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REGULATORY GUIDANCE ON THERMAL INSULATION

A GUIDE TO BS 5422:2023 BY ISOVER UK

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Isover UK offers a range of insulation products suitable for building services and HVAC systems

A guide to BS 5422:2023 by Isover UK

The British Standards Institute (BSI) released an updated version of the BS 5422 legislation in June 2023 – 'BS 5422:2023 Thermal insulating materials for pipes, tanks, vessels, ductwork, and equipment operating within the temperature range -40 °C to +700 °C. Method for specifying'.

This replaced the previous standard, which was last updated in 2009.

There are key changes which affect how we now specify Isover HVAC systems and solutions for pipework and ductwork insulation. These include the following products: Isover Climcover glass mineral wool rolls and slabs, Isover Climpipe glass mineral wool pipe sections and Isover passive fire protection systems.

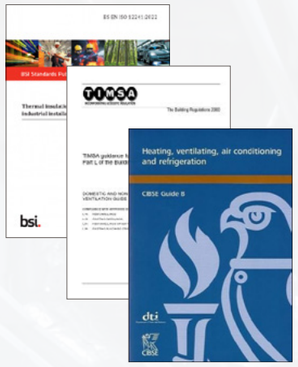
Key regulations

BS 5422:2023

BS 5422:2023 is the British Standard for thermal insulating materials for pipes, tanks, vessels, ductwork and equipment operating within the temperature range -40 °C to +700 °C.

This Guide uses tables from the Standard to calculate insulation thickness required for Isover products.

Other key documents



British Standard EN ISO 12241:2022 is a technical standard that provides guidelines for the thermal insulation of piping and equipment in industrial installations. It offers methods to calculate heat losses, heat gains, surface temperatures, and other thermal properties critical for insulation design in various industrial processes.

The Thermal Insulation Suppliers & Manufacturers Association (TIMSA) also produce a useful guide which presents the tables from BS 5422.

This TIMSA compliance guide is typically the first port-of-call considered for the specification of HVAC insulation alongside CIBSE Guide B.

When it comes to the specification of insulation for pipe and ductwork, the main drivers are UK Building Regulations and energy efficiency of building services

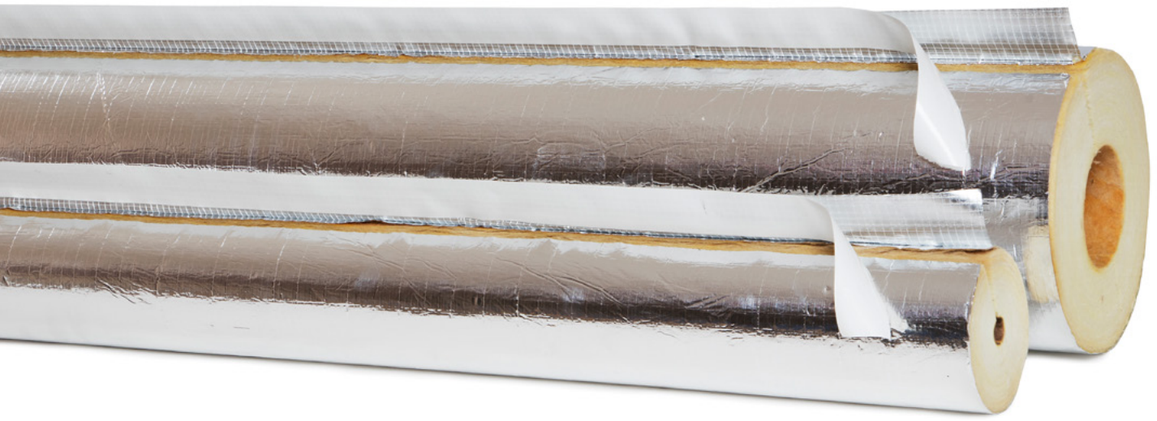
Updated Isover calculations for BS 5422:2023

The tables included in this guide have been adjusted to remove thermal insulation values that are less frequently used. We have also removed the separate tables for steel and copper pipework. This data has been refined to give a 'less than or equal to' value, which is designed to give contractors just one table to refer to.

Tables from the government-approved Energy Technology List (ETL)[1], which supersedes Enhanced Capital Allowances, have now been incorporated into the standard as 'additional enhanced tables'.

The tables within this guide contain calculations generated by Saint-Gobain Isover using bespoke 'Techcalc' software. The calculations are based on EN ISO 12241, EN ISO 23992 and VDI 2055 Part 1. It is the responsibility of the recipient to approve and coordinate the information provided by Isover before installation.

All materials, unless otherwise stated, shall be supplied by Isover and need to be installed in accordance with current manufacturers recommendations[2] and construction industry standards.



1 For more information on the ETL, refer to www.gov.uk/guidance/energy-technology-list

2 If you would like more information on any of Isover UK's range of HVAC solutions, please contact our friendly team: isover.customerservice@saint-gobain.com

BS 5422:2023 Table 8 – Minimum insulation thickness for chilled and cold water pipes to control condensation on a low emissivity outer surface (0.05) with an ambient temperature of +25 °C and a relative humidity of 80%

External diameter (mm)	t =10	t = 5
	Insulation thickness (mm)	Insulation thickness (mm)
17.2	20	25
21.3	20	25
26.9	20	30
33.7	25	30
42.4	25	40
48.3	25	40
60.3	25	40
76.1	30	40
88.9	30	40
114.3	30	50
139.7	40	50
168.3	40	50
219.1	40	50
273.0	40	60

BS 5422:2023 Table 10 – Indicative thickness of insulation for cooled and chilled water systems to control heat gain – Low emissivity outer surface. Emissivity = 0.05

External diameter (mm)	t =10		t =5	
	Maximum permissible heat gain (W/m)	Insulation thickness (mm)	Maximum permissible heat gain (W/m)	Insulation thickness (mm)
17.2	2.48	20	2.97	20
21.3	2.72	20	3.27	20
26.9	3.05	20	3.58	20
33.7	3.41	20	4.01	25
42.4	3.86	20	4.53	25
48.3	4.11	20	4.82	25
60.3	4.78	20	5.48	25
76.1	5.51	25	6.30	30
88.9	6.17	25	6.90	30
114.3	7.28	25	8.31	30
139.7	8.52	25	9.49	30
168.3	9.89	25	10.97	30
219.1	12.27	25	13.57	30
273.0	14.74	25	16.28	30

Updated Isover calculations for BS 5422:2023 continued

BS 5422:2023 Table 12 – Minimum insulation thickness for condensation control on ductwork carrying chilled air in ambient conditions: indoor still air temperature +25 °C, relative humidity 80%, dew point temperature 21.3 °C

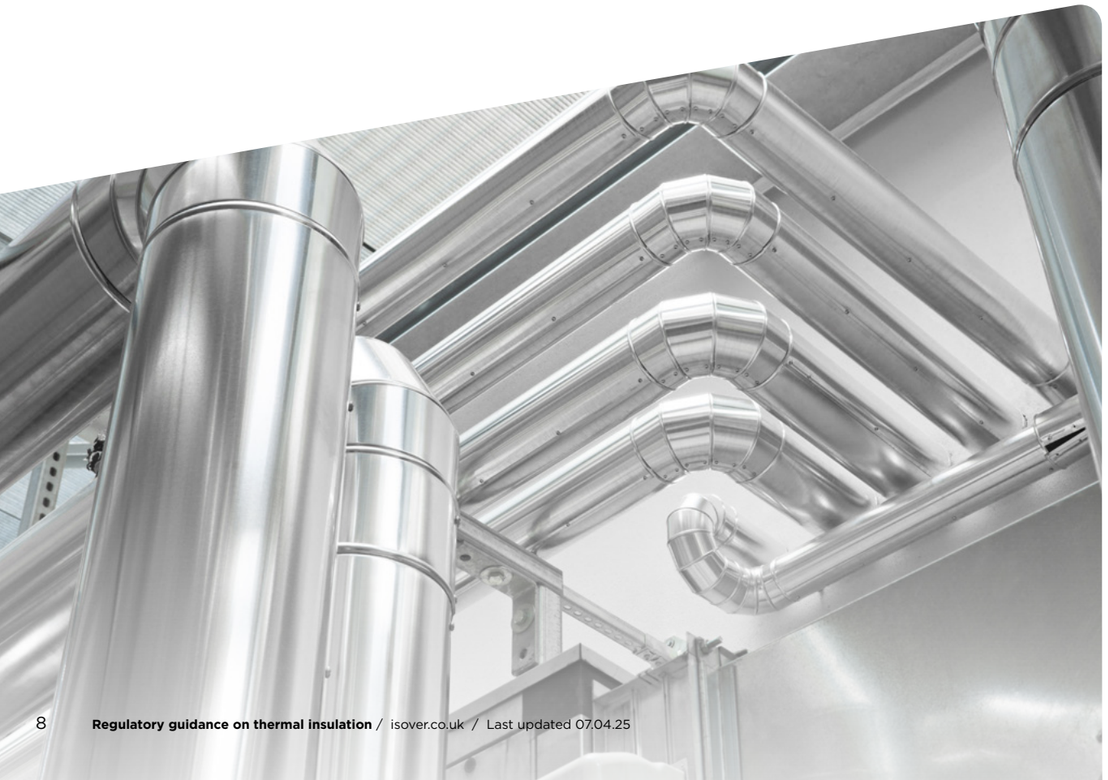
Minimum temperature inside duct (°C)	External Emissivity		
	0.05	0.44	0.90
	Minimum thickness of Climcover Roll or Slab (mm)		
15	25	13 (25)	8 (25)
10	45 (50)	23 (25)	15 (25)
5	64 (75)	33 (40)	21 (25)

Valid for Climcover Roll ALU2 and ALU Strong and Climcover Slab ALU2 and ALU2 Standard
External Service Emissivity
0.05: Bright Aluminium Foil
0.44: e.g. Dusty Galvanised Steel
0.90: e.g. Black Paint

BS 5422:2023 Tables 13 and 14
Table 13 – Indicative thickness of insulation for ductwork carrying warm air to control heat loss
Table 14 – Indicative thickness of insulation for chilled and dual-purpose ducting to control heat transfer

	Heated duct	Dual purpose	Cooled duct
Heat gain/loss max.	16.34 W/m²	-6.45 W/m²	-6.45 W/m²
Climcover Roll	30 mm	50 mm	50 mm
Climcover Slab	30 mm	50 mm	50 mm

Heated Duct: Horizontal duct at 35 °C, with 600 mm vertical sidewall in still air at 15 °C
Dual Purpose: Horizontal duct at 13 °C, with 600 mm vertical sidewall in still air at 25 °C
Cooled Duct: Horizontal duct at 13 °C, with 600 mm vertical sidewall in still air at 25 °C



The new Table 15a, below, covers the base level thickness of insulation for non-domestic heating services to control heat loss on low emissivity outer surfaces, as well as the recommended Isover solution.

BS 5422:2023 Table 15a – Base level thickness of insulation for non-domestic heating services to control heat loss – Low emissivity outer surfaces

External diameter (mm)	Maximum permissible heat loss (W/m)	Recommended Isover insulation thickness (mm)
17.2	8.90	25
21.3	9.28	30
26.9	10.06	40
33.7	11.07	40
42.4	12.30	40
48.3	12.94	40
60.3	14.45	40
76.1	16.35	50
88.9	17.91	50
114.3	20.77	50
139.7	23.71	50
168.3	26.89	50
219.1	32.54	50
273.0	38.83	50

Service temperature 75 °C
Ambient temperature 15 °C still air

The new Table 15b (Enhanced Level), below, covers the base level thickness of insulation for non-domestic heating services to control heat loss on low emissivity outer surfaces, as well as the recommended Isover solution.

BS 5422:2023 Table 15b – Enhanced level thickness of insulation for non-domestic heating services to control heat loss – Low emissivity outer surfaces

External diameter (mm)	Maximum permissible heat loss (W/m)	Recommended Isover insulation thickness (mm)
17.2	7.78	40
21.3	8.42	40
26.9	9.05	40
33.7	9.86	50
42.4	10.83	50
48.3	11.42	50
60.3	12.61	50
76.1	14.12	60
88.9	15.28	60
114.3	17.51	60
139.7	19.72	60
168.3	22.34	60

Service temperature 75 °C
Ambient temperature 15 °C still air

Updated Isover calculations for BS 5422:2023 continued

Table 17a and 17b have also been updated, to cover base level thickness of insulation for non-domestic hot water service areas on low-emissivity outer services.

BS 5422:2023 Table 17a – Base level thickness of insulation for non-domestic hot water service areas to control heat loss – Low emissivity value (0.05)

External diameter (mm)	Maximum permissible heat loss (W/m)	Recommended Isover insulation thickness (mm)
17.2	6.60	25
21.3	7.13	25
26.9	7.83	30
33.7	8.62	30
42.4	9.72	30
48.3	10.21	40
60.3	11.57	40
76.1	13.09	40
88.9	14.58	40
114.3	17.20	40
139.7	19.65	40
168.3	22.31	40
219.1	27.52	40
273.0	32.10	40

Service temperature 60 °C
Ambient temperature 15 °C still air

BS 5422:2023 Table 17b – Enhanced level thickness of insulation for non-domestic hot water service areas to control heat loss – Low emissivity value (0.05)

External diameter (mm)	Maximum permissible heat loss (W/m)	Recommended Isover insulation thickness (mm)
17.2	6.04	30
21.3	6.45	40
26.9	7.00	40
33.7	7.71	40
42.4	8.46	40
48.3	9.01	40
60.3	9.94	50
76.1	11.25	50
88.9	12.17	50
114.3	14.29	50
139.7	16.09	50
168.3	18.24	60
219.1	22.06	60
273.0	25.95	60

Service temperature 60 °C
Ambient temperature 15 °C still air

BS 5422:2023 Table 19a – Base level thickness of insulation for domestic heating and hot water systems having low emissivity outer surfaces

External diameter (mm)	Commercial insulation thickness (mm)
≤15	20
≤22	20
≤28	20
≤35	20
≤42	20
≤54	20

Service temperature 60 °C
Ambient temperature 15 °C still air

BS 5422:2023 Table 19b – Enhanced level thickness of insulation for domestic heating and hot water systems having low emissivity outer surfaces

External diameter (mm)	Commercial insulation thickness (mm)
≤15	20
≤22	20
≤28	25
≤35	25
≤42	25
≤54	30

Service temperature 60 °C
Ambient temperature 15 °C still air

BS 5422:2023 Table 19c – Indicative thickness of insulation for district heating systems having low emissivity outer surfaces (secondary system)

External diameter (mm)	Inner commercial insulation thickness (mm)	Outer commercial insulation thickness (mm)
21.3	22 x 50	
26.9	28 x 50	
33.7	35 x 20	76 x 40
42.4	42 x 30	108 x 40
48.3	48 x 30	108 x 40
60.3	60 x 40	140 x 50
76.1	76 x 40	168 x 60
88.9	89 x 40	168 x 60

Service temperature 55 °C
Ambient temperature 20 °C still air

Updated Isover calculations for BS 5422:2023 continued

BS 5422:2023 Table 23: Minimum insulation thickness to control the surface temperature of a metallic surface with a surface emissivity of 0.05 and design cold face temperature of 50 °C. Emissivity = 0.05		
	t =100	t = 200
External diameter (mm)	Insulation thickness (mm)	Insulation thickness (mm)
17.2	20	25
21.3	20	25
26.9	20	30
33.7	20	30
42.4	20	30
48.3	20	30
60.3	20	40
76.1	25	40
88.9	25	40
114.3	25	40
139.7	25	50
168.3	25	50
219.1	25	50
273.0	40	50

Service temperature 60 °C
Ambient temperature 20 °C still air

A global brand committed to a better world

Saint-Gobain Interior Solutions unites two global brands; Isover and British Gypsum, to offer a comprehensive range of solutions under one roof. This collaboration enables us to support our customers throughout their projects with ease and efficiency. Our commitments:

Isover: a global innovator

Isover has research and development centres across the world. We utilise these resources for product development, conducting insulation testing at facilities like the Building Test Centre in the UK; a UKAS accredited test facility which recently had a major £7million investment.

Environmental Product Declarations (EPDs)

EPDs for Climcover Roll Alu2 can be downloaded from the Isover.co.uk website, demonstrating the environmental impact of the product over its whole life-cycle in accordance with EN 15804 and ISO 14025.

Support and services

Our Technical Support and Customer Service teams in the UK are on hand to help with your query. The team can offer advice, with guidance on product selection and installation. Technical assistance is also available should you need it. We can also offer project support to ensure projects meet regulatory standards.

Contact the team at:
isover.technical@saint-gobain.com
isover.customerservice@saint-gobain.com

Sustainability

We're dedicated to achieving net-zero carbon emissions by 2050 with ambitious global targets across all Saint-Gobain companies. At Isover, we have set ambitious targets like 50 % water reduction at our UK factory to help us achieve this goal. Our insulation products also incorporate up to 82 % recyclable materials. In addition, our UK manufacturing facility at Runcorn in Cheshire has an electric furnace and and uses 100 % renewable electricity (independently certified).

Training

We offer a variety of courses at four Training Academies across the UK. Designed to help address skills gaps in the construction industry, courses and Continuous Professional Development (CPD) programmes are continually in development.

We care about building better for people and the planet by offering insulation solutions that deliver sustainability, innovation and performance, to drive the transformation of the construction market

SAINT-GOBAIN

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