

Cutlery and Allied Trades Research Association



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Quality Testing

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Sheet 1 of 5

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Testing of ‘Optic Sambonet Range’ Kitchen Knife Samples

Samples of kitchen knives described as ‘Optic Sambonet range, factory: InWin’ were received for testing to relevant kitchen knife standards.

The samples are illustrated in Figure 1 and comprised of the following:-

4 x Choppers
4 x Large Santoku knives
4 x Bread knives
6 x Chef’s knives
4 x Usuba knives
5 x Small Santoku knives
4 x Utility knives

The blade of each knife was marked ‘Sambonet KS’.

Procedure

The samples were evaluated with reference to the following standards:-

- BS EN ISO 8442-1: 1998 - Materials and articles in contact with foodstuffs - cutlery and table holloware - Part 1: Requirements for cutlery for the preparation of food
- BS EN ISO 8442-5: 2004 - Materials and articles in contact with foodstuffs - cutlery and holloware - Part 5: Specification for sharpness and edge retention test of cutlery

Results**BS EN ISO 8442-1: 1998****Clause 4.2 - Metals**

The chemical analysis of each knife blade was determined using x-ray fluorescence techniques and combustion infra-red techniques. The following results were obtained -

Knife I.D.	Blade Type	Composition; Mass %					
		C	Mn	S	Cr	Mo	Ni
Chopper	A	0.29	0.3	<0.005	13.9	<0.1	<0.1
Large Santoku	A	0.27	0.3	<0.005	13.9	<0.1	<0.1
Bread	B	0.29	0.4	<0.005	13.9	<0.1	<0.1
Chef's	A	0.27	0.4	<0.005	13.8	<0.1	<0.1
Usuba	A	0.29	0.4	<0.005	13.8	<0.1	<0.1
Small Santoku	A	0.31	0.3	<0.005	13.3	<0.1	<0.1
Utility	A	0.32	0.3	<0.005	13.2	<0.1	<0.1

(N.B. phosphorus not analysed)

The other compositional requirements were met except for the carbon content of the plain edge knives, which is below the minimum 0.36% specified in the standard for a type A (plain) cutting edge.

However the measured carbon content is considered to be satisfactory - all knives are identified as X30Cr13 type (30Cr13/420J2), probably the most common grade used for kitchen knives.

The bread knife met the requirements specified for a type B (serrated) cutting edge (0.16% carbon minimum).

Clause 5.2 - Alignment, uniformity and absence of defects

Each sample provided was examined and all met the requirements, with no significant visible manufacturing defects.

Clause 5.3 - Knife edges (angle measured only)

The cutting edge angle of one of each knife type was measured using a laser goniometer with the following results -

Knife I.D.	Angle (°)
Chopper	23
Large Santoku	25
Bread	20
Chef's	21
Usuba	23
Small Santoku	24
Utility	22

The standard specifies a maximum edge angle of 40°; all knife edges met this requirement.

Clause 6.1.1 - Resistance to blade corrosion

One of each knife type was subjected to the corrosion resistance test specified in the standard.

All knives met the requirements of the standard and are noted to have very good corrosion resistance.

Clause 6.1.2 - Resistance to tang and bolster corrosion

One of each knife type was tested and all met the requirements of the test, with no corrosion in evidence.

Clause 6.2 - Strength of cutlery

One of each knife type was subjected to the test and all met the requirements.

Clause 6.4 - Hardness of knife blades

The blade hardness of one of each knife type was determined using a Rockwell hardness test machine (C scale) with the following results –

Knife I.D.	Blade Type	Rockwell HRC			Average HRC
Chopper	A	55.0	55.5	55.5	55.5
Large Santoku	A	54.5	54.5	54.0	54.5
Bread	B	56.0	56.0	55.5	56.0
Chef's	A	54.5	54.0	54.0	54.0
Usuba	A	55.0	54.0	54.0	54.5
Small Santoku	A	54.5	55.5	55.0	55.0
Utility	A	56.0	55.0	55.0	55.5

The standard specifies a minimum hardness of 52.0 HRC for a plain edge blade (type A) and 48HRC for a serrated/scalloped blade (type B).

All knife blades met the hardness requirements.

Clause 6.5 - Resistance of plastic handles to softening at elevated temperatures

A sample of handle material from a bread knife was tested and met the requirements of the test.

Clause 6.6 - Resistance of non-metallic handles to environmental stress cracking

A utility knife handle was tested and met the requirements of the test.

Clause 6.7 - Resistance of non-metal handles to distortion in water

A bread knife and small santoku knife were tested and met the requirements of the test.

Clause 6.9 - Resistance to dropping

One of each knife type was tested and all met the requirements of the test.

BS EN ISO 8442-5: 2004**Clause 3.4 - Cutting performance**

A blade cutting test was carried out on one of each knife type using CATRA's automatic edge tester in accordance with BS EN ISO 8442-5: 2004 - Materials and articles in contact with foodstuffs - cutlery and holloware - Part 5: Specification for sharpness and edge retention test of cutlery.

The ICP, the Initial Cutting Performance (measured in mm), is the total depth of test card cut during the first three cutting cycles and is a measure of the initial sharpness of a blade.

The CER, the Cutting Edge Retention (measured in mm), is the total depth of test card cut during the test, and is a measure of the ability of a knife blade edge to resist wear throughout its useful life.

60 cutting cycles are specified for type A cutting edges and 200 for type B cutting edges. The standard specifies the following minimum criteria -

Blade Type	Minimum ICP (mm)	Minimum CER (mm)
A (Plain)	50	150 (60 cycles)
B (Serrated/Scalloped)	50	1500 (200 cycles)

One of each knife type was tested with the following results -

Knife I.D.	Blade Type	ICP (mm)	CER (mm)
Chopper	A	102	530
Large Santoku	A	91	473
Bread	B	35	1987
Chef's	A	97	566
Usuba	A	78	473
Small Santoku	A	87	350
Utility	A	58	187

All knives met the requirements of the standard except the bread knife which failed to meet the ICP requirements but maintained its edge and met the CER requirements.

Summary of test results

All knives met the requirements of BS EN ISO 8442-1: 1998 except for the carbon content of the plain edge knives which was below the minimum specified. However the lower carbon content is very common and is considered to be satisfactory.

The knives had a notably good corrosion resistance.

All knives met the requirements of BS EN ISO 8442-5: 2004 (Sharpness and edge retention test) with the exception of the bread knife, which failed to meet the ICP (initial sharpness) requirement. The bread knife did however have satisfactory edge retention, and the initial sharpness can probably be considered to be adequate.

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Figure 1 – General appearance of knives provided for testing