

**DIN - Material - No.** 1.2345  
**Code** X50CrMoV51

### Comparable standards

| Chemical composition | C    | Si   | Mn   | Cr   | Mo   | V    |
|----------------------|------|------|------|------|------|------|
| (Typical analysis %) | 0.50 | 0.95 | 0.30 | 5.00 | 1.35 | 0.90 |

**Steel properties** Good wear resistance, toughness and temper resistance. High hardenability. Good thermal conductivity & resistance to hot-cracking. Good dimensional stability at hardening. High strength at elevated temperatures. For tools, which are during work under strong dynamic loading.

|                     |                                         |        |        |        |        |        |        |          |
|---------------------|-----------------------------------------|--------|--------|--------|--------|--------|--------|----------|
| Physical properties | Thermal conductivity W/(m.K)            | 20°C   |        |        |        |        |        |          |
|                     |                                         | 25     |        |        |        |        |        |          |
|                     | Density g/cm³                           | 20°C   |        |        |        |        |        |          |
|                     |                                         | 7.77   |        |        |        |        |        |          |
|                     | Coefficient of linear thermal expansion |        |        |        |        |        |        |          |
|                     | 10 <sup>-6</sup> °C <sup>-1</sup>       | 20-100 | 20-200 | 20-300 | 20-400 | 20-500 | 20-600 | 20-700°C |
|                     |                                         | 11.7   | 12.5   | 12.7   | 13.2   | 13.4   | 13.6   | 13.8     |

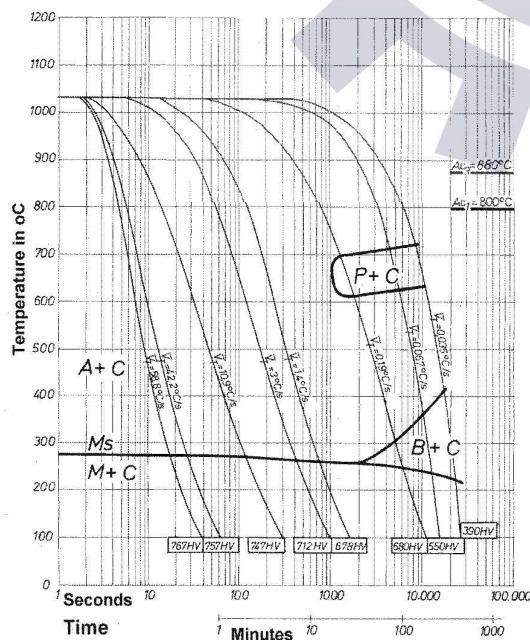
**Applications** Industrial cutters for cold and hot cutting. Pressure Die Casting dies, Pressing tools for non - ferrous metals & for hot pressing of steels. Dies and tools for cutting plastics.

**Stress Relieving** Holding at approx 649/677°C for one hour.

Heat treatment

|                  |                                  |                              |      |      |      |      |      |      |     |
|------------------|----------------------------------|------------------------------|------|------|------|------|------|------|-----|
| Soft annealing°C | Cooling                          | Hardness HB                  |      |      |      |      |      |      |     |
| 760 - 810        | furnace                          | max. 250                     |      |      |      |      |      |      |     |
| Hardening from°C | in                               | Hardness after quenching HRC |      |      |      |      |      |      |     |
| 1000 - 1040      | oil, air, thermal bath 450-550°C | 54 - 58                      |      |      |      |      |      |      |     |
| Tempering °C     | 100                              | 200                          | 300  | 400  | 500  | 550  | 600  | 650  | 700 |
| HRC              | 56                               | 55                           | 53   | 54   | 56   | 54   | 49   | 40   | 31  |
| N/MM²            | 2050                             | 1980                         | 1845 | 1910 | 2050 | 1910 | 1620 | 1260 | 995 |

### Time - Temperature - Transformation - Diagram



### Tempering Diagram

