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## 1. PURPOSE

The purpose of this specification is to give the insulation requirements, material build up, applicable to the Main Installation Contract for the Ormen Lange Onshore Plant. All insulation is to be done in accordance with documents referred to herein.

## 2. REFERENCES

NORSOK R-004, rev. 2

NHT-M50-02037, rev. 03M

37-1A-NHT-P52-00008, rev. 01M

37-1A-AK-R15-00003, rev. 04I

Piping and Equipment Insulation

Piping and Equipment Insulation, Supplement to  
NORSOK R-004, rev. 2

Ormen Lange Insulation Handbook

Insulation Requirements, Guideline

## 3. ABBREVIATIONS

SS - Stainless steel

AL - Aluminium

## 4. GENERAL

All insulation is to be done in accordance with documents referred to in chpt. 2. Close attention is to be paid, so that the applied coating is not damaged.

The insulation material build up and thickness are based on NORSOK R-004, NHT-M50-02037, design calculations and experience from previous projects.

The specific requirements for the materials to be used are given in NORSOK R-004.

The extent of insulation is defined by the process discipline with input from others, such as the safety discipline, and shown on P & IDs. The insulation thickness to be indicated on P & IDs are given in doc. 37-1A-AK-R15-00003.

Equipment installed in piping where insulation is required and that requires regular maintenance, replacement, inspection etc., such as probes for corrosion monitoring, are to be insulated with removable insulation.

HOLD for final fire loads and verification of insulation thickness for class 5 and 8. Applicable also to all other insulation classes in combination with class 5 and 8.

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**5. INSULATION CLASSES - GUIDANCE FOR INSULATION BUILD UP**

**5.1. CLASS 1: HEAT CONSERVATION**

Insulation material code: B for temp. < 420 °C, A for temp. > 420 °C

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	Ref. table 1, NORSOK R-004	Cellular glass	AL	For temp. < 420 °C
	Ref. table 2, NORSOK R-004	Mineral wool	AL	For temp. > 420 °C
Flanges / Valves	NA (Same as for piping / vessels)	NA (Cellular glass or Mineral wool)	NA (AL)	Insulated where specified. Removable boxes

**5.2. CLASS 2: COLD CONSERVATION & EXTERNAL CONDENSATION AND ICING PROTECTION**

Same as a combination of insulation classes 2 and 9 according to NORSOK R-004, rev. 2.

Insulation material code: E

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	Ref. table 3, NORSOK R-004	Cellular glass	AL	To be provided with vapour barrier
	25 mm	Mineral wool		Applicable when rivets or screws are used for fixing of jacketing
Flanges / Valves	Ref. table 3, NORSOK R-004	Cellular glass	AL	Removable boxes. Any void shall be filled with mineral wool.

**5.3. CLASS 3: PERSONNEL PROTECTION**

Insulation material code: NA.

	Distance from element	Material	Comments
Piping / Vessels	Ref. table 1, NORSOK R-004	Perforated sheet metal guards	Insulated only in combination with other classes
Flanges / Valves			

**5.4. CLASS 4: FROST PROOFING**

Same as insulation class 4 without heat tracing according to NORSOK R-004, rev. 2.

Insulation material code: B

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels				
	<= DN80	30 mm	Cellular glass	AL
	> DN80	40 mm	Cellular glass	
Flanges / Valves	Same as for piping / vessels	Cellular glass	AL	Removable boxes

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**5.5. CLASS 5: FIRE PROOFING**

Insulation material code: C

	Thickness	Material		Comments	
		Insulation	Jacketing		
Piping / Vessels ≤ DN150	30 mm	Cellular glass	SS		
	50 mm	Ceramic fibre			
	> DN150	40 mm	Cellular glass		SS
		50 mm	Ceramic fibre		
Flanges / Valves	Same as for piping / vessels	Cellular glass + ceramic fibre	SS	Removable boxes	

**5.6. CLASS 6: ACOUSTIC INSULATION TYPE A, B AND C**

Insulation type A, B or C is to be shown as a note on P&IDs.

**5.6.1. TYPE A**

Same as insulation class 6 according to NORSOK R-004, rev. 2

Insulation material code: E

	Thickness	Material		Comments	
		Insulation	Jacketing		
Piping / Vessels ≤ DN150	30 mm	Cellular glass	AL		
		Mineral wool			
		Aluminium foil			
	> DN150	40 mm	Cellular glass		AL
			Mineral wool		
			Aluminium foil		
Flanges / Valves	NA (Same as for piping / vessels)	NA (Cellular glass + mineral wool + aluminium foil)	NA (AL)	Insulated where specified Removable boxes	

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**5.6.2. TYPE B**

Same as insulation class 7 according to NORSOK R-004, rev. 2.

Insulation material code: E

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels				
<= DN150	30 mm	Cellular glass	AL	
	38 mm	Mineral wool		
	1 x 2,6 mm	Heavy synthetic sheet		
		Aluminium foil		
> DN150	40 mm	Cellular glass	AL	
	38 mm	Mineral wool		
	1 x 2,6 mm	Heavy synthetic sheet		
		Aluminium foil		
Flanges / Valves	NA (Same as for piping / vessels)	NA (Cellular glass + mineral wool + heavy synthetic sheet + aluminium foil)	NA (AL)	Insulated where specified Removable boxes

**5.6.3. TYPE C**

Same as insulation class 8 according to NORSOK R-004, rev. 2.

Insulation material code: E

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels				
<= DN150	30 mm	Cellular glass	AL	
	38 mm	Mineral wool		
	2 x 2,6 mm	Heavy synthetic sheet		
	25 mm	Mineral wool		
	2 x 2,6 mm	Heavy synthetic sheet		
		Aluminium foil		
> DN150	40 mm	Cellular glass	AL	
	38 mm	Mineral wool		
	2 x 2,6 mm	Heavy synthetic sheet		
	25 mm	Mineral wool		
	2 x 2,6 mm	Heavy synthetic sheet		
		Aluminium foil		
Flanges / Valves	Same as for piping / vessels	Cellular glass + mineral wool + heavy synthetic sheets + aluminium foil	AL	Removable boxes

**5.7. CLASS 7: HEAT TRACING**

Always in combination with other insulation classes.

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**5.8. CLASS 8: FIRE PROTECTION OF FLANGES ONLY**

Insulation material code: C

	Thickness	Material		Comments
		Insulation	Jacketing	
Flanges				Removable boxes
<= DN150	30 mm	Cellular glass	SS	
	50 mm	Ceramic fibre		
> DN150	40 mm	Cellular glass	SS	
	50 mm	Ceramic fibre		

**5.9. CLASS 9: FUTURE INSULATION**

Insulation material code: NA

	Thickness	Comments
Piping / Vessels	100 mm	Space for insulation to be reserved and pipe support shoes to be provided.
Flanges / Valves		

**6. COMBINATION OF INSULATION CLASSES - GUIDANCE FOR INSULATION BUILD UP**

The insulation build up for the class with the strongest requirements shall prevail. However, the total insulation build up shall maintain the insulation requirement for each separate insulation class in the combination.

**6.1. CLASS 13 (HEAT CONSERVATION + PERSONNEL PROTECTION)**

Insulation material code: B for temp. < 420 °C, A for temp. > 420 °C

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	Ref. table 1, NORSOK R-004	Cellular glass	AL	For temp. < 420 °C
	Ref. table 2, NORSOK R-004	Mineral wool	AL	For temp. > 420 °C
Flanges / Valves	NA (Same as for piping / vessels)	NA (Cellular glass or Mineral wool)	NA (AL)	Insulated where specified. Removable boxes

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**6.2. CLASS 15 (HEAT CONSERVATION + FIRE PROOFING)**

Insulation material code: C for temp. < 420 °C, A for temp. > 420 °C

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	Ref. table 1, NORSOK R-004 50 mm	Cellular glass	SS	For temp. < 420 °C
		Ceramic fibre		
	Ref. table 2, NORSOK R-004	Mineral wool	SS	
Flanges / Valves	Same as for piping / vessels	Cellular glass + ceramic fibre or Mineral wool	SS	Removable boxes

**6.3. CLASS 16 (HEAT CONSERVATION + ACOUSTIC INSULATION)**

**6.3.1. HEAT CONSERVATION + ACOUSTIC INSULATION TYPE A**

Insulation material code: E for temp. < 420 °C, A for temp. > 420 °C

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	Ref. table 1, NORSOK R-004 25 mm	Cellular glass	AL	For temp. < 420 °C
		Mineral wool		
		Aluminium foil		
	Ref. table 2, NORSOK R-004	Mineral wool	AL	
		Aluminium foil		
Flanges / Valves	NA (Same as for piping / vessels)	NA (Cellular glass + mineral wool + aluminium foil or Mineral wool + aluminium foil)	NA (AL)	Insulated where specified Removable boxes

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**6.3.2. HEAT CONSERVATION + ACOUSTIC INSULATION TYPE B**

Insulation material code: E for temp. < 420 °C, A for temp. > 420 °C

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	Ref. table 1, NORSOK R-004	Cellular glass	AL	For temp. < 420 °C
	38 mm	Mineral wool		
	1 x 2,6 mm	Heavy synthetic sheet		
		Aluminium foil	AL	
	Ref. table 2, NORSOK R-004	Mineral wool		
	1 x 2,6 mm	Heavy synthetic sheet		
	Aluminium foil			
Flanges / Valves	NA (Same as for piping / vessels)	NA (Cellular glass + mineral wool + heavy synthetic sheet + aluminium foil or Mineral wool + heavy synthetic sheet + aluminium foil)	NA (AL)	Insulated where specified Removable boxes

**6.3.3. HEAT CONSERVATION + ACOUSTIC INSULATION TYPE C**

Insulation material code: E for temp. < 420 °C, A for temp. > 420 °C

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	Ref. table 1, NORSOK R-004	Cellular glass	AL	For temp. < 420 °C
	38 mm	Mineral wool		
	2 x 2,6 mm	Heavy synthetic sheet		
	25 mm	Mineral wool		
	2 x 2,6 mm	Heavy synthetic sheet		
		Aluminium foil	AL	
	Ref. table 2, NORSOK R-004	Mineral wool		
	2 x 2,6 mm	Heavy synthetic sheet		
	25 mm	Mineral wool		
	2 x 2,6 mm	Heavy synthetic sheet		
	Aluminium foil			
Flanges / Valves	Same as for piping / vessels	Cellular glass + mineral wool + heavy synthetic sheets + aluminium foil or Mineral wool + heavy synthetic sheets + mineral wool + aluminium foil	AL	Removable boxes

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**6.4. CLASS 18 (HEAT CONSERVATION + FIRE PROTECTION OF FLANGES ONLY)**

Insulation material code:

\* Piping / Vessels / Valves: B for temp. < 420 °C, A for temp. > 420 °C

\* Flanges: C for temp. < 420 °C, A for temp. > 420 °C

	Thickness	Material		Comments	
		Insulation	Jacketing		
Piping / Vessels	Ref. table 1, NORSOK R-004	Cellular glass	AL	For temp. < 420 °C	
	Ref. table 2, NORSOK R-004	Mineral wool	AL	For temp. > 420 °C	
Flanges	<= DN150	30 mm	Cellular glass	Removable boxes For temp. < 420 °C	
		50 mm	Ceramic fibre		
	> DN150	40 mm	Cellular glass		SS
		50 mm	Ceramic fibre		
		Ref. table 2, NORSOK R-004	Mineral wool		SS
Valves	NA (Same as for piping / vessels)	NA (Cellular glass or Mineral wool)	NA (AL / SS)	Insulated where specified. Removable boxes	

**6.5. CLASS 25 (COLD CONSERVATION & EXTERNAL CONDENSATION AND ICING PROTECTION + FIRE PROOFING)**

Insulation material code: C

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	Ref. table 3, NORSOK R-004	Cellular glass	SS	To be provided with vapour barrier
	50 mm	Ceramic fibre	SS	
Flanges / Valves	Same as for piping / vessels	Cellular glass + ceramic fibre	SS	Removable boxes. Any void shall be filled with ceramic fibre.

**6.6. CLASS 26 (COLD CONSERVATION & EXTERNAL CONDENSATION AND ICING PROTECTION + ACOUSTIC INSULATION)**

**6.6.1. COLD CONSERVATION & EXTERNAL CONDENSATION AND ICING PROTECTION + ACOUSTIC INSULATION TYPE A**

Insulation material code: E

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	Ref. table 3, NORSOK R-004	Cellular glass	AL	To be provided with vapour barrier
	25 mm	Mineral wool		
		Aluminium foil		
Flanges / Valves	Ref. table 3, NORSOK R-004	Cellular glass	AL	Removable boxes. Any void shall be filled with mineral wool

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**6.6.2. COLD CONSERVATION & EXTERNAL CONDENSATION AND ICING PROTECTION + ACOUSTIC INSULATION TYPE B**

Insulation material code: E

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	Ref. table 3, NORSOK R-004	Cellular glass	AL	To be provided with vapour barrier
	38 mm	Mineral wool		
	2,6 mm	Heavy synthetic sheet		
		Aluminium foil		
Flanges / Valves	Ref. table 3, NORSOK R-004	Cellular glass	AL	Removable boxes. Any void shall be filled with mineral wool.

**6.6.3. COLD CONSERVATION & EXTERNAL CONDENSATION AND ICING PROTECTION + ACOUSTIC INSULATION TYPE C**

Insulation material code: E

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	Ref. table 3, NORSOK R-004	Cellular glass	AL	To be provided with vapour barrier
	38 mm	Mineral wool		
	2 x 2,6 mm	Heavy synthetic sheet		
	25 mm	Mineral wool		
	2 x 2,6 mm	Heavy synthetic sheet		
		Aluminium foil		
Flanges / Valves	Same as for piping / vessels	Cellular glass + mineral wool + heavy synthetic sheets + aluminium foil	AL	Removable boxes. Any void shall be filled with ceramic fibres.

**6.7. CLASS 28 (COLD CONSERVATION & EXTERNAL CONDENSATION AND ICING PROTECTION + FIRE PROTECTION OF FLANGES ONLY)**

Insulation material code:

\* Piping / Vessels: E, Flanges: C, Valves: B

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	Ref. table 3, NORSOK R-004	Cellular glass	AL	To be provided with vapour barrier
	25 mm	Mineral wool		Applicable when rivets or screws are used for fixing of jacketing
Flanges	Ref. table 3, NORSOK R-004	Cellular glass	SS	Removable boxes. Any void shall be filled with ceramic fibres.
	50 mm	Ceramic fibre		
Valves	Ref. table 3, NORSOK R-004	Cellular glass	AL / SS	Removable boxes. Any void shall be filled with mineral wool.

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**6.8. CLASS 35 (PERSONNEL PROTECTION + FIRE PROTECTION)**

Insulation material code: C

	Thickness	Material		Comments	
		Insulation	Jacketing		
Piping / Vessels					
<= DN150	30 mm	Cellular glass	SS		
	50 mm	Ceramic fibre			
> DN150	40 mm	Cellular glass	SS		
	50 mm	Ceramic fibre			
Flanges / Valves	Same as for piping / vessels	Cellular glass Ceramic fibre	SS		Removable boxes

**6.9. CLASS 36 (PERSONNEL PROTECTION + ACOUSTIC INSULATION)**

**6.9.1. PERSONNEL PROTECTION + ACOUSTIC INSULATION TYPE A**

Insulation material code: E

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels				
<= DN150	30 mm	Cellular glass	AL	
	25 mm	Mineral wool		
		Aluminium foil		
> DN150	40 mm	Cellular glass	AL	
	25 mm	Mineral wool		
		Aluminium foil		
Flanges / Valves	Ref. table 1, NORSOK R-004	Perforated sheet metal guards	AL	Perforated sheet metal guards installed in distance to element, if not otherwise specified.

**6.9.2. PERSONNEL PROTECTION + ACOUSTIC INSULATION TYPE B**

Insulation material code: E

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels				
<= DN150	30 mm	Cellular glass	AL	
	38 mm	Mineral wool		
	1 x 2,6 mm	Heavy synthetic sheet		
		Aluminium foil		
> DN150	40 mm	Cellular glass	AL	
	38 mm	Mineral wool		
	1 x 2,6 mm	Heavy synthetic sheet		
		Aluminium foil		
Flanges / Valves	Ref. table 1, NORSOK R-004	Perforated sheet metal guards	AL	Perforated sheet metal guards installed in distance to element, if not otherwise specified.

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**6.9.3. PERSONNEL PROTECTION + ACOUSTIC INSULATION TYPE C**

Insulation material code: E

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	<= DN150	30 mm	Cellular glass	AL
		38 mm	Mineral wool	
		2 x 2,6 mm	Heavy synthetic sheet	
		25 mm	Mineral wool	
		2 x 2,6 mm	Heavy synthetic sheet	
			Aluminium foil	
	> DN150	40 mm	Cellular glass	AL
		38 mm	Mineral wool	
		2 x 2,6 mm	Heavy synthetic sheet	
		25 mm	Mineral wool	
		2 x 2,6 mm	Heavy synthetic sheet	
			Aluminium foil	
Flanges / Valves	Same as for piping / vessels	Cellular glass + mineral wool + heavy synthetic sheets + aluminium foil	AL	Removable boxes

**6.10. CLASS 38 (PERSONNEL PROTECTION + FIRE PROTECTION OF FLANGES ONLY)**

Insulation material code:

\* Piping / Vessels / Valves: NA, Flanges: C

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	Ref. table 1, NORSOK R-004	Perforated sheet metal guards	AL	Installed in distance to element to be protected.
Flanges	<= DN150	30 mm	Cellular glass	Removable boxes
		50 mm	Ceramic fibre	
	> DN150	40 mm	Cellular glass	
		50 mm	Ceramic fibre	
Valves	Ref. table 1, NORSOK R-004	Perforated sheet metal guards	AL / SS	Installed in distance to element to be protected.

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**6.11. CLASS 45 (FROST PROOFING + FIRE PROOFING)**

Insulation material code: C

	Thickness	Material		Comments	
		Insulation	Jacketing		
Piping / Vessels					
<= DN80	30 mm	Cellular glass	SS		
	50 mm	Ceramic fibre			
> DN80	40 mm	Cellular glass	SS		
	50 mm	Ceramic fibre			
Flanges / Valves	Same as for piping / vessels	Cellular glass + ceramic fibre	SS		Removable boxes

**6.12. CLASS 46 (FROST PROOFING + ACOUSTIC INSULATION)**

**6.12.1. FROST PROOFING + ACOUSTIC INSULATION TYPE A**

Insulation material code:

\* Piping / Vessels: E, Flanges / Valves: B

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels				
<= DN80	30 mm	Cellular glass	AL	
	25 mm	Mineral wool		
		Aluminium foil		
> DN80	40 mm	Cellular glass	AL	
	25 mm	Mineral wool		
		Aluminium foil		
Flanges / Valves				
<= DN80	30 mm	Cellular glass	AL	Removable boxes
	>DN80	40 mm		

**6.12.2. FROST PROOFING + ACOUSTIC INSULATION TYPE B**

Insulation material code:

\* Piping / Vessels: E, Flanges / Valves: B

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels				
<= DN80	30 mm	Cellular glass	AL	
	38 mm	Mineral wool		
	1 x 2,6 mm	Heavy synthetic sheet		
		Aluminium foil		
> DN80	40 mm	Cellular glass	AL	
	38 mm	Mineral wool		
	1 x 2,6 mm	Heavy synthetic sheet		
		Aluminium foil		
Flanges / Valves				

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<= DN80	30 mm	Cellular glass	AL	Removable boxes
>DN80	40 mm	Cellular glass		

**6.12.3. FROST PROOFING + ACOUSTIC INSULATION TYPE C**

Insulation material code: E

	Thickness	Material		Comments	
		Insulation	Jacketing		
Piping / Vessels					
<= DN80	30 mm	Cellular glass	AL		
	38 mm	Mineral wool			
	2 x 2,6 mm	Heavy synthetic sheet			
	25 mm	Mineral wool			
	2 x 2,6 mm	Heavy synthetic sheet			
		Aluminium foil			
	> DN80	40 mm	Cellular glass		AL
		38 mm	Mineral wool		
		2 x 2,6 mm	Heavy synthetic sheet		
		25 mm	Mineral wool		
		2 x 2,6 mm	Heavy synthetic sheet		
			Aluminium foil		
Flanges / Valves	Same as for piping / vessels	Cellular glass + mineral wool + heavy synthetic sheets + aluminium foil	AL	Removable boxes	

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**6.13. CLASS 47 (FROST PROOFING + HEAT TRACING)**

Same as insulation class 4 with heat tracing according to NORSOK R-004, rev. 2.

Insulation material code: B

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels				
<= DN200	40 mm	Cellular glass	AL	
> DN200	50 mm	Cellular glass	AL	
Flanges / Valves	Same as for piping / vessels	Cellular glass	AL	Removable boxes

**6.14. CLASS 48 (FROST PROOFING + FIRE PROTECTION OF FLANGES ONLY)**

Insulation material code:

\* Piping / Vessel / Valves: B, Flanges: C

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels				
<= DN80	30 mm	Cellular glass	AL	
> DN80	40 mm	Cellular glass	AL	
Flanges				
<= DN150	30 mm	Cellular glass	SS	Removable boxes
	50 mm	Ceramic fibre		
> DN150	40 mm	Cellular glass	SS	
	50 mm	Ceramic fibre		
Valves	Same as for piping / vessels	Cellular glass	AL / SS	Removable boxes

**6.15. CLASS 56 (FIRE PROOFING + ACOUSTIC INSULATION)**

**6.15.1. FIRE PROOFING + ACOUSTIC INSULATION TYPE A**

Insulation material code: C

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels				
<= DN150	30 mm	Cellular glass	SS	
	50 mm	Ceramic fibre		
		Aluminium foil		
> DN150	40 mm	Cellular glass	SS	
	50 mm	Ceramic fibre		
		Aluminium foil		
Flanges / Valves	Same as for piping / vessels	Cellular glass + ceramic fibre + aluminium foil	SS	Removable boxes

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**6.15.2. FIRE PROOFING + ACOUSTIC INSULATION TYPE B**

Insulation material code: C

	Thickness	Material		Comments	
		Insulation	Jacketing		
Piping / Vessels ≤ DN150	30 mm	Cellular glass	SS		
	50 mm	Ceramic fibre			
	1 x 2,6 mm	Heavy synthetic sheet			
		Aluminium foil			
	> DN150	40 mm	Cellular glass		SS
		50 mm	Ceramic fibre		
		1 x 2,6 mm	Heavy synthetic sheet		
			Aluminium foil		
Flanges / Valves	Same as for piping / vessels	Cellular glass + ceramic fibre + heavy synthetic sheet + aluminium foil	SS	Removable boxes	

**6.15.3. FIRE PROOFING + ACOUSTIC INSULATION TYPE C**

Insulation material code: C

	Thickness	Material		Comments	
		Insulation	Jacketing		
Piping / Vessels ≤ DN150	30 mm	Cellular glass	SS		
	38 mm	Ceramic fibre			
	2 x 2,6 mm	Heavy synthetic sheet			
	25 mm	Ceramic fibre			
	2 x 2,6 mm	Heavy synthetic sheet			
		Aluminium foil			
	> DN150	40 mm	Cellular glass		SS
		38 mm	Ceramic fibre		
		2 x 2,6 mm	Heavy synthetic sheet		
		25 mm	Ceramic fibre		
2 x 2,6 mm		Heavy synthetic sheet			
	Aluminium foil				
Flanges / Valves	Same as for piping / vessels	Cellular glass + ceramic fibre + heavy synthetic sheets + aluminium foil	SS	Removable boxes	

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**6.16. CLASS 57 (FIRE PROOFING + HEAT TRACING)**

Insulation material code: C

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels <= DN200 <hr/> > DN200	40 mm	Cellular glass	SS	
	50 mm	Ceramic fibre		
	50 mm	Cellular glass	SS	
	50 mm	Ceramic fibre		
Flanges / Valves	Same as for piping / vessels	Cellular glass + ceramic fibre	SS	Removable boxes

**6.17. CLASS 67 (ACOUSTIC INSULATION + HEAT TRACING)**

**6.17.1. ACOUSTIC INSULATION TYPE A + HEAT TRACING**

Insulation material code:

\* Piping / Vessel: E, Flanges / Valves: B

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	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	<= DN200	40 mm	Cellular glass	AL
		25 mm	Mineral wool	
			Aluminium foil	
	> DN200	50 mm	Cellular glass	
		25 mm	Mineral wool	
			Aluminium foil	
Flanges / Valves	<= DN200	40 mm	Cellular glass	Removable boxes
		> DN200	50 mm	

**6.17.2. ACOUSTIC INSULATION TYPE B + HEAT TRACING**

Insulation material code:

\* Piping / Vessel: E, Flanges / Valves: B

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels	<= DN200	40 mm	Cellular glass	AL
		38 mm	Mineral wool	
		1 x 2,6 mm	Heavy synthetic sheet	
			Aluminium foil	
	> DN200	50 mm	Cellular glass	
		38 mm	Mineral wool	
		1 x 2,6 mm	Heavy synthetic sheet	
			Aluminium foil	
Flanges / Valves	<= DN200	40 mm	Cellular glass	Removable boxes
		> DN200	50 mm	

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**6.17.3. ACOUSTIC INSULATION TYPE C + HEAT TRACING**

Insulation material code: E

	Thickness	Material		Comments	
		Insulation	Jacketing		
Piping / Vessels ≤ DN200	40 mm	Cellular glass	AL		
	38 mm	Mineral wool			
	2 x 2,6 mm	Heavy synthetic sheet			
	25 mm	Mineral wool			
	2 x 2,6 mm	Heavy synthetic sheet			
		Aluminium foil			
	> DN200	50 mm	Cellular glass		AL
		38 mm	Mineral wool		
		2 x 2,6 mm	Heavy synthetic sheet		
		25 mm	Mineral wool		
		2 x 2,6 mm	Heavy synthetic sheet		
			Aluminium foil		
Flanges / Valves	Same as for piping / vessels	Cellular glass + Mineral wool + heavy synthetic sheets + aluminium foil	AL	Removable boxes	

**6.18. CLASS 68 (ACOUSTIC INSULATION + FIRE PROTECTION OF FLANGES ONLY)**

**6.18.1. ACOUSTIC INSULATION TYPE A + FIRE PROTECTION OF FLANGES ONLY**

Insulation material code:

\* Piping / Vessel / Valves: E, Flanges: C

	Thickness	Material		Comments	
		Insulation	Jacketing		
Piping / Vessels ≤ DN150	30 mm	Cellular glass	AL		
	25 mm	Mineral wool			
		Aluminium foil			
	> DN150	40 mm	Cellular glass		AL
		25 mm	Mineral wool		
			Aluminium foil		
Flanges	≤ DN150	30 mm	SS	Removable boxes	
		50 mm			Ceramic fibre
	> DN150	40 mm	SS		
		50 mm			Ceramic fibre
Valves	NA (Same as for piping / vessels)	NA (Cellular glass + mineral wool)	AL / SS	Insulated where specified Removable boxes	

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**6.18.2. ACOUSTIC INSULATION TYPE B + FIRE PROTECTION OF FLANGES ONLY**

Insulation material code:

\* Piping / Vessel / Valves: E, Flanges: C

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels				
<= DN150	30 mm	Cellular glass	AL	
	38 mm	Mineral wool		
	1 x 2,6 mm	Heavy synthetic sheet		
		Aluminium foil		
> DN150	40 mm	Cellular glass	AL	
	38 mm	Mineral wool		
	1 x 2,6 mm	Heavy synthetic sheet		
		Aluminium foil		
Flanges				
<= DN150	30 mm	Cellular glass	SS	Removable boxes
	50 mm	Ceramic fibre		
> DN150	40 mm	Cellular glass	SS	
	50 mm	Ceramic fibre		
Valves	NA (Same as for piping / vessels)	NA (Cellular glass + mineral wool + heavy synthetic sheet + aluminium foil)	AL/SS	Insulated where specified Removable boxes

**6.18.3. ACOUSTIC INSULATION TYPE C + FIRE PROTECTION OF FLANGES ONLY**

Insulation material code:

\* Piping / Vessel / Valves: E, Flanges: C

	Thickness	Material		Comments
		Insulation	Jacketing	
Piping / Vessels				
<= DN150	30 mm	Cellular glass	AL	
	38 mm	Mineral wool		
	2 x 2,6 mm	Heavy synthetic sheet		
	25 mm	Mineral wool		
	2 x 2,6 mm	Heavy synthetic sheet		
		Aluminium foil		
> DN150	40 mm	Cellular glass	AL	
	38 mm	Mineral wool		
	2 x 2,6 mm	Heavy synthetic sheet		
	25 mm	Mineral wool		
	2 x 2,6 mm	Heavy synthetic sheet		
		Aluminium foil		
Flanges	Same as for piping / vessels	Cellular glass + ceramic fibres + heavy synthetic sheets + aluminium foil	SS	Removable boxes
Valves	Same as for piping / vessels	Cellular glass + mineral wool + heavy synthetic sheets + aluminium foil	AL/SS	Removable boxes