Brass in focus

Chairman's Introduction

Ken Kempson

CDA Consultant Design Engineer

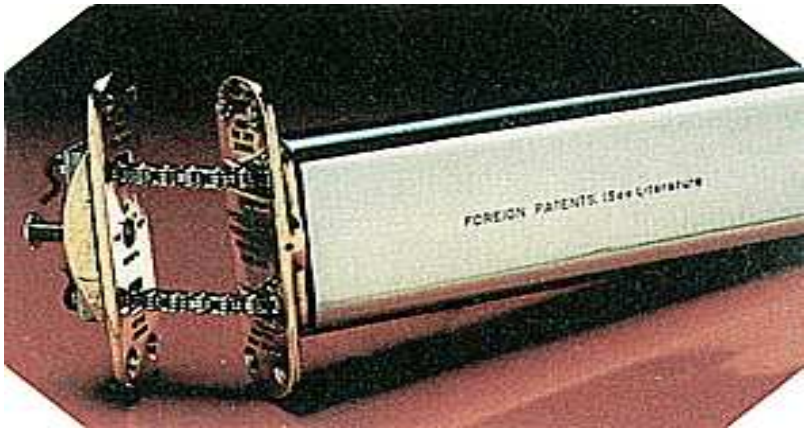
Typical Brass Applications

Typical Brass Applications

KeyMed

Typical Brass Applications

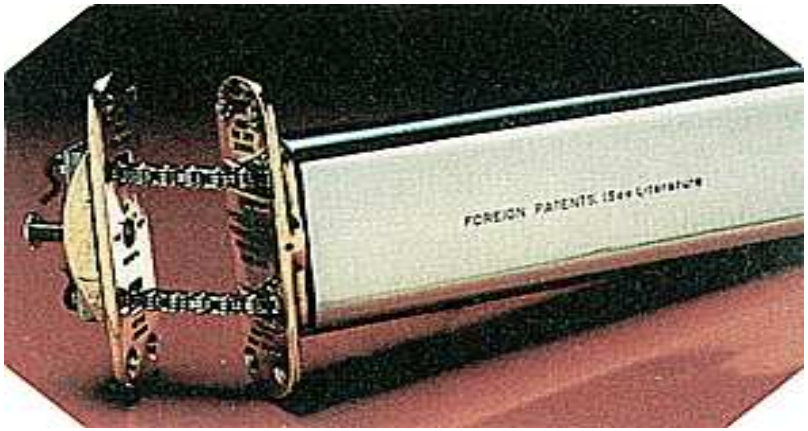
KeyMed



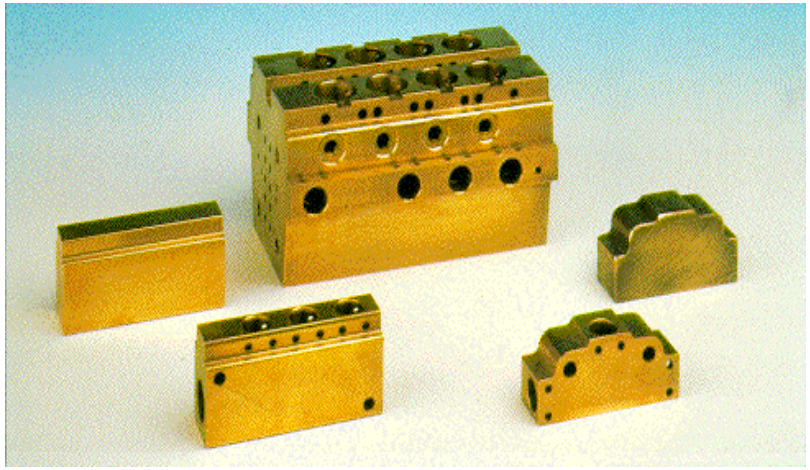
Samuel Heath & Sons plc

Typical Brass Applications

KeyMed



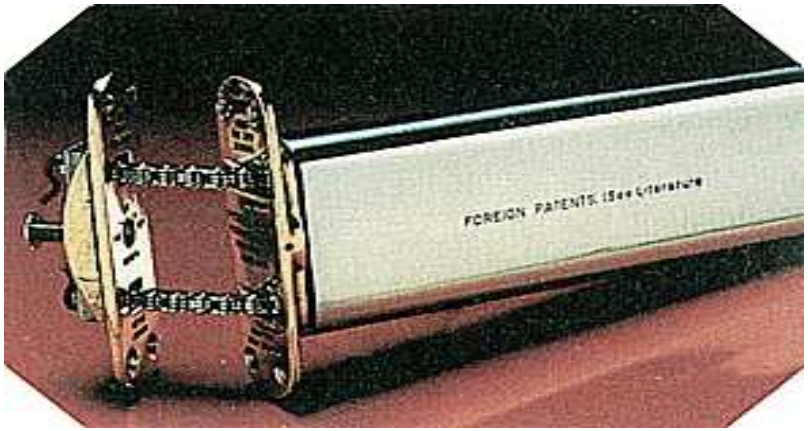
Samuel Heath & Sons plc



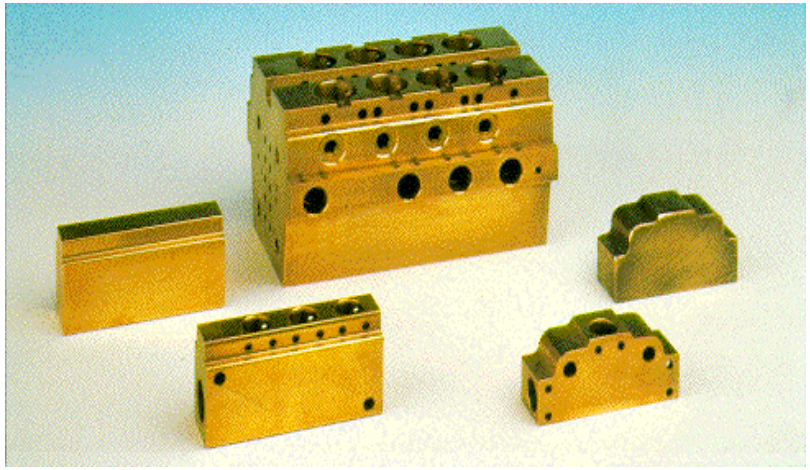
Meco International

Typical Brass Applications

KeyMed



Samuel Heath & Sons plc

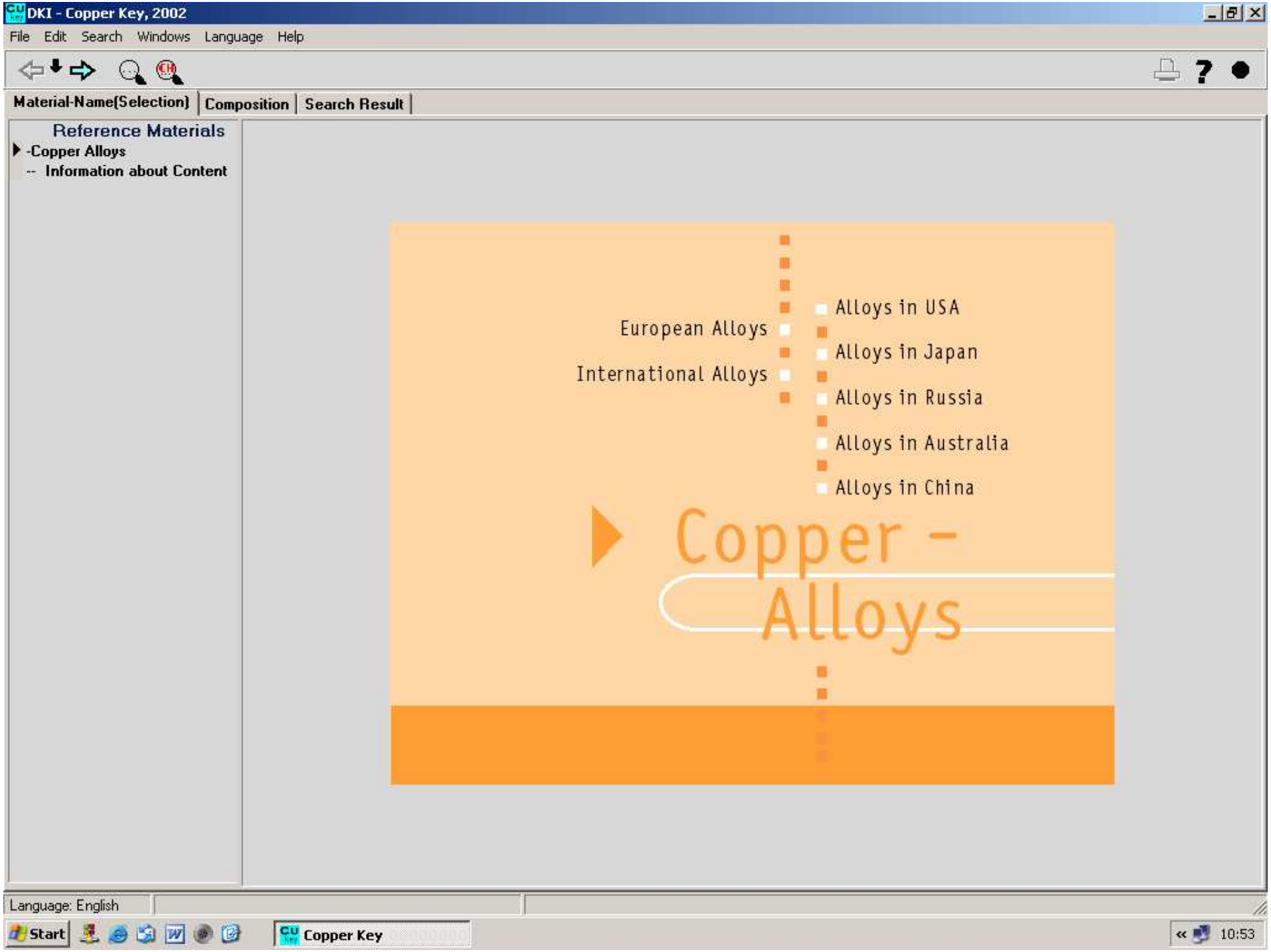


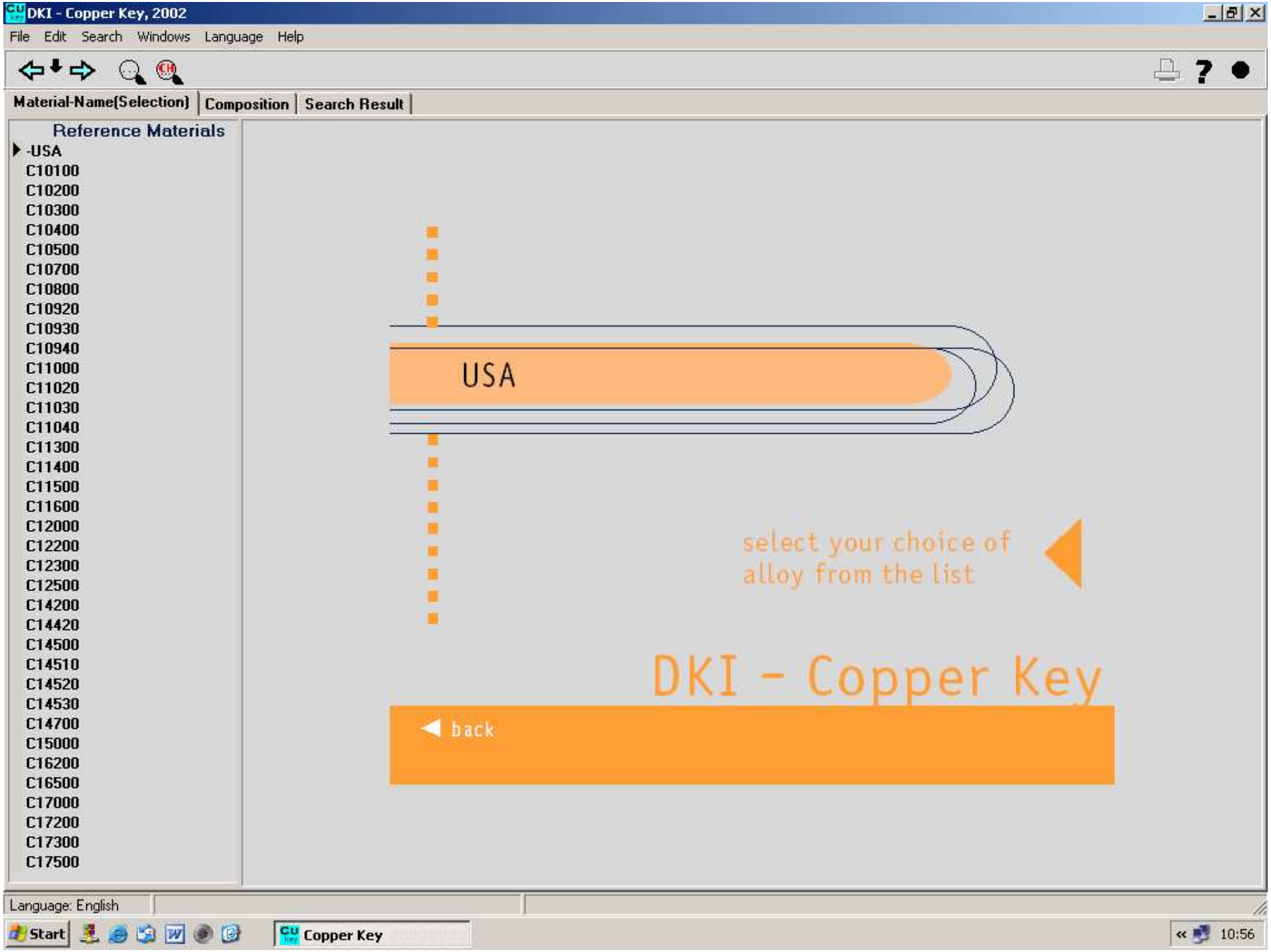
Meco International

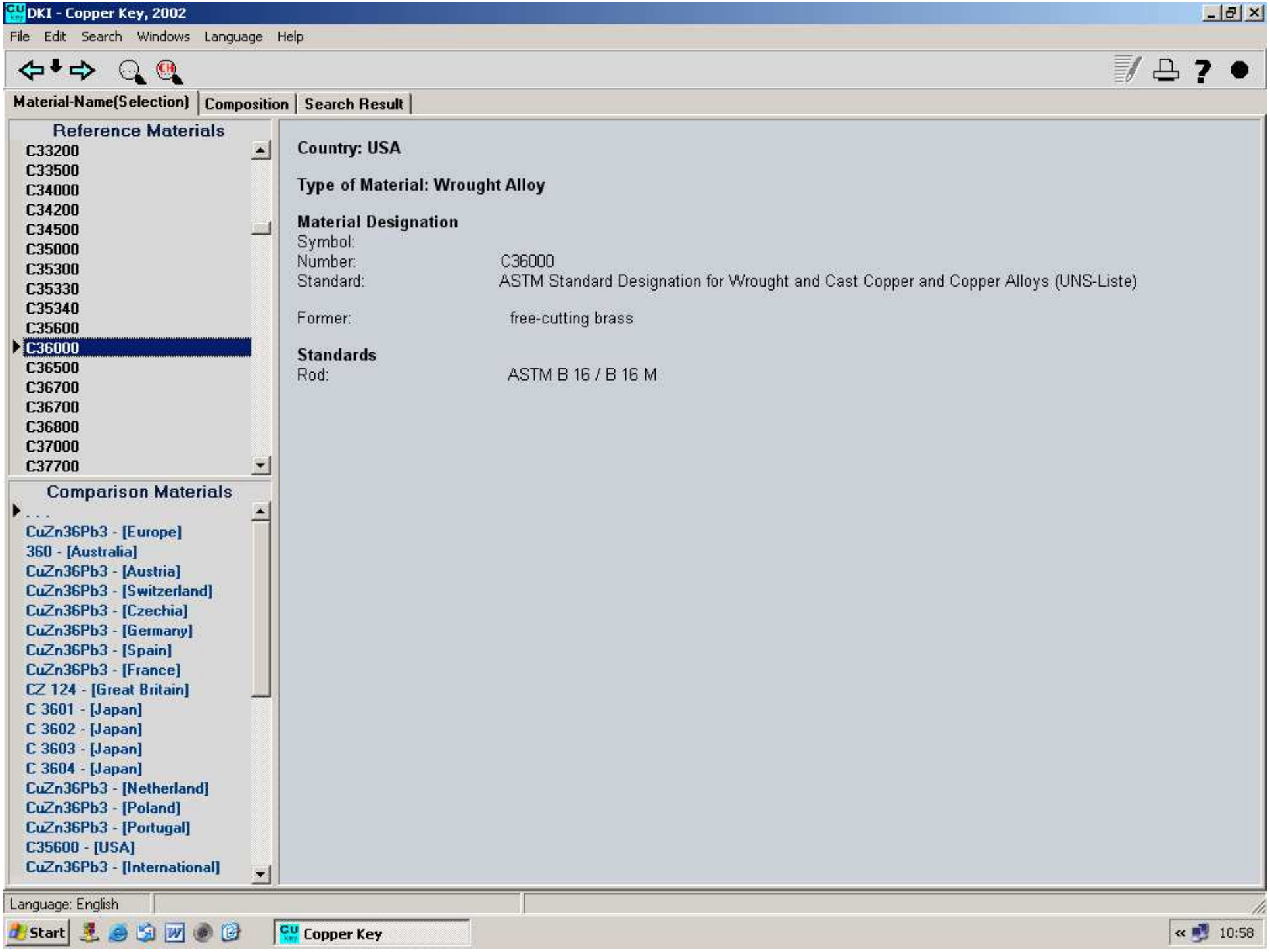
Trevelyans (Birmingham) Ltd

Copper Development Association

Demonstration
of
Copper Key CD-Rom


DKI - Copper Key, 2002
File Edit Search Windows Language Help
Material-Name(Selection) Composition Search Result
Reference Materials
-Copper Alloys
-- Information about Content
European Alloys
International Alloys
Alloys in USA
Alloys in Japan
Alloys in Russia
Alloys in Australia
Alloys in China
Copper - Alloys
Language: English
Start
Copper Key
10:53


DKI - Copper Key, 2002
File Edit Search Windows Language Help
Material-Name(Selection)
Composition
Search Result
Reference Materials
-USA
C10100
C10200
C10300
C10400
C10500
C10700
C10800
C10920
C10930
C10940
C11000
C11020
C11030
C11040
C11300
C11400
C11500
C11600
C12000
C12200
C12300
C12500
C14200
C14420
C14500
C14510
C14520
C14530
C14700
C15000
C16200
C16500
C17000
C17200
C17300
C17500
USA
select your choice of
alloy from the list
DKI - Copper Key
back
Language: English
Start
Copper Key
10:56


DKI - Copper Key, 2002
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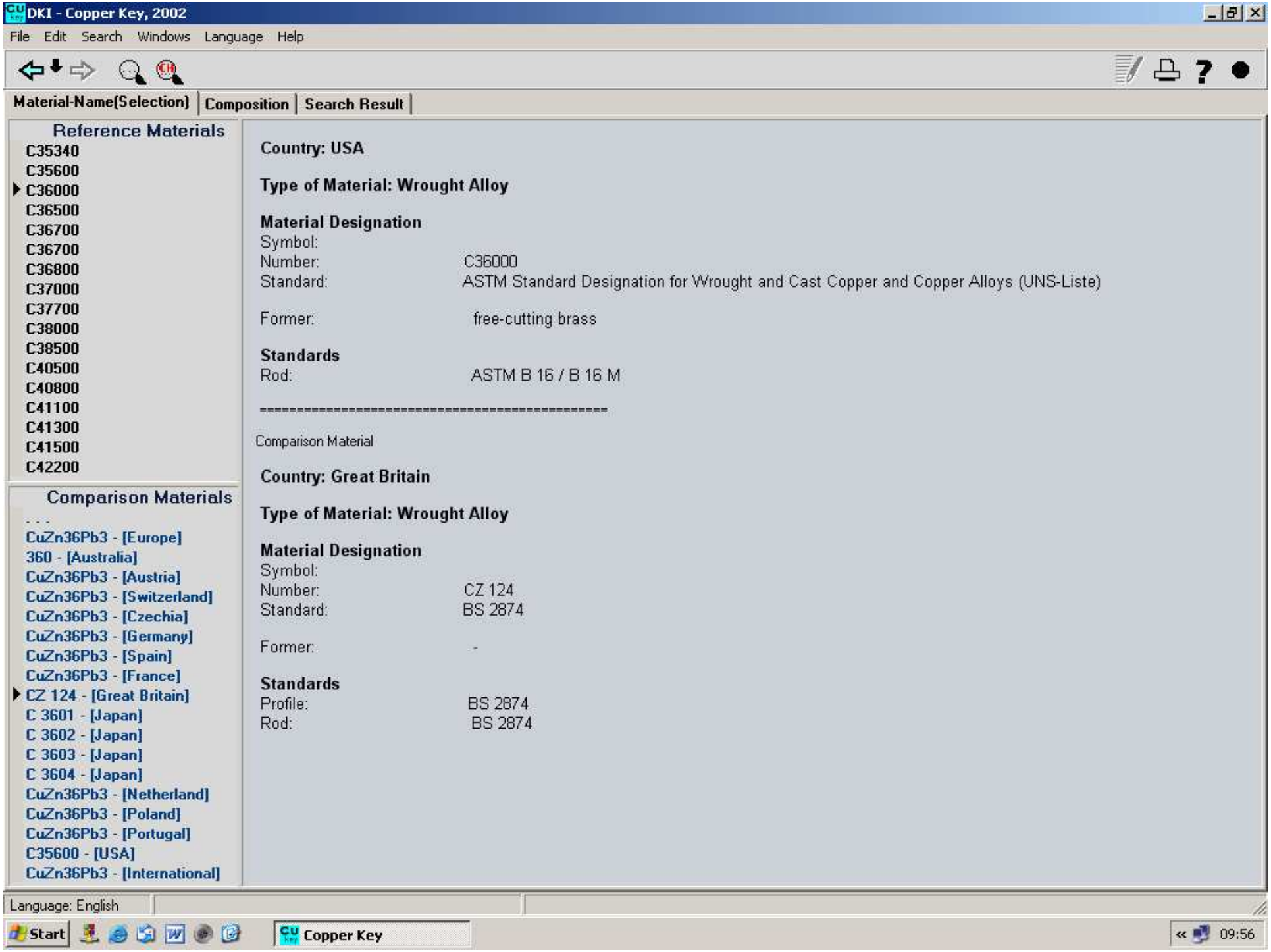
C33200
C33500
C34000
C34200
C34500
C35000
C35300
C35330
C35340
C35600
C36000
C36500
C36700
C36700
C36800
C37000
C37700
Comparison Materials
. . .
CuZn36Pb3 - [Europe]
360 - [Australia]
CuZn36Pb3 - [Austria]
CuZn36Pb3 - [Switzerland]
CuZn36Pb3 - [Czechia]
CuZn36Pb3 - [Germany]
CuZn36Pb3 - [Spain]
CuZn36Pb3 - [France]
CZ 124 - [Great Britain]
C 3601 - [Japan]
C 3602 - [Japan]
C 3603 - [Japan]
C 3604 - [Japan]
CuZn36Pb3 - [Netherland]
CuZn36Pb3 - [Poland]
CuZn36Pb3 - [Portugal]
C35600 - [USA]
CuZn36Pb3 - [International]
Country: USA
Type of Material: Wrought Alloy
Material Designation
Symbol:
Number: C36000
Standard: ASTM Standard Designation for Wrought and Cast Copper and Copper Alloys (UNS-Liste)
Former: free-cutting brass
Standards
Rod: ASTM B 16 / B 16 M
Language: English
Start
Copper Key
10:58


DKI - Copper Key, 2002
File Edit Search Windows Language Help
Material-Name(Selection) Composition Search Result
Reference Materials
C35340
C35600
C36000
C36500
C36700
C36700
C36800
C37000
C37700
C38000
C38500
C40500
C40800
C41100
C41300
C41500
C42200
Comparison Materials
- - -
CuZn36Pb3 - [Europe]
360 - [Australia]
CuZn36Pb3 - [Austria]
CuZn36Pb3 - [Switzerland]
CuZn36Pb3 - [Czechia]
CuZn36Pb3 - [Germany]
CuZn36Pb3 - [Spain]
CuZn36Pb3 - [France]
CZ 124 - [Great Britain]
C 3601 - [Japan]
C 3602 - [Japan]
C 3603 - [Japan]
C 3604 - [Japan]
CuZn36Pb3 - [Netherland]
CuZn36Pb3 - [Poland]
CuZn36Pb3 - [Portugal]
C35600 - [USA]
CuZn36Pb3 - [International]
Country: USA
Type of Material: Wrought Alloy
Material Designation
Symbol:
Number: C36000
Standard: ASTM Standard Designation for Wrought and Cast Copper and Copper Alloys (UNS-Liste)
Former: free-cutting brass
Standards
Rod: ASTM B 16 / B 16 M
==========
Comparison Material
Country: Great Britain
Type of Material: Wrought Alloy
Material Designation
Symbol:
Number: CZ 124
Standard: BS 2874
Former: -
Standards
Profile: BS 2874
Rod: BS 2874
Language: English
Start
Copper Key
09:56

DKI - Copper Key, 2002

File Edit Search Windows Language Help

Material-Name(Selection) | Composition | Search Result

Reference Materials

- C35340
- C35600
- C36000
- C36500
- C36700
- C36700
- C36800
- C37000
- C37700
- C38000
- C38500
- C40500
- C40800
- C41100
- C41300
- C41500
- C42200

Comparison Materials

- - -
- CuZn36Pb3 - [Europe]
- 360 - [Australia]
- CuZn36Pb3 - [Austria]
- CuZn36Pb3 - [Switzerland]
- CuZn36Pb3 - [Czechia]
- CuZn36Pb3 - [Germany]
- CuZn36Pb3 - [Spain]
- CuZn36Pb3 - [France]
- CZ 124 - [Great Britain]
- C 3601 - [Japan]
- C 3602 - [Japan]
- C 3603 - [Japan]
- C 3604 - [Japan]
- CuZn36Pb3 - [Netherland]
- CuZn36Pb3 - [Poland]
- CuZn36Pb3 - [Portugal]
- C35600 - [USA]
- CuZn36Pb3 - [International]

Country: USA

Type of Material: Wrought Alloy

Material Designation

Symbol:
Number: C36000
Standard: ASTM Standard Designation for Wrought and Cast Copper and Copper Alloys (UNS-Liste)

Former: free-cutting brass

Standards

Rod: ASTM B 16 / B 16 M

==========

Comparison Material

Country: Europe

Type of Material: Wrought Alloy

Material Designation

Symbol: CuZn36Pb3
Number: CW603N
Standard: TS 13388

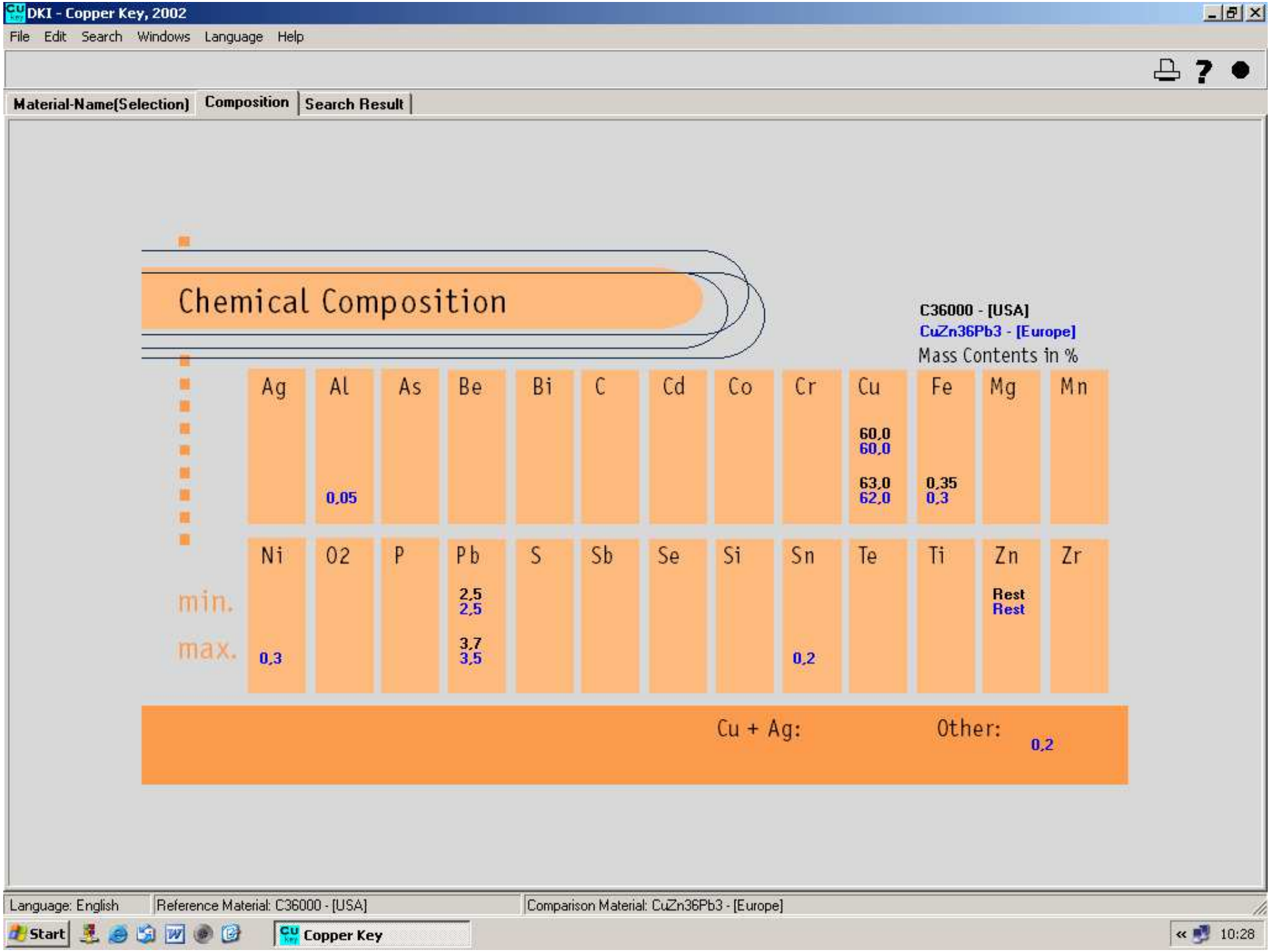
Former: -

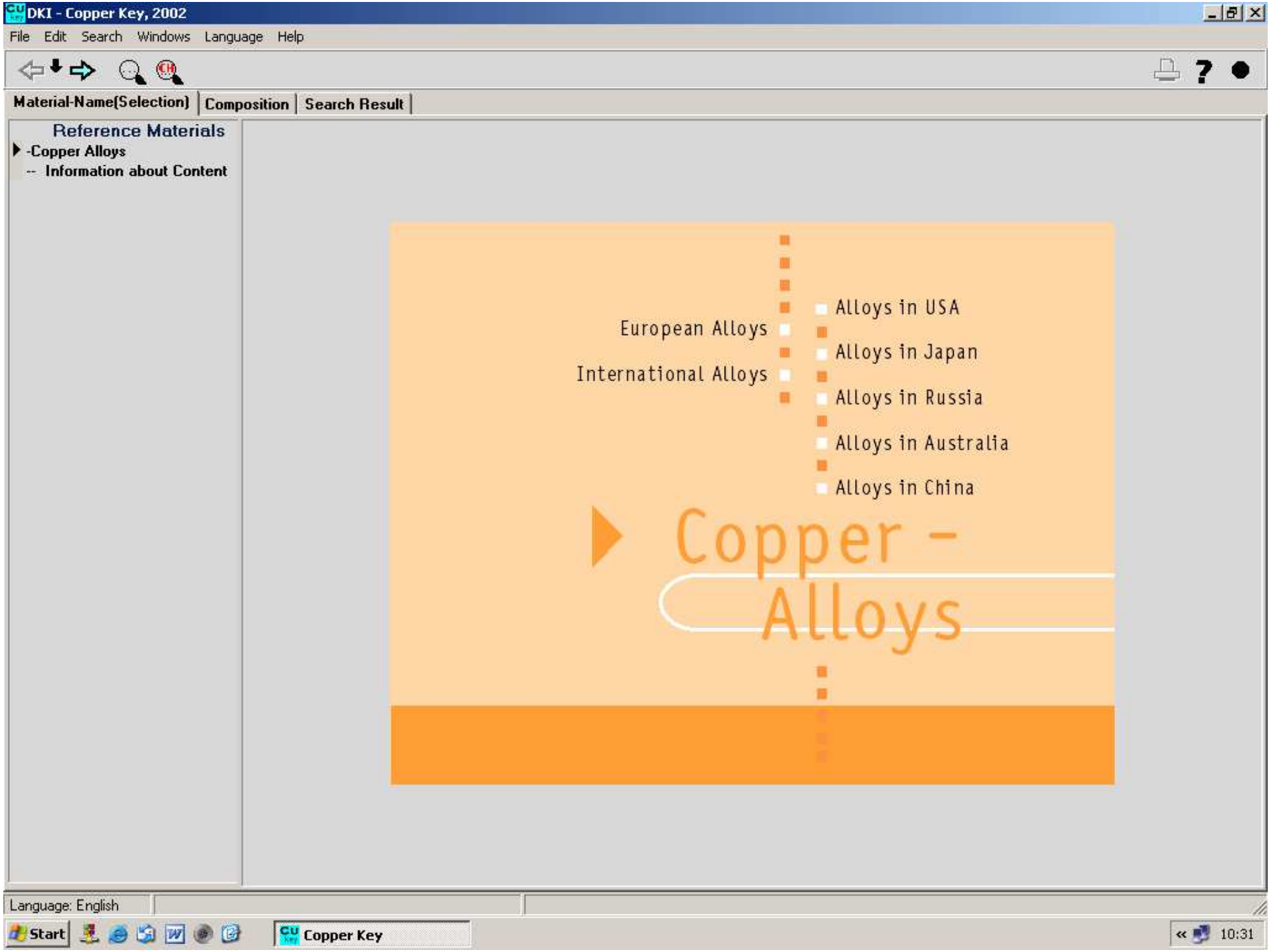
Standards

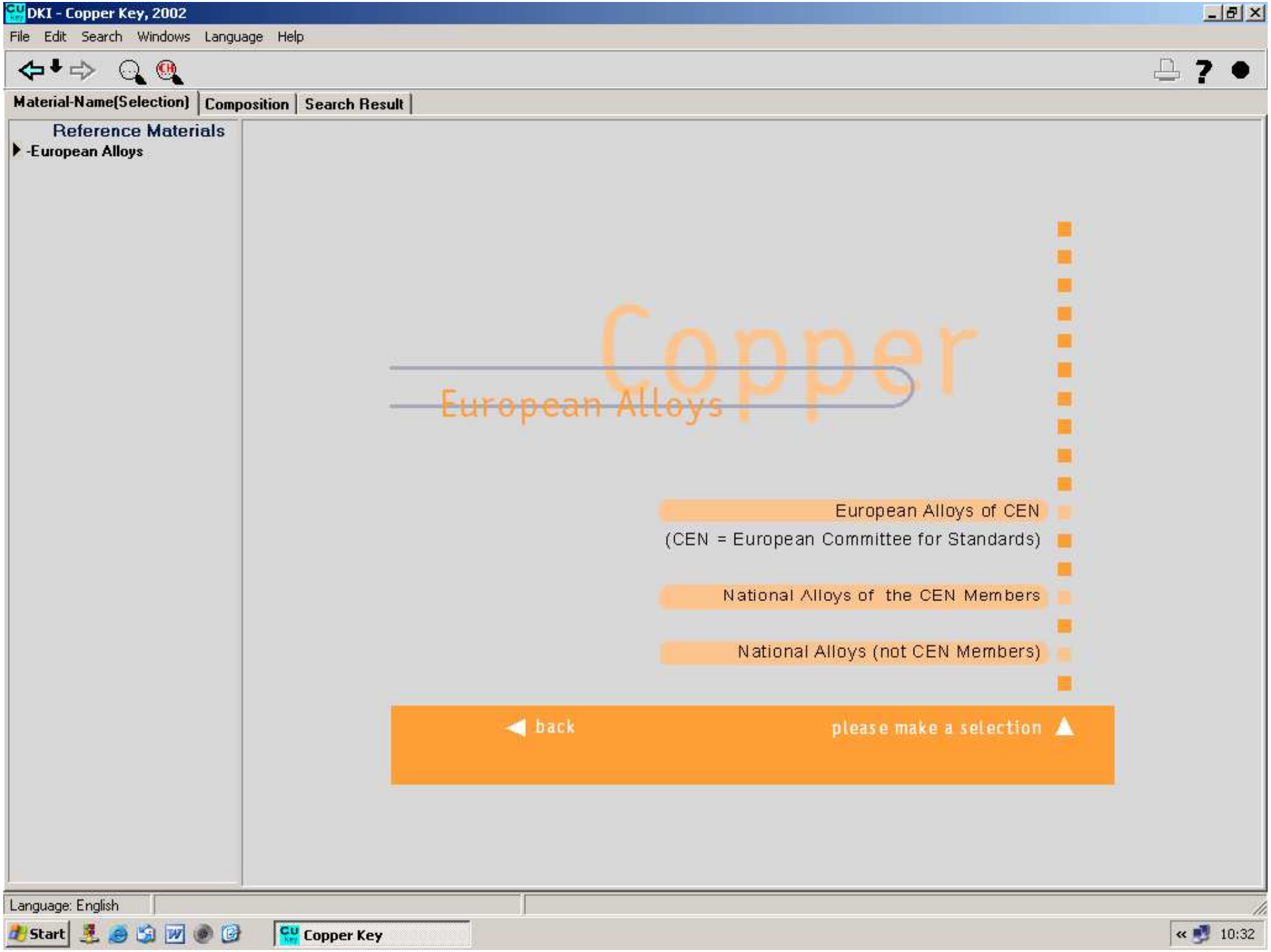
Wire: EN 12166
Profile: EN 12167
Tube: EN 12449
Rod: EN 12164, EN 12167, EN 12168

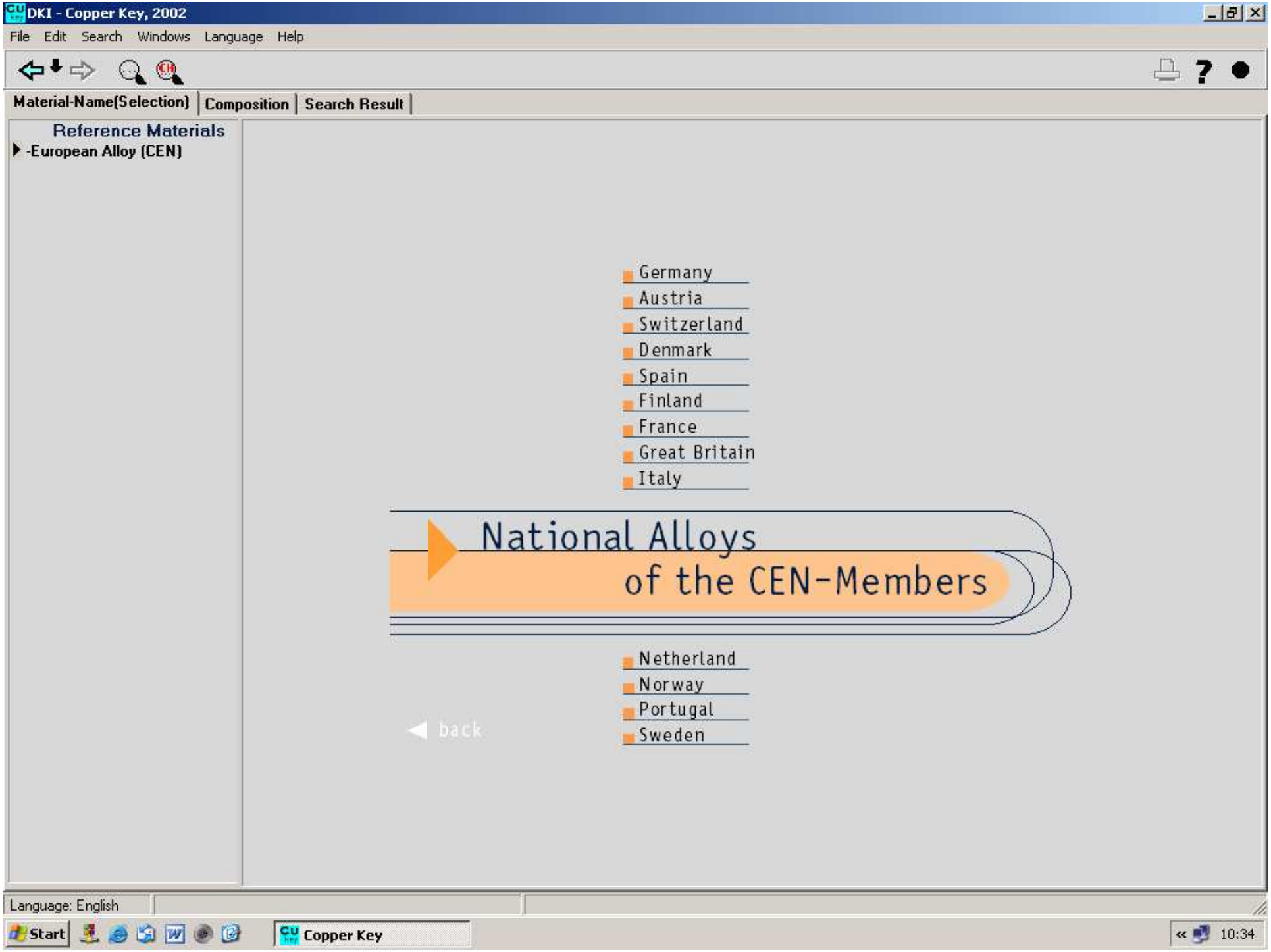
Language: English

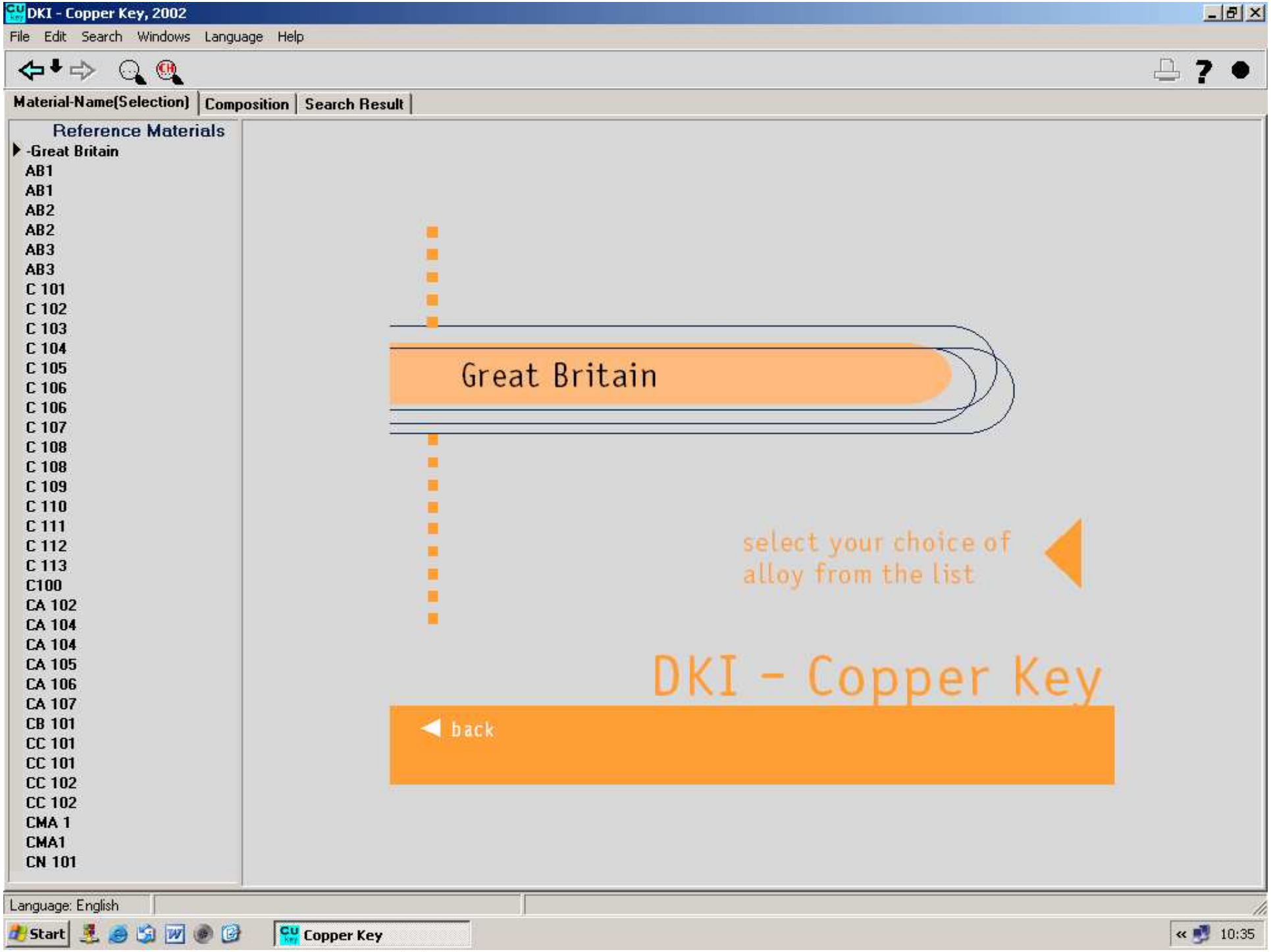
Start | Copper Key | 10:27


DKI - Copper Key, 2002
File Edit Search Windows Language Help
Material-Name(Selection) Composition Search Result
Chemical Composition
C36000 - [USA]
CuZn36Pb3 - [Europe]
Mass Contents in %
Ag Al As Be Bi C Cd Co Cr Cu Fe Mg Mn
60,0
60,0
63,0
62,0
0,35
0,3
0,05
Ni O2 P Pb S Sb Se Si Sn Te Ti Zn Zr
min.
max.
2,5
2,5
3,7
3,5
0,3
0,2
Rest
Rest
Cu + Ag:
Other:
0,2
Language: English
Reference Material: C36000 - [USA]
Comparison Material: CuZn36Pb3 - [Europe]
Start
Copper Key
10:28


DKI - Copper Key, 2002
File Edit Search Windows Language Help
Material-Name(Selection)
Composition
Search Result
Reference Materials
-Copper Alloys
-- Information about Content
European Alloys
International Alloys
Alloys in USA
Alloys in Japan
Alloys in Russia
Alloys in Australia
Alloys in China
Copper - Alloys
Language: English
Start
Copper Key
10:31


DKI - Copper Key, 2002
File Edit Search Windows Language Help
Material-Name(Selection)
Composition
Search Result
Reference Materials
-European Alloys
Copper
European Alloys
European Alloys of CEN
(CEN = European Committee for Standards)
National Alloys of the CEN Members
National Alloys (not CEN Members)
back
please make a selection
Language: English
Start
Copper Key
10:32


DKI - Copper Key, 2002
File Edit Search Windows Language Help
Material-Name(Selection)
Composition
Search Result
Reference Materials
-European Alloy (CEN)
Germany
Austria
Switzerland
Denmark
Spain
Finland
France
Great Britain
Italy
National Alloys
of the CEN-Members
Netherland
Norway
Portugal
Sweden
back
Language: English
Start
Copper Key
10:34


DKI - Copper Key, 2002
File Edit Search Windows Language Help
Material-Name(Selection)
Composition
Search Result
Reference Materials
-Great Britain
AB1
AB1
AB2
AB2
AB3
AB3
C 101
C 102
C 103
C 104
C 105
C 106
C 106
C 107
C 108
C 108
C 109
C 110
C 111
C 112
C 113
C100
CA 102
CA 104
CA 104
CA 105
CA 106
CA 107
CB 101
CC 101
CC 101
CC 102
CC 102
CMA 1
CMA1
CN 101
Great Britain
select your choice of
alloy from the list
DKI - Copper Key
back
Language: English
Start
Copper Key
10:35

DKI - Copper Key, 2002

File Edit Search Windows Language Help

Material-Name(Selection) | Composition | Search Result

Reference Materials

- CZ 111
- CZ 112
- CZ 114
- CZ 115
- CZ 116
- CZ 118
- CZ 119
- CZ 120
- CZ 121 Pb3
- CZ 121 Pb4
- CZ 122
- CZ 123
- CZ 124

Comparison Materials

- . . .
- CuZn39Pb3 - [Europe]
- 385 - [Australia]
- CuZn39Pb3 - [Austria]
- CuZn39Pb3 - [Switzerland]
- CuZn39Pb3 - [Czechia]
- CuZn39Pb3 - [Germany]
- CuZn39Pb3 - [Denmark]
- CuZn39Pb3 - [Spain]
- CuZn39Pb3 - [Finland]
- CuZn40Pb3 - [France]
- CuZn40Pb2 - [Hungary]
- CuZn39Pb3 - [Hungary]
- C 3561 - [Japan]
- C 3603 - [Japan]
- C 3604 - [Japan]
- CuZn39Pb3 - [Netherland]
- CuZn39Pb3 - [Norway]
- CuZn39Pb3 - [Poland]
- CuZn39Pb3 - [Portugal]
- CuZn39Pb3 - [Sweden]
- C38500 - [USA]
- CuZn39Pb3 - [International]

Country: Great Britain

Type of Material: Wrought Alloy

Material Designation

Symbol:
Number: CZ 121 Pb3
Standard: BS 2872; BS 2874

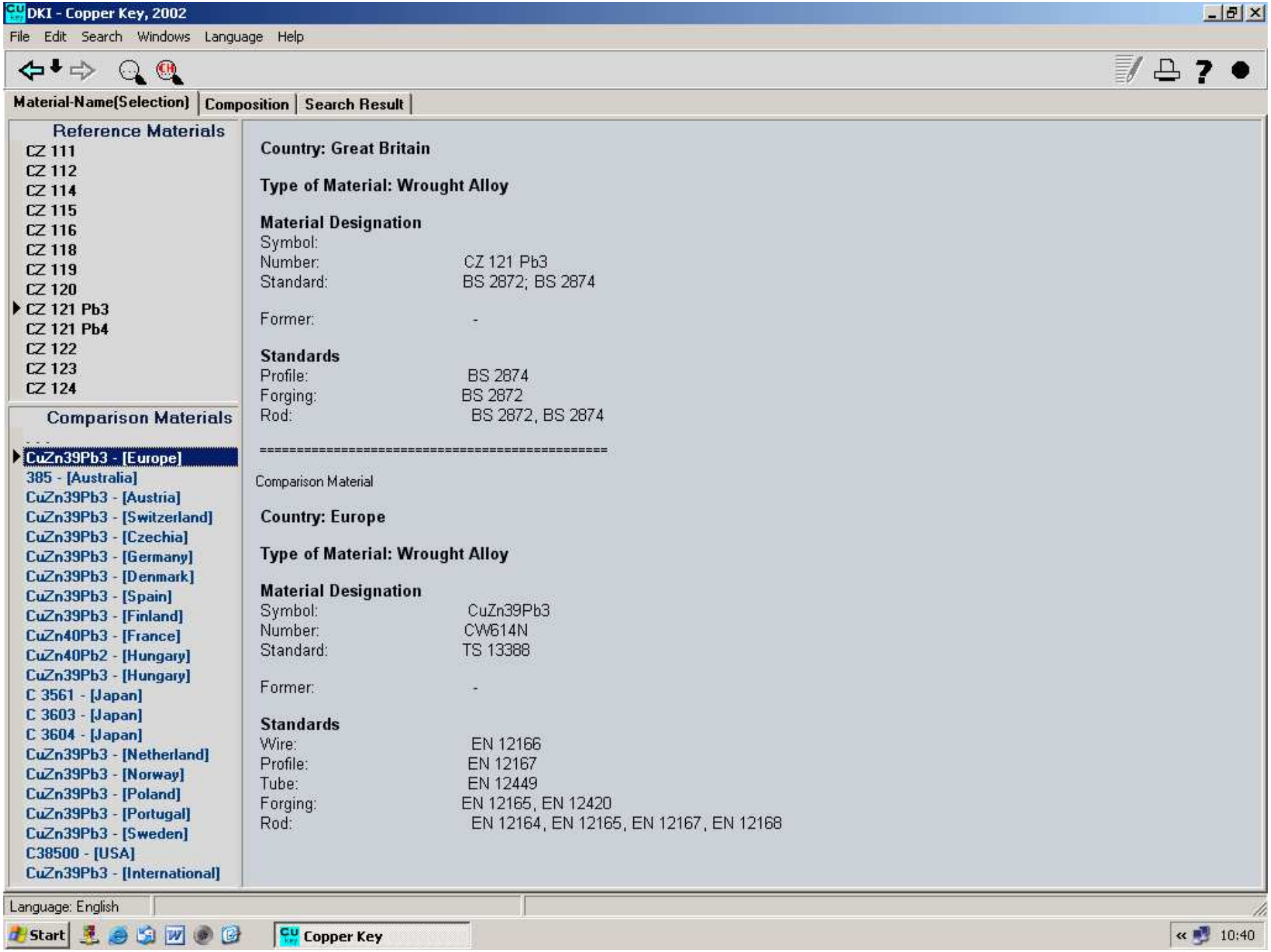
Former: -

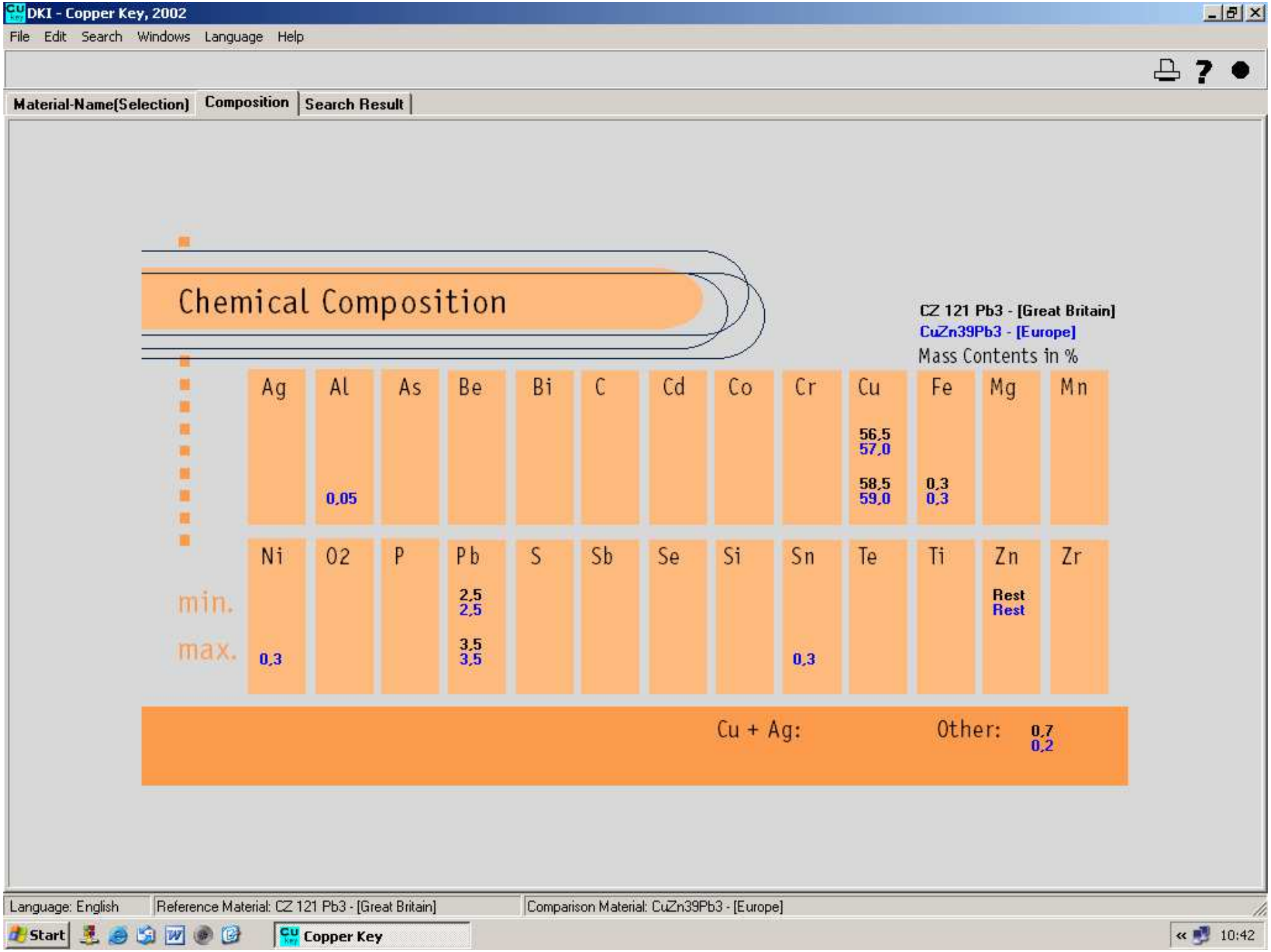
Standards

Profile: BS 2874
Forging: BS 2872
Rod: BS 2872, BS 2874

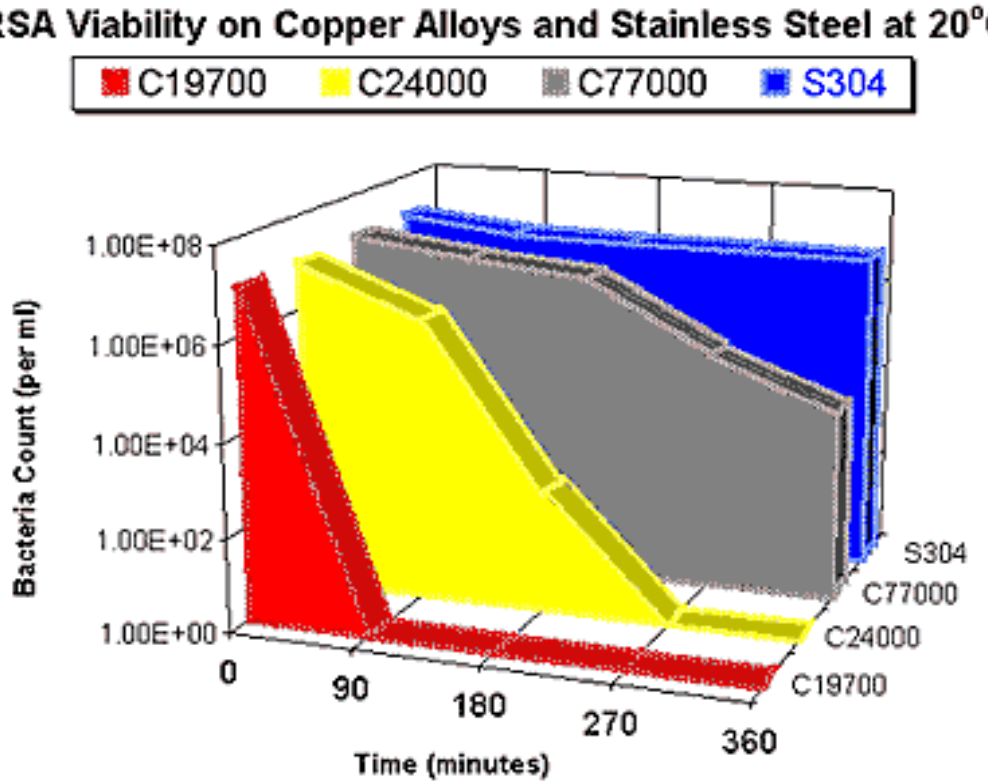
Language: English

Start | Copper Key | 10:38


DKI - Copper Key, 2002
File Edit Search Windows Language Help
Material-Name(Selection) Composition Search Result
Reference Materials
CZ 111
CZ 112
CZ 114
CZ 115
CZ 116
CZ 118
CZ 119
CZ 120
CZ 121 Pb3
CZ 121 Pb4
CZ 122
CZ 123
CZ 124
Comparison Materials
CuZn39Pb3 - [Europe]
385 - [Australia]
CuZn39Pb3 - [Austria]
CuZn39Pb3 - [Switzerland]
CuZn39Pb3 - [Czechia]
CuZn39Pb3 - [Germany]
CuZn39Pb3 - [Denmark]
CuZn39Pb3 - [Spain]
CuZn39Pb3 - [Finland]
CuZn40Pb3 - [France]
CuZn40Pb2 - [Hungary]
CuZn39Pb3 - [Hungary]
C 3561 - [Japan]
C 3603 - [Japan]
C 3604 - [Japan]
CuZn39Pb3 - [Netherland]
CuZn39Pb3 - [Norway]
CuZn39Pb3 - [Poland]
CuZn39Pb3 - [Portugal]
CuZn39Pb3 - [Sweden]
C38500 - [USA]
CuZn39Pb3 - [International]
Country: Great Britain
Type of Material: Wrought Alloy
Material Designation
Symbol:
Number: CZ 121 Pb3
Standard: BS 2872; BS 2874
Former: -
Standards
Profile: BS 2874
Forging: BS 2872
Rod: BS 2872, BS 2874
==========
Comparison Material
Country: Europe
Type of Material: Wrought Alloy
Material Designation
Symbol: CuZn39Pb3
Number: CW614N
Standard: TS 13388
Former: -
Standards
Wire: EN 12166
Profile: EN 12167
Tube: EN 12449
Forging: EN 12165, EN 12420
Rod: EN 12164, EN 12165, EN 12167, EN 12168
Language: English
Start
Copper Key
10:40


DKI - Copper Key, 2002
File Edit Search Windows Language Help
Material-Name(Selection) Composition Search Result
Chemical Composition
CZ 121 Pb3 - [Great Britain]
CuZn39Pb3 - [Europe]
Mass Contents in %
Ag Al As Be Bi C Cd Co Cr Cu Fe Mg Mn
0,05
56,5 57,0
58,5 59,0
0,3 0,3
Ni O2 P Pb S Sb Se Si Sn Te Ti Zn Zr
min.
max.
2,5 2,5
3,5 3,5
0,3
0,3
Rest Rest
Cu + Ag:
Other: 0,7 0,2
Language: English
Reference Material: CZ 121 Pb3 - [Great Britain]
Comparison Material: CuZn39Pb3 - [Europe]
Start
Copper Key
10:42

Antibacterial Copper Alloys



Graph depicts survival times of Methicillin Resistant Staphylococcus aureus on three copper alloys and stainless steel (C304) at room temperature. C19700 (99% copper) limited survival to 1.5 hours. C24000 (80% copper) showed a significant reduction after 3 hours and complete inviability after 4.5 hours. C77000 (55% copper) showed significant and continuing reduction after 4.5 hours. Survival time on stainless steel continued up to 72 hours.

Brass Case Studies

Illustrating the cost-effectiveness

&

recyclability of

Brass

MECO International
Heavy Duty Valve Chest

High Tensile Brass versus Steel

	HTB	**Steel**
Working pressure (bar)	350	350
Non sparking for mining application	Yes	No

MECO International
Cost Breakdown

	High Tensile Brass	Steel
Raw material cost	£6.22	£2.35
Pre-machining cost	£0.00	£3.50
Milling	£0.00	£2.50
Drilling & threading	£7.90	£11.70
Plating	£0.00	£1.41
Total	£14.12	£21.46
Total Saving	**£7.34**	

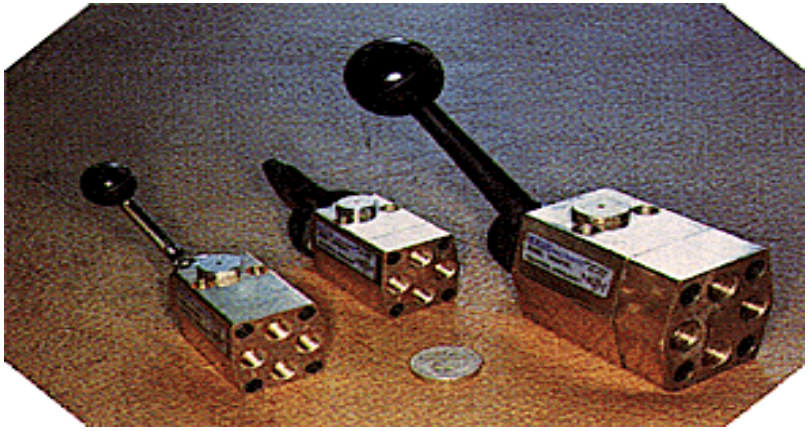
Nuclear Zoom Lens

Photographs courtesy of Abakus Scientific Ltd

Why do Abakus use Brass?

- Unaffected by exposure to nuclear radiation
- Readily machined
  - Close tolerances, with high degree of repeatability
  - Fine surface finish, regardless of machining method
- Corrosion resistant, eliminating need for plating and tolerance build up.
- Good bearing properties
- Readily available from stock in a variety of sizes

Vickers Systems Division



Courtesy of Vickers Systems Division, Trinova Ltd

- Process with no special dies required
  - Machining ideal
- Easily machined materials to be identified
- Corrosion resistant a requirement
- Good wear properties also required
- Brass was most cost-effective material

Vickers Valve Costing Analysis

	Brass	Aluminum
Cost of Raw Material (Extruded bar)	45%	21%
Machining cost	63%	66%
Cost of finishing (Hard Anodising)	0%	29%
Sub total	108%	116%
Less scrap value of machining swarf	8%	1%
Total Cost	**100%**	**115%**

Linic

Courtesy of Linic Plastics Ltd

- Mild steel replaced by brass
- Machining costs reduced
- Plating eliminated
- No need for a lubricant
- Increased perceived value

Summary

- Brass is cost-effective
  - Close tolerance manufacturing processes give near-net shapes
  - High-speed machining
  - Swarf/scrap commands premium price
  - No plating or painting required
- Brass is recyclable
  - Without loss of properties
  - The recycling infrastructure is already in place