2018 Company Presentation

History

- **1984 Established Hans Kjellerup A/S, Stenløse Denmark**
  - Agents for Ruston Gas Turbines Ltd
- **2000 Signed Service Centre Agreement with Alstom (now Siemens)**
  - Covering all Scandinavian & Baltic countries (10 countries)
  - Achieved level 5 status on TA1750, TB5000, SGT-100, 200 & 300 turbines
  - Completed 1,000 m2 workshop, Esbjerg Denmark
- **2008 Established Gas Turbine Services A/S**
- **2014 Expanded workshop with additional 5,000 m2**
- **2014 Major investment by new shareholder / Existing Customer**
- **2016 Hans Kjellerup renamed / rebranded as;**

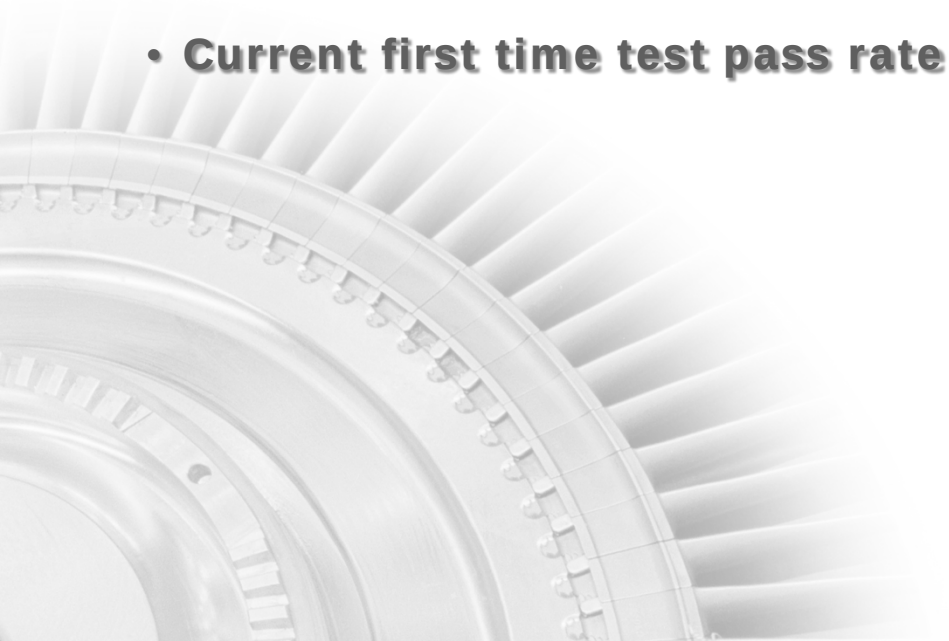
- **GAS TURBINE SERVICES**

GTS Facilities

- **2000**
  - Workshop and office facilities 1000 m2
- **2014**
  - Workshop and office facilities + 5000 m2
- **Location of GTS Facilities**
  - HQ & Main Workshop, Esbjerg Denmark
  - InoPower A/S Controls, Aalborg Denmark
  - Gas Turbine Services - (Lincoln), Lincoln UK
  - Gas Turbine Services - Dubai, UAE
- **Third party Partners**
  - IER Dubai, UAE
  - UES Oman

Key Facts

- Annual Turnover - £36 million
- Annual spend on Siemens OEM spares - £7.5 million
- Currently stock value of OEM parts inclusive pool engines - £22 million
- Average 16 workshop overhauls per year.
- Current first time test pass rate - 97% (based on last 50 engines tested)



Major equipment

Zero rated Core Engine - Strategic stock and Cores under overhauls

- 1 x TA1750 in Module form
- 1 X TB5000
- 3 X TB5400
- 3 x SGT-100 (4.9mw DLE /Conventional/MPI)
- 3 x SGT-100 (4.9MW Std Combustion) under overhauling
- 1 x SGT-100 (5.25mw Conventional)
- 3 x SGT-200 Gas Generators (6.45mw Twin/Single Shaft)
- 3 x SGT-200 Power Turbines (6.45mw Twin/Single Shaft)
- 1 x SGT-300 DLE (7.9mw)
- 2 x SGT-300DLE (7.9MW) under overhauling
- 1 x SGT-300 Std Combustion (7.9MW) under overhauling

Alternators (Refurbished)

- TB5400 / SGT-100 / 200 / 300

Gearboxes (Refurbished)

- TB5400 / SGT-100 / 200 / 300

Parts supply agreements with Allen Gears & Voith

Service Contract (LTSA) sites

Multiple LTSA contracts in operation:

- 2 x TB5400 Offshore Gen/Pump sets (Poland)
- 6 x TB5400 Offshore Gen sets (Denmark)
- 6 x TB5400 Offshore compressor drivers (Offshore UK)
- 3 x SGT 100 Offshore Gen sets (UK)
- 3 x SGT-100 DLE/CHP Gen sets (Denmark)
- 4 x SGT-100 DLE/CHP Gen sets (Denmark)
- 3 x SGT-100 Offshore Gen sets (Norway)
- 1 x SGT-200 Gen set (Denmark)
- 5 x SGT-200 Offshore Gen set/pumps (Denmark)
- 6 x SGT–100 Offshore Gen sets (Middle East)
- 3 x TB5000 Onshore Gen sets (Middle East)
- Total 42 core engines under LTSA as at Jan 2018

Siemens Service Centre Agreement - Clarification

- Following a 30+ year relationship with the OEM (under multiple OEM ownership) Gas Turbine Services made a strategic decision not to renew the SCA as of 31/12/2015

- Proactive commercially driven decision

- Relationship with Siemens is still strong and we continue to be a major spares customer trading £5+ million per annum

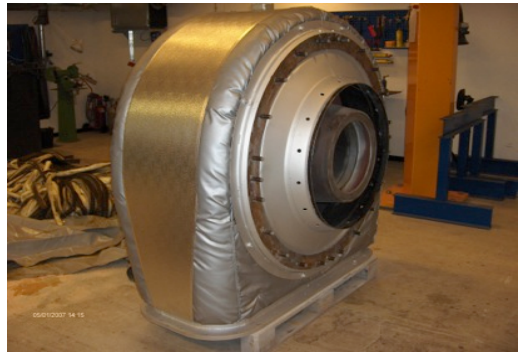
- All processes, procedures and operational activities remain unchanged and fully in line with current OEM specifications

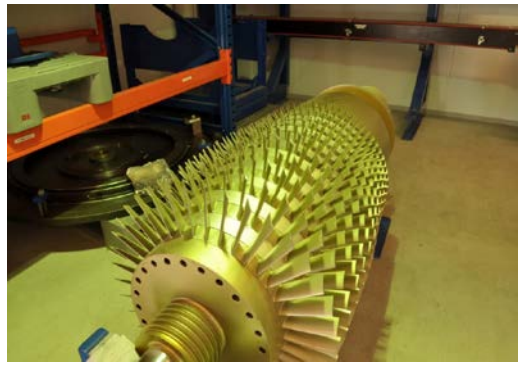
TA 1750 work

- **Several Full workshop overhauls**
  - TA1500 to TA1750 upgrades
- **CT/PT Blade change**
  - Blade distribution and balancing
- **CT/PT stator overhaul capability**
  - Level 5 jig and tooling
- **OEM approved upgrades**
- **Specialist Coatings**
  - Sermatel DP5380 / Metco TBC
  - S4000 Smooth seal

TB 5000 / TB5400 work

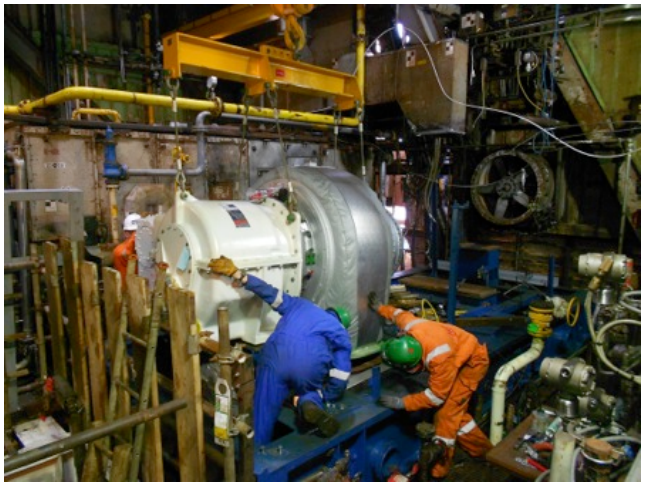
- **Over 50 Full workshop overhauls**
  - 12 TB5000 to TB5400 upgrades
- **CT/PT Blade change**
  - Blade distribution and balancing
- **CT/PT stator overhaul capability**
  - Level 5 jig and tooling
- **OEM approved upgrades**
  - PT Diffuser
- **Specialist Coatings**
  - Sermatel DP5380 / Metco TBC
  - S4000 Smooth seal
- **Full load Test capability**

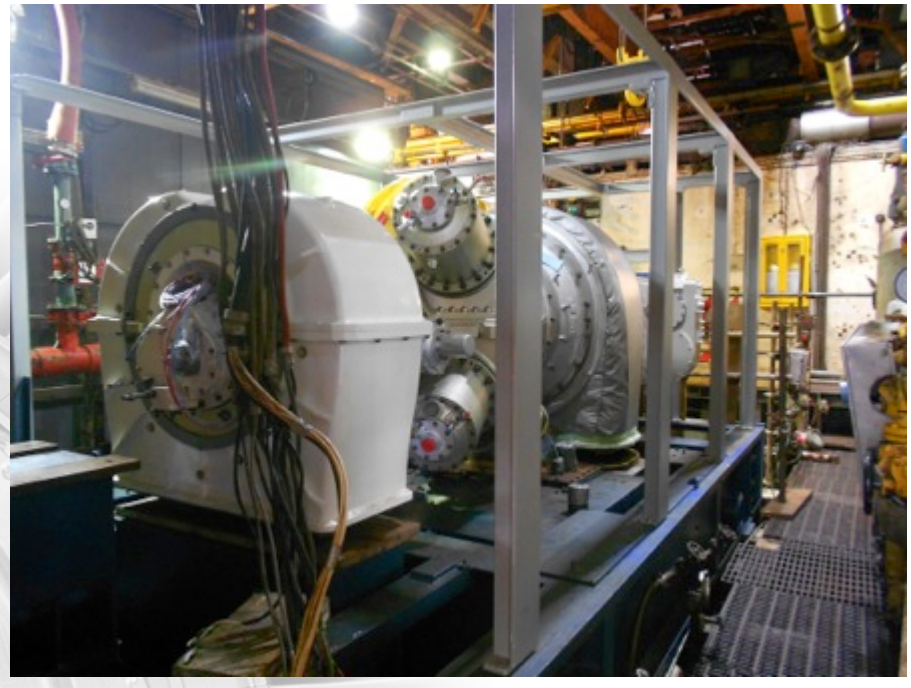


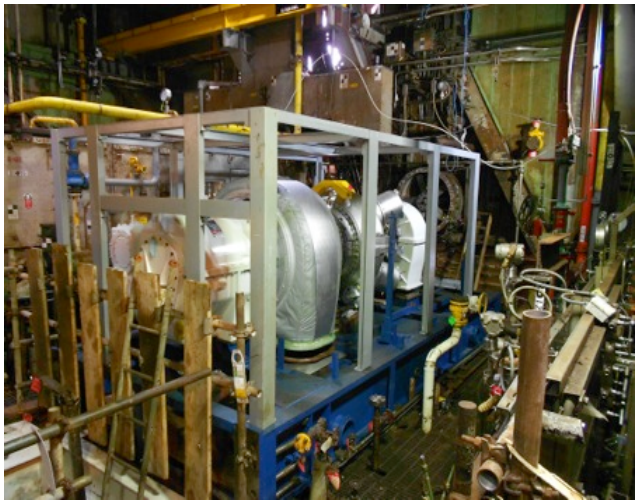


TB 5400 upgrades

- 12 packages upgraded to date
- 1 completed 2015/16
- 3 planned 2017/18
- Full package capability

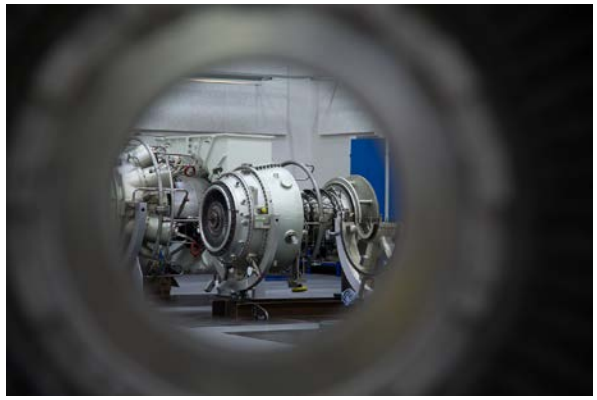


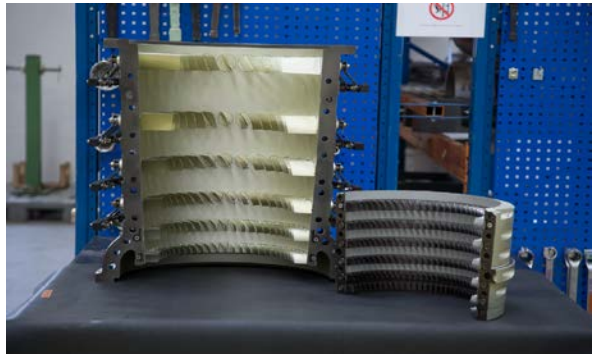




SGT 100 - Typhoon

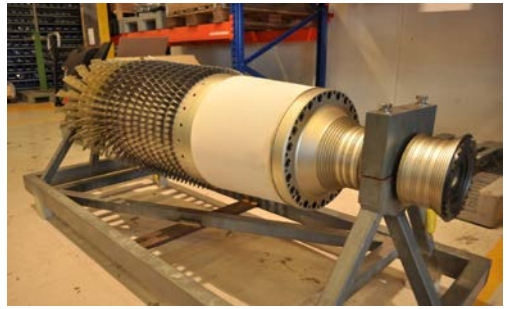
- **Over 15 workshop overhauls**
- **HP/LP stator overhaul capability**
  - Level 5 jigs and tooling
- **HP compressor abradable track replacement**
- **Full rotor overhaul capability**
  - Level 5 jigs and tooling
- **Specialist Coatings**
  - Sermatel DP5380 / Metco TBC
  - S4000 Smooth seal
- **Full load test capability**
- **Customer or DNV witness testing**





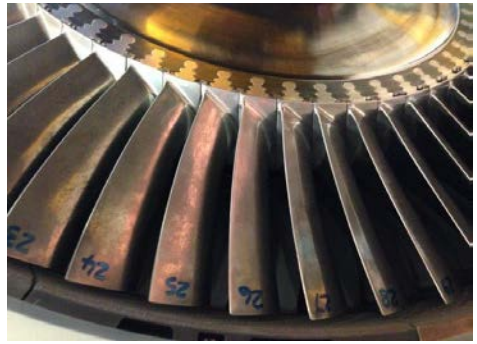
SGT 200 - Tornado

- **Over 25 workshop overhauls**
- **CT/PT stator overhaul capability**
  - Level 5 jigs and tooling
- **Interduct / PT1 lagging capability**
- **Full rotor overhaul capability**
  - Level 5 jigs and tooling
- **Specialist Coatings**
  - Sermatel DP5380 / Metco TBC
  - S4000 Smooth seal
- **Full load test capability**
- **Customer or DNV witness testing**



SGT 300 - Tempest

- **3 x workshop overhauls**
- **HP/LP stator overhaul capability**
  - Level 5 jigs and tooling
- **HP compressor abradable track replacement**
- **Full rotor overhaul capability**
  - Level 5 jigs and tooling
- **Specialist Coatings**
  - Sermatel DP5380 / Metco TBC
  - S4000 Smooth seal
- **Full load test capability**
  - Currently site test only
  - In house testing scheduled for mid 2017
- **Customer or DNV witness testing**



Main Gearbox Inspection/Overhaul Capability

- **Allen Gears**
- **TA 1750**
- Epicyclical
- **TB5400**
  - Epicyclical / Double Helical
- **SGT-100 Typhoon**
  - Epicyclical
- **SGT-200 Tornado**
  - Epicyclical
- **SGT-300 Tempest**
  - Epicyclical

- **David Brown (GEC Gears)**
  - SGT-200 Epicyclical

- **Rademaker**
  - TB5400 Epicyclical / Double Helical

Case Studies

- **Apache – UK North Sea**
  - SGT100 – Convert from single to twin Igniter dramatically improving start reliability
- **Maersk Oil and Gas - Danish North Sea**
  - Convert 11 x TB5 & TB54 to 'Fully Instrumented' BN3300/3500, giving greater operational diagnosis, reliability and forward planning / condition based maintenance
- **Maersk Oil and Gas – Danish North Sea**
  - Upgrade of Maersk's fleet from TB5000 to TB5400 specification, giving increased power and combustion stability and start up reliability
- **Danish onshore SGT-100 fleet**
  - Conversion of all SGT100 machines from conventional to DLE inclusive MKII to full IDS enabling remote monitoring / troubleshooting, resulting in increased uptime for the customers

Case Studies – Cont.

- **TB 5000/5400**
  - Redesign of TB Exhaust Volute internal profile eliminating cracking and dramatically reducing unit outage times during maintenance
    - 13 installed to date
  - Improved coatings, exceeding OEM Spec, giving extended component life and time between overhauls, reducing through life maintenance costs
- **Maersk Denmark SGT-200**
  - Conversion of 5 x SGT 200 units to MPI allowing full burner interchangeability across the fleet
- **General**
  - Numerous repair schemes developed 'in house' providing the option to repair not replace, giving reductions in through life maintenance cost

Remote Monitoring

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Main

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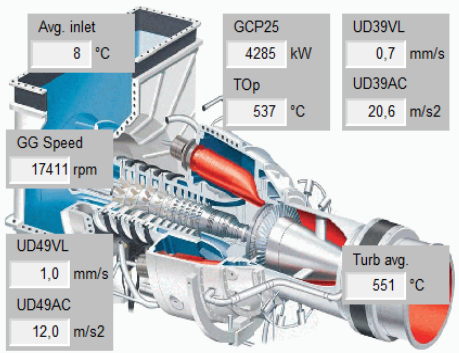
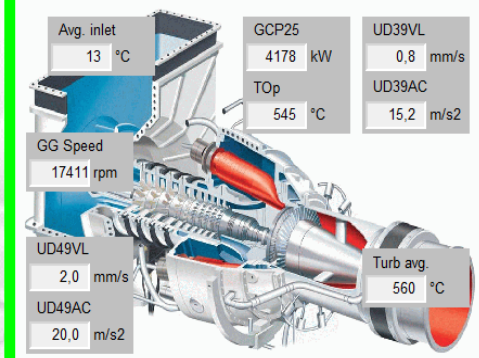


Avg. inlet 8 °C	GCP25 4285 kW	UD39VL 0,7 mm/s
	TOp 537 °C	UD39AC 20,6 m/s2
GG Speed 17411 rpm		
UD49VL 1,0 mm/s	Turb avg. 551 °C	
UD49AC 12,0 m/s2		

PCB Band1	PCB Band2	PCB Band3
0,018 psi	0,046 psi	0,128 psi

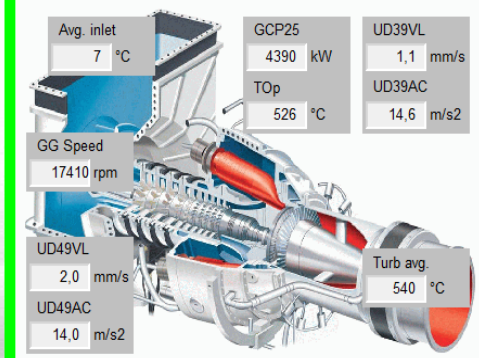
Arinco



Avg. inlet 13 °C	GCP25 4178 kW	UD39VL 0,8 mm/s
	TOp 545 °C	UD39AC 15,2 m/s2
GG Speed 17411 rpm		
UD49VL 2,0 mm/s	Turb avg. 560 °C	
UD49AC 20,0 m/s2		

PCB Band1	PCB Band2	PCB Band3
0,058 psi	0,169 psi	0,181 psi

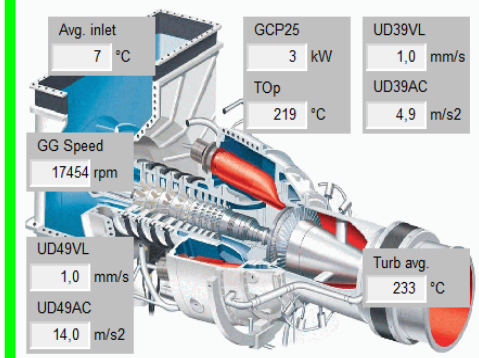
HOCO



Avg. inlet 7 °C	GCP25 4390 kW	UD39VL 1,1 mm/s
	TOp 526 °C	UD39AC 14,6 m/s2
GG Speed 17410 rpm		
UD49VL 2,0 mm/s	Turb avg. 540 °C	
UD49AC 14,0 m/s2		

PCB Band1	PCB Band2	PCB Band3
0,045 psi	0,080 psi	0,081 psi

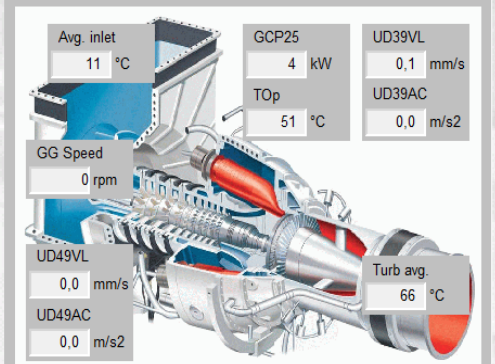
DK Protein



Avg. inlet 7 °C	GCP25 3 kW	UD39VL 1,0 mm/s
	TOp 219 °C	UD39AC 4,9 m/s2
GG Speed 17454 rpm		
UD49VL 1,0 mm/s	Turb avg. 233 °C	
UD49AC 14,0 m/s2		

PCB Band1	PCB Band2	PCB Band3
0,053 psi	0,018 psi	0,039 psi

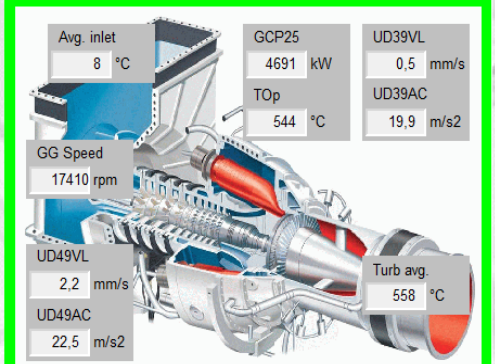
Cheminova L1



Avg. inlet 11 °C	GCP25 4 kW	UD39VL 0,1 mm/s
	TOp 51 °C	UD39AC 0,0 m/s2
GG Speed 0 rpm		
UD49VL 0,0 mm/s	Turb avg. 66 °C	
UD49AC 0,0 m/s2		

PCB Band1	PCB Band2	PCB Band3
0,005 psi	0,009 psi	0,004 psi

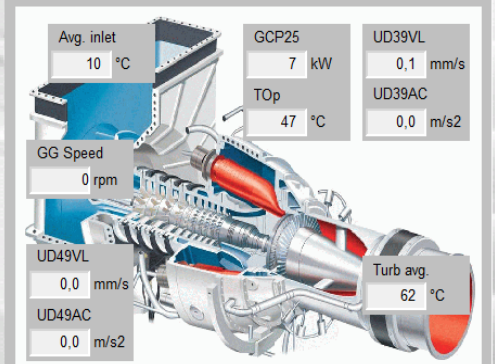
Cheminova L2



Avg. inlet 8 °C	GCP25 4691 kW	UD39VL 0,5 mm/s
	TOp 544 °C	UD39AC 19,9 m/s2
GG Speed 17410 rpm		
UD49VL 2,2 mm/s	Turb avg. 558 °C	
UD49AC 22,5 m/s2		

PCB Band1	PCB Band2	PCB Band3
0,004 psi	0,009 psi	0,025 psi

Cheminova L3



Avg. inlet 10 °C	GCP25 7 kW	UD39VL 0,1 mm/s
	TOp 47 °C	UD39AC 0,0 m/s2
GG Speed 0 rpm		
UD49VL 0,0 mm/s	Turb avg. 62 °C	
UD49AC 0,0 m/s2		

PCB Band1	PCB Band2	PCB Band3
0,000 psi	0,000 psi	0,000 psi

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Customer references

راس غاز
RasGas

MAERSK OIL

Shell

ConocoPhillips

OXY
Occidental of Oman Inc.
أوكسيدنتال عمان انكربوريتد

中国石化
SINOPEC

قطرغاز
QATARGAS

Statoil

Apache
CORPORATION

Why choose GTS as your preferred partner?

- Guaranteed OEM levels of quality
- Quicker response and turnaround times
- Cost reductions of up to 20%
- Peace of mind

Future plans and Expansions going forward 2018- 2020

- Additional product range support for SGT400 gas turbines
- Development of In-House core engine test facilities
- Global Expansion of Sales Team Network
- Further innovations of in-house repair procedures
- New supportive services for other OEM gas turbine models

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Gas Turbine Services New Core Engine Test Center - Esbjerg Denmark
****TB5000, SGT100, SGT200, SGT300 & SGT400 Core Engines****

THANK YOU FOR YOUR ATTENTION