



The Quiet House

Opening launch at Ideal Home Show Friday 15th March 2013

Quiet House is a ground breaking future sound-concept feature show-house presenting the latest technology and solutions to care for our aural health at home with products from over 25 awarded brands all under one peaceful roof



Facts and stats background for first Soundscaped home of the future

Quiet Mark has chosen the heart of UK's noisiest and busiest home show to gather a world- first showcase of quietest technology and solutions to unwanted noise for our home, work and everyday living environments with a campaign to raise awareness about the impact sound has upon our health, well-being, productivity and our neighbours, to provide solutions for peace and quiet in most unlikely places.

80% of the calls received on the Noise Abatement Society national noise 24/7 help line in 2012 were complaints about neighbour noise [Noise Abatement Society 2012](#)

It is easy to forget everyday how much the noise and sounds of technology affect us because we cannot see it with our eyes, yet it surrounds us constantly and is a complex science to understand.

This document aims to inform about pioneering an unexplained subject to the general public, noise is a difficult pollution to tackle and for leading scientists to explain succinctly because of its complexity. One thing we can do simply and practically is encourage development of quiet high performance technology to begin the transformation of our aural environments.

For the first time here products and solutions which help our aural health have been awarded by sound experts and brought together to help our understanding of the importance to re-tune our lives.

The Quiet House shows that by choosing a range of quieter high performance technology, sound insulation, isolation and noise absorbing solutions we can reduce unwanted noise in our homes by many decibels, depending on the combination of technology and solutions used in any given location, which completely transforms our home into a more supportive healthy aural soundscape.

The Quiet Mark awarded products are validated as a selection of the quietest technology and solutions currently available on the market across over 35 product categories, in response to the need for an easy labelling system at point of sale which assures consumers of a trusted assessment to show a product has achieved quieter noise levels, which is often near impossible to assess in a shop oneself. You never know what it going to sound like until you plug it in at home.

61% of people in recent Quiet Mark survey of 2,371 entrants to Win a Quiet Life in November 2012 said they have to take a break from what they are doing to escape noise every day.

45% of those people surveyed also named the washing machine as the most annoying appliance in their home. Followed by 14% who said the vacuum cleaner as the main nuisance
Quiet Mark Nov 2012

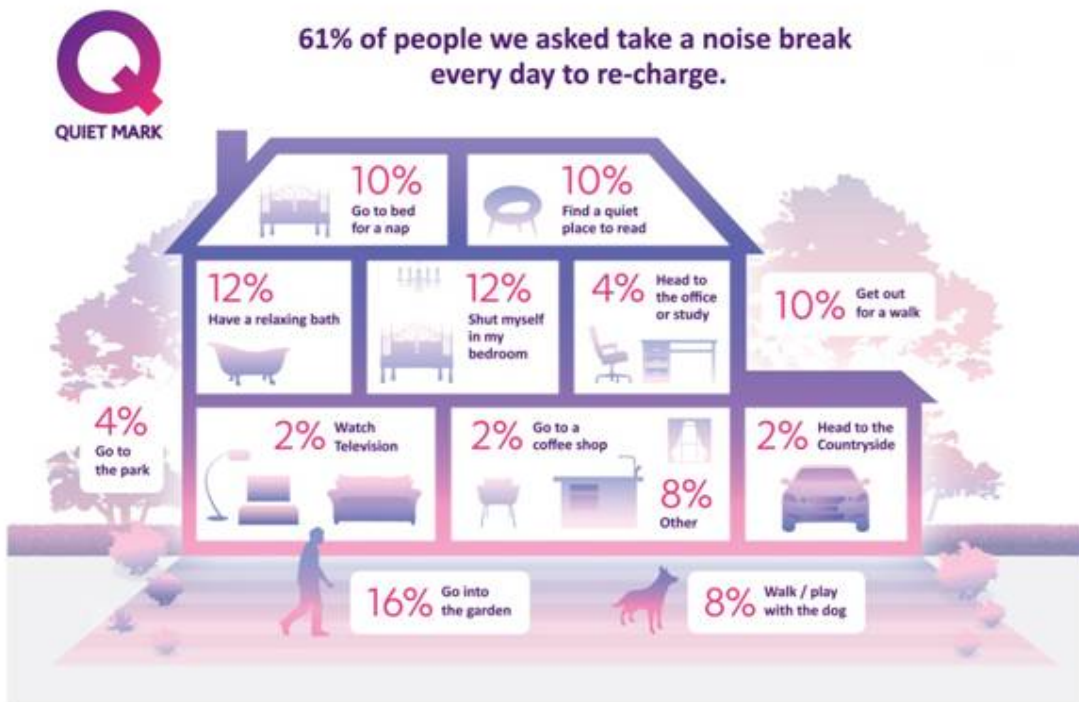
In the year 2011 local authorities in England received around 410,000 complaints about noise. That equates to about 1,100 complaints every day. The vast majority of those complaints were about noise from neighbours. If the principles to be found in the Quiet House are followed, it should help us live more quietly and reduce the disturbance caused to our neighbours.

DEFRA -UK Government Department of the Environment

Sound is measured in decibels and the scale dB(A) is weighted to the range perceived by the human ear and is based on a logarithmic scale: thus the sound level of 100 dB(A) contains twice the energy of a sound level of 97 dB(A) and a rise of 10dB in sound level corresponds to roughly a doubling of subjective loudness.

The combined noise levels of the products, appliances and sound absorption solutions are estimated to reduce the decibel levels in the Quiet House to under 40dB and make an average reduction of decibel levels or improved sound quality between 5-25dB per appliance depending on product category, even a few less decibels can make big difference to the layering of sound experienced in the home environment.

The Quiet House build is being brought together by leading acoustic insulation and isolation companies with complete insulation solutions, window noise reduction, sound doors, absorption panels and mats to achieve optimum silence within the house in the heart of the high volume levels of very busy Ideal Home show. More information on each acoustic insulation solution and decibel reduction of each build product contributing to the house is available on request.



* Based on 2,371 positive responses from entrants to the Quiet Mark 'Win a Quiet Life Competition' November 2012.

Facts and Stats on impact of sound at home

Living in airy open plan homes and offices with extensive laminate flooring and hard tiles is very popular, but comes at a cost: that attractive living spaces becomes a large reverberating drum, bouncing harsh sounds around our ears, often inflicting domestic appliance abuse as the noisy vacuum cleaner or kettle over-powers human inter-action.

We have all experienced this effect, and most of the time we think there is nothing that can be done about it, it is the painful price of technological progress: those appliances may look good and be very efficient, but they sound horrible. Continual irritation and annoyance as a result of excessive noise, either of your own making or forced upon you by others, will create stress and it is a well-documented fact that noise-induced stress, in the long term, is detrimental to health.

The sound emitted from an appliance may appear to be louder depending on the context in which it is placed. A small rectangular reflective tiled space like a WC can have a dramatic effect on decibel levels from an appliance like a hand dryer.

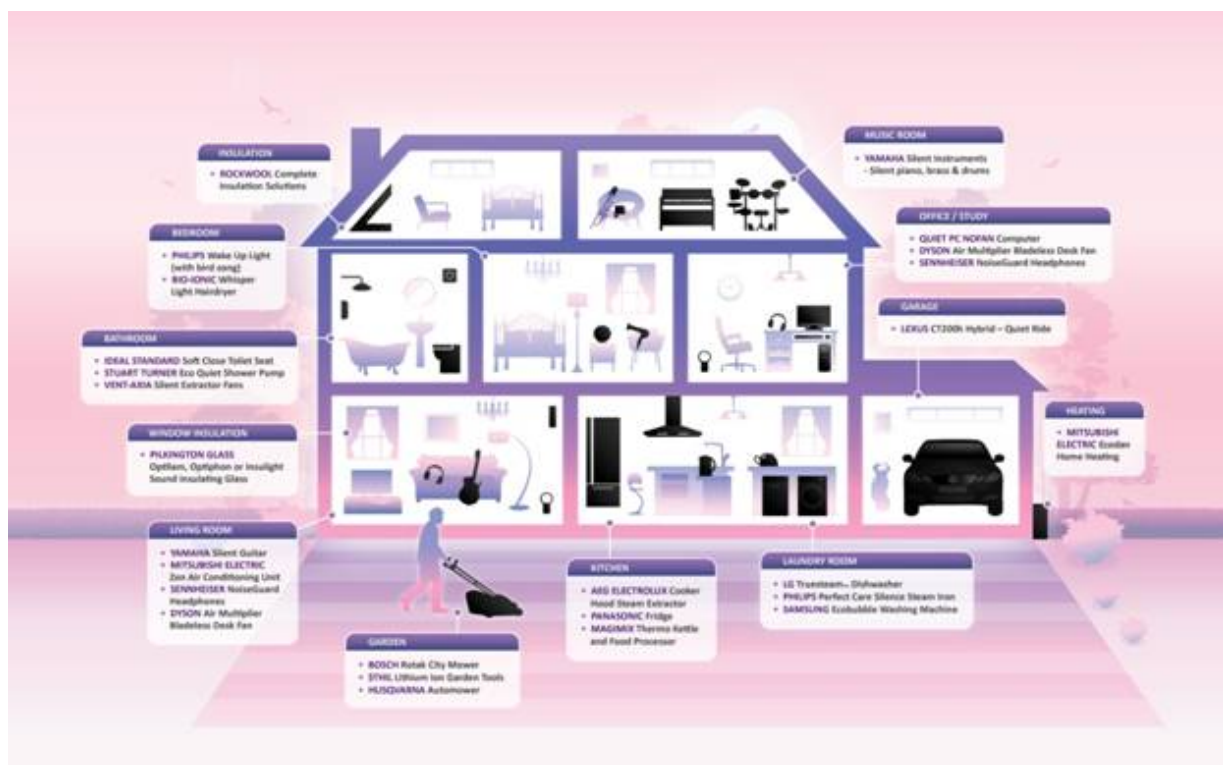
The average household contains around fourteen different appliances sometimes all working furiously at the same time.

When considering product design, the everyday lived auditory experience of the product should be paramount. Sound design should and can be composed. *Dr John Drever 'What is quietness'*

Compared to other areas of pollution, relatively little research has been done to completely understand the complex properties and effects of sound, and conveying how sound works and how it is measured is an area of mystification to the general public.

The Quiet House Award Winner Showcase at the Ideal Home Show

Each room in the home has been given a peaceful makeover by the Quiet Mark award winner products and home build solutions. Here are the awarded products and solutions in each living zone.



Kitchen/Laundry

Often seen as noisiest room in the house with most machines at work, solutions include quiet cooker hoods, fridge freezers, kettles, washing machines, tumble dryers, irons, extractor fans, food processors, quiet closing kitchen units. The Quiet House shows award winners from Samsung, Magimix, Philips, Whirlpool and Ventaxia

Bedroom

To re-charge in complete peace our award winner selection includes ear plugs, quiet high performance hair-dryers, quiet wake up lights with natural sounds like bird-song and wave sounds, home automation systems to control lighting and home audio systems, noise cancelation head-sets. The Quiet House shows award winners from Sennheiser, Philips, Lumie, Bio-ionic, Cirrus Ear Care

Bathroom

Relax in complete silence rather than company of a brush fans and pump systems, The Quiet House shows soft close toilet seats, silent extractor fans, quiet shower pumps and noiseless flush toilets. The Quiet House shows award winners from Ideal Standard, Ventaxia, Stuart Turner among others.

Living Room

The home entertainment zone can have a sound makeover with latest sound technology from soft fans to silent studio performance instruments. The Quiet House shows leading home automation brands, and award winning designs from Dyson, Yamaha, Mitsubishi Electric, Loxone.

Office/Study

To be most productive and help concentration the quiet office has silent fan-less computer, silent tech paper shredder, noise cancelation headphones to gentle sound quality desk fan. The Quiet House shows award winners from Quiet PC, Nofan, Intimus, Dyson, Sennheiser, Rockwool

Music Room

Practice to your heart's content without driving neighbours barmy, the Quiet House shows award winning range from Yamaha Silent Instruments from Grand Pianos, guitars, brass and drums

Windows The Quiet House shows noise reduction glass solutions from Pilkington Glass and Cantifix

Home Heating The Quiet House shows quietest home heating from Mitsubishi Electric Ecodan.

Insulation The Quiet House showcases several systems to demonstrate how to protect your home from acoustic levels and insulate at the same time, Quiet Mark award winners at the house include Rockwool, Pliteq, Firmacell among others which specialise in home insulation and isolation solutions.

Garage The Quiet House has a quiet car for silent sophistication high performance technology a hybrid car transforms driving experience to a peaceful ride. The Quiet House shows award winner Lexus Hybrid range in the garage. There are other award winners for travel from Oxygen Scooters.

Garden to truly love your neighbours there is now a choice of lower noise garden tools and lawn mowers which are mainly cordless lithium ion. The Quiet Mark award winners include quietest ranges from Bosch Lawn and Garden, STHIL, Husqvarna.



* Based on answers from 3,389 entrants to the Quiet Mark 'Win a Quiet Life Competition' November 2012.

In a noisy world – people want quieter appliances

The biggest ever survey on noise in the home commissioned by AEG-Electrolux in 2007 revealed that the vast majority of consumers across Europe say it was a mistake not taking more consideration of the noise an appliance makes at the time of purchase.

The AEG-Electrolux Noise Report in 2007 found that 29% of those buying washing machines, 28% of those buying dishwashers, 33% of those buying cooker hoods, 27% of those buying tumble dryers and 18% of those buying refrigerators wished they had taken noise in to account to a greater degree when they bought each item.

The study showed that in some cases, consumers were so unhappy with the noise their new appliance made, they eventually threw it out - or never actually used.

The survey revealed that given the choice again, around half would go for the quieter option, even if it was more expensive, whether it was for washing machines, cooker hoods or dishwashers. Interestingly, and perhaps not surprisingly, the survey found that many people also strongly associated quieter appliances with quality, reliability, efficiency and thus environmental friendliness.

What constitutes a ‘quiet appliance’?

The problem with noise is that it is subjective – one person’s harmonious melody is another person’s nightmare. This makes it impossible to measure noise, only sound can be measured. Most of us realise that decibels are the units by which sound is measured but few of us know what this means when it comes to measuring how loud appliances are in the home. The chart below gives a guide to the sound levels of some common noises. These are not absolute levels but give an indication of the relative rankings of everyday sounds. The chart includes average noise level for various domestic appliances along with the AEG quieter models

0 dB	The threshold of hearing
20dB	The sound of a whisper
30dB	WHO recommendation for undisturbed sleep
38dB	QUIET MARK AWARDED DISHWASHER
40dB	Refrigerator or a library
50dB	Average Dishwasher
60dB	QUIET MARK AWARDED COOKER HOOD
60dB	Sewing machine
65dB	Average Cooker hood
68dB	QUIET MARK AWARDED TUMBLE DRYER
70dB	Average tumble dryer
70dB	Average Washing Machine or TV
<u>85dB</u>	<u>Prolonged exposure above this level can cause damage to hearing</u>
90dB	Food processor, lawn mower,
100dB	Electric drill
110dB	Personal stereo
120dB	Thunder, loud stereo,
130dB	Threshold of pain
140dB	Fireworks, plane taking off
150dB	Gunshot

What few of us realise is that a change of 3dB(A) technically halves or doubles sound levels. For example, this actually means that a power drill emits more than 8 times as much noise as a food processor and more than 64 times as much noise as the average vacuum cleaner.



Do you take a noise break everyday to re-charge?



* Based on answers from 3,389 entrants to the Quiet Mark 'Win a Quiet Life Competition' November 2012.

Quiet Mark Background

The Quiet mark is a mark of approval, awarded by the Noise Abatement Society to manufacturers of the quietest products currently available on the market, validated by the Association of Noise Consultants and endorsed by DEFRA Department of the Environment.

This is a charity led initiative working together with industry to achieve a healthier stress-free living and working environment, thereby increasing productivity and improving quality of life and for the first time providing manufacturers with a public platform entirely devoted to supporting quiet design.

The Quiet Mark website Directory is a comprehensive collection of quiet-products made easily accessible to the consumer, the search done for them, a one-stop-shop for access to low-noise alternatives.

Now you can choose is a wake up device which is not 'alarming' and can ease you gently into your day, unobtrusive but effective washing machines and dishwashers and kettles that you don't have to shout over to be heard.

It's time to put an end to nights disturbed by the tumble dryer and neighbour noise; to enjoy that long hot steaming soak without the brashness of the bathroom fan.

Because the perceived level of loudness can change depending on the context that you place the machine in, the Quiet Mark website does not mention decibel levels, only that one machine is in a selection of the quietest in category. For example, a small rectangular reflective tiled space like a WC can have a dramatic effect on decibel levels from an appliance like a hand dryer and make it seem 18 times as noisy as the sound pressure decibel level given in its noise test specification carried out in an anechoic chamber.

Home Noise Stats and Facts – Top Survey Summary from past decade

2.9 million British householders say they have removed carpet and installed wooden floors in the past three years, in addition, 650,000 homeowners say they have removed walls to create an open plan space in the past three years, removing the noise barriers that internal walls create

ICM research April 2012

76% of homeowners between the ages of 18 and 40 would look to knock down walls to create the perfect living space in their next home *Halifax Mortgage research 2010*

World Health Organisation research suggests that 3% of all deaths caused by coronary heart disease are due to chronic noise exposure *WHO Noise Environmental Burden on Disease 2007*

More than one in ten (11%) of Britons who have been disturbed by noise in the past 12 months complained about the din from neighbours walking on wooden floors, rising to one in four (25%) of those living in flats However 2.9 million British householders say they have removed carpet and installed wooden floors in the past three years

In addition, 650,000 homeowners say they have removed walls to create an open plan space in the past three years, removing the noise barriers that internal walls create more noise.

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In 2007 around 1 million people moved home to escape noise coming from their neighbour; one in seven people are woken by their neighbours, whilst one in ten are kept awake; around half the population say that noise affects their quality of life *Ipsos Mori 2007*

In 2007, an independent research revealed that the vast majority of consumers across Europe say it was a mistake not taking more consideration of the noise an appliance makes at the time of purchase. The study showed that in some cases, consumers were so unhappy with the noise their new appliance made, they eventually threw it out - or never actually used.

Market Intelligence Management Limited January 2007 survey across European countries: Austria, Belgium, France, Germany, Italy, Netherlands, Norway, Spain, Russia and UK.

Cringing at the sound of nails scraping on a blackboard is part of the human condition, we still do not know why people react like this, and why they react differently to different sounds.

Dr Trevor Cox Salford University 'How Science Works'

Facts about impact of sound in office

Low-level noise in open-style offices seems to result in higher levels of stress and lower task motivation, according to a new study by a Cornell University environmental psychologist. And, surprisingly, experienced workers in these mildly noisy offices make fewer ergonomic adjustments to their workstations than do workers in quiet offices.

These findings suggest that even moderately noisy open offices might contribute significantly to health problems such as heart disease (due to elevated levels of epinephrine, a stress hormone) and musculoskeletal problems, says Gary Evans, professor of design and environmental analysis. Evans is a leading expert on environmental stress, such as noise and crowding.

80 dB(A) is the noise at work limit when hearing protection must be supplied if the worker has prolonged exposure at this level.

Office research shows noise lowers productivity by two thirds

Banbury, S and Berry, D.C 1998 (Disruption of office related tasks by speech and office noise)

Office noise, reduces cognitive performance by two thirds *Banbury and Berry 1998 Disruption of office-related tasks by speech and office noise British Journal of Psychology*

A series of studies in the workplace have established that office noise is now the primary cause of productivity loss in offices.

Office noise is related to reduced job satisfaction and dislike of the office environment.
Office noise increases stress among employees.

The negative effect of office noise is exacerbated when employees do not believe that they can control it, when it is perceived as unnecessary, or when employees have not been exposed to office noise previously.

'Distraction was most strongly related to degree of self-control of the noise and noise predictability. The most critical noise sources for the annoyance response were other machines than those used by oneself, whereas telephone signals had the largest effect on distraction. *Kjellberg, A., Landstrom, U., Tesarz, M., and Soderberg L., 1996 The effects of nonphysical noise characteristics, ongoing task and noise sensitivity on annoyance and distraction due to noise at work. Journal of Environmental Psychology*

'Office noise and lack of privacy affected worker satisfaction and mental health' *Klitzman, S., and Stellman, J.M. 1989 The impact of the physical environment on the psychological well-being of office workers Social Science & Medicine*

'Office noise led to worse performance on a measure of 'Integrative complexity' and a 'simple cognitive task' and led to perceptions of greater disturbance and stress. These effects could be ameliorated by masking white noise, but performance was best when there was no noise. *Loewen, L. and Suedfeld, P. 1992 Cognitive and arousal effects of masking office noise. Environment and Behaviour.*

Loud, uncontrolled office noise led to worsened mood (and a more negative mindset) and increased tension. These effects were not found when either the noise was controllable or when it was quiet' *Willner, P., and Neiva, J. 1986 Brief exposure to uncontrollable but not to controllable noise biases the retrieval of information from memory. British Journal of Clinical Psychology*

Effects of office noise on workers (this reference is particularly relevant, as it focusses on low-level noise, which affects very many more people than does high-level noise):

<http://www.news.cornell.edu/releases/Jan01/noisy.offices.ssl.html>

The History of Noise, Discord – By Dr Mike Goldsmith

Mike Goldsmith is a science writer and worked in the acoustics group at the UK's National Physical Laboratory and was head of the group for many years, his work included research into environmental noise, he has published over 30 science books. Here is an extract from his book published last August 2012 on the science of sound which explains more, Mike works closely with Quiet Mark on latest sound projects and is available for interviews to explain the more complex issues about noise and sound.

Noise, like any other type of sound, can be measured in terms of sound **pressure** (the thing that most sound-measuring devices measure) or sound **power** (the total energy sent out – often more relevant to the impact of sound but trickier to measure). Sound intensity is the amount of sound power in a particular area. Sadly, none of these quantities is equivalent to the loudness (sometimes called “perceived” loudness, but that is really a tautology) of a sound – and even more sadly, no instrument can measure this properly. Fortunately, there are approximate relations between these quantities. (The term “volume” is roughly equivalent to loudness but is not usually used except on dials on audio equipment).

Sound pressure, power or intensity can be measured in various units but are most frequently referred to in decibels, often used to label charts as above.

Decibels will be defined later, but the key point to bear in mind about them is that they are not linear measurements but logarithmic : as a sound gets louder, what happens is as follows.

A 3 dB increase means a doubling of sound intensity and of sound power

A 6 dB increase means a doubling of sound pressure

A 10 dB increase means an approximate doubling of loudness or “volume”

Conversely, if your sound-measuring device tells you that the sound pressure has increased by 20 dB, that means that

the sound pressure (and the voltage your device measures) has got 10 times larger
and

the sound power (and intensity) has got about 100 times greater

while

the loudness (and volume) has got about 4 times greater.

(There are all sorts of assumptions here – in particular, that the sound does not change in frequency as it increases and that it radiates equally in all directions).

To look at this from a third and final perspective : it is pretty much impossible to hear that a sound has changed in pressure by 1 dB. A 3 dB change can just about be detected by the ear (which is actually none too impressive, considering that this represents a doubling of the sound energy impinging on your eardrum). A 5 dB change is clearly noticeable, and, as mentioned above, a 10 dB change will be about twice as loud and a 20 dB change about 4 times as loud.

.... doubling the values of such units does not represent a doubling in the perceived sound. It also makes the task of reducing the impact of environmental noise very challenging. If water is flowing into your houseboat through two identical openings, closing one will halve the inflow and give you twice as long before you sink. But close one of two open windows to exclude the noise of a party on your street, and you will hardly notice the difference – the sound power in your room has halved (assuming that all the sound was coming in through the windows), but you will only hear a reduction of about 3 dB – barely noticeable. A similar issue occurs if one tries to organise a minute's silence in a cheering football crowd. If 9,999 out of the 10,000 people fall silent, the one remaining person's voice will be highly noticeable, even though the total sound power will indeed have fallen by about 99.99%

A complication is that the ear does not respond equally to all frequencies: it is about 1000 times as sensitive to a 1000 Hz tone than to a 100 Hz one. Hence, devices that measure noise levels must be furnished with filters (electronic or software-based) which mimic the frequency response of the human ear. A number of weightings are in use but the most popular since the 1930s is A-weighting – A-weighted decibels usually being written as dBA.

Cringing at the sound of nails scraping on a blackboard is part of the human condition, we still do not know why people react like this, and why they react differently to different sounds.

Dr Trevor Cox Salford University 'How Science Works'

The word 'noise' derives from the Latin word nausea meaning 'sickness'

ICM survey found that 87% of buyers and tenants, equivalent to 41.2 million people, said noise levels are an important consideration when they're looking to buy or rent, with almost half 43% saying they're very important. *ICM research April 2012*

87% of house-hunters say noise levels are important in purchasing decision, 43% say they're very important trend towards wooden floors and open plan living increasing internal din

Noise impact on health research

The best concise resource on noise impacts on health:

<http://www.euro.who.int/en/what-we-do/health-topics/environment-and-health/noise/facts-and-figures/health-effects-of-noise>

An excellent detailed report:

http://www.euro.who.int/__data/assets/pdf_file/0008/136466/e94888.pdf

Best resource on sound quality is Salford University's website:

http://www.acoustics.salford.ac.uk/res/cox/sound_quality/?content=intro

What we do know from WHO research is that noise related stress can have chronic physical affects. 'epidemiological evidence was accumulated supporting the hypothesis that persistent noise stress increases the risk of cardiovascular disorders including hypertension and ischaemic heart disease'. <http://www.euro.who.int/en/what-we-do/health-topics/environment-and-health/noise/facts-and-figures/health-effects-of-noise>

Health effects of noise

Noise causes a wide range of health effects, including:

- sleep disturbance;
- cardiovascular effects;
- damage to work and school performance;
- hearing impairment including tinnitus.