

Comprehension Test on Lighter Symbols UK Report

Prepared for

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The Ergonomic and Safety Research Institute has carried out the UK part of the lighter symbols test in January 2004. The comprehension tests were carried out in accordance with the methodology in ISO 9186: 2001 Graphical symbols – Test methods for judged comprehensibility and for comprehension.

Signed:.....Date:.....

Introduction

The Ergonomics and Safety Research Institute (ESRI) were commissioned by the LNE to carry out a UK comprehension test on symbols for lighters. The work, commissioned by LNE, is at the request of the European Federation of Lighters. The comprehension tests were carried out in accordance with the methodology in ISO 9186: 2001 Graphical symbols – Test methods for judged comprehensibility and for comprehension.

There were 2 variants for each referent and in total 2 referents were tested. The two variants for each referent tested can be seen illustrated in figures 1 and 2 below.



Fig 1. Referent 1 Variant A & B

Keep away from children / Keep out of reach of children

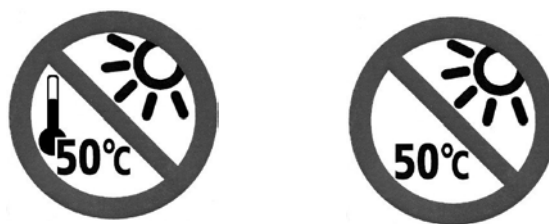


Fig 2. Referent 2 Variant A & B

Never expose to heat above 50°C or to prolonged sunlight

ESRI's Role

LNE supplied the test booklets ready to be provided to various respondents. ESRI were in charge of:

- Supplying LNE according to the set model, the texts written in English in order to set up the test booklets.
- Organising and performing the test with 200 respondents representative of the smoking population and used to a proposed referent.
- Analysing the results for each referent, drawing up the list of responses and appointing 3 judges to assign the responses on the standard categories, using examples of responses in each category.
- Tabulating the results as shown in the standard.
- Sending back all the documents used for the test, including the booklets.

Comprehension Test Methodology

The test booklets were setup according to ISO 9186: 2001

Test material

The test booklets used in the trials consisted of:

- Subject data sheet
- Instruction sheet
- Example sheet
- 2 test sheets

Symbols

The four symbols were tested twice. Once, at the size specified in ISO 9186: 2001 (28mm x 28mm), once at the actual size they will be when on the lighters/display units (10mm x 10mm).

Respondents

A total of 200 respondents carried out the symbol tests, all of whom were smokers. 100 respondents viewed the symbols at 28mm x 28mm and 100 respondents viewed the symbols at 10mm x 10mm. The respondent groups were matched as far as possible in terms of age, sex, educational level and occupation type. Respondents only participated in one test, seeing only one test booklet each.

Respondents' task in the comprehension test

Each respondent was presented with one test booklet. They were assisted if they required help in understanding the task. The tests were completed according to ISO 9186: 2001.

The tests took place in the East Midlands area of the UK. This area has been used for market research purposes in the past as it contains a roughly representative spread of the UK population.

Analysis of the results of the comprehension test

The responses in the test booklet were analysed by ESRI. Three judges were appointed from ESRI's staff, details of which are provided below.

Victoria Haines: Principle Researcher BSc DPS FErgS Eur Erg

Victoria holds practitioner status on the Professional Register of the Ergonomics Society and is a Registered European Ergonomist. She has an honours degree in Ergonomics, a Diploma in Professional Studies and a Professional Certificate in Management. Victoria specialises in consumer ergonomics and product safety, although her applied research experience covers a broad area and reflects her desire to see positive ergonomics impact across all areas of user interaction. She has provided consultancy and research across a wide range of application areas, including: consumer behaviour and expectations, instructions and warnings, packaging and labelling and work equipment design.

Martin Maguire: Principle Researcher, BSc Computer Science, MSc Ergonomics
PhD HCI, CNA

Martin Maguire joined the former HUSAT Research Institute in October 1983 with a background in both computer studies and ergonomics. His PhD was concerned with the development of information systems for the general public. He specialises in user requirements analysis, human interface design and usability evaluation. His main interests are in the design of interactive systems, pervasive computing, and consumer products to be usable by the general public and include the needs of people who are older or with disabilities. He is an associate member of the Ergonomics Society, the ACM and is a Council member of the UK Usability Professionals Association.

Val Mitchell: Principle Researcher, BSc Ergonomics, DPS.

Val has an honours degree in Ergonomics and a Diploma in Professional Studies. She has over 15 years experience in ergonomics specializing in understanding user requirements for consumer products and services including the design of user documentation.

Each judge assigned all responses to one of the seven categories listed in ISO 9186 : 2001:

1. Correct understanding of the symbol is certain
2. Correct understanding of the symbol is very probable
3. Correct understanding of the symbol is probable
4. The meaning which is understood is opposite to that intended
5. Any other response
6. The response given is 'Don't know'
7. No response is given

Results

The responses have been categorised according to the standard, with the judges meeting agreement where necessary. The results presented on the following pages are according to ISO 9186: 2001.

Symbols A1& B1**Referent:** Keep away from children / Keep out of reach of children**Function:** Warn adults to keep lighter away/out of reach of children**Field(s) of application:** On Lighters and / or the display unit**Country:** United Kingdom

Age: 15 to 30 35
 31 to 50 33
 Over 50 32
Total: **100**

Sex: Male 51
 Female 48

Educational Levels: Level 0 19
 (See key below) Level 1 49
 Level 2 13
 Level 3 7
 Level 4 10
 Level 5 2

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
No qualifications	GCSE	AS-Levels	ONC, OND	First Degree: BSc, BA	Higher degree; MSc, PHD
	CSE	A-Levels	BTEC National	HNC, HND, BTEC National	
	O-Levels	RSA Diploma	RSA Advanced Diploma	Teaching; other degree	
	City & Guilds	City & Guilds Craft	City & Guilds Advanced Craft	Diploma in higher education	
	GNVQ & NVQ foundation	GNVQ & NVQ intermediate	GNVQ & NVQ advanced	Nursing	

Occupations:

Unemployed	12
Student	8
Engineers	5
Warehouse operative	4
Housewife	4
Fork lift driver	3
Carer	3
HGV driver	2
Retired	2
Disabled	2
Retired disabled	2
Cleaner	2
Refurbish port-a-cabins	1
Home helps council	1
Window cleaner	1
Taxi driver	1
Nursery worker	1
Main layer	1
Scaffold erector	1
machinist	1
Community supporter	1
Stores	1
Shop assistant	1
Assistant hotel manager	1
Paint sprayer	1
Type setter	1
Assembler	1
Landlord	1
Security office	1
Fancy dress shop	1
Part owner / tool company	1
Factory worker	1

Technical Manager	1
School crossing	1
Bin man	1
Family resource worker	1
Joiner	1
Dance development worker	1
Civil Servant	1
Plasterer	1
Post room cimer	1
I.T.	1
Bank official	1
Delivery driver	1
Electrical contractor	1
Miner	1
Machine Operative	1
Assistant Manager - Pub	1
Nursery practitioner	1
Stock handler	1
Mid day supervisor	1
Sales exec	1
Administrator	1
Teacher	1
Co/director	1
Electrician	1
Technical Specialist	1
Administrator	1
Bodybuilder	1
Secretary	1
Teacher	1
Purchasing	1
Ward hostess	1

Cultural Background:	White British	96
	White French	1
	White Greek	1
	White Irish	1
	African Black	1

Physical Ability:	Diabetic, heart disease	1
	Mental Health	1
	Dust on lungs	1
	Dyslexic	1
	Arthritis	3
	Epilepsy	1
	Rheumatoid arthritis	1
	Half finger	1
	Ankle, Shoulders, back	1
	No disabilities	89

Qualifications or occupations of judges:

Judge 1: Principle Researcher, B.Sc. (Hons) Ergonomics, Diploma in Professional Studies, Fellow of the Ergonomics Society, Registered European Ergonomist.

Judge 2: Principle Researcher, B.Sc. (Hons) Ergonomics, Diploma in Professional studies.

Judge 3: Principle Researcher, B.Sc. Computer Science, M.Sc. Ergonomics Ph.D HCI, C.N.A.A



Variant A1



Variant B1

Context information: on the lighters and / or on the display unit.

Colour: Black and White

Source:

Sample Size: 100

Category:	Variant A1		Variant B1	
	50%		50%	
	%	Score	%	Score
Almost certain		48		20
Very probable		6		3
Probable		0		2
Opposite meaning	0		0	
Other Response	42		72	
Don't Know	2		0	
No Response	0		0	
Sum		54		25
Overall Score		54		25

Most frequent responses: A1



	Response	Frequency
Category 1	Keep away from children	8
	Keep out of reach of children	6
	Do not give to children	3
	Not for children's use	2
	Do not leave this item near children or where a child has access	2
Category 2	No leave a lighter near children/ No smoking for children	1
	I'll baby maybe on a smoking package (Keep away from children)	1
	Keep away from babies	1
	Not for children under the age of 3 years	1
Category 3	No answers in this category	
Category 4	No answers in this category	
Category 5	Do not smoke	5
	No babies allowed	4
	Not to be sad	3
	No lighters or matches	2
	Harmful to baby during pregnancy	1

Most frequent responses: B1



	Response	Frequency
Category 1	Keep away from children	4
	Keep out of reach from children	4
	Keep lighters away from small children and combustibles	1
	Not give to or allow children to have lighter	1
Category 2	Keep away from cloths and children	1
	Keep lighter in a safe place away from gases etc..	1
	And away from children	
Category 3	I would not put the lighter near any part of the body or give the lighter to a child	1
	Do not play with the lighter it could easily burn you	1
Category 4	No answers in this category	
Category 5	Can cause fire and is a danger to you and other people	15
	Flammable/Inflammable	10
	Can burn	3
	Be careful with lighter	2
	Beware of naked flames	1

Symbols A2 & B2**Referent:** Never expose to heat above 50°C or to prolonged sunlight**Function:** Warn adults not to expose the lighter to heat above 50°C or to prolonged sunlight**Field(s) of application:** On Lighters and / or the display unit**Country:** United Kingdom

Age: 15 to 30 35
 31 to 50 33
 Over 50 32
Total: **100**

Sex: Male 51
 Female 48

Educational Levels: Level 0 19
 (See key below) Level 1 49
 Level 2 13
 Level 3 7
 Level 4 10
 Level 5 2

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
No qualifications	GCSE	AS-Levels	ONC, OND	First Degree: BSc, BA	Higher degree; MSc, PHD
	CSE	A-Levels	BTEC National	HNC, HND, BTEC National	
	O-Levels	RSA Diploma	RSA Advanced Diploma	Teaching; other degree	
	City & Guilds	City & Guilds Craft	City & Guilds Advanced Craft	Diploma in higher education	
	GNVQ & NVQ foundation	GNVQ & NVQ intermediate	GNVQ & NVQ advanced	Nursing	

Occupations:

Unemployed	12
Student	8
Engineers	5
Warehouse operative	4
Housewife	4
Fork lift driver	3
Carer	3
HGV driver	2
Retired	2
Disabled	2
Retired disabled	2
Cleaner	2
Refurbish port-a-cabins	1
Home helps council	1
Window cleaner	1
Taxi driver	1
Nursery worker	1
Main layer	1
Scaffold erector	1
machinist	1
Community supporter	1
Stores	1
Shop assistant	1
Assistant hotel manager	1
Paint sprayer	1
Type setter	1
Assembler	1
Landlord	1
Security office	1
Fancy dress shop	1
Part owner / tool company	1
Factory worker	1

Technical Manager	1
School crossing	1
Bin man	1
Family resource worker	1
Joiner	1
Dance development worker	1
Civil Servant	1
Plasterer	1
Post room cimer	1
I.T.	1
Bank official	1
Delivery driver	1
Electrical contractor	1
Miner	1
Machine Operative	1
Assistant Manager - Pub	1
Nursery practitioner	1
Stock handler	1
Mid day supervisor	1
Sales exec	1
Administrator	1
Teacher	1
Co/director	1
Electrician	1
Technical Specialist	1
Administrator	1
Bodybuilder	1
Secretary	1
Teacher	1
Purchasing	1
Ward hostess	1

Cultural Background:	White British	96
	White French	1
	White Greek	1
	White Irish	1
	African Black	1

Physical Ability:	Diabetic, heart disease	1
	Mental Health	1
	Dust on lungs	1
	Dyslexic	1
	Arthritis	3
	Epilepsy	1
	Rheumatoid arthritis	1
	Half finger	1
	Ankle, Shoulders, back	1
	No disabilities	89

Qualifications or occupations of judges:

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Judge 2: Principle Researcher, B.Sc. (Hons) Ergonomics, Diploma in Professional studies.

Judge 3: Principle Researcher, B.Sc. Computer Science, M.Sc. Ergonomics Ph.D HCI, C.N.A.A



Variant A2



Variant B2

Context information: on the lighters and / or on the display unit.

Colour: Black and White

Source:

Sample Size: 100

Category:	Variant A2		Variant B2	
	50%		50%	
	%	Score	%	Score
Almost certain		36		36
Very probable		30		28.5
Probable		3		1
Opposite meaning	0		0	
Other Response	16		22	
Don't Know	2		2	
No Response	0		0	
Sum		69		65.5
Overall Score		69		65.5

Most frequent responses: A2



	Response	Frequency
Category 1	Keep out of direct sunlight and below 50°C	7
	Do not expose to heats over 50°C or direct sunlight	9
	Do not expose to temperatures above 50C (Not keeping it in direct sunlight)	1
	Do not leave in heat (Keep out of the sun and away from heat)	1
Category 2	Keep below 50°C	8
	Do not leave where exposed to heat	4
	Keep lighter away from the sunlight	4
	Store in cool place	3
	Keep out of extreme temperatures	1
Category 3	Hot weather (Keep in pocket)	1
	Not to be used at over 50C	1
	Do not expose to excessive temperature (Keep out of sunlight, don't put it in the fridge)	1
Category 4	No answers in this category	
Category 5	Temperature (Warning sign of temperature and weather conditions)	2
	Weather conditions	2
	Danger of fire risk	1
	Instant heat	1
	This area is hot one, please be warned lighter may get hot	1

Most frequent responses: B2



	Response	Frequency
Category 1	Do not expose to temperatures above 50C or direct sunlight	10
	Keep away from heat and sunlight	4
	Do not expose to high temperatures	2
	Not to expose this item to a degrees of 50 or more	1
	Do not store in direct sunlight, do not store above 50°C	1
Category 2	Do not expose to direct sunlight	7
	Do not expose to temperatures above 50°C	4
	Dangerous in sunlight over 50°C	4
	Do not expose to high temperatures	1
	Don't over heat (Don't leave lighter exposed to 50°C plus)	1
Category 3	Keep in shade	1
Category 4	No answers in this category	
Category 5	Temperature	3
	50°C is the temperature of the suns rays	3
	Sunshine	1
	Do not light in the sun if temperature reaches 50C	1
	Nothing to do with lighters	1

Symbols C1 & D1**Referent:** Keep away from children / Keep out of reach of children**Function:** Warn adults to keep lighter away/out of reach of children**Field(s) of application:** On Lighters and / or the display unit**Country:** United Kingdom

Age: 15 to 30 33
 31 to 50 33
 Over 50 34
Total: **100**

Sex: Male 42
 Female 58

Educational Levels: Level 0 22
 (See key below) Level 1 51
 Level 2 15
 Level 3 3
 Level 4 8
 Level 5 1

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
No qualifications	GCSE	AS-Levels	ONC, OND	First Degree: BSc, BA	Higher degree; MSc, PHD
	CSE	A-Levels	BTEC National	HNC, HND, BTEC National	
	O-Levels	RSA Diploma	RSA Advanced Diploma	Teaching; other degree	
	City & Guilds	City & Guilds Craft	City & Guilds Advanced Craft	Diploma in higher education	
	GNVQ & NVQ foundation	GNVQ & NVQ intermediate	GNVQ & NVQ advanced	Nursing	

Occupations:

Housewife	11
Unemployed	9
Student	9
Retired	5
Factory worker	4
Cleaner	4
Administrator	3
Sales	3
Supervisor	2
Fork lift driver	2
Engineer	2
Metal plating	1
Brewery Worker	1
None - ill health	1
Account Director	1
Line Manager	1
Buyer	1
Production Op	1
Auxiliary Worker	1
Scientist	1
999 Operator B.T.	1
Driver attendant	1
Investigator	1
Scientist	1
Project Manager	1
Clerical	1
Bus driver	1
Office manager	1
Upholsterer	1
Nail technician	1
Customer services	1

Housing office	1
Doctor	1
Warehouse man	1
Welder	1
Sandwich maker	1
Secretary	1
Assembly worker	1
Shop assistant	1
Trainee hairdresser	1
Moulder	1
Civil servant	1
Chef	1
Caretaker	1
Security guard	1
Drugs worker	1
Van driver	1
Accounts	1
Machinist	1
Shop assistant	1
Betting office clerk	1
Driver	1
Apprentice electrician	1
Foundry labourer	1
Learner support	1
Shop assistant	1
Lorry driver	1

Cultural Background:	White British	98
	Black British	1
	British Ukraine	1

Physical Ability:		
	Diabetes	1
	Parkinson's disease	1
	Diabetes and others	1
	Hearing disorder	1
	Spinal bifida, diabetes	1
	Collapsed discs	1
	Arthritis	1
	Registered disabled	1
	No Disability	92

Qualifications or occupations of judges:

Judge 1: Principle Researcher, B.Sc. (Hons) Ergonomics, Diploma in Professional Studies, Fellow of the Ergonomics Society, Registered European Ergonomist.

Judge 2: Principle Researcher, B.Sc. (Hons) Ergonomics, Diploma in Professional studies.

Judge 3: Principle Researcher, B.Sc. Computer Science, M.Sc. Ergonomics Ph.D HCI, C.N.A.A



Variant C1



Variant D1

Context information: on the lighters and / or on the display unit.

Colour: Black and White

Source:

Sample Size: 100

Category:	Variant C1		Variant D1	
	50%		50%	
	%	Score	%	Score
Almost certain		44		14
Very probable		3		1.5
Probable		0		1
Opposite meaning	0		0	
Other Response	32		76	
Don't Know	20		6	
No Response	0		0	
Sum		47		16.5
Overall Score		47		16.5

Most frequent responses: C1



	Response	Frequency
Category 1	Keep away from children	10
	Keep out of reach of children	6
	Not for use by children	2
	Harmful to young children (keep out of reach of minors)	1
	Do not leave near children	1
Category 2	Beware of children and lighters (action: don't leave near children)	1
	Under age, do not use (Only adults)	1
Category 3	No answers in this category	
Category 4	No answers in this category	
Category 5	Sad people	4
	No Children	2
	Smoking is dangerous	2
	Unfriendly	1
	Not to be sold to children	1

Most frequent responses: D1

	Response	Frequency
Category 1	Keep away from children	7
Category 2	Keep lighter away from your arm (keep them away from children)	1
Category 3	Don't play with lighters (Would not play with them)	1
Category 4		
Category 5	Fire hazard	12
	Danger	6
	Flammable/inflammable	5
	Someone on fire	3
	Be careful	2

Symbols C2 & D2**Referent:** Never expose to heat above 50°C or to prolonged sunlight**Function:** Warn adults not to expose the lighter to heat above 50°C or to prolonged sunlight**Field(s) of application:** On Lighters and / or the display unit**Country:** United Kingdom

Age: 15 to 30 33
 31 to 50 33
 Over 50 34
Total: **100**

Sex: Male 42
 Female 58

Educational Levels: Level 0 22
 (See key below) Level 1 51
 Level 2 15
 Level 3 3
 Level 4 8
 Level 5 1

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
No qualifications	GCSE	AS-Levels	ONC, OND	First Degree: BSc, BA	Higher degree; MSc, PHD
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Housewife	11
Unemployed	9
Student	9
Retired	5
Factory worker	4
Cleaner	4
Administrator	3
Sales	3
Supervisor	2
Fork lift driver	2
Engineer	2
Metal plating	1
Brewery Worker	1
None - ill health	1
Account Director	1
Line Manager	1
Buyer	1
Production Op	1
Auxiliary Worker	1
Scientist	1
999 Operator B.T.	1
Driver attendant	1
Investigator	1
Scientist	1
Project Manager	1
Clerical	1
Bus driver	1
Office manager	1
Upholsterer	1
Nail technician	1
Customer services	1

Housing office	1
Doctor	1
Warehouse man	1
Welder	1
Sandwich maker	1
Secretary	1
Assembly worker	1
Shop assistant	1
Trainee hairdresser	1
Moulder	1
Civil servant	1
Chef	1
Caretaker	1
Security guard	1
Drugs worker	1
Van driver	1
Accounts	1
Machinist	1
Shop assistant	1
Betting office clerk	1
Driver	1
Apprentice electrician	1
Foundry labourer	1
Learner support	1
Shop assistant	1
Lorry driver	1

Cultural Background:	White British	98
	Black British	1
	British Ukraine	1

Physical Ability:		
	Diabetes	1
	Parkinson's disease	1
	Diabetes and others	1
	Hearing disorder	1
	Spinal bifida, diabetes	1
	Collapsed discs	1
	Arthritis	1
	Registered disabled	1
	No Disability	92

Qualifications or occupations of judges:

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Judge 3: Principle Researcher, B.Sc. Computer Science, M.Sc. Ergonomics Ph.D HCI, C.N.A.A

**Variant C2****Variant D2**

Context information: on the lighters and / or on the display unit.

Colour: Black and White

Source:

Sample Size: 100

Category:	Variant C2		Variant D2	
	50%		50%	
	%	Score	%	Score
Almost certain		26		24
Very probable		27		24
Probable		6		2
Opposite meaning	0		2	
Other Response	20		30	
Don't Know	6		8	
No Response	0		0	
Sum		59		50
Overall Score		59		48

Most frequent responses: C2



	Response	Frequency
Category 1	Do not expose to heat/direct sunlight exceeding 50°C	8
	Do not expose to high temperatures (action: keep in a cool place out of direct sunlight)	3
	Not to be left above certain temperatures and direct sunlight	1
	Something that's too hot or that cant go above 50°C (action: Do not leave the lighter in the sun)	1
Category 2	Do not expose to temperatures above 50°C	5
	Keep out of sunlight	4
	Do not expose to heat	3
	Keep out of light anything over this 50°C is inflammable	2
	Do not use in temperatures over 50°C or direct sunlight	1
Category 3	Explode (action: remove from sunlight)	2
	Do not put in sun/heat	1
	Do not heat over 50°C	1
	The lighter wont work properly at 50°C and could also explode in your pocket	1
	Hot (action: keep away from heat)	1
Category 4	No answers in this category	
Category 5	It's a warm sunny day	4
	Keep thermometers out the sun	1
	No smoking	1
	The temperature isn't 50°C	1

Most frequent responses: D2



	Response	Frequency
Category 1	Do not expose to temperatures above 50°C or direct sunlight	5
	Don't use in temperature above 50°C (action: Do not leave in the sun)	3
	Keep under 50°C or out of sunlight	2
	Do not expose to the sun/with a temperature greater than 50°C	1
	Do not expose to certain temperature (action: keep out of sun and away from any heat source)	1
Category 2	Keep out of sunlight	5
	Do not have product in or above 50°C temperature	4
	Keep lighters away from heat	3
	Keep out of direct sunlight of 50°C and over	2
	If it gets in direct sunlight may explode	1
Category 3	Warning of high sun exposure (action: Do not leave out in the sun)	1
	The temperature must not be exposed to direct sunlight over at 50°C (action: keep in cool dry area)	1
Category 4	Can be used outdoors in good weather	1
Category 5	Very hot	5
	Weather	2
	Extreme heat	1
	The flame is hot – be careful	1
	The sun is dangerous	1

Conclusion

These comprehension tests have been conducted in the UK according to the methodology of BS ISO 9186: 2001. The scores for the symbols tested are detailed below.

Referent/Variant	Score
A1	54
B1	25
A2	69
B2	65.5
C1	47
D1	16.5
C2	59
D2	48