A Guide to EU & Belgian Safety Certification for Solar Production Lines

Compliance, Directives & Regulatory Strategy for EU Factories

Content Partner: J. v. G. technology GmbH

Turnkey solar module production lines — since 1997

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Technical Overview: EU & Belgian Safety Certification for Solar Production Lines

Created as part of the PVKnowHow Knowledge Network

Prepared by J.v.G. Technology GmbH

European specialists in turnkey solar module production lines

Why CE Certification Matters

Legal Market Access Requirement

- CE marking is mandatory for machinery placed on the EU market
- Without CE conformity, machinery cannot be legally operated in Belgium or any EU member state
- Applies equally to imported equipment integrated into a production line
- Liability for conformity rests with the party placing the assembled system on the market

What Is at Stake

- Non-compliant lines face shutdown orders from national market surveillance authorities
- Facility operator bears full legal responsibility for worker safety
- Insurance and financing conditions may require CE conformity documentation
- Procurement of a turnkey line from a compliant provider shifts significant risk

The Challenge of Integrating Global Machinery

Multi-Origin Equipment

- Solar production lines combine 20–40+ individual machines from multiple countries
- Each supplier may issue its own CE declaration — or none at all
- Individual declarations do not automatically cover the integrated system

Assembly Creates a New Legal Entity

- When interconnected machines form a functional unit, EU law treats this as a new "assembly of machinery"
- A new, unified CE declaration is required for the complete line
- The integrating party — often the turnkey provider — assumes the role of manufacturer

Documentation Complexity

- Technical files must cover all integrated machines, interfaces, and safety circuits
- Risk assessment must address the assembled system as a whole
- Harmonized standards used must be explicitly referenced in the Declaration of Conformity

What CE Marking Really Means

What CE Marking Is

- A manufacturer's declaration that the product meets all applicable EU requirements
- Mandatory — not a quality mark or voluntary certification
- Enables free movement of goods within the European Economic Area
- Must be affixed visibly, legibly, and indelibly to the machinery

What CE Marking Is Not

- Not a third-party safety approval in most cases — it is self-declaration
- Not a guarantee of quality — it confirms regulatory conformity only
- Not transferable between configurations — changes to the line may require reassessment
- Not optional for machinery placed on the EU market regardless of origin

Key EU Directives

Directive	Reference	Relevance to Solar Lines
Machinery Directive	2006/42/EC	Primary directive — covers mechanical hazards, safeguarding, controls
Low Voltage Directive	2014/35/EU	Electrical safety of equipment operating between 50V–1000V AC / 75V–1500V DC
EMC Directive	2014/30/EU	Electromagnetic compatibility — emissions and immunity of electrical equipment
Pressure Equipment Directive	2014/68/EU	Applicable where pneumatic or pressurised components are integrated
RoHS Directive	2011/65/EU	Restricts hazardous substances in electrical and electronic equipment

For a standard solar module production line in Belgium, the Machinery Directive, Low Voltage Directive, and EMC Directive are the three core compliance obligations.

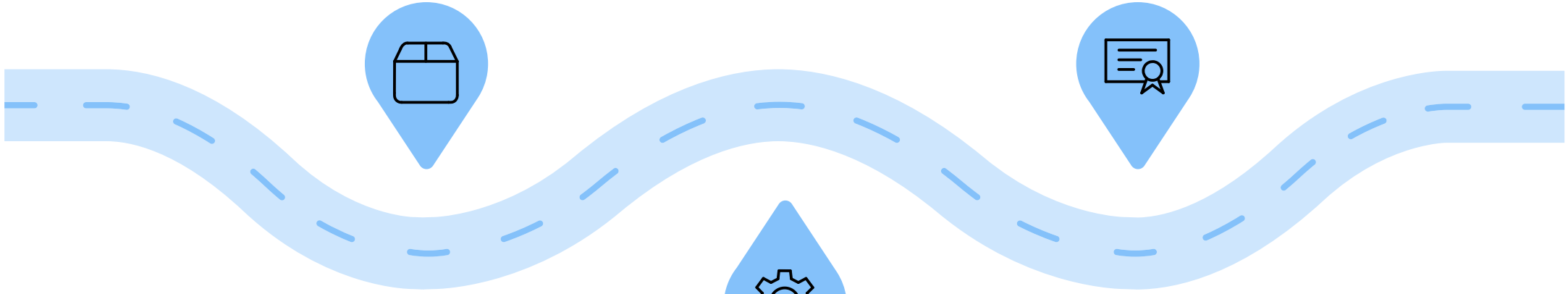
Assembly of Machinery Concept

Individual Machines

Each unit has its own documentation

Assembly of Machinery

Single CE declaration and unified file



Turnkey Integration

Provider interconnects and unifies control

Under the Machinery Directive, an interconnected production line is legally classified as an **Assembly of Machinery** — triggering a single, unified conformity process. The party responsible for integration assumes the role of manufacturer for the complete system.

Risk Assessment Obligations

Scope of Assessment

- All machinery hazards across the full production line must be identified and evaluated
- Includes mechanical, electrical, thermal, ergonomic, and process-specific risks
- Interfaces between machines — not only individual units — must be assessed

Methodology

- Structured risk assessment per EN ISO 12100:2010 — the primary harmonized methodology
- Risk reduction hierarchy: eliminate by design → safeguarding → information for use
- Residual risks must be documented and communicated in the operating manual

Documentation Obligation

- Risk assessment must be retained in the Technical File — not submitted but available to authorities
- Must be updated whenever the line configuration changes
- Required for each standalone machine and for the assembled line as a whole

Harmonized Standards Overview

Standard	Reference	Application Area
Safety of Machinery — General Principles	EN ISO 12100:2010	Risk assessment methodology — all machinery
Safety Distances	EN ISO 13857:2019	Guard positioning and reach distances
Safety-Related Control Systems	EN ISO 13849-1:2023	Control system performance levels (PLa–PLe)
Functional Safety (Electrical)	EN IEC 62061:2021	Safety integrity levels for electrical control systems
Electromagnetic Compatibility	EN 55011 / EN 61000 series	Emissions and immunity testing

Use of harmonized standards creates a presumption of conformity with the corresponding directive requirements — simplifying the conformity assessment process.

Electrical & Safety Integration

Electrical Panel & Control Integration

- All control cabinets and switchgear must comply with Low Voltage Directive and EN 60204-1
- Emergency stop circuits must cover the full line — not individual machines in isolation
- Safety-rated interlocks required at all machine interfaces and access points
- Electrical schematics must be included in the Technical File

Practical Integration Challenges

- Machines from different suppliers may use incompatible safety bus protocols
- EMC compliance requires testing of the assembled system — not only individual units
- CE declarations from sub-suppliers must be reviewed for scope — gaps create liability
- A centralised safety PLC covering the full line is the recommended architecture

Turnkey Compliance Approach

1

Design for Compliance

Compliance integrated from the engineering design phase — not retrofitted after installation

2

Unified Technical File

Single technical file covering all machines, interfaces, risk assessments, and harmonized standards applied

3

Single Declaration of Conformity

One EU Declaration of Conformity issued for the complete assembly of machinery upon commissioning

An experienced European turnkey provider assumes the role of manufacturer for the assembled line — issuing a single CE declaration and technical file that covers the complete production system. This eliminates the compliance gap that arises when individual sub-supplier declarations are assumed to cover the integrated system.

FAQ Highlights

Do individual machine CE marks cover the full production line?

- No — individual machine declarations cover only that machine in standalone configuration
- Integration into a production line creates a new legal entity requiring its own CE assessment
- The integrating party must issue a new Declaration of Conformity for the assembled system

Who is legally responsible for CE conformity of the assembled line?

- The party placing the assembled machinery on the market — typically the turnkey provider or factory owner
- If the factory owner self-integrates equipment, they assume full manufacturer responsibility
- A turnkey provider handling full integration takes on this responsibility contractually

Is a Notified Body required for solar manufacturing lines?

- For most solar module production equipment, self-declaration under the Machinery Directive is permitted
- Annex IV machinery (specific high-risk categories) requires Notified Body involvement
- Confirm applicability with a qualified machinery safety expert before finalising the assessment

Key Project Data

Factory Type

Solar module production line

Region

Belgium / European Union

Certification Scope

CE conformity for integrated machinery

Key Directives

Machinery · Low Voltage · EMC

Compliance Responsibility

Assembly of Machinery

Source

PVKnowHow / J.v.G. Technology GmbH

Industry: Solar module manufacturing · Focus: CE conformity & machinery compliance · Applicable law: EU Machinery Directive 2006/42/EC · Legal concept: Assembly of Machinery · Region: Belgium / European Union · Source: PVKnowHow / J.v.G. Technology GmbH

Strategic Conclusion

1

Compliance Is Non-Negotiable

CE marking is a legal prerequisite for operating any machinery in the EU — not an optional quality enhancement

2

Integration Creates New Obligations

Assembling a multi-machine production line creates a new legal entity requiring a unified risk assessment and Declaration of Conformity

3

Turnkey Advantage

A proven turnkey manufacturing concept with CE compliance expertise reduces regulatory risk and accelerates market entry for new European manufacturers

A proven turnkey manufacturing concept integrates CE compliance into the full-line engineering methodology — issuing a single, unified Declaration of Conformity and Technical File upon commissioning, reducing the regulatory burden for new manufacturers entering the Belgian and EU market.

About the Content Partner

J. v. G. technology GmbH — The DESERT Company

Founded in 1997 in Bavaria, Germany. Family-owned engineering company specializing in turnkey solar module production lines.

More than 90 factory projects delivered worldwide.
On-site team training included — no prior manufacturing experience required.

Key areas:

Turnkey PV manufacturing lines | DESERT Technology® | TÜV-certified module designs | Factory planning to production

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