

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Hoisting, Rotation and Pipehandling Equipment

with type designation(s)

CRTi Casing Running Tools (See product description for variant sizes)

Issued to

Volant Oil Tools Inc.
Edmonton, AB, Canada

is found to comply with

DNVGL-OS-E101 – Drilling facilities, Edition January 2018

DNVGL-SI-0166 – Verification for compliance with Norwegian shelf regulations, Edition July 2018

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Issued at **Houston** on **2020-07-28**

This Certificate is valid until **2025-07-27**.

DNV GL local station: **Houston, Approval CMC**

for **DNV GL**

Approval Engineer: **Bo Cui**

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Christian Nilsen
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Job Id: **262.1-030781-1**
Certificate No: **TAD00001B8**

Product description

CRTi tools are used to grip, handle and hoist tubulars and tubular strings for purpose of casing running or drilling with top drive equipped rigs. These tools are mechanically activated in tension and both rotational directions solely by top drive control and using Volant Oil Tool's TAWG™ technology, to enable the transfer of axial and both right and left hand torsion loads into or from the tubular segment being gripped. This tool supports make-up, break-out, hoisting, pushing, rotating and flow of pressurized fluid into and out of the tubular string.

The CRTi design variants included in the scope of this Type Approval Certificate are:

CRTi2-4.5 Part Number: 82304-XXXXX-XX¹
CRTi2-5.5 Part Number: 82305-XXXXX-XX¹
CRTi3-7.0 Part Number: 82016-XXXXX-XX¹
CRTi3-7.0 Part Number: 82306-XXXXX-XX¹
CRTi4-7.0 Part Number: 81246-XXXXX-XX¹
CRTi4-7.0 Part Number: 82163-XXXXX-XX¹
CRTi1-8.63 Part Number: 81007-XXXXX-XX¹
CRTi2-8.63 Part Number: 81007-XXXXX-XX¹
CRTi2-8.63 Part Number: 82151-XXXXX-XX¹
CRTi2-8.63 Part Number: 82307-XXXXX-XX¹
CRTi2-8.63HC750 Part Number: 82307-XXXXX-XX¹
CRTi1-10.75 Part Number: 103865-XXXXX-XX¹

Notes:

1. XXXXX-XX is the Sales Assembly number for the tool

Application/Limitation

General Limitations		(Equivalent)
- Minimum Design Temperature (TD)(See Note 9)	: -4 °F	(-20 °C)
	: -40 °F	(-40 °C)
(See Tables 1, 2 for specified material requirements)		
- Maximum Circulation Pressure	: 5,000 psi	(344.7 bar)
CRTi2-4.5		
- Maximum Hoist Load Rating (See Note 1)	: 120 tons	(108.9 tonnes)
- Maximum Torque Rating (See Note 1)	: 13,000 ft-lbs	(17,626 N-m)
CRTi1-5.5; CRTi2-5.5		
- Maximum Hoist Load Rating (See Note 2)	: 208 tons	(188.7 tonnes)
- Maximum Torque Rating (See Note 2)	: 25,000 ft-lbs	(33,896 N-m)
CRTi2-7.0; CRTi3-7.0		
- Maximum Hoist Load Rating (See Note 3)	: 323 tons	(293.0 tonnes)
- Maximum Torque Rating (See Note 3)	: 50,000 ft-lbs	(67,791 N-m)
CRTi4-7.0		
- Maximum Hoist Load Rating (See Note 4)	: 423 tons	(383.7 tonnes)
- Maximum Torque Rating (See Note 4)	: 50,000 ft-lbs	(67,791 N-m)
CRTi1-8.63; CRTi2-8.63		
- Maximum Hoist Load Rating (See Note 5)	: 696 tons	(631.4 tonnes)
- Maximum Torque Rating (See Note 5)	: 85,000 ft-lbs	(115,245 N-m)
CRTi2-8.63HC750		

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- Maximum Hoist Load Rating (See Note 6)	: 750 tons	(680.4 tonnes)
- Maximum Torque Rating (See Note 6)	: 85,000 ft-lbs	(115,245 N-m)
CRTi1-10.75		
- Maximum Hoist Load Rating (See Note 7)	: 1250 tons	(1134 tonnes)
- Maximum Torque Rating (See Note 7)	: 125,000 ft-lbs	(169,477 N-m)

Design Limitation Notes:

1. Maximum Hoist Load Rating is based on API 8C for axial tension loads only; limitations identified by Volant Oil Tools Doc. No. 20004 Rev. O shall be considered for combined Torque/Internal Pressure/ Axial Tension loading and Slip Die to Pipe Body load efficiencies.
2. Maximum Hoist Load Rating is based on API 8C for axial tension loads only; limitations identified by Volant Oil Tools Doc. No. 20005 Rev. P shall be considered for combined Torque/Internal Pressure/ Axial Tension loading and Slip Die to Pipe Body load efficiencies.
3. Maximum Hoist Load Rating is based on API 8C for axial tension loads only; limitations identified by Volant Oil Tools Doc. No. 20006 Rev. S shall be considered for combined Torque/Internal Pressure/ Axial Tension loading and Slip Die to Pipe Body load efficiencies.
4. Maximum Hoist Load Rating is based on API 8C for axial tension loads only; limitations identified by Volant Oil Tools Doc. No. 20009 Rev. N shall be considered for combined Torque/Internal Pressure/ Axial Tension loading and Slip Die to Pipe Body load efficiencies.
5. Maximum Hoist Load Rating is based on API 8C for axial tension loads only; limitations identified by Volant Oil Tools Doc. No. 20007 Rev. P shall be considered for combined Torque/Internal Pressure/ Axial Tension loading and Slip Die to Pipe Body load efficiencies.
6. Maximum Hoist Load Rating is based on API 8C for axial tension loads only; limitations identified by Volant Oil Tools Doc. No. 104317 Rev. A shall be considered for combined Torque/Internal Pressure/ Axial Tension loading and Slip Die to Pipe Body load efficiencies.
7. Maximum Hoist Load Rating is based on API 8C for axial tension loads only; limitations identified by Volant Oil Tools Doc. No. 102292 Rev. B shall be considered for combined Torque/Internal Pressure/ Axial Tension loading and Slip Die to Pipe Body load efficiencies.
8. Effects of the loads transmitted through the handled tubular are outside of the scope of this type approval. The manufacturer's Operating and Functional limitations shall be considered by the end user to avoid excessive loads.
9. Type Approved drawings indicate required materials on Option Tables. The certified product shall be fabricated from materials corresponding to the Type Approval documentation Tables 1, 2 below for the desired Minimum Design Temperature limitation. API 8C SR-2 shall be applied based on this limitation.

Type Approval documentation

Tests carried out

Fabrication Procedures:

Procedures related to testing, welding, NDT, etc. are to be reviewed/approved by DNVGL's local surveyor.

Type Testing:

1. Type testing for the CRTi1-4.5 & CRTi2-4.5 models was performed in accordance with API 8C Section 5.3.2 and reviewed by DNVGL; reference Test Report from Noetic Engineering file 111.130.114, dated 10- 19-2010.
2. Type testing for the CRTi1-5.5 & CRTi2-5.5 models was performed in accordance with API 8C Section 5.5 and reviewed by DNVGL; reference Test Report from C-FER Technologies file TX10005, dated 10-13-2010.
3. Type testing for the CRTi2-7.0 & CRTi3-7.0 models was performed in accordance with API 8C Section 5.5 and reviewed by DNVGL; reference Test Report from C-FER Technologies file TX10005, dated 10-13-2010.

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4. Type testing for the CRTi4-7.0 model was performed in accordance with API 8C Section 5.5 and reviewed by DNVGL; reference Test Report from C-FER Technologies file TX10005, dated 10-19-2010.
5. Type testing for the CRTi1-8.63 & CRTi2-8.63 models was performed in accordance with API 8C Section 5.5 and witnessed by DNVGL; reference Survey Report ANMUS470/EP026018/MMISER/2011-05-20-A.
6. Type testing for the CRTi2-8.63HC750 models was performed in accordance with API 8C Section 5.5 and witnessed by DNVGL; reference Test Report HollowayHouston, dated 12-18-2019.
7. Type testing for the CRTi1-10.75 models was performed in accordance with API 8C Section 5.5 and witnessed by DNVGL; reference Test Report StressEngServices, dated 12-19-2019.

Marking of product

For traceability of this Type Approval Certificate, the products are as a minimum to be marked as follows:

1. Serial number
2. Manufacturer's name and trademark
3. Working load limit

Periodical assessment

In order to maintain the validity of the type approval certificate, periodical assessment should be carried out according to DNVGL-CP-0338. Periodical assessments will, when possible, be harmonised with other surveys and audits carried out.

Comments

1. This certificate replaces TAD000007W
2. DNV GL Ref. Project No. A0639794

END OF CERTIFICATE