



THERMAL INSULATION MANUFACTURERS
& SUPPLIERS ASSOCIATION

The Building Regulations 2000

TIMSA guidance for achieving compliance with Part L of the Building Regulations

DOMESTIC AND NON-DOMESTIC HEATING, COOLING AND VENTILATION GUIDE

COMPLIANCE WITH APPROVED DOCUMENTS

- L1A: NEW DWELLINGS
- L1B: EXISTING DWELLINGS
- L2A: NEW BUILDINGS OTHER THAN DWELLINGS AND
- L2B: EXISTING BUILDINGS OTHER THAN DWELLINGS

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TIMSA
Thermal Insulation Manufacturers & Suppliers Association

Formed in 1978, TIMSA is a trade association comprising UK manufacturers, consultants, suppliers and distributors of the whole range of thermal insulation materials, ancillaries and services.

TIMSA is committed to raising standards and awareness of the need to insulate and the part insulation can play in the protection of the environment.

Further information is available on TIMSA's web site www.timsa.org.uk

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CONTENTS

1	FOREWORD	4
2	HOW TO USE THIS GUIDE	5
2.1	Who the Guide is for and which Sections are relevant to each audience	5
2.2	Scope of the Guidance	5
2.3	Summary	7
3	DEVELOPMENT OF METHODOLOGY	7
3.1	Linkage with the Part L Consultation and the Regulatory Impact Assessment Assumptions	7
3.2	Financial criteria - payback	8
3.3	Inclusion of the Social Cost of Carbon	10
3.4	Selection of Standardised Scenarios for Evaluating Compliance	10
4	CONSIDERATION OF PRACTICALITY	13
4.1	Linkage to Pipe Diameter	13
4.2	Selection of Reference Thermal Conductivities	13
5	WHERE TO INSULATE AND MINIMUM PERFORMANCE REQUIREMENTS	14
5.1	Dwellings	14
5.2	Buildings other than Dwellings	16
6	INDICATIVE INSULATION THICKNESSES	18
6.1	Dwellings	18
6.2	Buildings other than Dwellings	19
7	OTHER REASONS FOR INSULATING	26
7.1	Frost Protection	26
7.2	Condensation Control	30
7.3	Personnel Protection	31
8	FURTHER READING	31
9	CONTACTS WITH TIMSA	31
10	ANNEX 1 BACKGROUND TO THE DEVELOPMENT OF THE GUIDE	32
A-1.1	The UK's Climate Change Programme commitments	32
A-1.2	The importance of pipe and duct insulation in CO ₂ terms	34
A-1.3	The Energy Performance in Buildings Directive	36
A-1.4	The resulting revision of the Building Regulations	38
A-1.5	Linkage with other Compliance Guides	38

1 FOREWORD

TIMSA has been active in assessing the contribution of insulation to the UK carbon emission reduction goals since these were re-established in 1997. The commitment to 20% reduction in CO₂ emissions by 2010 has always been recognised as ambitious and certainly not achievable without substantial contributions from the energy efficiency industry in general and thermal insulation in particular.

The development of the Energy Performance in Buildings Directive in the early part of this decade and its finalisation in January 2002 began to put shape on the likely future requirements for the built environment in the UK. TIMSA has been at the forefront of evaluating the implications for the industry; both by participation in the Part L Industry Advisory Groups (IAGs) and in the revision of standards which might influence the fulfilment of the Directive's objectives.

With respect to pipe and duct insulation specifically, a TIMSA Sub-Group was formed in early 2004 to assist in developing minimum requirements for the 2006 revision of Part L based on cost-effectiveness criteria being established at the time within the IAGs and later re-assessed during and after the consultation process that took place in mid-2005. Throughout this process, the Sub-Group has stuck firmly to its task of defining the minimum criteria for pipes and ducts in both domestic and non-domestic environments. This scope has included all hot water, heating and cooling applications. As Tier 2 Compliance Guides in both domestic and non-domestic sectors began to emerge in early 2005, the TIMSA Sub-Group also became engaged in ensuring that pipe and duct insulation was consistently and appropriately covered.

In all the Sub-Group has met over 20 times in pursuit of these objectives and TIMSA would like to use this opportunity thank each participant and their respective employers for the support provided to the process. The following participants and companies were involved:

Nick Ralph (Chair of Sub-Group)	Rockwool Limited
Pat Johnson	Armacell
Vance Brownhill	Armacell
Nikolaus Odenwald	Armacell
David Davies	ex-Armacell
John Robertson	NMC (UK) Limited
Les Johnson	Deeside Technical Services/Union Foam
Pat Testa	Sheffield Insulation
Geoff Wright	KingspanTarec Limited
Stephen Wise	Knauf Insulation

In addition, TIMSA would wish to acknowledge the co-ordination and secretarial role played by Paul Ashford of Caleb Management Services Limited, who was also responsible for the initial development of this document for TIMSA review and approval.

TIMSA will be continuing to support the requirements of the industry through the implementation of the 2006 Part L Revisions and is already looking at the implications of future revisions of Part L which will be scheduled for 2010. The continued inter-linkage with BS 5422 will be a further focus of future work.

Patrick Hall
Chairman TIMSA

March 2006

2 HOW TO USE THIS GUIDE

2.1 Who the Guide is for and which Sections are relevant to each audience

The primary purpose of the 'TIMSA HVAC Guidance for Achieving Compliance with Part L of the Building Regulations' is to provide a single point reference for all compliance issues related to the treatment of pipework and ductwork insulation within the 2006 version of Part L of the Building Regulations.

The Guidance is targeted at three different audiences:

1. Those seeking to understand the role and significance of pipework and ductwork insulation in the wider development of climate change policy within the built environment [Policy Significance]
2. Those seeking to understand the basis on which the current performance standards have been derived and needing to know how to replicate the calculations for other scenarios (e.g. products with thermal performance other than those listed) [Basis of Calculation]
3. Those seeking to know simply when to use this Guide and an indicative assessment of the thicknesses of insulation required [Guidance for Compliance]

The following table provides a directory of sections relevant to each of these audiences:

Section		Policy Significance	Basis of Calculation	Guidance for Compliance
2	How to use this Guide	X	X	X
3	Background to the development of the Guide	X		
4	Development of methodology		X	
5	Consideration of practicality		X	
6	Where to insulate and minimum performance		X	X
7	Indicative insulation thicknesses		X	X
8	Other reasons for insulating		X	X
9	Further reading	X	X	
10	Contact point at TIMSA	X	X	X

2.2 Scope of the Guidance

This guidance is specifically targeted at the implementation of the 2006 revision of Part L of the Building Regulations covering the '*conservation of heat and power*'. It does not provide specific guidance on other aspects of pipework and ductwork insulation performance and users of the Guide need to take account of other reasons for insulating which might be operative (see Section 7). Consideration also needs to be given to other aspects impacting product performance such as temperature of operation, exposure to foot traffic, environmental credentials etc. With respect to pipes, the Guidance applies to all pipe materials (i.e. steel, copper, plastic and other).

Guidance on compliance with the energy efficiency requirements of in the Building Regulations as amended April 2006 is conveyed in four Approved Documents: ADL-1A, ADL-1B, ADL-2A and ADL-2B. Detail on the derivation of these documents is found in Annex 1. The documents cover the following four scenarios:

	Dwellings	Buildings other than Dwellings
New Build	ADL-1A	ADL-1B
Existing Buildings	ADL-2A	ADL-2B

These four Approved Documents are supported by two over-arching Compliance Guides entitled:

The Domestic Heating Compliance Guide

The Non-Domestic Heating, Cooling and Ventilation Compliance Guide

These *Tier 2* documents effectively act as Annexes to the Approved Documents and directly specify the minimum performance requirements for pipework and ductwork insulation. However, because there is insufficient room in the Compliance Guides themselves for a detailed explanation of pipework and ductwork related issues, this *Guidance* offers specific further information on aspects of compliance and, in particular, indicative thicknesses for insulation being applied at specified thermal conductivities. Since the TIMSA Guide is specifically referenced in both Compliance Guides, it is technically itself a *Tier 2* document and has been reviewed directly by ODPM on that basis.

The scope of this Guidance is expanded further in the sub-paragraphs below:

2.2.1 Dwellings and Buildings other than Dwellings (BoTD)

As described above, this *TIMSA HVAC Guidance* on pipework and ductwork supports Approved Documents and Compliance Guides relating to both dwellings and buildings other than dwellings. Sections 5 and 6 of this document are divided into dedicated sub-sections dealing specifically with each sector of the market. However, unlike the British Standard BS 5422, this *Guidance* does not cover the insulation of pipework and ductwork within the process sector.

For community heating systems, where the central heat source is within the overall building, it should be handled as part of a non-domestic provision and pipework and ductwork insulation should be applied accordingly. Where the community heating system breaks into a dwelling, it is considered as part of a dwelling and is subject to the requirements relevant to dwellings. Further information is available on this within the Domestic Heating Compliance Guide.

2.2.2 Pipework and Ductwork

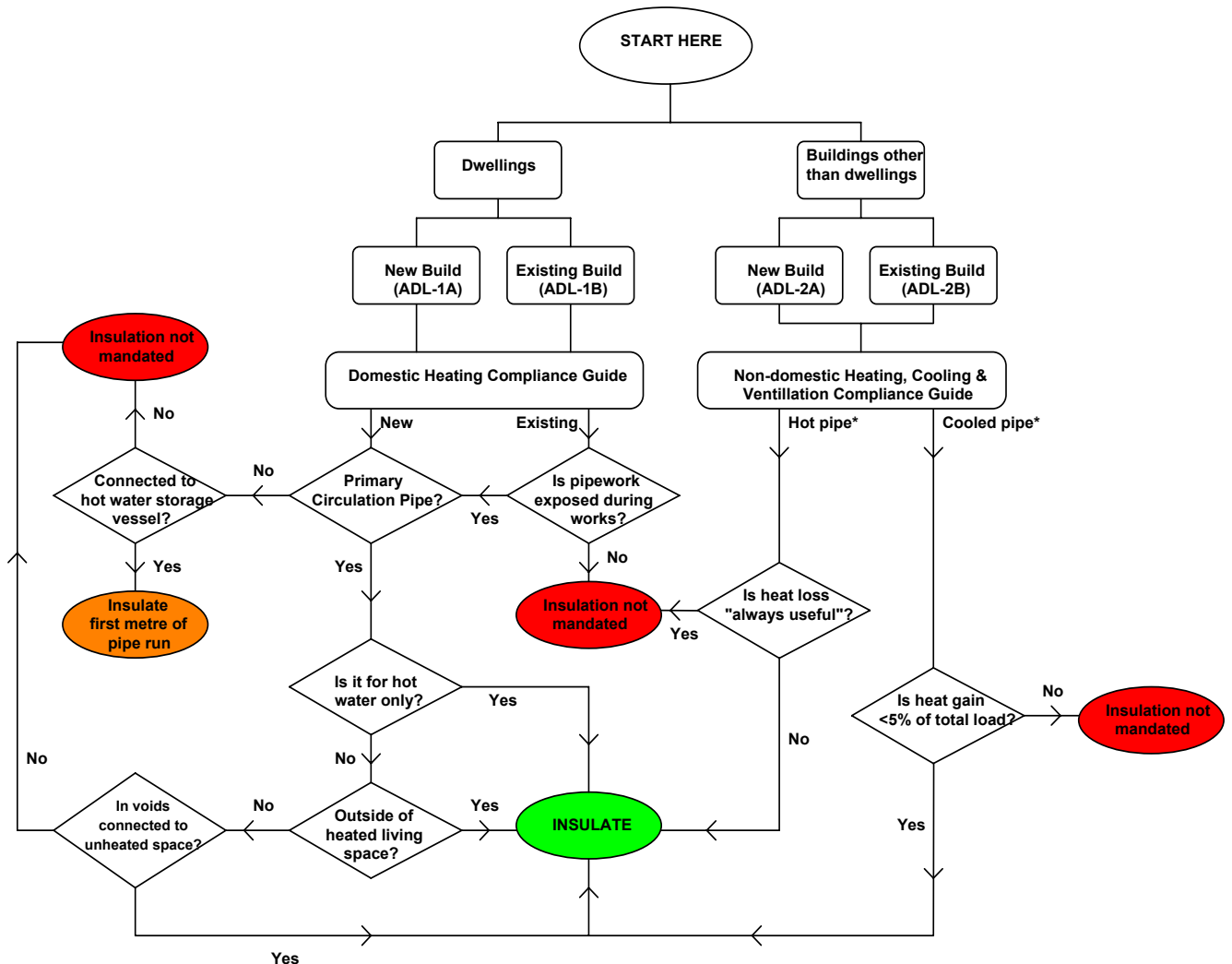
As with BS 5422, this *Guidance* deals with both pipework and ductwork. Although the fluid transported and typical temperature differentials vary considerably between the two types of structure, the analysis of heat losses or gains is essentially the same in both cases. It has therefore been possible to apply consistent assumptions across both sectors of the market in respect of important parameters such as cost-effectiveness limits. However, because there are no pre-specified sizes for a duct (in contrast to standardised pipe sizes), it has been most appropriate to quote the minimum performance criteria for duct in terms of maximum permissible heat losses/gains per unit area of duct wall rather than per linear metre of 'run' as is the case for pipework.

2.2.3 Hot water, Heating and Chilled Systems

This *Guidance* covers hot water, heating and cooling systems in both domestic and non-domestic environments. These six permutations are defined in terms of standardised temperatures, utilisation levels, fuel types and surface emissivity parameters. These scenarios are dealt with in more detail in Section 3.4. However, it is important to establish at this point that **all compliance calculations should be based on these standardised scenarios**. Accordingly, if a pipework installation is based on an alternative fuel type, a different operating temperature or even a different utilisation level, the thickness of insulation required should still be assessed by using the standardised conditions. Although this may seem counter-intuitive initially, and clearly will result in some variation of real heat losses and/or gains, it is the only practical way in which compliance can be readily assessed after the event. Indeed, such an approach makes it possible to follow product labelling protocols based on compliance – particularly in the dwellings sector.

2.3 Summary

The following flow-chart summarises the circumstances under which the pipework and ductwork provisions of the 2006 revision of Part L will apply:



Flowchart is indicative only: To ensure compliance always refer to the precise text in Section 6

* Both hot and cooled ducting should always be insulated

3 DEVELOPMENT OF METHODOLOGY

3.1 Linkage with the Part L Consultation and the Regulatory Impact Assessment Assumptions

During the consultation that took place on the amending of Part L of the Building Regulations in July 2004, the ODPM took advantage of specifying its considered assessment of key parameters which might be used in defining minimum performance criteria. These reflected earlier templates which had been circulated to industry via the Industry Advisory Groups (IAGs) and contained assumptions for fuel costs, target payback periods and other relevant factors. These were adopted at an early stage in TIMSA's work to develop appropriate minimum performance criteria and incorporated within appropriate Excel spreadsheets which drove the calculation methodology. An example of the way in which assumptions were incorporated is shown below:

Figure 2 – Example of assumptions adopted for heating and hot water pipework based in part on IAG inputs

COST EFFECTIVENESS ASSESSMENT

ASSUMPTIONS USED:

Target Payback Period:	(yrs)	7	
Fuel Type:		Gas	
Carbon Loading	(kg/kWh)	0.1944	IAG Cost Effectiveness Calculator
Utilisation Rates:			
- Domestic Hot Water	(hrs/yr)	500	
- Domestic Heating	(hrs/yr)	1500	
- Non-domestic Hot Water	(hrs/yr)	2000	
- Non-domestic Heating	(hrs/yr)	1750	
Fuel Price			
- Domestic	(£/kWh)	0.0135	IAG Cost Effectiveness Calculator
- Non-domestic	(£/kWh)	0.0100	IAG Cost Effectiveness Calculator
Insulation cost proportion	(%)	28%	
Lifetime of measure	(yrs)	15	
Social Cost of Carbon	(£/te)	82.5	
Discount Rate	(%/yr)	3.50%	IAG Cost Effectiveness Calculator
Pipe type		Oxidised Copper	

These IAG assumptions were also carried forward into the government’s Regulatory Impact Assessment which took into account such aspects as:

- The potential for adverse impacts on other aspects of building performance
- Demanding construction details or techniques that are too challenging
- Creating disproportionate burdens on particular sectors of industry
- Making the regulations and associated technical guidance too complex

The Regulatory Impact Assessment concluded in favour of the proposed Building Regulation changes and this was broadly supported by the subsequent consultation process.

3.2 Financial criteria - payback

At the time of the Part L Consultation, the criteria for cost effectiveness were defined in terms of the service life of the measure as follows:

“Measures are considered justified if their capital cost is equal to or less than the net present value of future savings in direct fuel costs, future capital costs (such as boiler replacements), and the avoided social costs of carbon emissions, accrued over the service life of the measure”

The test discount rate attached to this assessment was 3.5% in line with the guidance contained in the Treasury Green Book on assessing long term environmental improvement measures.

Recognising the complexity of such a method for simpler investments, the draft versions of ADL-1B and ADL-2B contained within the consultation both reverted to the following simpler clause:

“A measure will be deemed to be cost effective if the simple payback is no longer than seven years, where simple payback is given as the marginal cost of the energy efficiency measure divided by the value of the fuel savings ”

In view of the relatively simple functional units associated with pipe and duct insulation and the magnitude of pipe diameters to be assessed, it was decided to follow the simple seven year payback formula – albeit incorporating a correction for the discount rate ascribed to such measures by the Treasury.

