

# Coretrax

## ADVANCE

### HI TOOL<sup>®</sup> - Harmonic Isolation Tool

The HI Tool<sup>®</sup> Harmonic Isolation Tool is an on-bottom drilling tool, designed to reduce vibrational loads generated by drill bit dynamics. Drill string vibrations are typically the most common cause of NPT for the operators and suppliers of complex MWD/LWD equipment. Extensive job history with the HI Tool<sup>®</sup> has shown results for operators, with a direct impact on reduction of drilling costs in both domestic and international markets.

#### Features and benefits

- Limits lateral and axial vibration problems in difficult formations, which reduces non-productive time (NPT)
- Reduces the dynamic interaction between the bottom-hole assembly (BHA) and drill bit, through a flexible geared connection
- Decouples the BHA and mud motor harmonics from the drill bit and drill string
- Decouples the BHA from the drill string harmonics in severe drilling applications
- Allows the drill bit to self-center dynamically





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Specifications						
Tool Series	HI-2600	HI-1700	HI-1200	HI-800	HI-600	
<b>Connection Details</b>						
Upper Connection (Box Up)	7 5/8" Reg. LTM <sup>3</sup>	7 5/8" Reg.	7 5/8" Reg.	6 5/8" Reg.	4 1/2" IF (NC50)	3 1/2" IF (NC38)
Lower Connection (String Tool-Pin Down)	7 5/8" Reg. LTM <sup>3</sup>	7 5/8" Reg.	7 5/8" Reg.	6 5/8" Reg.	4 1/2" IF (NC50)	3 1/2" IF (NC38)
Recommended Make Up Torque <sup>4,11</sup>	102,000 ft-lb	98,700 ft-lb	98,700 ft-lb	46,300 ft-lb	36,000 ft-lb	15,600 ft-lb
Lower Connection (Near Bit Tool-Box Down)	7 5/8" Reg. LTM <sup>3</sup>	7 5/8" Reg.	7 5/8" Reg.	6 5/8" Reg.	4 1/2" Reg.	3 1/2" Reg.
Recommended Make Up Torque <sup>4,11,19</sup>	86,000 ft-lb	82,200 ft-lb	82,200 ft-lb	51,400 ft-lb	22,700 ft-lb	9,700 ft-lb
<b>Tool Dimensions</b>						
Fish Neck/Tong Neck OD	11 1/4"	9 1/2"	9 1/2"	8 1/2"	7"	5"
Fish Neck Length	26"	26"	23"	19"	19"	15"
Tong Neck Length (G&E)	22" Upper Body 18" Lower Body	12.5"	20" Upper Body 15" Lower Body	13" Upper Body 9.5" Lower Body	14"	12"
Tool Drift ID (C)	2.980"	2.980"	2.855"	2.780"	1.475"	1.485"
Overall Tool Length (A)	85 1/2"	83 1/2"	63"	42 1/2"	47"	39.7"
Approx. Tool Weight (lb) <sup>16</sup>	3,300-3,500	3,200 - 3,400	1,250-1,420	400-550	250-350	190-250
Connection Bending Strength Ratio	5.02	2.81	2.81	3.62	2.7	2.24
<b>Blade Dimensions</b>						
Blade OD (B)	19 1/2"-26"	19 1/2"-26"	12 1/8" - 18"	9 3/4"-14 3/4"	7 3/4"-9 3/4"	5 7/8" - 7 1/2"
Blade Length	24 1/2"-29 3/4"	24 1/2"-29 3/4"	12"-19"	7 1/2"-14"	8"-11"	8"-10"
Crown Length (D)	11"-14"	11"-14"	7" - 8"	4" - 4 1/2"	5" - 7"	4" - 6"
Blade Width (Perpendicular to Axis)	6.5" - 8"	6.5" - 8"	4.6" - 5.7"	3" - 3.7"	2.7" - 3.5"	1.3" - 2"
Blade Wrap	270° - 360°					
Number of Blades	3					
Blade Type <sup>21</sup>	Spiral					
<b>Structural Mechanical/Operational Properties</b>						
Rated Flow Rate <sup>2</sup>	1,750 gpm	1,750 gpm	1,500 gpm	1,250 gpm	850 gpm	500 gpm
Typical Pressure Drop at Rated Flow Rate (heavily dependent on ppg)	80 psi	80 psi	60 psi	40 psi	70 psi	40 psi
Maximum Rubber Operating Temperatures <sup>12</sup>	HNBR 929-05 390°F/200°C					
Torsional Limit - String Tool-Pin Down <sup>16</sup>	113,000 ft-lb <sup>15</sup>	109,600 ft-lb <sup>15</sup>	85,700 ft-lb <sup>20</sup>	51,000 ft-lb <sup>20</sup>	25,000 ft-lb <sup>20</sup>	16,098 ft-lb <sup>20</sup>
Torsional Limit - Near Bit Tool-Box Down <sup>16</sup>	95,000 ft-lb <sup>15</sup>	91,400 ft-lb <sup>15</sup>				10,800 ft-lb <sup>15</sup>
Maximum Weight on Bit <sup>1</sup>	150,000 lb	100,000 lb	100,000 lb	100,000 lb	100,000 lb	40,000 lb
Maximum Overpull <sup>17</sup>	1,462,000 lb	1,462,000 lb	916,000 lb	605,000 lb	350,000 lb	284,400 lb
Ultimate Overpull <sup>18</sup>	3,000,000 lb	3,000,000 lb	2,106,000 lb	1,391,000 lb	800,000 lb	552,000 lb
Burst Pressure <sup>1</sup>	5,000 psi	4,800 psi	4,800 psi	6,000 psi	6,000 psi	5,000 psi

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Notes:

1. Basic calculations based on 1.5FOS where stated and in accordance with API RP7G. PDS requirement stated rather than yield where necessary.
2. Flow Rates per PDS. Elevated flow rates can be sustained for limited duration and should be confirmed with engineering. Critical erosion occurs as 200 fps; this is where the risk of internal erosion significantly increases. Flow rates above this can be maintained for short operational periods but will result in a reduction in tool life.
3. RSC with low torque modification.
4. Recommended make-up torques shown are taken as 60% of the maximum stress condition to yield a RSC per API. API RP7G (4.8.1, A.9.2).
5. All RSC strength and make up torque values to be used as a guide only.
6. Connection strength calculations evaluated per API RP7G (A.9.1 and A.7) 1.5 FOS and dependent on weakest API RSC—Typically pin down Lower Body.
7. Connections considered to have Stress Relief Groove/Bore Back.
8. Bi-axial stresses for combined torsion and tension can be supplied upon request.
9. The geometry above represents typical production strategy. Mandrel ID and tool joint ODs can be supplied to see client specific requirement.
10. Mandrel ID and tool joint ODs should be confirmed on stock holding prior to referencing the above.
11. Make up torque to be set to a minimum to match string connections. The values provide are maximum conditions for the HI subs only.
12. Specific rubber strategy and temperature rating to be confirmed by Engineering and specific to client requirement.
13. For gauge diameters outside of that stated above, consult Engineering.
14. Bending Strength Ratios evaluated per API RP7G (A.11).
15. Rotary Shoulder Connection limited failure.
16. For actual weights consult Engineering.
17. Safe working limit; if value is exceeded, it is recommended to lay down the tool and pick up backup.
18. If Ultimate Overpull is exceeded, tool is at risk of separating.
19. Near Bit (NB) Tool configuration MUTs calculated using largest ID found in Table 33 of API7G. For assistance with MUT for Box-by-Box configuration contact Engineering.
20. Internal connection limited failure.
21. Different blade styles can be evaluated per request.
22. HI Tool is at risk of over deflection and loss of containment if used in reaming or back reaming operations with the HI Tool in an enlarged hole for more than 15 hours or if used to drill ahead when an underreamer is engaged below the HI Tool. Reamer may be activated below the HI Tool for rat hole elimination but only at the end of the section for no more than 300 feet or 15 hours of reaming.