Guidance for the Safe Use of IBCs

TABLE OF CONTENTS

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*

EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

1. Purpose

This guidance establishes the minimum requirements to ensure that the proper procedures for Intermediate Bulk Container (IBC) use and operations are followed, to prevent injury, loss of life, or catastrophic events such as fire, explosions or releases.

This guidance has been developed to comply with the various global laws and regulations and in accordance with ISO 45001 and/or ISO 14001, and OECD (Organization for Economic Co-Operation & Development) guidance that address IBC safety. Where local (region, country, municipality) laws and regulations are more stringent than those described below, then local laws and regulations will supersede present guidance.

2. Applicability

These guidelines may be applied to all IBC handling operations in ink or paint / coating manufacturing facilities. 'Flexible IBCs', also known as 'big bags', are not in the scope of this guidance.

3. Definitions

Conductivity of liquids

According to their conductivity, liquids can be divided into three categories:

- **conductive liquid**: liquid that has a conductivity > 10000 pS/m;
- **non-conductive liquid:** liquid that has a conductivity < 50 pS/m;
- **semi-conductive liquid**: liquid that has a conductivity from 50 to 10000 pS/m, limits included.

Continuous phase

Component in which the dispersed phase is distributed. For example, if a solid is dispersed (but not dissolved) in solvent, the continuous phase is the solvent.

Flashpoint

The lowest temperature at which a liquid gives off enough vapor to "flash" under standard test methods.

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

Homogeneous phase

Single phase of matter where e.g. everything is in solution.

Intermediate Bulk Containers (IBC)

Container with capacity between 227 and 3000 litres, constructed of metal, plastic or a composite of materials (see Appendix 1)

4. Requirements

4.1. General Requirements

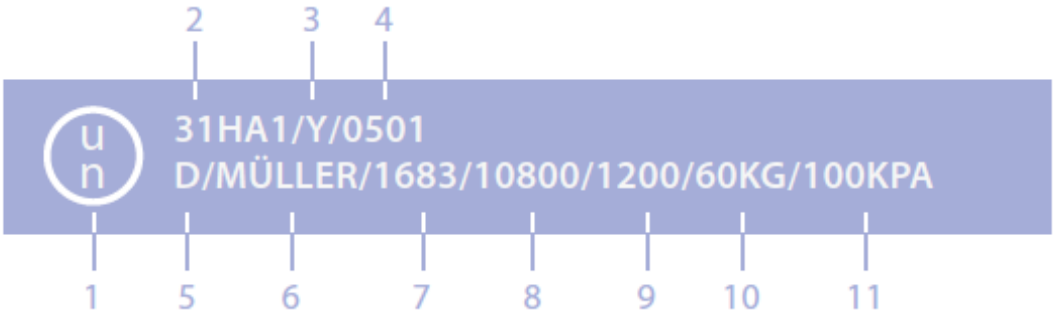
- All IBCs received, handled and shipped when containing dangerous goods must be UN approved and meet the requirements of international legislation for road transport (Transport of Dangerous Goods (TDG) under the Agreement of 30 September 1957 concerning the International Carriage of Dangerous Goods by Road **(**ADR)), by air and by sea.
- IBCs should be stored in areas where there is no drainage that could potentially adversely impact on surface waters and/or groundwater and/or soil, in the case of leakage or spillage (see Appendix 2).
- The IBC must be prevented from coming into contact with sharp objects that may damage the IBC material.
- IBCs should not be dragged or pushed at any time.
- When handling IBCs with forklifts, the IBC must be safely secured by keeping the forks tilted slightly backwards.
- When handling IBCs with forklifts, under no circumstances must forks be tilted forwards, for example to facilitate the discharging of the IBC.
- Under no circumstances should a person stand underneath a suspended IBC or place their arm beneath an unsupported IBC.
- When moving an IBC on a forklift, the load must be carried in a manner that does not obstruct the operator's view. Consider moving forklift with reverse gear, in order to have free view.
- Regardless of whether the chemical in the IBC is hazardous or non-hazardous, the secondary closure cap must always be covering the outlet valve during transportation and storage.

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

4.2. Labelling of IBCs

- Each composite IBC (intended for use according to the UN Model Regulations) should bear markings which are durable, legible and placed in a location so as to be readily visible. The markings should appear as shown in the following example:



where:

1= The United Nations packaging symbol.
2= The type of IBC: composite IBC for the transport of liquids with rigid plastics inner receptacle and a steel outer casing.
3= Packaging group for which the design type is approved, viz.
X: for packaging groups I, II and III (IBCs for solids only)
Y: for packaging groups II and III
Z: for packaging group III only.
4= Month and year (last two digits) of manufacture.
5= The country authorizing the allocation of the mark (according to the international distinguishing sign used for motor traffic vehicles).
6= The name of the manufacturer or other identification of the IBC as specified by the competent authority.
7= The stacking test load in kg. For IBCs not designed for stacking, the figure “0” shall be shown.
8= The maximum permissible gross mass in kg (composite IBC + content).
9= Capacity in litres at 20°C.
10= Tare mass in kg.
11= Test (gauge) pressure in kPa or bar, if applicable.

- All IBCs (including those used for temporary and intermediate containers) should be labelled **at all times** according to the GHS labelling for the material contained within, the hazards along with pictograms according to Regulation (EC) No 1272/2008 (the Classification Labelling and Packaging (CLP) Regulation) and/or the European Agreement concerning the International Carriage of Dangerous Goods by Road Regulations (ADR) and the related precautionary statements (see the CLP-compliant product Safety Data Sheet (SDS) for details). Labels with this information must also be applied when the IBC is empty but has just contained hazardous material and has not been cleaned/purged yet.

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

4.3. Storage and stacking of IBCs

- Storage requirements stated in the SDS should be reviewed prior to deciding how and where IBCs are to be stored.
- Storage must be decided considering compatibility/incompatibility with materials stored nearby.
- Storage must be in compliance with local / national legislation according to the type of IBC. Containment is necessary for all IBCs containing flammable liquids when these are stored outdoors to prevent fire from spreading in case of ignition.
- Stacking of filled IBCs is permitted if the stability of the stack is guaranteed, after proper risk assessment has been carried out, considering homologation and manufacturer's indications and only after ensuring that the ground on which the IBCs are stacked is completely flat. Exceeding two levels is a practice which isn't recommended, even if possible according to previous considerations.
- Stacking of filled or empty IBCs during storage (indoor or outdoor) is permitted only if IBCs are of the same type and only if correct nesting can be assured. In addition, stacking must be in compliance with the stacking test load stated in the UN marking on the identification plate (see above on labelling detail).
- Stacking of empty IBCs during storage (indoor or outdoor) is possible up to a height of 3 IBCs (see previous point).
- Stacking of filled or empty IBCs is not permitted when stored in racks.
- When IBCs contain materials with flash point ≤ 60 °C, the following additional storage requirements should be met:
- Where possible, IBCs should be stored in areas that avoid exposure to direct sunlight, contact with water or extreme climatic conditions. If exposure to direct sunlight is unavoidable, the IBC should have vents or similar devices (like safety (or relief) valves, rupture disks or equivalent equipment) in order to be able to relieve the pressure of the vapours generated inside it.
- Steel drums containing flammable liquids should be kept well away from composite/plastic IBCs whenever possible.
- In the case of indoor storage, natural or mechanical ventilation must be present to dissipate explosive atmospheres which may be generated in the case of leaks or spills (see Appendix 2).
- The factory's fire protection systems must meet the local regulations for storage density and sprinkler requirements. If the contained liquid is an organic solvent, or a mixture of solvents (e.g. washing solution), remember that according to its density it may be lighter than water and therefore a foam firefighting system may be more appropriate than a water one.

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

4.4. Lifting and transporting IBCs

- When using forklifts to lift filled IBCs, check the capacity plate of the forklift or the pallet stacker to make sure that they have the necessary lifting capacity for the task.
- When lifting full or empty IBCs, always use forks which reach fully underneath the pallet.
- Unless the IBC is being lifted to be stored or placed (for example placing the IBC on racking or on a mezzanine), whenever IBCs are lifted with forklifts above 0.5 m height they must be secured to the mast at all times, and with the mast tilted slightly backwards.
- With reference to the previous point, there may be operations whereby the material contained in the IBC needs to be transferred to another receiving container whilst keeping it lifted with the forklift. The first option in this case is to identify alternative ways of working that avoid the lifting of the IBC (e.g. by using pumps). If lifting the IBC is unavoidable, then the IBC can be tilted forwards only **if it is properly secured to the mast** with chains or similar.
- Never use ropes attached to the traverses or to the cage to move the IBC.
- **Under no circumstances should an IBC be lifted manually, even if it is empty or almost empty** to avoid ergonomic issues.
- Suitable tools may be used to facilitate the complete emptying, see example in the picture below:

4.5. Filling of IBCs

- Prior to filling, there must be a formal inspection to ensure that the IBC is fit for purpose and ready for safe filling (e.g. visual check that it is empty and clean).
- Prior to filling, the appropriate IBC type should be selected according to the following aspects:
    - Compatibility – the material that the IBC is made from must be compatible with the product which it is going to be filled with. In this sense you may refer to the publicly

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

available **GUIDANCE NOTE No. 51, SELECTION OF IBCS FOR HANDLING HYDROCARBON AND OXYGENATED SOLVENTS,** published by SIA**,** dated 05/16, Appendix 1, where you will find a table with most commonly used solvents and appropriate IBC material.

- If the IBC is to be used or stored in EX areas – the correct type of IBC must be used as indicated in Table 1 below, depending on the Minimum Ignition Energy, the flash point and the conductivity of the filling material.
- Regardless of the flashpoint of the filling product, metal IBCs or electrostatic protected composite IBCs must be used in explosive zones in order to prevent static discharge (see Table 1 and Appendix 1). However, classification and recommendations on the label on the IBC must be followed. In case of doubt, the manufacturer should be consulted.

- It is recommended that plastic IBCs are not used to supply non-conductive flammable liquids, and alternative more suitable containers should be used, where possible
- Ethyl acetate has been associated with a number of electrostatic ignition incidents and even though it has a high conductivity, it should be treated as a low conductivity material. It would be prudent to treat other light esters similarly.

Table 1
(Information from the Solvents Industry Association (SIA) Guidance Note 51)

IBC will be used or stored in area classified as explosive zone 1 or zone 2 or zone 21 or zone 22	CONDUCTIVITY OF THE CONTAINED MATERIAL	MINIMUM IGNITION ENERGY MIE OF THE CONTAINED MATERIAL	FLASH POINT OF THE CONTAINED MATERIAL	Static unprotected composite IBC.	Electrostatic protected composite IBC.	Metal IBC
YES	Conductive or non-conductive	< 0,2 mJ	≤ 0 °C	NO	NO	YES
			> 0 °C and ≤ 60 °C	NO	NO	YES
			> 60 °C	NO	NO	YES
		> 0,2 mJ or explosion group IIA or IIB	≤ 0 °C	NO	YES	YES
			> 0 °C and ≤ 60 °C	NO	YES	YES
			> 60 °C	NO	YES	YES
NO	Conductive	< 0,2 mJ	≤ 0 °C	NO	NO	YES
			> 0 °C and ≤ 60 °C	NO	NO	YES
			> 60 °C	NO	NO	YES
			≤ 0 °C	NO	YES	YES

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

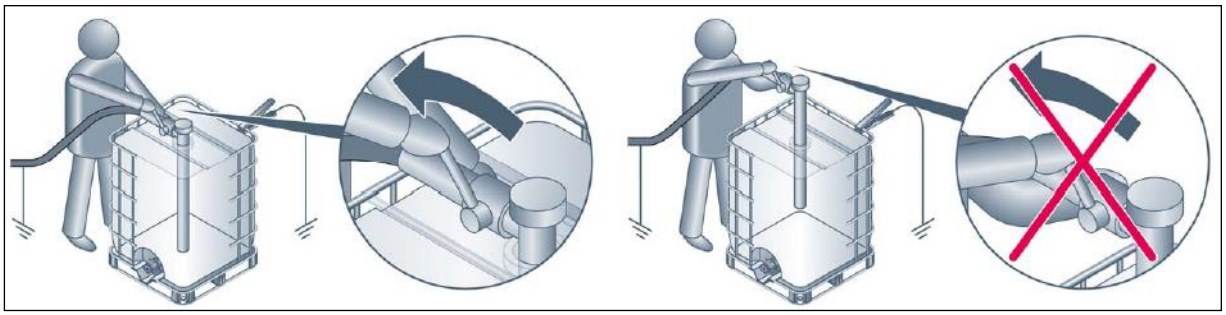
		> 0,2 mJ or explosion group IIA or IIB	> 0 °C and ≤ 60 °C	**NO**	**YES**	**YES**
			> 60 °C	**YES**	**YES**	**YES**
	Non-conductive	< 0,2 mJ	≤ 0 °C	**NO**	**NO**	**YES**
			> 0 °C and ≤ 60 °C	**NO**	**NO**	**YES**
			> 60 °C	**NO**	**NO**	**YES**
		> 0,2 mJ or explosion group IIA or IIB	≤ 0 °C	**NO**	**YES**	**YES**
			> 0 °C and ≤ 60 °C	**NO**	**YES**	**YES**
			> 60 °C	**NO**	**YES**	**YES**

- The outlet valve must be closed during the filling procedure (to be checked prior to filling operations). As best practice, an overview of an operator at beginning of filling activities is recommended, in order to verify tightness of outlet valve (this in order to avoid leaks and similar).
- A system should be in place to avoid overfilling of the IBC (e.g. level switches, level sensors with alarms, weight control interlocked with filling or with alarms). If this is not possible then filling must be **continuously** attended by operator(s).
- Depending on the risk assessment, one or more of the following PPEs may be required to be used by the operators during the filling:
    - Eyes and face protection. If a splash cannot be excluded, face shield is mandatory, as supplement to safety goggles/tight safety glasses.
    - Gloves (check SDS of the material for the correct glove type).
    - Protective working clothes
    - Respiratory protection (when local exhaust ventilation is available close to the opening of the IBC, or in the case of non-hazardous products, respiratory protection may not be necessary).
- When the IBC is to be filled with a liquid having flash point ≤ 60 °C, the following additional requirements must be adopted:
    - Select a suitable IBC according to Table 1.

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

- The IBC and all equipment relating to the filling process, such as fill nozzles and hoses, must be bonded and earthed **prior to filling** to prevent static charge build up, and must be designed for flammable service. The resistance to ground of all parts of the filling line, particularly nozzles (which can act as capacitors) must not exceed 10 Ohms. Wherever practical proper earthing & bonding should be ensured by an electronically monitored (LED alarm or interlock) earthing clamp which interlocks the filling process (via pump, valve etc.). For composite IBCs this should be seen as the standard and made mandatory.

- Splash filling should be avoided by bottom filling at a speed less than 1 m/s or by using a metal conductive fill nozzle or dip pipe which must reach to the base of the IBC. In any case, splash filling should not exceed a velocity inside the pipe of 1 m/s, or even less if necessary.
- Only conductive or dissipative hoses and filling pipes must be used. These should be inspected and in good condition before use.
- The filling process must be conducted on a clean dissipative floor.
- In case of the use of a dip pipe, attention must be paid to the following aspects:
  - the maximum filling velocity must initially be limited to 1 m/s and then velocity can be increased to 2 m/s.
  - the filling valve is not opened until the dip pipe has been inserted right down to the IBC bottom (this prevents a discharge between the liquid and the dip pipe).



European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

- The presence of a local exhaust ventilation system is preferable, to remove vapours generated during filling operation, thus reducing risks of ignition and exposure to operators. If this is not available, then the operator should ensure that the area is sufficiently ventilated.
- The earth connection of the IBC must remain in place after filling for the times reported in Table 2, and based on the relaxation times:

Table 2

Conductivity	
Non-conductive	5 minutes
Semi-conductive	1 minute
Conductive	30 seconds

- At no time must an IBC be moved after filling until the opening cap is firmly and tightly replaced.
- In addition to the requirements listed above, when filling IBCs with flash point ≤ 60 °C, PPEs worn by operators attending the filling process must fulfil these furthers requirements:
  - safety shoes must be dissipative and tested if a testing device is available.
  - gloves must be dissipative.

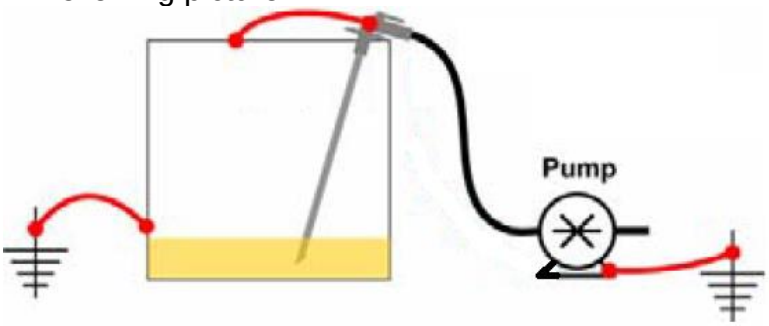
4.6. Emptying of IBCs

- Emptying the IBC should preferably be done through the outlet valve on the lower side, and must never be carried out under pressure.
- Prior to starting the emptying process, ensure that the IBC is sufficiently well- ventilated in order to avoid a low pressure inside the inner bottle.
- In case the outlet valve is connected to a fixed pipe installation, the attachment of the fixed pipe must be made in such a way that any movements and vibrations (liable to cause mechanical damage) will not affect the safety of the IBC. It must also be ensured that a vacuum is not created during the discharge of the product.
- If the IBC is emptied through the upper opening on the IBC by the use of mixers, pumps or other devices, these shall not be attached directly to the cage. Equipment must be arranged in such a way that any pump device will not transmit vibrations to the container.
- If an IBC is emptied by gravity (by lifting it with a forklift), the IBC must be secured to the mast of the forklift by chains or similar to prevent accidents (see above).
- Operators must be in continuous attendance whilst an IBC is emptied.
- Depending on the risk assessment, one or more of the following PPEs may be adopted by the operators during the filling:
  - Safety googles or safety glasses, in combination with a face shield when the possibility of splashing cannot be ruled out

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

- Gloves
- Protective working clothes
- Respiratory protection (when local exhaust ventilation is available close to the opening of the IBC, or in the case of non-hazardous products, respiratory protection may not be necessary).

- When the IBC that must be emptied contains a liquid having flash point ≤ 60 °C, the following additional requirements must be adopted:
  - The presence of a local exhaust ventilation system is strongly recommended and should be present, to remove vapours generated during filling operation, thus reducing risks of ignition and exposure to operators. This should match the exposure scenario / extended safety datasheet recommendations for the product in question.
  - If LEV is not available, then the operator should ensure that the area is sufficiently ventilated. If he/she isn't able to assess it, he/she must ask his/her supervisor.
  - Reduce the static fall of material when decanting by limiting the decanting height.
  - Ensure that the earthing and bonding practices are in place before starting the emptying process. All installations and objects in the emptying process must be earthed and bonded:
    - structure (racking, platform, forklift) on which the IBC stands, must be earthed
    - the IBC must be bonded to the structure
    - the IBC must be bonded to the container that fill material is being decanted to
    - If the IBC is being emptied through the upper opening by the use of a pipe, all equipment must be bonded and grounded as shown in the following picture:



    - if the IBC is being emptied through hoses, only conductive or dissipative hoses must be used

- In addition to the requirements listed in 4.4.5, when emptying IBCs with liquids with a flash point ≤ 60 °C, operators attending the filling process must also fulfil these further PPE requirements:
  - safety shoes must be dissipative
  - gloves must be dissipative.

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

4.7. Stirring and recirculating in IBCs

- Using IBCs as mixing vessels should be avoided whenever possible, as advised by the Solvent Industries Association (SIA).
- Prior to stir/mix the content of an IBC it must be checked if this practice is allowed by the IBC manufacturer (plastic IBCs only), checking also its homologation characteristics.
- When it is necessary to homogenise the product inside the IBC, precautions must be taken to avoid contact with the rotating parts of the mixer and to avoid accidental contact of the impeller with the internal surface of the IBC.
- When it is necessary to homogenise (through stirring or recirculation) a product which has a flash point ≤ 60 °C, this can be done inside an IBC only if the following requirements are satisfied:
    - Use only explosion-proof mixers & pumps (Ex-rated or ATEX[1]-rated)
    - Composite IBCs are suitable for use in ATEX zones and are provided with a grounding system for the contained material (grounding cable close to the valve connecting internal material with metallic frame)
    - Both the mixer, or recirculating pump, and the IBC are grounded
    - Stirring is started only when the impeller is fully immersed in the liquid
    - When performing recirculation, the return pipe/hose must be directed toward the wall of the IBC. Splash filling must be avoided at all times.
    - Sufficient relaxation time is left between the filling of the material inside the IBC and mixing or recirculation (5 minutes may be enough, Table 2)
    - Introduce local exhaust ventilation close to the upper fill opening
    - If the materials to be mixed are all miscible, resulting in a mixture with homogeneous phase, the conductivity of the continuous phase must be above 50 pS/m
    - If one or more of the materials are immiscible with the other(s), thus resulting in a mixture containing two or more phases (immiscible liquids or undissolved solids in liquid(s)), then the conductivity of each liquid in the continuous phase (see 3.2) must be above 1000 pS/m. Also, the power input to the stirrer or the speed of recirculation must be restricted (Note: waxes and suspended or dispersed solids, like pigments, reduce conductivity, whilst metals increase conductivity).

4.8. IBC cleaning processes

Cleaning of IBCs where flammable atmosphere is possible from the former content or the cleaning liquid must be done with utmost care on excluding electrostatic spark ignition sources that may arise from spray/splash of liquid or use of non-dissipative

[1] *ATEX directives are two EU directives describing the minimum safety requirements for workplaces and equipment used in explosive atmospheres. The name is an initialization of the French term Appareils destinés à être utilisés en Atmosphère Explosive*

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

brushes. Composite IBCs must not be cleaned at all under such conditions.
It is strongly advised to carry out a fire and explosion risk assessment for IBC cleaning with involvement of suitable expertise for ATEX type affairs.
Please refer to Appendix 3 for further details.

4.9. Inspection of IBCs

- IBCs must be inspected before use and re-tested on a regular basis, as a minimum in accordance with ADR regulations.
- This should include a visual inspection to ensure integrity and absence of contaminants.
- The inspection before use should include confirmation that the IBC is free from corrosion, contamination or other damage to any part of the IBC. Furthermore, the proper function of any service equipment should be inspected and ensured, such as valves and, where present, integrity of the grounding cable in electrostatic-protected composite IBCs.
- In the event of damage to the outer cage, the IBC shall not be stacked on top or under another IBC.
- Any IBC which shows signs of reduced strength, defects, damages etc. shall be put out of service, clearly marked to avoid its filling and returned to manufacturer/supplier if possible, otherwise it must be disposed of. No repairs must be performed on IBCs unless after consultation and authorisation of the manufacturer.

4.10. Reuse of IBCs.

- Reuse of IBCs must be done according to the requirements and technical information provided by the manufacturer.
- It is recommended that the IBCs are properly cleaned and residues eliminated before reuse.
- Before the reuse of IBCs, it must be ensured that inside there are no residues from previously contained materials or from washing chemical that can cause contamination inside the IBC itself. Compatibility of previous contained material/washing media has to be assessed as well.
- If the IBC is going to be reused, cross-contamination issues due to previously contained material and/or washing chemical must be also taken into the account.

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

5. References

SIA – Guidance Note 51: Selection of IBCs (May 2016).
SIA – Guidance Note 47: Flammable solvents the Hazard of Static Electricity (Nov 2018).
CLC/TR 50404:2003 Electrostatics - Code of practice for the avoidance of hazards due to static electricity.

EuPIA OSRA Working Group, May 2024

Note March 2025: renamed to guidance

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

APPENDIX 1 - Types and classification of IBCs

- From a design and materials of construction, IBCs can be classified into three main types:

All metal; e.g. Stainless Steel / Mild Steel / Aluminium.	
All plastic.	
Composite (has a rigid outer structure encasing a plastic inner receptacle / bottle, usually made of high density polyethylene. The outer and inner assemblies are used as an integrated single unit).	 

- From a protection against static discharges perspective, the 3 above mentioned types of IBCs can be classified as shown in Table 3:

Type of IBC	protection	suitable for use in ex zone 1 and 2	necessity to be earthed during the filling or emptying
Metal IBC	Conductive.	YES	YES
All plastic	Unprotected	NO	NO
Composite IBC.	Unprotected	NO	NO
	Electrostatic protected	YES	YES

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

(Information from the Solvents Industry Association (SIA) Guidance Note 51)

Below is an example of label that can be found on an electrostatic-protected composite IBC:

- From a fire resistance perspective, composite IBCs can be classified as Listed or Non-Listed:

  - **Listed composite IBCs**: composite IBCs that pass a standardized fire test, such as *Underwriters Laboratories (UL) 2368, Fire Exposure Testing of Intermediate Bulk Containers for Flammable and Combustible Liquids* or *FM Approvals Standard 6020, Approval Standard for Intermediate Bulk Containers.*

  - **Non-listed composite IBCs:** composite IBCs that don't pass the test mentioned in the previous bullet.

  Composite IBCs that are authorized for transportation by UN and DOT standards, **are not** automatically approved as listed containers from a fire code perspective

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

APPENDIX 2 - Spill hazards with IBCs

IBCs pose a far greater spill hazard than smaller containers; a leak in an IBC could quickly result in a pool fire involving hundreds of liters of flammable/combustible liquids; this condition is often “unprotectable” with automatic fire protection systems.

Fire testing recently conducted in the UK demonstrates that composite IBCs rapidly fail and release liquid (particularly around the valve area) when exposed to fire. This rapid release of liquid results in a fast-spreading pool of burning liquid, which can overwhelm sprinkler protection. The presence of containment equipment and measures are strongly recommended in the vicinity of IBCs, especially those containing flammable liquids.

Recommended Steps for Mitigation

Consideration should be given to the following:

- request supplying vendor to provide metal IBC
- store composite plastic IBC outside of buildings with adequate containment and away from buildings to limit exposure.
- Leakage prevention equipment kit should be available and readily accessible in the storage area.
- Surface water inlet protection (in case of the local presence of a sewer system)

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

APPENDIX 3 - IBC Washing & Recycling

1. Introduction

When a printing ink supplier grows in term of presence within a customer's facility, supply form of printing inks may vary from pails or drums to metal or plastic Intermediate Bulk Containers (IBC), sometime also designated as Totes. In this process it is logical to consider, for many reasons, the possibility to reuse/recycle IBCs, so prolonging their lifespan.
Reasons for that are:

- Economical
- Logistical
- Environmental

Let's have a look more in detail on the topic:

- Economically it is by far less expensive to wash and reuse an IBC, in comparison with purchasing a new one. Of course, many decisions need to be taken (wash it internally or give all the activities to a contractor), but in principle there is a very positive cashback for washing and recycling IBCs, which allows also to afford an investment for a cleaning IBC equipment, if IBCs number is sufficiently high.
- Logistically the washing activities allow to have trucks every time fully loaded, with packaged printing inks delivery or empty IBCs coming back.
- Environmentally this activity reduces the last for the environment, avoiding waste generation and consume of fresh raw materials.

2. Scope

Present document is aimed to describe how to carry in a safe way IBC cleaning operations and illustrate how to cope with safety and environment aspects of this activity.

3.Description

- At their entrance within printing ink manufacturer's premise, returning IBCs must be submitted to a visual integrity check in order to ascertain if damages happened during IBC permanence at customer's facility or during the transport. This also because IBCs are homologated containers according to main transport legislation, and, if damaged, they must be repaired and re-tested.

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

- After this stage, and prior to cleaning activities, following parameters need to be assessed:

    - That the bottom valve is closed
    - That bottom valve is correctly operating.
    - That safety (relief) valve is present and able to operate.
    - That manhole is free and its cover is working correctly.
    - That there are no mechanical damages/deformations posing a risk for stability or tightness of the IBC

- After those steps, the IBC must be checked in order to assess which was its previous content and if there is still part of initial content or other chemicals. If there are any product residues, these must be suctioned out of the container and carefully disposed, following environmental guidance where appropriate. A risk assessment should be done what level of cross-contamination may occur and if this would be acceptable for the intended use.

- Having positively passed first inspections, the IBC can go at cleaning area storage.

- There are many types of equipment used for cleaning IBCs, including:

    - High pressure water jet
    - Solvent washing
    - Other

Using omnidirectional spray head ensures complete coverage of the internal surfaces of the IBC. Depending on the level and type of the contamination, different cleaning mediums may be used to clean an IBC, including caustic, detergents, and, if the equipment is compliant with the ATEX directive, solvents.
Main risks bound to IBCs washing (not exhaustive list) are:

- Chemical spills
- Hazardous chemicals exposure
- Overpressure
- Explosion
- Fire
- Heavy load falling
- Also, an unintended chemical reaction will occur if two incompatible chemicals accidentally mixed in the reusable IBC.

For a number of important reasons, a robust risk assessment process for the individual application must be conducted prior to introducing IBC cleaning into the factory:
Irrespective of the IBC type, prior to submit them to the washing treatment, it is necessary, by visual inspection, wearing prescribed PPE, to verify if some liquid ink is still inside, in particular for solvent-based inks. This because organic vapours over liquid phase may easily take fire, in presence of an ignition point. It must be kept in mind that even water, if finely

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

dispersed and highly pressurized, may cause electrostatic discharges, thus igniting the organic vapours and triggering a fire/an explosion.
As typically cleaning facilities aren't inerted and air enters in IBC to be treated, this hazard must not be underestimated.
Other dangers present in such equipment are high pressure liquids (water pressure can be up to 200 bars) and moving (rotating) parts.
If the choice has been for a water jet, consider that solvent-based inks have limited solubility in water, and thus cleaning water must be treated with chemicals in order to get necessary washing capability. The number of washing cycles for cleaning water must be assessed, and waste-water must be treated according to local legal prescriptions.
Automatic or partially automatic cleaning devices are present on the market however the visual checks are a vital requirement and must be kept in place under all circumstances.

- After the cleaning, a final visual inspection in order to assess that cleaning operations went well is also required, as well as a verification of functionality of bottom valve.

- Residues or residual moisture (in case of water jets) can have an impact on the new product you are filling the container with. Consider a drying step if aluminium-pigment-based inks are manufactured at the site. A check about the fact that IBC is still leak proof (e.g. using compressed air) is recommended. A pressure tester that can either be integrated within a full reconditioning system or used as a standalone machine

- Particular attention must be paid to conductive plastic IBCs, because of their external metal cage, that, if damaged or not working in a proper way, may cause additional risks, if they are used again for transporting solvent-based inks.

- In case the company uses both Plastic IBC UN certified (3A1H) and plastic uncertified IBCs it's important if the IBC is disassembled for cleaning when recomposed, to pay attention not to miss-match the crate that is not tested with the metal cage that is homologated and vice-versa. The composite IBC it's to be considered one package and must be preserved for its characteristics.

- An additional point to be considered is the number of washing cycles to which the IBC can withstand. A reusable IBC has a limited life span. Determine its life span clearly. Never wait until it is broken or leaking.

- In many cases it is useful to record the reusable IBC traffic and so maintain the control over them in terms of lifespan (e.g. UN-tested Plastic IBC expired 5 years after being manufactured) and content. If the company is big enough, a person can follow the topic, but in all cases have an IBC register is a good practice.

- For a better management it is wise to separate the storage location for each reusable IBC type: dirty IBCs, IBCs after washing, damaged IBCs, and new IBCs, in order to prevent mixed usage.

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*

- Limit the stacking level and check its implementation. Look at the intermediate bulk container specifications. Make sure that maximum stacking level is respected. This is relevant especially with filled IBCs. Overload will cause the shortening of IBC life span. Stick to manufacturers/good industrial practices recommendation.

European Printing Ink Association *Boulevard du Triomphe 172 · 1160 Brussels, BELGIUM*
EuPIA - a sector of CEPE aisbl *T +32 2 897 20 20 · eupia@cepe.org · www.eupia.org*