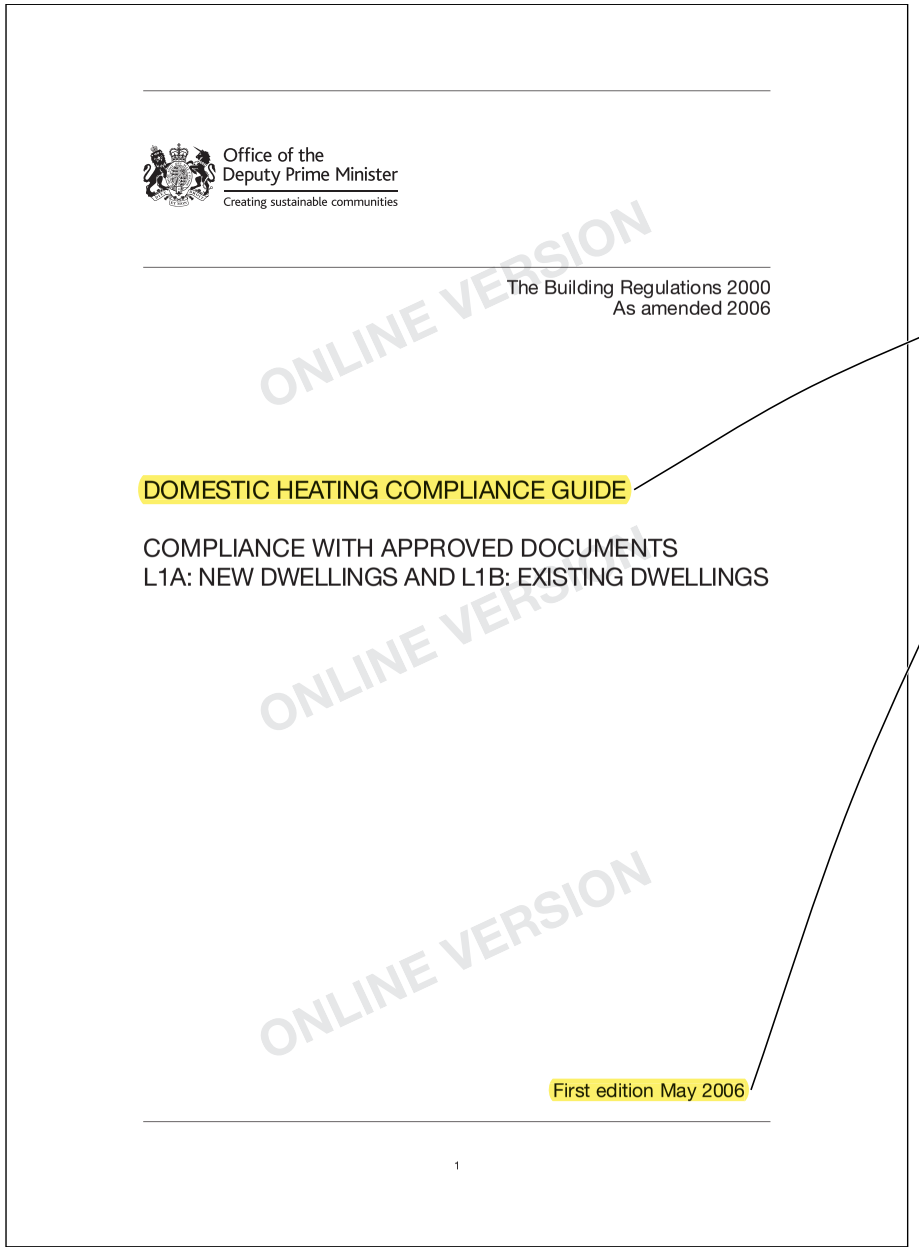

Summary of Comments on AD_A_cover

Page: 1

Author: barryjohnston
Subject: Highlight
Date: 05/02/2007 10:50

Portions of this document have been copied for fair comment because they contain material which may be inaccurate, misleading, or market limiting. if read from the perspective of new solar water heating technology such as, but not exclusively, Solartwin.

Author: barryjohnston
Subject: Highlight
Date: 05/02/2007 10:53

February 07. This document is being published because its use in UK means that Solar Twin Ltd faces what it sees as significant and apparently unjustified market limitation. This has happened because it appears that the Domestic Heating Compliance Guide (May 06 edition) has been written with too narrow a technological scope for the patented proprietary technology which we use. We have had productive discussions with DCLG concerning the content of documents relating to building regulations on solar thermal, however a timetable for action concerning updates is uncertain. Therefore it is important that designers, engineers, building control officers and regulators, among others, know about our concerns.

Section 9 Solar water heating

This section provides guidance on the specification of solar water heating for dwellings.

9.1 Scope of guidance

The guidance in this section covers solar systems with a collector area of less than 20m² and solar heated water storage of less than 440 litres. It does not cover systems intended to contribute exclusively to space heating or systems providing heat exclusively to heat swimming pools. It should be used in conjunction with the guidance on water heating contained in the fuel-based sections of this guide.

In order to comply with the requirements of Part L, solar water heating in new and existing dwellings should meet all of the following conditions:

a. The minimum provisions for collector certification, identification and testing should be met as specified in Table 31 (row a).

AND

b. The minimum provisions for selection of transfer fluid in the collector primary loop as given in Table 31 (row b) should be met.

AND

c. The minimum provisions for circulation pump power as given in Table 31 (row c) should be met.

AND

d. The minimum provisions for heat-exchanger sizing as given in Table 31 (row d) should be met.

AND

e. The minimum provisions for control of the system as given in Table 31 (row e) should be met. Where work is carried out in a dwelling that already has a solar hot water system it is recommended that the system control is upgraded in line with the minimum provisions for systems in new dwellings.

AND

f. Solar pre-heated water storage should be in accordance with the minimum provisions given in Table 31 (row f).Where work is carried out in a dwelling that already has a solar hot water system it is recommended that the insulation is upgraded in line with the minimum provisions for systems in new dwellings.

AND

g. The minimum provisions for storage of solar pre-heated water as given in Table 31 (row G) should be met.

AND

h. The minimum provisions for system labelling and commissioning, as given in Table 32 (rows h and i), should be met.

AND

i. The minimum provisions for insulating pipes in a solar primary system, as given in Table 33 should be met.

Page: 2

Author: barryjohnston
Subject: Highlight
Date: 05/02/2007 11:00
The main problems for new technology appear to be found in the minimum provisions tables which follow, however two assumptions which demonstrate the technically limited scope of this document ate identified below.

Author: barryjohnston
Subject: Highlight
Date: 05/02/2007 12:15
Limited technology scope assumption. This statement apparently presumes, that heat exchangers are always needed. heat exchangers are not needed in the majority of Solartwin installations. This is a market limiter. We do not usually use heat exchangers. Readers will assume that heat exchangers are usual or best when in fact they limit both thermal performance and stratification. Perhaps it should read "heat exchangers, if present". Regulators need to give direct heating full and fair representation. Trditional main pumped metal and glass solar is not necessarily the gold standard any more. There are alternative, arguable better, simpler, safer greener approaches such as ours.

Author: barryjohnston
Subject: Highlight
Date: 05/02/2007 10:58
Limited technology scope assumption. There appear to be provisions for insulating water pipes. But some solar thermal technologies (athough not Solartwin) use air (not water) as a heat transfer medium.

Table 31 Minimum provisions for solar water heating

Minimum provision		Supplementary information
Allowance for collector shading	No minimum provision	*Solar collectors should be sited in unshaded locations wherever possible. Where this is unavoidable or in cases of significant or heavy shading or significant variance to the optimum orientation and tilt (i.e. normal pitch roofs facing between SE and SW), then an allowance for the loss of performance should be made when sizing the collector area according to the factors indicated in SAP(2005) Appendix H*
a. Solar collector certification	Collectors should be independently certified to comply with all tests, safety, thermal performance reporting and identification according to BS EN 12975	*Copies of the full test report should be made available upon request*
b. Primary circuit fluid	The transfer fluid in the collector primary loop should be chosen so as not to deposit lime scale, sludge, ice or other solids that could either restrict circulation, or impair the rate of heat transfer within the absorber	*In secondary systems measures to reduce the formation of lime scale should be considered so that performance is not significantly affected*
c. Circulation pump power	The electrical input power of the primary pump in the solar system should be less than 50W or 2% of peak thermal power of the collector, whichever is the higher	
d. Heat-exchanger sizing	The heat exchanger between a solar primary and secondary system should sized as follows: • Systems with flow rates of greater than or equal to 0.5 litres per minute per m² of collector – no less than 0.2m² of heat exchanger area must be provided per 1m² of solar collector net absorber area • Systems with flow rates less than 0.5 litres per minute per m² of collector – no less than 0.1m² of heat exchanger area must be provided per 1m² of solar collector net absorber area	*Heat exchangers should be sized to ensure a low return temperature to the solar collector* *Heat transfer in a solar heat exchanger is complicated by the variability of flow rates and flow temperatures as compared to heat exchangers used for auxiliary heat sources*
e. System control	Solar domestic hot water system controls should be fitted to: i. maximise the useful energy gain from the solar collectors into the system's dedicated storage; ii. minimise the accidental loss of stored energy by the solar domestic hot water system, whether originating from solar collectors, cold intake or auxiliary heat sources; iii. ensure that hot water produced by auxiliary heat sources is not used when adequate grade solar pre-heated water is available; iv. provide a means of control consistent with the solar system being inherently secure against the adverse affects of excessive primary temperatures and pressures; v. where a separate domestic hot water heating appliance is pre-heated by a solar system, then this appliance should be controlled, where possible, such that no extra heat is added if the target temperature is already satisfied from the pre-heat vessel	

Page: 3

Author: barryjohnston
Subject: Highlight
Date: 05/02/2007 12:35

This does not affect Solartwin, expect in a strange way, by making all of its competitors noncompliant with this guids. Indirect solar heating is banned by Illogical and impossible requirement for heat exchanger size! Solartwin would be the only surviving business if it were not for poor regulations on it elsewhere. It is impossible to always have a low return temperature. This false premise leads to wrong advice. Actually the factor that brings low return temperatures is low cylinder temperatures. Heat exchangers cannot deliver water to the panels at temperatures which are lower than in the bottom of the cylinder. The result is farce! Solar water heating with heat exchangers are noncopmpliant: they all deliver high return temps in summer. Our direct installations are compliant because even though they may deliver hot water to the panel in summer it is not coming via a heat exchanger. Try writing instead: if a heat exchanger is used in the bottom of a hot water cylinder, the max acceptable temp diff between fluid leaving it and the water around it with irradiation of 1000 w/sqm and a water temp 20-30C is (say 5C or whatever). Exempt heat stores.

Author: barryjohnston
Subject: Highlight
Date: 05/02/2007 12:37

Market limiting and also illogical. Ice can be permissible. When ice has formed, the collector will be too cold to be of any use anyway. Maybe say instead "blockages which significantly impair performance".

Author: barryjohnston

Comments from page 3 continued on next page

Table 31 Minimum provisions for solar water heating

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Allowance for collector shading	No minimum provision	*Solar collectors should be sited in unshaded locations wherever possible. Where this is unavoidable or in cases of significant or heavy shading or significant variance to the optimum orientation and tilt (i.e. normal pitch roofs facing between SE and SW), then an allowance for the loss of performance should be made when sizing the collector area according to the factors indicated in SAP(2005) Appendix H*
a. Solar collector certification	Collectors should be independently certified to comply with all tests, safety, thermal performance reporting and identification according to BS EN 12975	*Copies of the full test report should be made available upon request*
b. Primary circuit fluid	The transfer fluid in the collector primary loop should be chosen so as not to deposit lime scale, sludge, ice or other solids that could either restrict circulation, or impair the rate of heat transfer within the absorber	*In secondary systems measures to reduce the formation of lime scale should be considered so that performance is not significantly affected*
c. Circulation pump power	The electrical input power of the primary pump in the solar system should be less than 50W or 2% of peak thermal power of the collector, whichever is the higher	
d. Heat-exchanger sizing	The heat exchanger between a solar primary and secondary system should sized as follows: • Systems with flow rates of greater than or equal to 0.5 litres per minute per m^2 of collector – no less than $0.2m^2$ of heat exchanger area must be provided per $1m^2$ of solar collector net absorber area • Systems with flow rates less than 0.5 litres per minute per m^2 of collector – no less than $0.1m^2$ of heat exchanger area must be provided per $1m^2$ of solar collector net absorber area	*Heat exchangers should be sized to ensure a low return temperature to the solar collector* *Heat transfer in a solar heat exchanger is complicated by the variability of flow rates and flow temperatures as compared to heat exchangers used for auxiliary heat sources*
e. System control	Solar domestic hot water system controls should be fitted to: i. maximise the useful energy gain from the solar collectors into the system's dedicated storage; ii. minimise the accidental loss of stored energy by the solar domestic hot water system, whether originating from solar collectors, cold intake or auxiliary heat sources; iii. ensure that hot water produced by auxiliary heat sources is not used when adequate grade solar pre-heated water is available; iv. provide a means of control consistent with the solar system being inherently secure against the adverse affects of excessive primary temperatures and pressures; v. where a separate domestic hot water heating appliance is pre-heated by a solar system, then this appliance should be controlled, where possible, such that no extra heat is added if the target temperature is already satisfied from the pre-heat vessel	

Subject: Highlight
Date: 05/02/2007 12:03

All tests? Not always. DCHG requirement for "all tests" on solar panel is unenforceable. There is a limitation of scope of Part L's second tier document by ADR7 which is higher level document, appears to exclude durability testing, requiring performance testing only. ADR7 Performance, (0.3 Limitations) limits standards of materials & workmanship to "no more than necessary to conserve fuel and power" & disability rights. Health and safety of persons are specifically excluded from part L, on fuel & power. Nor are materials and workmanship beyond any energy focus. This means that issues like durability or safety features of solar may not be enforceable under these regs, even though enforcement should be required under more appropriate regs. Under its requirements to conserve fuel and power it does not seem to support any requirement for any testing beyond the performance testing which would provide inputs to SAP calculations. It specifically excludes going further except disability rights. The immediate: effect is the apparent removal of non–performance aspects of BSEN 12975 from enforceability. (Longer term: unenforceable safety, durability and other quality standards of technology used in part L and an obvious need to have something enforceable on these.) Requiring "all tests" of BSEN 12975 exceeds the legal reach of Part L in the context of Reg 7. (BSEN 12975 "specifies test methods for validating the durability, reliability & safety requirements".) Sloppy wording in the DHCG needs cleaning up. Strange. Durability test are being required supposedly for health & safety reasons when in fact H&S are excluded from part L! Despite this exclusion, a broad need to show that the product has appropriate materials and workmanship is accepted.

Comments from page 3 continued on next page

Author: barryjohnston
Subject: Highlight
Date: 05/02/2007 12:45

Fitted? No, say operated. This is because our system does not have some fited controls, but in th ecase of say heat export is simply operated them using existing components. To specify fitted is market limiting as it implies an object instead of a solution.

Author: barryjohnston
Subject: Highlight
Date: 05/02/2007 12:39

Saying pump only ignores the power used (24 hrs a day) by the control system of conventional solar thermal. Maybe it needs to be considered too.

Author: barryjohnston
Subject: Highlight
Date: 05/02/2007 12:12

Our panel does not exist under the BS EN 12975 standard. Read BSEN 12975's description of what panels are made from. Despite 7 years on the market and widespread knowledge of our panels in UK, BSI failed to seek to introduce reference to silicone rubber until very recently. Silicone rubber is classed as an inorganic polymer. Tee effect is market limiting. The Standard seems to be too narrowly scoped. As for what solar panels can be made from, BSEN 12975 says that panels can be made of metals or organic polymers, thereby excluding our inorganic polymer. Regulators need to accept that we may use an alternative compliance path without impediment and that the standard is historical in its perspective. Regulators should consider onsider removing reference to BSEN 12975 until its scope is broadened on this inorganic issue and in several other relevant respects. Regulators need to know that the standard making & reviewing process is characterised by inertia and obstruction to the detriment of new

Comments from page 3 continued on next page

Table 31 Minimum provisions for solar water heating

Minimum provision		Supplementary information
Allowance for collector shading	No minimum provision	*Solar collectors should be sited in unshaded locations wherever possible. Where this is unavoidable or in cases of significant or heavy shading or significant variance to the optimum orientation and tilt (i.e. normal pitch roofs facing between SE and SW), then an allowance for the loss of performance should be made when sizing the collector area according to the factors indicated in SAP(2005) Appendix H*
a. Solar collector certification	Collectors should be independently certified to comply with all tests, safety, thermal performance reporting and identification according to BS EN 12975	*Copies of the full test report should be made available upon request*
b. Primary circuit fluid	The transfer fluid in the collector primary loop should be chosen so as not to deposit lime scale, sludge, ice or other solids that could either restrict circulation, or impair the rate of heat transfer within the absorber	*In secondary systems measures to reduce the formation of lime scale should be considered so that performance is not significantly affected*
c. Circulation pump power	The electrical input power of the primary pump in the solar system should be less than 50W or 2% of peak thermal power of the collector, whichever is the higher	
d. Heat-exchanger sizing	The heat exchanger between a solar primary and secondary system should sized as follows: • Systems with flow rates of greater than or equal to 0.5 litres per minute per m² of collector – no less than 0.2m² of heat exchanger area must be provided per 1m² of solar collector net absorber area • Systems with flow rates less than 0.5 litres per minute per m² of collector – no less than 0.1m² of heat exchanger area must be provided per 1m² of solar collector net absorber area	*Heat exchangers should be sized to ensure a low return temperature to the solar collector* *Heat transfer in a solar heat exchanger is complicated by the variability of flow rates and flow temperatures as compared to heat exchangers used for auxiliary heat sources*
e. System control	Solar domestic hot water system controls should be fitted to: i. maximise the useful energy gain from the solar collectors into the system's dedicated storage; ii. minimise the accidental loss of stored energy by the solar domestic hot water system, whether originating from solar collectors, cold intake or auxiliary heat sources; iii. ensure that hot water produced by auxiliary heat sources is not used when adequate grade solar pre-heated water is available; iv. provide a means of control consistent with the solar system being inherently secure against the adverse affects of excessive primary temperatures and pressures; v. where a separate domestic hot water heating appliance is pre-heated by a solar system, then this appliance should be controlled, where possible, such that no extra heat is added if the target temperature is already satisfied from the pre-heat vessel	

Table 31 Minimum provisions for solar water heating

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technology; the standard may be too narrow in scope in terms of materials, as well as in its solar panel design and operating assumptions. BSEN 12975 is overkill in places. It favours old solar approaches to solving problems including a particular focus on stagnation at high temperatures. This specifically limits the durability test's relevance to Solartwin. Old solar approaches / BSEN appears to be based on the false premise that switching off a pump is the right means of high temperature control. This control approach is the case in most solar thermal systems but it is never the case with Solartwin. BSEN 12975 anticipates frequent extremely high temperatures. Our system never switches off pumps as a means of high temperature control. It keeps them running, to water COOL the panel. We balance panel area to cyl vol in order to prevent boiling. To insist on the durability test and not to take our independent tests which were specified by DTI is perverse. To design old solar panels to reach 150-300C several times a day is essential since this is what they do. But ours normally operate under 100C. Regulators need to accept that continuous pumping at high temps and heat export are valid controls. They need to accept that while old solar stagnates hundreds of times a year, Solartwin does not. Regulators should stop invalidating our valid, proven approaches. Given that our technology is of a lower temperature heat export design we do not regard the level of emphasis given to stagnation testing as appropriate to Solartwin. Independent tests validate our approach. Furthermore, Requiring all BSEN 12975 tests to be done is perverse. Some other panels don't have all of them. Some are irrelevant. The wording in the requirements is unclear. DHCG page 63 Table 31 row a on solar collector certification first says "all tests" after which then lists three things, only one of which is an actual test (which is not durability). This wording is inconsistent.

Comments from page 3 continued on next page

Table 31 Minimum provisions for solar water heating

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e. System control	Solar domestic hot water system controls should be fitted to: i. maximise the useful energy gain from the solar collectors into the system's dedicated storage; ii. minimise the accidental loss of stored energy by the solar domestic hot water system, whether originating from solar collectors, cold intake or auxiliary heat sources; iii. ensure that hot water produced by auxiliary heat sources is not used when adequate grade solar pre-heated water is available; iv. provide a means of control consistent with the solar system being inherently secure against the adverse affects of excessive primary temperatures and pressures; v. where a separate domestic hot water heating appliance is pre-heated by a solar system, then this appliance should be controlled, where possible, such that no extra heat is added if the target temperature is already satisfied from the pre-heat vessel	

First it says "all tests". But then: it lists a non existent ?test (safety); lists an existing one (performance, which we have) and then a labelling requirement (this is not a test). It does not list durability testing. This is market limiting. On one hand, I think that a lot of solar panels in UK may be non-compliant with this "all tests" requirement. FoIR Why are we being singled out by DTI? If this particular durability test is apparently so important why was it not listed? Regulators need to the role of this standard and its component parts. Make them "as appropriate". Regulators need to welcome appropriate, alternative routes to compliance.

Author: barryjohnston
Subject: Highlight
Date: 05/02/2007 12:42
Not maximise, say optimise. Th edifference is that maximising puts undue emphasis on efficiency per square meter of solar panel and this can be at the expense of total system costs-benefts. The error which this document takes is that it looks too much at system components rather than th ebig pcturre of how the whole system works in terms of net energy, net carbon and overall sustainability.

Author: barryjohnston
Subject: Highlight
Date: 05/02/2007 12:43
The detail below is often far too specific and restrictive of innovations.

Table 31 (continued)

f. Solar pre-heated water storage	For new or replacement solar heated water storage the minimum provisions are as follows: a. Vented copper hot water storage vessels should comply with the heat loss and auxiliary heating heat exchanger requirements of BS 1566-1:2000 b. Unvented hot water storage systems products should: • comply with BS 7206; or • be certified by the British Board of Agrément, the Water Research Council; or • be certified by another accredited body as complying with Building Regulations c. Primary storage systems should meet the insulation requirements of sections 4.3.1 or 4.3.2 of the Water Heater Manufacturers Association performance specifications for thermal stores.	*Vented copper hot water cylinders should carry clear labelling on the product such as a BSI Kitemark, registered firm status or reference to an equivalent quality control scheme* *Vented cylinders which are not of copper construction should be labelled as complying with the heat loss and heat exchanger requirements of BS 1566* *Due to the higher than normal storage temperatures in primary stores it is very important that these are well insulated*
g. Storage of solar pre-heated water	The ratio of solar heated water storage volume to collector area should be specified as follows: i. The dedicated solar storage volume, Vs, should be at least 25 litres (or equivalent heat capacity) per net m² of the solar collector absorber area ii. Alternatively, Vs should be a volume (or equivalent heat capacity) which is equivalent to at least 80% of the daily hot water demand, Vd, (as defined by SAP 2005)	*Collector area is measured as effective aperture or net absorber area, whichever is smaller* *If a solar domestic hot water system is to be used in conjunction with an auxiliary heated thermal store, this will often operate at a higher temperature than domestic hot water only solar stores. The expected higher temperatures of auxiliary heated domestic hot water thermal stores and lack of stratification, particularly with combined thermal stores with open pumped circuits, would suggest that a separate pre-heat storage vessel should be considered wherever possible*

Page: 4

Author: barryjohnston
Subject: Highlight
Date: 05/02/2007 11:53

Error about poor stratification in heat stores. This Plain wrong. Stratification is good in direct systems. Inaccurate information and limited technical scope of this reg may mean loss of users of Solartwin. The guide should acknowledge that direct systems give excellent stratification. Promotion of myths should have no place in government documents.

Author: barryjohnston
Subject: Highlight
Date: 05/02/2007 11:48

Market closing against Solartwin and market biasing in favour of evacuated tubes. Several issues arise here. One is the definition of dedicated solar volume (DSV) and another is the use of square metres of absorber areas as a baseline. Firstly, DSV. This has two possible baselines, where this volume is provided in space, as in the volume below the fossil fuel heat exchanger in a traditional solar cylinder. This concept excludes most if not all of the volume above the bottom of the fossil fuel heat exchanger, on the assumption, which may be false, that the backup heat which it provides is running during the day. The other is whether DSV is provided in time, not spaces, as Solartwin may provide. This means that we turn the backup heating off until the sun has gone down. Solartrwin usually uses a backup heater positioned at the bottom of the cyl and switches it on after sunset. This gives a big dedicated solar volume in TIME not SPACE. Benefits: full not part cyl of hot water at night & better Legionella control. It is unacceptable to impose likely business closure by exclusive application of old solar dogma. Our valid approach is needlessly

Comments from page 4 continued on next page

banned by this guide. It should say: "In well stratified low flow systems with with backup heating coming on after 80% of the solar energy is delivered then the full cylinder volume can be treated as dedicated solar volume." Allow 80)–100% consideration of solar vols in TIME. Time based DSV is proven, with thousands of installations in UK. While both space & time DSV's have pros & cons, our approach was specifically allowed by Clearskies grants. The second problem is the use of a square metre baseline for this 25 litres per square metre of panel area. Per sqm of panel area? Nonsense. It should be by PEAK output. This is the key determinant of storage volume and of any scald risk or oversupply issue. This makes the market skewed towards evacuated tubes. They will be allowed to squeeze 10–30% more energy that flat plates into a small cylinder than flat plates. The document should refer to peak output / min volume ratio. It makes sense to use primary information such as peak output information where possible. The 25 litres rule has much more error in it.

Table 31 *(continued)*

f. Solar pre-heated water storage	For new or replacement solar heated water storage the minimum provisions are as follows: a. Vented copper hot water storage vessels should comply with the heat loss and auxiliary heating heat exchanger requirements of BS 1566-1:2000 b. Unvented hot water storage systems products should: • comply with BS 7206; or • be certified by the British Board of Agrément, the Water Research Council; or • be certified by another accredited body as complying with Building Regulations c. Primary storage systems should meet the insulation requirements of sections 4.3.1 or 4.3.2 of the Water Heater Manufacturers Association performance specifications for thermal stores.	*Vented copper hot water cylinders should carry clear labelling on the product such as a BSI Kitemark, registered firm status or reference to an equivalent quality control scheme* *Vented cylinders which are not of copper construction should be labelled as complying with the heat loss and heat exchanger requirements of BS 1566* *Due to the higher than normal storage temperatures in primary stores it is very important that these are well insulated*
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Table 32 Minimum provisions for labelling, commissioning and documentation for solar hot water systems

	Minimum provision	Supplementary information
1. Labelling of solar collectors and hot water stores	a. All solar collectors should have a visible and durable label displaying all information required according to BS EN12975, and including at least the following: • name of manufacturer; • collector type; • serial number; • year of production; • gross area of collector; • aperture area of collector; • net absorber area of collector; • maximum operation pressure; • stagnation temperature at 1000W/m² and 30°C; • volume of heat transfer fluid; • weight of empty solar collector; • labelling of solar heated water storage vessels within solar domestic hot water systems b. All hot water storage vessels should carry a label with the following information: • manufacturer's name; • nominal overall capacity in litres; • standing heat loss in kWh/day; • type of vessel; • auxiliary heating heat exchanger performance in kW (where present)	*In addition to the minimum provision for labelling of hot water storage vessels, labelling with the following information is also recommended:* • *total net fluid content of secondary volume normally heated by each heat exchanger, where present (±1.0 litre);* • *the type, fluid content, maximum pressure and surface area of all heat exchangers)*
2. Commissioning	a. A signed and dated commissioning certificate should be completed to confirm the equipment has been correctly installed and to record key safety and operational features b. As a minimum, the commissioning certificate shall record the following details of the solar system • net or aperture area of solar collector; • minimum ambient temperature without freeze damage to components; • location and method of controlling overpressure; • location of the electrical isolating switch; • type of circulation fluid; • circulation rate of collector circuit; • location of device for protection of overheating solar heated water	• *A signed commissioning certificate, certifying that the equipment is safe, legal and fit for use of its intended purpose, should be handed over to the dwelling owner and/or user as applicable* • *A separate certificate is required to cover the installation and commissioning of the hot water storage vessels and/or appliances within a solar domestic hot water system* • *A commissioning engineer should be a competent person who can personally testify by signature and date that the equipment is commissioned*
3. Documentation	No minimum requirement	*Information concerning the solar domestic hot water system should be provided to the dwelling owner and/or user as applicable. The documentation should include:* • *user's manual;* • *warranty information;* • *a recommended maintenance schedule;* • *commissioning certificate;* • *full contact details of the installer*

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Author: barryjohnston
Subject: Highlight
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This is a false presumption that all solar installations need an "isolating switch". Thermosyphon solar water heating systems do not need them. Nor does Solartwin and having one could lead to the system being misused. Both systems are zero carbon technologies. Both of these valid technologies are apparently potside the scope of this guide. To specify a switch like this is a component specification where one is not needed. This is market limiting. Our system does not need a switch. It could reduce performance, reliability and customer satisfaction. It is inappropriate to impose old solar conditions onto our new solar technology. Change to make: after electrical isolating switch, add where required. Regulators need to use wider scoped consultants, and to meet with innovators regularly and get up to speed on new technology. This supposed missing switch has been a recurrent issue, we discussed inspector demands for a switch with BRE at length on the clear skies grant scheme. We resolved it by agreeing that none was needed.

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Device? One may not be needed. This is again a component-led approach to regulation which it is inevitably market limiting. Our system does not need a device. Our system uses heat export to control peak temperatures. This is a tried and tested approach which is based on sound science.. A device could reduce

Comments from page 5 continued on next page

Table 32 Minimum provisions for labelling, commissioning and documentation for solar hot water systems

	Minimum provision	Supplementary information
1. Labelling of solar collectors and hot water stores	a. All solar collectors should have a visible and durable label displaying all information required according to BS EN12975, and including at least the following: • name of manufacturer; • collector type; • serial number; • year of production; • gross area of collector; • aperture area of collector; • net absorber area of collector; • maximum operation pressure; • stagnation temperature at 1000W/m² and 30°C; • volume of heat transfer fluid; • weight of empty solar collector; • labelling of solar heated water storage vessels within solar domestic hot water systems b. All hot water storage vessels should carry a label with the following information: • manufacturer's name; • nominal overall capacity in litres; • standing heat loss in kWh/day; • type of vessel; • auxiliary heating heat exchanger performance in kW (where present)	*In addition to the minimum provision for labelling of hot water storage vessels, labelling with the following information is also recommended:* • *total net fluid content of secondary volume normally heated by each heat exchanger, where present (±1.0 litre);* • *the type, fluid content, maximum pressure and surface area of all heat exchangers)*
2. Commissioning	a. A signed and dated commissioning certificate should be completed to confirm the equipment has been correctly installed and to record key safety and operational features b. As a minimum, the commissioning certificate shall record the following details of the solar system • net or aperture area of solar collector; • minimum ambient temperature without freeze damage to components; • location and method of controlling overpressure; • location of the electrical isolating switch; • type of circulation fluid; • circulation rate of collector circuit; • location of device for protection of overheating solar heated water	• *A signed commissioning certificate, certifying that the equipment is safe, legal and fit for use of its intended purpose, should be handed over to the dwelling owner and/or user as applicable* • *A separate certificate is required to cover the installation and commissioning of the hot water storage vessels and/or appliances within a solar domestic hot water system* • *A commissioning engineer should be a competent person who can personally testify by signature and date that the equipment is commissioned*
3. Documentation	No minimum requirement	*Information concerning the solar domestic hot water system should be provided to the dwelling owner and/or user as applicable. The documentation should include:* • *user's manual;* • *warranty information;* • *a recommended maintenance schedule;* • *commissioning certificate;* • *full contact details of the installer*

performance, reliability and customer satisfaction. It is inappropriate to impose old solar conditions onto our new solar technology.*We discussed inspector demands for a specific valve with BRE at length on the clear skies grant scheme. We resolved it: BRE accepted none was needed. Yet the issue recurs here.

Table 33 Minimum provision for insulation of pipes for solar hot water systems

Minimum provision	Supplementary information
In new and replacement systems should, in the following cases be insulated in accordance with the recommendations in this guide (in line with the maximum permissible heat loss indicated in the Supplementary Information column) and labelled accordingly: • All pipes of a solar primary system should be insulated throughout the length of the circuit • All other pipes connected to hot water storage vessels, including the vent pipe, should be insulated for at least 1m from their points of connection to the cylinder (or they should be insulated up to the point where they become concealed)	*The insulation should be suitably rated for the maximum foreseeable pipe temperature applicable and where external also be resistant to vermin attack and climatic degradation* *In a dwelling that already has a solar hot water system it is recommended that the insulation is upgraded in line with these minimum provisions where significant work, such as change of solar storage, is carried out* *Where insulation is labelled as complying with the Domestic Heating Compliance Guide it must not exceed the following heat loss values:*

Pipe diameter (OD) mm	***Maximum permissible heat loss* (W/m)***
8mm	*7.06*
10mm	*7.23*
12mm	*7.35*
15mm	*7.89*
22mm	*9.12*
28mm	*10.07*
35mm	*11.08*
42mm	*12.19*
54mm	*14.12*

**In assessing the thickness of insulation required to meet the provision, standardised conditions should be used in all compliance calculations based in this instance on a horizontal pipe at 60°C in still air at 15°C*

Further assistance in converting these heat loss limits to levels (thickness) of insulation for specific thermal conductivities is found in the "TIMSA HVAC Guidance for achieving compliance with Part L of the Building Regulations"

Insulation for pipework in unheated areas

Extra provision may need to be made to protect water carrying pipework in unheated areas against freezing

Further guidance is available in:

- *BS 5422:2001 Method for specifying thermal insulating materials for pipes, tanks, vessels, ductwork and equipment operating within the temperature range of –40°C to +700°C*
- *BRE Report No 262 Thermal insulation: avoiding risks, 2002 edition*

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Incorrect presumption which may be market limiting: that freezing needs to be prevented. Damage from freezing is what needs to be protected, and is what the water regs require. Solartwin's pipes are flexible. Filled with water, they can freeze without damage. It is not necessary to prevent them from freezing. The water regulations require protection from freeze damage, not from freezing itself. Our technology risks being regulated out of existence by the water regulations being misapplied / misinterpreted. This misinterpretation of regulations on this issue has been a repeated competition issue for our technology. We have to explain it and rebut it via one regulatory agency only to find it cropping up in another sooon after..

Supplementary information on solar water heating

Energy Efficiency Best Practice in Housing publication 'Solar Water Heating Guidance for Installers'

Glossary of standards relevant to solar hot water heating

BS 7431:1991	Method for assessing solar water heaters. Elastomeric materials for absorbers, connecting pipes and fittings
BS 6785:1986	Code of practice for solar heating systems for swimming pools
TS 12977-3:2001	Performance characterisation of stores for solar heating systems
TS 12977-2:2001	Thermal solar systems and components. Custom built systems. Test methods
TS 12977-1:2001	Thermal solar systems and components. Custom built systems. General requirements
BS EN ISO 9488:2000	Solar energy. Vocabulary
BS EN 12976-2:2001	Thermal solar systems and components. Factory made systems. Test methods
BS EN 12976-1:2001	Thermal solar systems and components. Factory made systems. General requirements
BS EN 12975-2:2001	Thermal solar systems and components. Solar collectors. Test methods
BS EN 12975-1:2000	Thermal solar systems and components. Solar collectors. General requirements
ISO 9553:1997	Solar energy – methods of testing preformed rubber seals and sealing compounds used in collectors
BS 3734-1:1997	Rubber – tolerances for products – Part 1: Dimensional tolerances
BS 903-0:2003	Physical testing of rubber – Part 0: General
BS 6920:2000	Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of water
ISO/TR 10217:1989	Solar energy – water heating systems – guide to material selection with regard to internal corrosion
BS 8000	Workmanship on building sites
BS 7206	Specification for unvented hot water storage units and packages
BS 7671	Requirements for electrical installations
BS 1566	Copper indirect cylinders for domestic purposes
BS 4814	Specifications for expansion vessels using an internal diagraph for sealed hot water heating systems
BS 7074	Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems
BS 5422	Methods of specifying thermal insulation materials on pipes, ductwork and equipment in the temperature range of –40°C to 700°C
BS 5449 BS EN 12831 BS EN 12828	Specification of forced circulation hot water central heating systems for domestic premises
BS 6701	Telecommunications equipment and telecommunications cabling
BS 5970	Code of practice for thermal insulation of pipes and equipment
BS 6700	Specification and design, installation, testing and maintenance of services supplying water for domestic uses within buildings and their curtilages

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Unfortunately, this document is also market limiting with respect to our technology.