

# DIN EN 15316-3-2:2008-06 (E)

## Heating systems in buildings - Method for calculation of system energy requirements and system efficiencies - Part 3-2: Domestic hot water systems, distribution

---

<b>Contents</b>		<b>Page</b>
Foreword .....		4
Introduction .....		6
1	Scope .....	7
2	Normative references .....	7
3	Terms and definitions .....	7
4	Symbols, units and indices .....	10
5	Domestic hot water system characteristics .....	11
5.1	General .....	11
5.2	Single zone and single system .....	12
5.3	Single zone and multiple systems .....	12
5.4	Multiple zones with single system .....	13
6	Distribution thermal losses .....	13
6.1	Total distribution thermal losses .....	13
6.2	Thermal losses from individual distribution pipe section .....	14
6.2.1	General .....	14
6.2.2	Thermal losses from pipes based on dwelling area .....	14
6.2.3	Thermal losses from pipes based on pipe lengths and number of tappings per day .....	15
6.2.4	Thermal losses from pipes based on pipe lengths and distribution efficiencies .....	15
6.2.5	Thermal losses from pipes based on pipe lengths and tapping profiles .....	16
6.2.6	Thermal losses from pipes based on pipe lengths and average temperature .....	16
6.2.7	Heat energy lost due to wasted hot water .....	16
6.2.8	Time periods .....	16
6.3	Thermal losses from circulation loop .....	16
6.3.1	General .....	16
6.3.2	Thermal losses from circulation loop based on pipe length and a fixed value of heat loss .....	16
6.3.3	Thermal losses from circulation loop based on a physical approach .....	17
6.3.4	Additional thermal losses from circulation loop during periods of no circulation .....	17
6.3.5	Total thermal loss from circulation loop .....	17
6.4	Thermal losses due to accessories .....	18
6.5	User outlets .....	18
7	Auxiliary energy .....	18
7.1	Total auxiliary energy consumption .....	18
7.2	Auxiliary energy consumption for ribbon heating .....	18
7.3	Auxiliary energy consumption for pumps .....	19
7.3.1	General .....	19
7.3.2	Simplified method .....	19
7.3.3	Detailed calculation method .....	20
8	Recoverable, recovered and unrecoverable system losses .....	20
Annex A (informative)	Calculation of thermal losses from pipes based on pipe lengths and the number of tappings per day .....	22

<b>Annex B (informative) Calculation of thermal losses from pipes based on pipe lengths and distribution efficiencies .....</b>	<b>24</b>
<b>Annex C (informative) Calculation of thermal losses from pipes based on pipe lengths and tapping profiles .....</b>	<b>26</b>
<b>Annex D (informative) Calculation of thermal losses from circulation loop .....</b>	<b>28</b>
<b>D.1 Calculation of thermal losses based on pipe length .....</b>	<b>28</b>
<b>D.2 Thermal losses based on a detailed calculation method .....</b>	<b>28</b>
<b>D.2.1 General .....</b>	<b>28</b>
<b>D.2.2 Determination of length of pipe sections .....</b>	<b>28</b>
<b>D.2.3 Determination of heat transfer coefficients .....</b>	<b>31</b>
<b>D.2.4 Tabulated method for calculation of linear thermal transmittance .....</b>	<b>33</b>
<b>D.2.5 Determination of average ambient temperature .....</b>	<b>34</b>
<b>D.2.6 Determination of average hot water temperature of pipe section .....</b>	<b>34</b>
<b>Annex E (informative) Calculation of thermal losses from user outlets .....</b>	<b>35</b>
<b>Annex F (informative) Calculation of auxiliary energy requirement of a circulation pump .....</b>	<b>36</b>
<b>F.1 Simplified method for calculation of auxiliary energy requirement of a circulation pump .</b>	<b>36</b>
<b>F.2 Detailed method for calculation of auxiliary energy requirement of a circulation pump ....</b>	<b>36</b>
<b>F.2.1 Hydraulic energy requirement .....</b>	<b>36</b>
<b>F.2.2 Hydraulic power required by the pump .....</b>	<b>36</b>
<b>F.2.3 Duration of the provision of domestic hot water .....</b>	<b>37</b>
<b>F.2.4 Pump performance coefficient .....</b>	<b>38</b>
<b>F.2.5 Intermittent pump operation .....</b>	<b>39</b>
<b>F.2.6 Expenditure value coefficient .....</b>	<b>39</b>
<b>F.3 Auxiliary energy recoverable factor .....</b>	<b>40</b>
<b>Bibliography .....</b>	<b>41</b>