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Deliverable: **D08**		*Verified:* **IAZCONA**
		Approved: **IAZCONA**

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INDEX

INDEX 1
1 AIM 3
2 SCOPE 3
3 DEFINITIONS AND ACRONYMS 3
4 DESCRIPTION 3
4.1 CABLE TRAYS 3
4.2 INSULATED CABLE TRAYS 4
4.3 CABLE TRAY ACCESORIES 4
4.3.1 TRAY COVERS 4
4.3.2 INSULATED TRAY COVERS 5
4.3.3 GRID TRAY DIVIDER 6
4.3.4 TRAY SPLICES 7
4.3.4.1. LATERAL SPLICE 7
4.3.4.2. ARTICULATED LATERAL SPLICE 7
4.3.5 SUPPORTS 7
4.3.6 INSULATED VERTICAL SUPPORT 7
4.3.7 COVER TRAY CLIP 8
4.4 REJIBANDS 9
4.5 CABLE TIES ACCESORIES 10
4.5.1 CABLE TIE BASES 10
4.5.2 CABLE TIES 11
4.5.3 CABLE TIES FOR HIGH TEMPERATURE 12
4.5.4 CABLE TIE ASSEMBLY 13
4.5.4.1. FA CABLE TIE BASE 13
4.5.4.2. FA CABLE TIE WIDE BASE 13
4.5.4.3. FA CABLE TIE SELF SCREW 13
4.5.4.4. FA CABLE ADHESIVE TIE 14
4.6 CADDY CABLEHOLD ERICO4H24ST3-4 14
4.7 HCLIP ERICO 4H912 15
4.8 VELCRO FASTENER WITH HOLDER 15
4.9 PROTECTIVE CONDUIT SYSTEM 16
4.9.1 FLEXIBLE CONDUIT 28 MM INSIDE DIAM 16
4.9.2 FLEXIBLE CONDUIT 45 MM INSIDE DIAM 17
4.9.3 FLEXIBLE CONDUIT 70 MM INSIDE DIAM 17
4.9.4 FLEXIBLE CONDUIT 89.9 MM INSIDE DIAM 18
4.9.5 OPEN FLEXIBLE CONDUIT 19
4.9.6 CLAMP FLEXIBLE CONDUIT 45 MM INSIDE DIAM 19
4.10 HELICOIDAL TAPE 20
4.10.1 HELICOIDAL TAPE 9,0 CH 9004.1 (NARROW) 20
4.10.2 HELICOIDAL TAPE 15,0 CH 9006.1 (WIDE) 20
4.11 PROTECTOR CAP FOR NUT & BOLT 20
4.12 PROTECTOR CAP FOR THREADED HOLES 21
4.13 BRIDLE 21
4.13.1 BRIDLE SICAME BSL 25-38 21
4.13.2 BRIDLE 1PHASE 21
4.14 EDGE GUARD 22
4.14.1 RUBBER PROFILE FOR E=5MM 22
4.14.2 EDGE GUARD METAL CORE 4700_01 PVC 14X8 22
4.14.3 EPDM ANGLE PROTECTION STRIP 23
4.14.4 FLEX.EDGE PROTEC.ST.INSERT PVC CLAMP 23
4.14.5 OTHER COMPONENTS 24

RECORD OF CHANGES

Rev.	Date	Author	Description
0	17/11/10	ISRODRIGUEZ	Initial Version
1	05/07/11	ISRODRIGUEZ	(4) ADDED ELEMENTS
2	05/07/12	AMORA/ESANMARTIN	ELEMENTS ADDED ON PARAGRAPHS 4.2, 4.3.1, 4.3.2, 4.3.4, 4.3.5, 4.3.6,4.4, 4.12, 4.5.4 and 4.9.5 WORKING TEMPERATURE RANGE CORRECTED
3	22/03/13	JOREDONDO	Updated section 4.3.1 due to new corrosion requirement
4	04/06/13	ESANMARTIN	Updated and included references on section 4.14.3 and 4.14.5
5	17/09/15	LUSANMARTIN	Included references on section 4.9
6	13/11/15	EALFARO	Included new reference on section 4.9.3
7	30/08/16	EYARNOZ	Included new elements on section 4.5.3.4
8	09/03/17	MSAN	Updated and included references on section 4.3.3
9	09/08/17	LUSANMARTIN	Point 4.5.3: High Temperature cable ties included

1 AIM

The object of this document is to define the auxiliary elements used for routing and protecting cables.

2 SCOPE

This document affects to all functional systems that include cables and cable protection elements.

3 DEFINITIONS AND ACRONYMS

HC: High Corrosion
LT: Low Temperature
LTDA: Low Temperature Dusty Ambient
OFS: Offshore
STD: Standard
WTG: Wind Turbine Generator

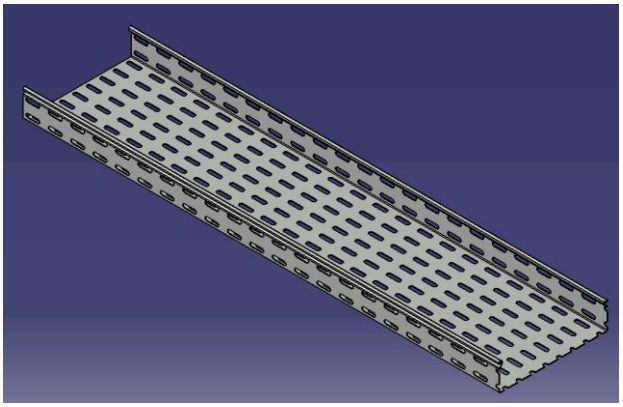
4 DESCRIPTION

Below are defined elements on nacelle for cable routing & protection.

4.1 CABLE TRAYS

All the cable trays used on the machine must comply with:

- Dimensions and specifications described on each specific GP drawing

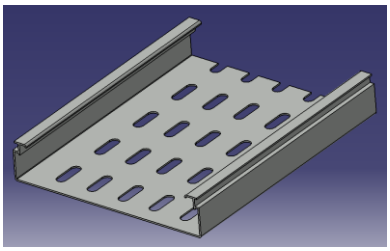


- Standards, that vary depending on WTG installation country:
  - Europe countries_ IEC 61000-5-2 and UNE EN 61537-2002
  - North America_ for this market, the component shall be UL approved

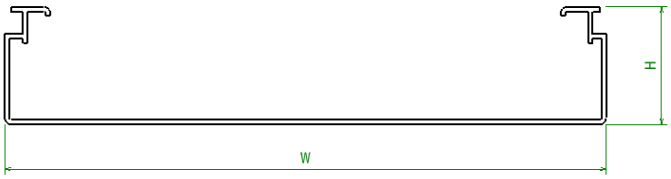
- Rubber protection on part edges and trim areas.

4.2 INSULATED CABLE TRAYS

These trays shall be made of PVC with classification M1 for fire reaction and shall have electrical insulating properties.
The working temperature range must be from -40ºC to 50ºC.



Dimensions are given in part's name, in the following order: INSULATED PLASTIC TRAY H x W



The Gamesa code is:

- **GP045987 M1 INSULATED PLASTIC TRAY 40X100**

4.3 CABLE TRAY ACCESORIES

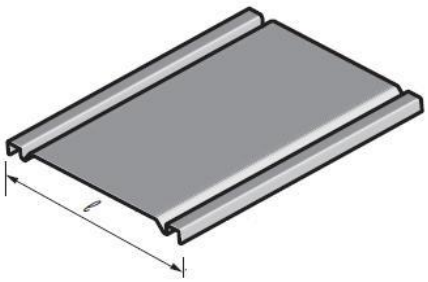
These parts must guarantee C4H corrosion protection according to ISO 12944-2 & ISO 9223. Materials and coatings accepted by Gamesa to fulfill this requirement can be confirmed under request.

The working temperature range must be from -40ºC to 50ºC.

4.3.1 TRAY COVERS

All the tray covers used on the machine must comply with:

- Standards, that vary depending on WTG installation country:
  - Europe countries_ IEC 61000-5-2 and UNE EN 61537-2002
  - North America_ for this market, the component shall be UL approved



- Dimensions:
  - Geometry of these elements must be compatible with cable tray.

- There are different options of width in these parts (related to cable try width):
  - 50 mm
  - 75 mm
  - 100 mm
  - 200 mm

The Gamesa codes for offshore and High Corrosion (HC) versions are:

- **GP093231 COVER 50MM TRAY**
- **GP096848 COVER 75MM TRAY**
- **GP095183 COVER 100MM TRAY**
- **GP211725 COVER 200MM TRAY**

C4H corrosion protection applies to these codes.

The Gamesa codes for standard corrosion requirements versions (STD, LT, LTDA) are:

- **GP236771 COVER 50MM TRAY C3H**
- **GP236780 COVER 75MM TRAY C3H**
- **GP236789 COVER 100MM TRAY C3H**

C3H corrosion protection applies to these codes.

4.3.2 INSULATED TRAY COVERS

- These covers shall be made of PVC with classification M1 for fire reaction and shall have electrical insulating properties.
- Geometry of these elements must be compatible with corresponding insulated cable tray.

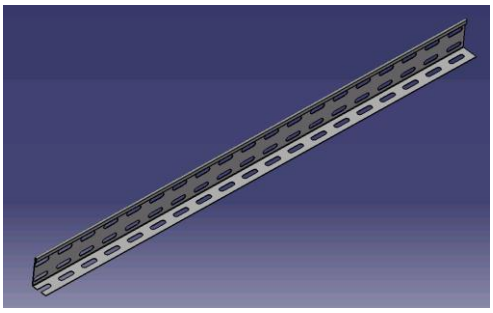
The Gamesa code is:

- **GP045988 M1 INSULATED PLASTIC TRAY COVER 100** (adapted to 100 mm width tray)

4.3.3 GRID TRAY DIVIDER

All the grid tray divider used on the machine must comply with:

- Standards, that vary depending on WTG installation country:
  - Europe countries_ IEC 61000-5-2 and UNE EN 61537-2002
  - North America_ for this market, the component shall be UL approved



- Dimensions:
  - Geometry of these elements must be compatible with cable tray.
  - There are two options to height in these parts.
    - 25 mm
    - 50 mm
- Rubber protection on part edges and trim areas.

The Gamesa codes are:

- **GP043957 GRID TRAY DIVIDER 25 HOT-DIP GALVANIZED**
- **GP043958 GRID TRAY DIVIDER 50 HOT-DIP GALVANIZED**

The Gamesa codes for High Corrosion (HC) versions are:

- **GP386545 GRID TRAY DIVIDER 25 HOT-DIP GALVANIZED HC**
- **GP386546 GRID TRAY DIVIDER 50 HOT-DIP GALVANIZED HC**

C4H corrosion protection applies to these codes.

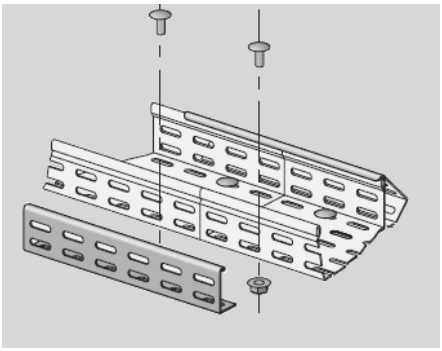
4.3.4 TRAY SPLICES

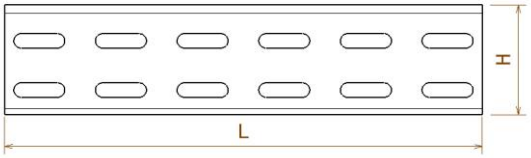
All splices used on the machine must comply with:

- Standards, that vary depending on WTG installation country:
  - Europe countries_ IEC 61000-5-2 and UNE EN 61537-2002
  - North America_ for this market, the component shall be UL approved
- Geometry of these elements must be compatible with cable tray.

4.3.4.1. LATERAL SPLICE

Dimensions are given in part's name, in the following order: TRAYS LATERAL UNION H x L



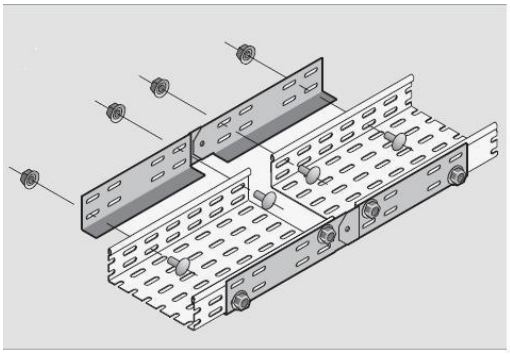


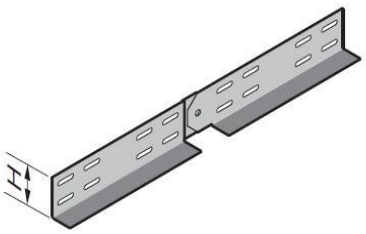
The Gamesa codes is:

- **GP096397 TRAYS LATERAL UNION H50 L240**

4.3.4.2. ARTICULATED LATERAL SPLICE

Dimensions are given in part's name: ARTICULATED LATERAL UNION TRAY H





The Gamesa codes is:

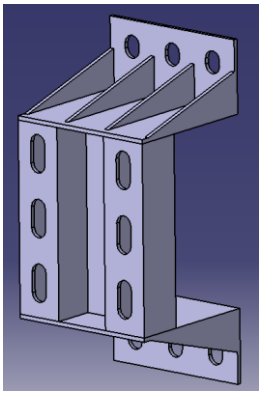
- **GP100066 ARTICULATED LATERAL UNION H50**

4.3.5 SUPPORTS

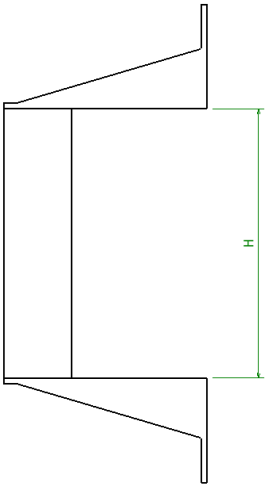
- Dimensions and specifications described on each specific GP drawing

4.3.6 INSULATED VERTICAL SUPPORT

- These trays shall be made of PVC with classification M1 for fire reaction and shall have electrical insulating properties.



Being H = 100 mm



The Gamesa code is:

- **GP045989 M1 INSULATED PLASTIC VERTICAL SUPPORT**

4.3.7 COVER TRAY CLIP

The cover tray clip is to be used for fixing the cover to cable trays. Below is shown an example:



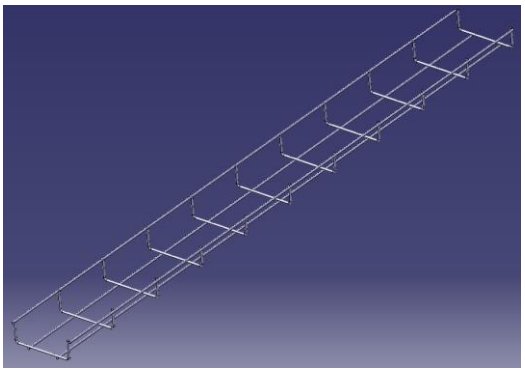
Regarding dimensions, this component must be compatible with covers and cable trays.

Gamesa code is:

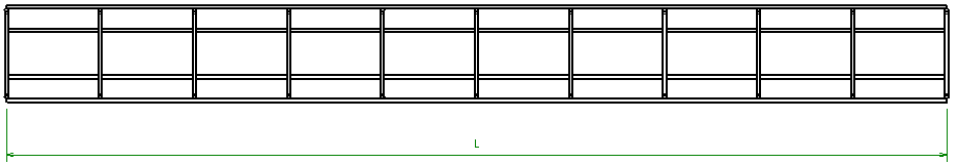
- **GP122101 COVER TRAY CLIP**

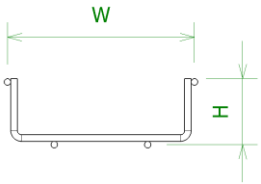
4.4 REJIBANDS

These parts are trays made of welded wire metallic material and have the following shape:



- Dimensions:
  Dimensions are given in part's name, in the following order: TRAY REJIBAND L x W x H





If a rejiband must include any special cut, it will be indicated in a specific drawing for such rejiband.

All cuts shall be made in such a way that there is no sharp edge which could potentially damage any cables.

- Corrosion protection:
  - Nacelle and Hub STD and LTDA machine versions: C4H
  - Nacelle HC machine version: C4H
  - Hub HC machine version: C5M-H.

Materials and coatings accepted by Gamesa to fulfill this requirement can be confirmed under request.

4.5 CABLE TIES ACCESORIES

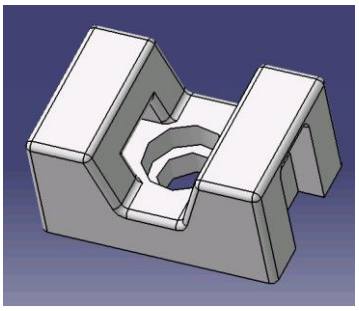
4.5.1 CABLE TIE BASES

These parts are made of Polyamide 6.6 UV stabilized for outside conditions or another material with similar characteristics.

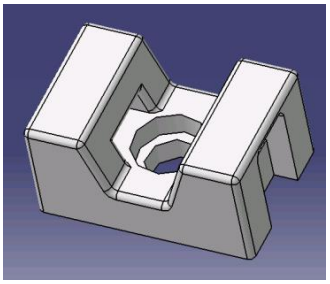
The working temperature range must be from -40ºC to 85ºC.

Gamesa codes are:

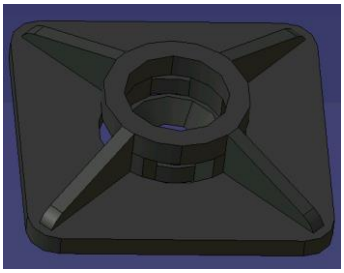
- **GP113771 CABLE TIE BASE.** Approximate dimensions are:
  - Width: 12mm
  - Height: 9mm
  - Length: 18mm
  - Hole Ø to clinch: (3,5 – 4,5) mm



- **P390020 Soporte brida cable POT.Sumelec LKCSF1.** Approximate dimensions are:
  - Width: 20mm
  - Height: 15mm
  - Length: 40mm
  - Hole Ø to clinch: (4,5 – 6,5) mm

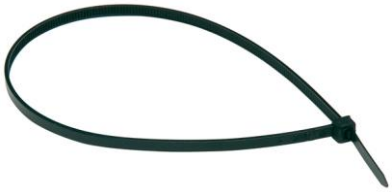


- **115543 HOLDER F.CABLEB.29X29 ABMS-A-D** Approximate dimensions are:
  - Width: 29mm
  - Length: 29mm
  - Height: 7mm
  - Hole Ø for screw: (4 – 6) mm



4.5.2 CABLE TIES

It is made of Polyamide 6.6 for outside conditions or another with similar characteristics. The working temperature range must be from -40ºC to 85ºC.



The Gamesa codes are:

- **P390350 Cable Tie 160x2,5mm black** Its approximate dimensions are:
  - Length_ 160mm
  - Width_ 2,5mm (don't overcome 6mm)

- **P390351 Cable Tie 290x4,8mm black** Its approximate dimensions are:
  - Length_ 290mm
  - Width_ 4,8mm (don't overcome 6mm)

- **GP001017 Cable Tie 530x9mm black** Its approximate dimensions are:
  - Length_ 530mm
  - Width_ 9mm (don't overcome 11mm)

4.5.3 CABLE TIES FOR HIGH TEMPERATURE

It is made of Polyamide 4.6 for outside conditions or another with similar characteristics. Working temperature is up to +150ºC

- **GP403400 HIGH TEMPERATURE CABLE TIE 300x 4,6mm.** Its approximate dimensions are:
  - Length_300mm
  - Width_ 4,6mm (don't overcome 6mm)

Cable Ties for temperatures up to +150 °C in Polyamide 4.6

T-Series in PA46 natural and grey

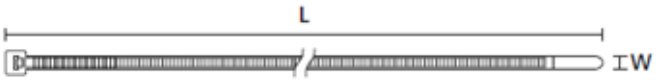
T-Series cable ties for bundling and securing cables, pipes and hoses. These cable ties can be used for almost any type of application.

Features and Benefits

- Higher temperature cable tie available in a wide range sizes
- Made from 100 % high quality plastic, allows for good recycling
- Inside serration for a strong hold around bundles
- Easy application either manually or with a processing tool
- Simple to insert due to the ergonomically bent tail
- Higher temperature resistance up to +150 °C



T-Series.



T-Series

Material specification please see page 24.

TYPE	Width (W)	Length (L)	Bundle Ø max.	N	Material	Colour	Pack Cont.	Tools	Article-No.
T18R	2.5	100.0	22.0	80	PA46	Natural (NA)	1,000 pcs.	2;4-6	114-01879
T30R	3.5	150.0	35.0	135	PA46	Natural (NA)	100 pcs.	2;4-6	114-03079
T50R	4.6	200.0	50.0	225	PA46	Grey (GY)	100 pcs.	2-10	111-00824
	4.6	200.0	50.0	225	PA46	Natural (NA)	100 pcs.	2-10	111-00525
T50I	4.6	300.0	85.0	225	PA46	Natural (NA)	100 pcs.	2-10	111-05220
T50L	4.6	390.0	110.0	225	PA46	Natural (NA)	100 pcs.	2-10	111-00526
T120R(E)	7.6	387.0	100.0	535	PA46	Natural (NA)	100 pcs.	3;9-12	114-12179

All dimensions in mm. Subject to technical changes.
Minimum Order Quantity (MOQ) may differ from package content. Other packaging options may also be available.

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