



SOLIDDRILL³

HOLE-MAKING PRODUCTS

Diameters:
Metric: 4mm - 12mm
11 Common Inch Diameters

Lengths:
3xD
5xD

Shank Sizes:
6, 8, 10 & 12mm

Geometry:
3-Flute
Self-centering

Grade:
IN2205

Materials:
Steel
Cast Iron



New 3-Flute Solid Carbide Drill for 50% Higher Feed Rates!

As part of the new SFeedUP campaign, Ingersoll has introduced a 3-flute solid carbide drill capable of 50% higher feed rates compared to conventional 2-flute drills. Not only does this SolidDrill3 line improve productivity due to the increased number of teeth, it also features a unique edge design that improves machining stability needed for these more aggressive cutting conditions. SolidDrill3 is an ideal, high performance solution for high production drilling applications, especially in steel and cast iron machining.

Features & Benefits:

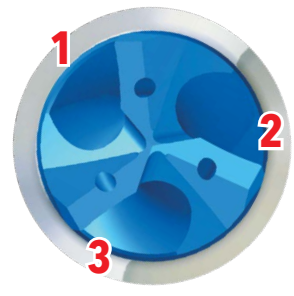
- 3-flute geometry increases productivity by at least 50%
- Self-centering geometry provides precise and accurate holes
- Very high stability in the cut due to its specially designed edge geometry
 - Reinforced cutting edge
 - Side geometry that minimizes heat and reduces cutting forces
- 3 coolant outlet holes to maximum flow and evacuate chips
- New PVD-coated grade IN2205, blue in color for easy identification
- Suitable for steel and cast iron drilling





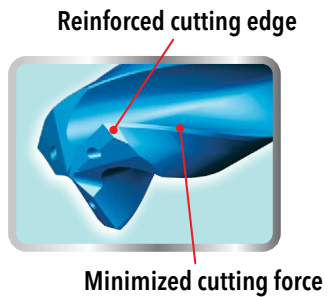
SOLID DRILL³™ FEATURES

Each 3-flute drill is designed with a need to balance core strength with flute depth, both of which are equally important with respect to high feed capability and optimum chip evacuation. Three coolant outlet holes increase the amount of coolant to the end of the drill and help to “push” the chips out of the drill body, even in vertical applications.



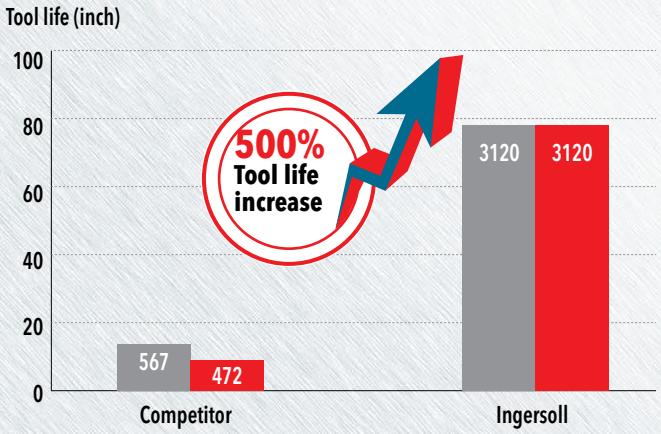
The unique drill geometry features a self-centering cutting edge that produces precision holes without a need for a pilot hole. Each drill also has a reinforced cutting edge at the full diameter and a less aggressive edge geometry up the flank, helping to reduce cutting forces in deeper holes.

All drills are available in new standard grade TT2205 which features a sub-micron substrate for toughness and hardness, and a PVD-TiAlN multi-nano coating with an easily identifiable outer coating layer that provides the blue color. This grade is an excellent choice for steel and cast iron drilling.



SOLID DRILL³™ CASE STUDY 1

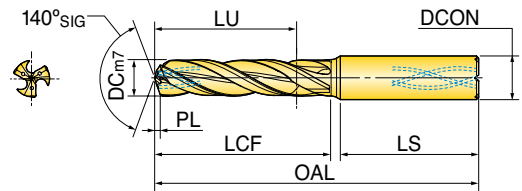
| | | Competitor | Ingersoll |
|------------------|---------|----------------------------------|---------------------|
| Material | | Alloy steel (AISI 4140, 42CrMo4) | |
| Drill | | Ø6, 5xD | FR0600035T7R01 (Ø6) |
| Cutting speed | V (sfm) | 330 | 330 |
| Feed rate | f (ipr) | .016 | .016 |
| Tool life (inch) | | 567, 472 | 3120, 3120 |





SOLID DRILL³™ SERIES FR (3XD)

3-FLUTE SOLID CARBIDE DRILLS WITH COOLANT HOLES

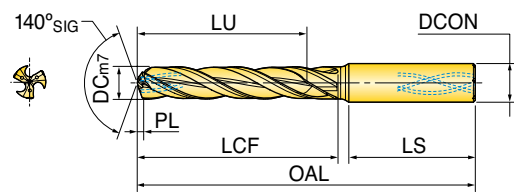


| Part Number | DC Cutting Dia. (mm) | DC Cutting Dia. (inch) | DC Cutting Dia. (fraction) | PL Point Length (mm) | LU Usable Length (mm) | LCF Chip Flute Length (mm) | LS Shank Length (mm) | OAL Overall Length (mm) | DCON Shank Diameter (mm) | Grade | IN2505 |
|----------------|----------------------|------------------------|----------------------------|----------------------|-----------------------|----------------------------|----------------------|-------------------------|--------------------------|-------|--------|
| FR0397017T7R01 | 3.97 | 0.1563 | 5/32" | 0.80 | 17 | 25 | 35 | 66 | 6 | • | |
| FR0400017T7R01 | 4.00 | 0.1575 | - | 0.82 | 17 | 25 | 35 | 66 | 6 | • | |
| FR0450017T7R01 | 4.50 | 0.1772 | - | 0.88 | 17 | 25 | 35 | 66 | 6 | • | |
| FR0476017T7R01 | 4.76 | 0.1875 | 3/16" | 0.90 | 17 | 25 | 35 | 66 | 6 | • | |
| FR0500020T7R01 | 5.00 | 0.1969 | - | 0.96 | 20 | 29 | 36 | 66 | 6 | • | |
| FR0510020T7R01 | 5.10 | 0.2008 | - | 0.98 | 20 | 29 | 36 | 66 | 6 | • | |
| FR0550020T7R01 | 5.50 | 0.2165 | - | 1.08 | 20 | 29 | 36 | 66 | 6 | • | |
| FR0556020T7R01 | 5.56 | 0.2188 | 7/32" | 1.09 | 20 | 29 | 36 | 66 | 6 | • | |
| FR0600020T7R01 | 6.00 | 0.2362 | - | 1.17 | 20 | 29 | 36 | 66 | 6 | • | |
| FR0635024TOR01 | 6.35 | 0.2500 | 1/4" | 1.20 | 24 | 35 | 36 | 79 | 8 | • | |
| FR0650024TOR01 | 6.50 | 0.2559 | - | 1.26 | 24 | 35 | 36 | 79 | 8 | • | |
| FR0680024TOR01 | 6.80 | 0.2677 | - | 1.29 | 24 | 35 | 36 | 79 | 8 | • | |
| FR0700024TOR01 | 7.00 | 0.2756 | - | 1.35 | 24 | 35 | 36 | 79 | 8 | • | |
| FR0714024TOR01 | 7.14 | 0.2813 | 9/32" | 1.38 | 29 | 42 | 36 | 79 | 8 | • | |
| FR0750029TOR01 | 7.50 | 0.2953 | - | 1.40 | 29 | 42 | 36 | 79 | 8 | • | |
| FR0794029TOR01 | 7.94 | 0.3126 | 5/16" | 1.48 | 29 | 42 | 36 | 79 | 8 | • | |
| FR0800029TOR01 | 8.00 | 0.3150 | - | 1.49 | 29 | 42 | 36 | 79 | 8 | • | |
| FR0850035T1R01 | 8.50 | 0.3346 | - | 1.63 | 35 | 48 | 40 | 89 | 10 | • | |
| FR0860035T1R01 | 8.60 | 0.3386 | - | 1.64 | 35 | 48 | 40 | 89 | 10 | • | |
| FR0873035T1R01 | 8.73 | 0.3438 | 11/32" | 1.65 | 35 | 48 | 40 | 89 | 10 | • | |
| FR0900035T1R01 | 9.00 | 0.3543 | - | 1.72 | 35 | 48 | 40 | 89 | 10 | • | |
| FR0950035T1R01 | 9.50 | 0.3740 | - | 1.75 | 35 | 48 | 40 | 89 | 10 | • | |
| FR0953035T1R01 | 9.53 | 0.3752 | 3/8" | 1.76 | 35 | 48 | 40 | 89 | 10 | • | |
| FR1000035T1R01 | 10.00 | 0.3937 | - | 1.85 | 35 | 48 | 40 | 89 | 10 | • | |
| FR1030040T2R01 | 10.30 | 0.4063 | 13/32" | 1.88 | 40 | 55 | 45 | 102 | 12 | • | |
| FR1050040T2R01 | 10.50 | 0.4134 | - | 1.98 | 40 | 55 | 45 | 102 | 12 | • | |
| FR1100040T2R01 | 11.00 | 0.4331 | - | 2.07 | 40 | 55 | 45 | 102 | 12 | • | |
| FR1111040T2R01 | 11.11 | 0.4375 | 7/16" | 2.08 | 40 | 56 | 45 | 102 | 12 | • | |
| FR1150040T2R01 | 11.50 | 0.4528 | - | 2.12 | 40 | 56 | 45 | 102 | 12 | • | |
| FR1191040T2R01 | 11.91 | 0.4688 | 15/32" | 2.20 | 40 | 56 | 45 | 102 | 12 | • | |
| FR1200040T2R01 | 12.00 | 0.4724 | - | 2.21 | 40 | 56 | 45 | 102 | 12 | • | |



SOLID DRILL³™ SERIES FR (5XD)

3-FLUTE SOLID CARBIDE DRILLS WITH COOLANT HOLES



| Part Number | DC Cutting Dia. (mm) | DC Cutting Dia. (inch) | DC Cutting Dia. (fraction) | PL Point Length (mm) | LU Usable Length (mm) | LCF Chip Flute Length (mm) | LS Shank Length (mm) | OAL Overall Length (mm) | DCON Shank Diameter (mm) | Grade | IN2505 |
|----------------|----------------------|------------------------|----------------------------|----------------------|-----------------------|----------------------------|----------------------|-------------------------|--------------------------|-------|--------|
| FR0397029T7R01 | 3.97 | 0.1563 | 5/32" | 0.80 | 29 | 37 | 35 | 74 | 6 | | • |
| FR0400029T7R01 | 4.00 | 0.1575 | - | 0.82 | 29 | 37 | 35 | 74 | 6 | | • |
| FR0450029T7R01 | 4.50 | 0.1772 | - | 0.88 | 29 | 37 | 35 | 74 | 6 | | • |
| FR0476029T7R01 | 4.76 | 0.1875 | 3/16" | 0.90 | 29 | 37 | 35 | 74 | 6 | | • |
| FR0500035T7R01 | 5.00 | 0.1969 | - | 0.96 | 35 | 45 | 36 | 82 | 6 | | • |
| FR0510035T7R01 | 5.10 | 0.2008 | - | 0.98 | 35 | 45 | 36 | 82 | 6 | | • |
| FR0550035T7R01 | 5.50 | 0.2165 | - | 1.08 | 35 | 45 | 36 | 82 | 6 | | • |
| FR0556035T7R01 | 5.56 | 0.2188 | 7/32" | 1.09 | 35 | 45 | 36 | 82 | 6 | | • |
| FR0600035T7R01 | 6.00 | 0.2362 | - | 1.17 | 35 | 45 | 36 | 82 | 6 | | • |
| FR0635043TOR01 | 6.35 | 0.2500 | 1/4" | 1.20 | 43 | 54 | 36 | 91 | 8 | | • |
| FR0650043TOR01 | 6.50 | 0.2559 | - | 1.26 | 43 | 54 | 36 | 91 | 8 | | • |
| FR0680043TOR01 | 6.80 | 0.2677 | - | 1.29 | 43 | 54 | 36 | 91 | 8 | | • |
| FR0700043TOR01 | 7.00 | 0.2756 | - | 1.35 | 43 | 54 | 36 | 91 | 8 | | • |
| FR0714043TOR01 | 7.14 | 0.2813 | 9/32" | 1.38 | 43 | 54 | 36 | 91 | 8 | | • |
| FR0750043TOR01 | 7.50 | 0.2953 | - | 1.40 | 43 | 54 | 36 | 91 | 8 | | • |
| FR0794043TOR01 | 7.94 | 0.3126 | 5/16" | 1.48 | 43 | 54 | 36 | 91 | 8 | | • |
| FR0800043TOR01 | 8.00 | 0.3150 | - | 1.49 | 43 | 54 | 36 | 91 | 8 | | • |
| FR0850049T1R01 | 8.50 | 0.3346 | - | 1.63 | 49 | 62 | 40 | 103 | 10 | | • |
| FR0860049T1R01 | 8.60 | 0.3386 | - | 1.64 | 49 | 62 | 40 | 103 | 10 | | • |
| FR0873049T1R01 | 8.73 | 0.3438 | 11/32" | 1.65 | 49 | 62 | 40 | 103 | 10 | | • |
| FR0900049T1R01 | 9.00 | 0.3543 | - | 1.72 | 49 | 62 | 40 | 103 | 10 | | • |
| FR0950049T1R01 | 9.50 | 0.3740 | - | 1.75 | 49 | 62 | 40 | 103 | 10 | | • |
| FR0953049T1R01 | 9.53 | 0.3752 | 3/8" | 1.76 | 49 | 62 | 40 | 103 | 10 | | • |
| FR1000049T1R01 | 10.00 | 0.3937 | - | 1.85 | 49 | 62 | 40 | 103 | 10 | | • |
| FR1030056T2R01 | 10.30 | 0.4063 | 13/32" | 1.88 | 56 | 71 | 45 | 118 | 12 | | • |
| FR1050056T2R01 | 10.50 | 0.4134 | - | 1.98 | 56 | 71 | 45 | 118 | 12 | | • |
| FR1100056T2R01 | 11.00 | 0.4331 | - | 2.07 | 56 | 71 | 45 | 118 | 12 | | • |
| FR1111056T2R01 | 11.11 | 0.4375 | 7/16" | 2.08 | 56 | 72 | 45 | 118 | 12 | | • |
| FR1150056T2R01 | 11.50 | 0.4528 | - | 2.12 | 56 | 72 | 45 | 118 | 12 | | • |
| FR1191056T2R01 | 11.91 | 0.4688 | 15/32" | 2.20 | 56 | 72 | 45 | 118 | 12 | | • |
| FR1200056T2R01 | 12.00 | 0.4724 | - | 2.21 | 56 | 72 | 45 | 118 | 12 | | • |



SOLID DRILL³ OPERATING GUIDELINES

| ISO | Material | Condition | Tensile Strength (N/mm ²) | Hardness HB | Material Group No | Cutting Speed Vc (sfm) | Feed vs. Drill Diameter (ipr) | | | | | |
|-----|--|-----------------------|---------------------------------------|-------------|-------------------|------------------------|-------------------------------|-------------|-------------|-------------|-------------|-------------|
| | | | | | | | Ø4-5mm | Ø5.1-6mm | Ø6.1-8mm | Ø8.1-10mm | Ø10.1-12mm | |
| P | Non-alloy steel, cast steel, free cutting steel | <0.25%C | Annealed | 420 | 125 | 1 | 260-460 | 0.006-0.010 | 0.008-0.014 | 0.010-0.018 | 0.012-0.022 | 0.014-0.024 |
| | | >=0.25%C | Annealed | 650 | 190 | 2 | 260-430 | 0.006-0.010 | 0.008-0.014 | 0.010-0.018 | 0.012-0.022 | 0.014-0.024 |
| | | <0.55%C | Quenched and tempered | 850 | 250 | 3 | 260-395 | 0.006-0.010 | 0.008-0.014 | 0.010-0.018 | 0.012-0.022 | 0.014-0.024 |
| | | >=0.55%C | Annealed | 750 | 220 | 4 | 225-365 | 0.006-0.010 | 0.008-0.014 | 0.010-0.018 | 0.012-0.022 | 0.014-0.024 |
| | | | Quenched and tempered | 1000 | 300 | 5 | 160-300 | 0.006-0.010 | 0.008-0.014 | 0.010-0.018 | 0.012-0.022 | 0.014-0.024 |
| | Low alloy steel and cast steel (Less than 5% of alloying elements) | Annealed | 600 | 200 | 6 | 260-395 | 0.006-0.010 | 0.008-0.014 | 0.010-0.016 | 0.012-0.020 | 0.014-0.022 | |
| | | Quenched and tempered | 930 | 275 | 7 | 225-365 | 0.006-0.010 | 0.008-0.014 | 0.010-0.016 | 0.012-0.020 | 0.014-0.022 | |
| | | | 1000 | 300 | 8 | 160-300 | 0.006-0.010 | 0.008-0.014 | 0.010-0.016 | 0.012-0.020 | 0.014-0.022 | |
| | High alloy steel, cast steel and tool steel | Annealed | 680 | 200 | 10 | 160-300 | 0.006-0.008 | 0.008-0.012 | 0.010-0.014 | 0.012-0.018 | 0.014-0.020 | |
| | | Quenched and tempered | 1100 | 325 | 11 | 130-265 | 0.006-0.008 | 0.008-0.012 | 0.010-0.014 | 0.012-0.018 | 0.014-0.020 | |
| K | Gray cast iron (GG) | Ferritic/pearlitic | | 180 | 15 | 260-460 | 0.008-0.012 | 0.010-0.018 | 0.014-0.022 | 0.016-0.024 | 0.018-0.026 | |
| | | Pearlitic | | 260 | 16 | 225-395 | 0.008-0.012 | 0.010-0.018 | 0.014-0.022 | 0.016-0.024 | 0.018-0.026 | |
| | Cast iron nodular (GGG) | Ferritic | | 160 | 17 | 260-395 | 0.008-0.012 | 0.008-0.016 | 0.012-0.020 | 0.014-0.022 | 0.016-0.024 | |
| | | Pearlitic | | 250 | 18 | 225-365 | 0.008-0.012 | 0.008-0.016 | 0.012-0.020 | 0.014-0.022 | 0.016-0.024 | |
| | Malleable cast iron | Ferritic | | 130 | 19 | 260-395 | 0.008-0.012 | 0.008-0.016 | 0.012-0.020 | 0.014-0.022 | 0.016-0.024 | |
| | | Pearlitic | | 230 | 20 | 225-365 | 0.008-0.012 | 0.008-0.016 | 0.012-0.020 | 0.014-0.022 | 0.016-0.024 | |

Steel Cast iron

