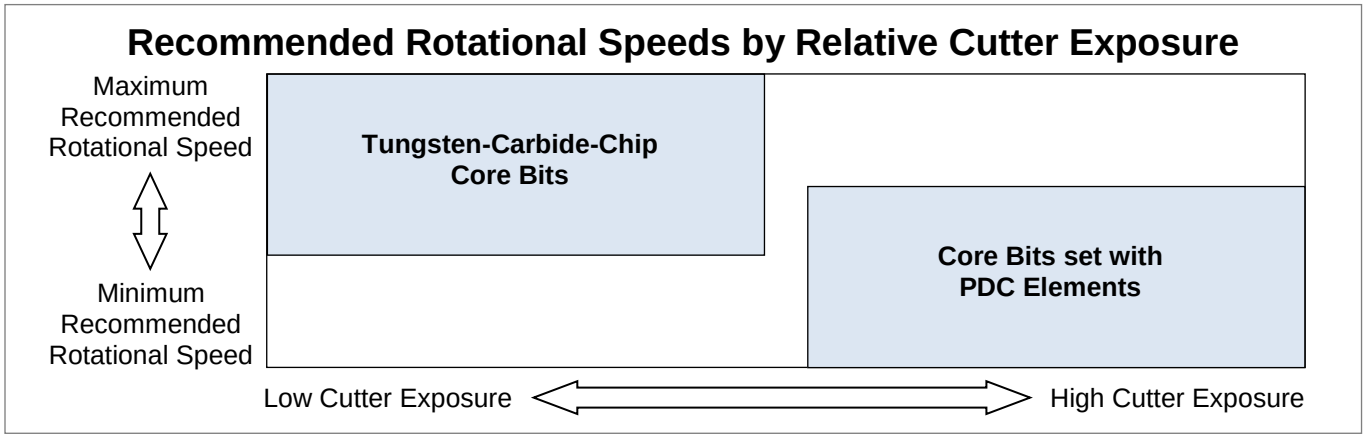
DIMATEC INC.

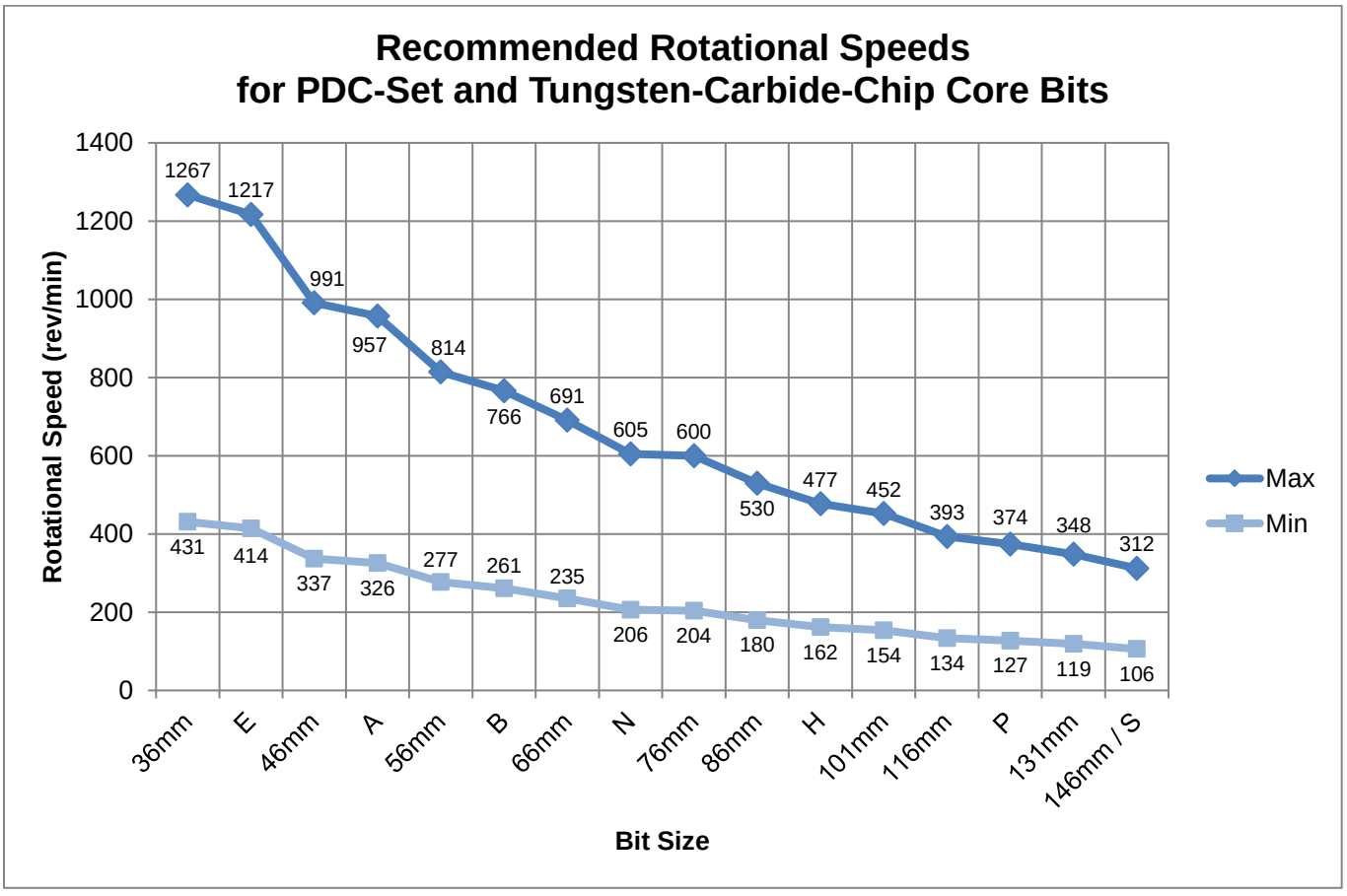
Operating Parameters: Rotational Speed for PDC-Set and Tungsten-Carbide-Chip Core Bits

General guidelines for the determination of rotational speed

A peripheral speed of **0.8 to 2.4 metres/second** (2.7 to 7.8 feet/second) measured on the outside diameter of the bit crown will often provide an acceptable rate of penetration (ROP).

In general, rotational speeds approaching the MINIMUM recommendation should be applied for PDC-set bits with a high degree of cutter exposure. Conversely, rotational speeds approaching the MAXIMUM recommendation should be applied for tungsten-carbide-chip bits with a low degree of cutter exposure. This relationship is illustrated in the following chart:





Calculation of rotational speed

The following formulae may be used to determine the required rotational speed (***s***) for any PDC-set or tungsten-carbide-chip core bit:

Imperial system

$$s = \left(\frac{12}{\pi d}\right) p$$

Where:
d = The mean outside diameter of the bit crown measured in **inches**. Normally, this value is considered to be the mid-point of the outside set diameter tolerance.

p = The peripheral speed of the outside diameter of the bit crown measured in **feet per minute**. In order to establish the recommended rotational speed range, it is necessary to perform this calculation twice: Where one calculation is used to determine the minimum recommended rotational speed and the other calculation is used to determine the maximum recommended rotational speed. The value ***p*** is a function of the type of cutting media on the core bit.

For tungsten-carbide-chip core bits, the values of ***p*** are:
280 feet/minute (Minimum) and **470 feet/minute (Maximum)**.

For PCD-set diamond core bits, the values of ***p*** are:
160 feet/minute (Minimum) and **350 feet/minute (Maximum)**.

Metric system

$$s = \left(\frac{1000}{\pi d}\right) p$$

Where:
d = The mean outside diameter of the bit crown measured in **millimetres**. Normally, this value is considered to be the mid-point of the outside set diameter tolerance.

p = The peripheral speed of the outside diameter of the bit crown measured in **metres per minute**. In order to establish the recommended rotational speed range, it is necessary to perform this calculation twice: Where one calculation is used to determine the minimum recommended rotational speed and the other calculation is used to determine the maximum recommended rotational speed. The value ***p*** is a function of the type of cutting media on the core bit.

For tungsten-carbide-chip core bits, the values of ***p*** are:
85 metres/minute (Minimum) and **143 metres/minute (Maximum)**.

For PCD-set core bits, the values of ***p*** are:
49 metres/minute (Minimum) and **107 metres/minute (Maximum)**.

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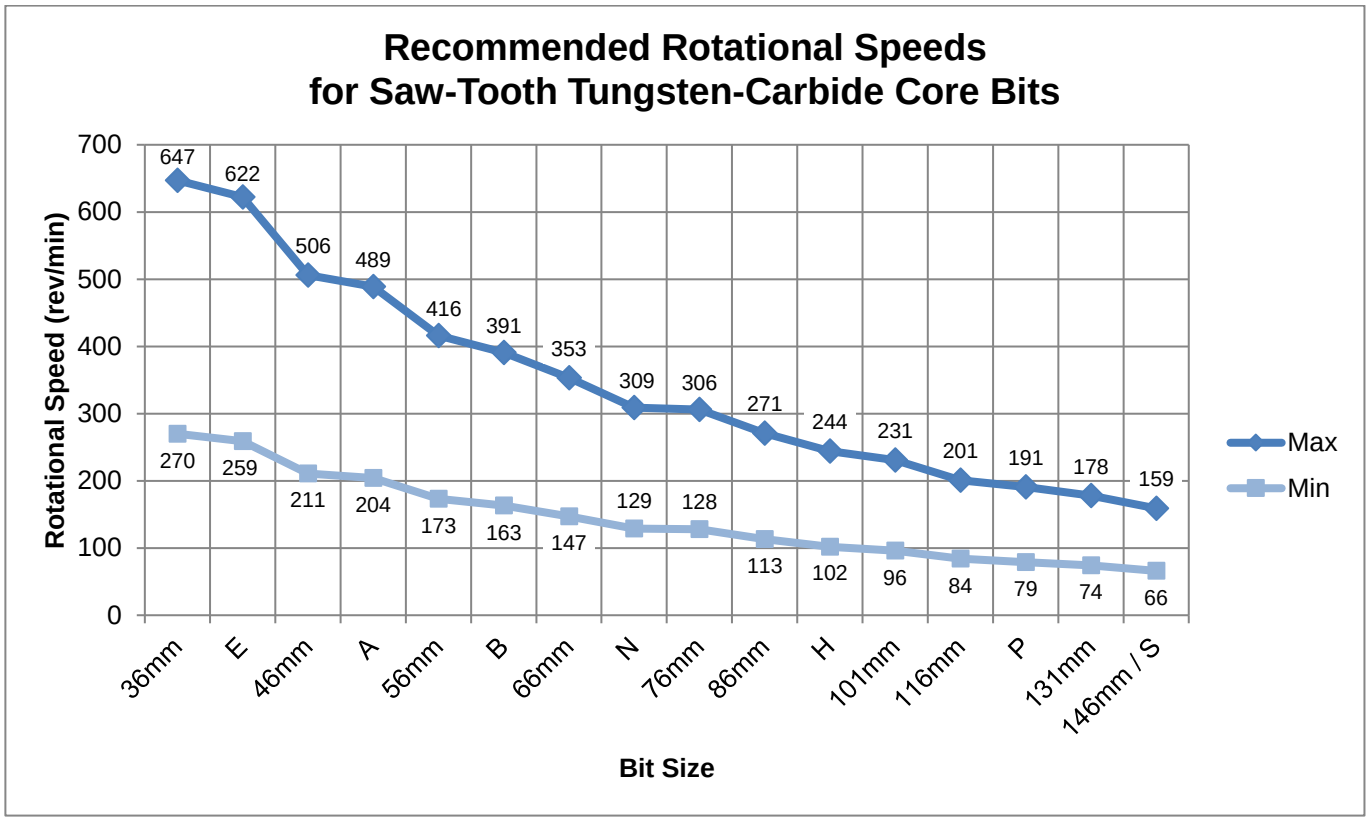
Operating Parameters: Rotational Speed for Saw-Tooth Tungsten-Carbide Core Bits

General guidelines for the determination of rotational speed

A peripheral speed of **0.5 to 1.2 metres/second** (1.7 to 4.0 feet/second) measured on the outside diameter of the bit crown will often provide an acceptable rate of penetration (ROP).



Calculation of rotational speed

The following formulae may be used to determine the required rotational speed (***s***) for any saw-tooth tungsten-carbide core bit:

Imperial system

$$s = \left(\frac{12}{\pi d}\right) p$$

Where:

d = The mean outside diameter of the bit crown measured in **inches**. Normally, this value is considered to be the mid-point of the outside set diameter tolerance.

p = The peripheral speed of the outside diameter of the bit crown measured in **feet per minute**. In order to establish the recommended rotational speed range, it is necessary to perform this calculation twice: Where one calculation is used to determine the minimum recommended rotational speed and the other calculation is used to determine the maximum recommended rotational speed. The value ***p*** is a function of the type of cutting media on the core bit.

For saw-tooth tungsten-carbide core bits, the values of ***p*** are:
100 feet/minute (Minimum) and **240 feet/minute (Maximum)**.

Metric system

$$s = \left(\frac{1000}{\pi d}\right) p$$

Where:

$\boldsymbol{d}$ = The mean outside diameter of the bit crown measured in **millimetres**. Normally, this value is considered to be the mid-point of the outside set diameter tolerance.

$\boldsymbol{p}$ = The peripheral speed of the outside diameter of the bit crown measured in **metres per minute**. In order to establish the recommended rotational speed range, it is necessary to perform this calculation twice: Where one calculation is used to determine the minimum recommended rotational speed and the other calculation is used to determine the maximum recommended rotational speed. The value $\boldsymbol{p}$ is a function of the type of cutting media on the core bit.

For saw-tooth tungsten-carbide core bits, the values of $\boldsymbol{p}$ are:
30 metres/minute (Minimum) and **73 metres/minute (Maximum)**.

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