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**Technical-Scientific Advisory Board (TAB)**

**of the gfpa - German Fire Protection Association**

**Vereinigung zur Förderung des Deutschen Brandschutzes e.V.**

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## 1. The most important aspects in brief

Smoke from a fire always contains substances, which are harmful to health and may enter the body via the mouth, respiratory tract, mucous tissue or skin. In hot smoke, these toxins occur in high concentrations as gases, which can be easily absorbed. In cold smoke, toxins tend to be bonded to soot, condensation water or fly ash. Additional hazards at the fire ground may be caused by raw materials, auxiliary and operating materials or construction materials containing asbestos or synthetic mineral fibres as defined by technical regulation TRGS 521.

Fire fighters can protect themselves to a great extent by observing the following rules of conduct:

- **During and after extinguishing the fire, e.g. as long as the fire ground remains “warm” (1 to 2 hours after the fire has been extinguished), respiratory protection must be worn by any means (see: Fire Brigade Working Regulation FwDV 7).**
- Rescue vehicles should be positioned outside the danger zone, i.e. beyond the range of the smoke, if possible. Do not allow smoke travelling into the crew cabins.
- Soot bonds toxins on its surface, thus making them less biologically active. Because of this contaminated protective clothing does not pose a direct hazard; nevertheless the incorporation of soot must be avoided by any means.
- It must be ensured that personal protective clothing (PPC) has been well vented before removing the face piece (outgassing from smoke).
- Only outside areas affected by soot and smoke eating, drinking and smoking should be permitted after undressing contaminated CPC followed by thoroughly washing of faces and hands.
- Gross decontamination of personal protective equipment (PPE) and used tools has to be done on the fire ground. Transport back to the station of PPE and tools should be done outside the crew compartment or wrapped in dustproof packaging.
- It is not permitted to enter social or staff rooms or to leave the fire station wearing clothing that is severely contaminated with soot.
- Personnel who were exposed to smoke and soot should shower and change their clothing after deployment. Contaminated equipment should be thoroughly cleaned before being placed back into the rescue vehicles.
- In accordance with guideline VdS 2357 (Fire Damage Restoration) issued by the German Insurance Association (GDV) cold fire sites are categorised into danger zones GB 0 to GB 3 with regard to their contamination with pollutants. The required knowledge for this purpose can be gained while fighting the fire. This categorisation leads to specific industrial safety measures for all activities within the scope of the restoration of fire damage.
  - If the fire service is involved in activities on the cold fire site, risk assessment and protective measures for the personnel should be done according to VdS 2357.
  - The same applies to the further treatment (in particular cleaning and disposal) of PPE and other equipment used during fire fighting.

## 2. Measures to be taken in the course of fire fighting

The assessment of the situation made by the Incident commander must also take the following into account:

- Which pollutants are present (hazardous substances store, construction materials store)?
- Which pollutants can be released in the course of the fire (fire pattern, burning materials)?
- What effects do measures taken by the fire service have on the generation of pollutants (catchwords: extinguishing agent, allow to burn under control)?
- How pollutants may travel outside the fire ground?
- Which pollutants (type, amount) can be expected at the 'cold' fire ground?

### 2.1 General measures

- During extinguishing, the fire develops through a temperature range in which increased pollutant generation occurs. This must be taken into account when assessing the situation. Under certain circumstances it may be better to let the fire burn under controlled conditions than extinguishing it.
- The composition of the smoke can be roughly calculated using standard fire brigade direct reading equipment. Rough estimates are sufficient for fire brigade operations as they are only used for the dynamic risk assessment on the scene. Accordingly, such readings should neither be used for press releases nor for recommendations to the general public.
- Analysis equipment such as GC/MS is used by the Analytical Task Force (ATF) throughout Germany. Representative samples would allow chemical advisors – experienced in metrology and the composition of smoke - to provide specific risk assessments for operational personnel. Apart from this, the determination of the lead substance is practicable for the decision of the incident commander.
- The criteria listed in VdS 2357 are not suitable for the risk assessment of the hot fire phase (fire fighting). The knowledge gained by the fire service about the course of the fire and type and quantity of the burnt material can nevertheless provide valuable hints for the assessment of the cold fire site.
- The risk assessment of the cold fire site with categorisation into the danger zones GB 0 to GB 3 in line with GDV guideline VdS 2357 (see Section 6) is not a common task of the fire brigade. Fire services should use VdS 2357 when they are working on cold fire sites (e.g. conducting safety and security measures or recovering tools and equipment, material assets or evidence).
- The number of persons deployed in the danger zone should be kept to the necessary minimum. Non-deployed personnel should be stationed outside the dispersion area of the soot and smoke.
- The exposure of operational vehicles and equipment to soot should be avoided wherever possible. Equipment that has been severely contaminated with soot should be pre-cleaned at the place of use prior to removal (Gross decontamination)
- The swirling up of soot and ash should be avoided during follow-up extinguishing work and the ventilation of burnt-out areas. The risk of spreading the contamination is particularly big with flaky soot.

- It must be ensured that personal protective clothing (PPC) has been well vented before removing the face piece (outgassing from smoke).
- When vehicles were deployed in the smoke zone, it must be checked whether they have been contaminated with acidic or basic smoke (pH value). Such layers can be removed by rinsing with water.
- Complete fire-fighting PPE (in line with gfpa regulation 08/05) and respiratory protection (observe FwDV7) must be worn when fighting fires.
- Compliance with Table 1 is required when working on cold fire sites.

**Table 1: Occupational Safety and Health Protection Measures by Danger Zone in accordance with VdS 2357 – PPE Matrix Fire Service**

Special Occupational Safety and Health Protection Measures by Danger Zone					
All information relates exclusively to <b>cold</b> fire sites. The regulations FwDV1, UVV Fire Service and FwDV7 apply to inspection and other work on sites that have <i>not</i> cooled down. When using repair chemicals and/or decontamination agents, the safety data sheets and manufacturers' instructions contained therein apply additionally to PPE. It is possible to increase the amount of PPE, depending on the situation.					
<b>1 Minimum protective equipment in line with FwDV1, No. 2.1</b> <sup>1)</sup> <b>2 Body Protection Form 2 in line with FwDV 500, min. Cat. III, Type 5 or 6</b> <b>3 Body Protection Form 2 in line with FwDV 500, min. Cat. III, Type 4</b> <b>4 Splash protection apron</b> <b>5 Respiratory protection, full mask, min. Class 3 particle filter (e.g. ABEK 2-P3)</b> <sup>2)3)</sup> <b>6 Chemical protection gloves in place of fire service protective gloves in line with FwDV 1, No 2.1</b> <b>7 Foot protection S5d (rubber boots) in place of fire service protective footwear in line with FwDV 1, No. 2.1</b> <b>8 Working clothing for work in the shelter (as listed under 1, above, if necessary)</b>		<b>Danger Zone 0</b>	<b>Danger Zone 1</b>	<b>Danger Zone 2</b>	<b>Danger Zone 3</b>
<b>On-site inspections</b>	Inspection of <u>cold</u> fire sites	1	1, (5)	1,5,6	Body protection in line with FwDV 500 by specific hazard.
	Inspection of cold fire sites, incl. standing extinguishing water		1, (5), 7	1, 5, 6, 7	
<b>Fire service measures after fire-fighting</b>	Activities without contact with extinguishing water or other liquids and without any particular risk of contamination (e.g. support work, creation of safe entrances or areas, safety repairs).	1	1, 5	2, 5, 6	
	Activities without contact with extinguishing water but with a risk of contamination through by-products of the fire (e.g. work with rubble, demolition/dismantling of objects severely contaminated with soot, return of equipment severely soiled with soot).		2, 5	2, 5, 6, 7	
	Activities with contact with extinguishing water (e.g. extinguishing water retention/ disposal, sealing measures, return of equipment from standing extinguishing water, removal of water contamination on construction sites).		3, 5, 7	3, 5, 6, 7	
<b>Cleaning work (operational equipment)</b>	Rough cleaning on-site (brushing, spraying, wiping off etc.) (Gross decontamination)	1	2, 5, (6)	2, 5, 6, 7	Decontamination measures in line with FwDV 500 and/or gfpa guideline 10/04
	Fine cleaning at the fire station (hand wiping method)	8	8, (5), 6	2, 5, 6	
	Fine cleaning at the fire station (immersion bath method or high pressure cleaning)	8, 4	8, 4, (5), 6, 7	3, 4, 5, 6, 7	
<b>( ) consider and use as necessary</b>					
<sup>1)</sup> In the event of excessive dust, it is recommended that additional protective clothing EG Cat. I be worn on top of working clothing when performing these tasks					
<sup>2)</sup> Ventilator-supported respiratory systems which do not rely on air circulation should be used when performing physically hard or moderately hard tasks					
<sup>3)</sup> A suitable gas filter in compliance with BGR 190 should be used in the presence of gases or vapours					

## 2.2 Operational hygiene at the fire ground

- The scene of the fire must always be secured and cordoned off during fire brigade operations. After the fire has been extinguished, burnt-out rooms must be ventilated for at least 1 to 2 hours to remove volatile compounds (e.g. aromatics).
- Once the extinguishing work has been completed, soot should be roughly removed from PPE and other tools and equipment on-site. The criterion for successful pre-cleaning is the removal of all visible traces of soot. PPE parts with traces of soot should be kept outside the crew compartment or transported separately (plastic bag). The pre-cleaned equipment should also be transported separately and only loaded back onto the fire engine after fine cleaning has taken place.
- Fire engine cabs must be kept shut during operations and aired briefly when operations have ended.
- Personnel may only eat, drink or smoke during operations after removing contaminated (dirty) clothing and thoroughly washing their hands and faces. Washing can be considered as adequate when there are no visible traces of soot afterwards. Food and drink may only be consumed outside the fire area, beyond the range of the soot and smoke.
- These principles also apply to subsequent on-site inspection and clean-up work and also for at least 1-2 hours after cross-ventilation of the site once the fire has been extinguished.
- When fighting fires, the prescribed personal protection equipment (PPE) including underclothing must be worn.
- The PPE should protect the skin completely from smoke gases and soot.

## 2.3 Operational hygiene at the fire station

- The deployed equipment and vehicles must be thoroughly cleaned after every operation. Personnel must also clean themselves and their clothing.
- Boots must be thoroughly cleaned. Dirt and soot must be washed off (including the soles) using a soap/water solution if necessary. Because pollutants dissolve in grease boots should only be greased once all traces of soot and dirt have been removed.
- Severely contaminated PPE (soot) should be exchanged after use. Cleaning with conventional cleaning agents is possible. Cleaning can be considered as adequate when there are no visible traces of soot after cleaning.
- Body areas contaminated with soot should be pre-cleaned locally with cold water and soap. This ensures that the pores stay closed so that the soot can be removed easily. Thorough body washing with hot water can only begin once all visible traces have been removed. Cleaning with organic solvents or substances containing grease should also be avoided as pollutants can dissolve in these products and penetrate into the skin. Fine cleaning can be regarded as successful if there are no visible traces of soot after washing with conventional body cleansing products. Only use skin care products after thorough body washing.

- Private and operational clothing must be kept separate at the fire station (black and white separation). It is not permitted to leave the fire station in working clothing that is contaminated with soot.

### 3. Transfer of responsibility for operations

The following chapter deals in detail with the various phases of a fire in order to clarify the fire service's responsibility in the various phases, which includes responsibility for the safety of persons inside the danger zone (area covered in smoke). From the moment on the Incident Commander hands over the fire ground to the owner/operator of the site or another authority, the fire service can consider it a "cold fire site". The Incident Commander decides when to make the fire ground accessible to other persons or whether certain areas should be cordoned off. After handing over the site the owner/ operator of the site or another authority has responsibility for the restricted area.

#### **The categorisation of the cold fire into the danger zones GB 0 to GB 3 in line with GDV guideline VdS 2357 is not the responsibility of the fire service.**

Evidence of the properties of hazardous substances, which includes the identification and determination of by-products of the fire, is only of significance to the fire service if the results have an effect on operational tactics during fire-fighting operations; this is laid out and explained in detail in gfpa Guideline 10/05 "Detection of Harmful Concentrations in Fire Service Operations".

Once the fire has been extinguished, the victims are usually helpless standing facing a scene of destruction.

All that remains from private homes are often only soot and burnt-out furnishings, carpets, wallpaper, appliances, electric cables and perhaps even rubble. Furthermore soot and soiled surfaces contain harmful substances.

In commercial and industrial enterprises scorched, sooty inventory, machinery and equipment, electrical cable, rubble and so on are left after the fire. In addition to harmful substances contained in soot or on soiled surfaces also raw materials and supplies may have been affected or released, thereby increasing the risk level.

After a fire, the victims are usually uncertain about the right thing to do.

Therefore the involved fire services, police and other authorities (e.g. public health offices, construction authorities, national industrial safety authorities), insurance companies and renovation companies are often faced with the following questions:

- What has to be done?
- Whom can I contact?
- Whom do I have to report the incident?
- What is the hazard posed by the residue of the fire and the pollution in my home / premises?
- Can I re-enter my home/premises without risk?
- Which clean-up tasks can I do by myself without risk?
- Who is responsible for clean-up, disposal etc?

To answer these questions, the instruction sheet "Handling of Cold Fire Sites" (VdS 2217 / vfdb 10/06) was prepared by the German Insurance Association (GDV) in cooperation with the German Fire Protection Association (gfpa) and jointly recommended for use. It contains a sample information sheet which can be completed by the emergency services and given to the victims after the fire has been extinguished and which insurance companies can also distribute to their customers.

VdS 2217 update 03/2014 is aimed at informing both householder, tenant and property managers as well as commercial and industrial companies.

Owners, tenants and property managers get advice, how to protect themselves and others from harmful fire derivatives or what action they need to take as victims or managers. Responsible persons from commercial and industrial enterprises should be supported, to take the right steps to protect themselves and their employees also their facilities from these threats.

The information sheet can be individually structured by naming local points of contact and important regional reference addresses. The basic text should not be altered with regard to its content, however. To facilitate implementation VdS 2217 is available as a download:

[www.vds-industrial.de](http://www.vds-industrial.de)

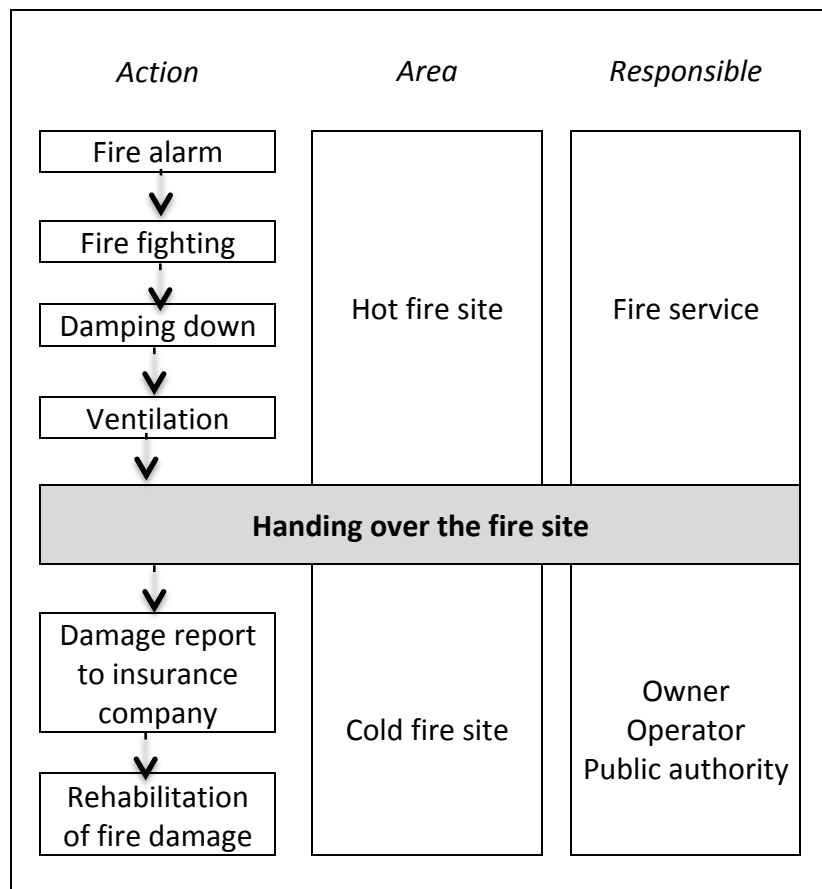


Figure 1: Procedural diagram for the separation of the “hot” and “cold” fire site



## 4. What to do after the fire has been extinguished

### 4.1 Occurrence and distribution of combustion products

#### Hot fire phase

The combustion products are released as smoker during the hot phase. Initially all these substances are mobile. The toxic and/or caustic gases and vapours that occur in high concentrations during this phase, such as carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), hydrogen chloride (HCl, hydrochloric acid when condensed), acrolein and hydrogen cyanide (HCN, prussic acid when condensed), constitute a potential hazard for the emergency services and fire-fighting crews.

#### Cold fire site

Once the fire has been put out and the burnt materials have cooled down to ambient temperature, especially hazardous organic substances – in particular soot particles – are adsorbed at surfaces. This strong adsorptive bonding severely reduces their mobility. The assessment of the mobility of combustion products is an essential parameter of the risk assessment when clearing up fire damage.

#### Note for emergency personnel:

Approx. 2 hours after the fire has been extinguished, damped down and cross-ventilated volatile toxins are still present in smoke. Therefore at least masks and filters must be worn in the danger zone during damping down.

#### Distribution of combustion products

The type and quantity of burnt material, the course of the fire and the extraction of the smoke are of utmost importance for the quantity of toxins formed and contamination of the cold fire site with pollutants; these are the criteria which govern the burn pattern. With fewer evidence can be found for a smouldering fire (lack of oxygen), the likelihood of occurrence of condensable combustion products decreases. Early destruction of the building and thereby opening of roofs and walls, a bright flame pattern during the blaze and a high fire load are indications of complete combustion at high temperatures and thereby less formation of pollutants.

The assumed formation of pollutants does only constitute an immediate direct risk without sufficient exposure and bioavailability of these pollutants. At fire grounds pollutants with low vapour pressure are generally strongly adsorbed at soot that the probability of absorption through the skin in case of contamination can be regarded as slight. In addition to the quantity, the mobility of the pollutants and thereby the possibility of their transfer to humans and the environment, is decisive for assessing the risk potential. It must nevertheless be taken into consideration that every cold fire site has to be initially regarded as a contaminated area, which means that a risk assessment has to be conducted before any activities are carried out.

### 4.2 Estimation of the danger of cold fire sites

According to the criteria outlined in VdS 2357, the areas affected by fire and its residual products at the cold fire site can be categorised into danger zones GB 0 to GB 3. A danger zone is a spatially separable area, which is contaminated with pollutants as a result of a fire.

The substances, which can pose a hazard at a cold fire site, depend on the fire residues and the extent and spatial distribution of contamination and are based on the following parameters:

- Expansion of the contaminated (“fire-polluted”) area

- Type and quantity of burnt materials involved, in particular hazardous substances (= influence of burnt material)
- Fire conditions
- Fire pollution to be encountered at the fire ground

Under consideration of the connections presented in the GDV guideline on the restoration of fire damage (VdS 2357), the following danger zones can be defined for personnel deployed at the damage site:

Considering correlations presented in the GDV guideline for fire damage restoration (VdS 2357) ), the following danger zones can be defined for personnel deployed at the fire ground:

### **Danger Zone 0 (GB 0)**

Fires with a spatially tightly restricted expansion (approx. 1 m<sup>2</sup>) of the contaminated area, e.g. waste paper basket, candle bouquet or stove  
or  
fires with a larger expansion area but minimal contamination.

### **Danger Zone 1 (GB 1)**

Fires with clearly visible contamination and larger expansion of the contaminated area than GB 0 in which standard household quantities of synthetic materials are burnt or with which no severe pollutant contamination is to be expected at the scene of the fire due to the fire conditions and pattern.

### **Danger Zone 2 (GB 2)**

Fires with a larger expansion of the contaminated area and very severe contamination involving larger quantities of materials containing synthetic substances, in particular organochlorides and brominated substances, such as PVC (e.g. high-density cable routes, stored materials), and with which there is severe contamination with pollutants at the scene of the fire due to the fire pattern and progression. Smouldering fires with which the shell of the building is largely left intact and which result in the fire contamination of walls, ceilings and floors are typical GB 2 fires.

### **Danger Zone 3 (GB 3)**

Fires where larger quantities of biological work materials and/or hazardous substances or materials containing hazardous substances are expected in addition to the normal by-products of a fire. These can exist in the form of raw, auxiliary or working materials either in the building or on the premises. The possibility of asbestos and man-made mineral fibres (MMMf) should therefore be given special consideration. In addition to this, critical biological working substances can either be released directly or develop through subsequent processes.

The measures outlined in Table 6 are recommended by the GDV on the basis of this classification in line with VdS 2357-05. Additional details can be taken from the charts in the appendix:

- Procedural diagram for the restoration of fire damage with responsibilities (Figure A1)
- Guideline for the estimation of hazards (Figure A2)

Note:

Other hazards, such as the impairment of the building structure through the influence of corrosive by-products of the fire are not taken into account in the classification into danger zones. The risks that they pose should be determined and assessed separately.

Table 2: Recommendations for the restoration of fire damage and disposal of rubble (from the GDV guidelines for the restoration of fire damage (VdS 2357-05))

Danger Zone	Involvement of Experts	Cleaning / Restoration	Disposal
0	Not required	Cleaning with no special measures	Household refuse
1	Normally not; recommended on case-by-case basis	Cleaning/ restoration with protective measures*	Disposal concept
2	Urgently recommended	Restoration with special protective measures*	Disposal concept
3	Mandatory	Restoration with special protective measures*	Disposal concept

\* Regulated in the guidelines for fire damage restoration (VdS 2357, 2007-04 (05))

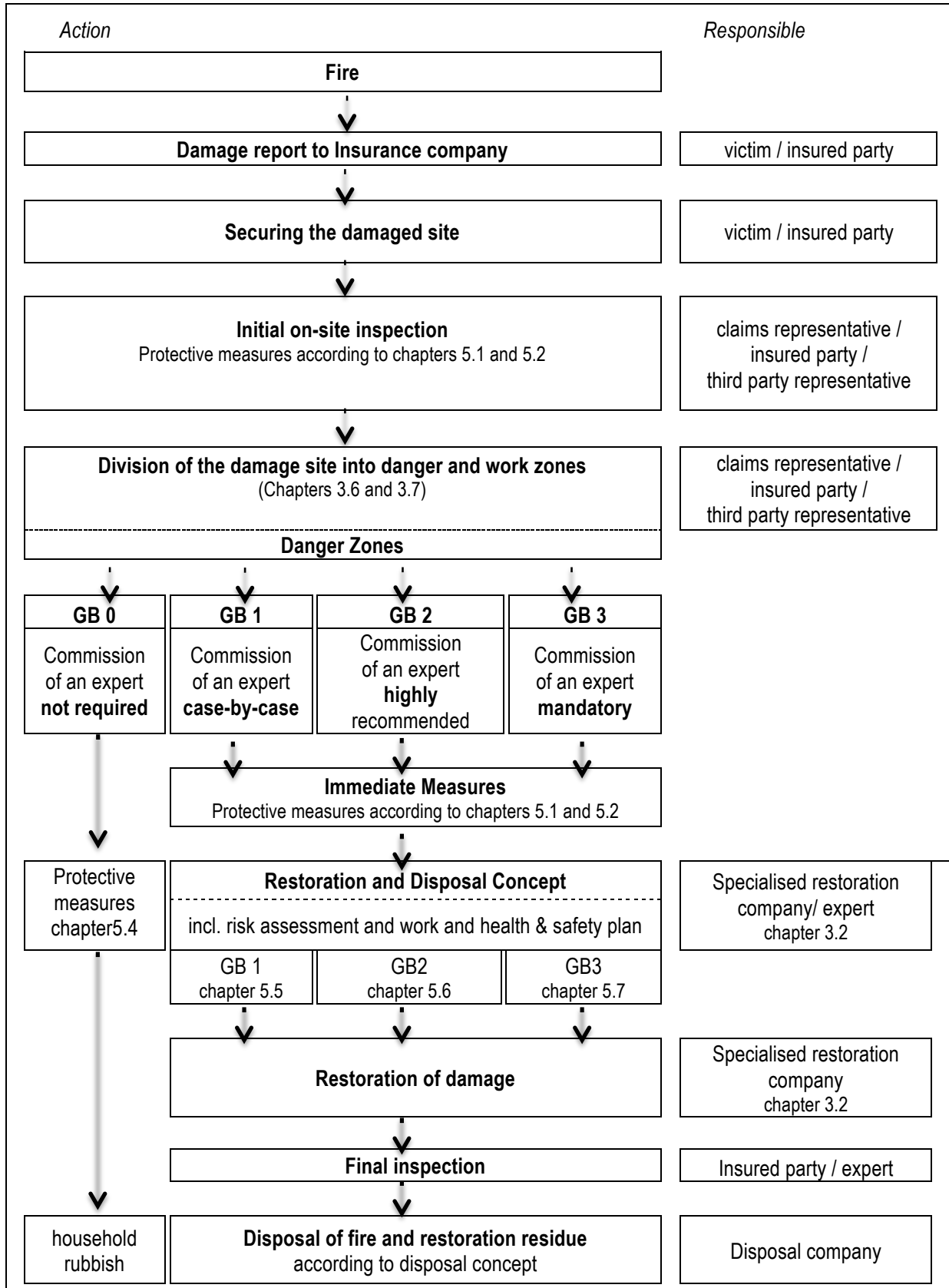
The involvement of a fire damage restoration expert is urgently recommended for Danger Zone 2 and required for Danger Zone 3. This expert then also decides whether analytical tests are required to assess the damage [proportions of chlorinated aromatic compounds (pre-dioxins), aromatics, halogen compounds, pesticides]. Tests can also be necessary in areas, which do not appear to be affected, within the scope of workplace approval after responsibility for the site has been passed to the office for industrial safety or the owner. This is not the responsibility of the fire service, however.

## 5. References

- Handbuch der gefährlichen Güter, G. Hommel, 1986, Springer Verlag, Berlin.
- Sicherheitstechnische Kennzahlen brennbarer Gase und Dämpfe, K. Nabert, G. Schön, 1963, Deutscher Eichverlag, Braunschweig.
- Giftliste, L. Roth, M. Daunderer, 1987, ecomed Verlagsgesellschaft, Landsberg.
- Chemiebrände, L. Roth, U. Weller, 1990, ecomed Verlagsgesellschaft, Landsberg.
- GESTIS-Stoffdatenbank - Gefahrstoffinformationssystem der gewerblichen Berufsgenossenschaften; Institut für Arbeitsschutz (BGIA) der Deutschen gesetzlichen Unfallversicherung; im Internet abrufbar unter: <http://www.dguv.de/bgia/de/gestis/stoffdb>.
- MEMPLEX Datenbank, keudel av Technik GmbH
- Richtlinien zur Brandschadensanierung (VdS 2357), 5. Auflage, 2007, Gesamtverband der Deutschen Versicherungswirtschaft e.V. (GDV), Berlin.
- Umgang mit kalten Brandstellen - Muster für ein Informationsblatt der Feuerwehren an brandgeschädigte Haushalte (VdS 2217), 1. Auflage, 1998, inhaltsgleich mit gfpa-Richtlinie 10/06), Gesamtverband der Deutschen Versicherungswirtschaft e.V. (GDV), Berlin.
- Leitlinien zum Umgang mit kontaminiertem Löschwasser (VdS 2557), in Vorbereitung, Gesamtverband der Deutschen Versicherungswirtschaft e.V. (GDV), Berlin.
- gfpa-Richtlinie 10/03 Schadstoffe bei Bränden (2009)

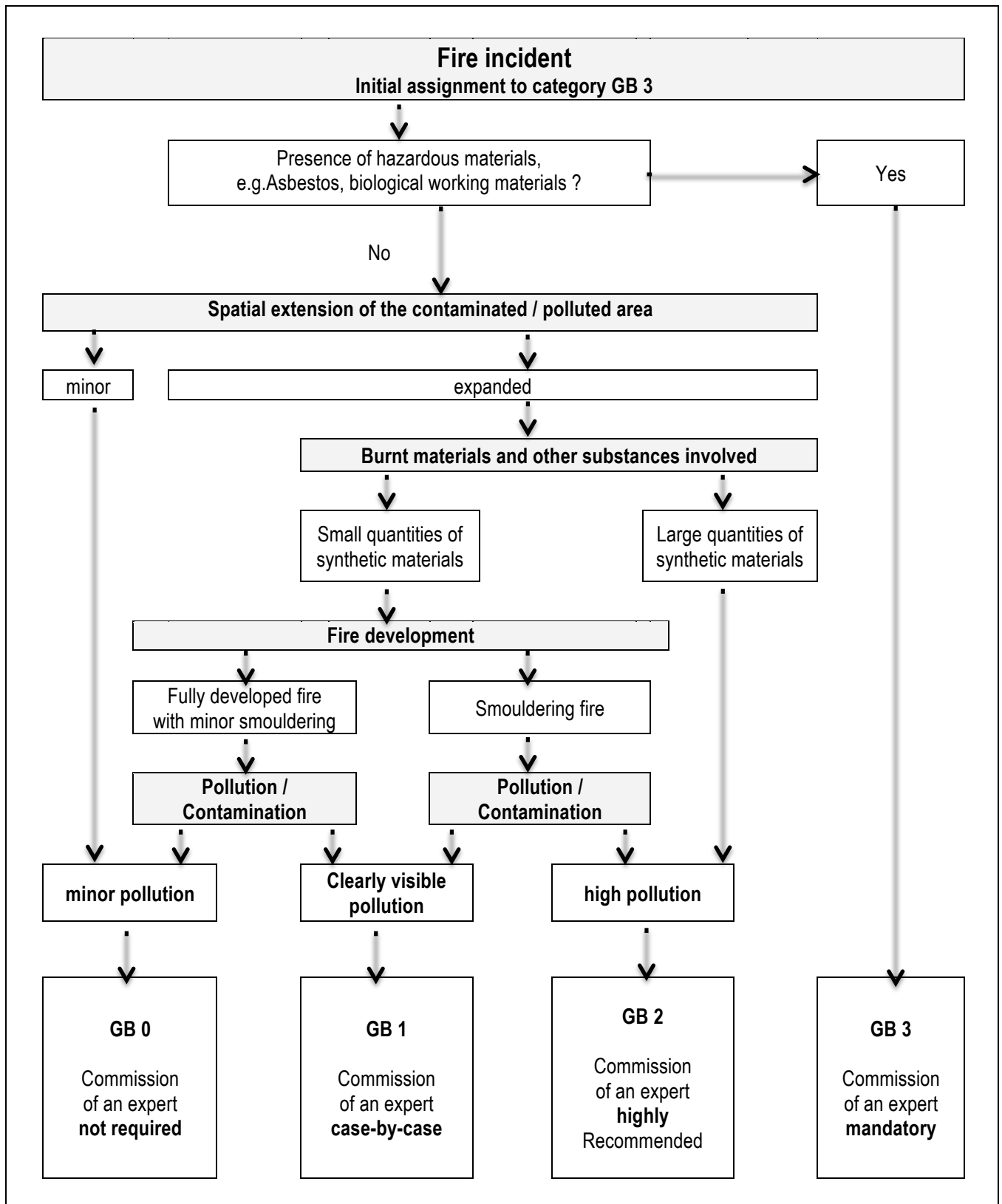
## 6. Appendix

Figure A1: Procedural diagram for the restoration of fire damage with responsibilities (in accordance with the GDV guidelines for the restoration of fire damage (VdS 2357-05))



**Figure A2:**

Guideline for risk assessment (in accordance with the GDV guidelines for the restoration of fire damage (VdS 2357-05))



## Explanations of the assessment criteria in accordance with VdS 2357 (see Figure A2)

### Spatial expansion of the contaminated area

- **Minor:**  
Spatially limited fire contamination, e.g. after a fire of waste paper basket, candle bouquet or stove.
- **Expanded:**  
Contaminated/polluted area includes commercial, production and storage warehouses or several rooms/floors of residential or office buildings.

### Burnt materials and other substances involved

Materials on fire containing synthetic substances release an increased amount of pollutants. Special attention should be paid to materials containing synthetic substances such as PVC, PU, PS or melamine and phenolic resin etc. which may be found in insulation materials, floor coverings, packagings, electrical and electronic devices, window frames, false ceilings and chipboard, for example.

- One will find **“Small quantities of materials containing synthetic substances”** if the substances mentioned above are only affected by a fire in the quantities that are customary in a normal household. The same applies to office and administration facilities with standard office fittings.
- One will find **“Large quantities of materials containing synthetic substances”** if production and storage areas, higher-density cable routes, computer centres, control rooms, large insulated roof areas and the like are affected by the fire.
- **“Other substances involved”** refers to hazardous substances and biological working materials which:
  - a) were already on the fire ground as raw, auxiliary, working or construction materials (including asbestos and synthetic mineral fibres) before the fire broke out or were released as a result of the fire
  - b) only occurred as an indirect result of the fire, e.g. release of bacteria or dangerous reaction products caused by the breakdown of technical installations.

### Fire development

- **Fully developed fire with minor smouldering:**
  - o Open fire with bright flame pattern and smoke extraction through openings in the building
  - o Unrestricted distribution of fire by-products
- **Smouldering fire:**  
Fire situations involving a lack of oxygen, such as
  - o Sealed-off rooms
  - o Minimal extraction to the open air
  - o Pressure build-up in interiors

### Pollution/contamination

- **Minor pollution:**
  - o Few soot particles to be found (not covering the entire area)
  - o Thin film of smoke condensate which can hardly be recognised on tarnished surfaces but which appears as a dark stain when wiped off with a white cloth.
- **Clearly visible pollution**
  - o Covering of soot particles over the entire surface
  - o Film of smoke condensate over the entire surface with clearly visible discoloration of the soiled surfaces
- **High pollution**
  - o Thick layers of soot particles over the entire surface
  - o Thick film of smoke condensate with intensive blackening of surfaces