



Australian Building Codes Board

Draft

PRELIMINARY IMPACT ASSESSMENT

Revision of AS 4254 Ductwork for air-handling systems in buildings 2002 and Amendments 1+ 2

[1] Nature and Extent of the Problem:

AS 4254 is called up by the BCA for both Rigid and flexible duct used in air handling systems in buildings. Rigid and flexible duct are commonly used together in commercial application, although almost never in domestic applications

Rigid and flexible duct have vastly different manufacturing processes and are not commonly produced by the same manufacturers. For ease of understanding these requirements, by the manufacturer, end user through to regulatory authorities separating the testing and manufacturing requirements of rigid and flexible ductwork for air-handling systems into two separate standards makes logical sense.

This Standard is to be Part 1 of a proposed series on ductwork for air-handling systems. This Part covers flexible duct. Part 2 will cover Rigid duct work. Part 2 of this standard is also being updated by the ME-062-06 committee with the first committee meeting already having taken place.

Many of the changes to the 2002 version concerning Part 1 of this Standard have been brought about via industry Government and ABCB who have recognized all too common inefficiencies with flexible duct that exist in many flexible duct installations in Australia and worldwide.

The Thermal Insulation Standard AS 4859.1 is mentioned numerous times throughout this document. AS 4254 1995 and 2002 both require the thermal insulation wrapped around flexible duct to be present in the "Flexible duct system" i.e. the final installed assembly when flexible duct is tested to AS 4254 fire and mechanical fit for purpose tests.

Flexible duct deficient of the required thermal values specified in the BCA has been highlighted as a major issue of concern by those within the industry and the AGO. The revised edition clearly defines and refines the thermal testing requirements for insulation used on flexible duct leaving little open to interpretation.

What are the issues and why are they a problem?

- 1) Flexible duct is a little understood product and is rarely considered by consumers. Flexible duct is generally out of sight, out of mind. On a domestic level tens of thousands consumers yearly invest in what is usually a once in a lifetime purchase of a ducted system for their family's comfort. In a **domestic ducted installation flexible duct is 97% of the air delivery system**, the MEPS rated unit being 2% and fittings around 1%. Consumers are prepared to spend upwardly of \$10,000.00 to install a reverse cycle heating/cooling ducted system into a standard 3 bedroom home with out giving the flexible duct a second thought. The prime considerations are the brand, size, efficiency and MEPS rating of the unit and number of air outlets in the home. Once these variables established several quotes from different installers all specifying the same unit and number of air outlet are usually obtained with the job usually going to the installer with the cheapest price.
- 2) The 1995 edition of ductwork used in air handling systems in buildings is referenced in BCA 2011 and is 17 years old and in need of updating. It is unclear as to why the 2002 edition including amendments 1+2 has been omitted from inclusion in the BCA since its publication in 2002.
- 3) Since 1998 the BCA has regulated significant improvements to the thermal performance of the buildings shell and has via MEPS mandated the performance and energy consumption of gas ducted heaters and reverse cycle ducted Air conditioners.
- 4) In the 2002 edition of this standard, labelling of flexible duct was normative inclusion in appendix F and has been disregarded by industry and not put into practice.
- 5) Flexible Duct is a poor cousin to its well-publicized, MEPS governed relatives, ducted air conditioning and heating units. For many years ducted heating and cooling units have been "Star Rated" so that consumers can easily compare the pricing and energy efficiency between different models and different manufacturers. **The ducted heating or cooling unit is 2% of the total ducted system, the other 98% of a ducted system is flexible duct. However this important part of the system (flexible duct) is not star rated** and left to the installer to make the selection. As regulation of flexible ducted installations is virtually nonexistent most installers compete solely on price. Consumers assume if they choose, Brand X "6 Star" gas ducted heater they will also get Brand X –"6 Star" flexible duct and

thus will have a Brand X – “6 Star ducted system installed in their home”. More often than not a “6 Star” heating unit is connected to poorly insulated flexible duct, the net effect being the consumer having what would amount to a “2 Star ducted system” installed into their home. **The consumer who purchased this system has no idea the flexible duct connected to their “6 star heater” is thermally deficient. The consumer can only look at their gas bill and wonder at how much more it would be if they hadn’t installed a “6 Star ducted heating System”, when in fact their ducted system is more costly to run than it should be, due to thermally deficient flexible duct being connected to the High efficiency heater. Should thermally deficient flexible duct be connected to a high efficiency 6 Star ducted Air Conditioner the same scenario applies only multiplied.**

- 6) For over 10 years low cost entry into the flexible duct manufacturing market has been commonplace. The machinery is often provided well below actual cost as long as the purchaser of the machinery binds itself to acquiring all its raw materials to make the flexible duct through the supplier of the machinery. A glut of unregulated flexible duct manufacturers soon emerged and has led to a nationwide price war on flexible duct to the detriment of the product being fit for its intended purpose and application .i.e. lacking the fire ratings, mechanical and thermal properties specified in the BCA.
- 7) In 2006, the ABCB went against industry recommendation and changed the BCA from material only thermal values (Rm) to Total Material thermal values (Rt), in regard to the thermal requirements of flexible duct. The net effect being all manufacturers having to compete on cost alone, further reducing the amount of thermal insulation used on their flexible duct.
- 8) In 2006 the AGO advised industry that they had received many complaints that there was no way for a consumer nor authority to look at flexible duct and determine its fire rating ,whether it be mechanically fit for purpose or its thermal properties. The AGO suggested labelling flexible duct and labelling be called up in the appropriate Australian Standard and plumbing regulation. Furthermore an increasing number of consumers were installing flexible ducted heating and cooling systems into their own homes due to the reduction in real costs of the units. It was also noted that it was difficult to regulate an industry where much of the work was outsourced by retailers with only an estimated 15 % of units being installed by registered plumbers. With Governments reduction of red tape it is easier for regulation to occur at the point where costs are lowest. In this instance, it is easier to regulate the thermal, fire and mechanical performance of flexible duct at point of manufacture.
- 9) The 2006 AGO meeting confirmed to those in the industry that weren’t already aware that flexible duct was in effect un regulate able .This escalated widespread industry claims that were false and misleading which are still commonplace .The claims include flexible ducts being fit for purpose (when tested to BCA specified AS 4254) fire and mechanical tests and flexible duct meeting the thermal performance requirements (when tested to BCA specified AS 4859.1).
- 10) In 2006-2007 an industry group, Australian Duct Manufacturers Alliance (ADMA) was formed at the request of the AGO to assist Government in regulating of the flexible duct industry.
- 11) In 2008 ADMA appointed an independent consultant (P.Spry) familiar with the industry to provide DEWHA the current status quo of the flexible duct industry in Australia and the products it was producing that were being purported to comply with AS 4254 and AS 4859.1.
- 12) In 2009 the Spry report confirmed the AGOs 2006 findings of wide spread non-compliance to AS 4254 and AS 4859.1.The report was signed off by the ABCB and accepted by DEWHA.
- 13) In 2011 the ABCB withdrew its 2006 decision to use Total Thermal Values (Rt) in regard to the thermal requirements of flexible duct and reverted back to the use of Material Thermal Values (Rm).Research results show technical revision to the Standard is needed.
- 14) Independent studies in both America and Australia have estimated in the vicinity of 20-40% thermal energy losses in flexible ducted systems. In the main due to ineffective air and vapour sealing, poor installation practices and insulation being thermally deficient for the application into which it is installed.
- 15) BCA 2011 requires 14 different Material Thermal Values (Rm) for the insulation used on flexible duct depending on the climate zone and the application it is installed into. Whilst BCA 2009 still current for some applications in Tasmania and Northern Territory still references Total Thermal Values (Rt). Without mandatory labelling on flexible duct there remains no way to determine its thermal value, fire ratings, being fit for purpose or its manufacturer, at point of purchase or once in situ. This in conjunction with the increased energy efficiency requirements for new constructions along with rising costs of is driving the requirement for more efficient flexible duct installed in the appropriate manner.
- 16) Consideration also needs to be given to flexible duct installed into installations where the neither BCA nor Australian Standards have any governance i.e. existing homes and buildings and the retrofit market. Existing homes and buildings and the retrofit market covers the bulk of flexible duct sold in Australia every year. Existing structures due to their age are far less energy efficient by nature than new constructions. The heating and or cooling units that are installed into these installations by law must be MEPS compliant and rated. It goes against comprehension and all government policy that flexible duct installed into these applications (98% of the air delivery system) does not have to comply with any Standards or Regulations. Flexible duct in some unregulated installations is still being installed today uninsulated. Other poor practices in unregulated installations include flexible duct installed exposed to open weather conditions and in contact with the ground.
- 17) Information provided to all users by flexible duct manufacturers concerning the specifications of their products is highly inconsistent creating confusion in the market place. This generally makes the issue of flexible duct to complex for users to make an informed decision on the benefits of one manufacturer’s product over another’s usually leads to the user basing their purchasing decision on price alone.

Who is affected by the problem and in what way?

Every person that buys or uses flexible duct including engineers, installers, designers, architects, regulators, authorities, councils, consumers, other users of the BCA, the owners and end users of the building are affected by the outdated Standard. The outdated Standard lags behind recognized industry and government acknowledged issues to the detriment of the consumer and the country's energy reserves. The current practices used by industry are consequently unsatisfactory for regulatory use in BCA, for industry use for design and installation and for use in building contracts. The existing home, building and retrofit markets are affected greatly as they are currently, in the main outside of the scope of BCA regulation and requirements of even this revised edition.

What evidence exists to show there is a problem?

- 03_ ADMA National Survey of Flexible Duct Manufacturers and review of current practices
- 04_ AGO Minutes from Industry Meeting on Thermal Performance of Flexible Air-Conditioning Ductwork
- 05_ Ministerial Council on Energy Efficiency-Bulletin 180
- 07_ USA Study on Thermal Losses in Duct Work System
- 10_ HVAC&R Editorial-Aging Ducted Heating Systems in need of attention
- 11_ Field study on Gas Ducted Systems in Victoria G. Palmer
- 12_ ACCC New Release re; Action Against Insulation Batt Manufacturers for non-compliance to AS 4859.1
- 13_ USA Study of Thermal Losses from Flexible Duct 1998
- 15_ ADMA Letter to Ministerial Council of Energy re; Seeking Support
- 17_ ADMA Letter to ABCB re; Labeling of Flexible Duct
- 18_ MPMSAA Letter to ABCB re; Labeling of Flexible Duct
- 19_ HCAA Letter to Duct Manufacturers re; Recent AGO Meeting
- 21_ ADMA Letter to MEPS re; Non Energy Using Products (flexible duct) Inclusion into Program
- 26_ ABCB Response to ADMA re; Including labeling of Flexible Duct
- 27_ ADMA Letter of DEWHA following up on 2006 AGO Meeting

[2] Objectives:

The objective of publication of the new version is to provide transparency and improve the accountability of flexible duct manufacturers to provide products that meet the appropriate fire, mechanical and thermal Australian Standard's as specified in the BCA. Furthermore provide consumers, installers and regulators of flexible duct concise easily interpretable documented requirements, often supported with diagrams on the correct installation practices to achieve minimum running costs with the lowest possible energy consumption.

What outcomes or goals will be achieved by addressing the problem?

The desired outcome is a revised national standard that provides far greater detail to the user via the latest energy efficient installation practices and provide accountability and traceability of flexible duct throughout its service life to all users. The objective is to update the standard with current industry knowledge and practice, providing certainty and ease of use for industry, regulators and all users

How do the outcomes align with the strategic goals of the ABCB?

This objective accords with the ABCB in line with its thermal efficiency requirements for all new buildings. Without correct installation practices as displayed in this revised version of the standard, even flexible duct with the correct fire, mechanical and thermal properties have its efficiency significantly compromised. Flexible duct that is not installed correctly will contribute significantly to higher operating costs of the ducted system for the life of the system and in turn use additional energy that would be not otherwise required. Additional operating time of ducted systems due to the flexible duct having substandard thermal properties unnecessarily adds to global warming and utilizes additional energy reserves.

The ABCB wish to reduce government and industry "red tape". Mandatory labelling of flexible duct will go a long way in achieving this outcome.

[3] Options:

- Option 1 Amend the standard to achieve the objectives above, or
Option 2 Revise the Standard and issue new edition to achieve the objectives above; or
Option 3: Do nothing, no change.
Option 4 A guideline document

Have you considered non-regulatory solutions?

Yes, However when consideration is given to widespread current industry practice a regulatory solution is the only option. A non-regulatory solution would have to include the technical information within the Standard and would be generally disregarded by industry as is current practice.

If a guideline were to be considered rather than reference in BCA of the revision of the Standard, due to the long history of the Standard being regulatory any ABCB Guidelines would be perceived as quasi-regulatory and therefore not be a non-regulatory option.

[4] Impact Analysis (of all options):

What are the economic, social and environmental cost and benefits associated with each option?

Option 1 & Option 2 above which are to amend or revise the Standard, achieve the objectives above:-
The impact on the industry will be positive and beneficial as the changes will benefit the building industry with clarification of ambiguous information and correction and update of provisions in the Standard.

Cost versus benefit.

Flexible Duct which is produced to Australian Standards and labelled will in the long term provide cost and energy savings due to being 'fit for purpose' and much easily regulated. Substandard flexible duct that is 'not labelled' will ultimately require more energy, be difficult to regulate and ultimately increase the cost to the consumer.

Cost benefits of properly thermally insulated buildings versus uninsulated buildings are the foundation and driving force of section J in the BCA. The benefits are elementary and do not only apply to new constructions that fall under BCA regulation. Strong consideration needs to be given to flexible duct installed into installations where the neither BCA nor Australian Standards have any governance. To align with Government policy and initiatives it is recommended that all flexible duct manufactured locally and imported into Australia have to comply with the revised edition.

A cost exercise

Assume

a 3 bed room house is to have a reverse cycle ducted heating cooling system installed

Note

- insulation is approx. 20% to 30% of the cost of a poorly insulated non BCA compliant flexible duct
- insulation is approx. 50% to 70% of the cost of a properly insulated R m 1.5 BCA compliant flexible duct

The flexible duct used in the installation is as follows;

8 x 6 meter lengths of 250 mm diameter R m 1.5 thermally insulated flexible duct

4 x 6 meter lengths of 300 mm diameter R m 1.5 thermally insulated flexible duct

2 x 6 meter lengths of 350 mm diameter R m 1.5 thermally insulated flexible duct

4 x 6 meter lengths of 400 mm diameter R m 1.5 thermally insulated flexible duct

The total square meter age of R m 1.5 insulation required to encase all the above mentioned flexible duct is approximately 130 meters squared.

Even at \$4.00 per meter squared, which is well over industry price for a third party accredited NATA certified insulation the total value of the insulation is \$520.00

R m 1.5 NATA certified wall batts are available on line from Bunnings for less than \$3.00 per square meter

Option 1: There are too many proposed changes to consider an amendment to the 2002 edition as a suitable solution and the age of the Standard (9 years old by BCA 2011) and the changes to section J of the BCA since that time suggests that a revision is required.

Option 2: This is the preferred option. The proposed revision of AS 4254 is regarded as essential to the Standard and the new edition that should be considered for reference in the BCA. When one considers proposed Government initiatives such as mandatory disclosure for all buildings including domestic dwellings being potentially only a few years off, issues such as the labelling of flexible duct must be introduced sooner than later to facilitate such future policies. Ease of regulation and product transparency are provided with this option.

Option 3: Industry to continue to use AS 4254 in its current format. This option will effectively continue to provide a substandard price driven product that is today commonplace and clearly does not meet current fire and mechanical nor energy efficiency requirements. To pursue this option is not in line with all other government initiatives and policies that for many years have strived to provide cost effective fit for purpose fire rated energy efficient products for all homes and buildings.

Option 4: A non-regulatory guideline could be developed but would still run contrary to the current referenced Standard resulting in further uncertainty and the continuance of non-conforming flexible duct in the market place. Indeed, a separate guideline would simply add to the market confusion and allow current industry practices of non compliance to continue on its price driven downward spiral.

Who is likely to be affected by the proposed solution?

The community, the flexible duct industry, building owners, builders, regulators, designers', authorities, installers and developers. The affects on these people will be positive by providing clarity to current practices and methods.

Are there any significant compliance costs?

The main cost based arguments against compliance to the new requirements when this draft becomes open to public comment are expected to come from some flexible duct manufactures and importers. These cost based arguments in the main are envisaged to be;

Printing equipment to label flexible duct

Claims may include labelling of flexible duct is not possible, not required and cost prohibitive.

These claims hold no foundation as the actual cost of labelling equipment is negligible. A number of manufacturers have already commenced labelling.

Unlabelled flexible duct once installed becomes anonymous, no regulator and in many cases even those within the industry cannot tell who made it, where it came from, its fire rating, mechanical properties nor its thermal value.

Careful consideration needs to be given to the thousands of kilometres of potentially non-compliant, unlabelled, unidentifiable flexible duct that is installed into thousands of Australian homes, hospitals and schools every year.

The most significant cost to compliance will be to some duct manufacturers having to purchase printers to label their flexible ducting with the proposed documentary requirements. Quotes from several label printing companies have been included in the attachments. In short label printers are readily available in Australia from AUD under \$3,000.00 to \$12,000.00.

The revised edition proposes a character print height of 19 mm for the information that has to be printed continually along the outer jacket of the flexible duct to enable identification. In the light of the printers quotes included in the attachments it has been found that to achieve print heights as previously specified will cost in order of \$9,000.00. This may put the cost of printing equipment out of reach for some of the smaller local manufacturers. Public comment will be made to the draft to reduce the print height to 10 mm which will enable more economical printers be utilized and still comply with the proposed requirements. It should be noted that print heights on similar products are 5 – 10 mm high, conduit for example.

The costs are not prohibitive to even small companies considering the host of benefits labelling provides. Consideration needs to be given that nearly every other building product is traceable via similar printed labelling on the product, e.g. conduit, structural timber, PVC stormwater pipe, glass windows and sewer piping. The real question is why mandatory labelling of flexible duct has taken so long.

Pre printed plastic outer duct jackets

An alternative open to all manufacturers that do not wish to purchase labelling equipment is to buy in pre labelled plastic outer duct jackets from known industry suppliers. Several duct manufacturers have for over 10 years already adopted this practice. The cost difference between a pre printed plastic outer duct jacket vs. a non printed plastic outer duct jacket is a few cents per length of flexible duct

Re-testing flexible duct to the revised editions' requirements

Testing of flexible duct to the 11 tests that comprise the requirements of AS 4254 costs around AUD \$3,500.00. Testing of any product that has fire rating requirements to enable it to be installed in new and existing constructions and sold as compliant to Australian Standards costs money.

Many flexible duct manufacturers and importers are currently claiming compliance to AS 4254 1995 or AS 4254 2002 and cannot provide the full host of required documentary evidence when requested by users.

Mandated NATA certified third party accreditation should be available to any potential user of flexible duct to quantify that the product being put forward for purchase to a consumer is fit for its intended purpose.

As the industry in the main is not regulated, it is common industry practice to have only as few as 1 of the 11 tests required to comply to AS 4254 1995 conducted, yet claim compliance to the full host of 11 tests.

To the uninitiated, which includes most regular users including flexible duct installers, architects, builders, specifiers as well as the other 99.9% of the population, an authentic NATA test report for 1 of the 11 tests with the words "tested in accordance with AS 4254 test methods – Passed", is enough to give the illusion that AS 4254 is only 1 test and thus the product fully complies to all 11 required tests.

Many flexible duct manufacturers and importers are using AS 4254 test results that are 10 years old or even older. Undoubtedly over this period of time most manufactures have changed raw material, raw material suppliers, manufacturing processes, and in some cases had their company bought and sold by local and foreign investors. There is no current provision within the existing standard to re test once certification has been achieved.

The revised edition proposes a 5 year shelf life on test results and should a raw material or component be changed from the original product tested, retesting must occur to reclaim compliance.

This 5 year shelf life on test results is in line with the retesting requirements of AS 4859.1, which is the thermal standard that is used for the thermal insulation blanket that encases flexible duct when it is tested to AS 4254.

Testing to AS 4859.1 Thermal Standard

Thermal Insulation products used on Flexible duct are purchased in by flexible duct manufacturers from insulation manufacturers. It is the insulation manufacturers' responsibility to provide independent certification to prove the thermal claims they make for their insulation products. The cost for thermal testing to this standard is not borne by flexible duct manufacturers therefore not an issue for concern.

A regulatory impact assessment does not need be undertaken for the items in the attachment list that show additional cost implications. The costs discussed are well known to those in the industry or can be substantiated by quotes provided in the attachments.

Will the option unfairly benefit one firm or industry over another?

No. By ensuring that duct is labelled and has current test data is available to substantiate that it meets the fire, mechanical and thermal tests in accordance with the required Australian Standards will only benefit all users and potential regulators.

What data sources have been used and do you have supporting documentation?

- 03_ ADMA National Survey of Flexible Duct Manufacturers and review of current practices
- 04_ AGO Minutes from Industry Meeting on Thermal Performance of Flexible Air-Conditioning Ductwork
- 07_ USA Study on Thermal Losses in Duct Work System
- 10_ HVAC&R Editorial-Aging Ducted Heating Systems in need of attention
- 11_ Field study on Gas Ducted Systems in Victoria G. Palmer
- 13_ USA Study of Thermal Losses from Flexible Duct 1998
- 22_ VEET Energy Efficient Target Regulations
- A1_ Duct Printer Quote Supplier 1
- A2_ Duct Printer Specifications Supplier 1
- B1_ Duct Printer Cover Page Supplier 2
- B2_ Duct Printer Specifications Supplier 2
- B3_ Duct Printer Specifications and Quote Supplier 2

[5] Consultation:

Please answer these questions:

Who are the affected parties and what are their views?

The community, the building industry, building owners, developers and those within the industry will be invited to provide comment on the proposals.

Proposed changes to AS 4254 will undergo a public comment period through the Standards Australia of 2 to 3 months and all comment will be considered in the development process.

The BCC of ABCB will similarly be invited to comment on the proposals.

The changes to the Standard have been developed by Standards Australia committee ME-062 - 06 comprising representatives from the following industry associations, regulators and other interested parties:

- Air Conditioning and Mechanical Contractors Association
- Australasian Fire and Emergency Service Authorities Council
- Australasian Fire and Emergency Service Authorities Council
- Australian Building Codes Board
- Australian Institute of Refrigeration Air Conditioning and Heating (Inc)
- Chartered Institution of Building Services Engineers
- Consumer Electronics Suppliers Association
- Department of Health and Human Services Tasmania
- Engineers Australia
- Facility Management Association of Australia
- Institute of Refrigeration Heating & Air Conditioning Engineers of New Zealand
- NSW Health Department
- Plastics and Chemicals Industries Association Incorporated
- Plumbing Industry Commission

Those proposals are expected to have ;

- Minimal increase in the end cost to the consumer yet providing a host of benefits to all users.
- Minimal increase in cost to purchase printing equipment by flexible duct manufacturers that do not already buy in pre-labelled outer duct jackets
- Minimal increase in cost for re testing of flexible duct by manufacturers to the revised standard. Third party accreditation via NATA certified Testing is already a mandatory requirement of this standard.

[6] Conclusion and Recommended Option:

Option 2 is the recommended option as it achieves the objectives and provides a better standard for consumers / industry. The various amendments proposed to AS 4254 are long needed improvements that have been obvious to industry and government for many years. Benefits are not only to the community at large but also the environment. The revision of this standard will aid in preserving our natural fuel resources (gas and coal reserves) and do not require a cost /benefit analysis before being included within the standard.

[7] Implementation and Review:

Every new, revised or amended Australian Standard undergoes a Draft for Public Comment period - usually two or three months. All comments from the public are considered in detail by the relevant Committee and, if necessary, further drafting is undertaken.

[8] List of Attachments (supporting documentation):

- Attachment A - Summary of proposed changes to the Standard
- Attachment B – Contains;
 - 15_ADMA Letter to Ministerial Council of Energy re; Seeking Support
 - 16_ADMA Letter to DEHWA re; The Acceptance of National Survey of Flex Duct and review of current practices.
 - 27_ADMA Letter of DEHWA following up on 2006 AGO Meeting
 - 08_ADMA Emails to AGO following up 2006 AGO Meeting
 - 07_USA Study on Thermal Losses in Duct Work System
 - 12_ACCC New Release re; Action Against Insulation Batt Manufacturers for non-compliance to AS 4859.1 2007
 - 02_ADMA Chairman's Address 2010
 - 05_Ministerial Council on Energy Efficiency-Bulletin 180
 - 06_ADMA Chairman's Address 2009
- Attachment C – Contains;
 - 17_ADMA Letter to ABCB re; Labeling of Flexible Duct
 - 22_VEET Energy Efficient Target Regulations
 - 26_ABCB Response to ADMA re; Including labeling of Flexible Duct
 - 10_HVAC&R Editorial-Aging Ducted Heating Systems in need of attention
 - 28_ADMA Submission to VEET for Flexible Ducts inclusion as an Eligible Activity
 - B3_Duct Printer Specifications and Quote Supplier 2
 - 13_USA Study of Thermal Losses from Flexible Duct 1998
 - 14_Air Leakage Test on Flexible Duct
 - B2_Duct Printer Specifications Supplier 2
 - B1_Duct Printer Cover Page Supplier 2
 - A1_Duct Printer Quote Supplier 1
 - 09_Proposal Flexible Duct Thermal Testing
 - 01_Aust Standards ME_062
 - 21_ADMA Letter to MEPS re; Non Energy Using Products (flexible duct) Inclusion into Program
 - 19_HCAA Letter to Duct Manufacturers re; Recent AGO Meeting
 - 18_MPMSAA Letter to ABCB re; Labeling of Flexible Duct
- Attachment D – Contains;
 - A2_Duct Printer Specifications Supplier 1
- Attachment E – Contains;
 - 04_Minutes from Industry Meeting on Thermal Performance of Flexible Air-Conditioning Ductwork
- Attachment F – Contains;
 - 03_National Survey of Flexible Duct Manufacturers and review of current practices
- Attachment G – Contains;
 - 11_Field study on Gas Ducted Systems in Victoria_G.Palmer

SUMMARY OF MAJOR CHANGES TO THE REVISION OF AS4254 2002 INCLUDING AMMENDMENTS 1+2

Overview

The previous edition ,94 pages long included both rigid and flexible duct.

Separating out issues only associated with flexible duct and updating their requirements has left a new 22 page draft standard for flexible duct alone, which includes over 5 new pages of diagrams.

Pages 15 to 68 and pages 75 to 90 of the previous addition are totally irrelevant to flexible duct.

Pages 1 to 14 concern both flexible and rigid duct although the content required when referencing only the former is considerably condensed.

Pages 69 to 74 and pages 91 to 94 in the previous edition include the main references to flexible duct.

The Summary of Major Changes will only refer to pages 1 to 14 pages 69 to 74 and pages 91 to 94 in the previous edition

No.	Clause	Proposed Change	Justification	Implication due to change
1	1.1 to 1.6	Refine existing text to only include information relative to flexible duct. Not intended to change current practice	Improved understanding of the standard. The current requirements for flexible duct (some 14 pages) are lost in a 93 page standard that covers the requirements of both Rigid and flexible duct. Refer AS 4254 2002	Clarity for all users. Will not increase costs
2	1.7 + 1.8	delete	Not relative to flexible duct.	Clarity for all users Will not increase costs
3	1.9	Refine existing text to only include information relative to flexible duct. Improved requirements for reporting of test results. 2.7,2.8,2.9 +2.10 in the draft standard bring clarity to and address these issues comprehensively	Research has shown the need for change. Industry in the main currently disregards these requirements. Refer attachment No. 3	Clarity for all users. Improved information. Will not increase cost. Will provide ease of regulation.
4	2.1.1	Refine existing text to only include information relative to flexible duct. Not intended to change current practice	Improved understanding of the standard. The current requirements for flexible duct (some 14 pages) are lost in a 93 page standard that covers the requirements of both Rigid and flexible duct. Refer AS 4254 2002	Clarity for all users. Will not increase costs
5	2.1.2	Delete	Not relative to flexible duct. The current requirements for flexible duct (some 14 pages) are lost in a 93 page standard that covers the requirements of both Rigid and flexible duct. Refer AS 4254 2002	Clarity for all users. Will not increase costs
6	2.1.3	Deleted	Not relative to flexible duct	Clarity for all users.

No.	Clause	Proposed Change	Justification	Implication due to change
7	2.2.1	<p>Refine existing text to only include information relative to flexible duct. Improved air sealing requirements added relative to flexible duct. Additional requirements specifying vapour sealing and mechanical fixing added.</p> <p>Requirements for tapes to be labelled and to comply to AS 4254 and AS 1635.10.1 have been deleted</p>	<p>Improve understanding of the standard. Research has shown the need for change for better air and vapour sealing and mechanical fixing of flexible duct to air terminal devices. Refer attachments 7+10+11</p> <p>Investigation by the ME – 062-06 committee was carried out. No tapes that were purported to comply with the required tests (AS 4254 + AS/NZ 1635.10.1) could be found. Manufacturers' could not provide the complete set of NATA test data.</p>	Clarity for all users. Improved information. Will not increase cost
8	Table 2.2.1	Deleted	Not relative to flexible duct	Clarity for all users.
9	2.2.2	Deleted	Not relative to flexible duct	Clarity for all users
10	2.2.3	Deleted	Not relative to flexible duct	Clarity for all users
11	2.2.4	Modify and refine existing clause Addressed in clause 2.2.6 in AS 4254.1	<p>Improved understanding of the standard. Research has shown the need for change for better installation practices for flexible duct. Refer Attachment No. 11</p>	Clarity for all users. Will not increase costs
12	2.2.5	Modify and refine existing clause Addressed in clause 2.2.7 in AS 4254.1	<p>Improved understanding of the standard. Research has shown the need for change for better installation practices for flexible duct. Refer Attachment No. 11</p>	Clarity for all users. Improved information. Will not increase cost Ease of regulation
13	2.3,2.4,2.5,2.6,2.7 and all tables therein	Deleted	Not relative to flexible duct	Clarity for all users. Will not increase costs
14	2.8.2, table 2.8.2+2.8.3	<p>Modified and revised to provide further clarity.</p> <p>Addressed in clause 2.4.1,2.4.2 +2.5 in AS 4254.1</p>	<p>Improved understanding of the standard. Ease of regulation</p>	Clarity for all users. Improved information. Will not increase cost Ease of regulation

No.	Clause	Proposed Change	Justification	Implication due to change
15	2.8.4	Modified and revised to provide further clarity. Additional diagrams.	Addressed in clause clauses 2.6, 2.6 (a) through 2.6 (i) in AS 4254.1 Improved understanding of the standard. Ease of regulation. Research has shown the need for change for better air and vapour sealing and mechanical fixing of flexible duct to air terminal devices. Refer Attachment No. 11	Clarity for all users. Improved information. Will not increase cost. Ease of regulation
16	2.8.5	Modified and revised to provide further clarity. Addressed in clause clauses 2.6.2. In AS 4254.1. Table 2.8.5 (h) replaced with a diagram Additional diagrams	Ease of regulation Improved understanding of the standard. Research has shown the need for change for better installation practices for flexible duct. Refer Attachment No. 11	Clarity for all users. Improved information. Will not increase cost. Ease of regulation
17	2.8.6	Modified and revised to provide further clarity	Improved understanding of the standard. Ease of regulation Research has shown; 1. The need for clarity in the thermal performance of flexible duct in accordance with BCA requirements. 2. Non compliance i.e. under thermally performing ductwork increases the amount of energy consumption unnecessarily and creates additional greenhouse gases 3. The test specified is already a requirement of the BCA.	Clarity for all users. Improved information. Will not increase cost. Ease of regulation
18	Section 3+4, Appendix A-E	Deleted	Not relative to flexible duct.	Clarity for all users. Will not increase cost
19	Appendix F	Labelling of flexible duct. No longer informative becomes a mandatory requirement in clauses 2.8 + 2.10. Addressed in clause clauses 2.8 + 2.10 in AS 4254.1	Improved understanding of the standard. Research has shown the need for change. Ease of regulation The current requirements for flexible duct (some 14 pages) are lost in a 93 page standard that covers the requirements of both Rigid and flexible duct. Refer AS 4254 2002	Clarity for all users. Potentially will increase cost. Alternatives other than purchasing in line printing equipment are available. Ready made pre labelled outer flexible duct jackets compliant to AS 4254 have been readily available for at least 10 years

No.	Clause	Proposed Change	Justification	Implication due to change
20	Proposed clause 2.9	Mandatory re testing of flexible duct every 5 years to ensure ongoing compliance to AS 4254.	<p>Many flexible duct manufacturers/suppliers are providing supposedly compliant flexible duct to the industry on test reports that are over 10 years old. It is unrealistic to believe that all the same raw materials, same raw material suppliers and the same manufacturing processes still exist in all cases.</p> <p>AS 4859.1 calls up retesting every 5 years. Proposed is to follow AS 4859.1 lead for the reasons given.</p>	<p>Clarity for all users. Potentially will increase cost dependant on flexible duct manufacturers' current regularity of re testing to AS 4254.</p> <p>Ease of regulation</p>
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				
51				
52				