



Defyer™ DT Series

The Weatherford Defyer DT is a drillable casing bit designed for drilling with casing or liners in soft to medium formations with confined compressive strengths up to 7,000 psi (48.3 MPa). These formations include gumbo, shales, claystones, unconsolidated sands, chalk, shaley sandstones, soft evaporites, and soft siltstones. The Defyer DT is rated to 250°F (121°C).

The innovative design of the DT series includes an aluminum nose and polycrystalline-diamond-compact (PDC) cutters that are optimally mounted on the face of the tool to maximize drilling efficiency and durability.

Capable of running on most standard casing or liner systems, the Defyer DT bit is available in sizes that range from 4-1/2 to 30 in. and models that include 3, 4, or 5 blades. The 5-blade models feature higher diamond content on the nose section to drill longer sections than 3-blade and 4-blade models. The 5-blade Defyer DT bit is available in sizes that suit standard casing or liner systems.

Defyer DT bits can be drilled out with any standard oilfield drill bit without compromising the cutting structure. A range of interchangeable, drillable nozzles is available to ensure optimal hydraulic performance.



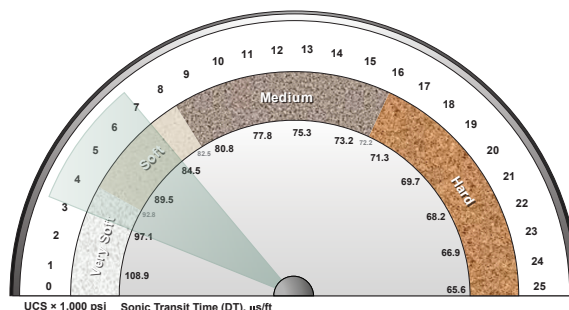
Photo depicts the 13 3/8- x 17-in. Defyer DT306.



Photo depicts the 9 5/8- x 12 1/4-in. Defyer DT406.

Applications

- Drilling with casing in soft to medium-soft formations
- Drilling or reaming with surface or intermediate casing strings
- Drilling short intervals in conjunction with a drilling-with-liner (DwL™) system
- Extending existing hole sections by drilling with casing or liner through hazards such as pressure transitions or depleted zones
- Drilling through cement and lost-circulation-material plugs that have been set to isolate losses, pressure, or unstable holes
- Reaming casing or liner through unstable hole conditions, excessive borehole caving, or in highly reactive swelling clay or mobile salt formations
- Drilling deviated hole sections in soft formations (nudge-type Defyer DT)
- Improving hole quality by using the backreaming feature to ream swelling formations and tight spots



Defyer DT Series
Unconfined Compressive Strength (UCS) Range
3,000 to 7,000 psi



Photo depicts the 24- x 27-in., 5-blade Defyer DT506.



Defyer™ DT Series

Features, Advantages, and Benefits



Thermally stable polycrystalline (TSP) diamonds measuring 6 mm are pressed into the aluminum to provide a durable cutting structure. Small cutters are easily drilled out and removed from the hole with drilling fluid.

The high-velocity oxy fuel (HVOF) hardfacing in the aluminum surface increases durability and enhances retention of the cutting structure.



Interchangeable, drillable nozzles increase hydraulic horsepower at the bit to optimize hydraulics and improve penetration rates. Copper nozzles are standard; however for increased durability, they can be replaced with ceramic nozzles.



The fully drillable center nose section is made of aircraft-grade aluminum. It enables rapid, damage-free drillout with conventional PDC bits, roller-cone bits, or another Defyer assembly, which eliminates the need for a special drillout run or retrieval of the bottomhole assembly after drilling to total depth.

The diamond cutting structure has high-standoff fishtail blades and a wave cutting profile. This design enhances cutting efficiency, rate of penetration, and durability to save time, extend drilling distances, and reduce hole problems.

The PDC cutting structure extends outside the drift diameter of the casing to improve wear resistance and cutting efficiency. It also allows setting of casing and liner on bottom, even in difficult hole conditions.

The DT series has a threaded connection between the aluminum nose and steel body/shoulder.

Gauge pads with tungsten carbide maintain gauge protection under severe hole conditions and reduce the potential for undergauge hole. This design facilitates backreaming when drilling in tight hole conditions.

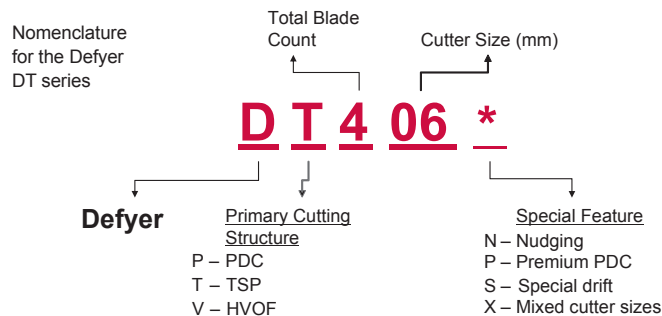


Defyer™ DT Series

Specifications

General Data

Nominal size (in.)	4-1/2 × 6	5 × 6	5 × 6-1/8	5-1/2 × 6-1/2	5-1/2 × 7-7/8
Defyer code	DT306-044060	DT306-050060	DT306-050061	DT306-054064	DT306-054077
Casing size (in., mm)	4-1/2 114.3	5 127.0		5-1/2 139.7	
Casing weight and grade	As requested				
Connection					
OD (in., mm)	6 152.4	6 152.4	6-1/8 155.6	6-1/2 165.1	7-7/8 200.0
Tool length (ft, m)	1.62 0.49	1.63 0.50	1.62 0.49	1.80 0.55	2.00 0.61
Tool weight (lb, kg)	37 17	44 20		51 23	68 31
Number of blades	3				
Number of nozzles					
Nozzle type	Type 100 and 200				
Cutting structure (drillable blade)	6-mm TSP				
Cutting structure (on casing body)	PDC				
Gauge length (in., mm)	8.53 216.7	5.43 137.8	5.36 136.1	5.76 146.3	
Gauge protection	Tungsten carbide briquettes				
Total flow area	Dependent on nozzle selection				
Junk slot area (in. ² , cm ²)	7.4 47.9	4.8 30.7	5.7 37.0	4.7 30.1	13.9 89.7
Equivalent casing grade (ksi, MPa)	110 758				
Nose material	Drillable aluminum alloy				





Defyer™ DT Series

Specifications (continued)

Nominal size (in.)	7 × 8-1/4	7 × 8-3/8	7 × 8-1/2	7-5/8 × 8-1/2	7-5/8 × 8-1/2	7-5/8 × 8-7/16	7-5/8 × 9-7/8	7-5/8 × 9-7/8
Defyer code	DT306-070082	DT306-070083	DT306-070084	DT306-075084	DT406-075084	DT306-075084	DT306-075097	DT406-075097
Casing size (in., mm)	7 177.8				7-5/8 193.7			
Casing weight and grade	As requested							
Connection	As requested							
OD (in., mm)	8-1/4 209.6	8-3/8 212.7	8-1/2 215.9		8-7/16 214.3		9-7/8 250.8	
Tool length (ft, m)	1.93 0.59	1.90 0.58		1.92 0.59		1.90 0.58	1.92 0.59	
Tool weight (lb, kg)	92 42	94 43	97 44	108 49		110 50	123 56	115 52
Number of blades	3				4		3	
Number of nozzles	3				4		3	
Nozzle type	Type 100 and 200							
Cutting structure (drillable blade)	6-mm TSP							
Cutting structure (on casing body)	PDC							
Gauge length (in., mm)	5.83 148.1	5.77 146.6	5.76 146.3	5.70 144.8	5.76 146.3	5.51 140.0	5.50 140.0	5.34 135.6
Gauge protection	Tungsten carbide briquettes							
Total flow area	Dependent on nozzle selection							
Junk slot area (in. ² , cm ²)	8.3 53.9	6.7 43.4	7.6 48.8	6.9 44.8	4.6 29.6	5.8 37.7	23.0 148.1	19.9 128.2
Equivalent casing grade (ksi, MPa)	110 and 125 758 and 862				110 758			
Nose material	Drillable aluminum alloy							



Defyer™ DT Series

Specifications (continued)

Nominal size (in.)	8-5/8 × 10-5/8	9-3/8 × 9-7/10	9-5/8 × 10-5/8	9-5/8 × 10-7/8	9-5/8 × 11-7/8	9-5/8 × 12	9-5/8 × 12
Defyer code	DT406-085105	DT406-093096	DT406-095105	DT406-095107	DT306-095117	DT306-095120	DT406-095120
Casing size (in., mm)	8-5/8 219.1	9-3/8 238.1	9-5/8 244.5				
Casing weight and grade	As requested						
Connection							
OD (in., mm)	10-5/8 269.8	9.7 246.4	10-5/8 269.8	10-7/8 269.8	11-7/8 301.6	12 304.8	
Tool length (ft, m)	2.12 0.65	1.94 0.59	2.05 0.63		2.12 0.65		2.05 0.63
Tool weight (lb, kg)	143 65	134 61	154 70	158 72	154 70		176 80
Number of blades	4				3		4
Number of nozzles							
Nozzle type	Type 100 and 200						
Cutting structure (drillable blade)	6-mm TSP						
Cutting structure (on casing body)	PDC						
Gauge length (in., mm)	5.91 150.0	6.47 164.4	6.54 166.2	6.39 162.2	6.19 157.2	6.54 166.1	5.74 145.7
Gauge protection	Tungsten carbide briquettes						
Total flow area	Dependent on nozzle selection						
Junk slot area (in. ² , cm ²)	9.1 58.7	7.6 47.5	11.2 72.3	12.6 81.1	17.4 112.2	23.5 151.6	24.6 159.0
Equivalent casing grade (ksi, MPa)	110 758						
Nose material	Drillable aluminum alloy						



Defyer™ DT Series

Specifications (continued)

Nominal size (in.)	9-5/8 × 12-1/4	9-5/8 × 12-1/4	9-5/8 × 12-1/4	9-7/8 × 10-5/8	10-3/4 × 12	10-3/4 × 13-1/2
Defyer code	DT306-095122	DT306-095122	DT406-095122	DT406-097105	DT306-106120	DT306-106134
Casing size (in., mm)	9-5/8 244.5		9-7/8 250.8		10-3/4 273.1	
Casing weight and grade	As requested					
Connection	As requested					
OD (in., mm)	12-1/4 311.2		10-5/8 269.8		12 304.8	13-1/2 342.9
Tool length (ft, m)	2.12 0.65		2.05 0.63		2.21 0.68	2.08 0.63
Tool weight (lb, kg)	165 75		183 83	154 70	215 98	243 110
Number of blades	3		4		3	
Number of nozzles	3	6	4		3	6
Nozzle type	Type 100 and 200					
Cutting structure (drillable blade)	6-mm TSP					
Cutting structure (on casing body)	PDC					
Gauge length (in., mm)	6.42 165.6		5.76 146.3	6.57 166.8	6.35 161.4	6.15 156.2
Gauge protection	Tungsten carbide briquettes					
Total flow area	Dependent on nozzle selection					
Junk slot area (in. ² , cm ²)	27.2 175.6		28.2 182.1	11.2 72.3	13.7 88.4	24.5 157.8
Equivalent casing grade (ksi, MPa)	125 862		65 448		110 758	
Nose material	Drillable aluminum alloy					



Defyer™ DT Series

Specifications (continued)

Nominal size (in.)	11-3/4 × 12-1/4 ^a	11-7/8 × 12-1/4	13-3/8 × 15-1/2	13-3/8 × 16	13-3/8 × 16	13-3/8 × 17	13-3/8 × 17	13-3/8 × 17
Defyer code	DT306-116122	DT306-117122	DT306-133154	DT306-133160	DT306N-133160	DT306-133170	DT406-133170	DT506-133170
Casing size (in., mm)	11-3/4 298.5	11-7/8 301.6	13-3/8 339.7					
Casing weight and grade	As requested							
Connection	As requested							
OD (in., mm)	12-1/4 311.1	15-1/2 393.7	16 406.4			17 431.8		
Tool length (ft, m)	2.08 0.63	2.59 0.79		2.27 0.69		2.59 0.79		2.66 0.81
Tool weight (lb, kg)	243 110	380 173	388 176			339 154	372 169	407 185
Number of blades	3						4	5
Number of nozzles	6						8	7
Nozzle type	Type 100 and 200							
Cutting structure (drillable blade)	6-mm TSP							
Cutting structure (on casing body)	PDC							
Gauge length (in., mm)	6.74 171.2	9.25 234.8	9.02 229.1	3.77 95.8	8.55 211.1	8.53 216.7	7.01 178.0	
Gauge protection	Tungsten carbide briquettes							
Total flow area	Dependent on nozzle selection							
Junk slot area (in. ² , cm ²)	7.4 47.9	23.8 153.8	29.2 188.3	48.3 311.7	49.1 317.0	48.4 312.5	44.8 288.9	
Equivalent casing grade (ksi, MPa)	110 758	110 and 125 758 and 862			110 758			
Nose material	Drillable aluminum alloy							

^aS13 (with baffle plate) version available.



Defyer™ DT Series

Specifications (continued)

Nominal size (in.)	13-3/8 × 17-1/2	13-3/8 × 17-1/2	16 × 17-1/2	16 × 19-1/2	18-5/8 × 21	18-5/8 × 23	20 × 23-7/8
Defyer code	DT306-133174	DT406-133174	DT306-160174	DT306-160194	DT506-185210	DT506-185230	DT306-200237W
Casing size (in., mm)	13-3/8 339.7		16 406.4		18-5/8 473.1		20 508.0
Casing weight and grade	As requested						
Connection	As requested						
OD (in., mm)	17-1/2 444.5		19-1/2 495.3		21 533.4	23 584.2	23-7/8 606.4
Tool length (ft, m)	2.59 0.79		2.64 0.81	2.59 0.79		2.64 0.80	2.59 0.79
Tool weight (lb, kg)	375 170	379 172	390 177	434 197	548 249	592 268	550 250
Number of blades	3	4	3		5		3
Number of nozzles	6	8	6		12	10	9
Nozzle type	Type 100 and 200						
Cutting structure (drillable blade)	6-mm TSP						
Cutting structure (on casing body)	PDC						
Gauge length (in., mm)	8.32 211.3	8.35 212.1	9.56 242.8	8.32 211.3	8.52 216.4	7.20 182.9	7.41 188.2
Gauge protection	Tungsten carbide briquettes						
Total flow area	Dependent on nozzle selection						
Junk slot area (in. ² , cm ²)	59.7 385.2	59.2 382.1	18.8 121.4	50.2 323.7	33.2 214.3	997.8 631.0	75.7 488.5
Equivalent casing grade (ksi, MPa)	110 758				65 448		
Nose material	Drillable aluminum alloy						



Defyer™ DT Series

Specifications (continued)

Nominal size (in.)	20 × 24	20 × 24	20 × 24	20 × 24
Defyer code	DT306-200240	DT406-200240W	DT506-200240	DT506-200240W
Casing size (in., mm)	20 609.6			
Casing weight and grade	As requested			
Connection				
OD (in., mm)	24 609.6			
Tool length (ft, m)	2.58 0.79	2.44 0.74	2.64 0.80	1.98 0.60
Tool weight (lb, kg)	550 250	595 270	638 290	
Number of blades	3	4	5	
Number of nozzles	9	12	10	
Nozzle type	Type 100 and 200			
Cutting structure (drillable blade)	6-mm TSP			
Cutting structure (on casing body)	PDC			
Gauge length (in., mm)	7.33 186.2		6.79 172.4	8.22 208.7
Gauge protection	Tungsten carbide briquettes			
Total flow area	Dependent on nozzle selection			
Junk slot area (in. ² , cm ²)	79.9 515.1	74.3 479.1	65.9 425.0	
Equivalent casing grade (ksi, MPa)	65 448			
Nose material	Drillable aluminum alloy			



Defyer™ DT Series

Specifications (continued)

Nominal size (in.)	20 × 26		20 × 26 ^a		20 × 27		24 × 27	
Defyer code	DT306-200260	DT306-200260W	DT506-200260	DT506-200260W	DT306-200270W	DT506-240270		
Casing size (in., mm)	20 660.4					24 609.6		
Casing weight and grade	As requested							
Connection								
OD (in., mm)	26 660.4				27 655.8			
Tool length (ft, m)	2.58 0.79	2.03 0.62	2.64 0.80	2.08 0.63	2.03 0.62	1.89 0.58		
Tool weight (lb, kg)	638 290	616 280	682 310	660 300	693 315	638 290		
Number of blades	3		5		3		5	
Number of nozzles	9		10		9		13	
Nozzle type	Type 100 and 200							
Cutting structure (drillable blade)	6-mm TSP							
Cutting structure (on casing body)	PDC							
Gauge length (in., mm)	6.91 175.6	8.03 204.1	7.41 188.3		6.33 160.7	7.95 202.0		
Gauge protection	Tungsten carbide briquettes							
Total flow area	Dependent on nozzle selection							
Junk slot area (in. ² , cm ²)	113.4 731.4	91.3 589.0	98.6 636.4		90.0 580.9	86.0 555.1		
Equivalent casing grade (ksi, MPa)	65 448							
Nose material	Drillable aluminum alloy							

^aS13 (with baffle plate) version available.



Defyer™ DT Series

Specifications (continued)

Recommended Operating Parameters

Nominal size (in.)	5 × 6	5 × 6-1/8	7 × 8-1/2	7-5/8 × 8-1/2	7-5/8 × 9-7/8
Minimum rotary speed (rpm)	40				
Maximum rotary speed (rpm)	120				
Minimum WOB (lb, kg)	2,000 907		3,000 1,361		
Maximum WOB (lb, kg)	8,000 3,628	9,000 4,082	13,000 5,897		15,000 6,804
Minimum flow rate (gal/min, L/min)	60 227	65 246	120 454	75 284	200 757
Maximum flow rate (gal/min, L/min)	110 416	130 492	240 908	140 530	400 1,514
Minimum torque (ft-lb, N•m)	500 678		1,000 1,356		1,200 1,627
Maximum torque (ft-lb, N•m)	90% of maximum connection makeup torque				

Nominal size (in.)	8-5/8 × 10-5/8	9-5/8 × 12	9-5/8 × 12-1/4	13-3/8 × 16	13-3/8 × 17
Minimum rotary speed (rpm)	40				
Maximum rotary speed (rpm)	120				
Minimum WOB (lb, kg)	4,000 1,814			5,000 2,268	6,000 2,722
Maximum WOB (lb, kg)	16,000 7,257	18,000 8,165	20,000 9,072	24,000 10,886	26,000 11,793
Minimum flow rate (gal/min, L/min)	200 757	250 946	300 1,136	400 1,514	550 2,082
Maximum flow rate (gal/min, L/min)	400 1,514	500 1,893	600 2,271	800 3,028	1,100 4,164
Minimum torque (ft-lb, N•m)	1,200 1,627	1,500 2,034		3,000 4,067	3,500 4,745
Maximum torque (ft-lb, N•m)	90% of maximum connection makeup torque				



Defyer™ DT Series

Specifications (continued)

Nominal size (in.)	18-5/8 × 21	18-5/8 × 21	20 × 24	20 × 26	24 × 27
Minimum rotary speed (rpm)	40		20		
Maximum rotary speed (rpm)	100				80
Minimum WOB (lb, kg)	7,000 3,175		8,000 3,629	9,000 4,082	
Maximum WOB (lb, kg)	32,000 14,515		36,000 16,329	40,000 18,144	45,000 20,412
Minimum flow rate (gal/min, L/min)	500 1,893	700 2,650	900 3,407	1,000 3,785	800 3,028
Maximum flow rate (gal/min, L/min)	900 3,407	1,400 5,300	1,500 5,678		
Minimum torque (ft-lb, N•m)	4,000 5,423				
Maximum torque (ft-lb, N•m)	90% of maximum connection makeup torque				