pos 9.4.
10.4.3 1 ring ø25 x Ø2672, 1 x 2 = 2 pcs L=15628 mm, ring 3 under bow pos 9.4.
10.4.4 1 ring ø25 x Ø2398, 1 x 1 = 1 pcs L=8945 mm, ring 4 under bow pos 9.4.

Hooks under grout trench (splitting bars)
11.1 138 pcs ø25 x 3989 mm, bended (84.2 deg., see Cut & Bending list.

Z-Bars under the anchor flange
12.1 92 pcs ø12 x 3167 mm, under base flange, see Cut & Bending list for detailed geometry.
12.2 1 ring ø12 x Ø4366, 1 x 3 = 3 pcs. L=13098 mm, ring placed on 2-bows pos. 12.1.
12.3 1 ring ø12 x Ø4166, 1 x 3 = 3 pcs. L=12498 mm, ring placed on 2-bows pos. 12.1.

Shrinkage mesh, cut to match cable conduits and adjustment feet
13.1 ø2383 mm top reinforcement mesh ø10 / 150 mm or equivalent with min. 324 mm2/m
13.2 ø3618 mm bottom reinforcement mesh ø10 / 150 mm or equivalent with min 324 mm2/m

Tolerances:
All non specified tolerances: +/- 10 mm

Remarks:
Dimensions 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 = 31.36 x Ø for other conditions.
Concrete cover: 60 mm against blinding layer, 110 mm against soil.
All overlap of bars shall be staggered.

Bending- and overlap lengths, bending diameters:

Size	Anchor	Overlap	Bending Ø	Remark
Ø32	1031	1447	160	Bottom radial bar (pos 1)
Ø32	1431	2061	160	Top radial bar (pos 2)
Ø25	685	959	N/A	Bottom concentric ring outside anchors (pos 3)
Ø25	979	1370	N/A	Top concentric ring outside anchors (pos 4)
Ø25	706	988	N/A	Bottom concentric ring inside anchors (pos 5)
Ø25	1006	1412	N/A	Top concentric ring inside anchors (pos 6)
Ø20	565	1101	N/A	Concentric ring in pedestal (pos 10)
Ø20	565	1101	N/A	Concentric ring in pedestal (pos 10)

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

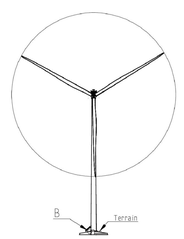
Tutte le dimensioni sono espresse in mm.

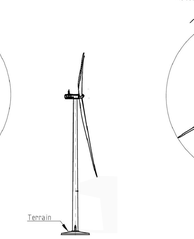
SEZIONE TIPO DEGLI AEROGENERATORI

(SCALE 1:1500)

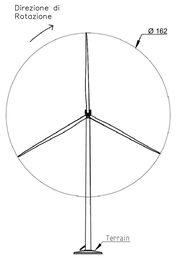
Tutte le dimensioni sono espresse in metri.

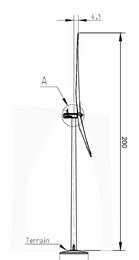
Pala in Posizione Y



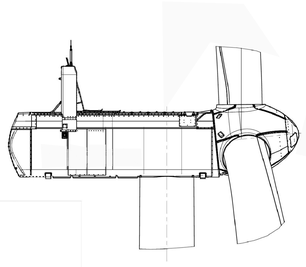


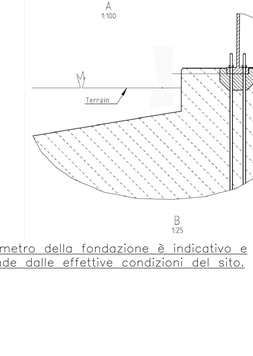
Pala in Posizione Y inversa





Pala in Posizione Orizzontale





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

REGIONE CAMPANIA · COMUNE DI ARIANO IRPINO · PROVINCIA DI AVELLINO

PROGETTO DEFINITIVO

Impianto di produzione di energia elettrica da fonte eolica "Ariano 2" di potenza nominale pari a 86,8 MW e relative opere connesse da realizzarsi nel Comune di Ariano Irpino

Titolo elaborato
Sezioni tipo aerogeneratori, disegni architettonici e particolari di ancoraggio

Codice elaborato: **PD227CA1**

Scala: -

Riproduzione e consegna a terzi sulla stessa specifica contrattuale vietata.

Progettazione

F4 ingegneria srl
Via Di Giura - Centro direzionale, 85100 Potenza
Tel: +39 0971 1944781 / Fax: +39 0971 54542
www.f4ingegneria.it - f4ingegneria@pec.it

Il Direttore Tecnico
(Ing. Giovanni DI SANTO)

Gruppo di lavoro
Dott. For. Luigi ZUCCARO
Ing. Giuseppe MANZI
Ing. Mariagrazia PIETRAFESA
Ing. Rosanna SANTAMASERO
Arch. Gaia TELESCA

Società certificata secondo le norme UNI EN ISO 9001:2015 e UNI EN ISO 14001:2015 per l'erogazione di servizi di ingegneria nei settori civile, idraulica, acustica, energia, ambiente (settore IAF: 34).

EPP srl
Via Cesare Battisti, 116 83053 S. Andrea di Conza (AV)
Tel e Fax 39 0827 35687

Consulenze specialistiche

Committente

WEB Ariano 2 S.r.l.
Via Leonardo Da Vinci 35, 39100 Bolzano (BZ)

Giugno 2022	Prima emissione	GDS	GZU	GMA
DATA	DESCRIZIONE	REDATTO	VERIFICATO	APPROVATO

File sorgente: **PD227CA1 - Sezione tipo degli aerogeneratori, disegni architettonici e particolari di ancoraggio.dwg**