

MATERIAL NUMBER 1.1133 · CLASS 1.1

# 20KHG2T

Material no. 1.1133

also listed as 20Mn5

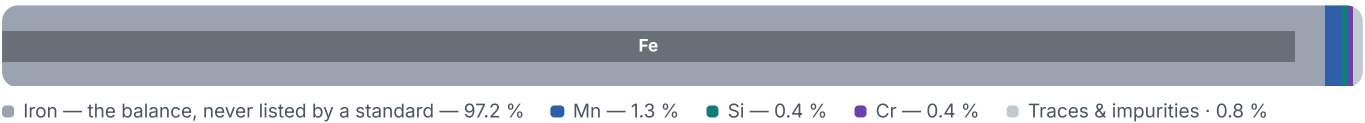
Chemical composition, mechanical and physical property values, and 71 standard designations from 19 regions.

|                              |                                               |                                      |
|------------------------------|-----------------------------------------------|--------------------------------------|
| DENSITY<br><b>7.85</b> g/cm³ | OTHER DESIGNATIONS<br><b>71</b> in 19 regions | PROPERTY VALUES<br><b>17</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

computed from composition · °C

|                                |                                |                                |                               |
|--------------------------------|--------------------------------|--------------------------------|-------------------------------|
| PREDICTED AE3<br><b>802</b> °C | PREDICTED AE1<br><b>714</b> °C | PREDICTED ACM<br><b>464</b> °C | PREDICTED BS<br><b>547</b> °C |
|--------------------------------|--------------------------------|--------------------------------|-------------------------------|

## Mechanical properties

14 values across 4 conditions

| NORMALIZED                                                           |                         |                         |                          | RM<br>N/mm <sup>2</sup>  |
|----------------------------------------------------------------------|-------------------------|-------------------------|--------------------------|--------------------------|
| ≤ 100                                                                |                         |                         |                          | 530                      |
| 100 – 250                                                            |                         |                         |                          | 520                      |
| 250 – 500                                                            |                         |                         |                          | 500                      |
| 500 – 750                                                            |                         |                         |                          | 490                      |
| CONDITION · DIMENSION                                                | RM<br>N/mm <sup>2</sup> | RE<br>N/mm <sup>2</sup> | A<br>%                   | HB                       |
| 15 – 15                                                              | ≥ 785                   | ≥ 590                   | ≥ 10                     | ≤ 187                    |
| NORMALIZING 940 - 960°C, DRAWING<br>630 - 650°C, COOLING AIR, 65°C/H |                         | RM<br>N/mm <sup>2</sup> | KCU<br>kJ/m <sup>2</sup> |                          |
| 60 - 90                                                              |                         | 440                     | 600                      |                          |
| CONDITION · DIMENSION                                                | RM<br>N/mm <sup>2</sup> | RE<br>N/mm <sup>2</sup> | A5<br>%                  | KCU<br>kJ/m <sup>2</sup> |
| Sheet, GOST 5520-79                                                  | 430-590                 | 255-265                 | 22                       | 590                      |

## 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) | RHO_EL<br>nΩ·m |
|-----------------------|--------------------------|----------|------------------------------|-------------------|----------------|----------------|
| 20                    | 7.859                    | 211      | –                            | 51.7              | –              | 173            |
| 100                   | 7.834                    | 208      | 11.75                        | 51                | 470            | 219            |
| 200                   | 7.803                    | 205      | 12.2                         | 48.5              | 483            | 292            |
| 300                   | 7.77                     | 200      | 12.8                         | 44.4              | –              | 381            |
| 400                   | 7.736                    | 191      | 13.2                         | 42.7              | 525            | 487            |
| 500                   | 7.699                    | 180      | 13.5                         | 39.3              | 571            | 601            |
| 600                   | 7.659                    | 165      | 13.85                        | 35.6              | –              | 758            |
| 700                   | 7.617                    | –        | 14.6                         | 31.9              | –              | 925            |
| 800                   | 7.624                    | –        | 12.7                         | 25.9              | –              | 1094           |
| 900                   | 7.6                      | –        | 12.4                         | 26.4              | –              | 1135           |
| 1000                  | 7.548                    | –        | 13.4                         | 27.7              | –              | 1167           |
| 1100                  | 7.496                    | –        | 14.2                         | 28.5              | –              | 1194           |
| 1200                  | –                        | –        | 14.8                         | 29.8              | –              | 1219           |

| CONDITION · DIMENSION | E<br>GPa | ALPHA<br>10 <sup>-6</sup> /K | LAMBDA<br>W/(m·K) | CP<br>J/(kg·K) |
|-----------------------|----------|------------------------------|-------------------|----------------|
| 20                    | 210      | —                            | —                 | —              |
| 100                   | —        | —                            | 40.06             | —              |
| 200                   | —        | 12.1                         | —                 | —              |
| 300                   | 185      | —                            | 42.29             | —              |
| 400                   | 175      | 13.5                         | —                 | —              |
| 500                   | —        | —                            | 37.26             | —              |
| 600                   | —        | 14.1                         | —                 | —              |
| 700                   | —        | —                            | 30.98             | —              |
| 900                   | —        | —                            | —                 | 586            |
| 1100                  | —        | —                            | —                 | 620            |

| PROPERTY                 | VALUE | UNIT              |
|--------------------------|-------|-------------------|
| Density                  | 7.85  | g/cm <sup>3</sup> |
| Transformation point Ac1 | 724   | °C                |
| Transformation point Ac3 | 845   | °C                |
| Transformation point Ar3 | 815   | °C                |
| Transformation point Ar1 | 682   | °C                |

## Technological properties

| PROPERTY           | VALUE                | UNIT |
|--------------------|----------------------|------|
| Weldability        | limited weldability. |      |
| Flake sensitivity  | not predisposed      |      |
| Temper brittleness | not predisposed      |      |

## Heat treatment

5 regimes

| STEP                                                  | TEMPERATURE            | MEDIUM |
|-------------------------------------------------------|------------------------|--------|
| source joins the operations with + / procedural order |                        |        |
| Quenching                                             | Temperature not stated | —      |
| Tempering                                             | Temperature not stated | —      |
| Quenching                                             | Temperature not stated | —      |
| Carburizing                                           | Temperature not stated | —      |
| Normalizing                                           | 880–940 °C             | —      |

| STEP        | TEMPERATURE            | MEDIUM |
|-------------|------------------------|--------|
| Normalizing | Temperature not stated | —      |

## Designations across standards

71 designations · 8 documented as identical

|                       |          |                      |        |
|-----------------------|----------|----------------------|--------|
| <b>United States</b>  | 19       | <b>Spain</b>         | 4      |
| G15180                | uns      | 20Mn6                | une    |
| G15220                | uns      | F.1515               | une    |
| H15220                | uns      | F.1515-20Mn6         | une    |
| 1021                  | aisi-sae | F.220A               | une    |
| 1022                  | aisi-sae |                      |        |
| 1518                  | aisi-sae | <b>Japan</b>         | 4      |
| 1522                  | aisi-sae | S Mn C 420           | jis    |
| 1522H                 | aisi-sae | SMn420               | jis    |
| G10210                | aisi-sae | SMn420H              | jis    |
| G10220                | aisi-sae | STB510               | jis    |
| G15180                | aisi-sae |                      |        |
| G15220                | aisi-sae | <b>China</b>         | 4      |
| H15211                | aisi-sae | 10Mn2                | gb     |
| H15220                | aisi-sae | 20G                  | gb     |
| K02700                | aisi-sae | 20Mn2                | gb     |
| 1022 1518             | astm     | 20MnG                | gb     |
| 201                   | astm     |                      |        |
| 321                   | astm     | <b>Czechia</b>       | 4      |
| A502                  | astm     | 12022                | csn    |
|                       |          | 13030                | csn    |
|                       |          | 13123                | csn    |
|                       |          | 422 714              | csn    |
| <b>Russia / CIS</b>   | 15       | <b>France</b>        | 2      |
| 20G                   | gost     | 20M5                 | afnor  |
| 20GS2                 | gost     | TU48C                | afnor  |
| 20GSL                 | gost     |                      |        |
| 20KHG2T               | gost     | <b>International</b> | 2      |
| 20KHG2TS              | gost     | 22Mn6                | iso    |
| 20KHGS2               | gost     | 22Mn6H               | iso    |
| 20N2M                 | gost     |                      |        |
| 20Г                   | gost     | <b>Italy</b>         | 2      |
| 20Г2                  | gost     | 20Mn7                | uni    |
| 20HM                  | gost     | G22Mn3               | uni    |
| 22K                   | gost     |                      |        |
| 22KhNM                | gost     | <b>Poland</b>        | 2      |
| 22K                   | gost     | 20G                  | pn     |
| CHN20D2SH             | gost     | 25                   | pn     |
| cr.22K                | gost     |                      |        |
| <b>United Kingdom</b> | 5        | <b>Europe</b>        | 1      |
| 080A20                | bs       | 20Mn5                | din-en |
| 120M19                | bs       |                      |        |
| 150M19                | bs       |                      |        |
| 20Mn5                 | bs       |                      |        |
| 90440                 | bs       |                      |        |

|                         |        |             |     |
|-------------------------|--------|-------------|-----|
| Sweden                  | 1      | Bulgaria    | 1   |
| 2132                    | ss     | 20G         | bds |
| Slovakia                | 1      | Switzerland | 1   |
| 13 030                  | stn    | 20Mn5       | snv |
| Hungary                 | 1      | South Korea | 1   |
| Ao20Mn5                 | msz    | SMnC420     | ks  |
| Australia / New Zealand | 1      |             |     |
| 1022                    | as-nzs |             |     |

**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 20KHG2T

Quotation, availability, mill certificate or a technical question — directly on the material page.

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|                        |                   |              |              |
|------------------------|-------------------|--------------|--------------|
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