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## 1.2344 VICTORY ESR

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| Electro-slag-remelting<br>(ESR)   |           |           |           |           |           |           |           |
|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>GENERAL:</b>   |           |           |           |           |           |           |           |
| <ul style="list-style-type: none"> <li>- Uniform and high level of machinability and polishability</li> <li>- High level of toughness and ductility</li> <li>- Good resistance to abrasion at both low and high temperatures</li> <li>- Excellent through-hardening properties</li> <li>- Good high-temperature strength and resistance to thermal fatigue</li> <li>- Very limited distortion during hardening.</li> <li>- isotropic properties compared to conventionally produced steelgrades</li> <li>- Excellent toughness and ductility in all directions</li> </ul> |           |           |           |           |           |           |           |
| <b>APPLICATIONS:</b>  |           |           |           |           |           |           |           |
| <p>Moulds for:</p> <ul style="list-style-type: none"> <li>- tools for die casting (dies, fixed inserts, cores, nozzles, nitrided ejector pins, nitrided shot-sleeves)</li> <li>- tools for extrusion (dies, dieholders, liners, dummy blocks)</li> <li>- tools for hot pressing (Aluminium, Magnesium, Copper Alloys)</li> <li>- moulds for plastics (injection moulds)</li> <li>- parts for severe cold punching, scrap shears, hot shearing, shrink rings, wear resisting parts</li> </ul>  |           |           |           |           |           |           |           |
| <b>CHEMICAL ANALYSIS: %</b>   |           |           |           |           |           |           |           |
| <b>C</b>  | <b>Si</b> | <b>Mn</b> | <b>P</b>  | <b>S</b>  | <b>Cr</b> | <b>Mo</b> | <b>V</b>  |
| 0,38 - 0,42   | 0,8 - 1,2 | 0,3 - 0,5 | ≤ 0,015   | ≤ 0,002   | 4,8 - 5,5 | 1,2 - 1,5 | 0,9 - 1,1 |
| <b>PHYSICAL PROPERTIES:</b>   |           |           |           |           |           |           |           |
| Coefficient of thermal expansion<br>[10 <sup>-6</sup> m/(m x K)]  | 20-100 °C | 20-200 °C | 20-300 °C | 20-400 °C | 20-500 °C | 20-600 °C | 20-700 °C |
|   | 10.9      | 11.9      | 12.3      | 12.7      | 13.0      | 13.3      | 13.5      |
| Thermal conductivity<br>[W/(m x K)]   | 20° C     |           | 350° C    |           | 700° C    |           |           |
|   | 25.2      |           | 27.0      |           | 30.3      |           |           |



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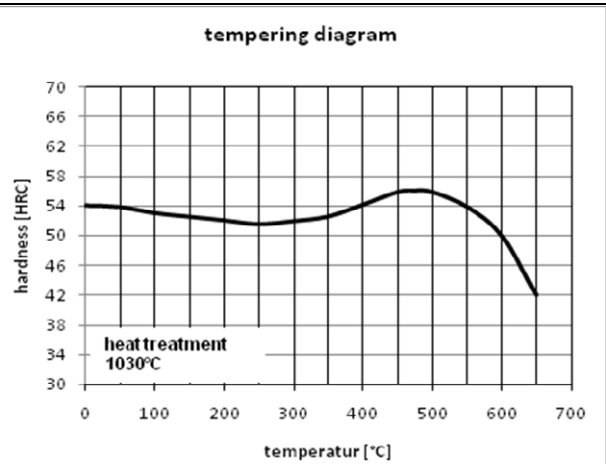
## 1.2344 VICTORY ESR

### HEAT TREATMENT:

| <i>Hot forming</i> | <i>Soft annealing</i> | <i>Hardening</i> | <i>Tempering</i> |
|--------------------|-----------------------|------------------|------------------|
| 1050 – 850 °C      | 820 – 840 °C          | 1010 – 1050 °C   | 520 – 700 °C     |

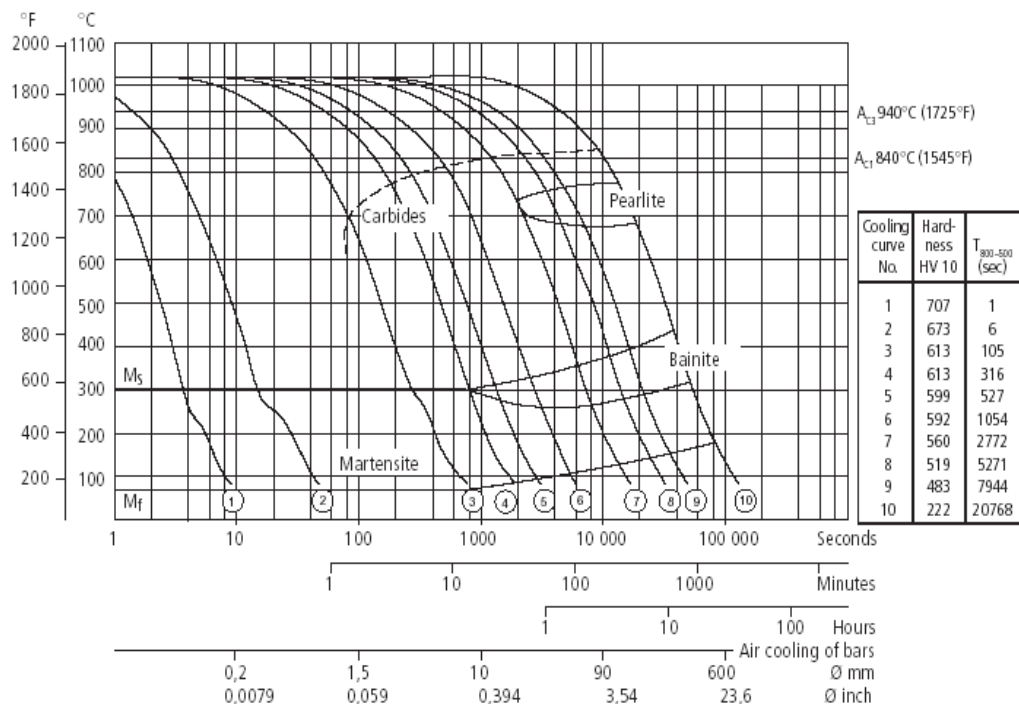
### TEMPERING DIAGRAM:

values in HRC  
 tested on samples dia. 25 x 50 mm long  
 hardened at 1030 °C in oil



### CCT GRAPH:

Austenitizing temperature 1020°C (1870°F). Holding time 30 minutes.



The details and values in this data sheet are typical values, no guarantee promises. Changes of the material, the qualities and/or performance data we reserve for us.



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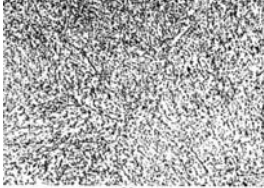
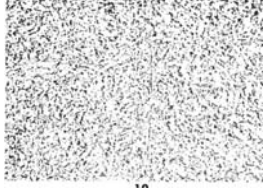
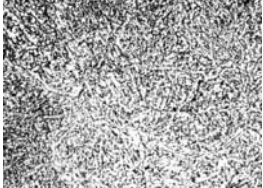
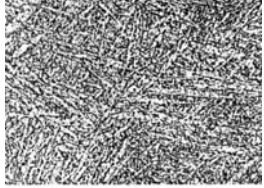
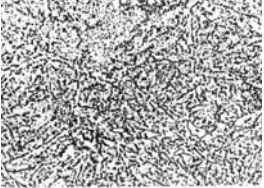

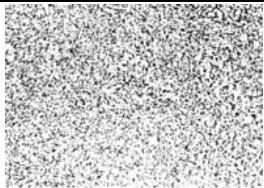
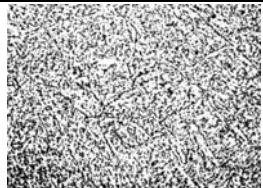
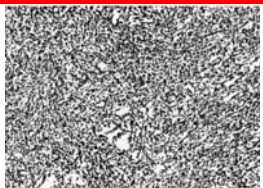
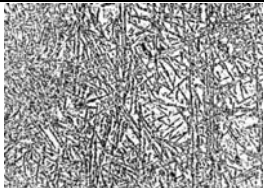
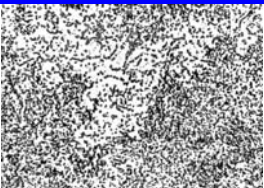
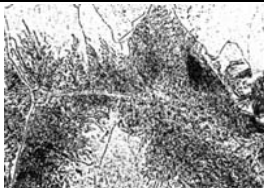
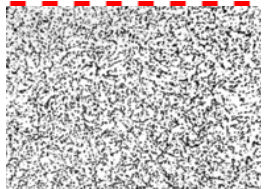
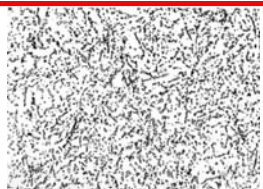

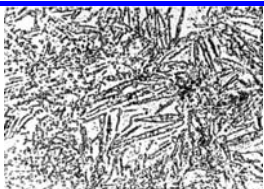


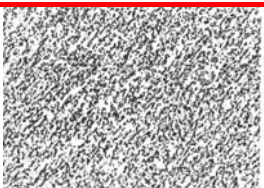





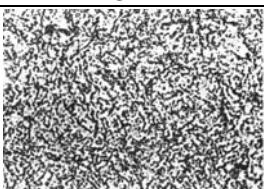
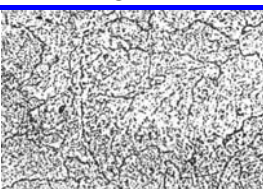
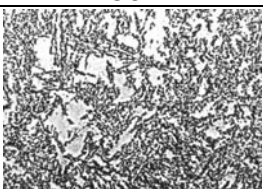

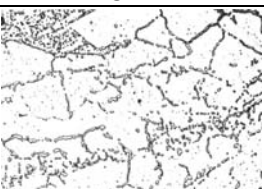

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|   |
|---|
| <b>DELIVERY CONDITION :</b>   |
| Soft annealed with a hardness of a maximum of 229HB<br>or hardened and tempered acc. to your request                    |
| <b>SERVICE HARDNESS:</b>  |
| 30 – 56 HRC   |
| <b>IMPACT STRENGTH:</b>   |
| Unnotched test sample 10x7x55 [mm] hardened and tempered at 44-46HRC<br>VDG M82 Ed.02/1993<br>400 J/cm <sup>2</sup>     |
| or according to                        |
| or acc. to your request   |
| <b>ULTRASONIC:</b>  |
| ASTM A388 - FBH max. 3 mm (1/8 inch)<br>or<br>SEP 1921 – test group 3 – class E , e<br>or acc. to your request          |
| <b>CLEANLINESS:</b>   |
| ASTM E45- Method A with type A ≤ 0,5 ,<br>B; C and D each ≤ 1<br>or<br>DIN 50602– K1 ≤ 10<br>or<br>acc. to your request |
| <b>STRUCTURE:</b>   |
| fine uniform annealed structure<br>see next page  |
| <b>DELIVERY SIZES:</b>  |
| Rounds – up to 600 mm<br>Blocks – up to 400 mm thickness<br>or acc. to your request                                     |

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### Rating Chart for the Evaluation of Microstructure of Annealed Hot-Work Tool Steel

|   | GA   | GB   | GC  | GD   | GE   | GF   |
|---|--|--|---|--|--|--|
| 1 | <br>GA1   | <br>GB1   | <br>GC1   | <br>GD1   | <br>GE1   | <br>GF1   |
| 2 | <br>GA2   | <br>GB2   | <br>GC2   | <br>GD2   | <br>GE2   | <br>GF2   |
| 3 | <br>GA3   | <br>GB3   | <br>GC3   | <br>GD3   | <br>GE3   | <br>GF3   |
| 4 | <br>GA4  | <br>GB4  | <br>GC4  | <br>GD4  | <br>GE4  | <br>GF4  |
| 5 | <br>GA5 | <br>GB5 | <br>GC5 | <br>GD5 | <br>GE5 | <br>GF5 |
|   | EFS geglüht / EFS annealed   |  | ESU bis 400 mm / ESR up to 400 mm   |  | ESU bis 250 mm / ESR up to 250 mm  |  |

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