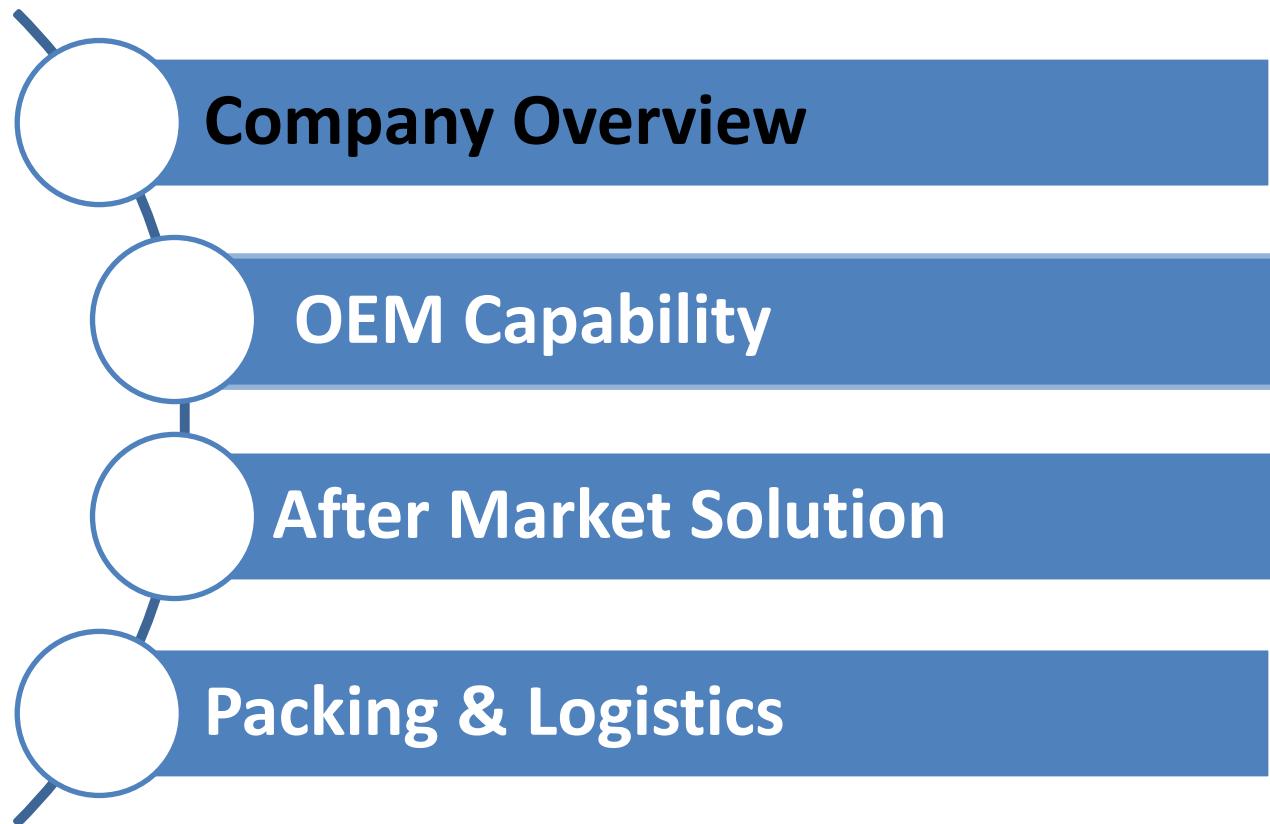


F-Diesel Turbo System

Presented by F-DIESEL
2022.05

Version 1.0



Turbo System Introduction

As the main division of Group, F-Diesel Turbo System can provide both diesel and gasoline application turbo & components to OE and aftermarket customers.

To be one of the top manufacturers in China, customized solutions can be offered to our clients:

OEM Simultaneous
Engineering and
R&D

Aftermarket
Replacement Turbo
and Components

Customized
Technical Solution
Upon Request

Headquarter & Manufacturing Base

With support of Shanghai headquarter, two different production bases are to achieve the optimization on quality and delivery upon different customers needs.



Headquarter & Sales Center



OE Production Base



Aftermarket Production Base

Global Networks

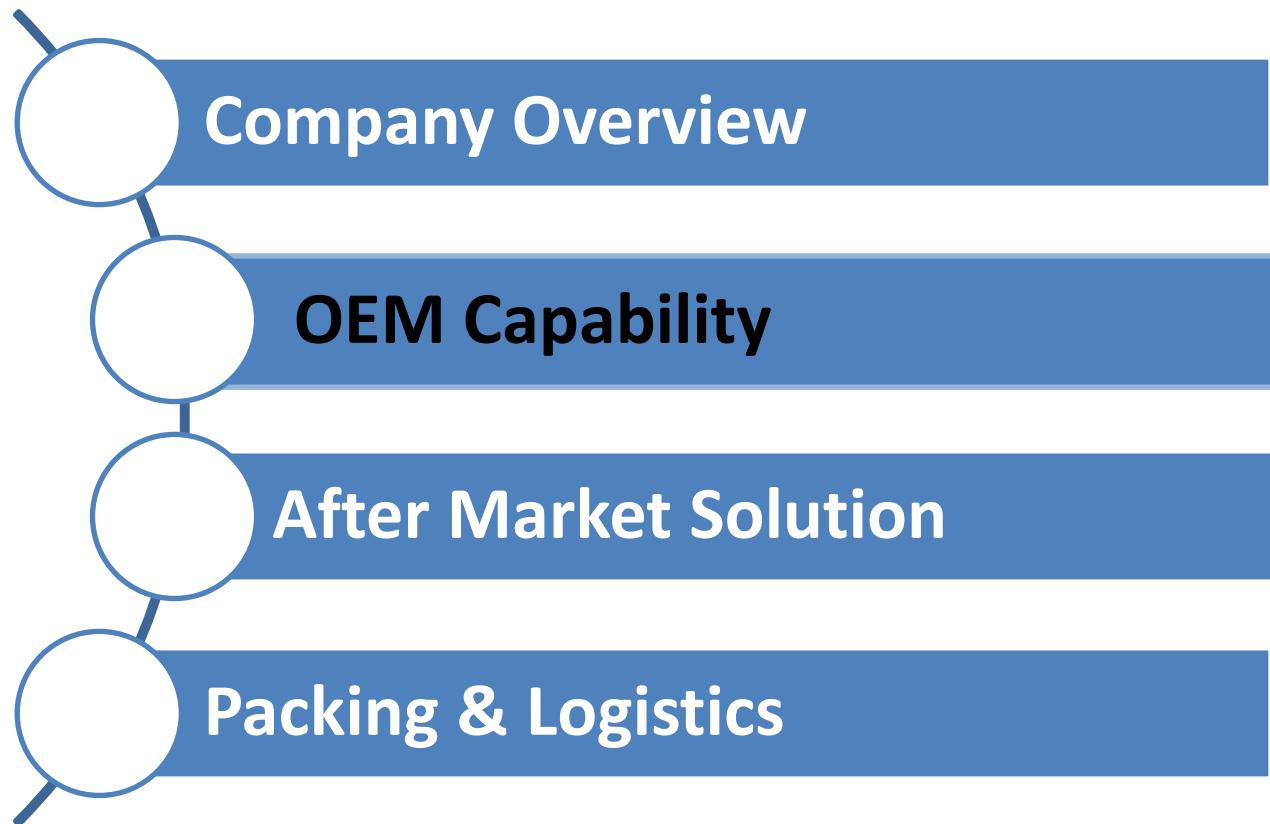
Basing on the headquarter in China, F-Diesel Group has extended the business network around the world to provide quick delivery and local service:

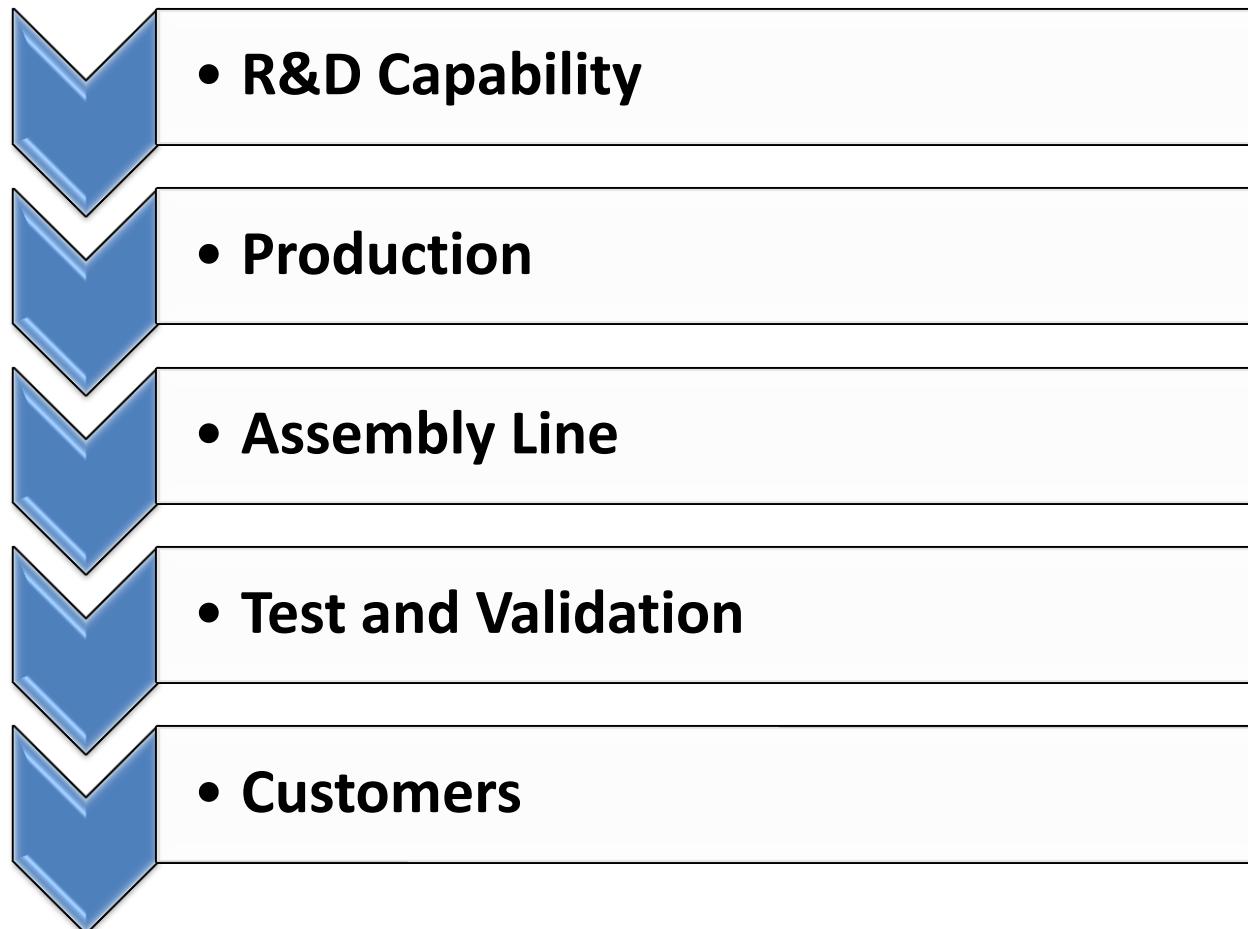
Branch companies in US and Germany

Exclusive Brand Agents

Authorized auto parts dealers







Overview

- **To Develop Turbo Synchronously**
- **To Match Current Engine**
- **To be Alternative Supplier**

Overview-- To Develop Turbo Synchronously

Engine Specification:

Engine: 4 cylinder

Replacement: 2.3L

Application: Passenger Car

Yearly Quantity :50000 pieces

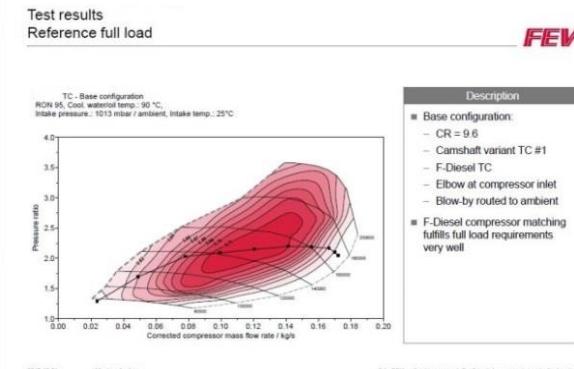
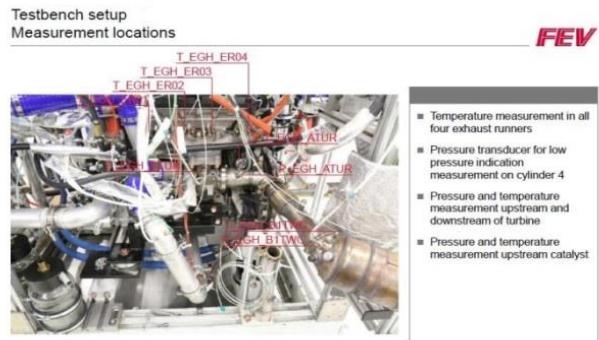


Characteristic

Synchronously Develop
turbo

To FEV's design

SOP Time: 2021



Overview-- To Match Current Engine

Engine Specification:

Engine: 3 cylinder

Replacement: 2.5L

Application: Agricultural Tractor

Yearly Quantity :20000 pieces

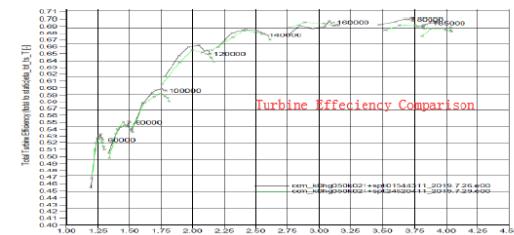
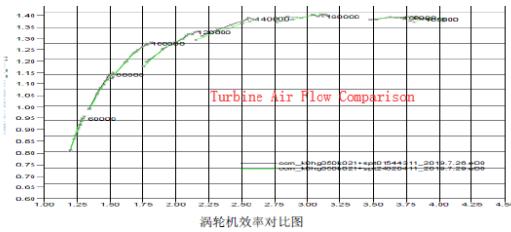
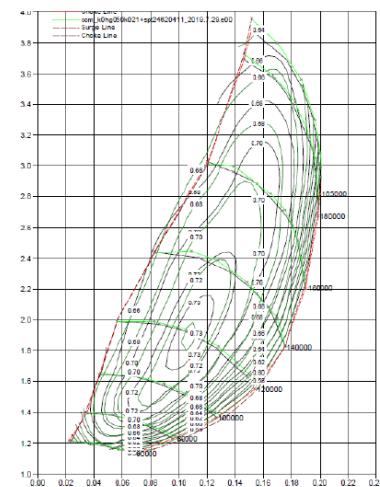


Performance Improvement

Power at rated speed increased by: 3%

Oil Consumption reduced by: 5%

SOP Time : 2020



Overview-- To be Alternative Supplier

Engine Specification:

Engine: 4 cylinder

Replacement: 2.8L

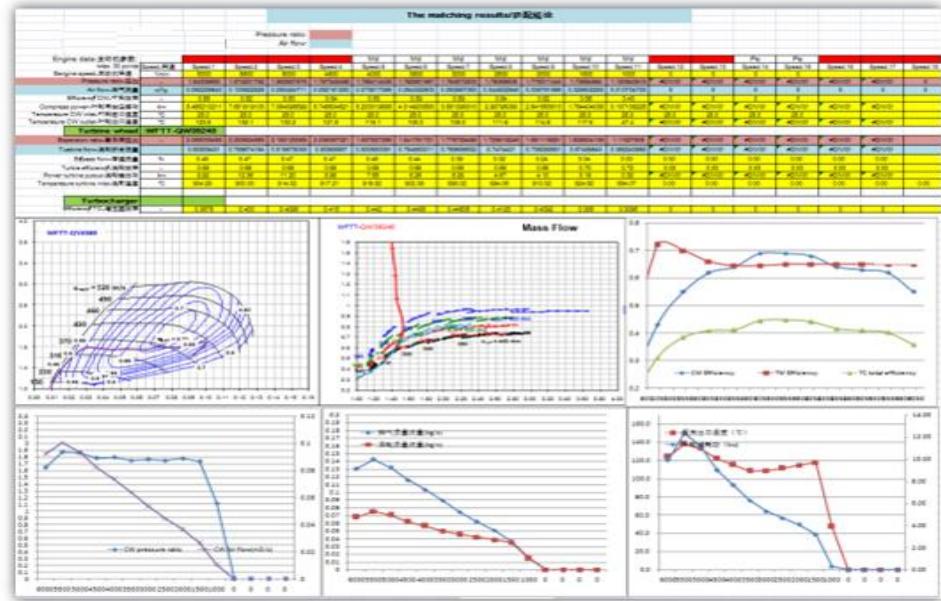
Application: Light Truck

Yearly Quantity :30000 pieces

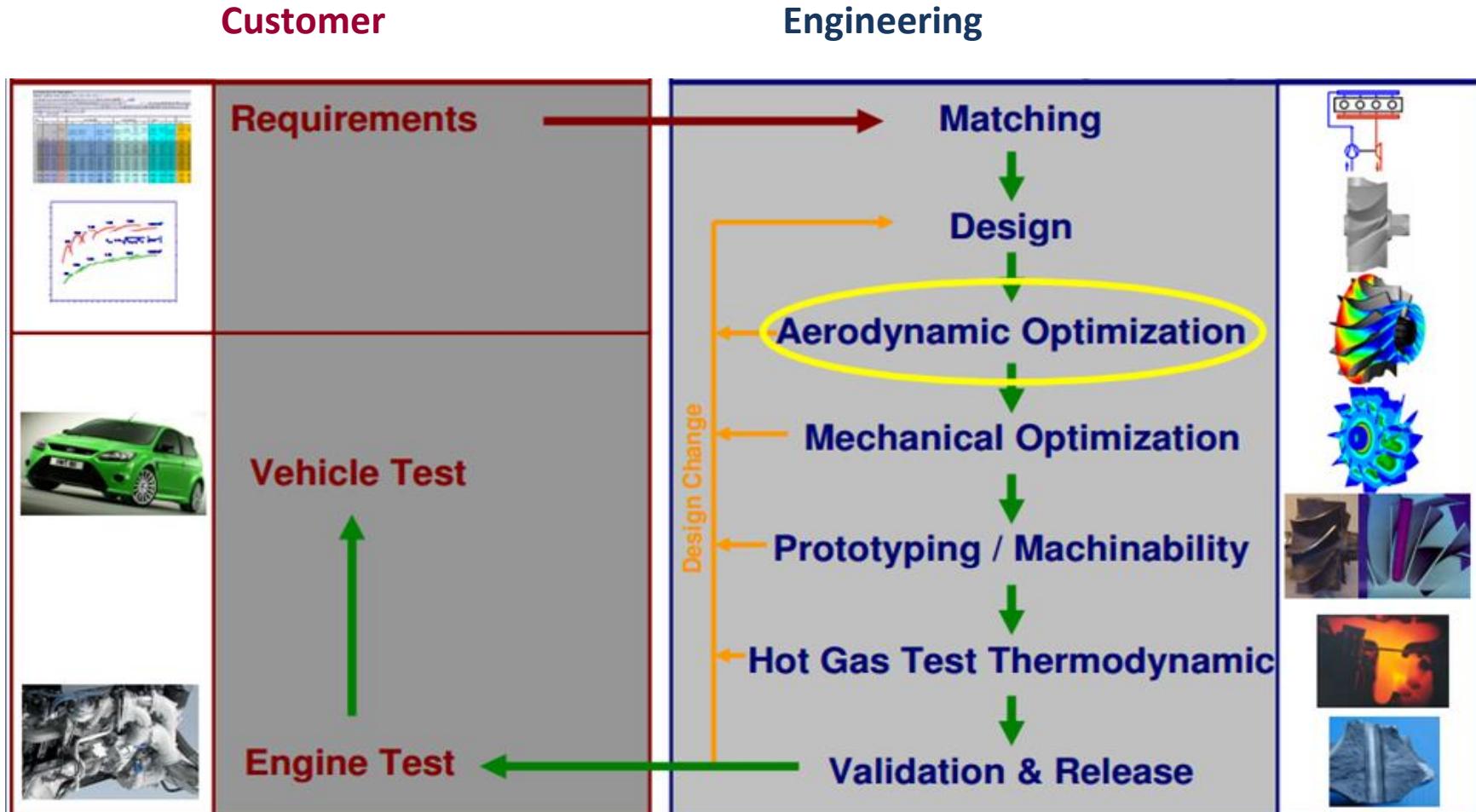


Performance Comments:

Both performance, oil consumption and smoke are improved 3-5% comparing with one famous brand

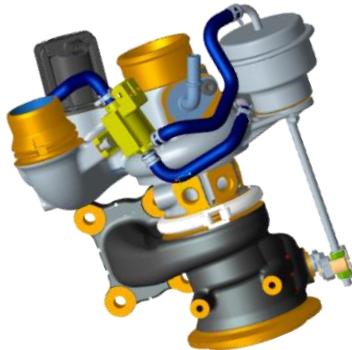


R&D Capability--Development Process

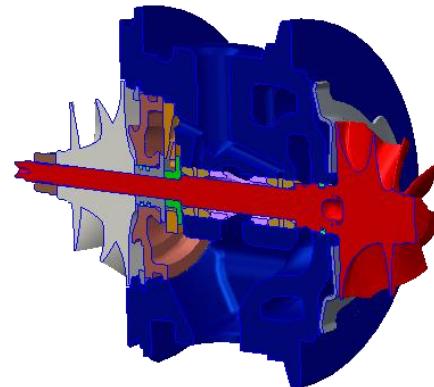


R&D Capability-- Design

- Design Team is responsible for 3D/2D design of the turbocharger and components;
- Collaboration with AE and CAE to ensure technical optimization proposal can achieve the certain target;
- Standardized technology configure;

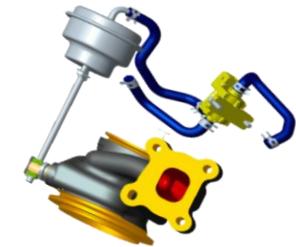


3D Drawing Of Turbo



Rotate System Design

Modular Turbine
Housing



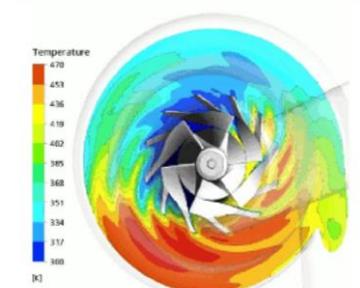
Modular Compressor
Housing



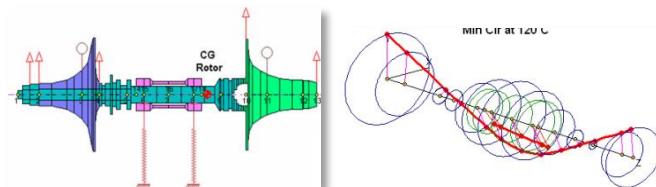
Modular Core
Assembly



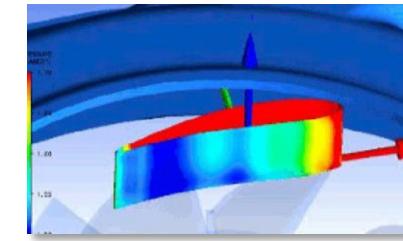
R&D Capability-- Simulation Analysis



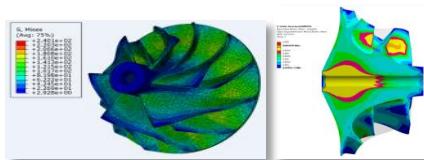
CFD Compressor



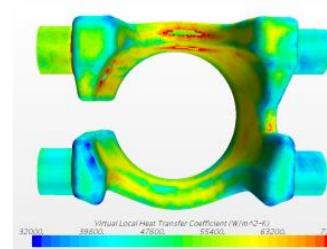
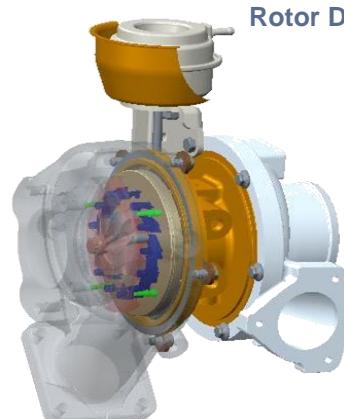
转子动力学分析
Rotor Dynamic Analysis



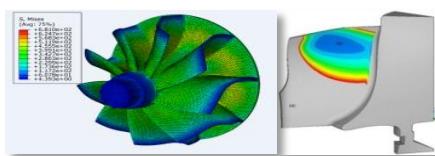
CFD Turbine



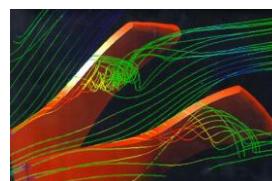
叶轮低周疲劳
Compressor wheel Low Circle Fatigue (LCF)



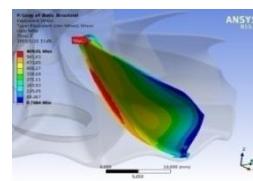
热传导分析
Heat Transfer Analysis



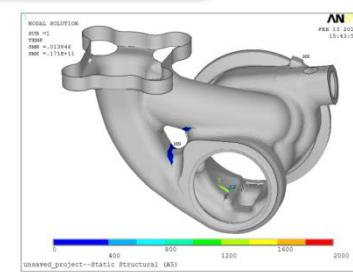
涡轮高周疲劳
Turbine Wheel High Circle Fatigue (HCF)



叶片载荷分析
Blade loading



涡轮叶片振动强度分析
TW Blade Vibration Strength



涡轮壳热应力分析
Turbine House FEA

Production—S&W Manufacturing



Code And Welding



Grinding



Measurement



Dynamic Balance

Production—CW Manufacturing



Turning



Milling



Dynamic
Balance



Cleaning

Assemble Line



CHRA Auto Assembly



High Speed Two Planes
Dynamic Balance



Turbo Assembly



End Of Line Testing Tool

Test and Validation

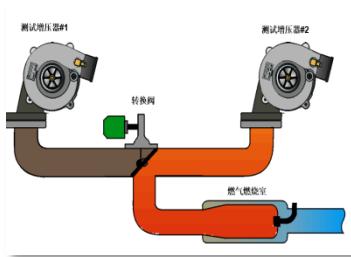
Hot Gas Test Bench 1#(kratzer)



Durability Test Bench(two)



Hot Gas Test Bench 2#(kratzer)



Engine Test Bench 1#



OEM Capability



Domestic OE Customers

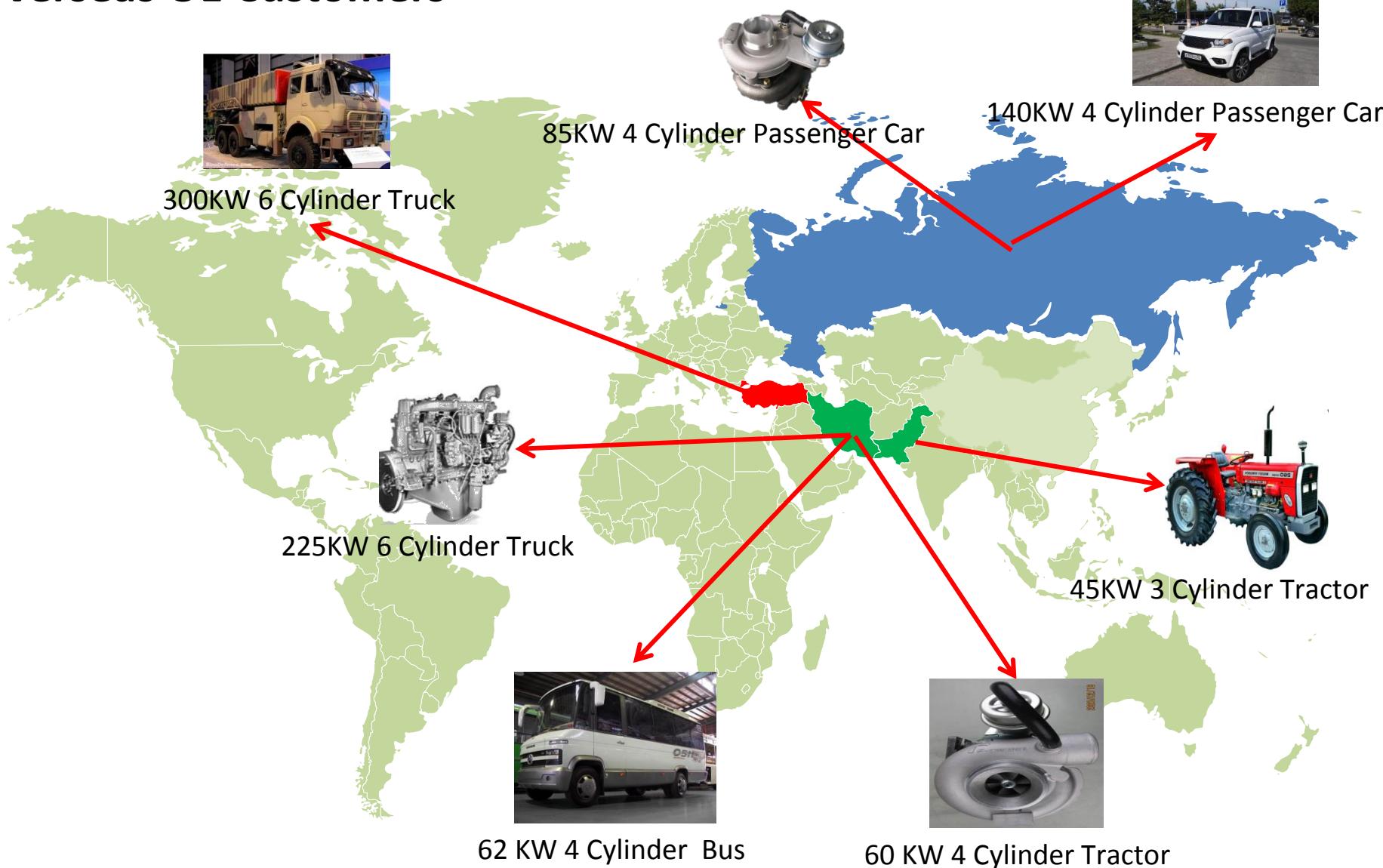
Commercial Car Market



Domestic Passenger Car Market



Overseas OE Customers





- Products Review
- Popular Series
- Key Partner
- Products Assurance
- QC Process

Products Review---Complete Turbo

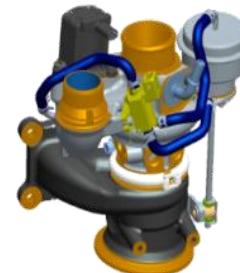
Popular Models



Diesel
Waste Gate Turbo



Diesel VNT Turbo

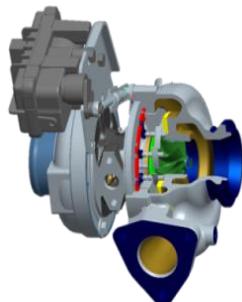


Gasoline
Waste Gate Turbo



Gasoline
E-waste Gate Turbo

New Developed



E-VNT Turbo



E-VGT Turbo

- More Than 600 models
- Fitting To European, American, Japanese And Korea Engines
- Covering On-road, Off-road And Passenger Application

Products Review---Components



Popular Series for US Application

- Middle Truck, Heavy Truck, Super Heavy Truck
Brand like Mack and Ford, Cummins, Detroit and International
- Passenger car like Ford Eco boost, Chevrolet, Subaru and Mazda
- Off-highway application like CAT, and Komatsu



GT1549L 790318-0008
Ford 3.5L Eco Boost



GT3271CVA-854572-5001S
Ford 6.7L Pickup



781504-5004S
Cruze 1.4 Turbo ECOTEC

Popular Series for European Application

- Heavy Truck, Super Heavy Truck Brand like DAF, SCANIA, Volvo, IVECO and Mercedes
- Diesel Passenger car like VW, Citroen, BMW, Fiat and Renault
- Construction application like Perkins, CAT, and Komatsu



S400 318081
Scania 112 DSC 11-21



GT1646V 765261
A3 2.0 TDI (8P/PA)



BV35 54359700027
Fiat Idea, Doblò 13.T

Popular Series for Japanese & Korean Application

- Commercial Truck including ISUZU, HINO, Nissan ,Mitsubishi, and Hyundai
- Passenger car like Toyotas, Subaru and Mazda, Kia and Hyundai
- Construction application like Komatsu and Hitachi



CT 16V 17210-11070
Toyota Hilux Innova



RHC7 114400-2100
Hitachi EX200-1 6BD1T

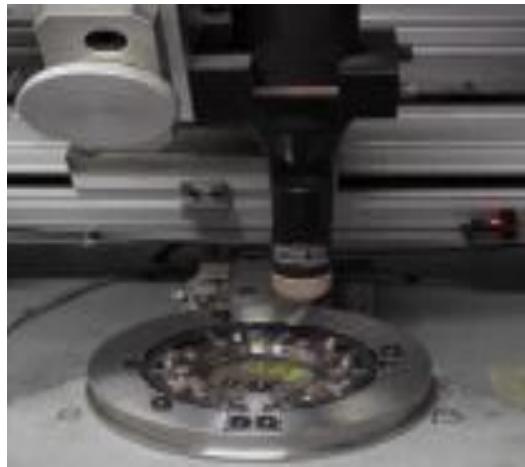


GT2559L 17201-E068
Hino Bus WO4D0

Key Partner---JV Nozzle Ring Assembly Factory



- Mainly focus on OEM

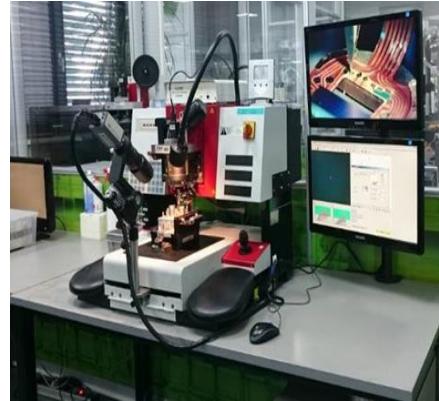


- More than 300 kinds Nozzle ring assembly available

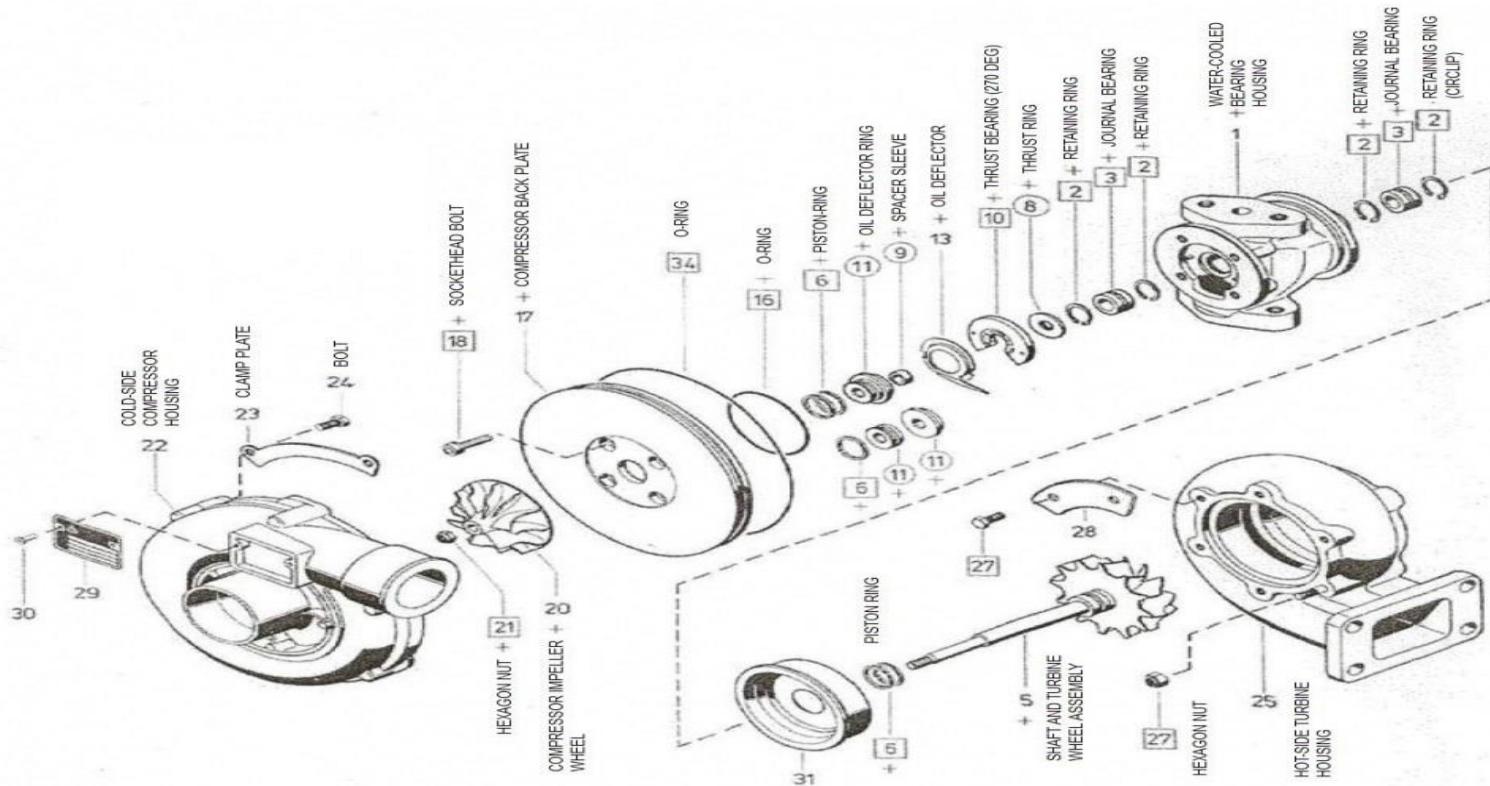


Key Partner---E-Actuator Factory

REA, UTA And VGT Actuator Available
Cover Both Diesel And Gasoline Application

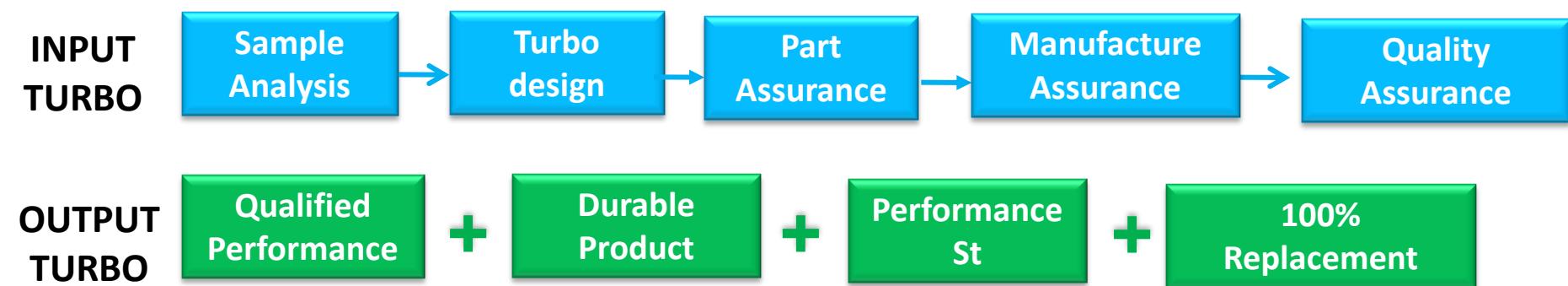


Products Assurance --Sub Supplier



- Same Channel to international brands, like GARRETT, BORGWARNER AND MITSUBISHI, etc.
- Same Channel to top local turbo brands
- Flexible option for OEM and aftermarket customers

Products Assurance –R&D Process



Challenge List

We Need

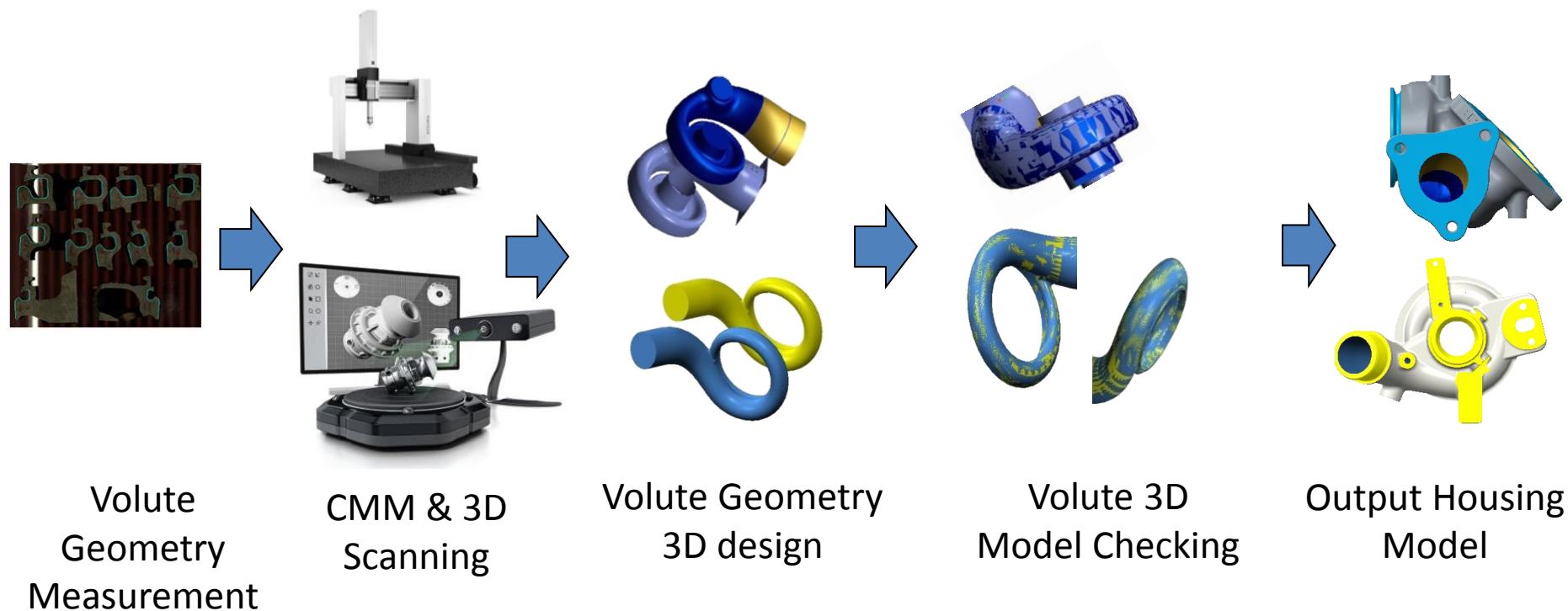
- ⌚ Deep Original Sample Study
- ⌚ Engineering Design Robustness
- ⌚ Stable Parts Consistency
- ⌚ Guaranteed manufacturing output
- ⌚ Strong Product Quality

We Can

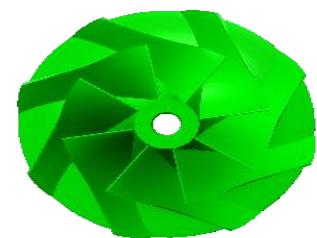
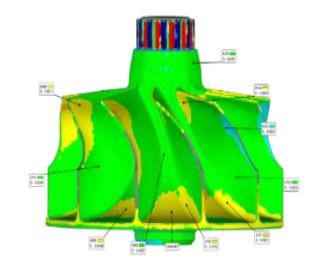
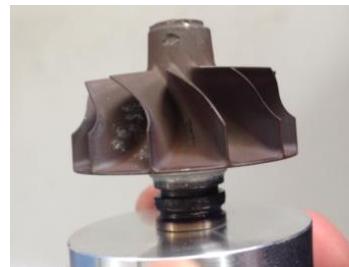
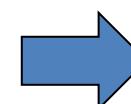
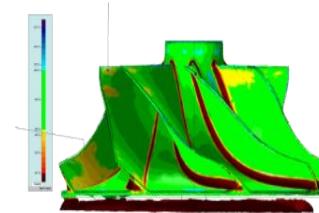
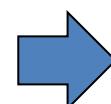
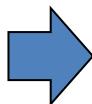
- Well study the original TC
- Available design specification
- Durable components
- Durable manufacture
- Durable quality control

Products Assurance –Housing Reverse

Turbine housing and compressor housing tooling and casting only accepted by the manner of rubbing:
The runner section with tolerance of 3~4%;



Products Assurance –Wheel Reverse



Input:
OE Sample

3D Scanning

Shape Scanning
Comparison

Output
Wheel Modeling

QC Process-- Flexible Assembly Line



Remarks:

Torque wrench, assembly tooling and other calibration tooling used on each workstation to keep accuracy and avoid process mistakes.

QC Process-- Balancing & Inspection



Balancing Machine



Optical Image
Measurement



Electronic Actuator
Calibration

QC Process-- Calibration and Testing



VNT Flow Calibration



Performance Test Bench



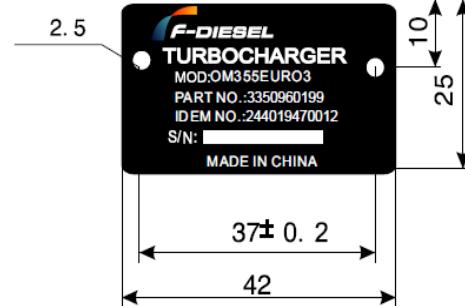
QC Process-- Approval Documents

- Assembly And Key Components Drawing
- Material Certification Of Key Components
- Balancing Report Of Rotor Assembly and Cartridge
- Offline Detection (Clearance Between Compressor Wheel And Housing, Axial Movement, Simulated Operation)
- Performance Comparison Reports If Requested



Packing--Box, Label and Tag Plate

F-diesel Packing Solution Including Paper Box ,Labels And Tag Plate



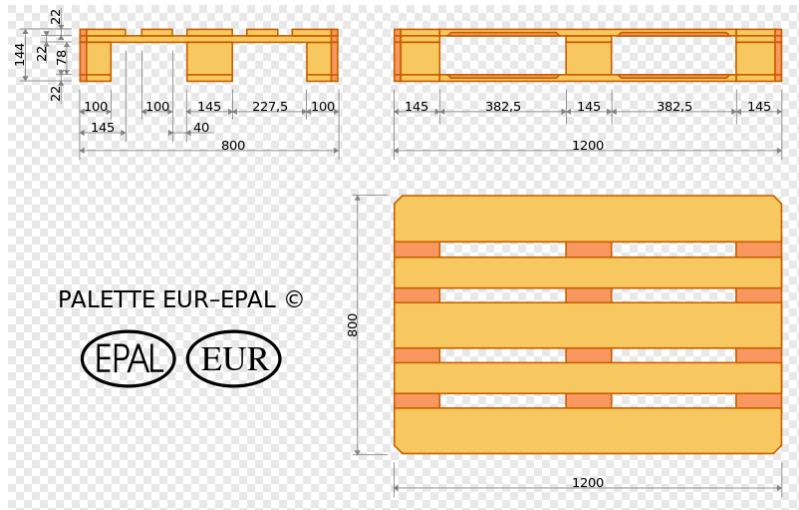
Turbo Label

Tag Plate

Turbo Box

Packing-- Pallets & Wooden Box

Pallets And Wooden Box Can Be Designed Upon Customer's Request

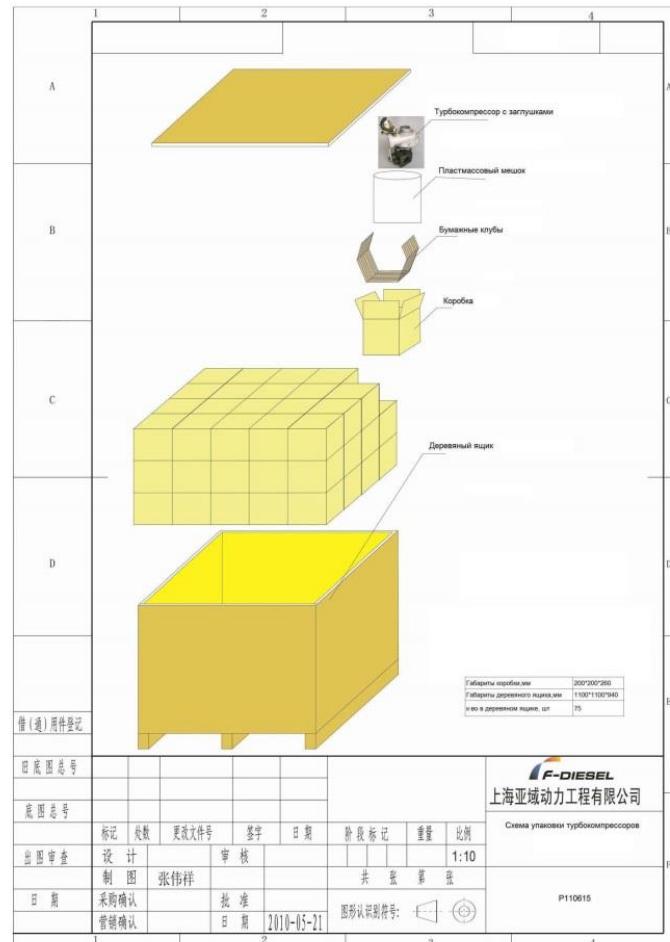


European Pallets

Contract 72-35/111-11

Приложение №4/ Appendix 4

стр. 23 из 23



Wooden Box

Logistics—Warehouse & Delivery



Well organised Warehouse



24 hours Logistics



Professional
Loading



By Express



By Air



By Sea

Why F-DIESEL Turbo System?

- Advanced Equipment
- Top R&D Ability
- Flexible Production Systems

F-DIESEL Team is capable to serving aftermarket customers with diversity models while providing OEM solution.

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Mobile/ WhatsApp / Wechat: 0086-15221256058

LinkedIn: Bruce Li



WhatsApp



Wechat

Thanks