


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

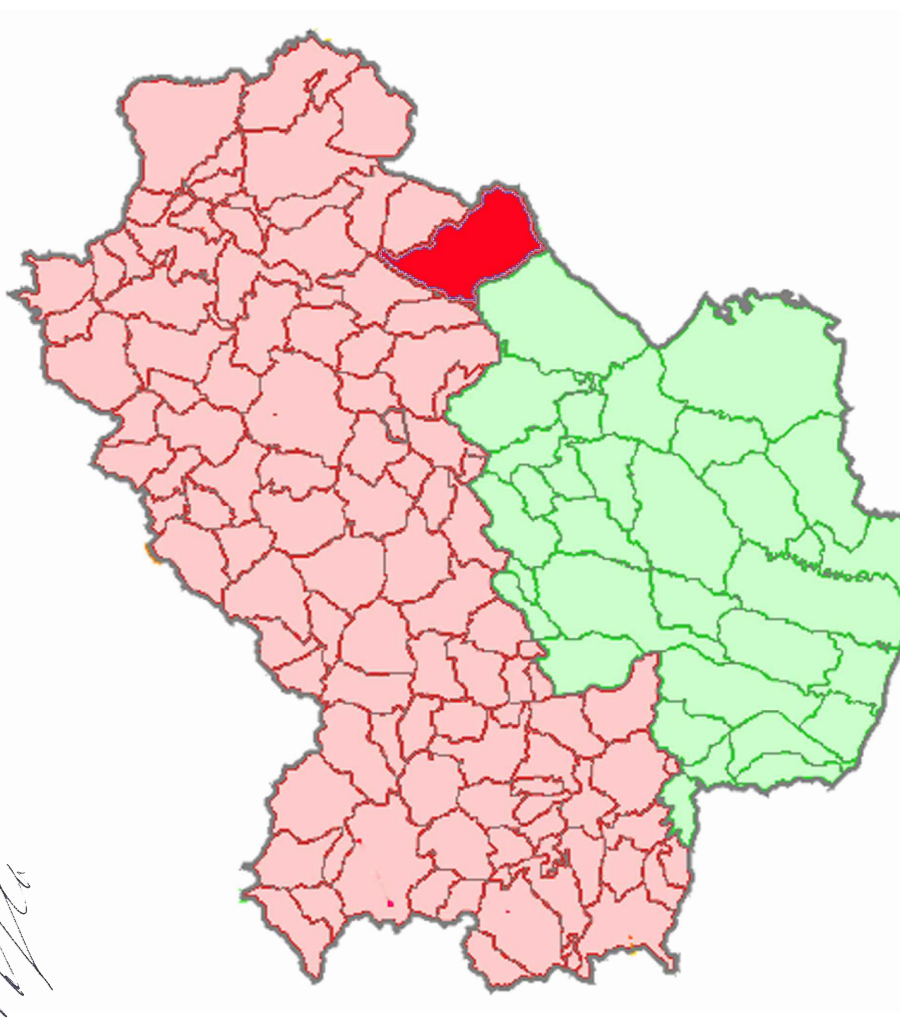
Zone	Number	Pos.	Zone 1 C-shape Ø28		Zone 2 Ø25		Zone 3 Ø16						
			C-shape Height	Shear Locks	C-shape Height	Shear Locks	C-shape Height	Shear Locks					
Ring 1	22	8.1.1	2308	16	1	2220	1	1213	58	1	1430	1	656
Ring 2	22	8.1.2	2308	20	2	2193	2	1213	63	2	1333	2	656
Ring 3	-	-	-	24	3	2084	3	1213	67	3	1237	3	656
Ring 4	-	-	-	28	4	1976	4	1213	71	4	1141	4	656
Ring 5	-	-	-	33	5	1867	5	1213	76	5	1044	5	656
Ring 6	-	-	-	37	6	1758	6	1213	80	6	948	6	656
Ring 7	-	-	-	41	7	1650	7	1213	85	7	852	7	656
Ring 8	-	-	-	45	8	1541	8	1213	89	8	755	8	656
Ring 9	-	-	-	0	-	-	-	-	93	9	659	9	656
Ring 10	-	-	-	0	-	-	-	-	0	-	-	-	-


Information for design approver:
 Loads: 0037-1072-V00, calculation: 0038-9184-V00
Soil condition to be fulfilled:
 Assumed characteristics soil parameters: friction angle 26° or undrained shear strength 45 KN/m².
 Min. density of soil 18 / 8 KN/m³, density of back filling 16,2 / 6,2 KN/m³ to 20,7 / 10,7 KN/m³.
 Weight of backfilling is included in stability and shall not be removed.
 Max. groundwater level: 0 m under terrain.
 No drainage required.
 Baledional soil stress: min. 30 GNM/rad equal to a E_s steel=6000 KN/m², E_s dyn=17000 KN/m² ($\times 0.35$) for sand or E_s steel=3000 KN/m², E_s dyn=22000 KN/m² ($\times 0.40$) for clay.
 Max. plastic design soil pressure: 122 KMN/m², constant over substitute area, with a PSF of 1.1 on wind, 0.9 on lower weight and backfilling, 1.0 on foundation weight.
 Max. elastic soil pressure 135 KMN/m² with PSF equal to 1.0 for all loads.
Specifications:
 All works carried out acc. to EN 1992-1-1/AC:2004; Design of Concrete Structures, EN 1997-1/AC:2009; Geotechnical design, general rules, EN 1997-2/AC:2009; Geotechnical design, investigation and testing, General description: 0005-8491-V04, Design life time: 20 years.
Anchor cage, approval drawing 0038-9182-V00:
 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 of 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 \pm 4 mm.
 Weight of anchor cage, app. 18000 kg total.
 Anchors shall be post tensioned according to approval drawing 0038-9182-V00.
Concrete:
 Concrete works acc. to EN 1370:2009 "Execution of concrete structures".
 The concrete must be composed, mixed and prepared according to EN 206-1 in the strength class C30/37 for plate, C45/55 for pedestal. Exposure class: XC4 - XC1 / XC3 / XC3 / XC4.
 Maximum aggregate size in the area of the bottom and top reinforcement: 16mm (in other areas max. 32mm).
 Low-creeping and low-shrink concrete for exterior buildings units, low heat of hydration.
 Min. required density of concrete due to stability: 2205 kg/m³.
 Covering: C_{min} = 60 mm against form work or blinding layer, C_{max} = 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 f_{yk} = 500 N/mm².
Grout:
 Max. shrink grout, min. compression strength C90/105.
 Min. compression strength of grout shall be 55 N/mm² and after 1 day: 10 N/mm².
 Post tension for fasten \geq 28 kN for the \geq 28 kN for the \geq 10-9 anchors and an elongation of 6.9 to 7.9 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 0019-2015 "Earthing on anchor cage foundation" incl. copper conductors, bolts, nuts and washers delivered with the anchor cage.
Reinforcement Cut and Bending List: 0038-9186-V00
Radiol bars, bottom part:
 1.1 22 pcs. Ø32 x 11140 mm, through anchors.
 1.2 22 pcs. Ø32 x 11337 mm, through anchors.
 1.3 44 pcs. Ø32 x 10801 mm, through anchors.
 1.4 88 pcs. Ø32 x 10059 mm, outside anchors.
 1.5 176 pcs. Ø28 x 3889 mm, outside anchors.
 1.6 88 pcs. Ø32 x 8911 mm, above L1-1-3.
Radiol bars, top part:
 2.1 22 pcs. Ø32 x 11874 mm, through anchors.
 2.2 22 pcs. Ø32 x 11471 mm, through anchors.
 2.3 44 pcs. Ø28 x 11016 mm, through anchors.
 2.4 88 pcs. Ø28 x 10293 mm, outside anchors.
 2.5 176 pcs. Ø16 x 3965 mm, outside anchors.
 2.6 88 pcs. Ø28 x 6209 mm, below L1-1-3.
Concentric bars outside anchors, bottom part:
 3.1 Ø25 ring Ø4583, 3 pcs. L=3860 mm, outer ring no. 1.
 3.2 Ø25 ring Ø4593, 7 pcs. L=1844 mm, outer ring no. 67.
Concentric bars outside anchors, top part:
 4.1 Ø25 ring Ø4583, 3 pcs. L=2917 mm, outer ring no. 1.
 4.2 Ø25 ring Ø4693, 8 pcs. L=10972 mm, outer ring no. 62.
Concentric bars inside anchors, bottom part, 1 layer below and 1 layer above pos. 2:
 5.1 Ø25 ring Ø3864, 2 x 2 x 4 pcs. L=8112 mm, ring no. 10.
 5.2 Ø25 ring Ø3864, 2 x 2 x 4 pcs. L=8112 mm, ring no. 10.
Concentric bars inside anchors, top part, 1 layer above pos. 2:
 6.1 Ø25 ring Ø1252, 1 x 1 x 1 pcs. L=5345 mm, ring no. 1.
 6.2 Ø25 ring Ø1262, 1 x 1 x 3 pcs. L=5228 mm, ring no. 10.
 6.3 Ø25 ring Ø1272, 1 x 1 x 1 pcs. L=5345 mm, ring no. 1.
Vertical bars at edge:
 7.1 332 pcs. Ø28 x 1316 mm, at outer edge.
Shear locks and hair pins - see Cut and Bending list for correct lengths:
 8.1 44 pcs. Ø28 x 2988 mm, shear locks, inside anchor cage (zone 1); C-shape.
 8.2 244 pcs. Ø25 x approx. 465 mm (mean value), shear locks in punching zone (zone 2).
 8.3 682 pcs. Ø16 x approx. 2689 mm (mean value), shear locks in shear zone (zone 3).
 8.4 244 pcs. Ø25 x approx. 2463 mm (mean value), hair pins for all zone 2.
 8.5 682 pcs. Ø16 x approx. 1800 mm (mean value), hair pins for zone 3.
Vertical bars and bows in pedestal:
 9.1 88 pcs. Ø25 x 1428 mm, vertical bar outside anchors.
 9.2 22 pcs. Ø25 x 1428 mm, vertical bar inside anchors.
 9.3 88 pcs. Ø16 x 1684 mm, outer bows, see Cut & Bending list.
 9.4 88 pcs. Ø16 x 1684 mm, inner bows, see Cut & Bending list.
Horizontal rings in pedestal:
 10.1 3 rings Ø16 x Ø3174, 1 x 3 - 21 pcs L=6742 mm, of outer vertical bars pos. 9.1.
 10.2 4 rings Ø16 x Ø3204, 4 x 1 - 4 pcs L=6102 mm, of inner vertical bars pos. 9.2.
 10.3 1 ring Ø25 x Ø3685, 1 x 3 - 3 pcs L=5390 mm, ring 1 under bow pos. 9.3.
 10.3.2 ring Ø25 x Ø3355, 1 x 3 - 3 pcs L=5020 mm, ring 2 under bow pos. 9.3.
 10.3.3 ring Ø25 x Ø3025, 1 x 3 - 3 pcs L=4790 mm, ring 3 under bow pos. 9.3.
 10.3.4 ring Ø25 x Ø4844, 1 x 3 - 3 pcs L=8453 mm, ring 4 under bow pos. 9.3.
 10.4 1 ring Ø25 x Ø3685, 1 x 3 - 3 pcs L=5390 mm, ring 1 under bow pos. 9.4.
 10.4.2 ring Ø25 x Ø2915, 1 x 2 - 2 pcs L=5090 mm, ring 2 under bow pos. 9.4.
 10.4.3 ring Ø25 x Ø2685, 1 x 2 - 2 pcs L=5384 mm, ring 3 under bow pos. 9.4.
 10.4.4 ring Ø25 x Ø2372, 1 x 1 - 1 pcs L=8864 mm, ring 4 under bow pos. 9.4.
Hooks under grout trench (splitting bars):
 11.1 33 pcs. Ø25 x 3368 mm, based 184.7 deg., see Cut & Bending list.
Z-bars under the anchor flange:
 12.1 88 pcs. Ø12 x 2486 mm, under base flange, see Cut & Bending list for detailed geometry.
 12.2 ring Ø12 x Ø4665, 1 x 3 - 3 pcs. L=4539 mm, ring placed on Z-bars pos. 12.1.
 12.3 ring Ø12 x Ø4665, 1 x 3 - 3 pcs. L=5390 mm, ring placed on Z-bars pos. 12.1.
Shrinkage mesh, cut to match cable conduits and adjustment feet:
 13.1 Ø255 mm top reinforcement mesh ϕ 17 / 150 mm or equivalent with min. 524 mm/m.
 13.2 Ø565 mm bottom reinforcement mesh ϕ 17 / 150 mm or equivalent with min. 524 mm/m.
Tolerances:
 All non specified tolerances: \pm 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: $l_b = 35.7d \times \sigma_{yk}$ for good conditions.
 Basic anchorage length for C45/55: $l_b = 31.5d \times \sigma_{yk}$ for good conditions.
 Lap length: $l_l = 1.4 \times l_b$. Bending diameter: $r \geq 20 \times d$, $4 \times \phi$ for $\phi < 20$ mm.
 All overlap of bars shall be staggered.
Bonding- and overlap lengths, bending diameters:

Steel	Anchor	Overlap	Bending ϕ	Remarks
Ø12	S500	132	85	Bottom radial bar (pos 1)
Ø28	S500	1858	650	Top radial bar (pos 2)
Ø25	S500	1032	175	Bottom concentric ring outside anchors (pos 3)
Ø25	S500	1438	175	Top concentric ring outside anchors (pos 4)
Ø25	S500	988	175	Bottom concentric ring inside anchors (pos 5)
Ø25	S500	1412	175	Top concentric ring inside anchors (pos 6)
Ø16	S500	1612	64	Concentric ring in pedestal (pos 10)

 Blinding layer S1 m3, concrete T34 m3, grout 2.64 m3, reinforcement 75 t, reinforcement ratio 102 kg/m3


REGIONE BASILICATA



Aut.	Quantità	PROGETTO PER LA REALIZZAZIONE DI UN PARCO EOLICO DA 33 MW NEL COMUNE DI GENZANO DI LUCANIA (PZ)		Numero art/collo/Riferimento
Progettato da	Controllato da	Approvato da - data	Nome file	Data
Ing. M. Marfellucci	Ing. M. Marfellucci	Ing. F. Di Chappari	E_25	16/06/2014
		Fondazione Tipo Aerogeneratori		
		A 16 b B		
		Edizione 1		
		Foglio 1/1		