



A brief introduction and description of
DES A company



Presenting DESA

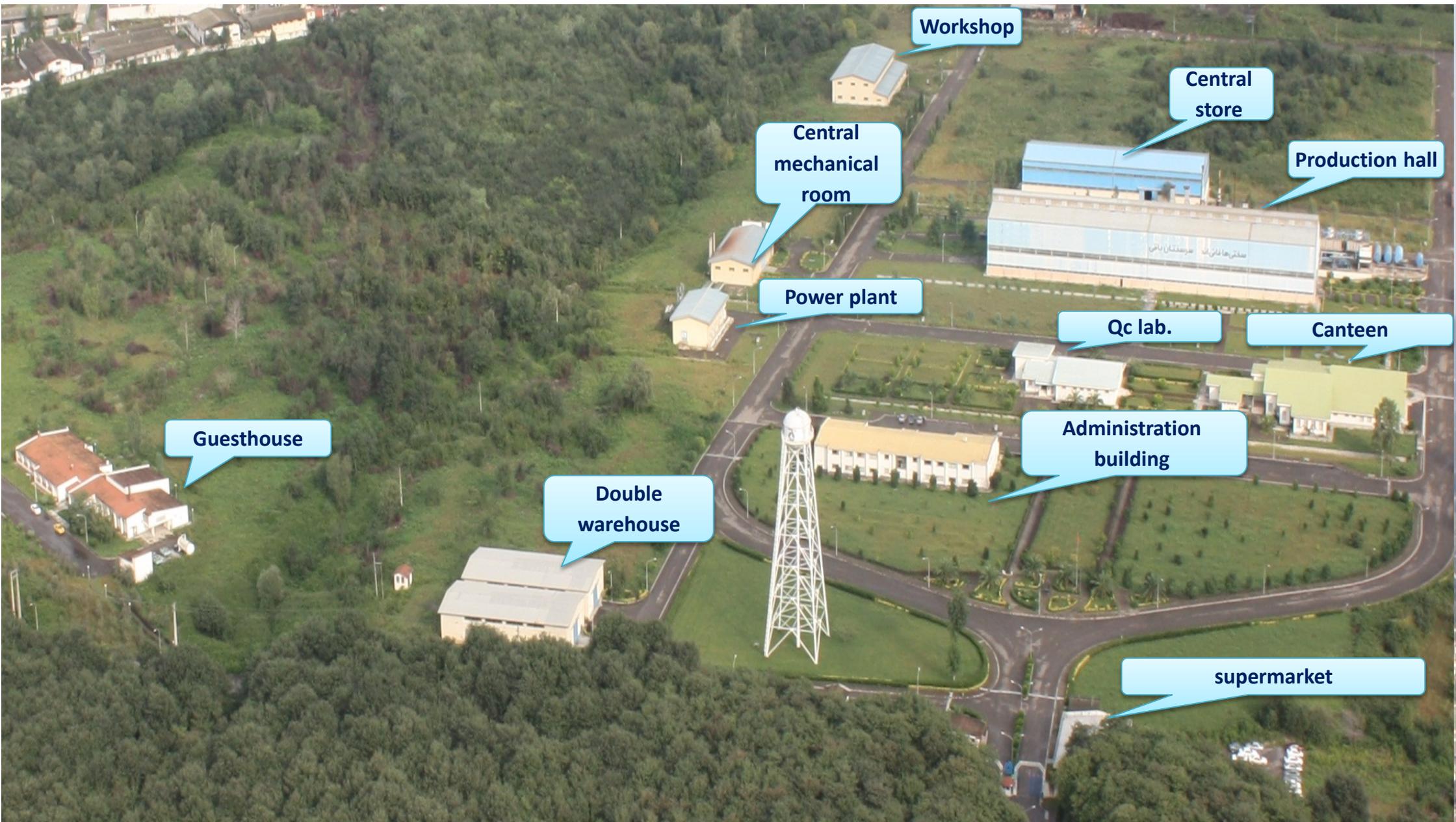
- Confirming the construction of Iran heavy diesel engine manufacturing company in 1990 by Islamic council parliament aiming at medium speed heavy diesel engine with potentials of 270 sets annually
- Initializing company's construction in 1991 and its accomplishment in 1997. Companies the main activity began from 1998 by WARTSILLA engines
- Delivery of 400 set of various types of updated rail application engines to Islamic republic of Iran's railroad as well as their after sales service and maintenance since 2001
- Constructing more than 10 power generation plant at capacity of 60 MW in different areas of the country.
- The design and manufacturing the first prototype domestic engine in 2009
- starting marine engines' design and manufacturing since 2011 and marine engines' production for Iranian marine fleet
- the design and manufacturing the first prototype of national dual fuel engine in 2011 and unmasking it by the petroleum minister





Presenting DESA

DESA's facilities' lay out





DESA's management manifestoes

VISION:

DESA willingly considers to be a pioneer company in the field of heavy duty diesel engine's design, manufacturing and production by creating a dynamic, scientific, and responsive organization. It also desires to become an excellent and the biggest producer as well as exporter for such engines into Iran and in the Middle East.

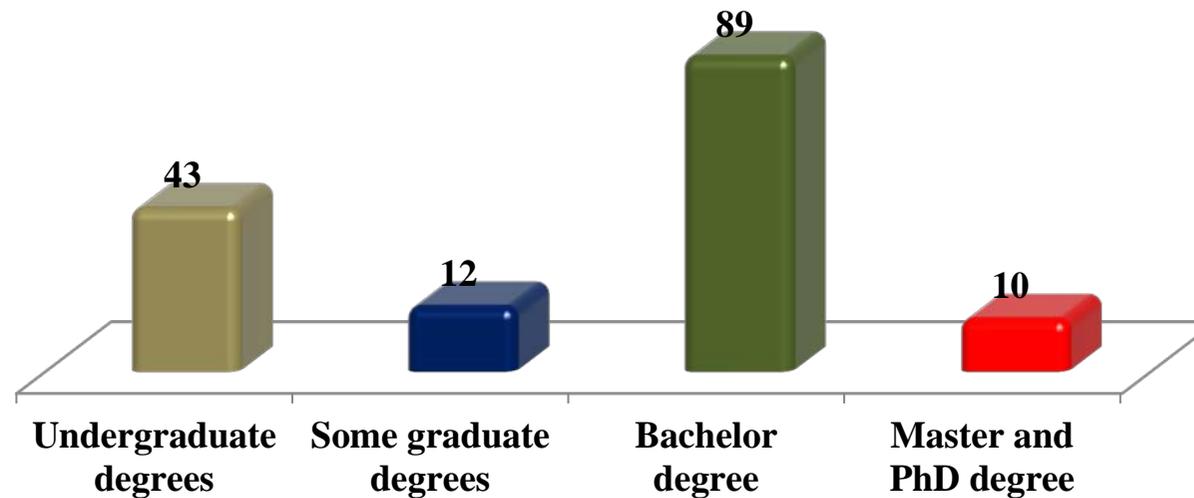
Mission:

DESA's mission is planned to create unique industrial zone for diesel engine's rail, marine and power plant application in the field of design, production, development, transfer technology, and maintenance training.



Human resource scope

Details of human resource line up according to level of education



This company's experts have been trained by the world's the most validated manufacturers in the following objects

AFS .MAN .RUSTON .WARTSILA .MTU, Technomot

In Finland, England, Germany and Canada

Assembly , installation and operation, development and application alteration , Test , Converting to dual fuel and a hundred percent to gas burning type, Supervision of UIC test, Maintenance , Engine design, Troubleshooting



Some of DESA's honors

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

جمهوری اسلامی ایران
وزارت علوم، تحقیقات و فناوری

پارک علم و فناوری مازندران

مجاز واحد فناور

شماره: ۶۰۴۸/پ.م

در جهت توسعه جامعه دانایی محور، به

شرکت صنعتی و تولیدی دیزل سنگین ایران

به شناسه ملی ۱۰۱۰۱۳۱۸۰۶۰ و به استناد قرارداد استقرار شماره ۵۹۹۳/پ.م مورخ ۱۳۹۵/۰۴/۰۱

اجازه داده می شود در زمینه تخصصی

محصولات پیشرفته سایر حوزه ها (فناوری های ساختمان و مسکن، راه سازی، ریلی و دریایی)

(استقرار واحد تحقیق و توسعه)

به عنوان واحد فناور در پارک علم و فناوری مازندران فعالیت نماید.

دکتر علی محمدزادگان
رئیس پارک علم و فناوری مازندران

اعتبار این مجوز از تاریخ ۱۳۹۵/۰۴/۰۱ تا تاریخ ۱۳۹۶/۰۴/۰۱ می باشد.

نشانی: مازندران، ساری، کوی تبرستان، میدان شهید شیر اوزن، ابتدای خیابان ساری کنار پارک علم و فناوری مازندران
تلفن: ۳۳۲۰۸۴۹۳ - ۱۱
www.mstp.ir

DESA's R&D membership in MAZANDARAN technology and Science Park with national gas burning engine D87



THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and its partner
CISQ/IMQ-CSQ
hereby certify that the organization

IRAN HEAVY DIESEL ENGINE M.F.G Co. (DESA)

IMAM ZADEH ABDOLLAH ROAD - AMOL IRAN

for the following field of activities

*Design, manufacturing, providing after sales and repairs
services for all type of heavy diesel engines
Refer to quality manual for details of applications to ISO 9001:2008 requirements*

*has implemented and maintains a
Quality Management System*

which fulfills the requirements of the following standard

ISO 9001:2008

Issued on: 2015 - 03 - 16

Expiry date: 2018 - 03 - 16

Registration Number: IT - 100654

The status of validity of the certificate can be verified at <http://www.cisq.com> or by e-mail to fedcisq@cisq.com



Michael Drechsel
President of IQNET



Ing. Claudio Provetti
President of CISQ

IQNet Partners*:

AENOR Spain AFNOR Certification France AIB-Vincotte International Belgium ANCE-SIGE Mexico APCER Portugal CCC Cyprus
CISQ Italy CQC China CQM China CQS Czech Republic Cro Cert Croatia DQS Holding GmbH Germany
FCAV Brazil FONDONORMA Venezuela ICONTEC Colombia IMNC Mexico Inspecta Certification Finland IRAM Argentina
JQA Japan KfQ Korea MIRTEC Greece MSZT Hungary Nemko AS Norway NSAI Ireland PCBC Poland
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IQNet is represented in the USA by: AFNOR Certification, CISQ, DQS Holding GmbH and NSAI Inc.

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Attaining international certificate IQNET
from Italian company IMQ



www.imq.it

CERTIFICATO N. **9190.C047**
CERTIFICATE N.

SI CERTIFICA CHE IL SISTEMA QUALITA' DI
WE HEREBY CERTIFY THAT THE QUALITY SYSTEM OPERATED BY

IRAN HEAVY DIESEL ENGINE M.F.G Co. (DESA)

IMAM ZADEH ABDOLLAH ROAD - AMOL IRAN

UNITA' OPERATIVE
OPERATIVE UNITS

IMAM ZADEH ABDOLLAH ROAD - AMOL IRAN

E' CONFORME ALLA NORMA
IS IN COMPLIANCE WITH THE STANDARD

ISO 9001:2008

PER LE SEGUENTI ATTIVITA'
FOR THE FOLLOWING ACTIVITIES

*Design, manufacturing, providing after sales and repairs
services for all type of heavy diesel engines*

Riferirsi al manuale della qualità per l'applicabilità dei requisiti della norma ISO 9001:2008
Refer to quality manual for details of applications to ISO 9001:2008 requirements

IL PRESENTE CERTIFICATO E' SOGGETTO AL RISPETTO DEL
REGOLAMENTO PER LA CERTIFICAZIONE DEI SISTEMI DI GESTIONE

THE USE AND THE VALIDITY OF THE CERTIFICATE SHALL SATISFY THE
REQUIREMENTS OF THE RULES FOR CERTIFICATION OF MANAGEMENT SYSTEMS

DATE:	PRIMA CERTIFICAZIONE FIRST CERTIFICATION	EMISSIONE CORRENTE CURRENT ISSUE	SCADENZA EXPIRY
	2015-03-16	2015-03-16	2018-03-16

IMQ S.p.A. - VIA QUINTILIANO, 43 - 20138 MILANO ITALY

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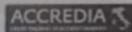
*IQNet, the association of the world's first
class certification bodies, is the largest
provider of management system
Certification in the world.
IQNet is composed of more than 30
bodies and counts over 150 subsidiaries
all over the globe.*

CISQ è la Federazione Italiana di
Organismi di Certificazione dei
sistemi di gestione aziendale.

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IAF: 22

ISO 9001, ISO 14001, SCR, ISO 22000
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MAN B&W Diesel Ltd
Commemoration Certificate



Presented to the Iranian
Islamic Republic Railway
to commemorate the
entry into commercial
service of the first
MAN B&W Diesel Ltd
16RK215 powered
locomotive

تقدیم به راه آهن
جمهوری اسلامی ایران
به مناسبت بزرگداشت
ورود اولین لکوموتیو
به جرگه خدمات
بازرگانی و تجاری
با موتور 16RK215
شرکت MAN B&W

Signed:  (MAN B&W Diesel Ltd)
R.J. Tett Vice President Traction

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Commemoration certificate from MAN
company regarding the first locomotive entry
into railway

Attaining thanksgiving card from rail transportation organization of Iran (RAJA) as a supreme leader of maintenance claimant companies



Attaining thanksgiving card from ministry of industries and mines for the beneficial of D87 Iranian heavy diesel engine's project





DESA's potentials in various demand



DESA's potentials

Production and assembly

- Area of production and assembly (7500 m²)
- Lateral equipment workshop, stores and semi-industrial buildings (3000 m²)
- A laboratory with exclusive devices for components' quality inspection
- Availability of proper facilities for assembly, troubleshooting and test purposes
- (Different types of general and special tools)
- Availability of skillful and trained staff for assembly and troubleshooting of domestic and foreign types

DESA's activities in heavy diesel engines assembly affairs

- Assembly of 114 sets MTU4000 rail application engines for MAPNA CO.
- Assembly of 104 sets DEUTZ power plant engines for Iranian telecommunication CO.
- Assembly of 70 sets RK215 for railroad CO.
- Assembly of 36 sets GEN – SET in railroad co.
- ASSEMBLY OF 4 SETS maritime engines DESA5000
- ASSEMBLY OF 4 SETS maritime engines DESA3000
- ASSEMBLY OF 4 SETS maritime engines DESA2000





Maintenance

- Planning systematic periodical inspection
- Presenting technical services and supports
- Troubleshooting
- Presenting different checklists
- Supplying maintenance instructions
- Presenting all maintenance services at different levels till overhaul
- Supply of components needed for the repair engines
- Inspection and repairing of different components
- Leakage tests
- Technical and repair services in operation during commissioning





DESA's potentials



The stages of heavy diesel engine's repair



receiving repair engines



repair engine



Disassembled crankcase



Turnover station



cleaning and checking of crankshaft



Crankcase turnover tool



DESA's potentials



The stages of heavy diesel engine repairing



QC laboratory



QC inspection



Surface Check



Sub-assembly



Sub-assembly



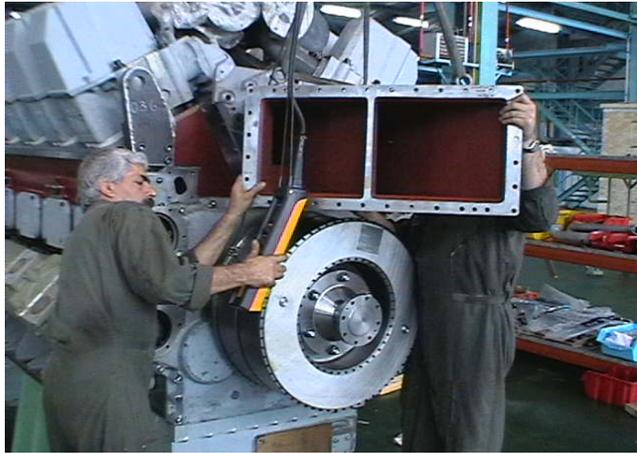
Main-assembly



DESA's potentials



The stages of heavy diesel engine repairing



Main-assembly



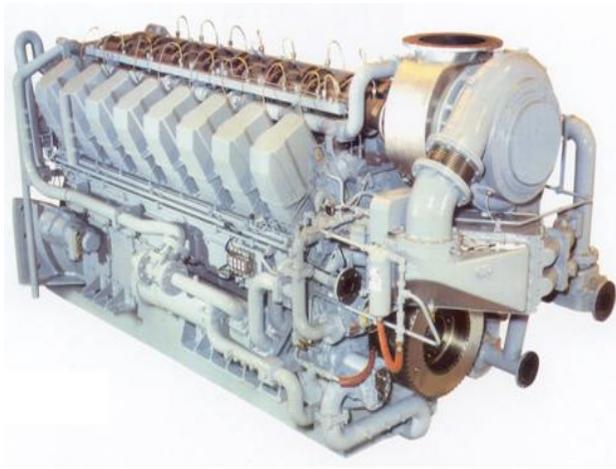
Test cell



Test cell



Finishing work activities



Complete repaired RK215 engine after each assembly stages



Packaging station



DESA's potentials



The activities done in the field of heavy diesel engines repair



Repaired Ruston engines.

Contract subject: supply of components, overhaul and testing RUSTON 16VRK215 engines



Repaired MTU4000 engines.

Contract subject: Repair and commissioning to MAPNA MTU4000 engines.



Repaired MAN2842 engines

Contract subject: Repairing and delivery of MAN2842 engines



Repaired MTU 538 engines

Contract subject: supply of components, main overhaul and testing MTU538 engines



DESA's potentials

Test cells

- Having 6 test beds which 4 of them are active and equipped to all required devices for any types of engine's endurance and performance test from 100 to 3600 KW
- Having test rooms that are equipped to water break validated brand such as; TAYLOR ·HORIB and SCHENCK
- Having upgraded and universal standard equipment to get international certificates such as; DNV, UIC, etc.

The main Implementing test of the engines are as follows:

114 set rail engines MTU400 (2400Kw)

100 set Ruston engines (3200 Kw)

104 set DEUTZ engines at various powers from 100 KVA to 500KVA

WARTSILLA engines (710Kw, 3Mw)

MTU396 engine

MTU538 engine

DESA 5000 engines' development and industrializing related maritime engines

DESA 3000 engines' development and industrializing related maritime engines

DESA 2000 engines' development and industrializing related maritime engines

DESA1000 engines' development test

D87 national domestic engine performance and endurance test

D500 (OM457) performance test

dual fuel domestic engine's performance and endurance test



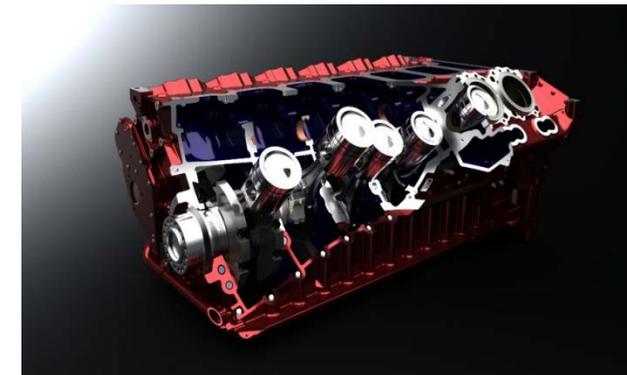
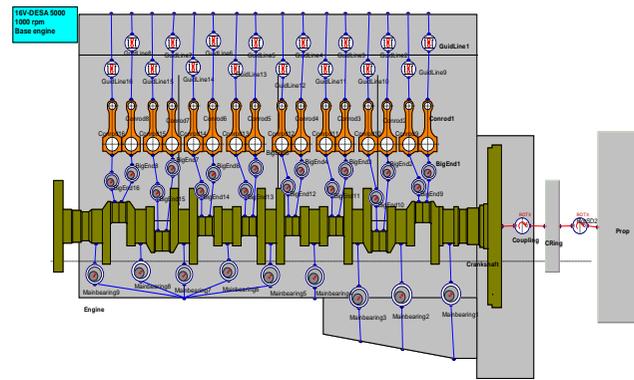
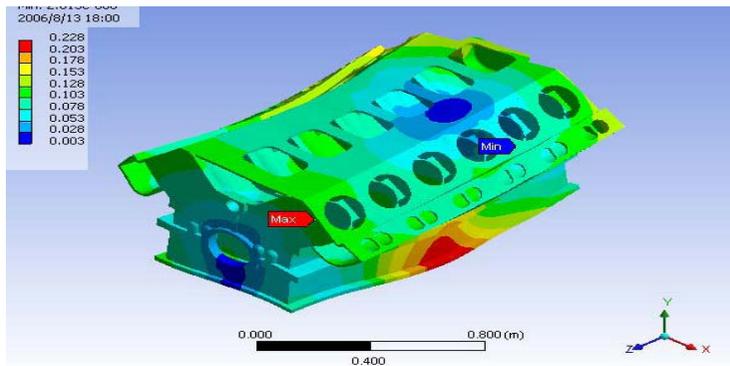


DESA's potentials

Designing and engineering department

In the presence of qualified experts in the world most validated companies and having experience in the field of domestic engine's design as well as having master education. The design engineering center uniquely does heavy diesel engines' designing and engineering affairs.

- Designing and manufacturing of heavy duty diesel engine related to national engines' family
- Analyzing and simulating all components and engine's lateral equipment
- Developing and changing diesel engines' application
- Organizing special workshop for designing, analyzing and manufacturing of diesel engines
- Codifying and implementing torsion, vibration and sonic test
- Developing rail application engines and achieving approximately 30% of rail power
- Marinating the world latest engines for ferries
- Doing dependent dynamic and structural analyze
- Calculating fluid, thermodynamic and performance
- Designing and simulating marine's components





DESA's potentials

Electrical engineering scopes (power and control systems)

- Consulting, designing and supervising on power boards manufacturing for diesel generators
- Consulting, designing and supervising on control boards manufacturing for GEN – SET power module in different positions of ferry
- Consulting, designing and supervising on manufacturing of driving engines' control system boards in different position of ferry
- Consulting, designing and supervising on electrical systems' installation using for various standby mode diesel or continuous power plant
- Consulting, designing and supervising on electrical systems' installation for diesel engines' test rooms





DESA's potentials



The reference laboratory for calibration and test (having endorsed cooperation certificate for standard organization)

- Calibrating various type of calipers, depth measuring gauge, micrometers, vertical measuring device and torque wrenches
- Calibrating filler gauge, dial gauge
- Measuring all light duty vehicles and engine's components geometrical and dimensional measurement
- Measuring surface roughness (clearance) on various surfaces of machined components
- Calculating lack of confirmed measuring in calibrations and tests
- Calculating optimum power measuring in the calibration and test procedures
- Estimating the calibration lifespan between various types of quantities according to Iran's defensive standard
- Metrology of various types engine and lateral equipment





Training center

The main targets of training office at DESA

- Updating the science
- Achieving new skills
- Implementing and orientating attained skills in the organization activities
- Training to organizations, companies and institutions (gaining international training reputable brand)
- Gaining acceptable index in country's scientific output
- Holding congress and professional workshops

Number of the most passed training courses

- Heavy diesel engines assembly, troubleshooting and maintenance, Wartsila, Finland.
- MTU engines' after sales service, MTU, Germany.
- Heavy diesel engines assembly, troubleshooting and maintenance, , MTU, Germany.
- Pneumatic training course, FESTO, Germany.
- Training course of MTU4000 engines , MTU, Germany.
- Training course of the software of control monitoring, CP, England.
- Training course of Dual fuel engines, AFS, Canada.
- Training course of engine's design, Technomot, England.
- Attending diesel engines conference, AVL, Austria.



Training courses from DESA

- full description of engine maintenance and troubleshooting
- Full engine and lateral equipment training– basic operation
- Full engine and lateral equipment training– intermediate
- Full engine and lateral equipment training– main
- Internal combustion engines' design – diesel engines
- Engine test
- Familiarizing non-destructive test strategies
- Familiarizing tools and engine test chamber
- Familiarizing steels and cast irons nomination and their application in engine
- Diesel engines rail application standard (UIC)
- Marine diesel engines standard (DNV)
- Air pollution, control planning, and equipment design
- CHP and its application
- Simulating combustion cycle and formation air pollutant in diesel engines and the effects of its specification on engine's performance
- Piston's structural and thermal analysis
- Crankshaft torsion vibration analysis
- Project managing and planning
- Storekeeping and store planning
- Supply chain management
- Maintenance planning



DESA's potentials



Finished training courses

- Full engine and its lateral equipment training – pielstik (O,I,D)
- Project planning and management
- Full engine and its lateral equipment training – Gen- set MAN 2842 (O,I,D)
- Fluid flow analysis via ANSYS – FLUENT software
- Piston 's structural and thermal analysis
- Crankshaft torsion vibration analysis
- Simulating combustion cycle and formation air pollutant in diesel engines and the effects of its specification on engine's performance
- Marine diesel engines
- Marine driving systems





DESA's potentials



Presenting some of the world's biggest companies that DESA has made contract with them

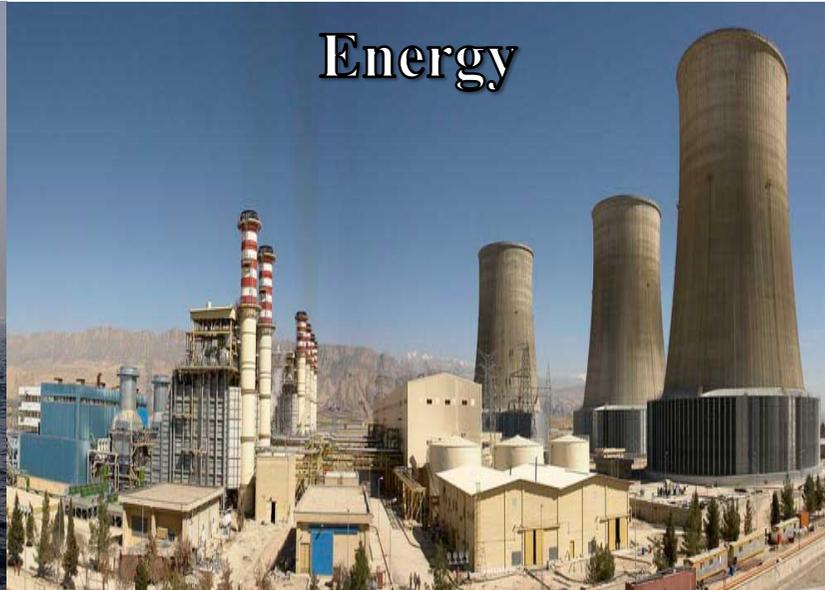
Company's name	country	Logo & Acronym
WARTSILLA (The designer and manufacturer of diesel engines)	Finland	
MAN B&W (The designer and manufacturer of diesel engines)	Germany	
MTU (The designer and manufacturer of diesel engines)	Germany	
MAN Truck and Bus (The designer and manufacturer of diesel engines)	Germany	
DEUTZ (The designer and manufacturer of diesel engines)	Germany	
YANMAR (The designer and manufacturer of diesel engines)	JAPAN	
AVL (The designer and manufacturer of diesel engines)	AUSTRIA	
AFS (The designer and manufacturer of diesel engines)	CANADA	
TECHNOMOT The consultant company for national domestic heavy diesel engine's design	ENGLAND	



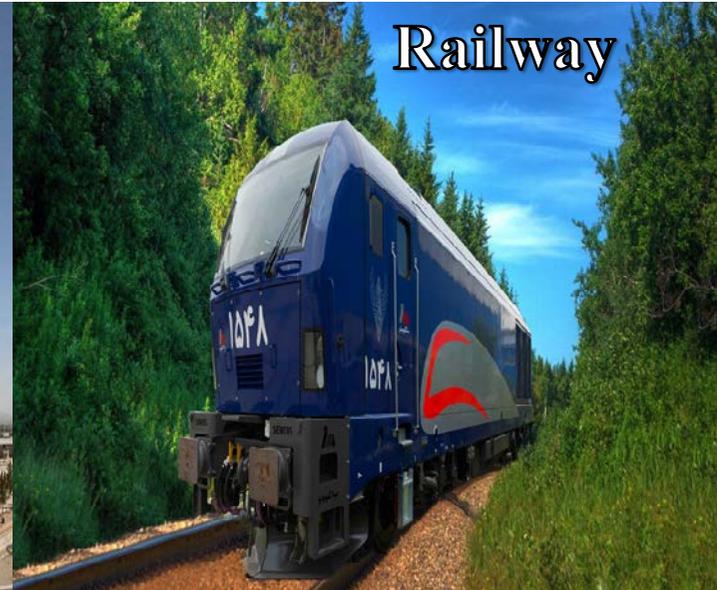
Marine



Energy



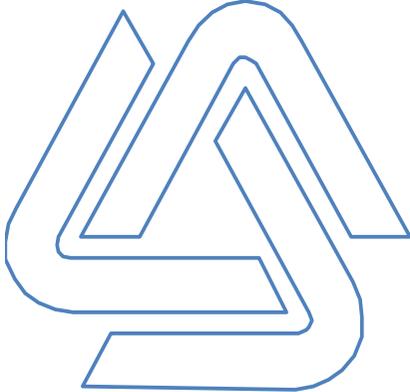
Railway



The projects of Iran heavy diesel manufacturing company



Installing, operating and implanting 13 power plants with 136 sets GEN – SET power module totally have the capacity of 57 Mw



Assembly and operating 427 sets rail engines totally have the capacity of 625 MW



Delivery of 36 marine engines totally have the capacity 68 MW



Installing, operating, troubleshooting and after sales service in power plant demand



DESA's project

- GEN-SET power module standby For Iran telecommunication center – 104 sets
- Assembly, Test and delivery of MTU4000 GEN-SET power module – 116 sets
- Continuous power plant of Iran KHODRO Company – 2 sets
- continuous power plant of Potassium company – 2 sets
- Iranian petroleum national excavation company – 6 sets
- Sugarcane standby power plant – 2 sets
- Iran KHODRO press complex standby power plant – 2 sets
- Continuous power plant of ministry of power generation
- RAZI standby power plant – 1 set
- SIPA RING standby power plant
- GEN – SET of TEHRAN and its suburbs bus root company – 1 set
- GEN – SET of ZARRIN SOOLEH company – 1 set
- GEN – SET of AB-O-BARGHE KHOOZESTAN – 9 sets
- GEN – SET of FOOLAD GOSTARESH – 1 set
- GEN – SET of DESA company's standby power plant
- DESA's CHP power plant – 1 set





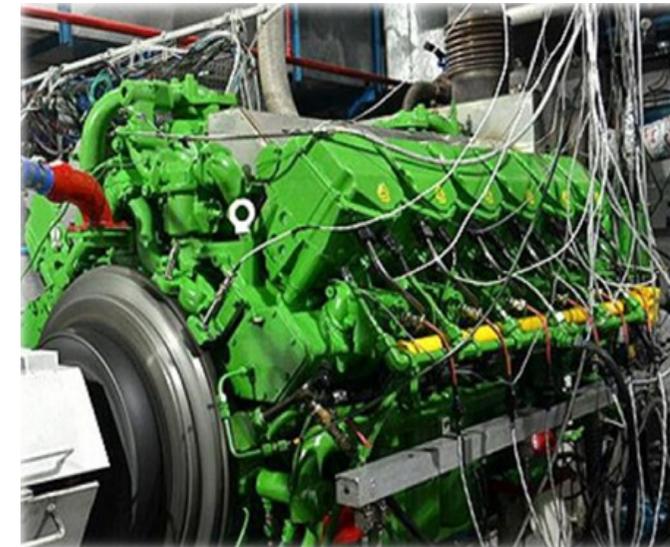
National domestic engine



National domestic engine

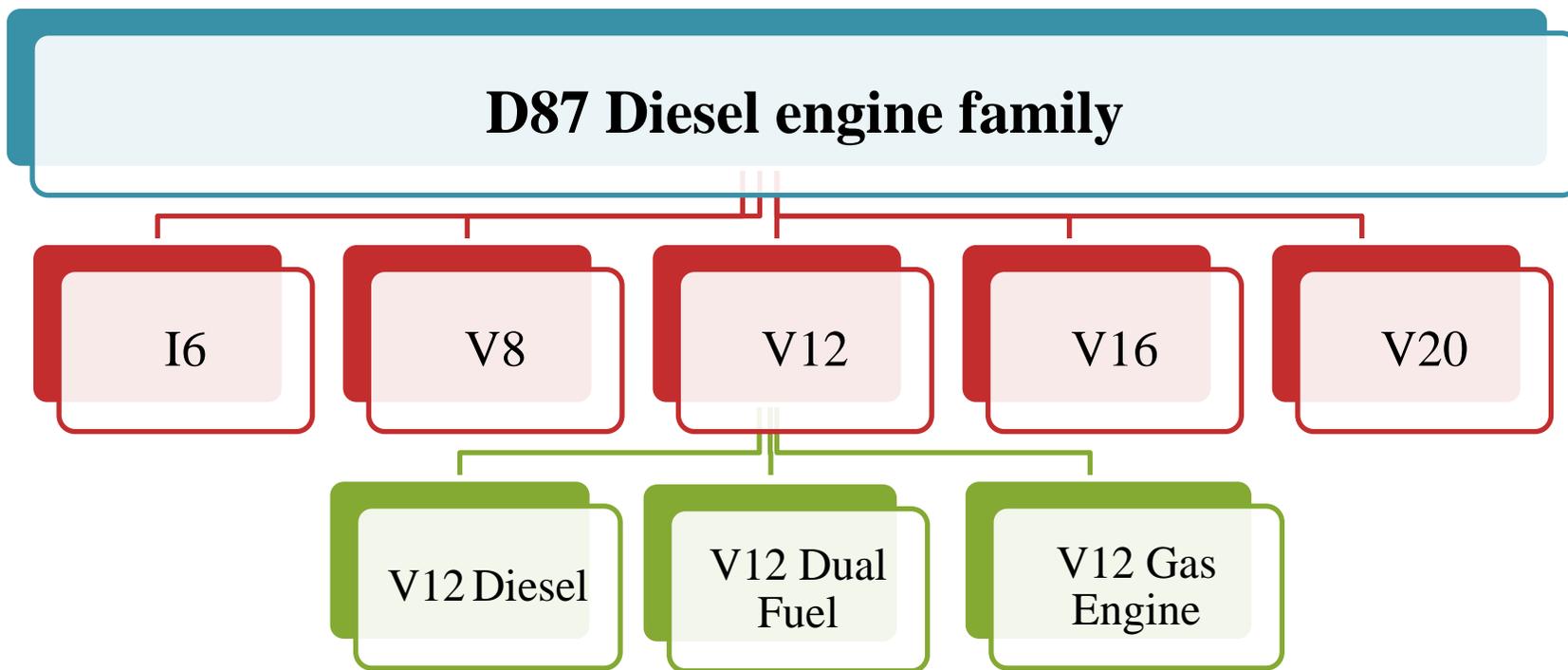
D87 Project

- ✓ Providing heavy Diesel engine requirements of different applications including railroad, marine, industrial and genset
- ✓ Obtaining the know-how of design and manufacturing of heavy Diesel engine
- ✓ Becoming familiar with up-to-date engine design standards in terms of materials selection, material usage, pollutant emissions, and fuel consumption
- ✓ Becoming as one of the designers and manufacturers of heavy Diesel engines
- ✓ Producing plenty of heavy Diesel engines' family
- ✓ Creating 400 to 2000 direct and indirect job vacancies and promoting personnel technically
- ✓ Providing national and international engine engineering and after sales service in all fields of heavy Diesel engines
- ✓ Optimizing and uprating other engines





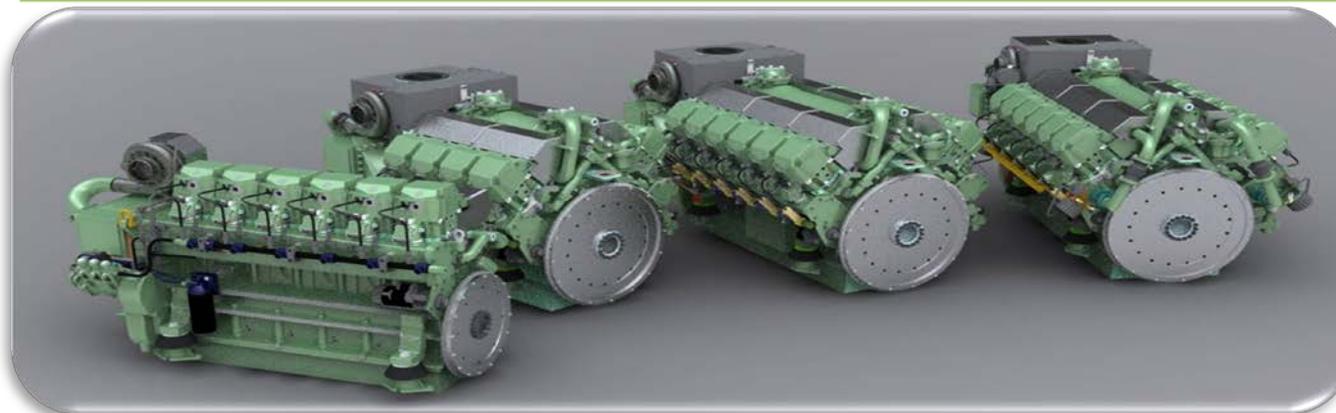
DESA D87 engine





National domestic engine

Parameter	unit	6-inline	V8	V12	V16	V20
bore	mm	150	150	150	150	150
stroke	mm	180	180	180	180	180
Engine volume	liter	19.09	25.45	38.2	50.9	63.6
length	mm	2150	1860	2290	3084	3996
width	mm	930	1290	1290	1420	1420
height	mm	1210	1290	1290	1419	1548
weight	kg	2600	3100	3700	4800	6000
Nominal power (1800-1500)	kw	550-650	650-700	850-1000	1200-1230	1500-1830





National domestic engine



D87 engine family sale vision

Application	Type	Engine	Required number
Industrial	V12	Diesel	200
	V20		
Industrial-Gen set	V12	Dual	100
Marine	V12	Diesel	8500
	V12		
	V16		
Railway	V12	Diesel	200
Railway	16		
Gen set	V12	GAS	250
Passive defense			



National domestic engine



The aims of the project national gas prototype D87 engine

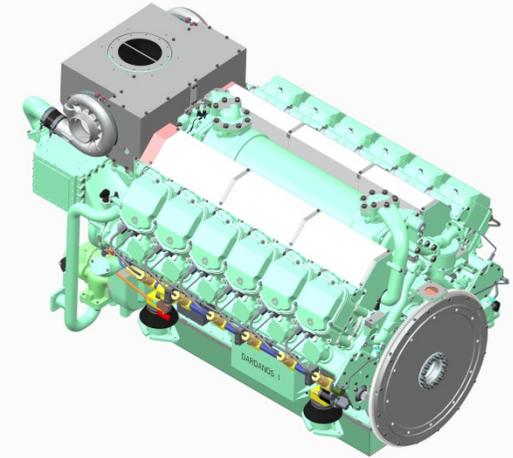
Minimum output power 850Kw at 1500rpm

The design of one power plant engine for electrical power generation

The design to achieve domestic suppliers for reducing product expense

The design according to overhaul 10000 hours

The national gas prototype engine's specification



Index	unit	value
Output power	(kW)	850
Engine speed	(RPM)	1500
Engine's minimum efficiency	(%)	39
Engine's maximum weight	(kg)	4000
BMEP	(bar)	18
Engine's total capacity	(LITER)	17.36
Compression ratio	-	11.5

- The heat loss of gas engine D87 would be 1220kW regarding its power is 850kW as well as engine's efficiency.
- In CHP mode, approximately 800kW could be achievable.
- The gas engine D87 efficiency in CHP application will reach to 80%.



A brief introduction and description of **DESA** company

Introduction

- Founded in 1991 as one of the top 10 national projects
- constructed on a 80-hectares land in Amol
- Entered the market with VASA22 engines from Wartsilla in 1998
- Assembled and tested 70 MAN 16RK215 engines for IR- Railway (started in 2004)
- Started a project with IR Railway to conduct main overhauls and repairing 50 MAN 16RK215 engines (30 engines were repaired, tested and delivered)
- Assembled and tested 104 Deutz engines for DG power plants of Telecommunication Company of Iran
- Installed DG power plants from 700 KW to 10 MW in Iran
- Conducted Navigation, Services and After sales services of MAN D2842 railbus engines
- Started D87 project in 2004 (A project for design and development of an engine family from 500 to 2000 kW power)
- Started a project with MTU for assembly and test of 114 MTU diesel engines having a power of 2.4 MW (4000 series)
- Started a project with Mapna to conduct main overhauls and repairing MTU 4000 engines



Iran heavy diesel engine manufacturing company is one of the constructive projects out of decimals, which established in 1991 in order to produce medium speed heavy diesel engine with potentials of 270 sets annually, is confirmed in Islamic council parliament and its construction started at 1992 in AMOL. In 1993, considering the article 15 related to budget law, this project separated from ministry of heavy industries and its handling was handed to Iran industries' development and renovation organization. This company has begun its main activity with assembly, maintenance, installation and operation of diesel engines since 1998.

During last years, by assisting young specialists in the field of designing, production, supplying and heavy diesel engines maintenance for marine, rail and power plant applications, this company has become the only brand either in the country or in the Middle East that has acquired achievements and honors in country's industry domains which the most important of them are as follows:



Iran Heavy Diesel Engine Mfg. Co.

- ✓ Delivery of 400 set of various types of rail application engines to Islamic republic of Iran's rail way as well as their troubleshooting and maintenance
- ✓ constructing more than 10 power generation plant at capacity of 60 MW in different areas of the country
- ✓ Producing marine engines for country marine fleet
- ✓ Supplying, installing and operating the engines belong to petroleum excavation company
- ✓ Designing and manufacturing of dual fuel heavy engine and its opening by respectable petroleum minister

Iran heavy diesel Company has become an initiative in Iran rail way fleet by assembling and testing various types of the world newest engines in order to their delivery to rail way and other sub-branches.

These workshops are:

disassembly, parts inspection, crankcase washing room, turn over device, mechanical parts sub-assembly, mechanical main assembly, electrical parts assembly, test, painting and finishing works.

Field of activities

- Management in construction of industrial factories for production of different diesel engines with different applications
- Importing machinery and tools for manufacturing sections and end-users
- Exporting and after-sales services for company products
- Providing maintenance and overhaul services for diesel engine users
- Assembly and testing of diesel engines for both end users and other companies
- Providing technical services for diesel engine users
- Investment, partnership, and authorized activities in the work scope

Factory

- Production and assembly workshop
- Diesel Engine test cells
- Diesels repairing workshop
- Manufacturing workshop
- QC Laboratory equipped with the unique facilities for quality test of the parts
- Store
- Production and assembly workshop
 - Tools and equipment for engine assembly and overhaul
 - High qualified assembly technicians
 - QC lab with advanced measurement tools



➤ Test cells

- Having 6 test beds which 4 of them are active and equipped to all required devices for any types of engine's endurance and performance test between 100 – 3600 KW
- Having test rooms that are equipped to water break validated brand such as; TAYLOR .HORIB and SCHENCK
- Having upgraded and universal standard equipment to get international certificates such as; DNV, UIC, etc.
-



Designing and engineering scopes of diesel engines

- ✓ Designing and manufacturing of heavy duty diesel engine related to national engines' family
- ✓ Analyzing and simulating all components and engine's lateral equipment
- ✓ Developing and changing diesel engines' application
- ✓ Organizing special workshop for designing, analyzing and manufacturing of diesel engines
- ✓ Codifying and implementing torsion, vibration and sonic test

- ✓ Developing rail application engines and achieving approximately 30% of rail power
- ✓ Marinating the world latest engines for ferries
- ✓ Doing dependent dynamic and structural analyze
- ✓ Calculating fluid, thermodynamic and performance
- ✓ Designing and simulating marine's components

Electrical engineering scopes (power and control systems)

- ✓ Counseling, designing and supervising on power boards manufacturing for diesel generators
- ✓ Counseling, designing and supervising on control boards manufacturing for diesel generators in different positions of ferry
- ✓ Counseling, designing and supervising on manufacturing of driving engines' control system boards in different position of ferry
- ✓ Training power and control system for various types of diesel engines on level operation, middle and main
- ✓ Training control monitoring systems for ferry driving engines on level operation, middle and main
- ✓ Training the requisite electrical control accurate devices at ferry recommended equipment
- ✓ Training SIEMENS control monitoring software such as; SIMATIC MANAGER. WINCC. WINCC FLEXIBLE on three distinct levels
- ✓ Counseling, designing and supervising on electrical systems' installation using for various diesel emergency or never-ending power plant
- ✓ Counseling, designing and supervising on electrical systems' installation for diesel engines test rooms

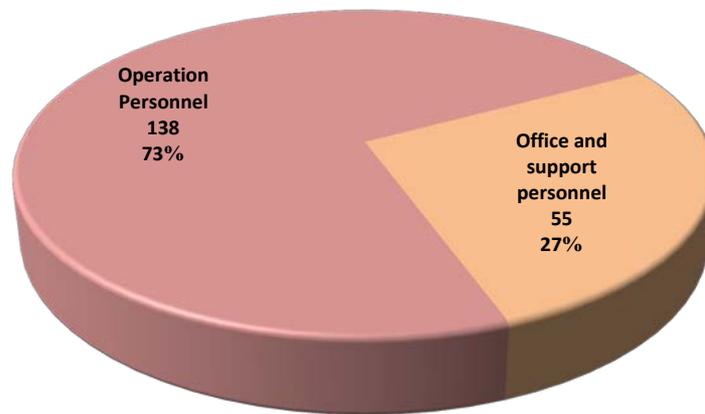


The reference laboratory for calibration and test (having endorsed cooperation certificate for standard organization)

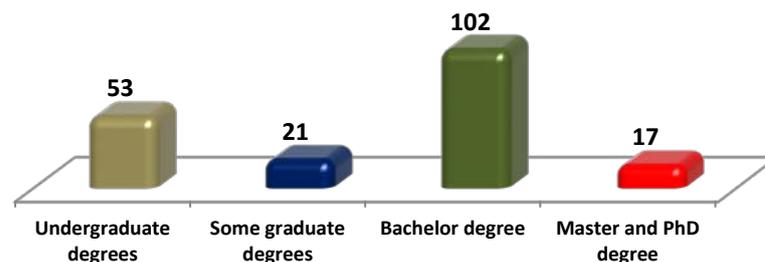
- ✓ Calibrating various types of caliper, depth measuring gauge , micrometers, vertical measuring device and torque meters
- ✓ Calibrating filler gauge, dial gauge
- ✓ Measuring all light duty vehicles and engine's components geometrical and dimensional measurement
- ✓ Measuring surface roughness (clearance) on various surfaces of machined components
- ✓ Calculating lack of confirmed measuring in calibrations and tests
- ✓ Calculating optimum power measuring in the calibration and test procedures
- ✓ Estimating the calibration timespan between various types of quantities according to Iran defensive standard
- ✓ Metrology of various types engine and lateral equipment



Human resource scope



details of human resource line up according to level of education



DESA's potentials in the scopes of heavy duty diesel engines' maintenance

- **Planning systematic periodical inspection**

This company is able to present detailed and systematic program, replacing different parts and repairs at different levels by applying staff's technical and skillfully capabilities as well as different engines' documents.

- **Presenting technical services and supports**

DESA is utterly ready to make contract and do perfectly maintenance service and all predicted services with companies and factories which have many types of diesel engines in different applications. That's coherently could be done by allocating resident specialist if both parties recognize or take it into account.

- **Troubleshooting**

Undoubtedly, one of the main perfect and well done work's procedures is exact finding of the failure reason. This company, regarding to its skilled and trained staff, is ready to render services to its compatriots for diagnosing different diesel, dual fuel and gas fueled engines.

- **Presenting different checklists**

Regarding to proper operation of an engine, there is a close relation to engine's running-in and shutting down as well as engine's performance in various loads and circumstances. Our specialists and engineers are able to present checklist of how an engine could be operated and shut down in addition specific tables in order to record the engine operational steps.

- **Supplying maintenance instructions**

Definitely, the variety and the abundance of equivalent engines in industry require a maintenance manual book for any engines that become accessible for a user in order to not being encountered difficulty in operating time due to the dimensional limitation for many parts.

- **Presenting all maintenance services at different levels till overhaul**

DESA Company is ready to do complete overhaul and reform the light and heavy duty diesel, dual and gas engines for different applications on site or into DESA considering its specialists and their practical and functional training terms for maintenance in reputable and validated companies.

It is to mention that, regarding to different test cells in factory and after engine maintenance, the company can test the engine via different dynamometer. Furthermore, the repaired engines in the factory will be thoroughly painted, in such a manner that the repaired engines are completely the same as the new engines in terms of both power and the appearance.



- **Supply of components needed for the repair engines**

Due to the mutual contracts with world-leading engine manufacturers, DESA has no problem for supply of components needed for the repair engines and can procure the components directly from the original manufacturers which is a good warranty for well-structured components and to a higher degree good engine operation.

- **Inspection and repairing of different components**

Due to the high qualified personnel and equipment, DESA can inspect and repair (both minor and major) components such as cylinder-head and liner of engines with different applications. These include repairing or changing items such as valve seat and guide. Examples for successful achievement are repairing MAN and MTU cylinder-heads. Moreover, due to the crack-detection equipment (such as UT, MT and PT) which DESA owns, careful inspection of all engine components and detection of component cracks are possible which prevents any risk in using the components.

- **Leakage tests**

One of the major problems which is common in different engines, is the water or oil leakage from different engine parts such as coolers and liner O-rings. Due to the hydraulic pressure test equipment which DESA



owns, careful and standard pressure test of block, coolers, cylinder-heads and etc. to detect and remove leakages are possible.

- **Technical and repair services in operation during travel**

One of DESA's successful achievements was management, maintenance and repairing of engines in operation, in projects such as gen-set wagon and train-set self-propulsion trains. DESA is ready to send qualified technical personnel with rail engines, to assure the customer that all technical issues are prevented and in case of any technical failure it can be resolved quickly during the travel. It should be mentioned that all disassembly and repairing activities either in the factory or at customer's site are conducted based on standard documents, and best calibrated equipment and instrumentations are used for components investigation in order to validate the acceptable performance of all components.

The stages of heavy diesel engine repairing



The figure of repair engine sent from railway



The stage of disassembly and receiving repair engines



Disassembled engine block



Turnover station to enhance assembly and disassembly activities



The stage of cleaning all bearing seating surfaces and crankshaft oil drillings



Engine block turnover tool to wash and inspect different sections



Separation of usable and rejected components



Equipped laboratory for careful components measurement



Continuous presence of quality control inspectors to ensure high quality assembly and test procedures



Ensuring the quality of moving and rotating surfaces



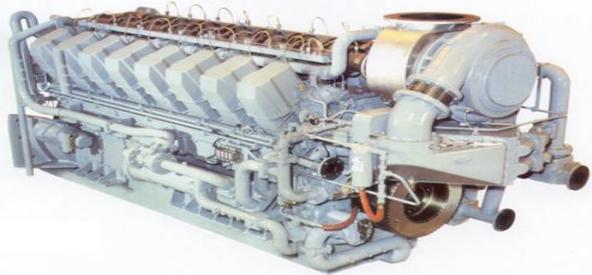
Assembly the engines based on standard procedures



Pre-assembly section



Disassembly of components and technical inspection and service



RK215 engine after completion of assembly stages



Disassembly, washing, component inspection, NDT on firing surfaces, leakage test, seating valves, etc.



Sending the engine to test cell, installing electrical and mechanical joints, engine loading based on test procedures



Packaging station



Washing, painting and complementary activities

The activities done in the field of heavy diesel engines repairing

❖ **Repairing 50 Ruston engines.**

- **Contract subject: supply of components, main overhaul and testing 50 RUSTON 16VRK215 engines**
- **Customer: Islamic Republic of Iran Railway.**



❖ **Repairing MTU4000 engines.**

- **Contract subject: Repairing and delivery of Mapna MTU4000 engines.**
- **Customer: Mapna Company.**



❖ **Repairing MAN2842 engines**

- **Contract subject: Repairing and delivery of MAN2842 engines**
- **Customer: Wagon Pars Company.**



❖ **Repairing MTU 538 engines**

- **Contract subject: supply of components, main overhaul and testing MTU538 engines**
- **Customer: Shahid Rasouli Industries.**





DESA's training department

Human resource

Regarding the availability of skilled employees and graduated students at DESA as well as they are trained and certified by the most reputable companies in the world, the technicians, engineers, and designers of this company are ready thoroughly to represent their achievements.

Besides, DESA's individual facilities and fundamentals have caused special potential within this domain. Issuing and codifying applied training booklet for all employers' considered engines also the presentation of practical and theoretical objects are DESA's training department honors.

The specialists of this company are trained and certified by the world validated companies such as; AFS , MAN , RUSTON , WARTSILLA , MTU , TECHNOMOT in Finland, England, Germany and Canada in designing, assembly, test, maintenance, implanting and UIC test supervision for dual fuel and light duty natural gas engines, development of maritime industries.

DESA's managers do believe that work staff is the most important factor for each organization, so the training is being taken into account and has valid history in DESA.

The main targets of training department at DESA:

- Updating the science
- Achieving new skills
- Implementing and orientating attained skills in the organization activities
- Training to organizations, companies and institutions (gaining international training reputable brand)
- Gaining acceptable index in country's scientific output
- Holding congress and professional workshops

Finished training terms

Some of training terms which DESA's employees passed are as following table:

Training venue	Training title
MAN England	General training of Ruston engines
	Ruston assembly and test procedures
	Ruston engines' maintenance
MTU Germany	Assembly of MTU engines
	Training of MTU's after sales service
	Training of MTU engine's test
	Power line 4000with ECU-7
CP England	Training of CP software
Waretsilla Finland	Training of Wartsilla engines
AVL congress Austria	Gas engines' workshop
Technomot England	Engine design
IPCO	Engine manufacturing's workshop
	Architectural design workshop for engine's ECU
Islamic republic of iran railway	Training of train set driving
EBASTO	Rail application heating systems
Easy laser	Measuring and leveling system
Vocational training center	Accurate tools
	Working with thermal meters
	Industrial drawing power
	Welding(manual electrical arc, E6, G3, G4, covered gas grade 1 st)
	Welding inspection and non-destructive tests
	Training of marine engines
	CATIA software
	Hydraulic and pneumatic (basic, advance, electricity supply control)
	PRO/E software
	Solid works software
DESA	Training of marine floating
	Training of OM457 engine diagnosing device
	Maintenance of MAN 2842
	Production procedure
	Basic concepts of quality management system
	Training of ISO documentation
	Internet and security of network
	ISO 2008 - 9001
Management in general	

Training venue	Training title
	APQP
	QFD , COQ ,CIP ,5S
	EDS
	FMEA and necessities' training
	OM457 engine training
	Process control and product's evaluation
	CREO software
	Safety in laboratory and risks of chemical materials
	Industrial electrical power
	Developing test general introduction
	D87 assembly training
	Measuring principles and tools recognition
	Diesel engines and national gas engine fuel system (HEINZMAN)
	Resilient couplings alignment
	Storage procedure, product preservation and delivery
	Purchase and supply procedure
	Actuator assembly and its internal parts recognition
	Internal combustion engines theoretical concepts
	Training of engine's performance analysis
GT POWER software	
West training and develop center	AVL-FIRE Software
Noshirvani industrial university develop center	Research and development and its position on economical realtors
Andazeh Negasht	Measuring and calibration
Iran industrial research center	Project management and planning
	Communicating management to the customers (CRM)
	The principles and ways to establish technical archive
Tof navard academy	Balanced preferential card B.S.C
	IRIS standard
	Training of marketing management
Industrial management organization	ISO 17025 training principles and internal audit training
	Executive management
Idem Tabriz	Training of Primavera
	Familiarizing diesel engines assembly and manufacturing
QMS company, the research and development center of work safety and protection regulation	OHSAS 18001
SWIQ company	Training of welding via Argon
Govah company	Engine maintenance series 457, 500, 900

Training venue	Training title
Mazandaran Industries head office	Degenerating sedimentation of steamers
Modern System Alborz	Training of intermediate connecting system
Canteronic training center	Mechanical desktop software
Itako, Andazeh Negasht company	Dimensional and geometrical toleration (GD&T)
Mashahir Paytakht	Training of Rapid form
ELIN EBG company	SCADA control system planning
Ameed company	CHP systems design
Petrodad Danesh company	Training of Flow master
Iran's standard institution	The calculation principles of lack decisive action in test results
Sharif industrial university	Ocean engineering principles
Tehran Khat Ramz company	Training of EFQM
	Training of total management quality
CIMAC congress	the workshop of internal combustion engines turbocharger conformity and its selection
	Training of sound, vibration and turbulence
Casting founders society	Training of the defects of cast iron and steel products

Training courses from DESA

DESA is able to have training courses in technical affairs as follows regarding the availability of skillful employees as long as proper fundamentals of software and instruments

- full description of engine maintenance and troubleshooting
- Full engine and lateral equipment training – basic operation
- Full engine and lateral equipment training – intermediate
- Full engine and lateral equipment training – main
- Internal combustion engines' design – diesel engines
- Engine test
- Familiarizing non-destructive test strategies
- Familiarizing tools and engine test chamber
- Familiarizing steels and cast irons nomination and their application in engine
- Diesel engines rail application standard (UIC)

- Marine diesel engines standard (DNV)
- Air pollution, control planning, and equipment design
- CHP and its application
- Simulating combustion cycle and formation air pollutant in diesel engines and the effects of its specification on engine's performance
- Piston's structural and thermal analysis
- Crankshaft torsion vibration analysis
- Production planning
- Project managing and planning
- Projects feasibility
- Storekeeping and store planning
- Supply chain management
- Maintenance planning

Syllabus of above training terms would be announced to applicant organizations if requires

Training facilities

Training course

An appropriate visual and hearing course with peaceful and convenient atmosphere for training activities has been established. Meanwhile, having different training terms and getting the feedback of customers' worthwhile concepts show the satisfaction of given services.



Production and test area

The production and test working area are equipped with exclusive facilities for practical training. The fact that caused DESA's specific capability in training is; many year's experiences and sciences in heavy and semi heavy diesel engines as well as collaboration with engine manufacturers in the world in order to domestic marketing of this tremendous science.



Trainee's locating

DESA's guest house with its relaxing and peaceful environment and services will be rendered to trainees. Its unique environmental view also its adjacency to the training courses has created a favorable condition.



Finished training courses and Ongoing training courses that committed to sign contract

- Full engine and its lateral equipment training – pielstik (O,I,D)
- Project planning and management
- Full engine and its lateral equipment training – Gen- set MAN 2842 (O,I,D)
- Fluid flow analysis via ANSYS – FLUENT software
- Piston 's structural and thermal analysis
- Crankshaft torsion vibration analysis
- Simulating combustion cycle and formation air pollutant in diesel engines and the effects of its specification on engine's performance
- Marine gas turbine
- Marine diesel engines
- Marine gearbox
- Marine driving systems



The presentation of DESA's products

Power plant application

The project of equipping DESA's combined heat and power plant

This project has been done by utilizing one WARTSILLA engine 4 cylinders for standby purposes and has been operating since 2006 up to now. The engine and generator technical specification are presented as the data included in the following table:

Engine specification	
Engine type	4R22/26
Engine rated power	710 KW
Engine speed	1000 RPM
Type of consumable fuel	Gasoline
Generator specification	
Generator type	DSG 74 M2-6
Generator rated power	800 KVA
Voltage output	400 V
AVR	COSIMAT C



WARTSILLA 4R22/26

Project Code: D-PP-C01

In 2008, DESA has operated ZARIN SOOLEH CO. standby power plant by utilizing 2 set DEUTZ engine.

Engine specification	
Engine type	BF 6M 1013EC
Engine rated power	100 KW
Engine speed	1500 RPM
Type of consumable fuel	Gasoline
Quantity	2
Generator specification	
manufacturer	AVK
Generator type	DSG 43 M1-4
Generator rated power	150 KVA
Voltage output	400 V
AVR	COSIMAT N
Total capacity	0.2 MW



DEUTZ BFEC1013M6

Project Code: D-PP-C02

Iran Heavy Diesel Engine Company began to operate the stand by electric unit for Tehran and the suburbs bus service by utilizing 3 set DEUTZ engine

Engine specification	
Engine type	BF 8M 1015C
Engine rated power	333 KW
Engine speed	1500 RPM
Type of consumable fuel	Gasoline
Quantity	3
Generator specification	
manufacturer	AVK
Generator type	DSG 62 M1-4
Generator rated power	350 KVA
Voltage output	400 V
AVR	COSIMAT N
Total capacity	0.84 MW



DEUTZ BF C1015

Project Code: D-PP-C03

In this valuable project, regarding 104 sets DEUTZ engine, DESA has acted to operate standby power plant for Telecommunication Company.

Engine specification	
Engine type	BF 8M 1015C
Engine rated power	333 KW
Engine speed	1500 RPM
Type of consumable fuel	Gasoline
Quantity	104
Generator specification	
manufacturer	AVK
Generator type	DSG 62 M1-4
Generator rated power	350 KVA
Voltage output	400 V
AVR	COSIMAT N
Total capacity	29.12 MW



DEUTZ BF8M 1015C

Project Code: D-PP-C04

This project was accomplished by DESA in 2008 by utilizing 2 set VOLVO engine for standby purpose under the supervision of Iran industries development and renovation organization.

Engine specification	
Engine type	TAD 1242GE
Engine rated power	385 KW
Engine speed	1500 RPM
Type of consumable fuel	Gasoline and gas
Quantity	2
Generator specification	
manufacturer	STAMFORD
Generator type	HCI 544E
Generator rated power	450 KVA
Voltage output	400 V
AVR	SX421
Total capacity	0.72MW



VOLVO TAD1242 GE

Project Code: D-PP-C05

This project is supposed to operate in 4 milestones with the purpose of continuous application by utilizing 14 sets MTU engines which are detailed in the following table.

D-PP-C05/1

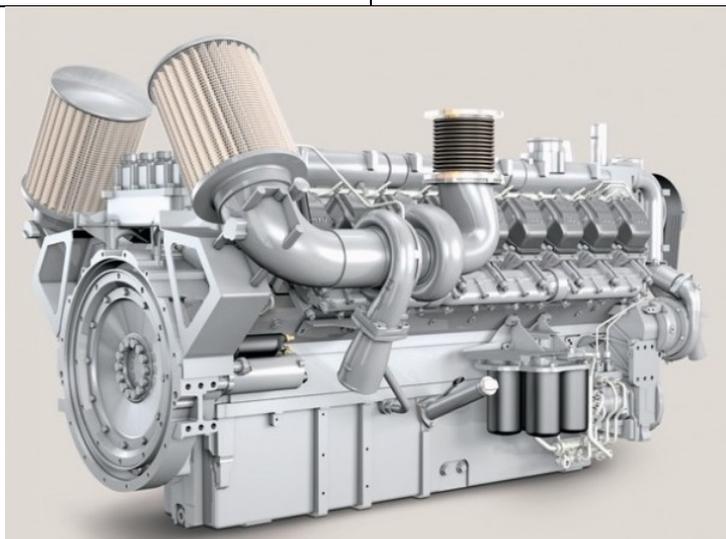
Engine specification	
Engine type	12V2000 G65
Engine rated power	629 KW
Engine speed	1500 RPM
Type of consumable fuel	Gasoline
Quantity	6
Type of application	Continuous
Generator specification	
Manufacturer	NEWAGE STAMFORD
Generator type	MVWI 734 E
Generator rated power	800KVA
Voltage output	3300 V
Total capacity	3.840 MW



MTU 12V2000 G65

D-PP-C05/2

Engine specification	
Engine type	16V2000 G25
Engine rated power	729 KW
Engine speed	1500 RPM
Type of consumable fuel	Gasoline
Quantity	3
Type of application	Continuous
Generator specification	
Manufacturer	NEWAGE STAMFORD
Generator type	MVWI 734 E
Generator rated power	1000KVA
Voltage output	3300 V
Total capacity	2.4MW



MTU 16V2000 G25

D-PP-C05/3

Engine specification	
Engine type	18V2000 G65
Engine rated power	910 KW
Engine speed	1500 RPM
Type of consumable fuel	Gasoline
Quantity	2
Type of application	Continuous
Generator specification	
Manufacturer	NEWAGE STAMFORD
Generator type	PI 734 A
Generator rated power	1200KVA
Voltage output	400 V
Total capacity	1.92 MW



MTU 18V2000 G65

D-PP-C05/4

Engine specification	
Engine type	12V4000 G23
Engine rated power	1320 KW
Engine speed	1500 RPM
Type of consumable fuel	Gasoline
Quantity	3
Type of application	Continuous
Generator specification	
Manufacturer	NEWAGE STAMFORD
Generator type	PI 734 D
Generator rated power	1700 KVA
Voltage output	690 V
Total capacity	4.08 MW



MTU 12V4000 G23

Project Code: D-PP-C06

In 2000, 2 sets of WARTSILLA engine were operated in RING SAIPA for standby purpose

Engine specification	
Engine type	4R22/26
Engine rated power	710 KW
Engine speed	1000 RPM
Type of consumable fuel	Gasoline
Quantity	2
Generator specification	
manufacturer	LEROY SOMER
Generator type	LSA 50 VL11-6P
Generator rated power	795 KVA
Voltage output	400 V
AVR	ESB 10/12-250P
Total capacity	1.35 MW



WARTSILLA 4R22/26

Project Code: D-PP-C07

This power plant has been planned by DESA to generate standby mode by utilizing 2 sets MTU engine

Engine specification	
Engine type	18V2000 G63
Engine rated power	985 KW
Engine speed	1500 RPM
Type of consumable fuel	Gasoline
Quantity	2
Generator specification	
manufacturer	LEROY SOMER
Generator type	LSA 50.1 M 6 C6/4
Generator rated power	1100 KVA
Voltage output	400 V
AVR	AREP-R449
Total capacity	1.76 MW



MTU 18V2000G63

Project Code: D-PP-C08

DESA implemented standby power plant for SEROM SAZI CO. in 2004 by utilizing 2 set RUSTON engine

Engine specification	
Engine type	6RK215
Engine rated power	1120 KW
Engine speed	1000 RPM
Type of consumable fuel	Gasoline
Quantity	2
Generator specification	
manufacturer	LEROY SOMER
Generator type	LSA 52.2M60
Generator rated power	1150 KVA
Voltage output	400 V
AVR	AREP
Total capacity	2MW

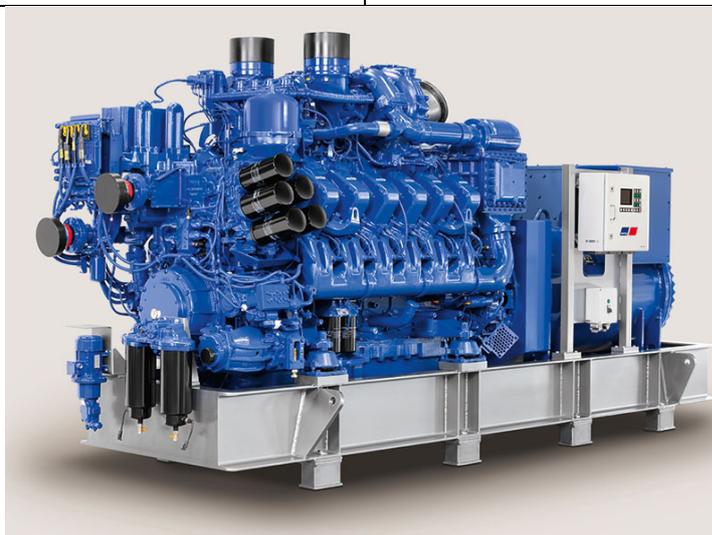


RUSTON 6RK215

Project Code: D-PP-C09

This power plant has been equipped and operated by two sets MTU engine

Engine specification	
Engine type	12V4000 G20
Engine rated power	1200 KW
Engine speed	1500 RPM
Type of consumable fuel	Gasoline
Quantity	2
Generator specification	
manufacturer	LEROY SOMER
Generator type	LSA 50.1 M 6 C6/4
Generator rated power	1500 KVA
Voltage output	400 V
AVR	AREP-R449
Total capacity	2.4 MW



MTU 12V4000 G20

Project Code: D-PP-C10

This power plant was equipped and operated by Iran Heavy Diesel Company in 2004 – 2005 by utilizing 4 sets WARTSILLA engine

Engine specification	
Engine type	12V22/26
Engine rated power	1950 KW
Engine speed	1000 R.P.M
Type of consumable fuel	Gasoline
Quantity	4
Generator specification	
manufacturer	AVK
Generator type	DIG6/1301
Generator rated power	1875 KVA
Voltage output	6000 V
AVR	COSIMAT N+
Total capacity	6 MW



WARTSILLA 12V22/26

Project Code: D-PP-C11

In this project, DESA has operated 4 sets MIRRLEES BLACKSTONE engine in order to generate continuous power from single select (gasoline) to double select (gasoline and gas) fuel

Engine specification	
Engine type	K9-Major
Engine rated power	3263 KW
Engine speed	1000
Type of consumable fuel	Gasoline and gas
Quantity	4
Generator specification	
manufacturer	STAMFORD
Generator type	MVI 734 E
Generator rated power	3500 KVA
Voltage output	6 KV
AVR	XS 440
Total capacity	12 MW



MIRRLEES BLACKSTONE K9-Major

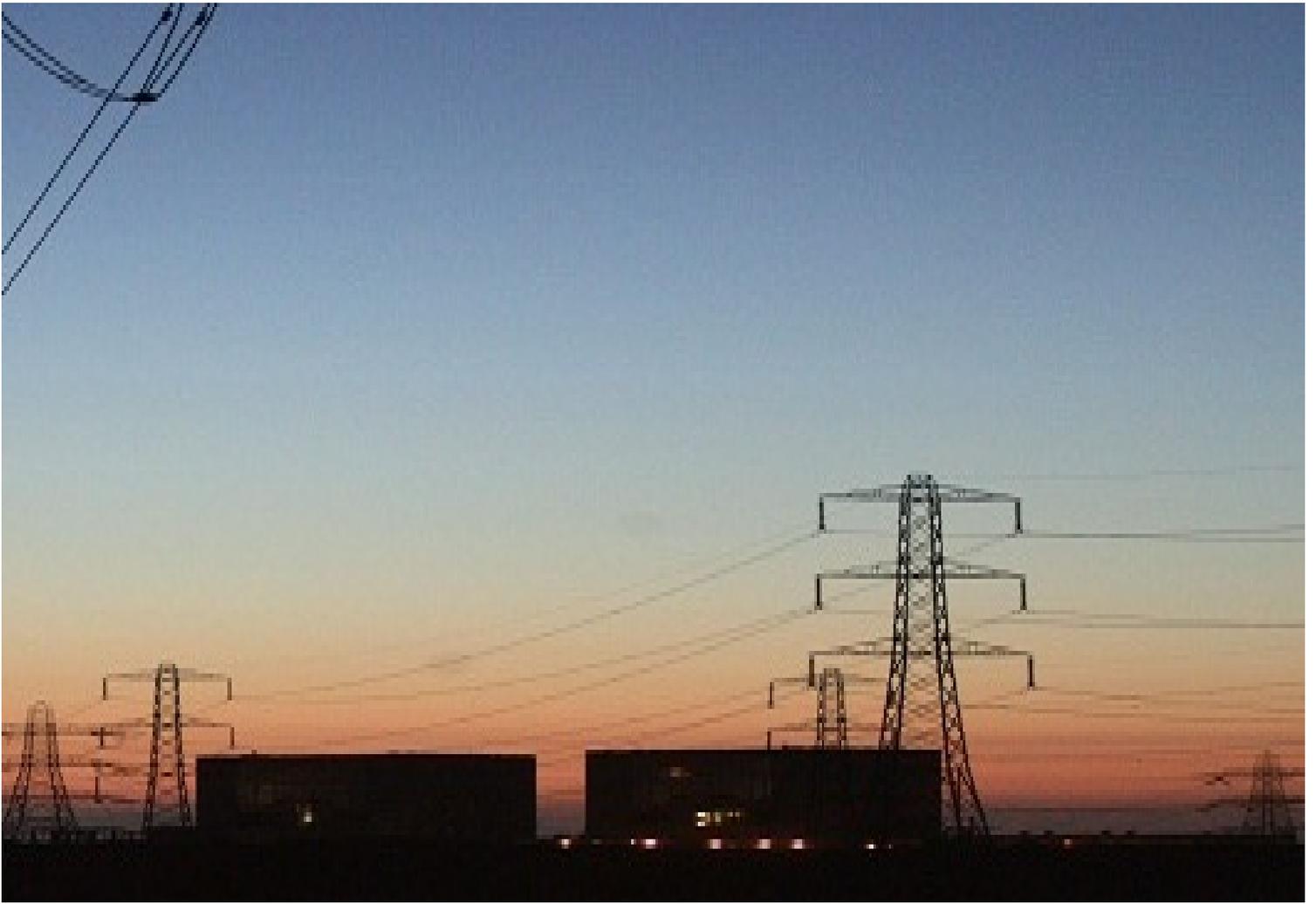
Project Code: D-PP-C12

In 2004, two sets of CATEPILLAR gas engines installed in IRAN KHODRO CO. with continuous application under the supervision of German supervisor.

Engine specification	
Engine type	G 16 CM34
Engine rated power	6100 KW
Engine speed	750 RPM
Type of consumable fuel	Natural gas
Quantity	2
Generator specification	
manufacturer	LEROY SOMER
Generator type	LSA 58 S6
Generator rated power	6436 KVA
Voltage output	6600 V
AVR	AREP
Total capacity	10.23 MW



Caterpillar G16CM3



No8, Toor alley, South Mofatteh St, 7 Tir square, Tehran, Iran

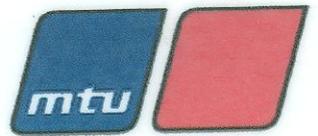
Postal code: 1584864813 Tel: +98 (21) 88324738, 86071936 Fax: +98 (21) 86071931

www.desa.ir

info@desa.ir



Rolls-Royce



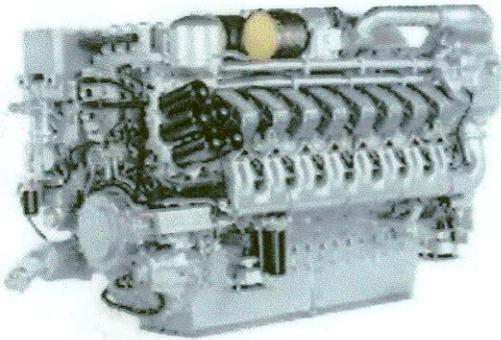
Rolls-Royce Power Systems AG

Power. Passion. Partnership.

Certificate

**According to Contract from 29.10.2009 between MTU/DESA
Project, 114 Engines**

Mr.	Shahram Ashori
Of	Iran Heavy Diesel Engine MFG Co. (Desa)
Attended from	01.02.2011
To	30.04.2015
Engine MTU	16V4000R43L



Project Contents

- Complete Assembly PKD/SKD AP2 Station
- Power Module Assembly AP3 Station
- Working about MTU Quality Standards
- Usage of MTU Assembly Documentation
- Working about MTU Assembly Quality Procedure



All Work was done under Supervision MTU Germany, MTU Quality Standard Rules

Andreas Kofler Supervisor MTU, Amol 30.03.2015



Certificate

Mr. Shahram Ashory

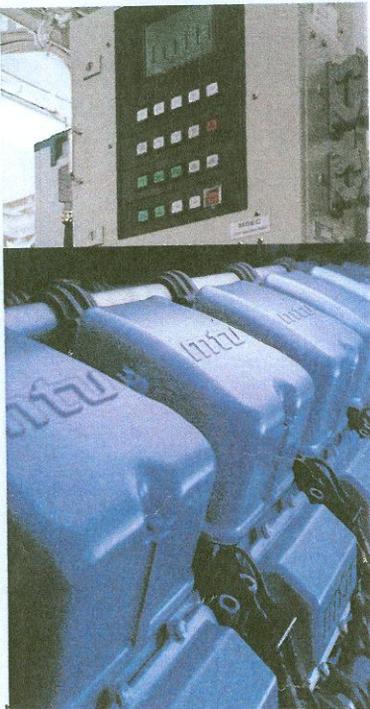
of IRAN HEAVY DIESEL
ENGINE MFG CO.

attended from 06. April 2010
to 02. June 2010

a full-time training course on Power Module 16V4000R43L

including the following topics:

- Complete Engine Assembly 16V4000R43L
- Power Module Assembly
- Usage of MTU Assembly Documentation
- Explanation of necessary Tools, Fixtures.



Friedrichshafen, 02. June 2010


Witzmann


Vetter

MTU Friedrichshafen
Licence Department ESOL





Rolls-Royce

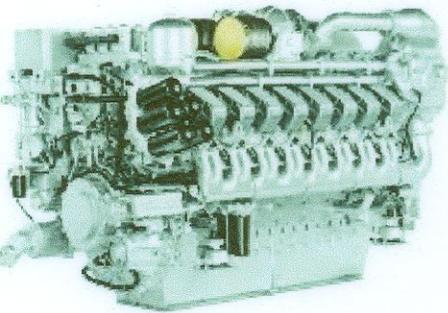
Rolls-Royce Power Systems AG



Power. Passion. Partnership.

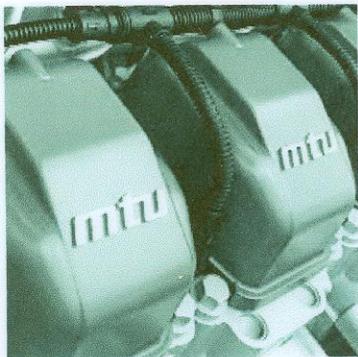
Certificate

Mr. Shahram ashori
of DESA Iran Heavy Diesel Engine
attended from 04.04.2010
to 21.05.2010
a fulltime Training Course on Engine 16V4000R43L



Course Contents

- Complete Engine Assembly 16V4000R43L
- Power Module Assembly
- Usage of MTU Assembly Documentation
- Explanation of necessary Tools, Drawing



Friedrichshafen, 21.05.2010

Andreas Kofler Supervisor MTU



Zertifikat

Mr. Manouchehr Yousefian

attended the training

Rail Heating Systems

Thermo 230 - 350

from February 11 – 12, 2010

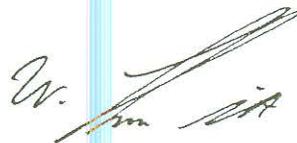
successfully.

**As certified Webasto specialist he is familiar with
all technical basics enabling him to provide
profound technical services.**

Gilching, February 12, 2010

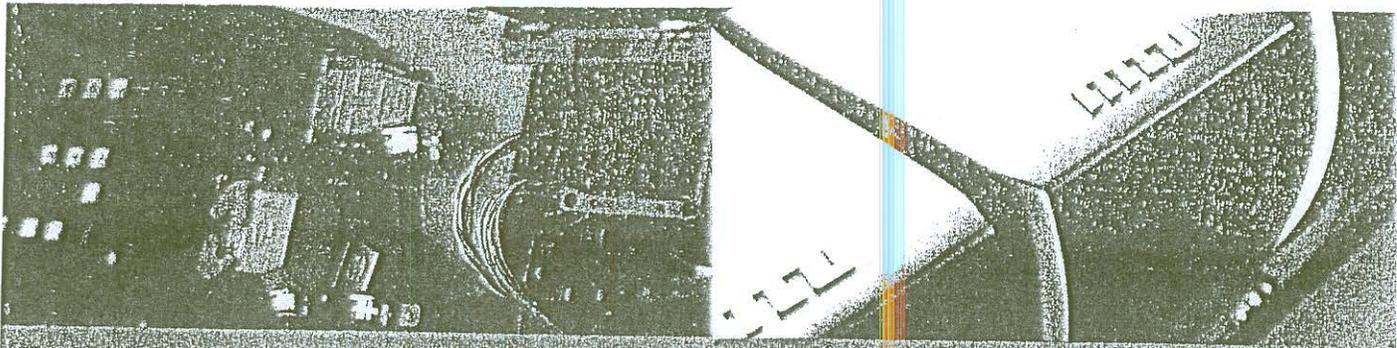


Armin Küllmer
Manager Product & Technic
GCS Germany



Walter Schmitt
Trainer

Certificate valid until February 2012



CERTIFICATE

MR. Manouchehr Yousefian

of DESA

attended from 15.02.2010

to 19.02.2010

a fulltime-course on 4000-03 M1/R

Course contents

- Initial test
- Handling of documentation
- Design and function of the engine
- Explanation of oil, fuel, etc. systems
- Explanation of the Fluids and Lubricants Specification
- Troubleshooting
- Execution of maintenance tasks QL 2
- Exchange of the subassemblies
- Final Test (verification of success)

Instructor: Ralf Brügger

Senior Manager Training Center



Friedrichshafen, 19.02.2010

Iranain Industrial Development & Rehabilitation Organisation
Iran Heavy Diesel Engine Manufacturing Company

Certificate Of Training

This is to certify that

Manuchehr Yusefian son of Mohammad

Identity number 10

Representing the DESA Production Department

Has successfully completed a 250 hour
Assembly and Test Training Programme on the

MAN B & W Diesel Ltd

16 RK215T Diesel Engine

During his working period with the DESA Company
between the following dates

March ~ July 2005

Issue Date :

84/3/17 (01.08.2005)

serial Number : 366

Signed

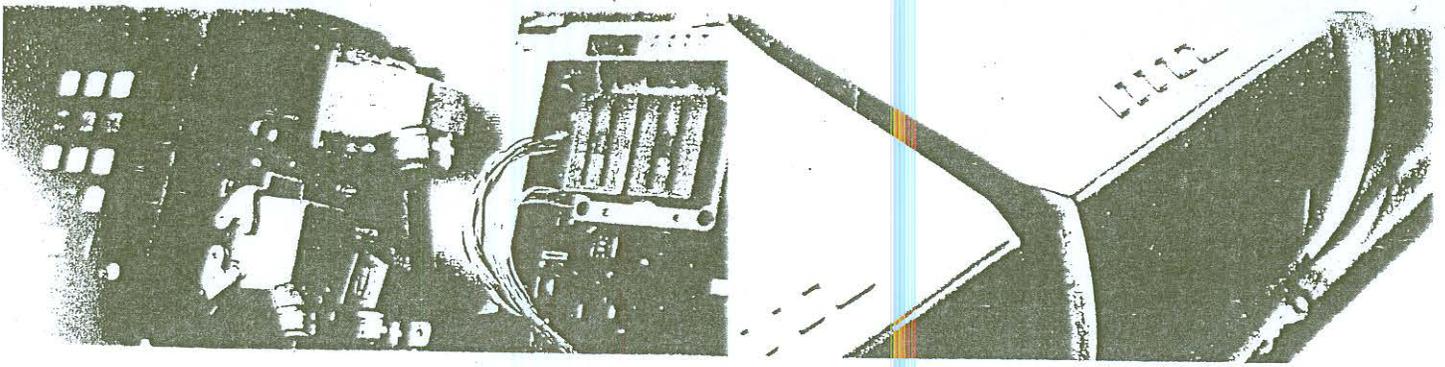
Signed

Training Department Manager

TT Supervisor

DESA

MAN B & W Diesel Ltd



CERTIFICATE

MR. Manouchehr Yousefian

of DESA

attended from 22.02.2010

to 26.02.2010

a fulltime-course on Powerline 4000 with ECU-7

Course contents

- Introduction of Scope of electronics
- Handling of documentation and drawings
- Explanation of:
 - System operations / functions / configuration
 - Engine wiring and sensors
 - Governor (ECU-7) functions and parameters (level 1B)
 - Component replacement
 - Commissioning tasks
- Servicing the dialog units and service tools specific to the respective system e.g.:
 - DiaSys 2.xx (actual version)
 - CAN communication
 - Programming of the system software
 - Malfunction symptoms
 - Extended troubleshooting
- Final Test

Instructor: Joachim Herbst

Senior Manager Training Center



Friedrichshafen, 26.02.2010



CERTIFICATE

Mr Manochehr Yousofian

from

IRAN HEAVY DIESEL ENGINE MFG.CO (DESA)

Participated in a high level repair course on MAN industrial Diesel engines D 2842 LE 602 from 27. April until 01. May 2008.

The course included the repair of the MAN Diesel engine, a presentation of the engine in theoretical and practical instructions in the structure and mode of operation of the engine and its individual components.

As a result of his theoretical and practical knowledge he is qualified to carry out the technical service, maintenance and repair of MAN Diesel engines.

Amol, 01. May 2008,


Bernd Böhmländer


Günter Gmelch

MAN Nutzfahrzeuge Aktiengesellschaft
Business Unit Engines and Components
Nuremberg Plant

MAN B&W Diesel Ltd



Certificate of Training

MAN B&W Diesel Ltd
hereby certify that

Darbanjafari Navid
Iran Heavy Diesel Engine Manufacturing Company DESA

has completed the
RK215T Engine Assembly Training Course

The training began on 1st July 2002
and
was completed on 26th July 2002
and the training was completed to our satisfaction

Signed  (MAN B&W Diesel Ltd)
Brian H Sutton, Training Manager

Date issued: 26th July 2002

Serial number 1121

MAN B&W Diesel Ltd
Bramhall Moor Lane, Hazel Grove, Stockport, Cheshire, SK7 5AH
Tel: +44 161 483 1000
Fax: +44 161 487 1465
www.manbwLtd.com



MAN B&W Diesel Ltd.
Registered in London NO. 759517
Registered Office
Bramhall Moor Lane, Hazel Grove
Stockport, Cheshire SK7 5AH, England



CERTIFICATE

MR. Ali Janalipouromran

of DESA

attended from 22.02.2010

to 26.02.2010

a fulltime-course on **Powerline 4000 with ECU-7**

Course contents

- Introduction of Scope of electronics
- Handling of documentation and drawings
- Explanation of:
 - System operations / functions / configuration
 - Engine wiring and sensors
 - Governor (ECU-7) functions and parameters (level 1B)
 - Component replacement
 - Commissioning tasks
 - Servicing the dialog units and service tools specific to the respective system e.g.:
 - DiaSys 2.xx (actual version)
 - CAN communication
 - Programming of the system software
 - Malfunction symptoms
 - Extended troubleshooting
 - Final Test

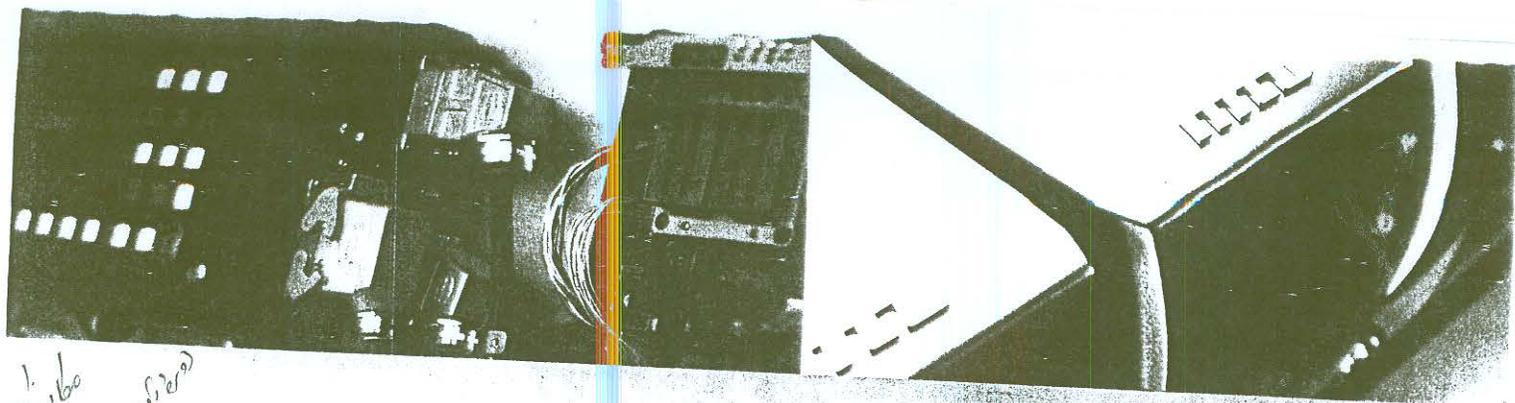
Instructor: Joachim Herbst

Senior Manager Training Center



Friedrichshafen, 26.02.2010

Handwritten notes in Persian script: "مستور" (Mastour) and "عید" (Eid).



1. Janalipour
15.02.2010 - 19.02.2010

CERTIFICATE

MR. Ali Janalipour Omran

of DESA

attended from 15.02.2010
to 19.02.2010

a fulltime-course on 4000-03 M1/R

Course contents

- Initial test
- Handling of documentation
- Design and function of the engine
- Explanation of oil, fuel, etc. systems
- Explanation of the Fluids and Lubricants Specification
- Troubleshooting
- Execution of maintenance tasks QL 2
- Exchange of the subassemblies
- Final Test (verification of success)

Instructor: Ralf Brugger

Senior Manager Training Center



Friedrichshafen, 19.02.2010

کالی پورمان
گیتینگ

Zertifikat

Mr. Ali Janali Pouromran

attended the training

Rail Heating Systems

Thermo 230 - 350

from February 11 – 12, 2010

successfully.

**As certified Webasto specialist he is familiar with
all technical basics enabling him to provide
profound technical services.**

Gilching, February 12, 2010



Armin Küllmer
Manager Product & Technic
GCS Germany



Walter Schmitt
Trainer

Certificate valid until February 2012

Iranain Industerial Development & Rehabilitation Organisation

Iran Heavy Diesel Engine Manufacturing Company

Certificate Of Training

This is to certify that

Sharam Ashoori son of Mahebali

Identity number 812

Representing the DESA Production Department

Has successfully completed a 250 hour
Assembly and Test Training Programme on the

MAN B & W Diesel Ltd

16 RK215T Diesel Engine

During his working period with the DESA Company
between the following dates

March ~ July 2005

Issue Date :

84/3/17 (01.08.2005)

serial Number : 364

Signed

Signed

Training Department Manager

TT Supervisor

DESA

MAN B & W Diesel Ltd



CERTIFICATE

Mr Sharam Ashoori

from

IRAN HEAVY DIESEL ENGINE MFG.CO (DESA)

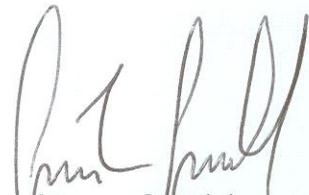
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As a result of his theoretical and practical knowledge he is qualified to carry out the technical service, maintenance and repair of MAN Diesel engines.

Amol, 01. May 2008,


Bernd Böhmländer


Günter Gmelch

MAN Nutzfahrzeuge Aktiengesellschaft
Business Unit Engines and Components
Nuremberg Plant

MAN B&W Diesel Ltd



Certificate of Training

MAN B&W Diesel Ltd
hereby certify that

Nasser Afra

Iran Heavy Diesel Engine Manufacturing Company DESA

has completed the
RK215T Engine Assembly Training Course

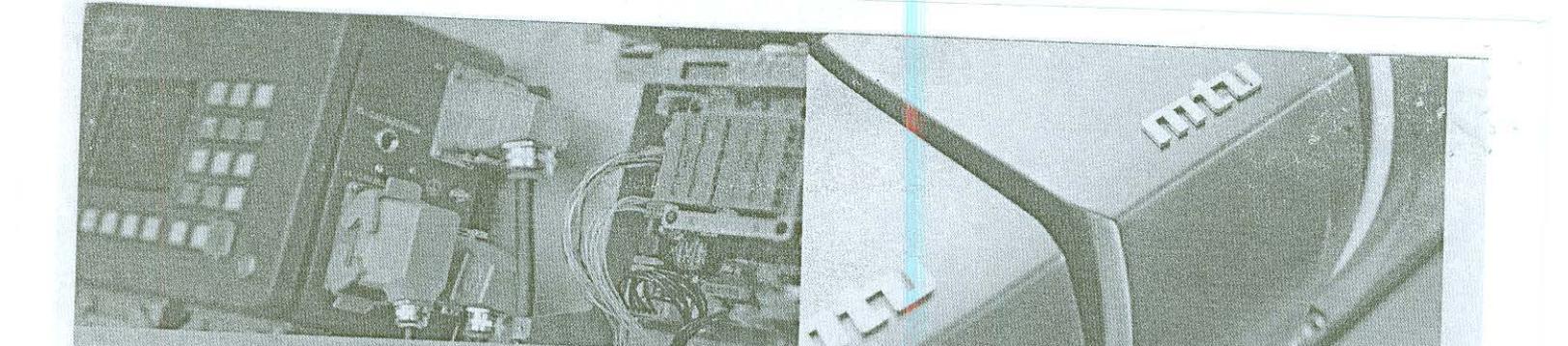
The training began on 29th April 2002
and
was completed on 7th June 2002
and the training was completed to our satisfaction

بیمار درجه سه سوختن
۱۲ سینه را تست

Signed *Brian H Sutton* (MAN B&W Diesel Ltd)
Brian H Sutton, Training Manager

Date issued: 7th June 2002

Serial number 1104



CERTIFICATE

MR. Ali Janalipour Omran

of DESA

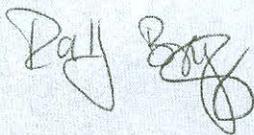
attended from 15.02.2010
to 19.02.2010

a fulltime-course on 4000-03 M1/R

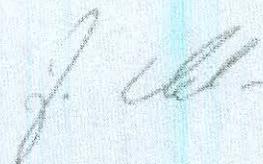
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- Execution of maintenance tasks QL 2
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- Final Test (verification of success)

Instructor: Ralf Brugger



Senior Manager Training Center



Friedrichshafen, 19.02.2010

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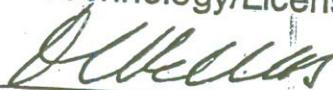
Mr Alireza Zaheri
from Iran Heavy Diesel Engine Mfg. Co.
has attended our license training course
in Vaasa, Finland, 7.10. - 31.10.1997
for engine types

Wärtsilä Vasa 22 and 22/26

The course included the following main topics:

	Total days
◆ General company information	1
◆ Wärtsilä Vasa 22 design	3
◆ Wärtsilä Vasa service policy	1
◆ Production, general overview	1
◆ Planning and dimensioning of auxiliary systems	8
◆ Guidings for installation depending engine design	2
◆ Quality standards and control	1

Wärtsilä NSD Corporation
Technology/Licensing



M. Pellas
License Manager

Mr Hossein Bayeh
from Iran Heavy Diesel Engine Mfg. Co.
has attended our license training course
in Vaasa, Finland, 17.5. - 3.7.1997
for engine types

Wärtsilä Vasa 22 and 22/26

The course included the following main topics:

	Total days
◆ General information about Wärtsilä Diesel Group	1
◆ Wärtsilä Vasa 22 design	3
◆ Wärtsilä Vasa service policy	1
◆ Production, general overview	2
◆ Assembly training	12
◆ Manufacturing training	12
◆ Quality standards and control	2
◆ Classification societies' requirements	1

Wärtsilä NSD Corporation
Technology/Licensing



M. Pellas
License Manager



TRAINING CERTIFICATE

We hereby certify that

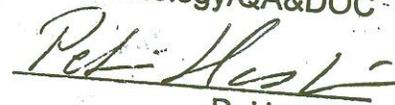
Mr Khajevandi, Majid
from Iran Heavy Diesel Engine Mfg. Co.
has attended our license training course
in Vaasa, Finland, 22.9. - 21.12.1999
for engine types

Wärtsilä Vasa 22 and 22/26

The course included the following main topics:

	Total days
◆ Documentation management	1
◆ Quality assurance	1
◆ Engine technology (Vasa 22)	12
◆ Hands-on training	5
◆ Vasa 22 development history	1
◆ Production, subsuppliers	5
◆ Mechanical behaviour, defect analysis	1
◆ Material technology	1
◆ Operation data evaluation	1
◆ Resresearch facilities and equipment	1
◆ Participation in research project	9
◆ Measurement technology	6
◆ Application technology (marine and power plant)	12
◆ R&D project processes	2
◆ Visit of a vasa 22 power plant	1

Wärtsilä NSD Corporation
Technology/QA&DOC


P. Hanstén
Manager



WÄRTSILÄ NSD
CORPORATION

CERTIFICATE

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Mr Majid Khajevand
from Iran Heavy Diesel Engine Mfg. Co.
has attended our license training course
in Vaasa, Finland, 7.10. - 31.10.1997
for engine types

Wärtsilä Vasa 22 and 22/26

The course included the following main topics:

	Total days
◆ General company information	1
◆ Wärtsilä Vasa 22 design	3
◆ Wärtsilä Vasa service policy	1
◆ Production, general overview	1
◆ Planning and dimensioning of auxiliary systems	8
◆ Guidings for installation depending engine design	2
◆ Quality standards and control	1

Wärtsilä NSD Corporation
Technology/Licensing

M. Pellas
License Manager

Mr Gholamhossein Safalarijani

from Iran Heavy Diesel Engine Mfg. Co.
has attended our license training course
in Vasa, Finland, 9.8. - 2.10.1997
for engine types

Wärtsilä Vasa 22 and 22/26

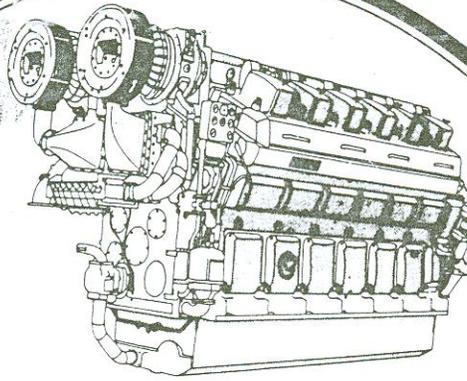
The course included the following main topics:

	Total days
◆ General company information	1
◆ Wärtsilä Vasa 22 design	3
◆ Wärtsilä Vasa service policy	1
◆ Production, general overview	2
◆ Test run	10
◆ Finishing works	5
◆ Quality standards and control	2
◆ Classification societies' requirements	1
◆ Operation and maintenance of WV22	10
◆ Overhaul of special components	3

Wärtsilä NSD Corporation
Technology/Licensing



M. Pellas
License Manager



CERTIFICATE

Mr Gholamhossain Safa Larijani

has attended our Basic Engine, Power Plant Introduction and Hands-on Courses 8.9. - 1.10.1997 in Vaasa, Finland for

WÄRTSILÄ VASA 22

The courses included the following main topics:

	Total hours
• General terminology and design	17
• Function, operation and operation data	20
• Trouble shooting and condition monitoring	15
• Maintenance and tools	14
• Hands-on	28
• Other subjects	6

Wärtsilä NSD Finland Oy
Service
Training

Olli-Pekka Vuorinen
Training Manager, Marine

WÄRTSILÄ DIESEL

CERTIFICATE

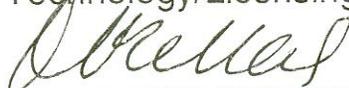
Mr Alireza Abedinpour Omran
from Iran Heavy Diesel Engine Mfg. Co.
has attended our license training course
in Vaasa, Finland, 17.5. - 3.7.1997
for engine types

Wärtsilä Vasa 22 and 22/26

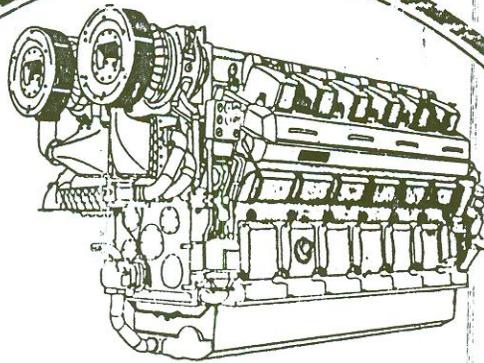
The course included the following main topics:

	Total days
◆ General information about Wärtsilä Diesel Group	1
◆ Wärtsilä Vasa 22 design	3
◆ Wärtsilä Vasa service policy	1
◆ Production, general overview	2
◆ Assembly training	12
◆ Manufacturing training	12
◆ Quality standards and control	2
◆ Classification societies' requirements	1

Wärtsilä NSD Corporation
Technology/Licensing



M. Pellas
License Manager



CERTIFICATE

Mr Ali Karimi

has attended our Basic Engine, Power Plant Introduction and Hands-on Courses 8.9. - 1.10.1997 in Vaasa, Finland for

WÄRTSILÄ VASA 22

The courses included the following main topics:

	Total hours
• General terminology and design	17
• Function, operation and operation data	20
• Trouble shooting and condition monitoring	15
• Maintenance and tools	14
• Hands-on	28
• Other subjects	6

Wärtsilä NSD Finland Oy
Service
Training

Olli-Pekka Vuorinen
Training Manager, Marine

WÄRTSILÄ DIESEL

Mr Ali Karimi
from Iran Heavy Diesel Engine Mfg. Co.
has attended our license training course
in Vaasa, Finland, 9.8. - 2.10.1997
for engine types

Wärtsilä Vasa 22 and 22/26

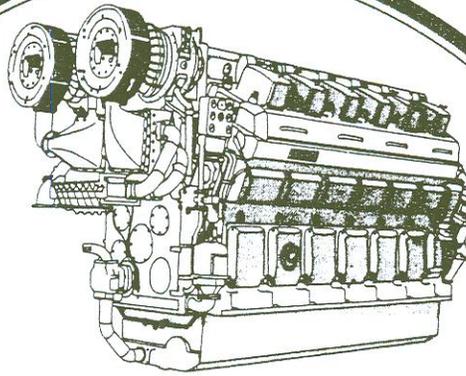
The course included the following main topics:

	Total days
◆ General company information	1
◆ Wärtsilä Vasa 22 design	3
◆ Wärtsilä Vasa service policy	1
◆ Production, general overview	2
◆ Test run	10
◆ Finishing works	5
◆ Quality standards and control	2
◆ Classification societies' requirements	1
◆ Operation and maintenance of WV22	10
◆ Overhaul of special components	3

Wärtsilä NSD Corporation
Technology/Licensing



M. Pellas
License Manager



CERTIFICATE

Mr Hossein Motamedi

has attended our Basic Engine, Power Plant Introduction and Hands-on Courses 8.9. - 1.10.1997 in Vaasa, Finland for

WÄRTSILÄ VASA 22

The courses included the following main topics:

	Total hours
• General terminology and design	17
• Function, operation and operation data	20
• Trouble shooting and condition monitoring	15
• Maintenance and tools	14
• Hands-on	28
• Other subjects	6

Wärtsilä NSD Finland Oy
Service
Training

Olli-Pekka Vuorinen
Training Manager, Marine

WÄRTSILÄ DIESEL

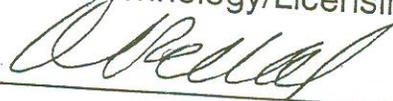
Mr Hossein Motamedi
from Iran Heavy Diesel Engine Mfg. Co.
has attended our license training course
in Vaasa, Finland, 9.8. - 2.10.1997
for engine types

Wärtsilä Vasa 22 and 22/26

The course included the following main topics:

	Total days
◆ General company information	1
◆ Wärtsilä Vasa 22 design	3
◆ Wärtsilä Vasa service policy	1
◆ Production, general overview	2
◆ Test run	10
◆ Finishing works	5
◆ Quality standards and control	2
◆ Classification societies' requirements	1
◆ Operation and maintenance of WV22	10
◆ Overhaul of special components	3

Wärtsilä NSD Corporation
Technology/Licensing



M. Pellas
License Manager

TRAINING CERTIFICATE

We hereby certify that

Mr Mohamadi, Mehrdad

from Iran Heavy Diesel Engine Mfg. Co.
has attended our license training course
in Vaasa, Finland, 22.9. - 21.12.1999
for engine types

Wärtsilä Vasa 22 and 22/26

The course included the following main topics:

	Total days
◆ Documentation management	1
◆ Quality assurance	1
◆ Engine technology (Vasa 22)	12
◆ Hands-on training	5
◆ Vasa 22 development history	1
◆ Production, sub-suppliers	5
◆ Mechanical behaviour, defect analysis	1
◆ Material technology	1
◆ Operation data evaluation	1
◆ Research facilities and equipment	1
◆ Participation in research project	9
◆ Measurement technology	6
◆ Application technology (marine and power plant)	12
◆ R&D project processes	2
◆ Visit of a Vasa 22 power plant	1
	<u>89</u>

سایت
89 = 89

Wärtsilä NSD Corporation
Technology/QA&DOC


P. Hanstén
Manager

CERTIFICATE

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۱۳۷۳

Mr Merdad Mohammadi
from Iran Heavy Diesel Engine Mfg. Co.
has attended our license training course
in Vaasa, Finland, 25.4. - 22.5.1997
for engine types

Wärtsilä Vasa 22 and 22/26

The course included the following main topics:

	Total days
◆ General information about Wärtsilä Diesel Group	1
◆ Wärtsilä Vasa 22 design	3
◆ Wärtsilä Vasa service policy	1
◆ Production, general overview	1
◆ Documentation from order to product	4
◆ Production planning and ordering of parts	4
◆ Quality standards and control	2
◆ Classification societies' requirements	1

$\frac{1+3+1+1+4+4+2+1}{13} = 133$
133

Wärtsilä NSD Corporation
Technology/Licensing

M. Pellas

M. Pellas
License Manager

WÄRTSILÄ DIESEL

**Purchase Contract
for the performance of work**

between

Iran Heavy Diesel Engine Mfg.Co.(DESA)

And

MTU Friedrichshafen GmbH

Date: 21.10.2009

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✓

Design & Engineering Services Contract

by and between

**Iran Heavy Diesel Engines Manufacturing Company
(DESA) and**

a British Engine Consultancy Company (Technomot)

**Tehran
February 2005**

M *C.A.B* *ERK*

August 13, 1996

IN THE NAME OF GOD

TRANSFER OF TECHNOLOGY AND LICENSE AGREEMENT

BY AND BETWEEN

WARTSILA DIESEL INTERNATIONAL LTD OY

AND

IRAN HEAVY DIESEL ENGINE MANUFACTURING COMPANY (DESA)

August 14, 1996

Supply and manufacturing issues of Engine main parts

DESA Company, towards its imaginary prospect, has always tried to enable heavy diesel engine parts supply chain, so it is able to do supply chain and following parts manufacturing by cooperating domestic and foreign suppliers with the least expense as well as time consuming along with the best quality.

List of main parts at a glance:

- ✓ **Engine cooling system**
- ✓ **Standard parts**
- ✓ **Lubricating system**
- ✓ **Exhaust and air system**
- ✓ **Fuel system**
- ✓ **Lateral parts**
- ✓ **Engine oil sump**
- ✓ **Engine gears**
- ✓ **Flywheel unit**
- ✓ **Piston unit**
- ✓ **Valve train unit**
- ✓ **Crankshaft unit**
- ✓ **Turbocharger unit**
- ✓ **Camshaft unit**
- ✓ **Engine crankcase and ladder frame**
- ✓ **Cylinder head unit**
- ✓ **Oil thermostatic valve**
- ✓ **Oil heat exchanger**
- ✓ **Oil strainer**
- ✓ **Fuel filter**
- ✓ **Bearings unit**

- ✓ O-ring
- ✓ Oil adjusting valve
- ✓ Water pump, oil and fuel
- ✓ Connecting rod unit
- ✓ Liner
- ✓ Oil and water pipes
- ✓ Heat shield
- ✓ Fuel transmission system and engine smart control unit (ECU)

List of some of those domestic suppliers are included in the following table. In addition, DESA has had contract with some of reputable suppliers such as, Heinzmann, Incanit, Carters, Markish, Alfing, ... which they are not listed below.

Row	Part name	Manufacturer's name
1	Oil Sump	Sedad Mashin
2	Connecting Rod assyRH	Idem
3	Connecting Rod Assy LH	Idem
4	Connecting Rod-forging	Tractor Sazi Tabriz
5	Cylinder Head-machining	Idem / Hyde
6	B Bank lower exhaust heat shield-insulation	Kabiran industrial group
7	Exhaust Manifold INSULATION	Kabiran industrial group
8	A Bank lower exhaust heat shield-insulation	Kabiran industrial group
9	Cam Follower Shaft	Kodaparast machining center
10	Cam follower roller	Kodaparast machining center
11	Follower Roller pin	Kodaparast machining center
12	v12 camshaft	Kodaparast machining center
13	Cam follower shaft inlet	Kodaparast machining center
14	compressor outlet duct machined a bank	Ataco CO.
15	compressor outlet duct machined b bank	Ataco CO.
16	air duct machined no valve	Incanite
17	air duct casting	Incanite
18	Heinzman dardanos 1	Heinzmann
19	Flywheel	Vala Fan Afarin
20	Liner-machining	Keyhan Sanat GHaem
21	Cutting ring (casting & machining)	Keyhan Sanat GHaem

22	Piston	Piston Sazi Iran
23	Gudgeon Pin	Piston Sazi Iran
24	Top Ring	Piston Sazi Iran
25	Oil Control Ring	Piston Sazi Iran
26	Connecting rod	Kodaparast machining center
27	Rocker Shaft	Kodaparast machining center
28	Fresh water pump	Ataco CO.
29	CYLINDERHEAD	Sanaye rikhtegari Iran (ICI)
30	CYLINDER block	Sanaye rikhtegari Iran (ICI)

Iran Heavy Diesel Manufacturing Company (DESA)

Bill of profit

	2013-2014 (\$)	2014-2015 (\$)
Net of sale and income from given services	3385904	3845220
Sold good's final cost and given services	2311390	2970068
Gross profit	1074514	875152
Sale's expense, ministerial and public	585762	486561
Operational profit	488752	388591
Financial expenses	471590	364978
Other net income and non-operational expenses	92682	26126
	378962	338852
Net profit (loss) before tax deduction	109844	49738
Net profit	109844	49738