

# ISCAR GRADE CHART

| MACHINED MATERIALS*                                       | MILLING  | SOLID CARBIDE and MULTI-MASTER**                                 | DRILLING  | PARTING  | GROOVE TURN  | FACE GROOVING                                 | ISO TURNING   | THREADING                                     |
|---|--|--|---|--|--|---|---|---|
| <b>P</b><br>Steel<br>Material Groups 1-13                 | Hard<br>IC5400<br>IC30N<br>IC808/908<br>IC810<br>IC5500<br>IC830/928<br>IC330/328<br>IC845 | Hard<br>IC702<br>IC902<br>IC903<br>IC608<br>IC900/908<br>IC300   | Hard<br>IC8080<br>IC808/908<br>IC5500<br>IC907                | Hard<br>IC30N<br>IC807/907<br>IC808/908<br>IC1010<br>IC5400<br>IC830<br>IC1030 | Hard<br>IC20N<br>IC807/907<br>IC808/908<br>IC8250<br>IC830<br>IC528<br>IC228 | Hard<br>IC808/908<br>IC8250<br>IC830          | Hard<br>IC520N/IC20N<br>IC530N<br>IC807/IC907<br>IC908<br>IC8150<br>IC8250<br>IC8350<br>IC830 | Hard<br>IC1007<br>IC808/908<br>IC250<br>IC228 |
|   | Tough  | Tough  | Tough   | Tough  | Tough  | Tough   | Tough   | Tough   |
| <b>M</b><br>Stainless Steel<br>Material Group 14          | Hard<br>IC808/908<br>IC840<br>IC830/928<br>IC330/328<br>IC882                              | Hard<br>IC902<br>IC608<br>IC903<br>IC900/908<br>IC300/308        | Hard<br>IC907<br>IC808/908<br>IC5500                          | Hard<br>IC808/908<br>IC1010<br>IC5400<br>IC830<br>IC1030                       | Hard<br>IC20N<br>IC807/907<br>IC808/908<br>IC8250<br>IC830<br>IC528<br>IC228 | Hard<br>IC806<br>IC808/908<br>IC8250<br>IC830 | Hard<br>IC806<br>IC807/907<br>IC908<br>IC6015<br>IC830<br>IC8250                              | Hard<br>IC1007<br>IC908<br>IC228              |
|   | Tough  | Tough  | Tough   | Tough  | Tough  | Tough   | Tough   | Tough   |
| <b>K</b><br>Cast Iron<br>Material Groups 15-20            | Hard<br>IS8<br>IC5100/4100<br>DT7150<br>IC810<br>IC808/908                                 | Hard<br>IS6<br>IC902<br>IC903<br>IC608<br>IC900/908              | Hard<br>IC8080 <sup>(1)</sup><br>IC907<br>IC808/908<br>IC5500 | Hard<br>IC807/907<br>IC20<br>IC808/908<br>IC1010                               | Hard<br>IC428<br>IC5010<br>IC418<br>IC808/908<br>IC807/907                   | Hard<br>IC428<br>IC5010<br>IC808/908          | Hard<br>IS6<br>IN23<br>IB90<br>IC5005<br>IC5010<br>IS8<br>IC8150                              | Hard<br>IC1007<br>IC808/908                   |
|   | Tough  | Tough  | Tough   | Tough  | Tough  | Tough   | Tough   | Tough   |
| <b>N</b><br>Nonferrous Materials<br>Material Groups 21-30 | Hard<br>ID5<br>IC04<br>IC08<br>IC28  | Hard<br>IC08   | Hard<br>ID5<br>IC907<br>IC808/908<br>IC08                     | Hard<br>IC807/907<br>IC20<br>IC808/908   | Hard<br>ID5<br>IC07<br>IC20  | Hard<br>IC20<br>IC808/908                     | Hard<br>ID5<br>IC20   | Hard<br>IC1007<br>IC08                        |
|   | Tough  | Tough  | Tough   | Tough  | Tough  | Tough   | Tough   | Tough   |
| <b>S</b><br>Super Alloys<br>Material Groups 31-37         | Hard<br>IC808/908<br>IC380<br>IC840<br>IC5820<br>IC882<br>IC830/928<br>IC330/328           | Hard<br>IS6<br>IC902<br>IC903<br>IC608<br>IC900/908<br>IC300/308 | Hard<br>IC907<br>IC808/908                                    | Hard<br>IC807/907<br>IC808/908<br>IC1010                                       | Hard<br>IC804<br>IC807/907<br>IC808/908                                      | Hard<br>IC806<br>IC808/908                    | Hard<br>IB05S<br>IB10S<br>IW7<br>IS25<br>IS35<br>IS9<br>IC804<br>IC806<br>IC807/907<br>IC908  | Hard<br>IC806<br>IC1007<br>IC808/908          |
|   | Tough  | Tough  | Tough   | Tough  | Tough  | Tough   | Tough   | Tough   |
| <b>H</b><br>Hardened Materials<br>Material Groups 38-41   | Hard<br>IB55<br>IB85<br>IC30N<br>IC808/908<br>DT7150                                       | Hard<br>IC702<br>IC902<br>IC903<br>IC608<br>IC900/908            | Hard<br>IC907<br>IC808/908                                    | Hard<br>IC807/907<br>IC808/908<br>IC1010                                       | Hard<br>IB50<br>IB10H<br>IB20H<br>IC807/907                                  | Hard<br>IC806<br>IC428<br>IC808/908           | Hard<br>IB05H<br>IB10HC/IB10H<br>IB20HC<br>IB20H<br>IB25HA<br>IB25HC<br>IN420<br>IN22         | Hard<br>IC1007<br>IC808/908                   |
|   | Tough  | Tough  | Tough   | Tough  | Tough  | Tough   | Tough   | Tough   |



## Application Range And Coating Data For The Most Popular Grades

| Grades           | Machined Materials*** | Coating                     | Application                         |  |  |  |
|------------------|-----------------------|-----------------------------|-------------------------------------|--|--|--|
| <b>MILLING</b>   |                       |                             |                                     |  |  |  |
| IC830            | P, M, S               | PVD - TiAlN                 |                                     |  |  |  |
| IC928            | P, M, S               | PVD - TiAlN                 |                                     |  |  |  |
| IC330            | P, M, S               | PVD - TiCN+TiN              |                                     |  |  |  |
| IC810            | P, K                  | PVD - AlTiCrN+TiN           |                                     |  |  |  |
| IC28             | N                     | Uncoated                    |                                     |  |  |  |
| IC840            | M, S                  | PVD - AlTiN+TiAlSiN+TiSiN   |                                     |  |  |  |
| IC882            | M, S                  | PVD - AlTiN+TiAlSiN+TiSiN   |                                     |  |  |  |
| IC808            | P, M, K, S, H         | PVD - AlTiN/TiAlN           |                                     |  |  |  |
| IC900/908        | P, M, K, S, H         | PVD - AlTiN                 |                                     |  |  |  |
| IC902            | P, M, K, S, H         | PVD - AlTiN                 |                                     |  |  |  |
| IC903            | P, M, K, S, H         | PVD - AlTiN                 | <b>SOLID CARBIDE MULTI-MASTER**</b> |  |  |  |
| IC702            | P, H                  | PVD - AlTiCrSiN             |                                     |  |  |  |
| IC300/308        | P, M, S               | PVD - TiCN                  |                                     |  |  |  |
| IC808/908        | P, M, K, S, H         | PVD - TiAlN                 |                                     |  |  |  |
| IC5500           | P                     | CVD - TiCN+Al2O3+TiN        |                                     |  |  |  |
| IC8080           | P, K                  | CVD - TiCN+Al2O3+TiN- TiAlN |                                     |  |  |  |
| IC907            | P, M, K, N, S, H      | PVD - TiAlN                 |                                     |  |  |  |
| ID5              | P, M, K, N, S, H      | PCD grade                   |                                     |  |  |  |
| IC08             | N                     | Uncoated                    |                                     |  |  |  |
| <b>PARTING</b>   |                       |                             |                                     |  |  |  |
| IC30N            | P                     | CERMET                      |                                     |  |  |  |
| IC1030           | P, M                  | PVD - AlTiN+TiN             |                                     |  |  |  |
| IC5400           | P, M                  | MT-CVD - TiCN+Al2O3         |                                     |  |  |  |
| IC807/907        | P, K, N, S, H         | PVD - TiAlN                 |                                     |  |  |  |
| IC808/908        | P, M, K, S, H         | PVD - TiAlN                 |                                     |  |  |  |
| IC830            | P, M                  | PVD - TiAlN                 | <b>GROOVE TURN</b>                  |  |  |  |
| IC1010           | P, M, K, S, H         | PVD - AlTiN+TiN             |                                     |  |  |  |
| IC808/908        | P, M, K, S            | PVD - AlTiN                 |                                     |  |  |  |
| IC804            | S                     | PVD - AlTiN                 |                                     |  |  |  |
| IC428            | K                     | CVD - TiC+Al2O3             |                                     |  |  |  |
| IC5010           | K                     | CVD - TiCN+Al2O3            |                                     |  |  |  |
| IC807/907        | P, M, K, S, H         | PVD - AlTiN                 |                                     |  |  |  |
| IB50             | H                     | CBN grade                   | <b>FACE GROOVING</b>                |  |  |  |
| IC20             | N                     | Uncoated                    |                                     |  |  |  |
| IC808/908        | P, M, K, N, S, H      | PVD - TiAlN                 |                                     |  |  |  |
| IC8250           | P, M                  | MT-CVD - TiCN+Al2O3+TiN     |                                     |  |  |  |
| IC830            | P, M                  | PVD - TiAlN                 |                                     |  |  |  |
| IC428            | K, H                  | CVD - TiC+Al2O3             |                                     |  |  |  |
| IC5010           | K                     | CVD - TiCN+Al2O3+TiN        | <b>ISO TURNING</b>                  |  |  |  |
| IC20             | N                     | Uncoated                    |                                     |  |  |  |
| IC8250           | P                     | MT-CVD - TiCN+Al2O3 +TiN    |                                     |  |  |  |
| IC6025           | M                     | MT-CVD - TiCN+Al2O3 +TiN    |                                     |  |  |  |
| IC5010           | K                     | CVD - TiCN+Al2O3 +TiN       |                                     |  |  |  |
| IC20             | N                     | Uncoated                    |                                     |  |  |  |
| IC806            | M                     | PVD - AlTiN                 |                                     |  |  |  |
| IB20H            | H                     | CBN grade                   |                                     |  |  |  |
| IC807/907        | P, M, S               | PVD-TiAlN                   |                                     |  |  |  |
| IC908            | P, M, S               | PVD-TiAlN                   |                                     |  |  |  |
| <b>THREADING</b> |                       |                             |                                     |  |  |  |
| IC908            | P, M, K, S, H         | PVD - TiAlN                 |                                     |  |  |  |
| IC1007           | P, M, K, N, S, H      | PVD - TiAlN+TiN             |                                     |  |  |  |

■ First choice  
 \* ISCAR material groups in accordance with VDI 3323 standard  
 \*\* Solid Carbide and MULTI-MASTER Endmills  
 \*\*\* In accordance with ISO 513 standard  
 (1) Use for an outer insert on DR drills

## Type Of Wear And Remedy

| Flank wear  | Crater wear   | Notch wear   | Chipping  | Fracture   | Comb cracks  | Built-up edge  | Plastic deformation   |
|---|---|--|---|--|--|--|---|
|   |   |  |   |  |  |  |   |
| <b>Possible causes:</b> <ul style="list-style-type: none"> <li>Cutting speed too high</li> <li>Heat development too high</li> <li>Carbide grade too low-wear</li> </ul> | <b>Possible causes:</b> <ul style="list-style-type: none"> <li>Cutting speed too high</li> <li>Heat development too high</li> <li>Feed too low</li> </ul> | <b>Possible causes:</b> <ul style="list-style-type: none"> <li>Cutting speed too high</li> <li>Carbide grade too low-wear</li> </ul>                     | <b>Possible causes:</b> <ul style="list-style-type: none"> <li>Carbide grade too wear-resistant</li> <li>Cutting edge too positive</li> <li>Formation of edge</li> </ul>  | <b>Possible causes:</b> <ul style="list-style-type: none"> <li>Cutting edge too positive</li> <li>Carbide grade too rigid</li> <li>Vibrations</li> </ul> | <b>Possible causes:</b> <ul style="list-style-type: none"> <li>Heat alternating voltage</li> <li>Strongly interrupted cut</li> <li>Thermal shock through coolant</li> </ul>            | <b>Possible causes:</b> <ul style="list-style-type: none"> <li>Low cutting speed</li> <li>Feed too low</li> <li>Cutting edge too negative</li> </ul>       | <b>Possible causes:</b> <ul style="list-style-type: none"> <li>Feed too high</li> <li>Cutting speed too high</li> <li>Carbide grade too tough</li> </ul>    |
| <b>Possible remedy:</b> <ul style="list-style-type: none"> <li>Reduce cutting speed</li> <li>Harder carbide grade</li> <li>Smaller lead angle</li> </ul>                | <b>Possible remedy:</b> <ul style="list-style-type: none"> <li>Reduce cutting speed</li> <li>Harder carbide grade</li> <li>Increase feed</li> </ul>       | <b>Possible remedy:</b> <ul style="list-style-type: none"> <li>Reduce cutting speed</li> <li>Harder carbide grade</li> <li>Vary cutting depth</li> </ul> | <b>Possible remedy:</b> <ul style="list-style-type: none"> <li>Tougher carbide grade</li> <li>Higher cutting speed</li> <li>Choice of more stable cutting edge</li> </ul> | <b>Possible remedy:</b> <ul style="list-style-type: none"> <li>Reduce cutting depth</li> <li>Lower feed</li> <li>More stable cutting wedge</li> </ul>    | <b>Possible remedy:</b> <ul style="list-style-type: none"> <li>Choice of tougher carbide grade</li> <li>Improved coolant supply</li> <li>Dry machining for interrupted cuts</li> </ul> | <b>Possible remedy:</b> <ul style="list-style-type: none"> <li>High cutting speed</li> <li>Increase feed</li> <li>Smooth, positive cutting edge</li> </ul> | <b>Possible remedy:</b> <ul style="list-style-type: none"> <li>Reduce cutting speed</li> <li>Reduce feed</li> <li>Choice of harder carbide grade</li> </ul> |