



ČZ a.s. Turbo Division

Basic division presentation.

ČZ a.s. (production site); Tovární 202; 386 15 Strakonice; Czech Republic.



ČZ a.s. Division Turbo.

Location.



Company Head Office:

ČZ a.s.

Sluneční náměstí 2540/5

CZ-158 00 Praha 5

Production Plant:

ČZ a.s.

Tovární 202

CZ-386 15 Strakonice



ČZ a.s. Division Turbo.

History of ČZ a.s.

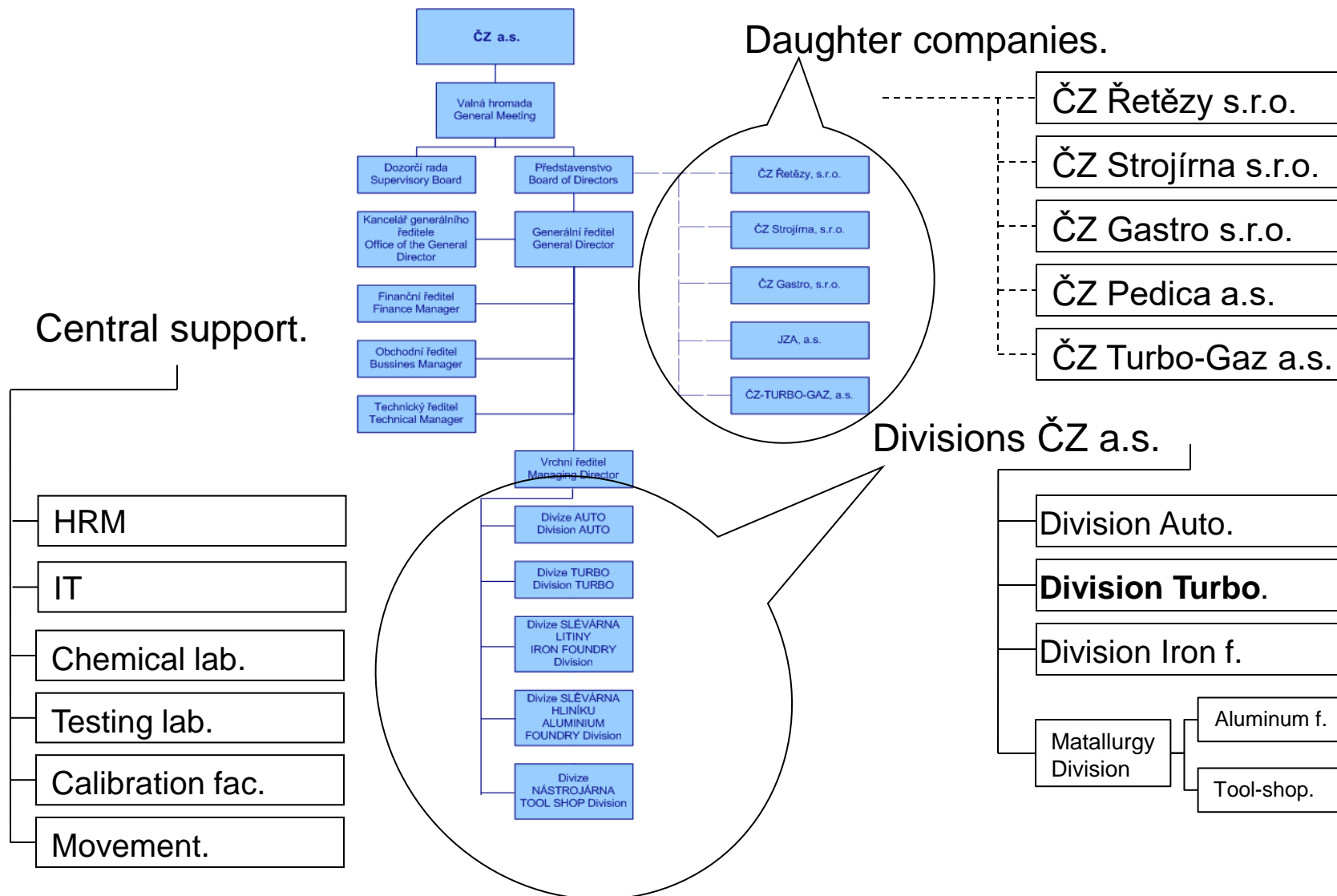
- 1919 — Started under the name “Jihočeská zbrojovka” in Prague.
- 1922 — Started production of guns in Strakonice.
- 1929 — Started production of bicycle parts and bicycles .
- 1932 — Started production of motorcycles under own brand ČZ.
Extension of production with chains and machine tools.
- 1939 — Wartime production of guns.
- 1946 — Nationalisation of the company, production of guns shutdown.
- 1950 — Production of motorcycles increases due to world success.
till Became possible to start with own grey iron and
1970 aluminium pressure castings foundries.
- 1980 — Motorcycle production slumping. Focus on automotive, start
production of turbochargers, gearboxes, automotive components
besides chains, tools and foundries.
- 1991 — Transformation into joint stock company.
- 1993 — Privatisation of the company.
Acquiring shares inside stock companies.





ČZ a.s. Division Turbo.

Location of Turbo
Division in ČZ
organization.

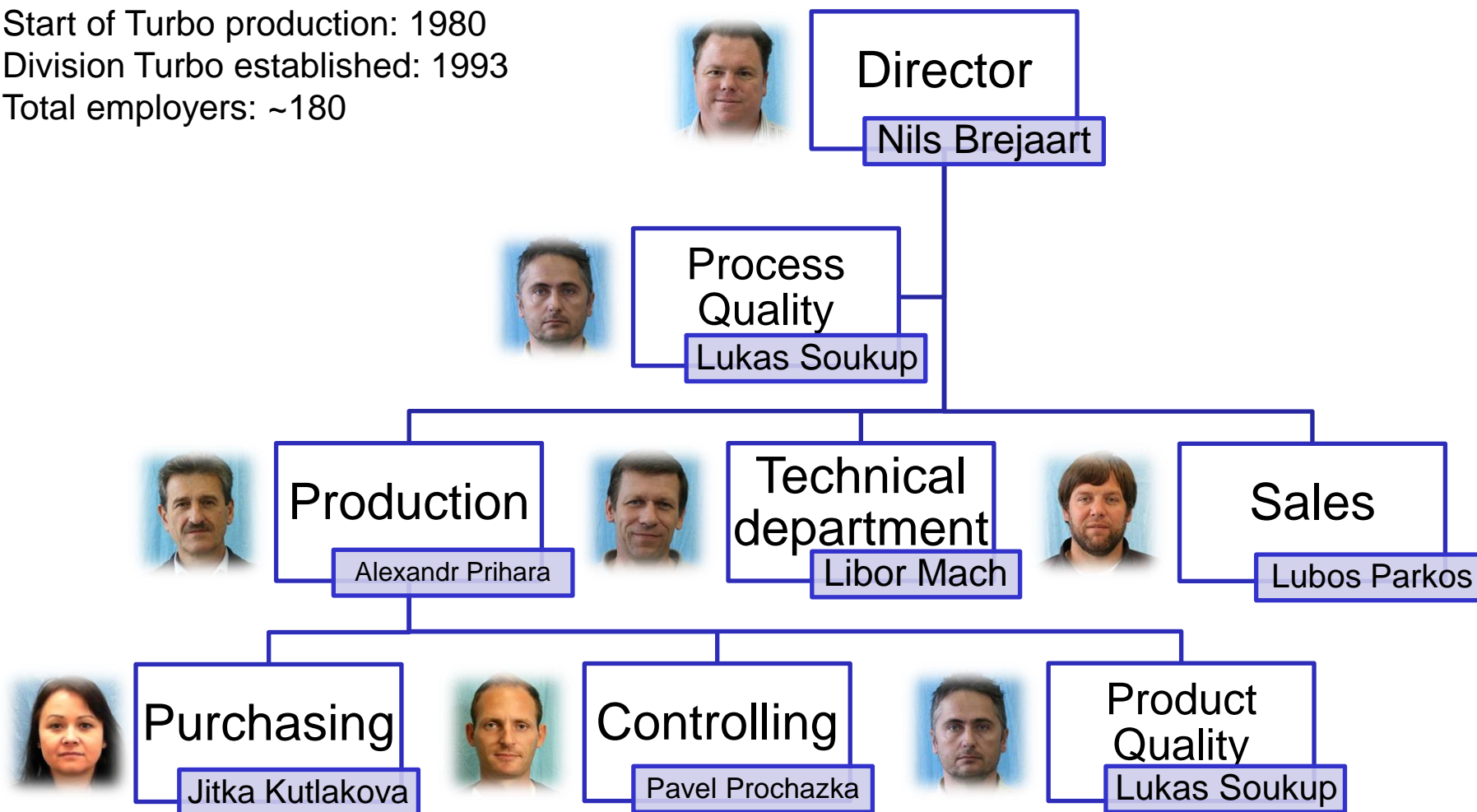




ČZ a.s. Division Turbo.

Turbo Division organization.

Start of Turbo production: 1980
Division Turbo established: 1993
Total employers: ~180



in mil. EUR	2017	2018	2019
Gross Sales	61,79 mil Eur	65,99 mil Eur	62,18 mil Eur
Domestic Sales	25,31 mil Eur	26,32 mil Eur	23,97 mil Eur
Export	35,65 mil Eur	38,83 mil Eur	38,33 mil Eur

(1 EUR = 25,672 CZK)



Number of Employees (incl. Ltd.): 1 122

Total Area: 500 000 m²

Floor Area: 160 000 m²

Ownership Structure: 100% ČZ a.s.

Division auto.



Division Iron foundry.





ČZ a.s. Division Turbo.

The Divisions.

Matallurgy Division.

Aluminium foundry.

Tool-shop.



Daughter Řetězy s.r.o.



Daughter Strojírna s.r.o.





**Your Turbocharger
specialist for
Commercial Diesel
and Gaseous
engines**



ČZ a.s. Division Turbo.

Division Turbo.



DIVISION TURBO.

- Development and production of turbochargers for Commercial Diesel and Gaseous engines of 25 – 450 kW.
- Turbocharger family types; C0, C1, C2 and C3.
- Fixed geometry, Waste gated, Variable Turbine Geometry and 2 stage.
- Annual production capacity 350.000 pcs/year
- Number of employees ~180
- Export ~ 95%
- QM-System ISO 9001/2015 (Certificate), Working conform TS 16949

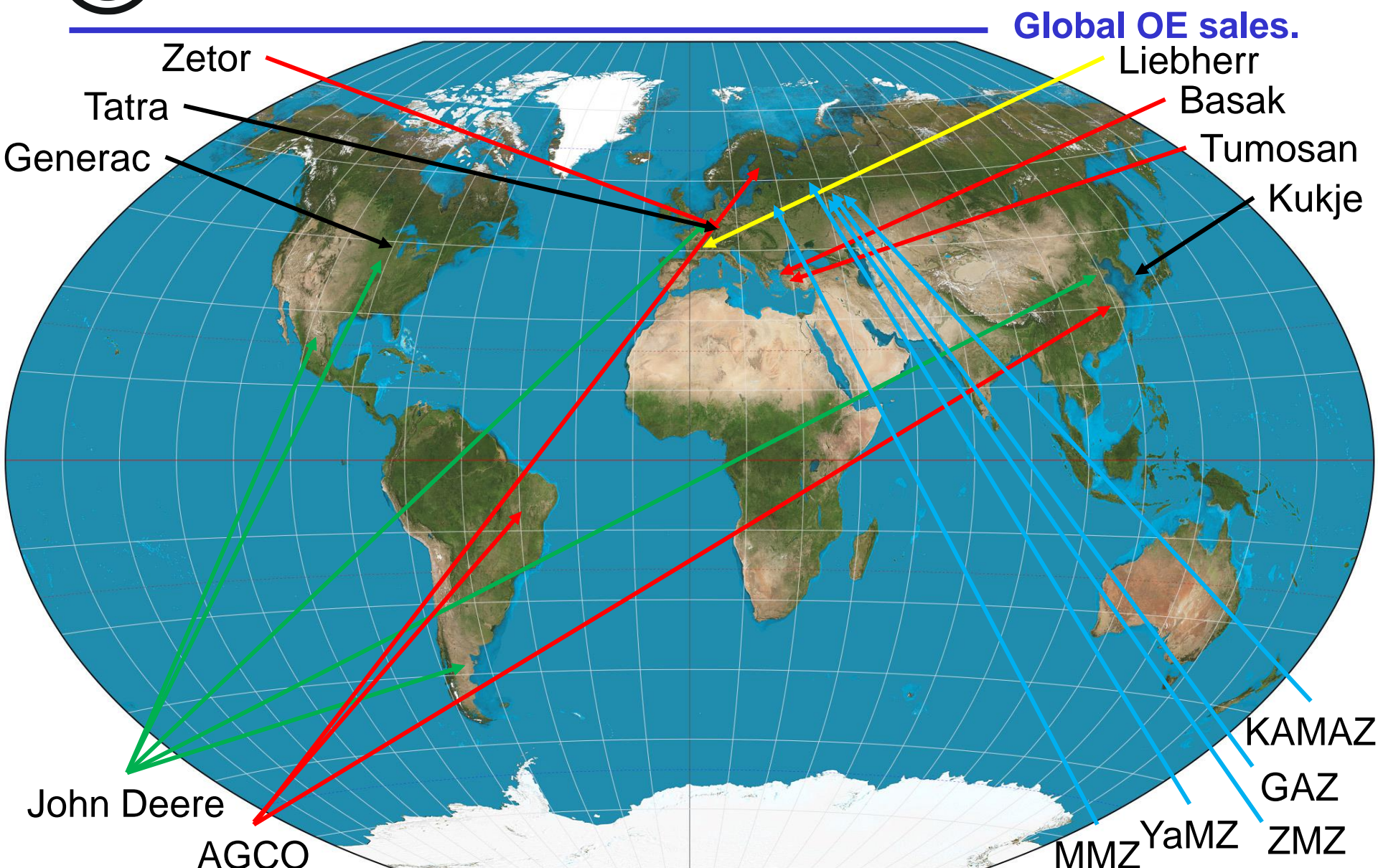
Financial parameters Division Turbo

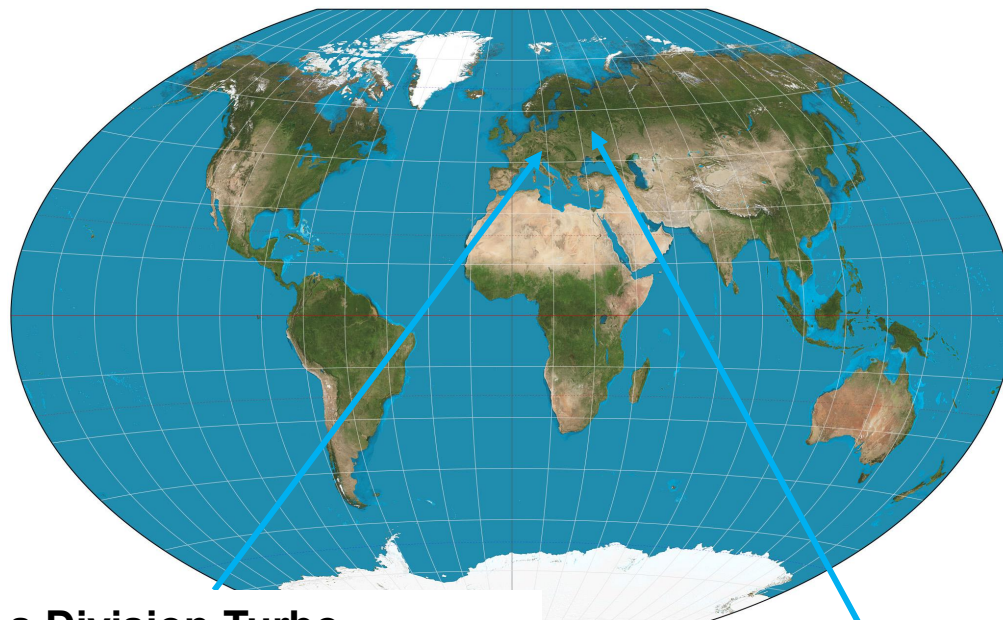


	2017	2018	2019
Sales of division Turbo in mil. EUR (1 EUR = 25,672 CZK)	24,57	27,27	25,08
Sales of division Turbo – share of CZ group sales	39,76%	41,32%	40,33%
CAPEX (in percent of profit before taxes)	82,07%	135,83%	-
CAPEX in mil. EUR (1 EUR = 25,672 CZK)	2,87	4,45	6,87

- 1976 — License contract (for 10 years) with KKK (Germany) for K27, K36 turbochargers.
- 1980 — Start of production of turbochargers.
- 1986 — License contract expired (no obligations).
- 1994 — Start of series production of C1 turbochargers.
- 1995 — Certification for ISO 9001.
- 1997 — Start of deliveries to John Deere.
- 2004 — Certification for EN ISO 14001.
- 2006 — Supplier of the year for John Deere.
- 2007 — Introduction C1 VTG and C09.
- 2009 — Start production for AGCO Sisu Power
- 2012 — Introduction C31 Family.
- 2023 — ISO/ TS 16949 (Working conform TS requirements, although certification not required by current customer base).







ČZ a.s.Division Turbo.

Strakonice, Czech Republic.

Export world wide.

J/V ČZ-TURBO-GAZ.

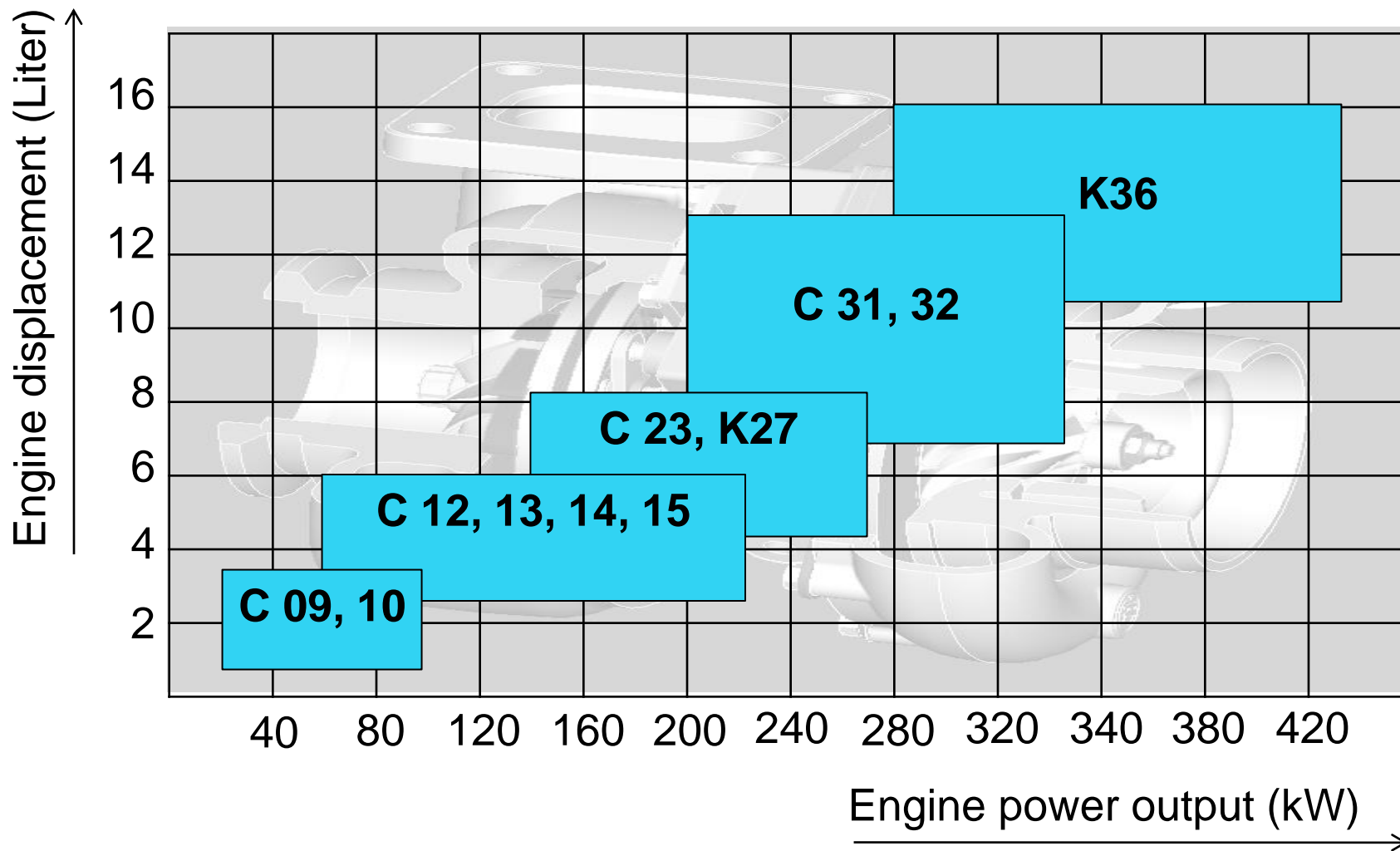
**Nižnij Novgorod. Export to
JAMZ, GAZ, PAZ, KAMAZ,
AMZ, VTZ and ZMZ.**





ČZ a.s. Division Turbo.

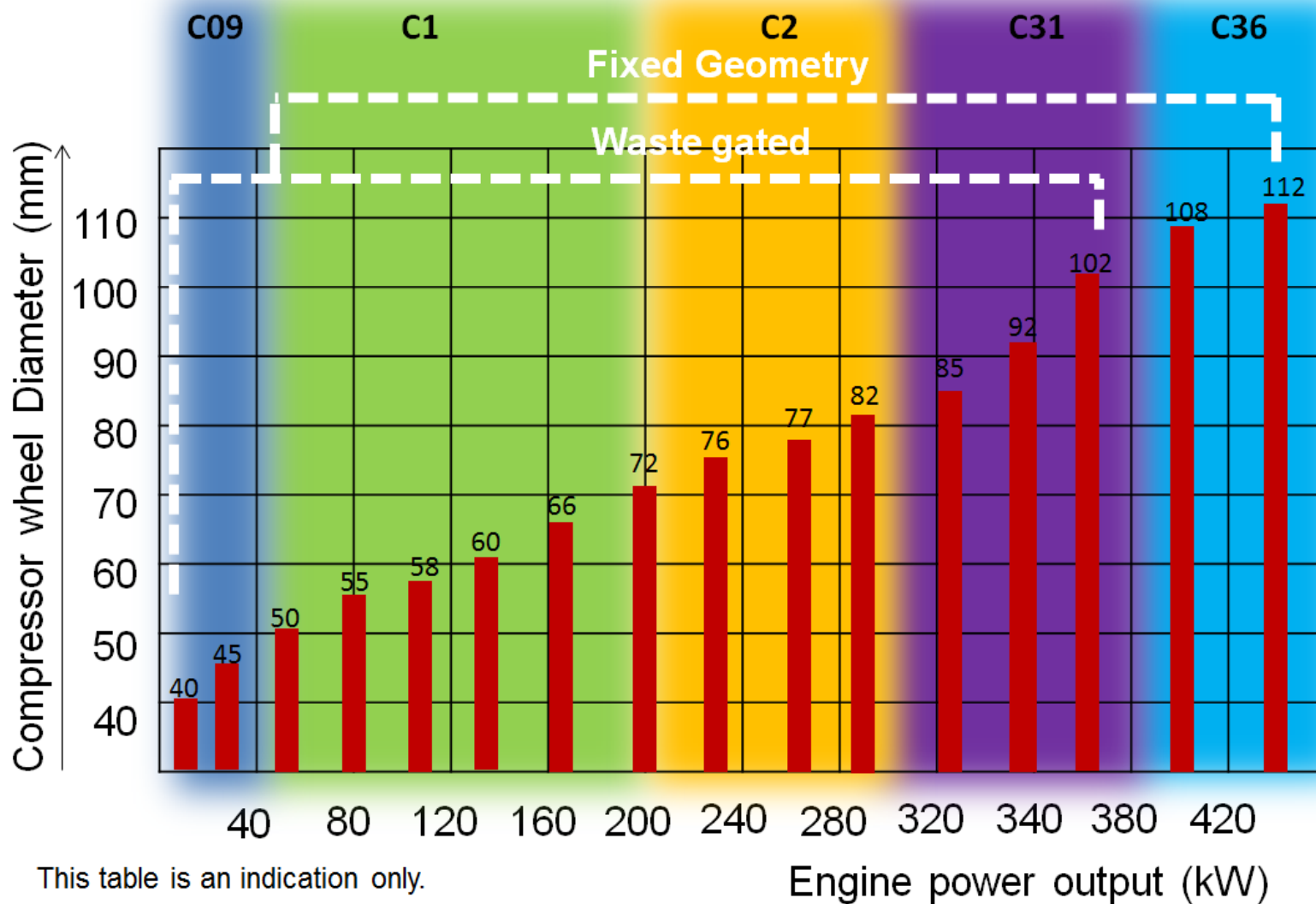
Product range.





ČZ a.s. Division Turbo.

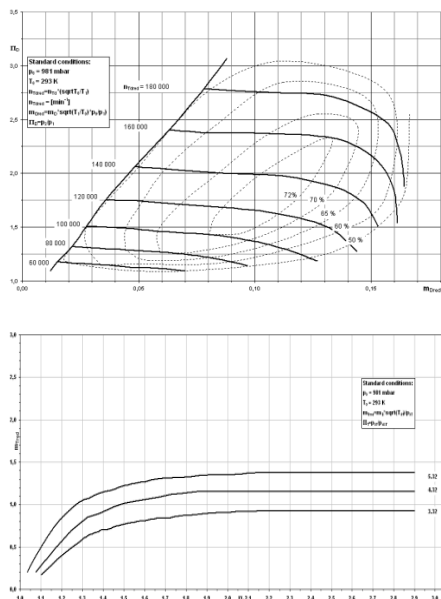
Product range.





Aluminum alloy:
Compressor wheel of Ø 60mm ~ 7- 9 minutes
Compressor wheel of Ø 90mm ~ 9-12 minutes





90 types of
compressor
characteristics.

140 types of
turbine
characteristics.

Approximately 355 part-
numbers in serial
production with order firm
zones up to 20 days.

With or without waste gate, Water-
cooled bearing houses, Water-cooled
Turbine housing, Fixed Turbine
Geometry, Variable Turbine Geometry,
Two stage solutions



State of the art in serial production.

- CZ design setup
- Sonceboz BLDC GR3 actuator (GEN2)
 - Smart
 - Precise operation of WG
 - Custom setting
 - Easy integration with Engine Management
 - Robust (Cooling possibility)

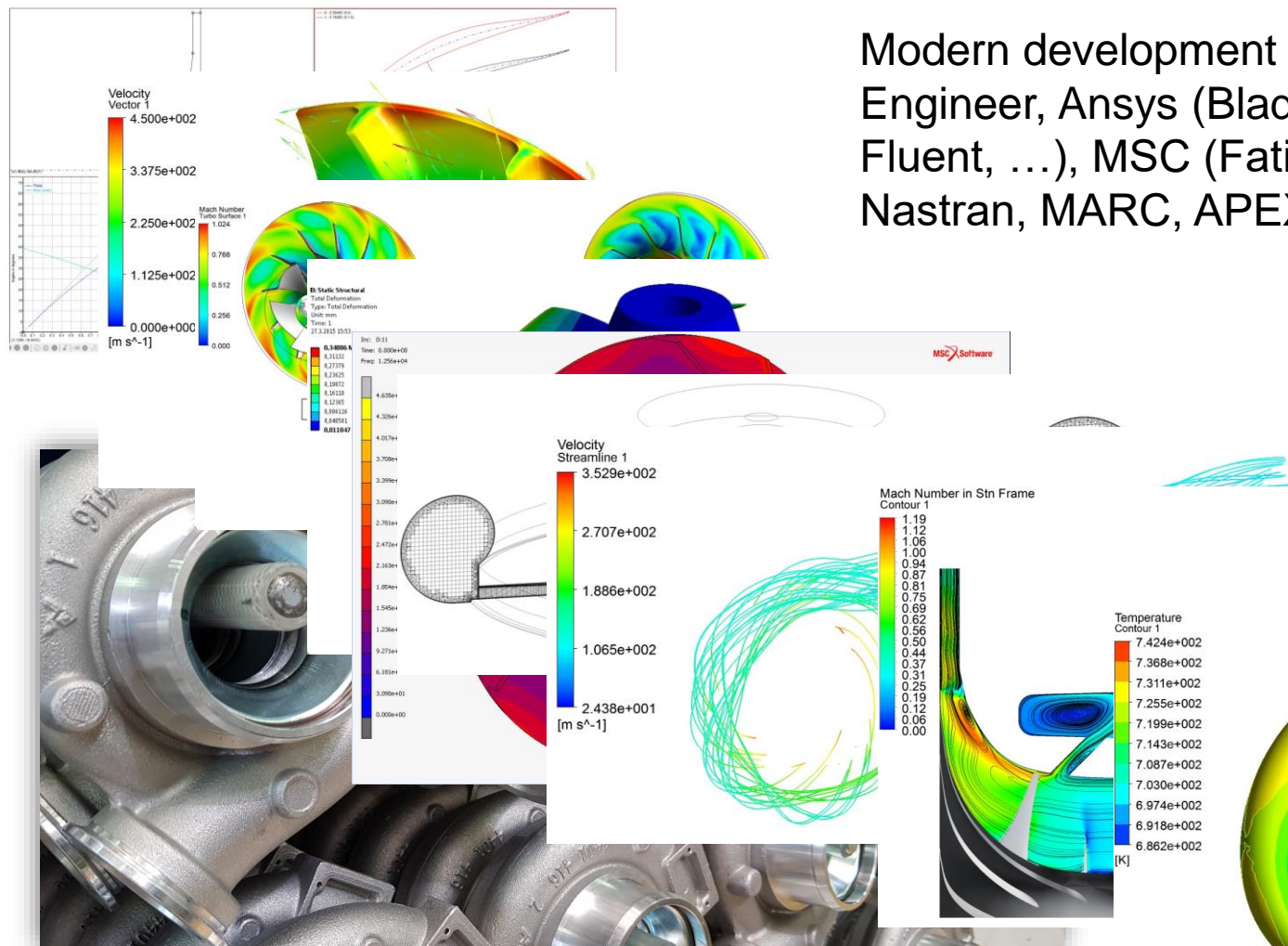


State of the art intended for serial production

- CZ design setup
- Mitsubishi Electric Gen3.5 actuator
 - Melco original Brush Motor
 - Linear actuation by Lead Screw mechanism
 - Precise operation of WG
 - Easy integration with Engine Management
 - Robust



Modern development methods (Pro Engineer, Ansys (Bladegen, CFX, Fluent, ...), MSC (Fatigue, Patran Nastran, MARC, APEX...))

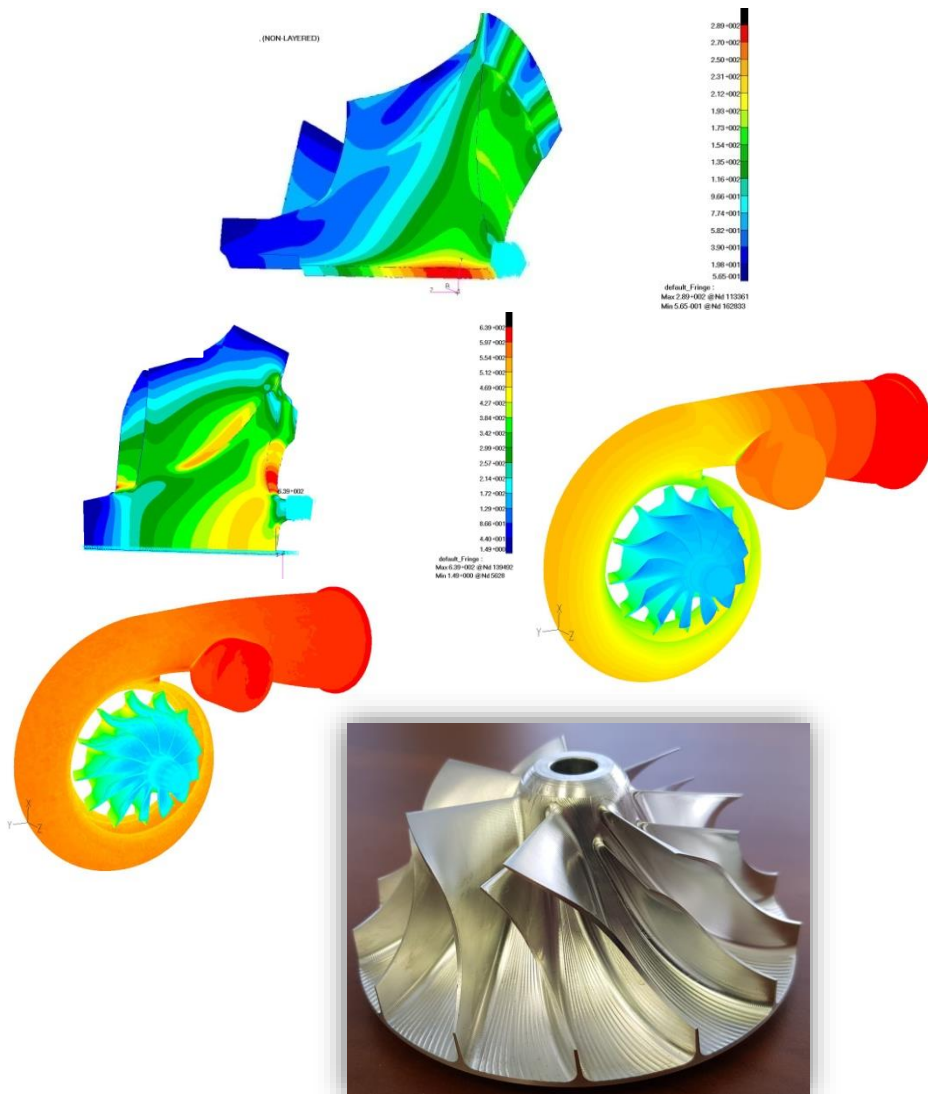


Same for turbine



ČZ a.s. Division Turbo.

Development.



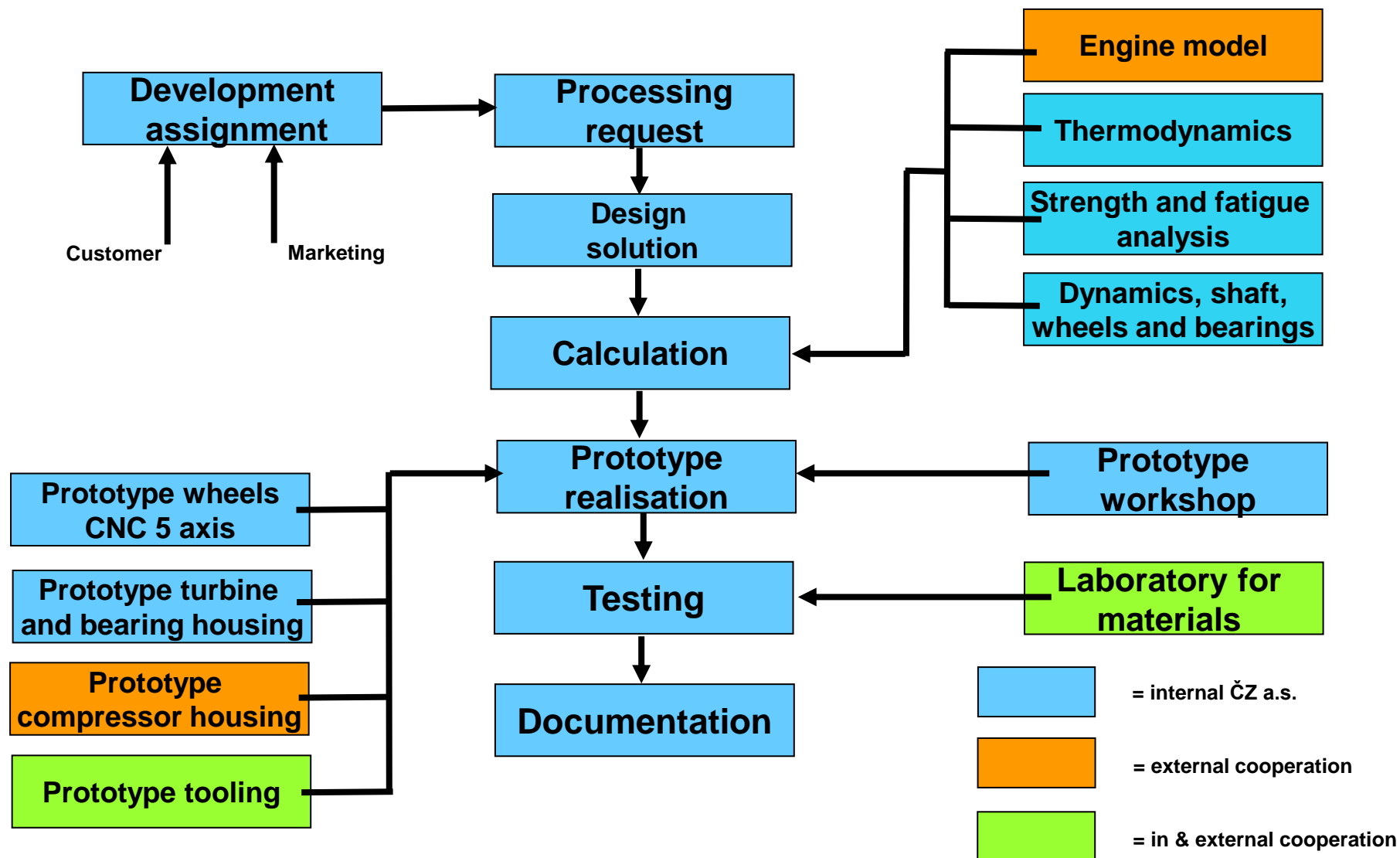
In our development:

Close co-operation with customers when adjusting the turbochargers to engines (dimensions and thermal dynamics).

Co-operation with leading scientific institutions in the Czech Republic.

Development of turbochargers ensures required emission limits are achieved.

Engine-less testing benches for testing of turbochargers.





ČZ a.s. Division Turbo.

Development.

Rapid prototyping of Turbine, compressor and bearing housing by 3D printing of casting mold.

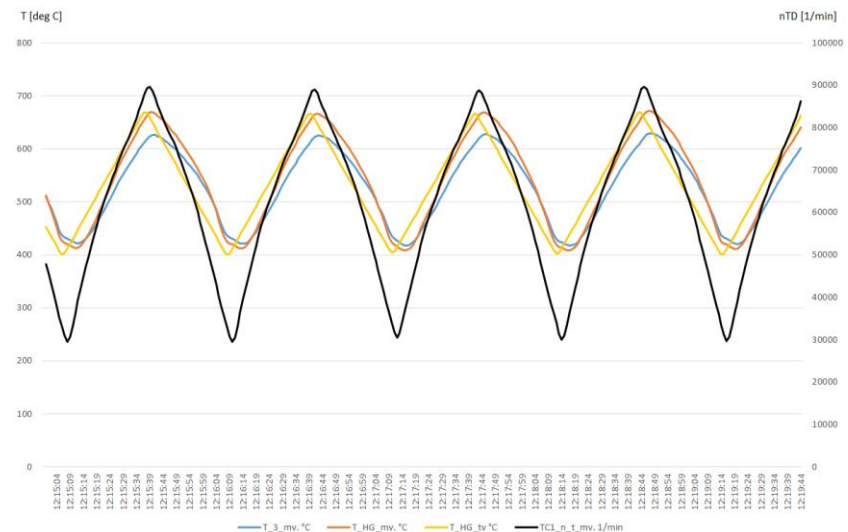
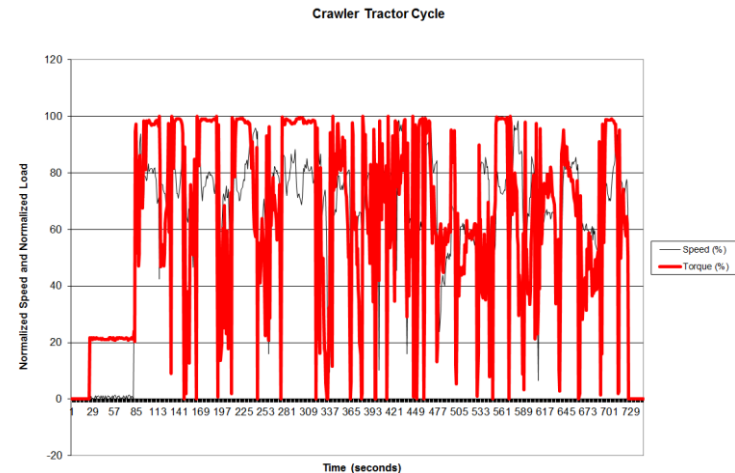


CZ is now using a Kratzer turbocharger test stand for the long term cyclic testing of turbochargers.

Basic parameters of this test stand:

Natural gas burner:	400kW (heat power)
Mass flow:	0,5 kg/s
Max Temp continue:	900°C
Thermo shock unit:	Yes
Programmable cycle:	Yes
Automatic switch off:	Yes
Switching Unit:	Yes
Max # of turbo per test:	2

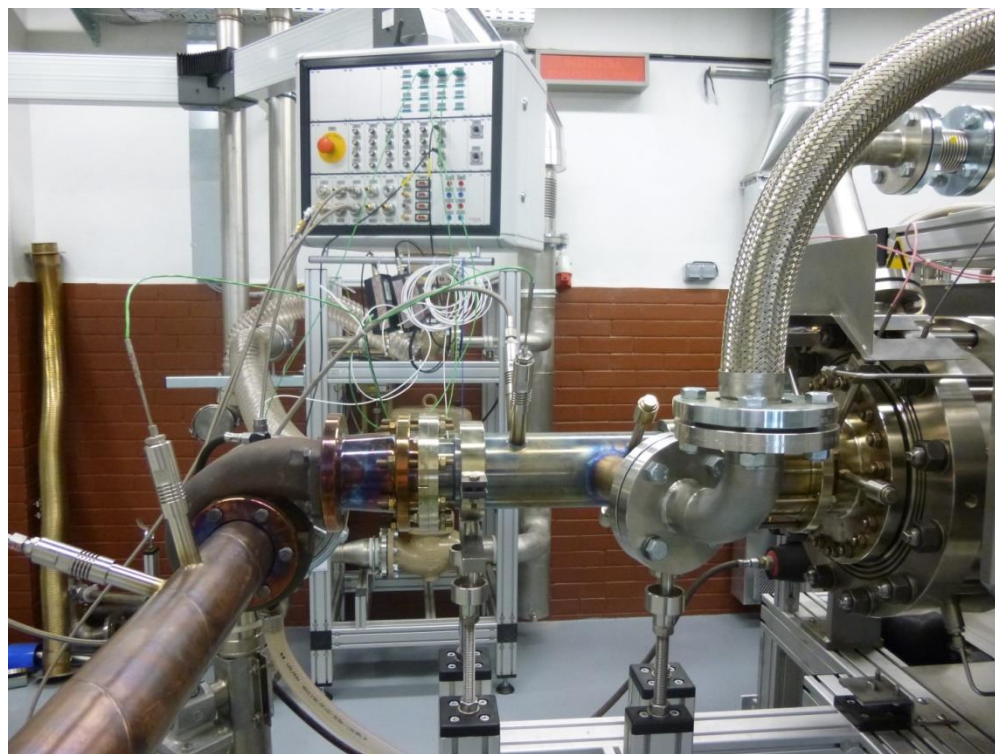
Test stand is made for testing
CZ turbocharger range:
C12, C13, C14, C15, K27, C23, C31, K36

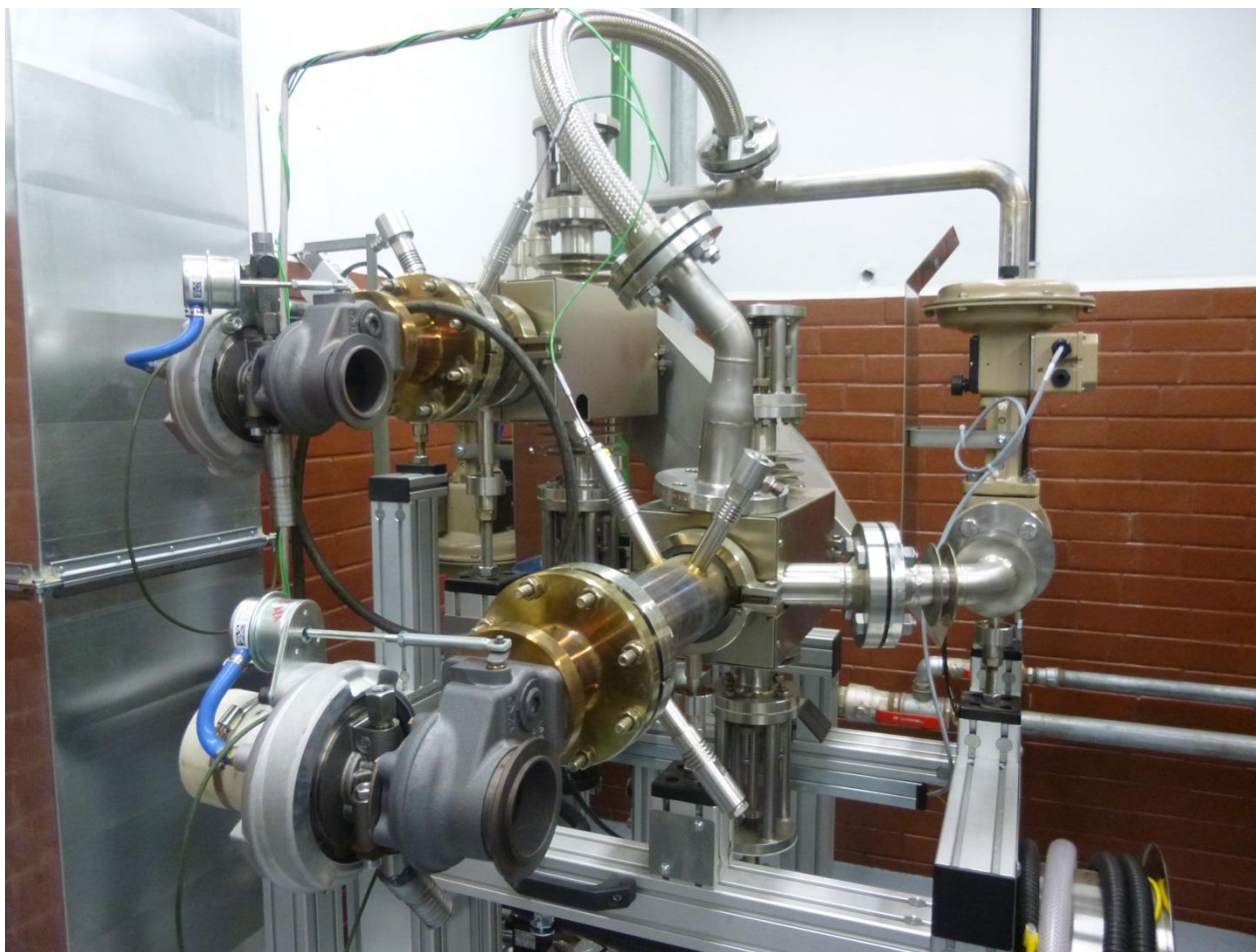




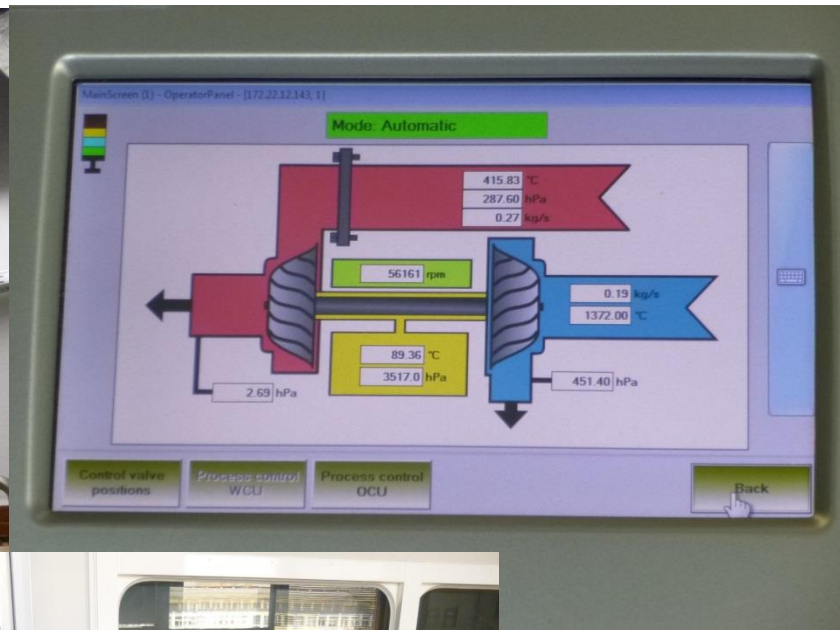
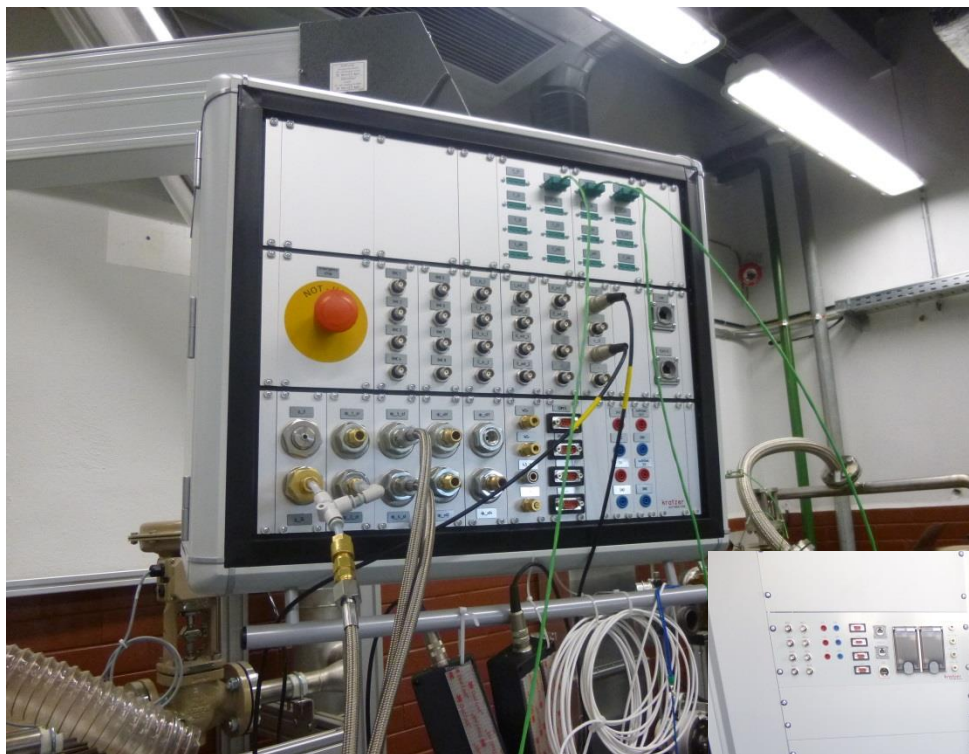
Natural gas burner of 400kW
(heat power)

Thermo-shock unit





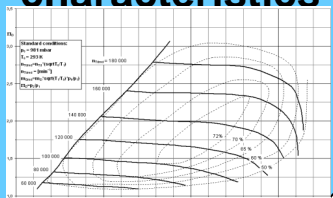
Switching unit including Thermo-shock



Measuring, programming
and controlling of test
stand 24/7



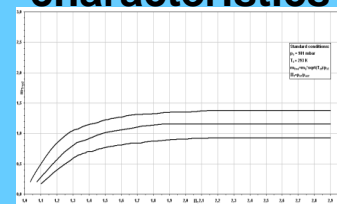
Compressor characteristics



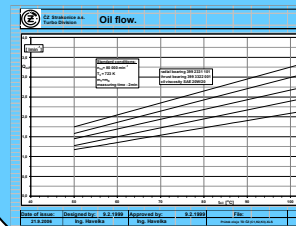
Temperature analysis and temperature shock.

Sealing and oil leakage simulation

Turbine characteristics



Oil flow.

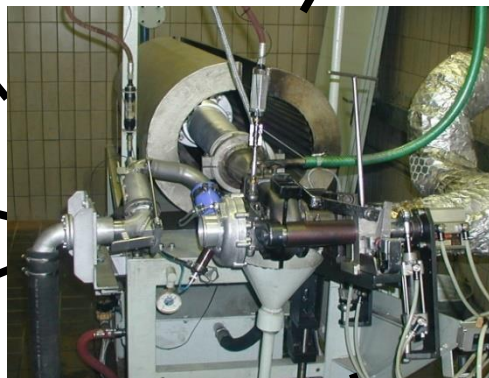
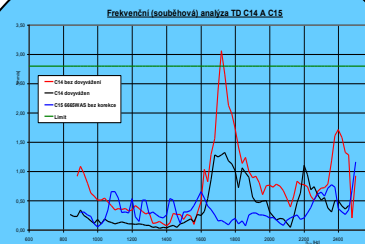


Containment test and bursting test

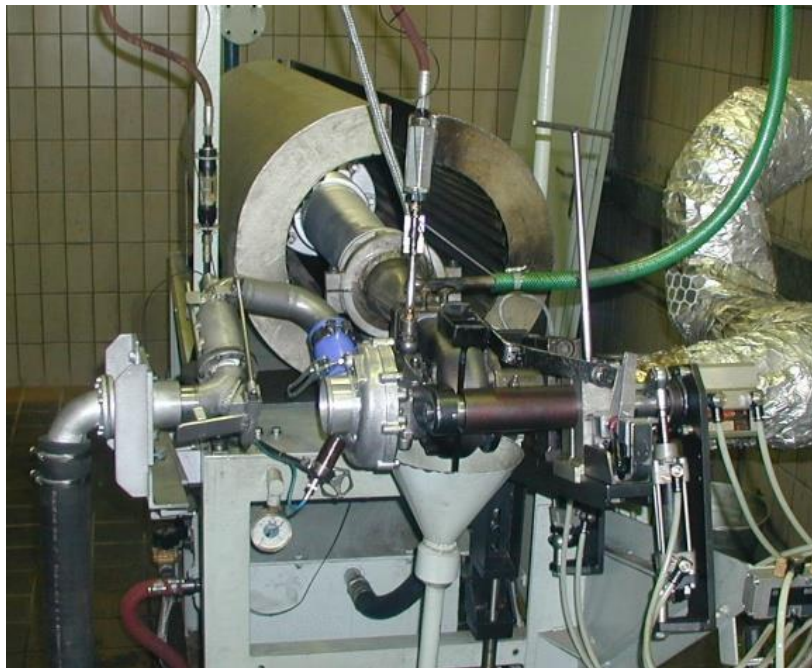


Reproduction of specific problems occurred at customer.

Turbocharger vibration



Next step.

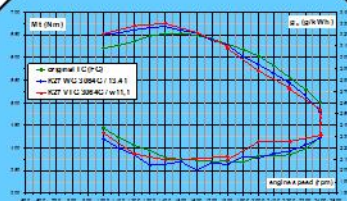


Year 2022 / 2023 increase of use of Natural gas.

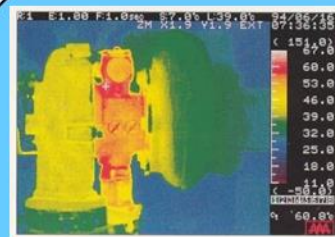


ČZ a.s. Division Turbo.

On engine testing.



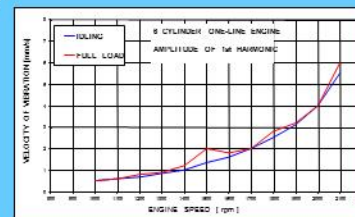
Power and torque characteristics.



Temperature.



Influence of engine to TC leak prove



Turbocharger vibration.



ČZ a.s. Division Turbo.

In the news.



Fendt 211 F
Vario
Winner of
BEST OF
SPECIALIZED
year 2010
Turbo:
C13-121-02



Massey
Ferguson
5713SI
Winner of
BEST UTILITY
year 2016
Turbo:
C13-263-01



Massey
Ferguson 5610
Year 2015
2,900 MILES
ACROSS THE
TOUGHEST
ENVIRONMENT
ON EARTH
Turbo:
C12-210-03



Massey
Ferguson 6713
Nominee
Tractor Of The
Year 2019 in
the prestige
competition.
Turbo
C13-263-01



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Thank you !