

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Lift Component**

with type designation(s)

**CENTAUR 40, 50 CS/MD & GENERATOR SET, TAURUS 60, 65, 70 CS/MD & GENERATOR SET,
MARS 90, 100 CS/MD & GENERATOR SET, TITAN 130, 250 CS/MD & GENERATOR SET**

Issued to

**Solar Turbines Incorporated
San Diego CA, USA**

is found to comply with

DNV GL standard DNVGL-ST-0378 – Standard for offshore and platform lifting appliances**Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed
by DNV GL.**Issued at **Houston** on **2017-12-05**This Certificate is valid until **2022-12-04**.for **DNV GL**DNV GL local station: **Long Beach**Approval Engineer: **Kairy Otero**

**Nick Prokopuk
Team Lead**

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.



Product description

Lifting devices intended for handling of gas turbine equipment including design configurations of internal/external beams, A-frames, Jib Cranes and Gantry Cranes structures.

Application/Limitation

- The different equipment is approved for use onshore and offshore. It is the operator's responsibility to ensure that the real dynamic coefficient is under a level equivalent to the design dynamic coefficient as listed below.
- Design temperature: TD = -20°C
- It is assumed that the load is secured and tethered on both sides of the engine/parts throughout the removal operation.

The different equipment is approved for the following conditions:

	Design dynamic coefficient, ψ	Safe Working Load, SWL
Centaur 40, 50 & Taurus 60 CS/MD:		
Trolley Beam Assy	1.15	10,000 lb
External, Turbine Handling Kit	1.15	10,000 lb
Centaur 40, 50 & Taurus 60, 65 Generator Set:		
External, Turbine Handling Kit	1.15	10,000 lb
Trolley Beam Assy	1.15	10,000 lb
Beam Assy, Aux. – Equipment Handling	1.15	2,000 lb
Mars 90, 100 CS/MD:		
External, Turbine Handling Kit	1.15	16,000 lb
Trolley Beam Assy (Dual Hoist Capacity)	1.15	16,000 lb
Jib Crane Assy, Accessory Drive Lift	1.15	3,200 lb
Start Motor Lifting Kit	1.15	1,030 lb
Mars 90, 100 Generator Set:		
External, Turbine Handling Kit	1.15	16,000 lb
Trolley Beam Assy (Dual Hoist Capacity)	1.15	16,000 lb
Start Motor Lifting Kit	1.15	1,030 lb
Taurus 70 CS/MD:		
Trolley Beam Assy	1.15	10,000 lb
External, Turbine Handling Kit	1.15	10,000 lb
Taurus 70 Generator Set:		
External, Turbine Handling Kit	1.15	16,000 lb
Trolley Beam Assy (Dual Hoist Capacity)	1.15	16,000 lb
Titan 130 CS/MD:		
External, Turbine Handling Kit	1.15	16,000 lb
Trolley Beam Assy (Dual Hoist Capacity)	1.15	16,000 lb
Titan 130 Generator Set:		
External, Turbine Handling Kit	1.15	16,000 lb
Trolley Beam Assy (Dual Hoist Capacity)	1.15	16,000 lb
Titan 250 CS/MD:		
External, Turbine Handling Kit	1.15	4,000 lb
Trolley Beam Assy (Dual Hoist Capacity)	1.15	4,000 lb
Titan 250 Generator Set:		

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External, Turbine Handling Kit	1.15	4,000 lb
Trolley Beam Assy (Dual Hoist Capacity)	1.15	4,000 lb

Field Tool Assemblies:

FT28499: T70, Four Point Engine Lift Tool	1.15	12,160 lb
FT28624: T70, Diffuser Lift Tool	1.15	1,600 lb
FT28630: T70, Radial Exhaust Diffuser Lift Tool	1.15	1,400 lb
FT30421: Mars 90, 100, Complete Engine Lift Kit	1.15	20,300 lb
FT33495: T130, Three Point Engine Lift Tool	1.15	15,000 lb
FT33499: T130, Four Point Engine Lift Tool	1.15	15,000 lb
FT33624: T130, Diffuser Lift Tool	1.15	2,600 lb
FT33630: T130, Radial Exhaust Diffuser Lift Tool	1.15	3,100 lb
FT34470: T250, Bleed Air Valve Lift Tool	1.15	400 lb
FT34500: T250, Lift Tool, Single Point, Complete / G.P.	1.15	52,000 lb
FT34603: T250, Power Turbine Lift Tool	1.15	20,000 lb

General comments

1. Grades of materials as stated on drawings shall be delivered with certificates, minimum equal to EN 10204:2004, 3.1. All materials shall document Charpy V-notch values according to DNV's Standard for Certification No. 2.22 "Lifting Appliances" June 2013, Ch. 2 Sec. 1. Impact test temperatures for welded structural steel are defined by Table 1-1.
2. All welding shall be carried out by qualified welders and according to weld procedures acceptable to the attending surveyor.
3. Non destructive testing is to be carried out according to an agreed plan with basis in the requirements found in DNV's Standard for Certification No. 2.22 "Lifting Appliances" June 2013, Ch. 2 Sec. 1, and to the DNV surveyor's satisfaction.
4. Loose gear e.g. shackles, turnbuckles, hoists, etc. is not covered by this approval and is to be delivered with the manufacturer's certificate documenting sufficient capacity.
5. The turbine enclosure structure is outside the scope of this design approval.
6. This Type Approval replaces Type Approval Certificate No. S-7891 dated December 18, 2013.

Type Approval documentation

Tests carried out

Each unit of the lifting equipment subject to DNV's certification is to be tested according to Det Norske Veritas Standard for Certification No. 2.22 "Lifting Appliances" June 2013, Ch. 2 Sec.12.

Marking of product

The lifting equipment shall be marked as follows:

- Safe Working Load, SWL
- Product certificate number. Reference to Type Approval number is preferable.

Periodical assessment

For retention of the Type Approval, Det Norske Veritas' representative shall carry out biennial Product Audits if regular certification no longer takes place.

END OF CERTIFICATE