

Stichting Life and Building Safety Initiative

Standard for Structural, Fire and Electrical Safety in the Ready-Made Garment and Footwear sector in Vietnam - Annexure 1 incl. Bags and Accessories sector

Version 1.1

27th May 2021

Stichting Life and Building Safety Initiative

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Overview

This document together with existing Vietnam LABS standards (v1.4, 21st November 2018), are minimum standards for RMG, Footwear, Bags and Accessories factories, designed to address those issues which create the biggest risk to the life safety of the workers. They are based on international best practice for Fire, Electrical and Structural Engineering.

Compliance with this document and existing Vietnam LABS standards does not infer compliance with any other national codes, standards or statutory requirements that may prevail and it is not intended to replace those. For those factories which are part of the Stichting Life and Building Safety Initiative, while they may satisfy local codes, the minimum requirements of this document and existing Vietnam LABS standard shall prevail, where related to life safety.

Implementation

This document will be implemented together with existing Vietnam LABS standards (v1.4, 21st November 2018) in RMG, Footwear, Bags and Accessories factories in Vietnam where this life safety programme is being rolled out.

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1 Part 1 Scope and Definitions

1.1 Scope

1.1.1 **Title.** Standard for Structural, Fire and Electrical Safety in the Ready-Made Garment and Footwear sector in Vietnam - Annexure 1 incl. Bags and Accessories sector developed by the LABS Initiative shall be referred to herein as "the Standard" or "this Standard."

1.2 Application

1.2.1 This Standard is the standard which shall be used together with existing Vietnam LABS standards (v1.4, 21st November 2018) in Vietnam for the LABS Initiative.

1.2.2 This Standard shall apply to the construction, addition, alteration, enlargement, extension, replacement, repair, installation or movement of major equipment, use and occupancy, maintenance, removal, and demolition of all buildings and structures used for the RMG, Footwear, Bags and Accessories factories in Vietnam.

1.2.3 This Standard shall also apply to subcontractors' buildings and structures producing RMG, Footwear, Bags and Accessories for LABS affiliated brands.

1.3 Purpose: The purpose of this Standard is to establish a common set of minimum requirements that provide a uniform and effective method for assessing structural, fire and electrical safety in New and existing RMG, Footwear, Bags and Accessories factories utilized by LABS-affiliated vendors.

1.4 Disclaimer: The technical principles and requirements of this Standard are intended for use by professional Structural Engineers, Fire Safety Engineers or Architects, and Electrical Engineers who are competent to evaluate the significance and limitation of its content and who will accept the responsibility for the application of the material it contains. The developers of this Standard and the Stichting Life and Building Safety Initiative disclaim any responsibility for the stated principals and requirements and shall not be liable whether in contract or tort (including strict liability and negligence) for any loss, damage or injury of whatever nature resulting from the application of the principles and requirements stated in the Document.

1.5 References

- 1.5.1 **General:** The documents listed in this section are referenced in this Standard and the portions thereof are considered part of the requirements of this Standard to the extent of each such reference.
- 1.5.2 **Vietnam National Technical Code.** Current versions of Vietnam National Construction Regulations. The following is a non-exhaustive list of codes referred to in this Standard:
- 1.5.2.1 QCVN 06:2020/BXD on fire safety for buildings and constructions, Hanoi 2020
 - 1.5.2.2 QCVN: 2020/BCT. National technical regulation on safety in the process of producing, storage, transportation and use of hazardous chemicals - General regulation
 - 1.5.2.3 QCVN 621:2015/BCT National Technical Regulation on Electric Power Technical
 - 1.5.2.4 QCVN32:2018/BLĐTBXH National technical regulation on safe work for home lift
- 1.5.3 **Vietnam National Laws and Rules.** Current versions of Vietnam national laws and rules. The following is a non-exhaustive list of technical documents referred to in this Standard:
- 1.5.3.1 TCVN 5507: 2002- Hazardous chemicals - Code of practice for safety in production, commerce, use, handing and transportation
 - 1.5.3.2 TCVN 6223: 2018 on Liquefied Petroleum Gas Stores (LGP) - General requirements for safety
 - 1.5.3.3 TCVN 5687-2010 Ventilation-air conditioning - Design standards
 - 1.5.3.4 TCVN 9455-2013 Stationary air compressors - Safety rules and code of practice
 - 1.5.3.5 TCVN 12314-1: 2018 - Firefighting - Automatic diffusion fire extinguishers - Part 1: Hanging type dry powder fire extinguishers
 - 1.5.3.6 TCVN 7447-1:2010 Low-voltage electrical installations - Part 1: Fundamental principles, assessment of general characteristics, definitions
 - 1.5.3.7 TCVN 7447-4-41:2010 Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock
 - 1.5.3.8 TCVN 7447-4-42:2005 Electrical installations of buildings - Part 4-42: Protection for safety - Protection against thermal effects
 - 1.5.3.9 TCVN 7447-4-43:2010 Low-voltage electrical installations - Part 4-43: Protection for safety - Protection against overcurrent
 - 1.5.3.10 TCVN 7447-5-51:2010 Electrical installations of buildings - Part 5-51: Selection and erection of electrical equipment - Common rules
 - 1.5.3.11 TCVN 7447-5-52:2010 Low-voltage of electrical installations - Part 5-52: Selection and erection of electrical equipment - Wiring systems

- 1.5.3.12 TCVN 7447-5-53: 2005 Electrical installations of buildings - Part 5-53: Selection and erection of electrical equipment - Isolation, switching and control
- 1.5.3.13 TCVN 7447-5-54:2015 Low-voltage electrical installations - Part 5-54: Selection and erection of electrical equipment - Earthing arrangements and protective conductor
- 1.5.3.14 TCVN 7447-5-56:2011 Low-voltage electrical installations - Part 5-56: Selection and erection of electrical equipment - Safety services
- 1.5.3.15 TCVN 6592-1: 2009 Low-voltage switchgear and control devices - Part 1: General rules
- 1.5.3.16 TCVN 7447-7-712:2015 Electrical installations of buildings - Part 7-712: Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems
- 1.5.3.17 TCVN 9385:2012 Installation of equipment earthing system for industrial projects - General requirements
- 1.5.3.18 TCVN 9888-1:2013 Protection against lightning - Part 1: General principles
- 1.5.3.19 TCVN 9888-2:2013 Protection against lightning – Part 2: Risk management
- 1.5.3.20 TCVN 9888-3:2013 Protection against lightning - Part 3: Physical damage to structures and life hazard
- 1.5.3.21 TCVN 2737: 2020 Loads and Actions
- 1.5.3.22 TCVN5574:2018 Design of Strengthening Measures
- 1.5.3.23 TCVN 4514: 2012 Factories – Total Plan Areas – Design Standards
- 1.5.3.24 TCVN 4604: 2012 Factories – Production Buildings – Design Standards

- 1.5.4 **ICC publications.** International Code Council, 5203 Leesburg Pike, Suite 600, Falls Church, VA 22041 USA.
 - 1.5.4.1 IBC, International Building Code, 2021
 - 1.5.4.2 IFC, International Fire Code, 2021
 - 1.5.4.3 IEBC, International Existing Building Code, 2021

- 1.5.5 **NFPA publications.** National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169 - 7471 USA.
 - 1.5.5.1 NFPA 1, Fire Code, 2021
 - 1.5.5.2 NFPA 10, Standard for Portable Fire Extinguishers, 2018
 - 1.5.5.3 NFPA 13, Standard for the Installation of Sprinkler Systems, 2019
 - 1.5.5.4 NFPA 14, Standard for the Installation of Standpipe and Hose Systems, 2019
 - 1.5.5.5 NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection, 2019
 - 1.5.5.6 NFPA 22, Water Tanks for Private Fire Protection, 2018

- 1.5.5.7 NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, 2020
- 1.5.5.8 NFPA 30, Flammable and Combustible Liquids Code, 2021
- 1.5.5.9 NFPA30B, Code for the Manufacture and Storage of Aerosol Products, 2019
- 1.5.5.10 NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, 2021
- 1.5.5.11 NFPA 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, 2019
- 1.5.5.12 NFPA 58, Liquefied Petroleum Gas Code, 2020
- 1.5.5.13 NFPA 59A Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG), 2019
- 1.5.5.14 NFPA 72, National Fire Alarm and Signaling Code, 2019NFPA 80, Standard for Fire Doors and Other Opening Protectives, 2019
- 1.5.5.15 NFPA 85, Boiler and Combustion Systems Hazards Code, 2019
- 1.5.5.16 NFPA 86, Standard for Ovens and Furnaces, 2019NFPA 88A, Standard for Parking Structures, 2019
- 1.5.5.17 NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems, 2021
- 1.5.5.18 NFPA 92, Standard for Smoke Control Systems, 2018
- 1.5.5.19 NFPA 101, Life Safety Code®, 2021
- 1.5.5.20 NFPA 110, Standard for Emergency and Standby Power Systems, 2019
- 1.5.5.21 NFPA 111, Standard on Stored Electrical Energy Emergency and Standby Power Systems, 2019
- 1.5.5.22 NFPA 204, Standard for Smoke and Heat Venting, 2021
- 1.5.5.23 NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2019
- 1.5.5.24 NFPA 5000, Building Construction and Safety Code®, 2021

- 1.5.6 **ACI publications.** American Concrete Institute, 38800 Country Club Drive, Farmington Hills, MI 48331 USA.
 - 1.5.6.1 ACI214R:2011 Recommended Practice for Evaluation of Strength Test Results of Concrete
 - 1.5.6.2 ACI-562: 2019 Code Requirements for Assessment, Repair and Rehabilitation for Existing Concrete Structures and Commentary

- 1.5.7 **ASTM Publications.** ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428 USA.
 - 1.5.7.1 ASTM C42: 2020 Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

2 Part 2 Structure Safety Referred Codes Updates

Firstly, the RMG, Footwear, Bags and Accessories factories shall comply with the references in Part 1.6 and Section 8 of existing LABS standard. This standard updated some of the referred codes and added several new references, as listed in below table:

No.	Group	Standard / Code	Code Descriptions
01	DEA	ACI214R:2011	Recommended Practice for Evaluation of Strength Test Results of Concrete
02	DEA	ACI-562: 2019	Code Requirements for Assessment, Repair and Rehabilitation for Existing Concrete Structures and Commentary
03	DEA	TCVN 2737: 2020	Loads and Actions
04	DEA & Remediation	TCVN5574:2018	Design of Strengthening Measures
05	DEA & Remediation	ASTM C42: 2020	Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
06	Design	TCVN 4514: 2012	Factories – Total Plan Areas – Design Standards
07	Design	TCVN 4604: 2012	Factories – Production Buildings – Design Standards

3 Part 3 Structure Safety Requirements

3.1 General

The main aims of this section are to extend and apply the updates/ reviews for structure safety in the RMG, Footwear, Bags and Accessories factories in Vietnam. Therefore, the requirements in part 8 of “the existing LABS Standard (V1.4, 21st Nov 2018)” should be followed as always.

New updates in this Stichting Life and Building Safety Initiative Standard have been considered based on:

- 1) extent of coverage of the current standard for accessory factories
- 2) practical conformity when applying the standard

3.2 Terms and Definitions:

Terms and Definitions shall follow the existing LABS standard.

3.3 Updates to Existing LABS Methodology and Standards

3.3.1 Methodology Updates

3.3.1.1 LABS Methodology - C1 Garment Factory Loading Guidance, Storage Loads. Adding references for new types of storages as below:

Material type	Density (kN/m³)	Reference
Leather	8.0-9.0	Appendix A – TCVN 2737-2020
PVC sheets	16.1~17.1	Refer to product properties of PVC sheet. (Density = 1.65~1.75 g/cm ³)
Polyester webbing roll	13.5	Refer to product properties of polyester (Density = 1.38 g/cm ³)

3.3.1.2 LABS Methodology - C1 Garment Factory Loading Guidance, Machinery and Dynamic Loads. Adding details for Machinery and Dynamic Loads as below:

Attention should also be paid to the plinths on which the equipment may be set up, and the effects of vibration from the machinery, referring to TVCN 2737 – 2020.

- Dampers should be installed at the feet of the machinery to reduce dynamic load;
- Use static load instead of dynamic load on elevated floors in the FOS calculation column;
- The dynamic load needs to be considered for the flooring system capacity, and fatigue checked by a qualified engineer;
- If no information provided by the machinery manufacturer, suggest using a dynamic load

factor of 1.20~1.5.

Some cases as mentioned in clause 16.07.8.2 of IBC-2009:

- Light machinery, shaft-or motor-driven: Dynamic Load factor of 1.2
- Hangers for floors or balconies: Dynamic Load factor of 1.33
- Reciprocating machinery or power-driven units: Dynamic Load factor of 1.5

3.3.2 **Standards Updates**

3.3.2.1 Existing Standard 8.5.6 - Adding **solar panel**

Any installations of telecoms towers, water tanks, solar panels, or similar structures on the roof of any existing factory building shall be critically examined against induced forces as per the Vietnam National Construction Regulations using the usual load factors.

If they are found to adversely affect the safety of the structure, such structures must be removed from the building, or the existing structural system retrofitted.

3.3.2.2 Existing Standard 8.5.8 - New adding for structure check with **dynamic load**

Structural components of the floor must be confirmed as having adequate capacity to support heavy machinery, such as press cutting machines, according to the design or inspection report.

The calculation should include floor vibration and structural fatigue calculation, according to TVCN 5574 - 2018.

3.3.2.3 Existing Standard 8.18.5 - New adding for **roof stability** check

Roof sheeting must have the capacity to resist wind load according to the standard: TCVN 8053 – 2009: Corrugated sheets for pitched roofs - Design standard and guide for installation.

4 Part 4 Fire Safety Referred Codes Updates

The RMG, Footwear, Bags and Accessories factories shall comply with the latest issues of the references in Section 1.5 of existing LABS standard. This Stichting Life and Building Safety Initiative Standard updated some of the referred codes and added several new references as listed in below table:

Group	Clause	Codes referred	New edition
Vietnam National Technical Code	1.5.2.1	QCVN 06:2010/BXD Vietnam Building Code on Fire Safety of Buildings, Hanoi 2010.	QCVN 06:2020/BXD on fire safety for buildings and constructions, Hanoi 2020
	New	N/A	QCVN: 2020/BCT. National technical regulation on safety in the process of producing, storage, transportation and use of hazardous chemicals - General regulation
Vietnam National Laws and Rules	New	N/A	TCVN 5507: 2002- Hazardous chemicals - Code of practice for safety in production, commerce, use, handling and transportation
	New	N/A	TCVN 6223: 2018 on Liquefied Petroleum Gas Stores (LGP) - General requirements for safety
	New	N/A	TCVN 5687-2010 Ventilation-air conditioning - Design standards
	New	N/A	TCVN9455-2013 Stationary air compressors - Safety rules and code of practice
	1.5.3.8	TCVN (no number - under development): 2017 - Automatic diffusion dry-powder fire extinguisher - Technical requirements and test methods.	TCVN 12314-1: 2018 - Firefighting - Automatic diffusion fire extinguishers - Part 1: Hanging type dry powder fire extinguishers
ICC publications	1.5.4.1	IBC, International Building Code, 2012	IBC, International Building Code, 2021
	1.5.4.2	IFC, International Fire Code, 2012	IFC, International Fire Code, 2021

Group	Clause	Codes referred	New edition
	1.5.4.3	IEBC, International Existing Building Code, 2012	IEBC, International Existing Building Code, 2021
NFPA publications	New	N/A	NFPA 1, Fire Code, 2021
	1.5.5.1	NFPA 10, Standard for Portable Fire Extinguishers, 2013	NFPA 10, Standard for Portable Fire Extinguishers, 2018
	1.5.5.2	NFPA 13, Standard for the Installation of Sprinkler Systems, 2016	NFPA 13, Standard for the Installation of Sprinkler Systems, 2019
	1.5.5.3	NFPA 14, Standard for the Installation of Standpipe and Hose Systems, 2016	NFPA 14, Standard for the Installation of Standpipe and Hose Systems, 2019
	1.5.5.4	NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection, 2016	NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection, 2019
	1.5.5.5	NFPA 22, Water Tanks for Private Fire Protection, 2013	NFPA 22, Water Tanks for Private Fire Protection, 2018
	1.5.5.6	NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, 2017	NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, 2020
	1.5.5.7	NFPA 30, Flammable and Combustible Liquids Code, 2018	NFPA 30, Flammable and Combustible Liquids Code, 2021
	1.5.5.8	NFPA30B, Code for the Manufacture and Storage of Aerosol Products, 2015	NFPA30B, Code for the Manufacture and Storage of Aerosol Products, 2019
	1.5.5.9	NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, 2018.	NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, 2021
	1.5.5.10	NFPA 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, 2014.	NFPA 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, 2019
	New	N/A	NFPA 58, Liquefied Petroleum Gas Code, 2020
	New	N/A	NFPA 59A Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG), 2019
1.5.5.12	NFPA 72, National Fire Alarm and Signaling Code, 2016.	NFPA 72, National Fire Alarm and Signaling Code, 2019	

Group	Clause	Codes referred	New edition
	1.5.5.13	NFPA 80, Standard for Fire Doors and Other Opening Protectives, 2016.	NFPA 80, Standard for Fire Doors and Other Opening Protectives, 2019
	New	N/A	NFPA 85, Boiler and Combustion Systems Hazards Code, 2019
	New	N/A	NFPA 86, Standard for Ovens and Furnaces, 2019
	New	N/A	NFPA 88A, Standard for Parking Structures, 2019
	1.5.5.14	NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems, 2018.	NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems, 2021
	1.5.5.15	NFPA 92, Standard for Smoke Control Systems, 2015.	NFPA 92, Standard for Smoke Control Systems, 2018
	1.5.5.16	NFPA 101, Life Safety Code®, 2015.	NFPA 101, Life Safety Code®, 2021
	1.5.5.17	NFPA 110, Standard for Emergency and Standby Power Systems, 2016.	NFPA 110, Standard for Emergency and Standby Power Systems, 2019
	1.5.5.18	NFPA 111, Standard on Stored Electrical Energy Emergency and Standby Power Systems, 2016.	NFPA 111, Standard on Stored Electrical Energy Emergency and Standby Power Systems, 2019
	New	N/A	NFPA 204, Standard for Smoke and Heat Venting, 2021
	1.5.5.19	NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2013.	NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2019
	New	N/A	NFPA 5000, Building Construction and Safety Code®, 2021
FM Global publications	1.6.11.1	FM Data Sheet 7-1, Fire Protection for Textile Mills, January 2012.	FM Data Sheet 7-1, Fire Protection for Textile Mills, April 2020.
	New	N/A	FM Data Sheet 3-29, Reliability of Fire Protection Water Supplies, October 2017.

5 Part 5 Fire Safety Requirements

5.1 General

In order to ensure an adequate level of safety to the occupants in the event of fire, the requirements from Section 3 to Section 9 of existing LABS Standard shall be complied. This Stitching Life and Building Safety Initiative Standard updated some of the requirements to better apply to bags and accessories factories.

5.2 Definitions

5.2.1 **General Industrial Occupancy:** Refer to 3.10.2.1 of the existing LABS standard. Bags and accessories factories fall under the Industrial - General Industrial Occupancy Type.

5.2.2 **Special-Purpose Industrial Occupancy:** Refer to 3.10.2.2 of the existing LABS standard. Bags and accessories factories are typically not classified as Industrial – Special-Purpose Industrial Occupancy Type.

5.2.3 **High-Hazard Industrial Occupancy:** Refer to 3.10.2.3 of the existing LABS standard. Bags and accessories factories fall under the Category C fire hazard and combustion characteristics in accordance with the Vietnamese codes.

5.2.4 **Storage Occupancy - Ordinary Hazard Contents:** Refer to 3.10.9.2 of the existing LABS standard. Bags and accessories factories fall under the Ordinary Hazard Contents classification.

5.2.5 **Boiler:** The definition of a boiler is a closed vessel in which water is heated, steam is generated, steam is superheated, or any combination thereof by the application of heat from combustible fuels in a self-contained or attached furnace.

5.2.6 **Electric Steam Boiler:** An electrical device that converts an electric current into heat to generate steam.

5.2.7 **Parking Structure:** A building, structure, or portion thereof used for the parking, storage, or both, of motor vehicles. The types of parking structure are further classified as open, enclosed, basement and underground.

5.3 Updated requirements

5.3.1 Separation of mixed-use occupancies

5.3.1.1 Electrical steam boiler

Any room or space housing electrical steam boilers shall be separated from other occupancies by a minimum 2-hour fire rated construction. The installation of electrical steam boiler shall be in

accordance of NFPA 70 and NFPA 101.

5.3.1.2 **Portable Generator**

Generator sets shall be separated from all other occupancy areas by a minimum 2-hour construction. Fuel tanks shall be limited to a maximum 2500 L (660 gal) when located in a building with other occupancies. Exhaust shall be in accordance with NFPA 37. All exhaust systems shall discharge to the exterior of the building in a safe location.

Further, the following additional aspects shall be considered in the operation of portable generator:

- 1) Portable generators shall not be operated or refueled within buildings, on balconies, or on roofs.
- 2) Portable generators shall be permitted to be operated or refueled in a building or room that has been constructed for such use.
- 3) Fueling from a container shall be permitted when the engine is shut down and engine surface temperature is below the autoignition temperature of the fuel.
- 4) Portable generators shall be positioned so that the exhaust is directed as follows:
 - At least 5 ft (1.5 m) in any direction away from any openings or air intakes.
 - Away from the building

5.3.1.3 **Parking Structure**

Open, enclosed, basement, and underground parking structures shall be constructed in accordance with NFPA 88A, Standard for Parking Structures.

5.3.1.4 **Chemical Storage - Liquids**

The maximum allowed quantities (MAQs) of liquids allowed in each control area shall not exceed the amounts specified in Table 307.1 of International Building Code (IBC).

5.3.1.5 **Chemical Storage - LPG**

- 1) The maximum allowed quantities (MAQs) of LPG allowed in each control area shall not exceed 400Kg per TCVN 6304.
- 2) LPG cylinders shall be placed on a firm, clean, dry, and level base. They shall be sited at ground level, in a well-ventilated area where any gas leakage can safely and rapidly disperse.
- 3) Cylinders in storage shall be located to minimize exposure to excessive temperature rises, physical damage, or tampering. [NFPA 58: 8.2.1.1]
- 4) Cylinders stored in buildings shall not be located near exits, near stairways, or in areas normally used, or intended to be used, for the safe egress of occupants. [NFPA 58: 8.2.1.3]
- 5) NFPA 54, NFPA 58 and TCVN 6304 shall be referred to for requirements not effected or covered under this section.

5.3.2 **Fire Protection Construction**

5.3.2.1 **Fire Windows**

The maximum size of openings for fire windows shall be in accordance with chapter 17 of NFPA 80, Standard for Fire Doors and Other Opening Protectives.

The heavy intermediate and industrial types shall be used for openings not exceeding 84 ft² (7.8 m²), with neither dimension exceeding 12 ft (3.66 m).

Where multiple units are installed, the distance between unprotected vertical steel mullions shall not exceed 7 ft (2.13 m).

5.3.3 **Fire Protection Systems**

5.3.3.1 **Control Valves in Automatic Sprinkler Systems**

Each control valve shall be identified and have a sign indicating the system or portion of the system it controls.

Systems that have more than one control valve that must be closed to work on a system shall have a sign on each affected valve referring to the existence and location of other valves.

Each normally open valve shall be secured by means of a seal or a lock or shall be electrically supervised in accordance with the applicable NFPA standards.

Normally closed valves shall be secured by means of a seal or shall be electrically supervised in accordance with the applicable NFPA standard.

5.3.3.2 **Automatic Sprinkler Systems for Storage Protection**

All storage shall be maintained with a 460 mm minimum clearance from the top of storage to the sprinkler deflector.

A minimum clearance to storage of 36 in. (900 mm) shall be permitted for special sprinklers.

The clearance from the top of storage to sprinkler deflectors shall be not less than 36 in. (900 mm) where rubber tires are stored.

5.3.3.3 **Automatic and manual heat and smoke ventilation**

Smoke ventilation shall be provided for corridors with a length of more than 15m where there is no natural lighting from openings of exterior wall in production buildings of Class A, B and C that have two or more floors.

5.3.3.4 **Fire Department Access Roads**

The angle of approach and departure for any means of fire department access road shall not exceed 1 ft drop in 20 ft (0.3 m drop in 6 m) or the design limitations of the fire apparatus of the fire department.

5.3.4 **Means of Egress (MOE)**

5.3.4.1 **Egress Illumination**

An emergency power system shall be provided to supply power to the exit signs and means of egress illumination per Cl. 5.13.1 of the existing LABS standard. Emergency illumination shall be provided for not less than 90 minutes in the event of failure of normal lighting. If the egress illumination system is powered by central batteries of the emergency power, the minimum duration time of the emergency power shall be not less than 90 min.

6 Part 6 Electrical Safety Referred Codes Updates

The RMG, Footwear, Bags and Accessories factories shall comply with the latest issues of the references in part 1.6 and 10.5 of existing LABS standard. This Stichting Life and Building Safety Initiative Standard updated some of the referred codes in existing LABS standard, the last version of the codes as listed in below table:

No.	Group	Standard / Code	Code Descriptions
01	Supplies to Life Safety Service	TCVN 7447-5-56: 2011	Safety services
02	Earthing & Grounding	TCVN 7447-5-54:2015	Earthing arrangements and protective conductor
		TCVN 9385:2012	General requirements for installation of equipment earthing system
		TCVN 9888-1/2/3:2013	Protection against lightning
03	Power supply	QCVN 621:2015/BCT	National Technical Regulation on Electric Power Technical
		TCVN 6592-1: 2009	General rules of Low-voltage switchgear and control devices
		TCVN 7447-5-53: 2005	Selection and erection of electrical equipment - Isolation, switching and control
04	Distribution	TCVN 7447-1:2010	Low-voltage electrical installations: Fundamental principles, assessment of general characteristics, definitions
		TCVN 7447-4-41:2010	Protection against electric shock
		TCVN 7447-4-42:2005	Protection against thermal effects
		TCVN 7447-4-43:2010	Protection against overcurrent
		TCVN 7447-5-52:2010	Wiring systems
05	Others	TCVN 7447-7-712:2015	Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems
		QCVN32:2018/BLĐTBXH	National technical regulation on safe work for home lift

7 Part 7 Electrical Safety Requirement

7.1 General

The main aims of this section are to extend and apply the updates/ reviews for Electrical Safety in the RMG, Footwear, Bags and Accessories factories in Vietnam. Therefore, the requirements in part 10 of "the Standard for Structural, Fire & Electrical Safety in the Ready-Made Garment and Footwear Sector in Vietnam" should be followed first. This part has been prepared with priority given to referencing local standards and the practicality of applying standards. All updates in electrical safety parts have been considered based on:

- extent of coverage of the current standard for accessory factories
- ease of understanding for critical points, which should be described in more detail
- practical conformity when applying the standard

7.2 Terms and Definitions:

Terms and Definitions shall be taken from TCVN 7447-1:2010.

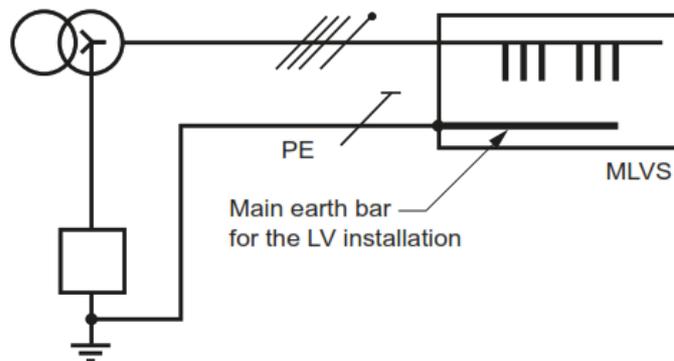
7.3 Neutral cross section area (c.s.a) selection

7.3.1 Single-phase circuits or those of c.s.a. $\leq 16 \text{ mm}^2$ (copper) or $\leq 25 \text{ mm}^2$ (aluminum): the c.s.a. of the neutral conductor must be equal to that of the phases

7.3.2 Three-phase circuits of c.s.a. $> 16 \text{ mm}^2$ (copper) or $> 25 \text{ mm}^2$ (aluminum): the c.s.a. of the neutral may be smaller than that of the phases, corresponding to clause 524.2 of TCVN-7447-5-52-2010

7.4 c.s.a. of PE conductor between the MV/LV transformer and the Main Low Voltage Switchboards (MLVS)

Recommended c.s.a. of PE conductor between the MV/LV transformer and the MLVS, as a function of transformer ratings and fault-clearance times



Transformer rating in kVA (230/400 V output)	Conductor material	Bare conductors			PVC-insulated conductors			XLPE-insulated conductors					
		Copper t(s)			0.2	0.5	-	0.2	0.5	-	0.2	0.5	-
		Aluminium t(s)			-	0.2	0.5	-	0.2	0.5	-	0.2	0.5
≤100	c.s.a. of PE conductors SPE (mm ²)	25	25	25	25	25	25	25	25	25	25	25	
160		25	25	35	25	25	50	25	25	35	25	35	
200		25	35	50	25	35	50	25	25	50	25	50	
250		25	35	70	35	50	70	25	35	50	25	50	
315		35	50	70	35	50	95	35	50	70	35	70	
400		50	70	95	50	70	95	35	50	95	50	95	
500		50	70	120	70	95	120	50	70	95	50	95	
630		70	95	150	70	95	150	70	95	120	70	120	
800		70	120	150	95	120	185	70	95	150	70	150	
1000		95	120	185	95	120	185	70	120	150	70	150	
1250	95	150	185	120	150	240	95	120	185	95	185		

The table indicates the c.s.a. of the conductors in mm² according to:

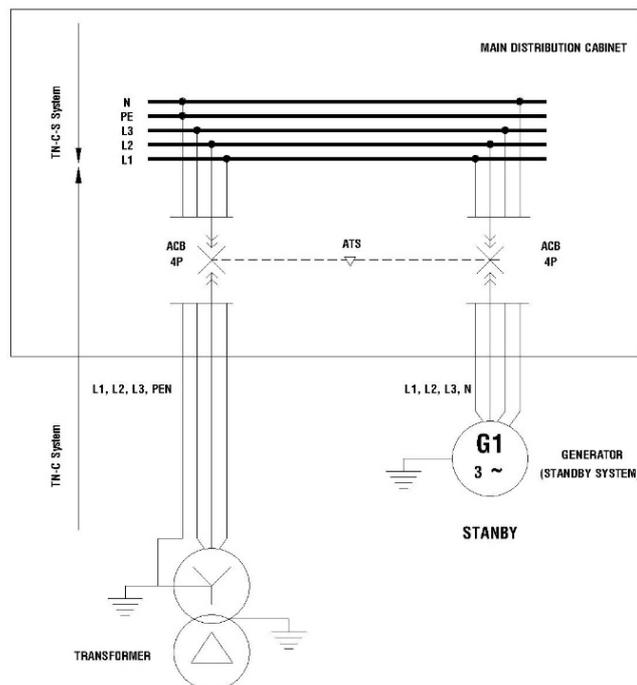
- 1) The nominal rating of the MV/LV transformer(s) in kVA
- 2) The fault-current clearance time by the MV protective devices, in seconds
- 3) The kinds of insulation and conductor materials

7.5 Transformer oil soak pit

Soak pits must be provided for indoor transformer with oil content > 600kg or outdoor transformer with oil content > 1000kg. Soak pits shall be adequately sized to deal with the volume of oil.

7.6 Earthing of generator

The requirement of TCVN 9358:2012 - Clause 4.14 should be followed



7.7 Selection and Erection of Wiring Systems

7.7.1 The requirement of TCVN 7447-5-52:2010 shall be followed

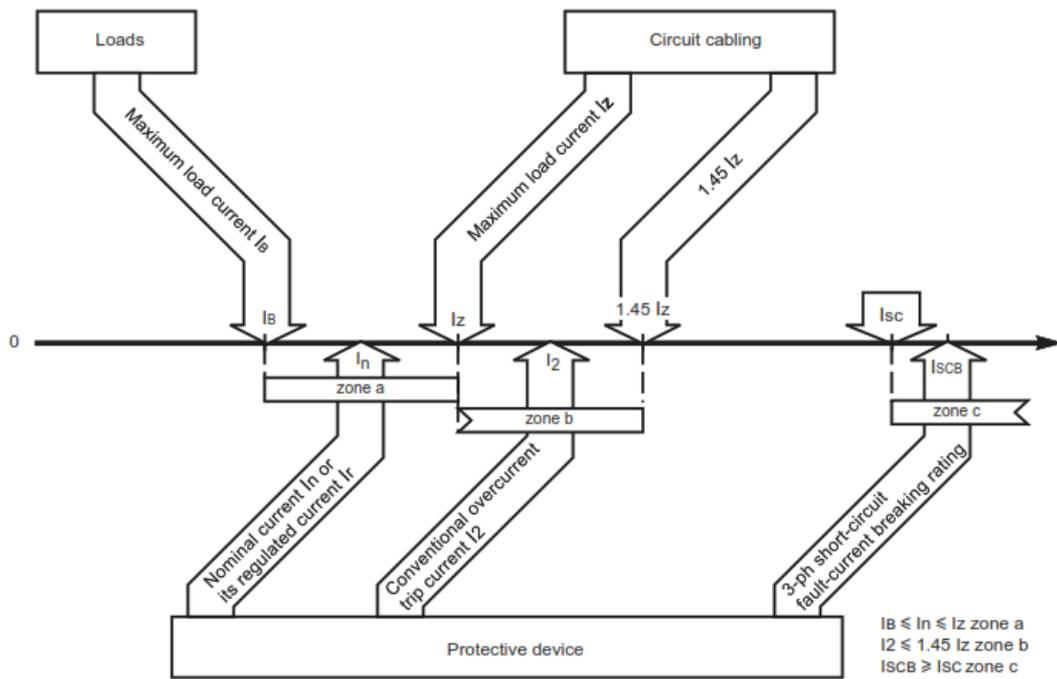
7.7.2 Maximum load current I_z should be referenced to table B52.2 to B52.13 in TCVN 7447-5-52:2010

7.8 Protection against Overload Current

7.8.1 The requirement of TCVN 7447-4-43:2010 - Clause 433.1 should be followed

7.8.2 A protective device (circuit breaker or fuse) functions correctly if:

- 1) Its nominal current or its setting current I_n is greater than the maximum load current I_B but less than the maximum permissible current I_z for the circuit, i.e. $I_B \leq I_n \leq I_z$ corresponding to zone "a".
- 2) Its tripping current I_2 "conventional" setting is less than $1.45 I_z$ which corresponds to zone "b".



7.9 Additional Protection: Residual Current Devices (RCDs)

7.9.1 The requirement of TCVN 7447-4-41:2010 - Clause 411.3.3 should be followed

7.9.2 RCDs with a rated residual operating current ($I_{\Delta n}$) not exceeding 30mA and operating time not exceeding 40ms at a residual current of 5 times $I_{\Delta n}$ shall be provided for

- Socket-outlets with a rated current not exceeding 20A, and
- Mobile equipment with a current rating not exceeding 32A for use outdoor

Note 1: Can be excluded for

a. sockets are used under the supervision of a skilled or instructed person, for example in some commercial or industrial location, or

b. Special socket is provided for connection to specific item of equipment.

Additional protection can be specified with protective measures under certain conditions of external influence at some special locations (see Part 7 of IEC 60364).

7.10 Solar photovoltaic (PV) power supply systems

7.10.1 The requirements of TCVN 7447-7-712:2015 should be followed

7.11 Cargo/ passenger lift maintenance

7.11.1 Lifts should be inspected and maintained every 3 months at least as QCVN 32:2018/BLĐTBXH or Circulars 48/2016/TT-BLĐTBXH

7.12 Electrical isolation procedure

7.12.1 An isolation procedure is a set of predetermined steps that should be followed when workers are required to perform tasks such as inspection, maintenance, cleaning, repair and construction as TCVN7447-5-53-2005

DOCUMENT VERIFICATION

Document title		Standard for Structural, Fire and Electrical Safety in the Ready-Made Garment and Footwear sector in Vietnam - Annexure 1 incl. Bags and Accessories sector		
Description				
Revision	Date	Prepared by	Checked by	Approved by
V1.1	27 th May 2021	Roxy Xu (Structural Engineer)	Bowen Shi	Gabriel Amouyal
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		Nguyen Thanh Sang (Electrical Engineer)		