DOKUMENTATIONEN
10/2015

Checklists for surveying and assessing industrial plant handling materials and substances, which are hazardous to water

№ 2

Overfill safety systems

For our Environment

Umwelt Bundesamt

DOKUMENTATIONEN 10/2015

Advisory Assistance Programme (AAP) of the
Federal Ministry for the
Environment, Nature Conservation,
Building and Nuclear Safety

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Overfill safety systems

by

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On behalf of the Federal Environment Agency (Germany)

Imprint

Publisher:
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Updated:
09/2014

Edited by:
III 2.3 Plant Safety
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Publication as pdf:
http://www.umweltbundesamt.de/publikationen/checklists-for-surveying-assessing-industrial-plant-1

ISSN 2199-6571

Dessau-Roßlau, June 2015

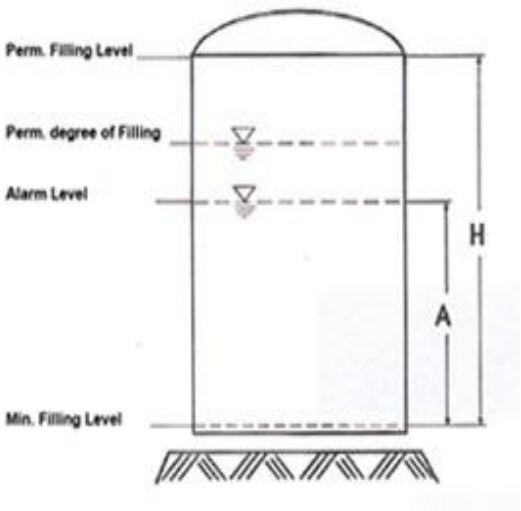
This publication is financed by the German Federal Environment Ministry's Advisory Assistance Programme (AAP) for environmental protection in the countries of Central and Eastern Europe, the Caucasus and Central Asia and other countries neighbouring the European Union.

Recommendations of the International River Basin commission for overfill safety systems

1. Containers may not be filled with substances hazardous to water unless an overfill safety system is used.
2. Exceptions to the overfill safety systems requirement may only be made if it is ensured (in particular) that overfilling of the container is prevented by other means (e.g. manual filling with self-closing dispensing pistol).
3. Before the highest permissible filling level is reached, the overfill safety system must either interrupt the filling operation automatically or release an acoustic alarm. The highest permissible filling level must be determined taking into account the additional amount that will be delivered after interrupting the supply, and after activation of the safety system before interruption of the supply.
4. Efficiency of the system must be guaranteed at all times.

Checklist for monitoring the implementation of the recommendations

0 Introduction



The filling level is the height of a liquid substance above a reference height. The maximum permissible filling level is the level which prevents the tank/container from being overfilled. There is still no design up today which fulfil all application- and safety-relevant requirements.
For this reason different physical methods of measuring were developed, which has to be considered when choosing a suitable overfill safety system. The instruments should be able to withstand the environmental conditions at the place where they are installed. The following measuring methods are available for overfill safety systems:

- Floating Method,
- Displacing method,
- Ground pressure method,
- Weighing method,
- Capacitive measuring method,
- Heat dissipation method,
- Radiometric measuring method,
- Optical measuring method,
- Resistance measuring method, among other methods.

1 Filling of vessels

1.1 Do the vessels being filled have overfill safety devices?

Tank	Substance	m³	WRC	Overfill safety device					
				Yes			No		
					Permission is available	Applicable		Non applicable	Remark

Further № 3 **Further № 2, Then towards outlet**

❒ Action ❒ No action

Remarks:

Examples of actions:
Short-term measures:
- Trainings and instructing the staff to check the level indicating devices regularly and on how to take the right decision if there is a danger of overfilling;
- Perform filling operations with at least two staff present;
- Ensure direct observation of the level in the vessel when filling.

Long-term measures:
- Install an approved overfilling protection device.

Determination of the real risk
Is the sub-point of the recommendation implemented? (In connection with point 2)

Yes	Partially	No
❒	❒	❒
RC=1	RC=15	RC=30

2 Exceptions

❒ significant ❒ insignificant

2.1 The filling of a vessel may only take place without an overfilling prevention device (OS) in exceptional cases. Do you have an exceptional case?

***Reference*:** The exception can only be relevant, if a vessel is being filled with the automatically closed spillway device, or if the overfill is technologically impossible.

Tank	Substance	m³	WRC	OS	Exception		Remark, Description
				No	Yes	no	

2.2 In this exceptional case, is overfilling of the vessel or vessels reliably prevented using other means?

❒ Yes ❒ No ❒ Not applicable

2.3 Do you fill vessels manually using dispensing devices with automatic response (dispensing valve or pistol)?

❒ Yes ❒ No ❒ Not applicable

❒ Action ❒ No action

Remarks:

Examples of actions

Short-term measures:

- Training and instructing the staff to check the level gauging devices regularly and on how to take the right decision if there is a danger of overfilling.
- Ensure direct observation of the level in the vessel when filling.
- Only fill vessels with at least two operating personnel present.

Medium-term measures

- Install dispensing devices with automatic response or weight-controlled filling devices if vessels or mobile containers are filled manually by the operating staff.
- Install a level indicator, if in exceptional cases; the vessel is filled without an overfilling prevention device.

3 Stopping the filling process before reaching the maximum level with the help of the overfill safety device

3.1 Did you ensure that the overfill safety device automatically interrupts the filling process or trigger off an acoustic alarm before the maximum level is reached?

Tank	Substance	Overfill safety device			Acoustic alarm			Remarks
		Yes	No	N.a.	Yes	No	N.a.	

❒ Action ❒ No action

3.2 Were the following factors considered when installing and adjusting the overfill safety devices?

The following limiting conditions must be considered when fixing the level at which the overfill safety device trigger off an alarm or interrupts the filling process:

	Yes	No	N.a.
- possible drips from tanks, pumps and pipelines when the device is on			
- the maximum allowable filling level of the tank			

❒ Action ❒ No action

3.3 Were the changes in the operation mode of the tank taken into consideration (e.g. the dependency between the principle used in measuring and the substance when using the balancing method) ?

❒ Yes ❒ No ❒ Not applicable,

❒ Action ❒ No action

Remarks:

Examples of actions

Short-term measures:

- Additional check by calculation or technical investigation whether the chosen filling level for the overfilling prevention device excludes the possibility of overfilling.
- Adjust the level at which the overfilling protection device will respond, if it is not adjusted correctly.

Determination of the real risk

Is the sub-point of the recommendation implemented?

Yes	Partially	No
❒	❒	❒
RC=1	RC=5	RC=10

4 Efficiency of the overfilling protection device

4.1 Is the efficiency of the overfilling protection device guaranteed at all times by taking at least the following measures?

	Yes	No	N.a.
- regular visual check conducted by personnel operating the system regarding damages and other harmful influences,			
- regular functional test in the context of the internal checks conducted by plant operator,			
- regular functional test in the context of checks conducted by external experts,			
- recognising the defect of the overfill safety device or an interruption of the signal transmission (signal path from the overfill safety device to the signal processing unit) by an appropriate notification alarm.			

❒ Action ❒ No action

Remarks:

Examples of actions

Short-term measures:

- The monitoring measures should include appropriate test instructions such as weekly visual checks, annual internal efficiency checks and efficiency checks every five years by an external expert.
- Document the efficiency checks in writing.
- Reduce the intervals of the checks performed by internal and external specialists if the interruption of the signal path can not be detected automatically.
- Trainings and instructing the staff to check the measuring instruments regularly and direct observation of the level during the filling process and to respond immediately if irregularities are noticed.

Long-term measures:

- Installation of new approved and suitable overfilling prevention devices.

Determination of the real risk

Is the sub-point of the recommendation implemented?

Yes	Partially	No
❒	❒	❒
RC=1	RC=5	RC=10

Summery of the Checklist

Sub-point of the Recommendation	Possible Risk category	Risk categories
1+2	1 / 15 / 30	
3	1 / 5 / 10	
4	1/ 5 / 10	

Average **R**isk of the **C**hecklist **(ARC)**