

MATERIAL NUMBER 1.1221 · CLASS 1.1

# 1.1221

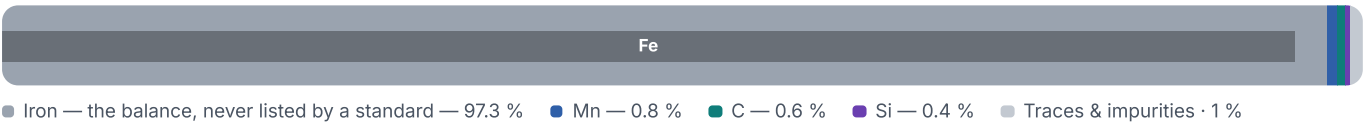
Chemical composition, mechanical and physical property values, and 38 standard designations from 18 regions.

|                                          |                                               |                                      |
|------------------------------------------|-----------------------------------------------|--------------------------------------|
| DENSITY<br><b>7.85</b> g/cm <sup>3</sup> | OTHER DESIGNATIONS<br><b>38</b> in 18 regions | PROPERTY VALUES<br><b>16</b> on file |
|------------------------------------------|-----------------------------------------------|--------------------------------------|

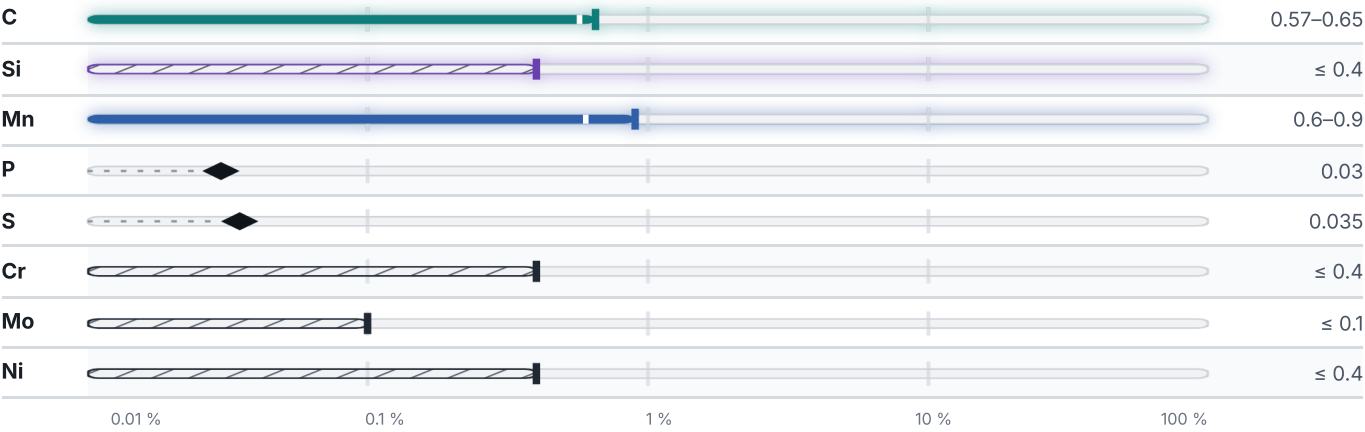
## Chemical composition

Mass fraction in %

What this alloy is



Logarithmic scale, 0.01 % to 100 % — every value here compares directly, decade by decade.



The scale is logarithmic, not the element's raw share of the alloy — the only honest way to fit 0.01 % and 100 % in one picture, and it means every value here can be compared with every other.

## Predicted transformation temperatures

This grade's composition falls outside the published model's validated range (a low-alloy composition window), so no transformation temperature is predicted here.

## Mechanical properties

52 values across 13 conditions

| NORMALIZED                      |  | RM<br>N/mm <sup>2</sup>  | A<br>%                  |         |        |
|---------------------------------|--|--------------------------|-------------------------|---------|--------|
| ≤ 16                            |  | 710                      | 10                      |         |        |
| 16 – 100                        |  | 670                      | 11                      |         |        |
| 100 – 250                       |  | 650                      | 11                      |         |        |
| 250 – 500                       |  | 630                      | –                       |         |        |
| 500 – 1000                      |  | 620                      | –                       |         |        |
| QUENCHED AND TEMPERED           |  | REH<br>N/mm <sup>2</sup> | RM<br>N/mm <sup>2</sup> | A<br>%  |        |
| 0.3 – 3                         |  | –                        | 1150–1750               | –       |        |
| ≤ 8                             |  | 580                      | 850                     | 11      |        |
| 8 – 20                          |  | 520                      | 800                     | 13      |        |
| 20 – 50                         |  | 450                      | 750                     | 14      |        |
| 50 – 80                         |  | 420                      | 710                     | 14      |        |
| COLD DRAWN / HARD               |  | RM<br>N/mm <sup>2</sup>  |                         | A<br>%  |        |
| 5 – 10                          |  | 800–1150                 |                         | 5       |        |
| 10 – 16                         |  | 780–1130                 |                         | 5       |        |
| 16 – 40                         |  | 730–1100                 |                         | 6       |        |
| CONDITION · DIMENSION           |  | RM<br>N/mm <sup>2</sup>  | A5<br>%                 | HB      |        |
| Band annealed , GOST 2284-79    |  | 440–740                  | 10                      | –       |        |
| Band cold-worked , GOST 2284-79 |  | 740–1130                 | –                       | –       |        |
| Rolled stock GOST 1050-88       |  | –                        | –                       | 255     |        |
| SOFT ANNEALED                   |  | RM<br>N/mm <sup>2</sup>  | A80<br>%                |         |        |
| 0.3 – 3                         |  | 620                      | 17                      |         |        |
| NORMALIZING                     |  | RM<br>N/mm <sup>2</sup>  | RE<br>N/mm <sup>2</sup> | A5<br>% | Z<br>% |
| to 80                           |  | 680                      | 400                     | 12      | 35     |
| CONDITION · DIMENSION           |  | RM<br>N/mm <sup>2</sup>  | RE<br>N/mm <sup>2</sup> | A5<br>% | Z<br>% |
| Steel                           |  | 700                      | 510                     | 17      | 60     |

| QUENCHING 780 - 830°C, OIL,<br>DRAWING 560°C | RM<br>N/mm² | RE<br>N/mm² | A5<br>% | Z<br>% | KCU<br>kJ/m² |
|----------------------------------------------|-------------|-------------|---------|--------|--------------|
| 30                                           | 920         | 590         | 19      | 50     | 240          |
| TREATED TO IMPROVE SHEARABILITY              |             |             |         |        | HB           |
| Treated to improve shearability              |             |             |         |        | 255          |
| SOFT ANNEALED                                |             | HB          |         |        | HV           |
| Soft annealed                                |             | 241         |         |        | 195          |
| AS ROLLED AND TURNED                         |             |             |         |        | HB           |
| As rolled and turned                         |             |             |         |        | 198–278      |
| COLD ROLLED                                  |             |             |         |        | HV           |
| Cold rolled                                  |             |             |         |        | 305          |
| QUENCHED AND TEMPERED                        |             |             |         |        | HV           |
| Quenched and tempered                        |             |             |         |        | 345–530      |

## Physical properties

8 values

| CONDITION · DIMENSION    | RHO<br>g/cm <sup>3</sup> | E<br>GPa | ALPHA<br>10 <sup>-6</sup> /K | LAMBDA<br>W/(m·K) | CP<br>J/(kg·K) |
|--------------------------|--------------------------|----------|------------------------------|-------------------|----------------|
| 20                       | 7.8                      | 204      | –                            | –                 | –              |
| 100                      | –                        | –        | 11                           | 68                | 483            |
| 200                      | –                        | 208      | 11.9                         | 53                | 487            |
| 300                      | –                        | 189      | –                            | –                 | –              |
| 400                      | –                        | 174      | 13.9                         | 36                | 529            |
| 500                      | –                        | –        | 14.6                         | –                 | –              |
| 600                      | –                        | –        | –                            | –                 | 567            |
| PROPERTY                 | VALUE                    |          | UNIT                         |                   |                |
| Density                  | 7.85                     |          | g/cm <sup>3</sup>            |                   |                |
| Transformation point Ac1 | 725                      |          | °C                           |                   |                |
| Transformation point Ac3 | 750                      |          | °C                           |                   |                |
| Transformation point Ar3 | 745                      |          | °C                           |                   |                |
| Transformation point Ar1 | 690                      |          | °C                           |                   |                |

## Technological properties

| PROPERTY           | VALUE              | UNIT |
|--------------------|--------------------|------|
| Weldability        | is not used.       |      |
| Flake sensitivity  | weakly predisposed |      |
| Temper brittleness | not predisposed    |      |

## Heat treatment

2 regimes

| STEP                                                  | TEMPERATURE            | MEDIUM |
|-------------------------------------------------------|------------------------|--------|
| source joins the operations with + / procedural order |                        |        |
| Annealing                                             | Temperature not stated | —      |
| Annealing                                             | Temperature not stated | —      |
| Tempering                                             | Temperature not stated | —      |
| Normalizing                                           | Temperature not stated | —      |
| Tempering                                             | Temperature not stated | —      |
| Normalizing                                           | Temperature not stated | —      |

## Designations across standards

38 designations · 6 documented as identical

|                                           |          |                     |       |
|-------------------------------------------|----------|---------------------|-------|
| <b>United States</b>                      | 6        | <b>France</b>       | 3     |
| G10550                                    | uns      | 2C60                | afnor |
| G10600 <span>This grade's own name</span> | uns      | C60E                | afnor |
| G10640 <span>This grade's own name</span> | uns      | XC60                | afnor |
| 1055                                      | aisi-sae |                     |       |
| 1060 <span>This grade's own name</span>   | aisi-sae | <b>Spain</b>        | 3     |
| 1064 <span>This grade's own name</span>   | aisi-sae | C55k                | une   |
|                                           |          | F.511               | une   |
|                                           |          | F.512               | une   |
| <b>United Kingdom</b>                     | 6        |                     |       |
| 060A62                                    | bs       |                     |       |
| 070M60                                    | bs       | <b>China</b>        | 2     |
| 080A62                                    | bs       | 60                  | gb    |
| 43D                                       | bs       | 60Mn                | gb    |
| CS60                                      | bs       |                     |       |
| EN43D                                     | bs       | <b>Russia / CIS</b> | 2     |
|                                           |          | 60                  | gost  |
| <b>Europe</b>                             | 3        | 60G                 | gost  |
| 1.1221                                    | din-en   |                     |       |
| C60E <span>This grade's own name</span>   | din-en   | <b>Sweden</b>       | 2     |
| Ck 60 <span>This grade's own name</span>  | din-en   | 1665                | ss    |
|                                           |          | 1678                | ss    |

|                      |     |                 |      |
|----------------------|-----|-----------------|------|
| <b>Poland</b>        | 2   | <b>Brazil</b>   | 1    |
| 55                   | pn  | 1060            | abnt |
| 60                   | pn  |                 |      |
| <b>International</b> | 1   | <b>Slovakia</b> | 1    |
| C60E4                | iso | 12 061          | stn  |
| <b>Japan</b>         | 1   | <b>Croatia</b>  | 1    |
| S58C                 | jis | Č.1731          | hrn  |
| <b>Italy</b>         | 1   | <b>Türkiye</b>  | 1    |
| C60                  | uni | Ç 1060          | mke  |
| <b>Czechia</b>       | 1   | <b>Hungary</b>  | 1    |
| 12061                | csn | C 60            | msz  |

**Note on use.** The data is compiled to the best of our knowledge from publicly available standards and manufacturer documentation. It replaces neither material testing nor an inspection document to EN 10204. Please request a mill certificate to EN 10204 2.1, 3.1 or 3.2 together with your enquiry. The standard in its current valid edition always prevails.

### Enquiry about 1.1221

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#### ISSUED

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