This document contains a list of resources and links compiled in 2016 about:

1. General inclusive design
2. Kitchens
3. Kitchen appliance design guidelines and recommendations
4. Heating controls
5. Smart meters

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General inclusive design

What is Universal Design? (2012)
The Centre for Excellence in Universal Design (part of National Disability Authority)
Overview of universal design (UD), including definition, outline of the 7 principles, who benefits and 10 things to know about UD
universaldesign.ie

The Center for Universal Design (NC State University)
Guidelines for evaluating how well products satisfy the Principles of Universal Design to highlight strengths and weaknesses
Read the guide

Inclusive Design Toolkit
University of Cambridge
Definition of inclusive design, list of user capabilities (such as vision, hearing, thinking and mobility) to consider, why and how to practice inclusive design
www.inclusivedesigntoolkit.com

Designing with people: Methods
Designing with people (Helen Hamlyn Centre for Design)
20 methods which can help designers develop an understanding of their users' capabilities, wants and needs in order to design with, not just for, people (participatory design). Consider the principles relating specifically to user interfaces and as products become more complex with more functions, the user/product interaction increases
designingwithpeople.rca.ac.uk

Usability Heuristics for User Interface Design
Jakob Nielsen (Nielsen Normal Group)
10 usability 'rules of thumb' (heuristics) of how a user interface should be made to navigate and
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what it should offer users
www.nngroup.com/articles/ten-usability-heuristics

Kitchens

How we test.......?
*Which*?
Describes how they test products, including what they look for in an ease of use assessment and what is considered good design and a ‘Best Buy’
Search on Which? website: ‘How we test [insert product]’

*Loughborough Design School (International Journal of Design)*
How the kitchen environment affects the use of appliances, including comments on difficulties with certain appliances (kettle 81-82, dishwasher 82) and the location of appliances (85)
Read the original article

Kitchen design that stands the test of time. Features that make your kitchen easier for everyone to use
*Consumer reports*
A few suggestions on how to make a kitchen environment more accessible
Read Kitchen design that stands the test of time

Kitchen Appliance design guidelines and recommendations

Requirements needed in European household appliance performance standards to improve ease of use of appliances by older and disabled people (2011)
*Loughborough Design School and ANEC*
Overview of control types for potential use on household appliances. Includes suggestions of controls for tasks on variety of household appliances, the qualities of control types, additional considerations and quantitative recommendations of controls
Read Requirements needed in European household appliance performance standards

Addendum to final report: Requirements needed in European household appliance performance standards to improve ease of use of appliances by older and disabled people (2012)
*Loughborough Design School*
Addendum to the final report. Re-visiting the guidelines for font size and text contrast.
Read Addendum to final report

Development of guidelines for designing appliances for older persons (2012)
*Work*
Focuses mainly on the technology behind domestic appliances and how this should be designed for
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ease of use of older persons (for instance ‘mental models’)
Read Development of guidelines

The use of domestic appliances by cognitively impaired users (2013)
Glasgow and Higgins, Engineering and Industrial Sciences- Aus (Cognitive Performance Support)
Consideration of older users’ mental models in designing appliances and/or user interfaces

American Foundation for the Blind: Access World Magazine
Testing of controls used on domestic appliances with blind and visually impaired people. It’s an old study, but highlights the difficulties faced by using touchpads and screens and how these affect user confidence. Touchscreens are being used more frequently so is there increased difficulty now?
Read Usability Study

Ease of use: Appliances
Intertek
Training course
Read Ease of use: Appliances

Left to your own devices: Results of a study on the usability of everyday household and electronic products for people with vision loss (2011)
American Foundation for the Blind: Access World Magazine
Suggestions of features needed on household and electronic equipment to improve usability for blind and visually impaired users. (User-centred research to understand people’s preferences and whether product accessibility would influence their buying)

Guidelines for designing kitchen appliances for the elderly (2006)
Auburn University
Student dissertation (for Masters degree) developing guidelines for designing kitchen appliances for the elderly
etd.auburn.edu/bitstream/handle/10415/265/RAVEN_SUSAN_15.pdf?sequence=1&ts=1438177808720

Human factors design guidelines for the elderly and people with disabilities (1992) - incomplete draft?
Honeywell
Effect of ageing and certain conditions on user abilities. Covers the different types of controls, visual displays (rest missing), noting when to use certain types and suggested dimensions

Development of a usability evaluation framework with quality function deployment: from customer sensibility to product design (2009, Korea)
Human Factors and Ergonomics in Manufacturing
onlinelibrary.wiley.com/doi/10.1002/hfm.20145/epdf
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A few basic design recommendations for appliances and the kitchen environment
Read Designing inclusive futures

Accessible Appliances and Universal Design (1996)
Special Interest Forum on Accessible Appliances and Universal Design. Centre for Inclusive Design and Environmental Access
Report on special interest forum on accessible appliances. Includes information on which principles of design to consider and lists range of domestic appliances and what to consider in their design
Read Accessible Appliances and Universal Design

Examples of inclusively designed kitchen appliances

Designing for the Senior Surge (2008)
The Wall Street Journal
Gives examples of changes in appliance design to accommodate older users
www.wsj.com/articles/SB120908542602343631

How to choose kitchen appliances for universal design
Houzz
Briefly covers some of the different styles of a range of domestic appliances and their usability. Focus is 'accessibility and safety features for kitchen appliances'
www.houzz.co.uk/ideabooks/5350132/list/how-to-choose-kitchen-appliances-for-universal-design

Kitchen: Accessible Appliances
Briefly discusses development of inclusive appliances including a few examples for improved usability (visibility and ease of use)
www.improvenet.com/a/accessible-appliances

Kitchen appliance buying advice

Home appliances
Which?
Reviews of home appliances by Which? (Need to sign up to view)

Accessible Appliances and Universal Design (1996)
Special Interest Forum on Accessible Appliances and Universal Design. Centre for Inclusive Design and Environmental Access
Report on special interest forum on accessible appliances. Includes information on which principles of design to consider and lists a range of domestic appliances and what to consider in their design
Read Accessible Appliances and Universal Design

Easy to use home and tech products
Which?
Gives advice on the elements of different home and tech products to consider when purchasing an easy to use product (Includes: Kettles, microwaves, toasters, washing machines and more).
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logged in, for each product also have access to a list of the best models for ease of use as selected from Which? reviews.

**Easy to use kettles**
**Easy to use microwaves**
**Easy to use toasters**
**Easy to use washing machines**

**Fridge accessibility (2015)**
*Choice*
A guide to choosing an accessible fridge. Details some specific design features which are more beneficial than others for users with different impairments

**Dishwasher accessibility (2015)**
*Choice*
A guide to choosing an accessible dishwasher. Details some specific design features which are more beneficial than others for users with different impairments

**Washing machine accessibility (2015)**
*Choice*
A guide to choosing an accessible washing machine. Details some specific design features which are more beneficial than others for users with different impairments
[Read Washing machine accessibility](#)

**The kinds of controls you will encounter**
*American Foundation for the Blind*
Explains, and gives examples of, which controls are accessible, inaccessible, and ambiguous to a blind or visually impaired user
[Read The kinds of control you will encounter](#)

**AccessWorld Appliance Accessibility Guide**
*American Foundation for the Blind*
Product and shopping advice for blind or visually impaired users for stoves, ovens, microwaves, dishwashers, washing machines and dryers

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**Heating controls**

**Types of boiler and heating controls**
*Which?*
Explanations of the different types of boiler and heating controls
[Read Types of boiler and heating controls](#)
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Consumer and domestic heating controls: a literature review
*Consumer Focus*
Identifies barriers associated to control usability, industry’s attitude towards developing and installing usable controls
[Read Consumer and domestic heating controls]

What people want from their heating controls: a qualitative study
*Department of Energy and Climate Change*
Diary study: how people currently use heating controls and how they want to (PDF)
[Read What people want from their heating controls]

How people actually use thermostats (2010)
*American Council for an Energy-Efficient Economy (ACEE)*
Reviews previous research to establish the thermostats used, whether successful thermal goals are reached, and energy saving and the difficulties experienced during use. Includes table identifying barriers from previous testing. Usability testing on thermostats includes interviews, online surveys and tasks to complete which highlight the barriers to users (PDF)

Advice on how to use heating controls
*NatCen Social Research for Department of Energy and Climate Change*
Findings of a randomised control trial in Newcastle testing whether tailored advice from a ‘trusted messenger’ on how to use heating controls can help households reduce energy consumption (PDF)
[Read Advice on how to use heating controls]

Thermostat Interface and Usability: A Survey (2014)
*Ernest Orlando Lawrence Berkeley National Laboratory, USA*
A survey of the research and literature relating to residential thermostats
[www.researchgate.net/publication/255220886_Thermostat_Interface_and_Usability_A_Survey]

Development of heating control evaluation technique (including usability testing)

*Ergonomics*
Overview of different design principles. Usability testing of programmable thermostats where users were given tasks to complete. Identifies elements of the design that work well and contribute to success of tasks. Develops guidelines for the design of thermostat that may also be applicable to domestic appliances. Doesn’t relate to inclusive design but fixing problems which affect everyone would make design more inclusive (PDF)

Usability of residential thermostats: Preliminary investigations (2011)
*Building and Environment*
Summarises problems identified from previous research on usability issues of thermostats. Proposed a calculation/tool to give a single measure of usability consisting of the time taken to complete and ability to complete task - only initial, and gives idea for further research to test validity (PDF)
[Click here for Usability of residential thermostats]
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The characteristics of a usable temperature control
*Helsinki University of Technology, Finland*
Design guidelines, tested on an office work environment (PDF) [Click here for The characteristics of a usable temperature control](#)

Enabling sustainable user interaction with domestic heating controls
*Nicola Combe et al, Proceedings of the research students' conference on 'Buildings don’t use energy, people do?'
Gives initial design guidelines for heating controls (PDF) [bura.brunel.ac.uk/bitstream/2438/6061/2/Fulltext.pdf](#)

Are users necessary for inclusive design? (2005)
*15th International Conference on Engineering Design, Melbourne, Australia*
Considers how designers can use Exclusion Analysis to prioritise accessibility problems without referring to older or disabled users, based on an estimate of the number of people affected and the frequency of occurrence of problems during user/device interaction [www.designsociety.org/publication/23148/are_users_necessary_for_inclusive_design](#)

Evaluation and design recommendations for heating controls (including usability testing)

*An investigation into usability and exclusivity issues of digital programmable thermostats (2011)*
*Engineering Design, Brunel University*
Aims to investigate why older users in particular have difficulty using heating controls effectively. Uses ‘Exclusion calculator’ from Cambridge inclusive design toolkit. Makes design recommendations for effective controls and confirms are problems with design effecting both younger and older users (PDF) [dspace.brunel.ac.uk/bitstream/2438/6060/2/Fulltext.pdf](#)

*Reducing domestic energy consumption through inclusive interface design*
*Nicola Combe, Brunel University*
Dissertation. Examines the scale of exclusion to digital programming (of people living on one estate) and the reasons for exclusion, through in-depth study focusing on the difficulties experienced by older people. Findings of both studies contributed to the design of a more inclusive control interface which, when tested, gave tasks an increased success rate and indicated potential energy savings (PDF) [bura.brunel.ac.uk/bitstream/2438/7172/3/FulltextThesis.pdf](#)

*Assessing the ‘Design Exclusion’ of Heating Controls at a low-cost, low-carbon housing development (2014)*
*International Journal of Sustainable Engineering, Brunel University*
Details three main user capabilities that are challenged by heating controls: vision, dexterity, and ‘thinking’. For each, lists how the design affects the user and how usability could be improved. (Appendix has detailed HTA on using thermostats and a table on the capabilities required by users) [Read Accessing the 'Design Exclusion'](#)

*Exploring consumer preferences for home energy display functionality (2009)*
*Centre for Sustainable Energy*
Qualitative feedback from users after using different heating controls for a week in their own home. Two workshops were conducted: a workshop before testing to develop a specification for desired heating controls, and a workshop after testing to reevaluate their preferences. Key design issues were
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identified and a core specification for the design of heating controls developed (PDF) Read exploring consumer preferences for home energy display functionality

How people use thermostats in homes: review (2011)
Building and Environment
Gives overview of usability testing done and recommendations to improve design (PDF)
Read How people use thermostats in homes

Usability testing of smarter heating controls
Department of Energy and Climate Change
Usability testing (PDF)
Read Usability testing of smarter heating controls

Reducing domestic energy consumption through inclusive interface design
Nicola Combe, Brunel University
Dissertation. Examines the scale of exclusion to digital programming (of people on one estate) and the reasons for exclusion through in-depth study focusing on the difficulties experienced by older people. Findings of both studies contributed to the design of a more inclusive control interface which, when tested, gave tasks an increased success rate and indicated potential energy savings
bura.brunel.ac.uk/bitstream/2438/7172/3/FulltextThesis.pdf

Consumer advice

Choosing central heating controls and saving energy (2015)
RiDC
www.ridc.org.uk/content/central-heating-controls

Controls

Heating control specific
Controls for end users: a guide to good design and implementation (2007)
Building Controls Industry Association
Barriers between the intention to provide good controls and users' real-life experience. Includes checklist for control manufacturers and suppliers (PDF)
Read Controls for end users