

## OPERATING PARAMETERS - LPA TIPS

| ISO | Material                                                                                          | Condition               | Tensile Strength<br>RM<br>(N/mm2) | Hardness<br>(HB) | Matl<br>No. | Cutting<br>Speed<br>VC (SFM) | Feed vs. Drill Diameter        |                                 |                                 |
|-----|---------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------|------------------|-------------|------------------------------|--------------------------------|---------------------------------|---------------------------------|
|     |                                                                                                   |                         |                                   |                  |             |                              | Ø20-29.9mm<br>(.7874"-1.1772") | Ø30-34.9mm<br>(1.1811"-1.3740") | Ø35-41.9mm<br>(1.3800"-1.6496") |
|     |                                                                                                   |                         |                                   |                  |             |                              | IPR (inches/rev)               |                                 |                                 |
| P   | Non-alloy steel <0.25% C<br>& cast steel, >= 0.25% C<br>free cutting <0.55% C<br>steel >= 0.55% C | Annealed                | 420                               | 125              | 1           | 260-460                      | .012 - .020                    | .012 - .020                     | .014 - .022                     |
|     |                                                                                                   | Annealed                | 650                               | 190              | 2           | 260-430                      |                                |                                 |                                 |
|     |                                                                                                   | Quenched & Tempered     | 850                               | 250              | 3           | 260-400                      |                                |                                 |                                 |
|     |                                                                                                   | Annealed                | 750                               | 220              | 4           | 230-360                      |                                |                                 |                                 |
|     |                                                                                                   | Quenched & Tempered     | 1000                              | 300              | 5           | 165-300                      |                                |                                 |                                 |
|     | Low alloy steel & cast steel<br>(less than 5% alloying elements)                                  | Annealed                | 600                               | 200              | 6           | 260-400                      | .010 - .018                    | .010 - .018                     | .012 - .020                     |
|     |                                                                                                   | Quenched & Tempered     | 930                               | 275              | 7           | 230-360                      |                                |                                 |                                 |
|     |                                                                                                   |                         | 1000                              | 300              | 8           | 165-300                      |                                |                                 |                                 |
|     |                                                                                                   |                         | 1200                              | 350              | 9           | 135-230                      |                                |                                 |                                 |
|     | High alloy steel, cast steel<br>& tool steel                                                      | Annealed                | 680                               | 200              | 10          | 165-300                      | .010 - .014                    | .010 - .014                     | .012 - .016                     |
|     |                                                                                                   | Quenched & Tempered     | 1100                              | 325              | 11          | 130-265                      |                                |                                 |                                 |
| M   | Stainless steel &<br>cast stainless steel                                                         | Ferritic/martensitic    | 680                               | 200              | 12          | 130-230                      | .006 - .012                    | .006 - .012                     | .008 - .014                     |
|     |                                                                                                   | Martensitic             | 820                               | 240              | 13          | 130-230                      |                                |                                 |                                 |
|     |                                                                                                   | Austenitic              | 600                               | 180              | 14          | 100-230                      |                                |                                 |                                 |
| K   | GreyCast Iron<br>(GG)                                                                             | Ferritic                | -                                 | 160              | 15          | 300-600                      | .014 - .022                    | .014 - .022                     | .016 - .024                     |
|     |                                                                                                   | Pearlitic               | -                                 | 250              | 16          | 265-460                      |                                |                                 |                                 |
|     | Cast Iron Nodular<br>(GGG)                                                                        | Ferritic                | -                                 | 180              | 17          | 300-600                      |                                |                                 |                                 |
|     |                                                                                                   | Pearlitic               | -                                 | 260              | 18          | 265-460                      |                                |                                 |                                 |
|     | Malleable Cast Iron                                                                               | Ferritic                | -                                 | 130              | 19          | 300-525                      |                                |                                 |                                 |
| N   | Aluminum - wrought alloy                                                                          | Not cureable            | -                                 | 60               | 21          | 300-725                      | .016 - .024                    | .016 - .024                     | .020 - .028                     |
|     |                                                                                                   | Cured                   | -                                 | 100              | 22          | 300-725                      |                                |                                 |                                 |
|     | Aluminum - <=12% Si<br>cast, alloyed _____<br>>12% Si                                             | Not cureable            | -                                 | 75               | 23          | 300-725                      |                                |                                 |                                 |
|     |                                                                                                   | Cured                   | -                                 | 90               | 24          | 300-725                      |                                |                                 |                                 |
|     |                                                                                                   | High temperature        | -                                 | 130              | 25          | 265-525                      |                                |                                 |                                 |
|     | > 1% Pb<br>Copper alloys                                                                          | Free cutting            | -                                 | 110              | 26          | 300-725                      |                                |                                 |                                 |
|     |                                                                                                   | Brass                   | -                                 | 90               | 27          | 300-725                      |                                |                                 |                                 |
|     |                                                                                                   | Electrolitic copper     | -                                 | 100              | 28          | 300-725                      |                                |                                 |                                 |
|     | Non-metallic                                                                                      | Duro & fiber plastics   | -                                 | -                | 29          | -                            |                                |                                 |                                 |
|     |                                                                                                   | Hard rubber             | -                                 | -                | 30          | -                            |                                |                                 |                                 |
| S   | Fe based<br>High temp.alloys _____<br>Ni or Co<br>based                                           | Annealed                | -                                 | 200              | 31          | 100-200                      | .004 - .008                    | .006 - .010                     | .006 - .010                     |
|     |                                                                                                   | Cured                   | -                                 | 280              | 32          | 70-165                       |                                |                                 |                                 |
|     |                                                                                                   | Annealed                | -                                 | 250              | 33          | 70-165                       |                                |                                 |                                 |
|     |                                                                                                   | Cured                   | -                                 | 350              | 34          | 70-165                       |                                |                                 |                                 |
|     |                                                                                                   | Cast                    | -                                 | 320              | 35          | 70-165                       |                                |                                 |                                 |
|     | Titanium, Ti alloys                                                                               | -                       | Rm 400                            | -                | 36          | 70-165                       | .004 - .008                    | .006 - .010                     | .006 - .010                     |
|     |                                                                                                   | Alpha+beta alloys cured | Rm 1050                           | -                | 37          | 70-165                       |                                |                                 |                                 |
| H   | Hardened steel                                                                                    | Hardened                | -                                 | 55 HRC           | 38          | 70-165                       | .004 - .008                    | .006 - .010                     | .006 - .010                     |
|     |                                                                                                   | Hardened                | -                                 | 60 HRC           | 39          | 70-165                       |                                |                                 |                                 |
|     | Chilled cast iron                                                                                 | Cast                    | -                                 | 400              | 40          | -                            | -                              | -                               | -                               |
|     | Cast iron nodular                                                                                 | Hardened                | -                                 | 55 HRC           | 41          | -                            | -                              | -                               | -                               |

\* Feed Rates are Based on Two Effective - DO NOT DOUBLE