Gamesa	GENERAL CHARACTERISTICS MANUAL	*Code:* **GD051042-en**	*Rev:* **05**
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		Prepared:	**JPI**
Deliverable: **S12**	**Foundation design procedure**	*Verified:*	**DJAUQUICOA**
		Approved:	**JUAL**

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RECORD OF CHANGES

Rev.	Date	Author	Description
00	17/07/08	ESB	Initial version
01	03/04/09	ESB	Change in load document codes
02	21/01/10	ESB JUAL	Update for inclusion of G5X
03	08/05/12	FRREY	Update for inclusion of G9X
04	13/06/14	JPI	Update for inclusion of G114 (2.0-2.5MW)
05	08/02/17	JPI	Update for optimized G114 design loads and interface definition

1 AIM

This document defines the procedure to follow for the correct definition of foundations regardless of whether Gamesa designs the foundations or the client is responsible for their design.

Reference is made throughout the document to different documents, the application of which is equally necessary for correctly defining the foundations of Gamesa wind turbines.

2 SCOPE

The procedure for the definition and design of foundations specified in this document shall apply to all Gamesa wind turbines of the G9X-2.0MW, G8X-2.0MW and G5X-850kW platforms.

3 DESCRIPTION

The foundation designer must submit all necessary information in Spanish and/or English to make sure that at least the requirements established in the functional foundation specification GD014674 are met.

3.1 DESIGN LOADS AND INTERFACE DEFINITION

The design loads must be requested from Gamesa and are exclusive to each wind turbine and each type of site, according to standards EN 61400-1 or DIBt.

These design loads can be found in the following documents:

- GD155022: G114 CIII 2.0MW STD design loads and interface definition.
- GD203121: Optimized G114 design loads and definition of interfaces
- GD194908: G114 CII 2.5MW design loads and interface definition.
- GD207170: G106 CI 2.5MW design loads and interface definition.
- GD175594: G90 design loads and interface definition.
- GD220602: G97 Class S design loads and interface definition.
- GD092758: G97 design loads and interface definition.
- GD141424: G87 Class S design loads and interface definition.
- GD058857: G80 design loads and interface definition.
- GD058858: G83 design loads and interface definition.
- GD058859: G87 design loads and interface definition.
- GD058860: G90 design loads and interface definition.
- GD062063: G52 design loads and interface definition.
- GD062064: G58 design loads and interface definition.

The loads described in the documents listed above do not include cases of special loads (earthquakes, hurricanes, etc.). The necessary information for calculating seismic loads is described in document GD051045 Section (3.2). This information must on all accounts be supplied by the wind farm developer.

The foundation designer must provide Gamesa with the documents described in this section for the foundation design to be accepted.

3.2 CHARACTERISTICS OF THE GROUND

The foundations must be designed according to the characteristics of the ground in which they are to be installed. The characteristics of the ground must be justified to Gamesa by means of a Geotechnical study that must meet at least the requirements specified in the document:

GD051045: Geotechnical data required for the design of foundations for a wind turbine

Gamesa must be provided with the mathematical equations of the seismic elastic response spectrum (horizontal and vertical) in line with the regulations applicable in each country and the values of the coefficients with which they are defined (shock absorption, ground coefficient, structural significance coefficient, characteristic ground acceleration), indicating in turn the impact of each of these factors on the seismic elastic response spectrum, so that Gamesa can provide the design loads applicable in this case.

3.3 GROUND CONNECTION REQUIREMENTS

The Foundation designer must include the grounding requirements indicated by Gamesa in his/her design, as described in the document:

GD051058: G8X/G9X grounding network specification
FT000110: Grounding network specification G5X

3.4 GAMESA DESIGN CRITERIA

Where Gamesa is responsible for designing the foundations, the design criteria for its standard foundations are described in the document:

GD051043: Gamesa Foundation Design Criteria