



## List 6560 - A Brand ADO: 40D List 6570 - A Brand ADO: 50D

### General Drilling Operations

Work Material		Carbon Steels, Mild Steels 1010, 1050, 12L14		Alloy Steels 4140, 4130		Stainless Steels 300SS, 400SS, 17-4PH		Cast Iron	
Drilling Speed		195-295 SFM		195-295 SFM		130-195 SFM		195-295 SFM	
Drill Dia.		Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR
mm	Inch								
3	-	7,500	0.002-0.005	7,500	0.002-0.005	5,300	0.002-0.005	7,500	0.002-0.005
-	1/8	7,100	0.003-0.005	7,100	0.003-0.005	5,000	0.003-0.005	7,100	0.003-0.005
4	-	5,600	0.003-0.006	5,600	0.003-0.006	4,000	0.003-0.006	5,600	0.003-0.006
-	3/16	4,700	0.004-0.008	4,700	0.004-0.008	3,300	0.004-0.008	4,700	0.004-0.008
6	-	3,700	0.005-0.009	3,700	0.005-0.009	2,700	0.005-0.009	3,700	0.005-0.009
-	1/4	3,500	0.005-0.010	3,500	0.005-0.010	2,500	0.005-0.010	3,500	0.005-0.010
8	-	2,800	0.006-0.011	2,800	0.006-0.011	2,000	0.006-0.011	2,800	0.006-0.011
-	3/8	2,400	0.008-0.013	2,400	0.008-0.013	1,700	0.008-0.013	2,400	0.008-0.013
10	-	2,300	0.008-0.014	2,300	0.008-0.014	1,600	0.008-0.014	2,300	0.008-0.014

### General Drilling Operations

Work Material		Ductile Cast Iron		Special Alloy Steels, Hardened Steels			
Hardness				26-30 HRC		30-34 HRC	
Drilling Speed		165-260 SFM		165-260 SFM		130-230 SFM	
Drill Dia.		Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR
mm	Inch						
3	-	6,400	0.002-0.005	6,400	0.002-0.005	5,300	0.002-0.004
-	1/8	6,000	0.003-0.005	6,000	0.003-0.005	5,000	0.003-0.005
4	-	4,800	0.003-0.006	4,800	0.003-0.006	4,000	0.003-0.006
-	3/16	4,000	0.004-0.008	4,000	0.004-0.008	3,300	0.004-0.007
6	-	3,200	0.005-0.009	3,200	0.005-0.009	2,700	0.005-0.008
-	1/4	3,000	0.005-0.010	3,000	0.005-0.010	2,500	0.005-0.009
8	-	2,400	0.006-0.011	2,400	0.006-0.011	2,000	0.006-0.009
-	3/8	2,000	0.008-0.013	2,000	0.008-0.013	1,700	0.008-0.011
10	-	1,900	0.008-0.014	1,900	0.008-0.014	1,600	0.008-0.012

**Note:**

- The indicated speeds and feeds are for drilling with **water-soluble oil** or **MQL**. (We do not recommend mist drilling with stainless steels.)
- Water-soluble oil (20-30 times dilution) is recommended.
- When using non-water-soluble oil, set the cutting speed between 70-100% of the lowest limit.
- Make a pilot hole before deep drilling; recommended operation is on pages 310-311.
- A clogged oil hole can lead to breakage. Make sure that a filter is attached to the oil feeder.
- Peck drilling of 1D-2D is strongly recommended in high hardness materials.
- If, after piloting with ADO-5D and drilling with ADO-40D/50D, hole condition or accuracy is poor or machining is difficult, ADO-20D/30D may be used as an intermediate drilling step. This three-step process may improve accuracy and condition as well as permit more aggressive parameters than stated above.

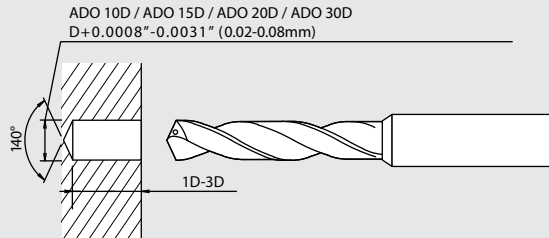




## Deep Hole Operational Guidelines

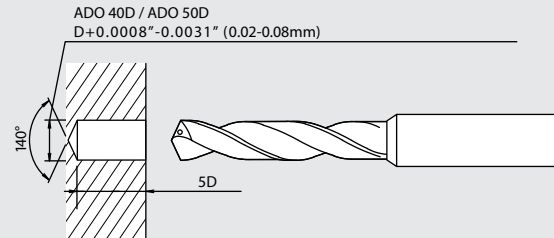
### 1. Make a pilot hole. (For 10-30D)

For a pilot hole, select 0.0008"-0.0031" (0.02-0.08mm) larger size drill than ADO 10D, ADO 15D, ADO 20D and ADO 30D. If the needed pilot drill size is not available, we recommend using the same diameter drill from ADO 3D.



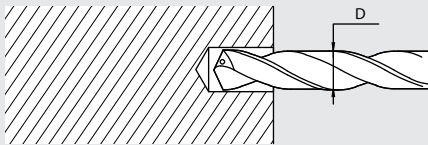
### 1. Make a pilot hole. (For 40 & 50D)

For a pilot hole, select 0.0008"-0.0031" (0.02-0.08mm) larger size drill than ADO 40D and ADO 50D. If the needed pilot drill size is not available, we recommend using the same diameter drill from ADO 5D or ADO-TRS.

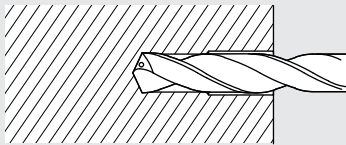


## Remaining Steps are the Same for 10-50D

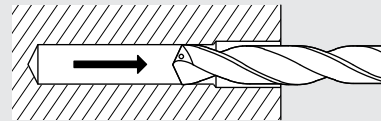
### 2. Insert the extra long drill into a pilot hole with zero or low revolution (below 500rpm).



### 3. Increase the revolution to the designated speed and start drilling.



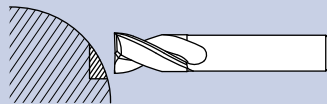
### 4. After drilling, move the drill away from the bottom of the hole, then reduce its speed while pulling it out of the hole.



Make sure to use an internal coolant supply when drilling.

### Drilling a Curved Surface

When working on a curved surface, we recommend piloting with A Brand ADF flat drill.



### Improve Accuracy & Hole Condition

If, after piloting with ADO-5D and drilling with ADO-40D/50D, hole condition or accuracy is poor or machining is difficult, ADO-20D/30D may be used as an intermediate drilling step. This three-step process may improve accuracy and condition as well as permit more aggressive parameters.

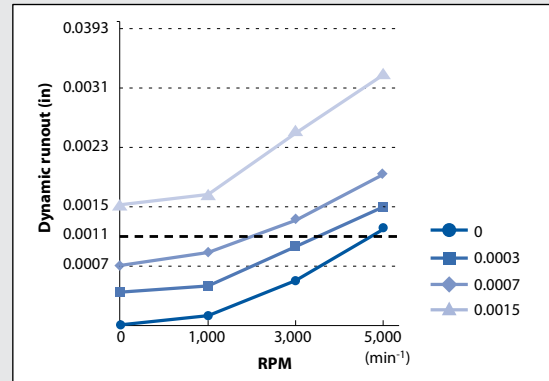




## Stable Drilling with Long Drills

The runout of a gripped cutting tool increases with the speed, as shown in the graph on the right. To ensure a higher level of work stability, OSG recommends making +0.0008"-0.0031" (+0.02-0.08mm) pilot holes and inserting long drills stopped or at low speeds.

The reason for this is made evident in the graph on the right. Increasing the speed increases the dynamic runout, posing a higher risk of the drill not fitting properly in the pilot hole. Therefore, reducing the speed and minimizing static runout is the recommended drilling method for long drills.



Static runout RPM (min <sup>-1</sup> )	0"	0.0003"	0.0007"	0.0015"
1,000	0.0001	0.0005	0.0009	0.0018
3,000	0.0005	0.0010	0.0014	0.0025
5,000	0.0012	0.0015	0.0019	0.0034

Dynamic runout values for Ø6mm 30xD drill.

