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## CERTIFICATION AND TRAINING IN DANGEROUS PRODUCTS FOR MILITARY FIREFIGHTERS

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**Abstract:** The role of Military Firefighters in

incidents involving Dangerous Products (PP) requires specific technical knowledge, physical and emotional preparation, as well as certifications that guarantee their ability to operate in high-risk environments. This article discusses the importance of certification and specialized training in the area of Dangerous Goods, highlighting the levels of training, the legislation involved and the operational benefits. Adequate training ensures greater safety for response teams and the population, as well as effective containment, evacuation and decontamination actions.

**Keywords:** Hazardous products, Military firefighters, Certification, Training, Chemical emergencies.

## INTRODUCTION

Responding to emergencies involving Dangerous Goods is one of the most critical areas of activity for Military Firefighters. These incidents can involve chemical, biological, radiological and nuclear (CBRN) substances, with potential impacts on public health and the environment. To this end, professionals are required to be properly trained and certified, ensuring the application of standardized and safe protocols (SILVA, 2018).

Handling and responding to emergencies involving hazardous products (PP) is one of the most complex and risky tasks faced by Military Firefighters. These professionals are often the first to arrive at incidents involving chemical, biological, radiological or nuclear substances. To ensure the safety of the population, the environment and the agents themselves, it is essential that they receive specialized training and recognized and up-to-date certifications (SILVA, 2018).

Dangerous goods are substances that pose a risk to human health, the environment or public safety. These materials are classified according to international standards such as the GHS (Globally Harmonized System of Clas-

sification and Labelling of Chemicals) and Annex I of ANTT (National Land Transport Agency) Resolution No. 5,947.

The OPCW is an intergovernmental organization based in The Hague, created in 1997 to implement the Chemical Weapons Convention (CWC), which prohibits the development, production, stockpiling, use and transfer of chemical weapons. With 193 member countries, it acts through inspections, verifying the destruction of stockpiles and controlling chemical industries that could generate threats, as well as promoting the peaceful use of chemistry. The body was awarded the Nobel Peace Prize in 2013 for its success in chemical disarmament. Until recently, more than 97-99% of declared stocks of chemical weapons were destroyed under the supervision of the OPCW.

The OPCW promotes training and international cooperation through centers such as the ChemTech Centre and educational programs. Brazil, for example, has contributed around €49,426 to this center, reinforcing its work in research and training personnel to prevent chemical threats. In addition, the OPCW organizes workshops and trainings such as the "Politics and Diplomacy for Scientists" meeting or the program in Rio de Janeiro (April 2024), aimed at developing capacities in chemical security and disarmament, especially for young people from developing economies.

## ABIQUIM - BRAZILIAN CHEMICAL INDUSTRY ASSOCIATION

Abiquim actively represents Brazilian industry at the OPCW, participating in various international events. In November 2023, it took part in a workshop in The Hague to discuss the prevention of the resurgence of chemical weapons and chemical terrorism, presenting the role of the industry and national programs such as Atuação Responsável®. In September 2024, in Camaçari (BA), Abiquim

took part in the closing of the OPCW Associates Program, highlighting the industry's contribution to implementing the Convention and training specialists.

Other examples include events focused on policies and diplomacy for scientists (April 2023), international symposiums such as "Women in Chemistry" in Panama (May 2024) aimed at integrating gender and disarmament, as well as national activities related to the inspection and control of industrial precursors within Brazil.

## JOINT CONTRIBUTIONS AND IMPACT

Collaboration between the OPCW, the Brazilian government and the national chemical industry strengthens the implementation of the Chemical Weapons Convention. Abiquim promotes training, disseminates good security practices and cooperates with national authorities (such as the MCTI/CGBS), helping to prevent the detour of chemicals with war potential. By participating in regional forums in Latin America (such as the forum in Buenos Aires, September 2023), Abiquim strengthens regional governance and the training of agents in industrial inspection, emergency response and criminal law.

The OPCW is the main global organization for the verification and elimination of chemical weapons, with strong involvement from Brazil and its industry, represented by Abiquim. The association actively participates in educational, technological and regulatory programs, contributing to national and international security in the control of chemical substances. This strengthens the Convention, preventing the resurgence of chemical weapons and promoting the responsible and peaceful use of chemistry.



Examples of PPs

Source: Google (2025).

Data analysis aims to organize and summarize the data in such a way as to provide answers to the proposed problem. To analyze the data obtained, the tabulation technique will be used, defined as the process of grouping and counting the cases that fall into the analysis categories (GIL, 2008).

To analyze the qualitative data, the content analysis techniques defined by Bardin (2011) and Minayo (2007) will be used. For these authors, the data analysis process involves several phases to obtain meaning from the data collected. With regard to the essential stages of content analysis, Bardin (2011) and Minayo (2007) use different terminology, but are similar in their action.

In view of this diversification and also due to the terminological approximation, Bardin (2011) and Minayo (2007) will be used as a reference to describe the three phases of content analysis: the first phase is pre-analysis, the second phase is exploration of the material and the third phase is treatment of the results, inference and interpretation.

## DANGEROUS PRODUCTS: DEFINITION AND CLASSIFICATION

Dangerous goods are substances or articles that pose risks to human health, property and the environment, and can be classified according to United Nations (UN) guidelines and Brazilian regulations, such as ANTT Resolution No. 5,947 (2022). The risk classes include:

- Class 1 - Explosives
- Class 2 - Gases
- Class 3 - Flammable liquids
- Class 4 - Flammable solids
- Class 5 - Oxidizing substances and organic peroxides
- Class 6 - Toxic and infectious substances
- Class 7 - Radioactive materials
- Class 8 - Corrosives
- Class 9 - Miscellaneous hazardous substances and articles (ABNT, 2018)

## DANGEROUS GOODS CERTIFICATION FOR FIREFIGHTERS

Professional certification is a formal process that certifies a firefighter's qualification to work in PP operations. Based on international standards such as **NFPA 1072** and **NFPA 472** (NATIONAL FIRE PROTECTION ASSOCIATION, 2018), the training is structured into different levels:

- **Awareness:** Initial risk recognition and reporting of the occurrence;
- **Operations:** Defensive actions for containment and isolation;
- **Technician:** Offensive interventions with direct handling of substances;
- **Specialist:** Acting in specific scenarios, such as radioactivity or chemical terrorism (GOMES, 2020).

The Military Fire Brigade of several Brazilian states has adopted these standards, complementing them with internal regulations and standardized operational protocols.



Firefighters' regulations for PPs

Source: Google (2025).

## TRAINING SYLLABUS

The Dangerous Goods training courses involve a multidisciplinary approach, covering:

- Fundamentals of chemistry applied to emergencies;
- Identification and classification of substances;
- Use of Personal Protective Equipment (PPE) and Collective Protective Equipment (CPE);
- Containment, evacuation and decontamination techniques;
- Incident Command System (ICS);
- Environmental and transportation legislation (BRASIL, 1997).

Practical activities include simulations of leaks, fires and collisions with PP transport, using mobile laboratories and controlled areas.



Training procedure

Source: Google (2025).



## BENEFITS OF CERTIFICATION AND ONGOING TRAINING

Specialized training considerably reduces operational risks, improves decision-making in the field and standardizes procedures in high-stress situations (COSTA; ALMEIDA, 2021). The main benefits include:

- Increased staff safety;
- Improved interagency response (firefighters, police, civil defense, environment);
- Protection of the population and the environment;
- Reduction of collateral damage and secondary contamination.

In addition, certification adds value to the firefighter's career, enabling them to work in CBRD task forces and international humanitarian aid missions.

## FINAL CONSIDERATIONS

Continuous training in Dangerous Goods is fundamental to the safe and effective performance of Military Firefighters. Investment in technical training, physical structure and institutional integration contributes directly to the protection of life, property and the environment. Therefore, PP certification must be seen not only as a legal requirement, but as an ethical and professional commitment.

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Firefighter training for responding to dangerous goods incidents (HAZMAT) combines solid theoretical training with intense practice, usually based on international standards such as NFPA 472, OSHA 1910.120 and ABNT NBR 14064.

Participants learn substance identification, label reading, the use of PPE at levels A to D, defensive containment techniques and monitoring with detectors, as well as decontamination and rescue in simulated scenarios that reflect real spills. The workload varies depending on the level (operational, technical, command or specialist), with typical courses lasting from 40 hours (operations level) to advanced training lasting hundreds of hours. In Brazil, corporations such as CBMERJ, CBMMG, CBMPR, CBMGO and CBMSC, as well as companies such as Ambipar, promote courses that involve integration between firefighters from various states, military forces, SAMU and environmental agencies, using multimodal fields and workshops with realistic simulations

These training sessions aim to enable teams to protect lives, property and the environment with maximum safety, speed and technical coordination.

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