

## **Summary document for the catalogue of questions "Gas"**

### **Transmitted by the Central Commission for the Navigation of the Rhine**

The informal working group on the catalogue of questions was mandated by the ADN Safety Committee to revise and adapt the catalogue of questions to the 2013 edition of ADN. At the end of this work, a catalogue of questions in three parts "General", "Gas" and "Chemicals" have been prepared.

In order to document these changes, the informal working group, whose title has been changed in the meantime to informal working group on the training of experts, provides in the annex to the present document a summary of the status of work on the catalogue of questions.

These summaries present the correct response to each question, the reference in the ADN (source) and the date that the question was deleted or added.

Number	Source	Response	Remarks	Dealt with on
<b>Knowledge of physics and chemistry</b>				
<b>Objective 1.1</b>				
231 01.1-01	Boyle-Mariotte law: $pV=\text{constant}$	C		06.06.2011
231 01.1-02	Boyle-Mariotte law: $pV=\text{constant}$	C		06.06.2011
231 01.1-03	Boyle-Mariotte law: $pV=\text{constant}$	B		06.06.2011
231 01.1-04	Boyle-Mariotte law: $pV=\text{constant}$	A		06.06.2011
231 01.1-05	Boyle-Mariotte law: $pV=\text{constant}$	B		06/06/2011
231 01.1-06	Gay-Lussac law: $p/T=\text{constant}$	C		06.06.2011
231 01.1-07	Gay-Lussac law: $p/T=\text{constant}$	D		06.06.2011
231 01.1-08	Gay-Lussac law: $p/T=\text{constant}$	B		06.06.2011
231 01.1-09	Gay-Lussac law: $p/T=\text{constant}$	C		06.06.2011
231 01.1-10	Gay-Lussac law: $p/T=\text{constant}$	B		13.09.2012
<b>Objective 1.2</b>				
231 01.2-01	Fundamental law of gases: $pV/T=\text{constant}$	A		06.06.2011
231 01.2-02	Fundamental law of gases: $pV/T=\text{constant}$	B		06.06.2011
231 01.2-03	Fundamental law of gases: $pV/T=\text{constant}$	D		06.06.2011

Number	Source	Response	Remarks	Dealt with on
<b>Knowledge of physics and chemistry</b>				
231 01.2-04	Fundamental law of gases: $pV/T=\text{constant}$	C		06.06.2011
231 01.2-05	Fundamental law of gases: $pV/T=\text{constant}$	D		06.06.2011
231 01.2-06	Fundamental law of gases: $pV/T=\text{constant}$	B		06/06/2011
231 01.2-07	Fundamental law of gases: $pV/T=\text{constant}$	A		06.06.2011
231 01.2-08	Fundamental law of gases: $pV/T=\text{constant}$	B		06.06.2011
231 01.2-09	Fundamental law of gases: $pV/T=\text{constant}$	A		06.06.2011
231 01.2-10	Fundamental law of gases: $pV/T=\text{constant}$	C		06.06.2011
<b>Objective 2.2</b>				
231 02.1-01	Partial pressure – definitions	B		06.06.2011
231 02.1-02	Partial pressure – definitions	C		06.06.2011
231 02.1-03	$p_{tot} = \sum p_i$ and Vol.-% = $p_i \times 100 / p_{tot}$	D		06.06.2011
231 02.1-04	$p_{tot} = \sum p_i$ and Vol.-% = $p_i \times 100 / p_{tot}$	C		06.06.2011
231 02.1-05	$p_{tot} = \sum p_i$ and Vol.-% = $p_i \times 100 / p_{tot}$	B		06.06.2011
231 02.1-06	Deleted			06.06.2011
231 02.1-07	$p_{tot} = \sum p_i$ and Vol.-% = $p_i \times 100 / p_{tot}$	B		06/06/2011
231 02.1-08	$p_{tot} = \sum p_i$ and Vol.-% = $p_i \times 100 / p_{tot}$	C		06.06.2011
231 02.1-09	$p_{tot} = \sum p_i$ and Vol.-% = $p_i \times 100 / p_{tot}$	D		06.06.2011
231 02.2-01	$p_{tot} = \sum p_i$ , percentage of volume = $p_i \times 100 / p_{tot}$ and $p \cdot V = \text{constant}$	B		06.06.2011
231 02.2-02	$p_{tot} = \sum p_i$ , percentage of volume = $p_i \times 100 / p_{tot}$ and $p \cdot V = \text{constant}$	D		06.06.2011

Number	Source	Response	Remarks	Dealt with on
<b>Knowledge of physics and chemistry</b>				
231 02.2-03	$p_{tot} = \sum p_i$ , percentage of volume = $p_i \times 100 / p_{tot}$ and $p \cdot V =$ constant	B		06.06.2011
231 02.2-04	$p_{tot} = \sum p_i$ , percentage of volume = $p_i \times 100 / p_{tot}$ and $p \cdot V =$ constant	D		06.06.2011
231 02.2-05	$p_{tot} = \sum p_i$ , percentage of volume = $p_i \times 100 / p_{tot}$ and $p \cdot V =$ constant	A		06.06.2011
231 02.2-06	$p_{tot} = \sum p_i$ , percentage of volume = $p_i \times 100 / p_{tot}$ and $p \cdot V =$ constant	C		06.06.2011
231 02.2-07	$p_{tot} = \sum p_i$ , percentage of volume = $p_i \times 100 / p_{tot}$ and $p \cdot V =$ constant	C		06.06.2011
<b>Objective 3.1</b>				
231 03.1-01	1 kmol ideal gas = M kg = 24m <sup>3</sup> at 1 bar and 15 °C	B		06.06.2011
231 03.1-02	1 kmol ideal gas = M kg = 24m <sup>3</sup> at 1 bar and 15 °C	A		06/06/2011
231 03.1-03	1 kmol ideal gas = M kg = 24m <sup>3</sup> at 1 bar and 15 °C	B		06.06.2011
231 03.1-04	1 kmol ideal gas = M kg = 24m <sup>3</sup> at 1 bar and 15 °C	A		06.06.2011
231 03.1-05	1 kmol ideal gas = M kg = 24m <sup>3</sup> at 1 bar and 15 °C	B		06.06.2011
231 03.1-06	1 kmol ideal gas = M kg = 24m <sup>3</sup> at 1 bar and 15 °C	C		06.06.2011
231 03.1-07	1 kmol ideal gas = M kg = 24m <sup>3</sup> at 1 bar and 15 °C	B		06.06.2011
231 03.1-08	1 kmol ideal gas = M kg = 24m <sup>3</sup> at 1 bar and 15 °C	D		06.06.2011
231 03.1-09	1 kmol ideal gas = M kg = 24m <sup>3</sup> at 1 bar and 15 °C	C		06.06.2011

Number	Source	Response	Remarks	Dealt with on
<b>Knowledge of physics and chemistry</b>				
231 03.1-10	1 kmol ideal gas = M kg = 24m <sup>3</sup> at 1 bar and 15 °C	C		06.06.2011
<b>Objective 3.2</b>				
231 03.2-01	$m = 12 * p * M * V / T$	B		06.06.2011
231 03.2-02	$m = 12 * p * M * V / T$	A		06.06.2011
				06/06/2011
231 03.2-03	$m = 12 * p * M * V / T$	B		06.06.2011
231 03.2-04	$m = 12 * p * M * V / T$	C		06.06.2011
231 03.2-05	$m = 12 * p * M * V / T$	A		06.06.2011
231 03.2-06	$m = 12 * p * M * V / T$ or $p = m * T / ( 12 * M * V )$	D		06.06.2011
231 03.2-07	$m = 12 * p * M * V / T$ or $p = m * T / ( 12 * M * V )$	D		06.06.2011
231 03.2-08	$m = 12 * p * M * V / T$ or $p = m * T / ( 12 * M * V )$	C		06.06.2011
231 03.2-09	$m = 12 * p * M * V / T$ or $p = m * T / ( 12 * M * V )$	D		06.06.2011
231 03.2-10	$m = 12 * p * M * V / T$ or $p = m * T / ( 12 * M * V )$	D		06.06.2011
<b>Objective 4.1</b>				
231 04.1-01	$m = \rho_{11} * V_{11} = \rho_{12} * V_{12}$ (with tables)	C		06.06.2011
231 04.1-02	$m = \rho_{11} * V_{11} = \rho_{12} * V_{12}$ (with tables)	B		06.06.2011
				06/06/2011
231 04.1-03	$m = \rho_{11} * V_{11} = \rho_{12} * V_{12}$ (with tables)	C		06.06.2011
231 04.1-04	$m = \rho_{11} * V_{11} = \rho_{12} * V_{12}$ (with tables)	B		06.06.2011
231 04.1-05	$m = \rho_{11} * V_{11} = \rho_{12} * V_{12}$ (with tables)	B		06.06.2011
231 04.1-06	$m = \rho_{11} * V_{11} = \rho_{12} * V_{12}$ (with tables)	C		06.06.2011
231 04.1-07	$m = \rho_{11} * V_{11} = \rho_{12} * V_{12}$ (with tables)	C		06.06.2011
231 04.1-08	$m = \rho_{11} * V_{11} = \rho_{12} * V_{12}$ (with tables)	B		06.06.2011

Number	Source	Response	Remarks	Dealt with on
<b>Knowledge of physics and chemistry</b>				
231 04.1-09	$m = \rho_{l1} * V_{l1} = \rho_{l2} * V_{l2}$ (with tables)	C		06.06.2011
231 04.1-10	$m = \rho_{l1} * V_{l1} = \rho_{l2} * V_{l2}$ (with tables)	B		06.06.2011
<b>Objective 4.2</b>				
231 04.2-01			deleted (2011)	06.06.2011
231 04.2-02			deleted (2011)	06.06.2011
231 04.2-03			deleted (2011)	06/06/2011
231 04.2-04			deleted (2011)	06.06.2011
231 04.2-05			deleted (2011)	06.06.2011
231 04.2-06			deleted (2011)	06.06.2011
231 04.2-07			deleted (2011)	06.06.2011
231 04.2-08			deleted (2011)	06.06.2011
231 04.2-10			deleted (2011)	06.06.2011
231 04.2-09			deleted (2011)	06.06.2011
<b>Objective 5</b>				
231 05.0-01	Critical pressure and temperature	A		06.06.2011
231 05.0-02	Critical pressure and temperature	C		13.09.2012
231 05.0-03	Critical pressure and temperature	B		06.06.2011
231 05.0-04	Critical pressure and temperature	A		06/06/2011
<b>Objective 6.1</b>				
231 06.1-01	Polymerization	C		06.06.2011
231 06.1-02	Polymerization	A		06.06.2011
231 06.1-03	Polymerization	B		06.06.2011
231 06.1-04	Polymerization	B		06.06.2011
231 06.1-05	Polymerization	D		06.06.2011
<b>Objective 6.2</b>				
231 06.2-01	3.2, Table C	C		06.06.2011
231 06.2-02	Polymerization	C		06/06/2011
231 06.2-03	Polymerization	D		06.06.2011
231 06.2-04	Polymerization	A		06.06.2011
231 06.2-05	3.2, Table C	A		06.06.2011
231 06.2-06	3.2, Table C	D		06.06.2011
231 06.2-07	Polymerization	B		06.06.2011

Number	Source	Response	Remarks	Dealt with on
<b>Knowledge of physics and chemistry</b>				
231 06.2-08			deleted (2007)	06.06.2011
231 06.2-09	Polymerization	C		06.06.2011
<b>Objective 7.1</b>				
231 07.1-01	Vapour pressure	A		06.06.2011
231 07.1-02	Vapour pressure	B		13.09.2012
231 07.1-03	Vapour pressure	C		06.06.2011
231 07.1-04	Vapour pressure	D		06/06/2011
231 07.1-05	Vapour pressure	A		06.06.2011
231 07.1-06	Vapour pressure	B		06.06.2011
231 07.1-07	Vapour pressure	C		06.06.2011
231 07.1-08	Vapour pressure	D		06.06.2011
231 07.1-09	Vapour pressure	A		06.06.2011
231 07.1-10	Vapour pressure	B		06.06.2011
<b>Objective 7.2</b>				
231 07.2-01			deleted (2007)	06.06.2011
231 07.2-02			deleted (2007)	06.06.2011
231 07.2-03	Increase in temperature in the cargo tank	C		06.06.2011
231 07.2-04	Increase in temperature in the cargo tank	D		06.06.2011
231 07.2-05	Behaviour of pressure in the cargo tank	C		06.06.2011
231 07.2-06	Behaviour of pressure in the cargo tank	D		06.06.2011
231 07.2-07			deleted (2007)	06.06.2011
231 07.2-08	Vapour saturation pressure	B		06.06.2011
231 07.2-09	Liquefying of gas	A		06.06.2011
<b>Objective 8.1</b>				
231 08.1-01	Saturation vapour pressure, depending on composition	B		06.06.2011
231 08.1-02	Saturation vapour pressure, depending on composition	C		06.06.2011
231 08.1-03	Saturation vapour pressure, depending on composition	A		06.06.2011
231 08.1-06			deleted (2007)	06.06.2011

Number	Source	Response	Remarks	Dealt with on
<b>Knowledge of physics and chemistry</b>				
231 08.1-05			deleted (2007)	06.06.2011
231 08.1-04			deleted (2007)	06.06.2011
<b>Objective 8.2</b>				
231 08.2-01	Health risks	C		06.06.2011
231 08.2-02	Health risks	B		06/06/2011
231 08.2-03	Health risks	B		06.06.2011
231 08.2-04	Health risks	C		06.06.2011
231 08.2-05	Hazard characteristics	A		13.09.2012
231 08.2-06	Hazard characteristics	C		13.09.2012
231 08.2-07	Hazard characteristics	C		13.09.2012
231 08.2-08	Hazard characteristics	C		13.09.2012
<b>Objective 9</b>				
231 09.0-01	Polymerization	A		06.06.2011
231 09.0-02	Molecular mass	D		06.06.2011
231 09.0-03	Molecular mass	C		06/06/2011
231 09.0-04	Molecular mass	B		06.06.2011
231 09.0-05	Molecular mass	A		06.06.2011
231 09.0-06			deleted (2007)	06.06.2011
231 09.0-07			deleted (2007)	06.06.2011
231 09.0-08	Molecular mass	A		06.06.2011
<b>Practice</b>				
<b>Objective 1.1</b>				
232 01.1-01	Flushing in the event of a change of cargo	C		06.06.2011
232 01.1-02	Flushing in the event of a change of cargo	C		06.06.2011
232 01.1-03	Flushing in the event of a change of cargo	A		06.06.2011
232 01.1-04	Flushing in the event of a change of cargo	A		13.09.2012
232 01.1-05	Flushing in the event of a change of cargo	D		06.06.2011
<b>Objective 1.2</b>				
232 01.2-01	Addition of air to the cargo	D		06.06.2011
232 01.2-02	Addition of air to the cargo	C		06.06.2011



Number	Source	Response	Remarks	Dealt with on
<b>Knowledge of physics and chemistry</b>				
232 01.2-03	Addition of air to the cargo	B		06.06.2011
232 01.2-04	Addition of air to the cargo	B		06.06.2011
232 01.2-05	Addition of air to the cargo	C		06.06.2011
<b>Objective 1.3</b>				
232 01.3-01	Methods for flushing	D		06.06.2011
232 01.3-02	Methods for flushing	D		06/06/2011
232 01.3-03	Methods for flushing	C		06.06.2011
232 01.3-04	Methods for flushing	A		06.06.2011
232 01.3-05	Flushing (degassing) in connection with repair work	B		06.06.2011
232 01.3-06	Flushing (degassing) in connection with repair work	C		06.06.2011
232 01.3-07	Flushing (degassing) in connection with entry into the cargo tanks	B		06.06.2011
232 01.3-08	Longitudinal flushing	C		06.06.2011
232 01.3-09			deleted (2007)	06.06.2011
<b>Objective 2</b>				
232 02.0-01			deleted (2010)	06.06.2011
232 02.0-02			deleted (2010)	06.06.2011
232 02.0-03	Flushing/rinsing of test tubes	D		06.06.2011
				06/06/2011
232 02.0-04	Flushing/rinsing of test tubes	A		06.06.2011
232 02.0-05	Sampling during longitudinal flushing	C		06.06.2011
232 02.0-06			deleted (2007)	06.06.2011
232 02.0-07	Storage of samples in test tubes	A		06.06.2011
232 02.0-08	Flushing of the cargo tanks	C		06.06.2011
232 02.0-09			deleted (2007)	06.06.2011
232 02.0-10	Taking of samples	B		06.06.2011
<b>Objective 3</b>				

Number	Source	Response	Remarks	Dealt with on
<b>Knowledge of physics and chemistry</b>				
232 03.0-01	Definition of explosive limit	A		06.06.2011
232 03.0-02	Definition of explosive limit	C		06.06.2011
232 03.0-03	Definition of explosive limit	D		06.06.2011
232 03.0-04	Definition of explosive limit	D		13.09.2012
232 03.0-05	Definition of explosive limit	A		06.06.2011
232 03.0-06	Critical dilution rate	B		06.06.2011
232 03.0-07	Critical dilution rate	C		06.06.2011
232 03.0-08	Risk of explosion	B		06.06.2011
232 03.0-09	Explosive limit and static electricity	D		06.06.2011
<b>Objective 4</b>				
232 04.0-01	Imminent hazards	A		06.06.2011
232 04.0-02	Delayed effect	B		06.06.2011
232 04.0-03	Anaesthetizing effect	D		06.06.2011
232 04.0-04	Definition of the maximum workplace concentration	C		06/06/2011
232 04.0-05	Definition of the maximum workplace concentration	C		06.06.2011
232 04.0-06	Exceeding the maximum workplace concentration	B		06.06.2011
232 04.0-07	Maximum workplace concentration – odour threshold	A		06.06.2011
232 04.0-08			deleted (2007)	06.06.2011
232 04.0-09	Asphyxiation	C		06.06.2011
<b>Objective 5.1</b>				
232 05.1-01	Measuring gas concentration	D		06.06.2011
232 05.1-02	Measuring gas concentration	A		06.06.2011
232 05.1-03	Measuring gas concentration	B		06.06.2011
232 05.1-04	Measuring gas concentration	C		06.06.2011

Number	Source	Response	Remarks	Dealt with on
<b>Knowledge of physics and chemistry</b>				
232 05.1-05	Measuring gas concentration	D		13.09.2012
232 05.1-06	Measuring gas concentration	A		06/06/2011
232 05.1-07	Measuring gas concentration	B		13.09.2012
232 05.1-08	Measuring gas concentration	C		13.09.2012
232 05.1-09	Measuring gas concentration	B		06.06.2011
232 05.1-10	Measuring gas concentration	D		13.09.2012
<b>Objective 5.2</b>				
232 05.2-01	Measuring gas concentration	A		13.09.2012
232 05.2-02	Measuring gas concentration	D		06.06.2011
232 05.2-03	Measuring gas concentration	A		06.06.2011
232 05.2-04	Measuring gas concentration	D		06.06.2011
232 05.2-05	Measuring gas concentration	A		06.06.2011
232 05.2-06	Measuring gas concentration	D		13.09.2012
232 05.2-07	Measuring gas concentration	A		06/06/2011
232 05.2-08	Measuring gas concentration	A		06.06.2011
232 05.2-09	Measuring gas concentration	B		06.06.2011
232 05.2-10			deleted (2007)	06.06.2011
<b>Objective 6</b>				
232 06.0-01	Measuring gas concentration	B		06.06.2011
232 06.0-02	Measuring gas concentration	A		13.09.2012
232 06.0-03			deleted (2007)	06.06.2011
232 06.0-04	Measuring gas concentration	C		13.09.2012
232 06.0-05	Measuring gas concentration	A		13.09.2012

Number	Source	Response	Remarks	Dealt with on
<b>Knowledge of physics and chemistry</b>				
232 06.0-06	7.2.3.1.6	D		13.09.2012
232 06.0-07	Measuring gas concentration	D		06.06.2011
232 06.0-08	7.2.3.1.6	C		06/06/2011
232 06.0-09	Measuring gas concentration	C		13.09.2012
<b>Objective 7</b>				
232 07.0-01	Measuring gas concentration	B		13.09.2012
232 07.0-02	Measuring gas concentration	B		13.09.2012
232 07.0-03	8.3.5	C		13.09.2012
232 07.0-04	8.3.5	A		13.09.2012
232 07.0-05	8.3.5	D		13.09.2012
232 07.0-06	8.3.5	A		13.09.2012
232 07.0-07	7.2.3.1.5	A		13.09.2012
232 07.0-08	8.3.5	A		13.09.2012
232 07.0-09	8.3.5	C		13.09.2012
232 07.0-10	8.3.5	D		13.09.2012
<b>Objective 8</b>				
232 08.0-01	1.2.1	C		06.06.2011
232 08.0-02	Degree of filling	D		06.06.2011
232 08.0-03	Degree of filling	C		06.06.2011
232 08.0-04	Degree of filling	A		06.06.2011
232 08.0-05	Degree of filling	B		06.06.2011
232 08.0-06	Degree of filling	A		06.06.2011
232 08.0-07	Overfilling	C		06.06.2011
232 08.0-08	9.3.1.21.1	D		06.06.2011
232 08.0-09	9.3.1.21.1	A		06.06.2011
232 08.0-10	Degree of filling	B		06.06.2011
<b>Objective 9</b>				
232 09.0-01	Safety against bursts in the piping	A		13.09.2012
232 09.0-02	Safety against bursts in the piping	C		06.06.2011
232 09.0-03	Safety against bursts in the piping	D		06.06.2011
232 09.0-04	Safety against bursts in the piping	B		06.06.2011
232 09.0-05	Safety against bursts in the piping	A		06.06.2011
232 09.0-06	9.3.1.21.9	A		06.06.2011

Number	Source	Response	Remarks	Dealt with on
<b>Knowledge of physics and chemistry</b>				
232 09.0-07	7.2.2.21	B		06.06.2011
232 09.0-08	7.2.2.21	C		13.09.2012
232 09.0-09	Rapid closing system	D		13.09.2012
232 09.0-10	Rapid closing system	A		13.09.2012
<b>Objective 10</b>				
232 10.0-01	Unloading of the cargo	C		06.06.2011
232 10.0-02	Unloading of the cargo	D		06.06.2011
232 10.0-03	Unloading of the cargo	A		06.06.2011
232 10.0-04	Deck pumps	B		06.06.2011
232 10.0-05	Compressors	C		06.06.2011
232 10.0-06	Compressors	D		06.06.2011
232 10.0-07	Deck pumps	A		06.06.2011
232 10.0-08	Compressors	C		06.06.2011
232 10.0-09	Compressors	B		06.06.2011
<b>Emergency measures</b>				
<b>Objective 1.1</b>				
233 01.1-01	Liquefied gas on skin	B		06.06.2011
233 01.1-02	Liquefied gas on skin	A		06.06.2011
233 01.1-03	Liquefied gas on skin	C		06.06.2011
233 01.1-04	Liquefied gas on skin	D		06.06.2011
<b>Objective 1.2</b>				
233 01.2-01	Breathing in gas	C		06.06.2011
233 01.2-02	Breathing in gas	D		06.06.2011
233 01.2-03	Breathing in gas	A		06.06.2011
233 01.2-04	Breathing in gas	B		06.06.2011
233 01.2-05	Breathing in gas	B		06.06.2011
<b>Objective 1.3</b>				
233 01.3-01	Emergency assistance, general	A		06.06.2011
233 01.3-02	Emergency assistance, general	C		06.06.2011
233 01.3-03	Emergency assistance, general	C		06.06.2011

Number	Source	Response	Remarks	Dealt with on
<b>Knowledge of physics and chemistry</b>				
233 01.3-04	Emergency assistance, general	D		06.06.2011
<b>Objective 2.1</b>				
233 02.1-01	Leak in a connection	A		06.06.2011
233 02.1-02	Leak in a connection	B		06.06.2011
233 02.1-03	Leak in a connection	C		06.06.2011
<b>Objective 2.2</b>				
233 02.2-01	Fire in the engine room	C		06.06.2011
233 02.2-02	Fire in the engine room	A		06.06.2011
233 02.2-03	Fire in the engine room	C		06.06.2011
<b>Objective 2.3</b>				
233 02.3-01	Hazards in the vicinity of the vessel	B		06.06.2011
233 02.3-02	Hazards in the vicinity of the vessel	A		06.06.2011
233 02.3-03	Hazards in the vicinity of the vessel	B		06.06.2011
<b>Objective 2.4</b>				
233 02.4-01	Over-filling	A		06.06.2011
233 02.4-02	Over-filling	A		06.06.2011
233 02.4-03	Over-filling	D		06.06.2011
<b>Objective 2.5</b>				
233 02.5-01	Polymerization	C		06.06.2011
233 02.5-02	Polymerization	B		06.06.2011
233 02.5-03	Polymerization	D		06.06.2011

\*\*\*