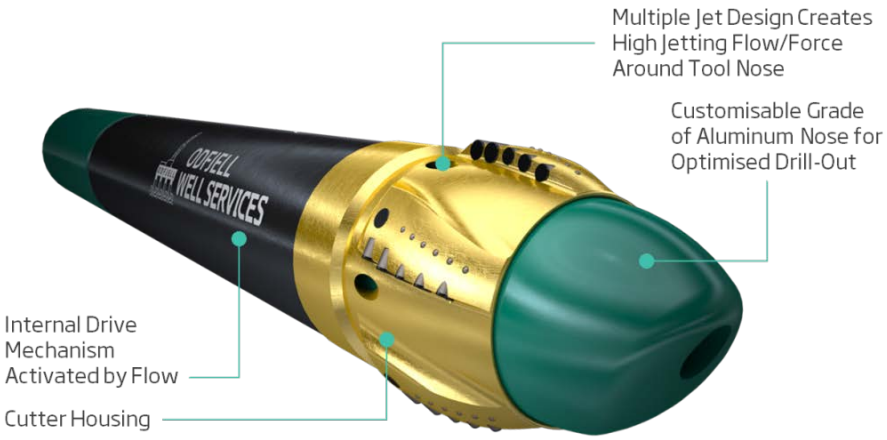
ODFJELL WELL SERVICES
A PART OF ODFJELL DRILLING

Defuse™ High Speed Casing Reamer

The Defuse™ High Speed Casing Reamer is a PDC drillable casing shoe with a reverse impeller drive system to enable hydraulically controlled rotation of the shoe when necessary in order to prevent premature landing of the casing caused by ledges, high dog legs, high frequency wellbore spiralling and other wellbore obstructions. Once resistance is encountered, the pump can be applied to engage the drive mechanism inside the tool, turning it into a high-speed reaming shoe. It is designed to allow cement to be pumped through it, and the cement will receive a shear effect prior to entering the annulus.



Key Benefits

- ✓ Eliminates the risk of stuck casing caused by wellbore imperfections
- ✓ Eliminates time and cost associated with wiper trips & re-runs (up to 2-3 days per offshore well section)
- ✓ Provides total depth assurance

Features

- **Top Sub:** Same grade of steel as the casing being run with a default of P-110
- **Tool Body:** 4140 machine steel with further treatments
- **Internal Drive Mechanism and Nose:** 60, 61, T-6 aircraft Aluminum
- Nose material grade is custom-selected for optimized drill-out using a PDC bit and any drilling assembly
- Available in sizes from 2-7/8" up to 13-5/8"

Applications

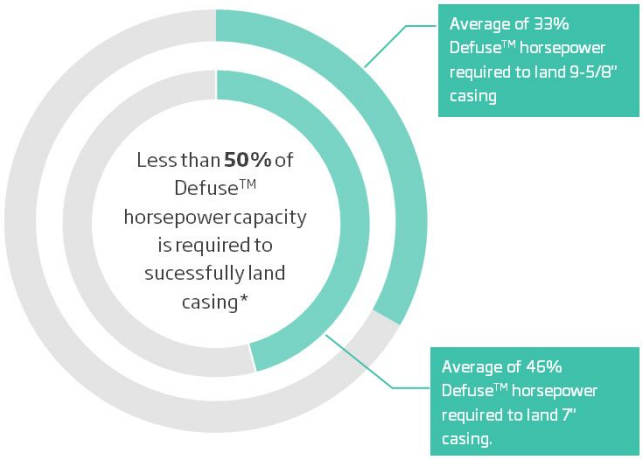
- Running conventional and unconventional Casing, Liner and Tubing
- For ERD application with capable of reaming through High Frequency Wellbore Spiraling
- Workover and intervention operations where the DHSR tool coupled with a Mill head can be deployed on Coiled Tubing to perform functions such as scraping off or milling through scales and rust inside tubing string

Operational Optimization

- Rapid activation when hole problems are encountered
- Hydraulically removes debris ahead of the casing
- Improved wellbore preparation before performing cement job
- Designed for efficient drill-out with PDC bit
- Provides a significant secondary sheer to the cement slurry as it is pumped through the tool
- High speed bearings capable of speeds of +8000 RPM
- For high dog-leg applications with risk of casing string fatigue failures, reaming operation can be performed without a need to rotate the casing string

Tool Efficiency

*Based on average performance metrics;



Tool Specifications

Tool Size	Length	Bladed Diameter	Flow Rate	Speed	Torque	Max. Pressure Drop	Max. Weight	Max. Overpull	Hole Size	Casing/Liner Size
	in. (mm)	in. (mm)	gpm (lpm)	RPM	ft-lbs	psi (kPa)	lbf (kdaN)	lbf (kdaN)	in. (mm)	in. (mm)
450	55.25 (1,403)	5.75+ (146+)	60 - 400 (227 - 1,514)	300+	< 1,600	1,300 (8,964)	23,000 (10.2)	23,000 (10.2)	5.875+ (149+)	4.50+ (114+)
500	55.25 (1,403)	5.75+ (146+)	60 - 400 (227 - 1,514)	300+	< 1,600	1,300 (8,964)	23,000 (10.2)	23,000 (10.2)	6.0+ (152+)	5.0+ (127+)
550	57.5 (1,461)	6.00+ (152+)	100 - 600 (379 - 2,271)	300+	< 2,100	1,200 (8,274)	28,100 (12)	28,100 (12)	6.50+ (165+)	5.50+ (140+)
700	63.5 (1,613)	8.25+ (210+)	130 - 650 (492 - 2,461)	300+	< 2,900	1,100 (7,585)	30,500 (14)	30,500 (14)	8.375+ (213+)	7.00+ (178+)
9625	65.5 (1,664)	12.00+ (305+)	150 - 1,200 (568 - 4,543)	250+	< 3,700	990 (6,826)	47,300 (21)	47,300 (21)	12.25+ (305+)	9.625+ (286+)
9625	65.5 (1,664)	12.00+ (305+)	100 - 1,200 (379 - 4,543)	250+	< 3,700	4,125 (28,442)	47,300 (21)	47,300 (21)	12.25+ (305+)	9.625+ (286+)
10750	68 (1,727)	13.125+ (333+)	150 - 1,200 (568 - 4,543)	200+	< 3,000	870 (6,000)	55,000 (24.5)	55,000 (24.5)	13.5 + (343 +)	10.750+ (273 +)
13375	70 (1,778)	15.875+ (403+)	200 - 1,200 (757 - 4,543)	250+	< 4,800	800 (5,516)	65,000 (29)	65,000 (29)	16+ (406+)	13.375+ (340+)