



Specification Summary

Tool Model: CRTi4-7.0

| Base Tool Characteristics | | | |
|--------------------------------------|--------------------|--------|-----------|
| CRTi Rated | Hoist ¹ | ton | 442 |
| Load Cap. | Torque | ft.lbs | 50,000 |
| Comb. Load | Hoist | ton | 300 |
| Large Hoist | Torque | ft.lbs | 30,000 |
| Comb. Load | Hoist | ton | 200 |
| High Torque | Torque | ft.lbs | 50,000 |
| Typ. Circ. Prss. Lim. ^{6,7} | psi | | 5,000 |
| Base Tool Length | in | | 57 |
| Tool Stroke | in | | 0.61 |
| Max. Tool Diam. | in | | 20 |
| Through Hole | in | | 1.5 |
| Tool Joint | | | 6-5/8 REG |

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Operating and Functional Summary

Casing Running Tool (CRTi) with internal grip

Volant Oil Tool's CRTi tools are designed for casing running or drilling with top drive equipped rigs to enable connection make-up, break-out, circulation and rotation. These tools are mechanically activated in tension and both rotational directions solely by top drive control using TAWG™ (Torque Activated Wedge Grip) technology.

This patent pending architecture puts control in the hands of the driller, reducing the need for third party support to run casing. Simple intuitive operating steps for pipe engagement and release closely emulate the familiar make and break steps used to run drill pipe—stab, rotate to the right to engage and reverse to disengage. Similarly, rig-in and rig-out steps are simple, intuitive and fast. This architecture has a proven track record in running over **one million** metres of casing.

Starting from the insertion diameter of the base tool, selectable sizes of integral jaw/dies are used to configure the CRTi tool to support gripping casing of increasing internal diameter (decreasing weight). Through the use of a patent pending extended reach die structure, the gripping diameter can be further increased to include casing sizes much greater than the base tool.

Summary of Selected Slip Die Sizes ²

| Die P/N | Nom. Pipe size | Max Pipe wt ³ | Min Pipe Wt ⁴ | Die Curv. Diam. | OAL | Max. Tool Diam. | Tool Wt. | Slip to Pipe Body Load Eff. ¹ | Comp. Cap. ⁵ |
|---------|----------------|--------------------------|--------------------------|-----------------|------|-----------------|----------|--|-------------------------|
| | (in) | (ppf) | (ppf) | (in) | (in) | (in) | (lbs) | % Fy | (ton) |
| 81277 | 7.00 | 26.00 | 17.00 | 8.04 | 70.4 | 20.0 | 1100 | 80% | 210 |
| 81421 | 8.63 | 36.00 | 28.00 | 8.72 | 70.4 | 20.0 | 1100 | 80% | 210 |
| 81420 | 9.63 | 53.50 | 47.00 | 8.72 | 70.4 | 20.0 | 1100 | 80% | 210 |
| 81255 | 10.75 | 65.70 | 60.70 | 9.72 | 70.4 | 20.0 | 1300 | 80% | 210 |
| 81494 | 10.75 | 73.20 | 71.10 | 9.57 | 70.4 | 20.0 | 1300 | 80% | 210 |
| 81138 | 10.75 | 79.20 | - | 9.40 | 70.4 | 20.0 | 1300 | 80% | 210 |
| 81495 | 11.75 | 60.00 | 54.00 | 10.94 | 70.4 | 20.0 | 1400 | 76% | 210 |
| 81306 | 13.38 | 54.50 | 48.00 | 12.74 | 70.4 | 20.0 | 1900 | 74% | 210 |
| 81150 | 13.38 | 72.00 | 68.00 | 12.52 | 70.4 | 20.0 | 1900 | 74% | 210 |
| 81431 | 16.00 | 65.00 | - | 15.42 | 70.4 | 20.0 | 2300 | 59% | 210 |
| 81434 | 18.63 | 87.50 | - | 17.88 | 70.4 | 20.0 | 2600 | 45% | 210 |
| 81483 | 20.00 | 133.00 | - | 18.92 | 70.4 | 20.0 | 2800 | 51% | 210 |

¹ Tool hoist rating is based on API Spec. 8C; however casing load limit is further constrained by local interaction of slip dies with casing which must not exceed the efficiency indicated for individual slip die sizes to avoid excess deformation.

² Common dies sizes shown. All API casing sizes and weights with drift diameter above 5.873 in. are available.

³ Maximum pipe weight is defined by the API Spec. 5CT drift diameter of the heaviest weight casing into which the CRTi assembled with the specified die set will fit.

⁴ Indicated minimum pipe weight is based on the assumption that control of average pipe inside diameter over die grip interval does not allow pipe body area reduction less than 3.5% from nominal and additionally takes into account tool wear allowances, die penetration, casing deformation and tool stroke.

⁵ Maximum allowable compressive load applied to the tool. Some compressive load may be reacted through the coupling, this rating does not take into account bearing load limitations of the coupling.

⁶ CRTi circulation pressure capacity is generally governed by packer cup pressure capacity. Pressure capacity may be less than indicated if alternative seal arrangements are used.

⁷ CRTi hoist capacity must be reduced by the pressure end load during circulation.

Tool Configuration with Extended Slip Dies

