

Kurzname	EN Norm	ASTM / AISI	AFNOR	DIN Kurzbezeichnung	ISO	Others
Klaviersaitendraht	1.1211	A228	corde à piano	1.1211		piano wire

## 1.1211 Wire

Chemical analysis according to the Europe a standard EN 10088-1 percentage by mass.

C	Si	Mn	P	S	Cu	Fe
0.75-0.90	0.10-0.35	0.40-1.00	≤ 0.03	≤ 0.03	≤ 0.03	Rest

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**Diameter** 0.02 – 4.00 mm

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### Application

1.1211 belongs to the class of patented cold drawn spring steel. Thanks to his patented homogeneous structure and his tight tolerances this steel is often used for instrument making. Other applications include various types of springs with high tensile strength as a function of the diameter.

### Corrosion resistance

A carbon steel has no natural resistance to corrosion in the usual sense. He must be protected as required with an appropriate procedure before general corrosion.

### Heat treatment

The patented and cold drawn spring steel wire must not be heat treated. By patenting it receives its application for the typical microstructure.

### Weldability

The patented and cold drawn spring steel wire should not be welded because of the heat input to the structure and work hardening which can have a huge affected. In addition, hardness cracks by welding were provoked, as with all high carbon steels.

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### Surface version

Drawn	Chemically cleaned	0.020 – 3.499 mm
Polished	Chemically cleaned	3.500 – 4.000 mm

## Delivery Form

In Rings  
 On different Coils  
 Straightened bars  
 Axes

## Diameter tolerances

Diameter (mm)	Tolerance (%)	Tolerance (µm)
0.020 – 0.249		± 1.0
0.250 – 0.399		± 1.5
0.400 – 1.500		± 2.0
1.500 – 4.000		± 2.5

## Mechanical properties

Delivery condition (mm)	Tensile strength (N/mm <sup>2</sup> )
0.005 – 0.019	3200 – 4200
0.020 – 0.199	2800 – 3800
0.200 – 0.499	2500 – 3100
0.500 – 0.999	2200 – 2800
1.000 – 1.999	2000 – 2600
2.000 – 4.000	1800 – 2400

Further tensile strengths on request.

## Physical properties

Density		7.80	g/cm <sup>3</sup>
Coefficient of expansion	20 °C – 200 °C	11.00	10 <sup>-6</sup> /K
Specific heat capacity	20 °C	460.00	J/kgK
Heat conductivity	20 °C	55.00	W/mK
Specific electric resistance	20 °C	var.	Ω mm <sup>2</sup> /m
Elasticity modulus	20 °C	210.00	GPa
Modulus of rigidity	20 °C	81.00	GPa

All information given in the data sheets of Jacques Allemann based on the best knowledge and the latest developments in technology, but without guarantee. The specific use of materials should always be discussed with the sales consultant or the laboratory of the Jacques Allemann.