# Material data sheet
# SWG XPM

Schmiedewerke Gröditz
GMH GRUPPE

| material characteristics | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | material number / grade | SWG XPM | | | | | | |
| | short designation | 25MnCrNiMoV6-6-4 | | | | | | |
| | comparable grade | P20HH | | | | | | |
| | chemical composition - reference analysis [%] | C | Si | Mn | Cr | Mo | Ni | others |
| | | 0.27 | 0.30 | 1.55 | 1.35 | 0.50 | 1.00 | alloyed |
| | production technology | EAF/LF/VD, forging, Q+T | | | | | | |
| | service hardness / strength converted acc. to DIN EN ISO 18265 table B2 | | | HB | HRC | N/mm² | | |
| | | | | 359 - 400 | 38 - 42 | 1140 - 1270 | | |
| | delivery condition | Q+T | | 359 - 400 | 38 - 42 | 1140 - 1270 | | variation upon request |
| | maximum dimension | diameter | | | thickness | | | |
| | | - | | | ≤ 1500 mm | | | |
| | US-specification | EN 10228-3 | | | SEP 1921 | | | |
| | | table 3 - type 1 - qual. class 3 | | | group 3 - class D,d | | | |
| | cleanliness | DIN 50602 | | | ASTM E45 method A | | | |
| | | K4 ≤ 20 | | | A ≤ 1,5; B, C, D ≤ 2 | | | |

| technological properties | | 0 | 1 | 2 | 3 | 4 | 5 | comment |
|---|---|---|---|---|---|---|---|---|
| | toughness | | ■ | ■ | ■ | | | in relation to service hardness |
| | hot strength at working temp. | | ■ | ■ | ■ | | | |
| | wear resistance | | ■ | ■ | ■ | | | |
| | corrosion resistance | ■ | | | | | | |
| | machinability | | ■ | ■ | ■ | | | Q+T |
| | polishability | | ■ | ■ | ■ | | | ISO/SPI: N1/A-1 |
| | weldability | | ■ | ■ | ■ | ■ | | CET = 0.57 % acc. DIN EN 1011-2 |
| | texturability | | ■ | ■ | ■ | ■ | | |
| | nitridability | | ■ | ■ | ■ | | | nitriding hardness 550 - 700 HV1 |
| | chrome-platability | | ■ | ■ | ■ | ■ | | |

rating properties: 0 = not suitable; 1 = low; 2 = middle; 3 = good; 4 = very good; 5 = perfectly suitable

| physical properties | | | | | |
|---|---|---|---|---|---|
| | thermal conductivity [W · m$^{-1}$ · K$^{-1}$] | 20 °C | 200 °C | 300 °C | 500 °C |
| | | 37.0 | 38.9 | 38.6 | 37.2 |
| | coefficient of thermal expansion between 20 °C and ... [10$^{-6}$ · K$^{-1}$] | 100 °C | 200 °C | 300 °C | 500 °C |
| | | 11.8 | 12.5 | 13.1 | 14.8 |
| | elastic modulus [kN/mm$^2$] | 20 °C | 200 °C | 300 °C | 500 °C |
| | | 212 | 207 | 192 | 175 |

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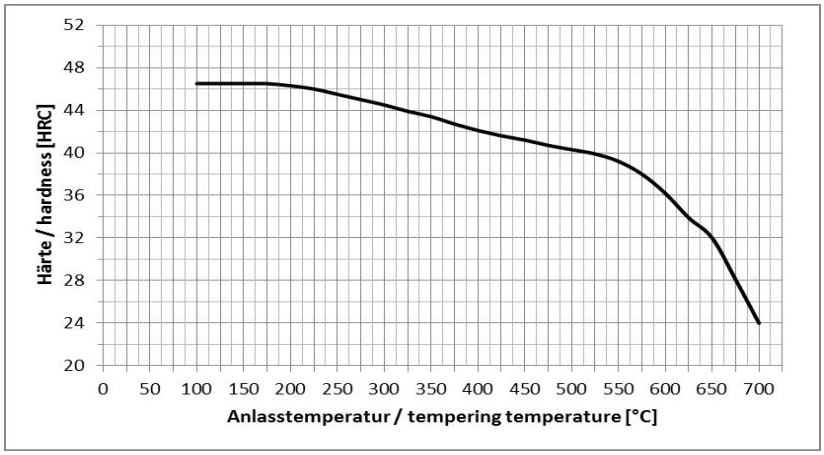
| | | |
|---|---|---|
| application | technology | mold making, injection molding, press-molding |
| | tools | large plastic molds, cavities, with high surface requirement |
| | process temperature | < 250 °C |
| | tool size | medium- and large-sized molds |
| | final products | TV housing, bumpers, interior car parts, car lights |
| | features | good texturing reliability |

| | |
|---|---|
| SWG processing instructions | welding, texturing,<br>polishing, deep-hole drilling |

| | | T min [°C] | T max [°C] | medium / comment |
|---|---|---|---|---|
| heat treatment | annealing | 710 | 740 | air |
| | hardening | 870 | 920 | oil, polymer |
| | tempering | 540 | 650 | air |
| | stress relieving | 500 | 530 | max. 30 °C below tempering temp. |
| | pre-heating before welding | 300 | 330 | |
| | nitriding | 450 | 530 | max. 30 °C below tempering temp. |
| | PVD-treating | 450 | 530 | |

| | | |
|---|---|---|
| diagrams / structure | TTT-diagram | yes |
| | tempering diagram | yes |
| | advice on heat treatment | pre-hardened |
| | microstructure | mainly bainitic |

## Tempering diagram: Average values on samples dia 25 mm x length 50 mm; hardened at 880 °C in oil




## TTT-diagram (continuous)