

Document endorsed by Specialized Group n° 14.4 - 5<sup>th</sup> June 2018

## **Information from Specialized Group GS n°14.4 Data used for assessment of corrosion risks**

### **Specialized Group n° 14.4 « Equipment / Thermal solar products and energy recovery systems »**

This document applies to every system in the field of GS n°14.4, for with some components are installed outside of the building.

At the time of writing, the list of affected families is as follows:

- Evacuated tube solar thermal collector - On roof
- Integral collector storage solar water heater
- Air solar thermal collector
- Unglazed flat-plate solar thermal collector – On roof
- Glazed flat-plate solar thermal collector - On roof
- Glazed flat-plate solar thermal collector - On roof or in roof
- hot water heater
- Forced circulation solar domestic hot water heater
- Thermosyphon solar domestic hot water heater
- Thermal energy recovery system
- Hybrid energy system

## 1. Scope of document

Specialized Group n°14.4 publishes in this document the data it uses for assessment of thermal solar systems.

- Any Technical Appraisal applicant can use the information in this document.
- In case a material or a situation is not described in this document, the applicant must provide specific substantiation. The claims must be consistent with the information below.

## 2. Compatibility of materials with corrosive atmosphere

This part is mainly an extract of following documents:

- NF P34-310:2017 – Continuously hot-dip zinc coated structural steel sheet and strip element for building purposes — Classification and tests
- NF P34-301:2017 – Steel sheet and strip either coil coated or organic film counter-glued or colaminated for building purposes – Technical delivery conditions
- NF P24-351:1997 – Metal joinery – Windows, curtain walling, metal frame panels. Protection against corrosion and conservation of surface conditions
- NF DTU 65.12:2012 – Building works – Solar thermal systems with glazed collectors

## 2.1. Direct outside atmospheres

Material / Coating	direct outside atmosphere							Particular
	Rural non-polluted	Urban or industrial		Marine				
		Normal	Severe	20 to 10 km from coast	10 to 3 km from coast	< 3 km from coast*	Mixed	

Continuously hot-dip metallic coated steel flat products (EN 10346):

Z180 – Z200 – Z225	-	-	-	-	-	-	-	-
Z275	○	○	-	-	-	-	-	-
Z350	■	○	-	○	-	-	-	-
Z450	■	■	○	■	○	○	○	○
AZ	○ - according to ETPM document or Technical Appraisal available on website evaluation.cstb.fr or provided by manufacturer of coating							
ZM	○ - according to ETPM document or Technical Appraisal available on website evaluation.cstb.fr or provided by manufacturer of coating							

Steel sheet and strip either coil coated or organic film counterlaminated or colaminated (NF P34-301)

Minimal category according to NF P34-301	III	III	○	III	IV	V	○	○
Minimal requirement according to NF EN 10169+A1 and requirement §7.6, §7.8 and §8 of NF P34-301	RC2	RC3	○ (RC4 or RC5)	RC3	RC4	RC5	○ (RC5)	○

Hot dip galvanized coatings on fabricated iron and steel articles (EN ISO 1461)

Minimum local weight of coating: 325g/m <sup>2</sup> (45µm) for steel ≥1,5 to <3 mm 395g/m <sup>2</sup> (55µm) for steel ≥3 to <6 mm	■	■	-	■	■	-	-	○
Minimum local weight of coating: 395g/m <sup>2</sup> (55µm)	■	■	■	■	■	■	■	○

Corrugated aluminum profiles

AW-6060	■	■	○	■	■	■	○	○
The conservation of the appearance of aluminum parts is considered non-critical, in the scope of solar thermal processes usually examined by GS n°14.4								

Stainless steel

1.4301 X5CrNi18-10	■	■	○	■	■	○	○	○
1.4404 X2CrNiMo17-12-2	■	■	○	■	■	■	○	○

Stainless steel screws

A2	■	■	○	■	■	○	○	○
A4	■	■	○	■	■	■	○	○

Notes and caption:

\* : seafront excluded

■ : accepted use

○ : the final assessment or the definition of special provisions must be made after consultation and agreement of all the parties involved.

- : forbidden use

## 2.2. Protected and vented outside atmospheres

“Vented and protected outside atmospheres” is used for assessment of components installed under roof cover.

Material / Coating	direct outside atmosphere							Particular
	Rural non-polluted	Urban or industrial		Marine				
		Normal	Severe	20 to 10 km from coast	10 to 3 km from coast	< 3 km from coast*	Mixed	

Continuously hot-dip metallic coated steel flat products (EN 10346):

Z275	■	■	-	-	-	-	-	-
Z350	■	■	■	■	■	-	-	-
Z450	■	■	■	■	■	■	■	○
AZ	○ - according to ETPM document or Technical Appraisal available on website evaluation.cstb.fr or provided by manufacturer of coating							
ZM	○ - according to ETPM document or Technical Appraisal available on website evaluation.cstb.fr or provided by manufacturer of coating							

Hot dip galvanized coatings on fabricated iron and steel articles (EN ISO 1461)

Minimum local weight of coating: 325g/m <sup>2</sup> (45µm) for steel ≥1,5 to <3 mm 395g/m <sup>2</sup> (55µm) for steel ≥3 to <6 mm	■	■	-	■	■	-	-	○
Minimum local weight of coating: 395g/m <sup>2</sup> (55µm)	■	■	■	■	■	■	■	○

Stainless steel

1.4301 X5CrNi18-10	■	■	■	■	■	■	○	○
1.4404 X2CrNiMo17-12-2	■	■	■	■	■	■	■	○

Stainless steel screws

A2	■	■	■	■	■	■	○	○
A4	■	■	■	■	■	■	■	○

Notes and caption:

\* : seafont excluded

■ : accepted use

○ : the final assessment or the definition of special provisions must be made after consultation and agreement of all the parties involved.

- : forbidden use

### 3. Compatibility of materials – galvanic corrosion

Risk of galvanic corrosion must be considered:

- or by using compatible materials,
- or by using physical separators.

Accepted direct contacts:

- aluminum / stainless steel
- aluminum / electrogalvanized steel
- aluminum / hot dip galvanized steel
- electrogalvanized steel / hot dip galvanized steel

forbidden direct contacts:

- stainless steel / hot dip galvanized steel
- stainless steel / electrogalvanized steel

## **Appendix A – Definition of corrosive atmospheres**

These definitions are extracted from French standards NF P34-301:2017 et NF P34-310:2017.

### **A.1 Overview**

Atmospheres defined in parts A.2 to A.5 below, only applies to places where altitude is below 900 m. For attitude above or equal to 900 m part A.6 applies.

### **A.2 Rural non-polluted atmosphere**

Environment corresponding to the outside of constructions located in the countryside in the absence of specific pollution, for example: fallout of smoke containing sulphurous vapors (oil heating).

### **A.3 Normal urban or industrial atmosphere**

Environment corresponding to the outside of buildings located in agglomerations and / or in an industrial environment comprising one or more factories producing gases and fumes creating a significant increase in atmospheric pollution, without being a source of corrosion due to the high content of chemical compounds.

### **A.4 Severe urban or industrial atmosphere**

Environment corresponding to the outside of buildings located in agglomerations or in an industrial environment with a high content of chemical compounds, source of corrosion (for example: refineries, incineration plants, distilleries, fertilizers, cement factories, paper mills), in a continuous or intermittent way.

### **A.5 Marine atmosphere**

#### **A.5.1 Atmosphere of buildings located between 10 km and 20 km from the coast.**

#### **A.5.2 Atmosphere of buildings located between 3 km and 10 km from the coast.**

#### **A.5.3 Seaside**

Less than 3 km from the coast, excluding conditions of direct attack by seawater (seafont).

#### **A.5.4 Mixed atmosphere**

Environment corresponding to the concomitance of a marine seaside atmosphere (see A.5.3) and one of the atmospheres defined in paragraphs A.3 and A.4.

## **A.6 Special atmosphere**

### **A.6.1 Atmosphere subjected to strong radiation U. V.**

For example: buildings located in metropolitan France at an altitude greater than 900 m, buildings located in the French overseas territories (DROM-COM) between the 38th parallels.

*Note from GS n°14.4 :* In the scope of solar thermal processes usually examined by GS n°14.4, aesthetic behavior of structural and cladding elements has a low criticality. High UV atmospheres are not considered in this document.

### **A.6.2 Particular atmospheres**

Environment where the severity of the exposures described above is increased by some effects such as:

- abrasion;
- high temperatures;
- high hygrometry;
- significant dust deposits;
- sea sprays on the seafront;
- etc.