



COMPANY PROFILE

Blade & Diaphragm for ST & GT

2021

Turbine Blade Expert

CONTENTS

☐ General Information	- 3 (page)
☐ Plant Information	- 4 ~7
☐ Man power	- 8
☐ Quality System	- 9
☐ Major Customers & Businesses	- 10
☐ Major Products (Turbine Blade)	- 11~13
☐ Material	- 14
☐ Blade/ Diaphragm for ST	- 15 ~28
☐ Inspection	- 29~30
☐ GT Compressor	- 31~35
☐ Other P/J(Small Rotor & Packing Rings)	- 36~37
☐ Major Facility	- 38~39
☐ Forging Capability (with partner)	- 40~43
☐ Over 30 Years Experience	- 46

GENERAL INFORMATION

□ **Company Name : JINYOUNG TBX CO., LTD.**
(TBX: Turbine Blade Expert)

□ **Establish : 1982. 1. 5**

□ **Category : Manufacture**

□ **President : Kim, Joon-Seob**

□ **Plant State**

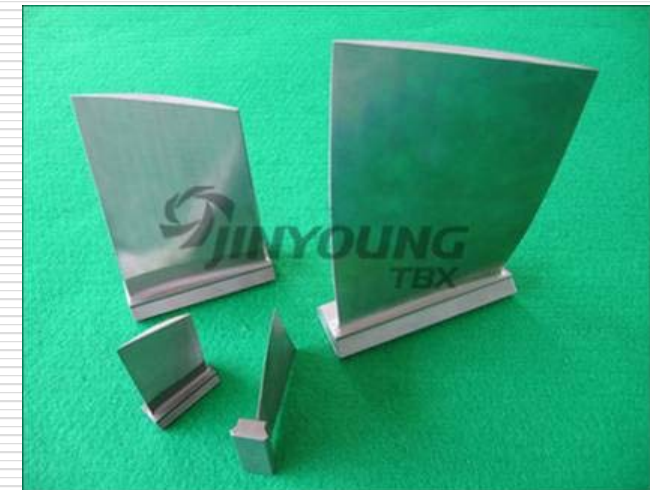
Head Office & Plant :

#501 Nammyeon-ro, Seongsan-gu, Changwon-si,
Kyungnam, 641-050, Korea.(Tel : +82-55-295-2801~2)

□ **Capital Stock : USD 4,200,000 (as of 2018)**

□ **Total Assets : USD 12,000,000**

□ **Employees : 100 Person**



Scale of company

	Head Office & Plant
Site	15,525m ² (167,000 ft ²)
Building	9,165m ² (98,000 ft ²)

PLANT INFORMATION

□ LOCATION



Changwon Plant is located about 35Km(21Mile) from Busan (Kimhae international Airport)

Distance Information	Tokyo (Japan)	Beijing (China)	Seoul (Korea)
Busan (Kimhae International Airport)	about 2hours by air	about 2hours by air	about 45 minutes by air

PLANT INFORMATION

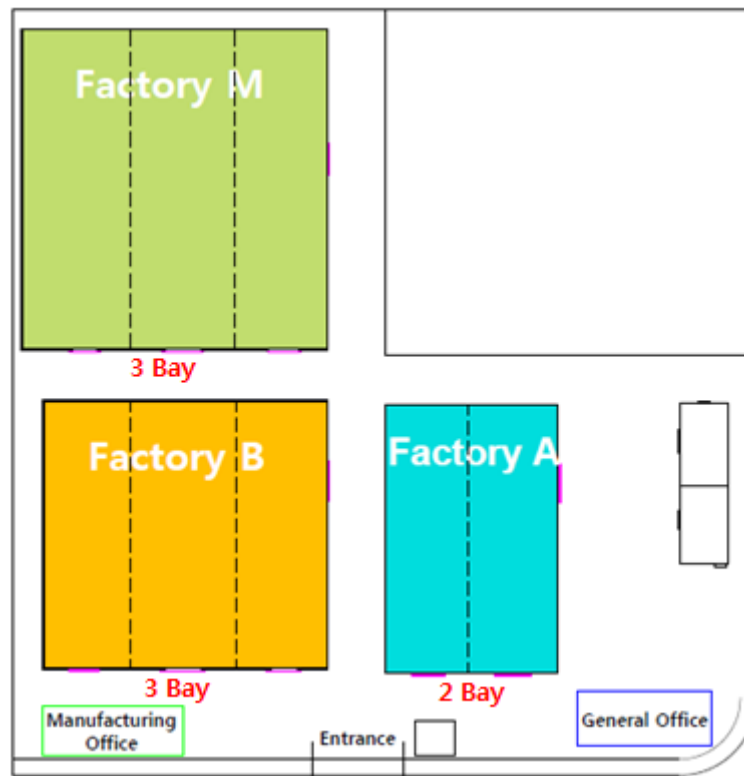


[Office]



[Plant]

PLANT INFORMATION



[Layout]



PLANT INFORMATION

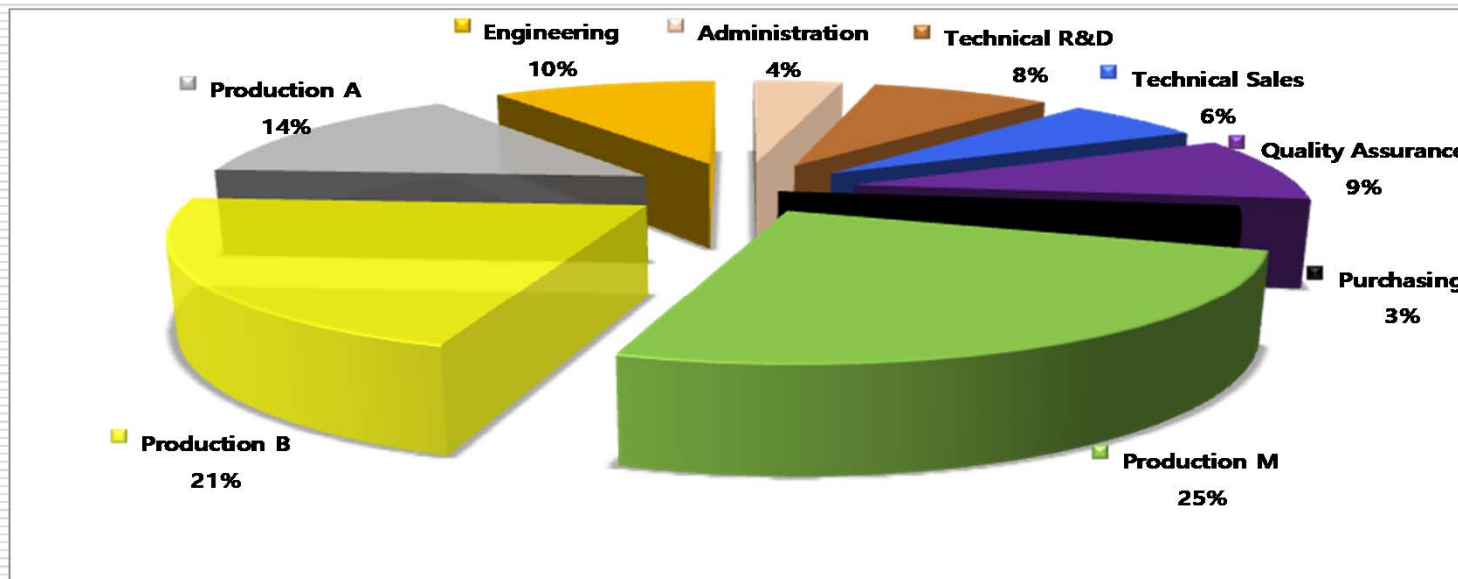
□ INSIDE



Blade MFG Equipment – 200 Units

Airfoil Milling Machine Tools – 90 Units

MANPOWER



TOTAL : 100People

- | | |
|---------------------|---------------------|
| ■ Machining | ■ Assembly / Others |
| - 5 Years : 30% | - 10 Years : 40% |
| - 10 Years : 30% | - 15~20Years : 60% |
| - 15~20 Years : 40% | |

QUALITY SYSTEM

- ISO 9001/ ISO 14001/ OHSAS 18001
- AS 9100 (Rev. D)
- OEM's certificate

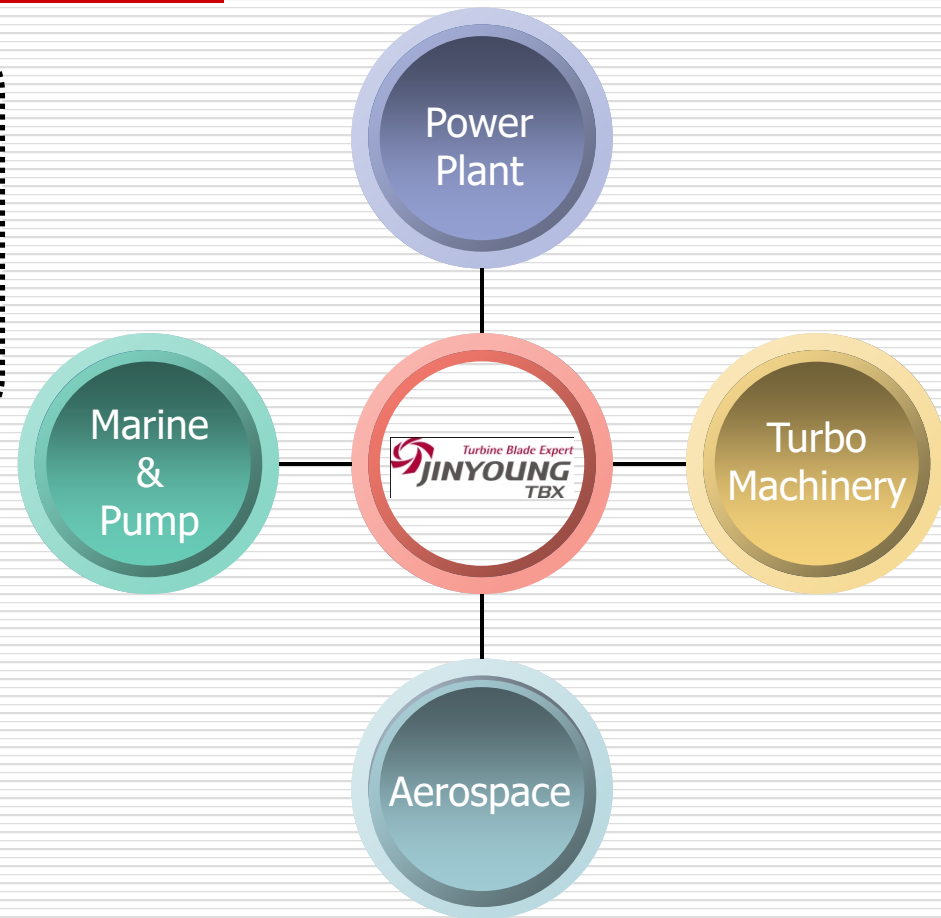
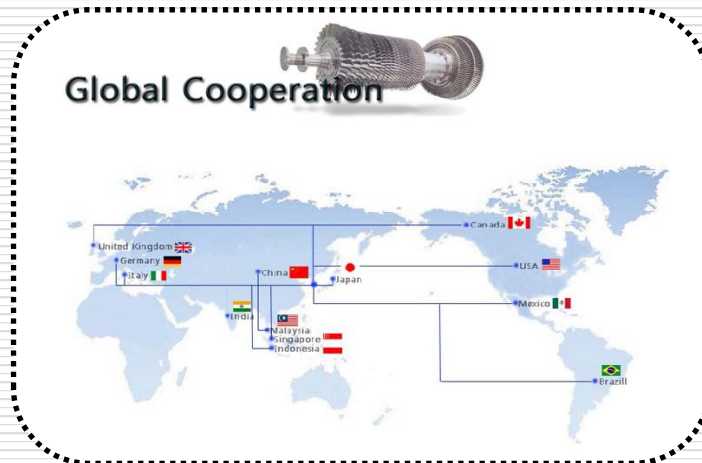


ISO9001/AS9100

품질 및 Global Partner 인증

미쓰비시 / 두산중공업 / 한국 수력 원자력 외 다수

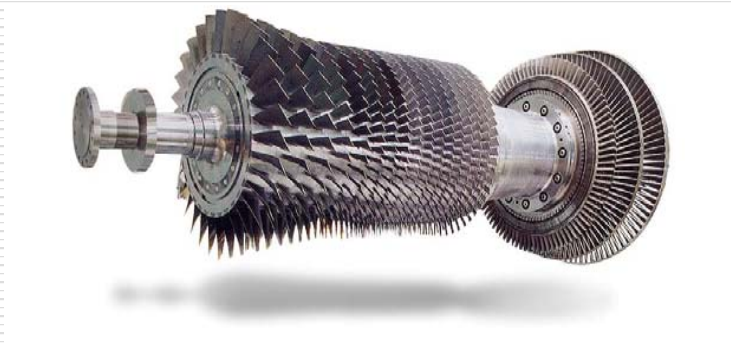
Major Customers & Businesses



Major Products

□ Main item: Turbine Blade (200,000ea/year)

- Gas Turbine – Compressor Blade / Vane / IGV/ OGV
- Steam Turbine – Rotating / Moving / Rotor / Fan Blade
 - Stationary / Fixed / Stator Blade / Profile / Partition
 - Bucket / Airfoil
 - Nozzle for diaphragm / Spacer
- Turbo Machinery – Impeller / Blisk / Diffuser / Blade

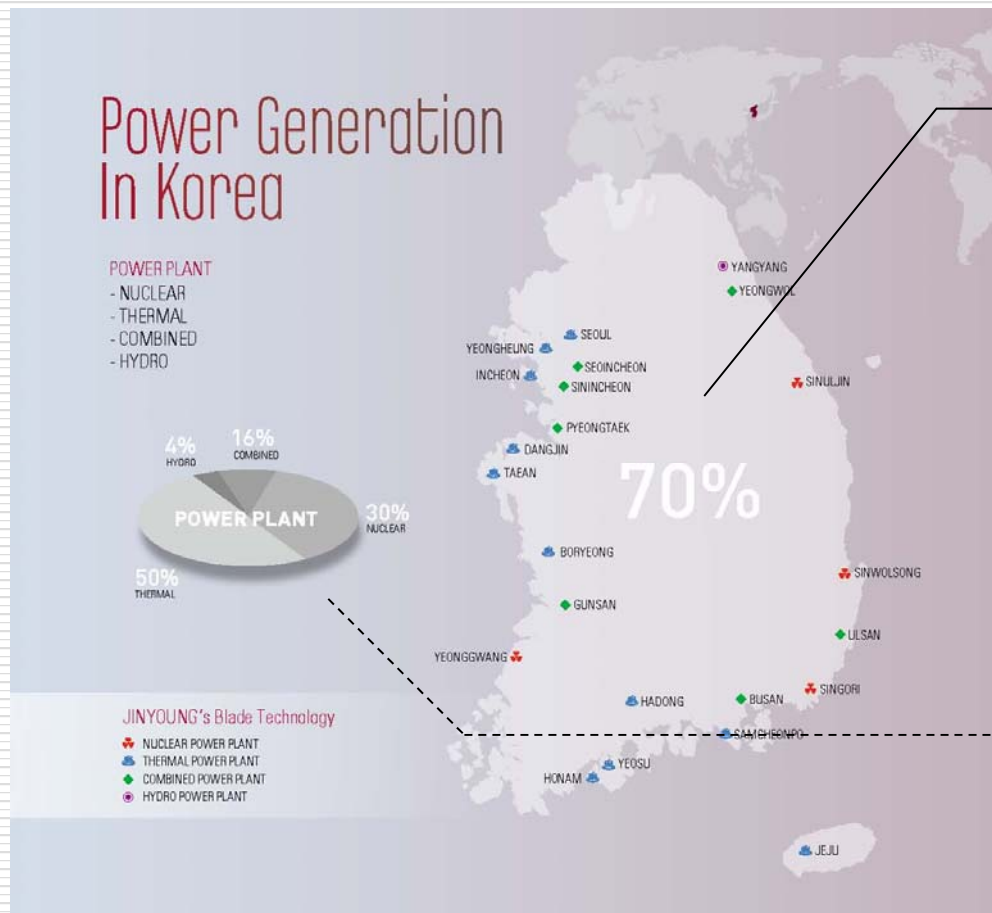


< Turbine Rotor >



< Turbine Blade >

No. 1 Supplier for Turbine Blade



'No. 1 Supplier' of Turbine Blade in Korea...

— 70 % —

- ◆ Thermal 40%
- ◆ Nuclear 30%
- ◆ Combined 26%
- ◆ Hydro 4%

Turbine Blade eXpert



Material

- Flat Bar & Forging (Stainless Steel & Titanium & Super Alloy)



Blade – ST

- T-root, Profile, ND type



<Nozzle ~ ND blade>

Blade – ST (Thermal, Nuclear)

- Pine Tree /Side Entry Type



<HP, IP, LP – up to 43 inch available>

Blade – ST (OEMs)

- Steam turbine – Rotor & Stator Blade



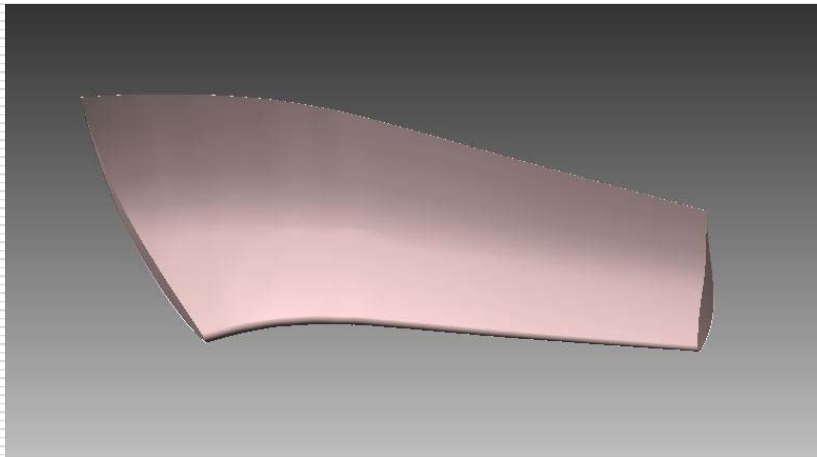
Nozzle/Partition – ST

- Nozzle Partition – up to 52 inch



Nozzle/Partition – ST

- L-0 Partition – 52 inch

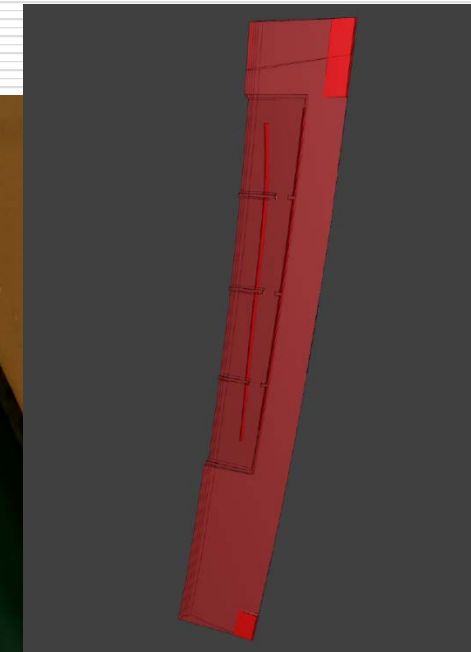
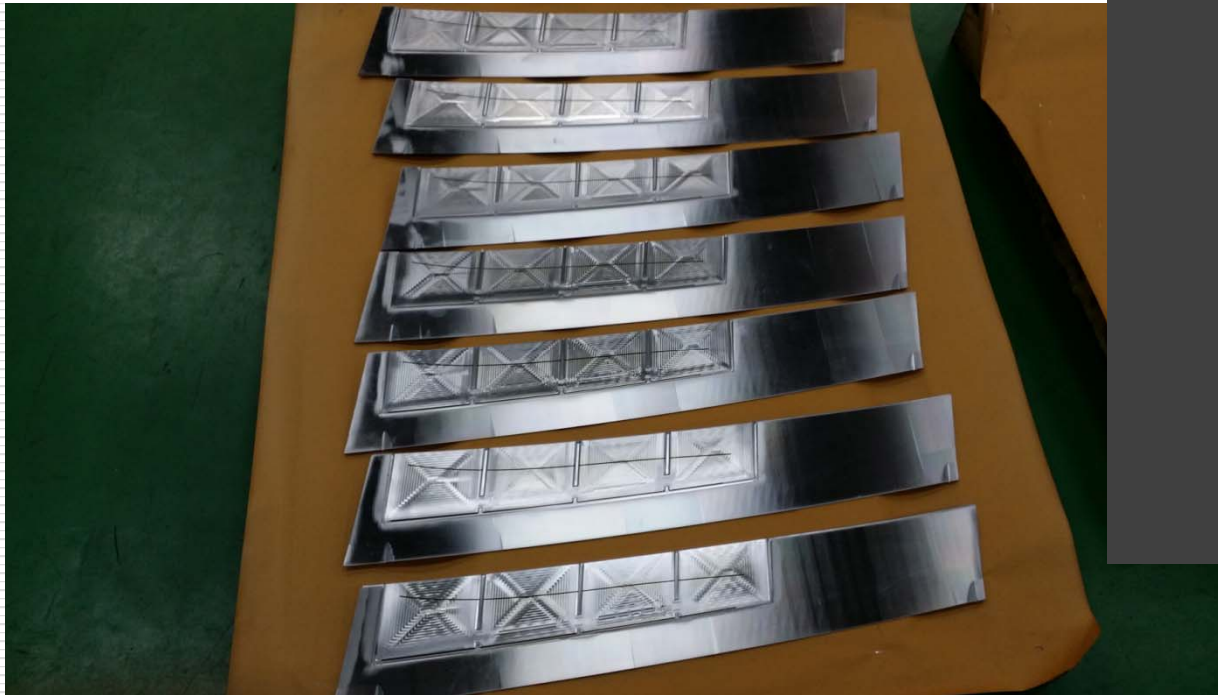


Modeling



Polished Nozzle

L-0 Partition of MHPS



60inch Nozzle Partition Parts – SUS304

Diaphragm – ST

□ Diaphragm for S/T



Small Size– Dia. 500mm



Middle Size– Dia. 3400mm

Diaphragm – ST

- Assembly Diaphragm for HP/IP



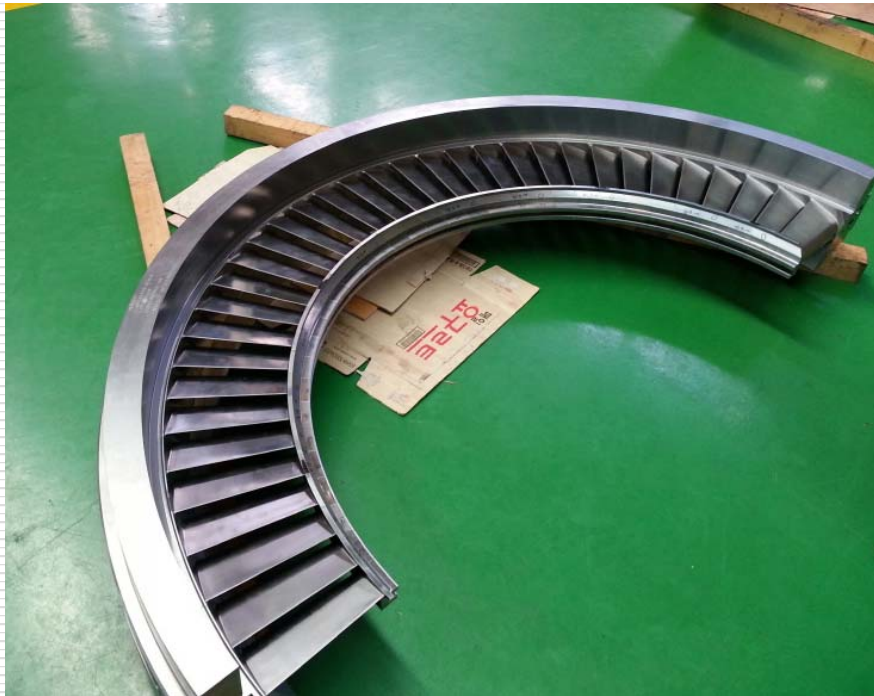
<Diameter 1,000 ~ 2,500mm>

Diaphragm – ST



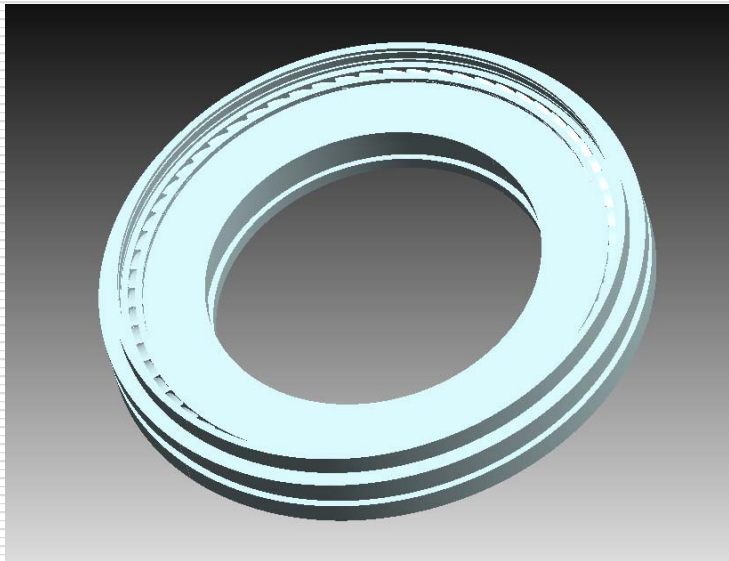
Diaphragm & Packing ring

Diaphragm – ST



Diaphragm – ST

- Nozzle / Diaphragm



Modeling



Welded Nozzle



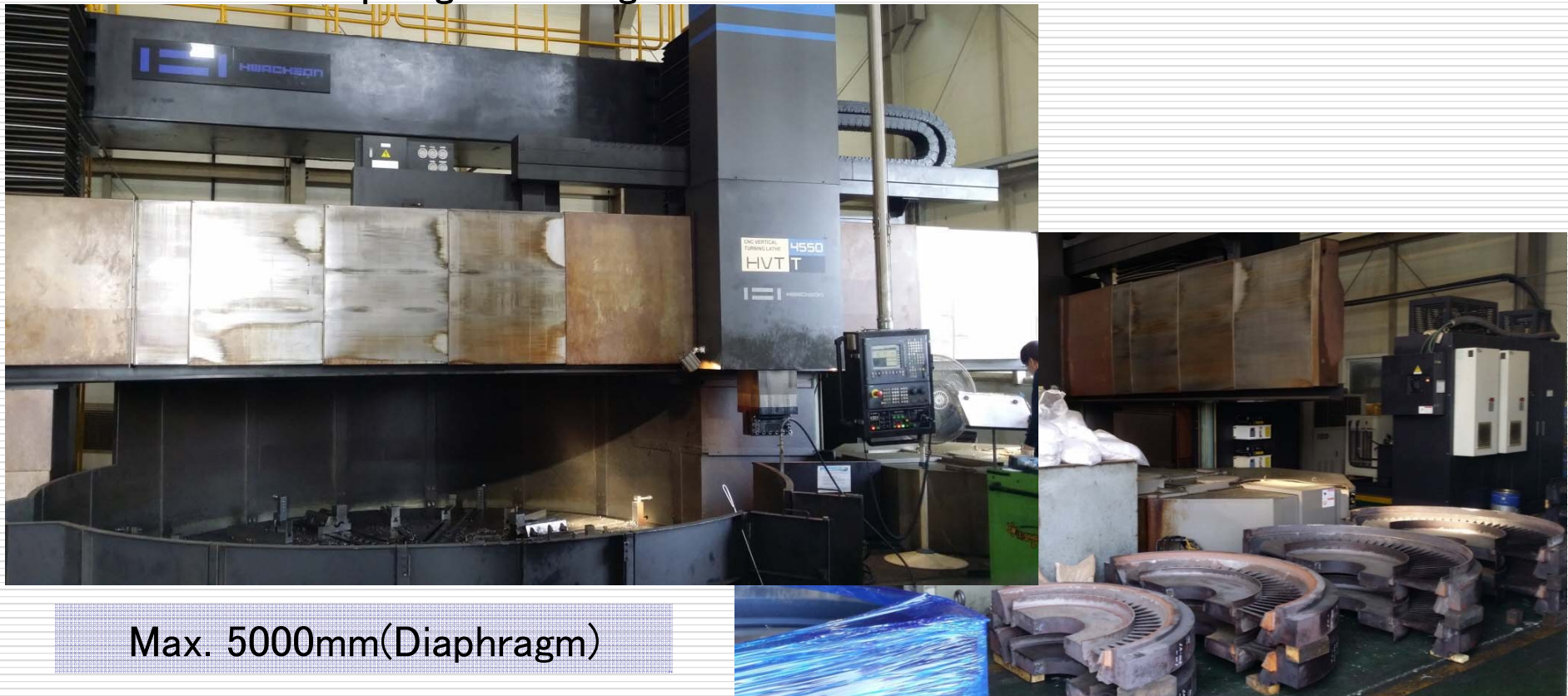
Turning Equipment



Max. Diameter is up to 2,000 mm.

Turning Equipment

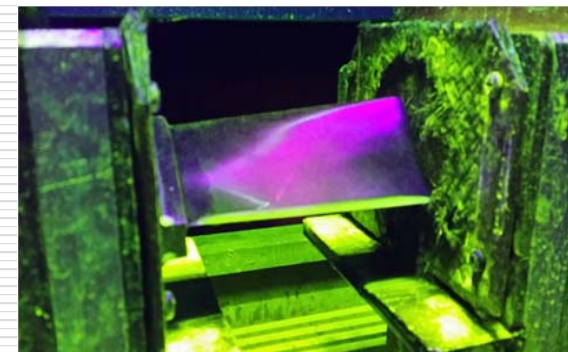
□ Nozzle Diaphragm & Turing



Max. 5000mm(Diaphragm)

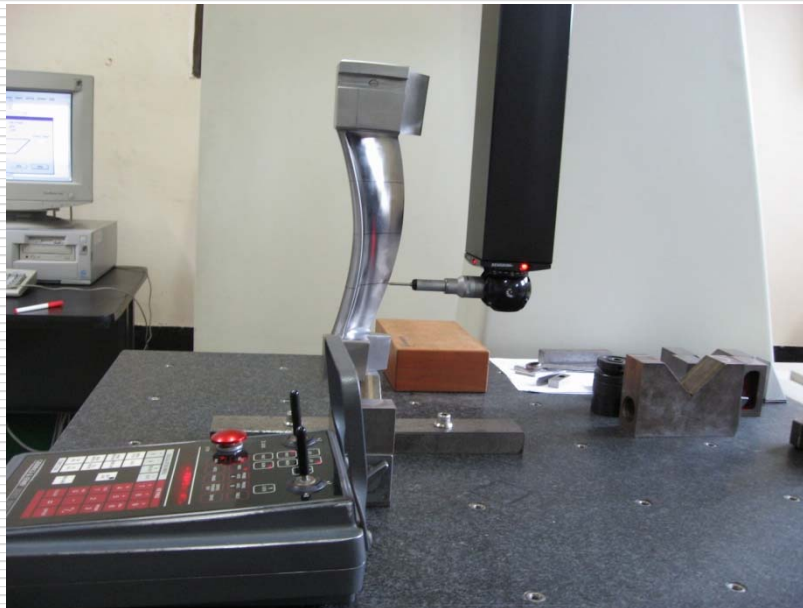
Cooperation for Diaphragm

☐ Out sourcing



- Max. Diameter is up to 5,000 mm
- NDE Process
- Welding Process

INSPECTION – CMM



Customer Inspection



<Pre inspection before shipment>

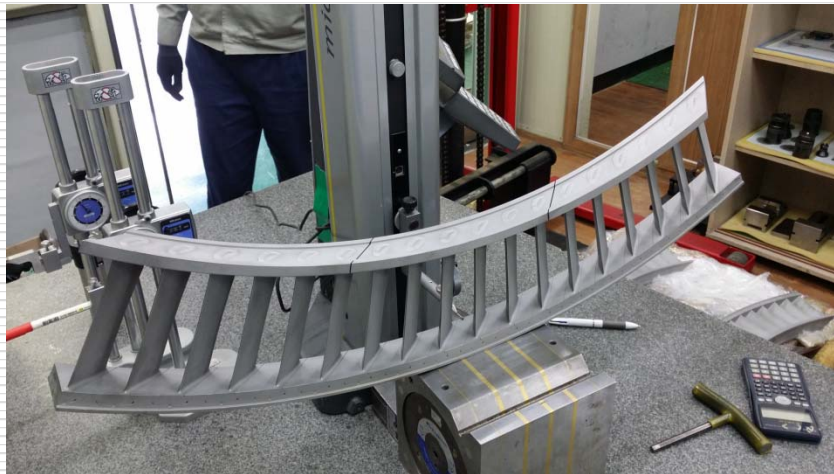
Gas Turbine Compressor

- Gas turbine – Compressor blade / Blisk

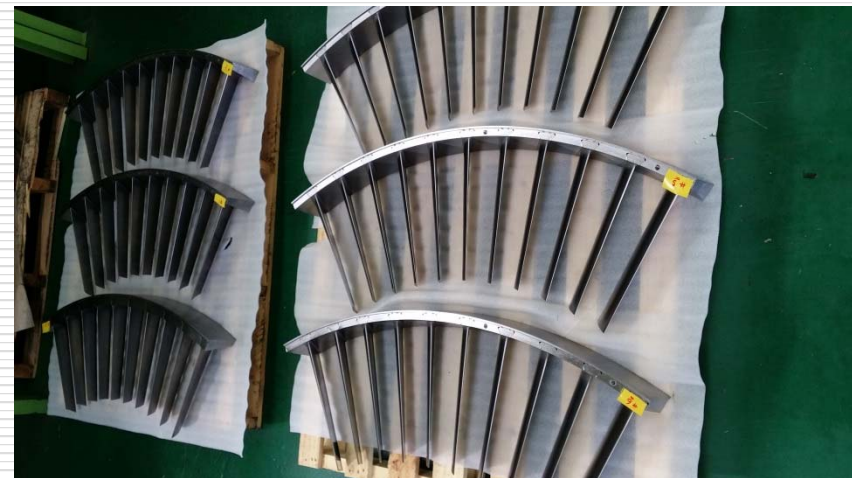


Gas Turbine Compressor

- Vane, Diaphragm for G/T



Welding Type



Assembly Type

GT Engine Item – VSV & Blisk



- VSV -



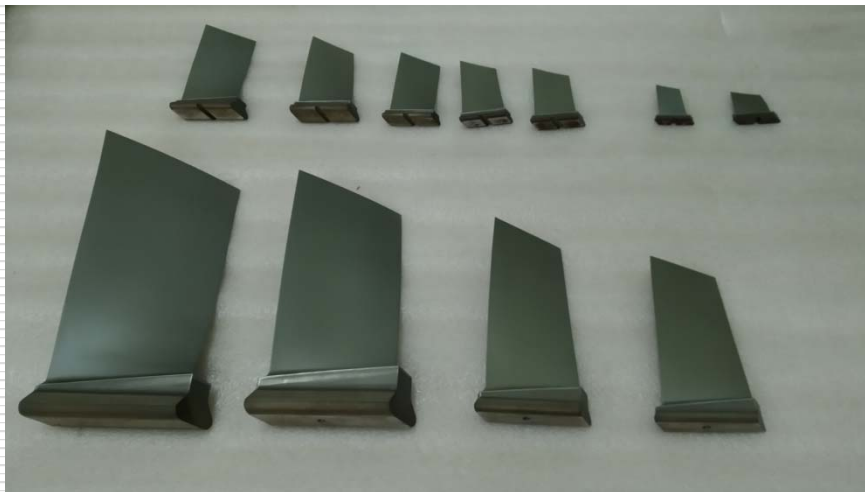
- Compressor Blade(Titanium) -



- Blisk -

Gas Turbine Compressor

□ Coating



<HVOF & APS Coating available>

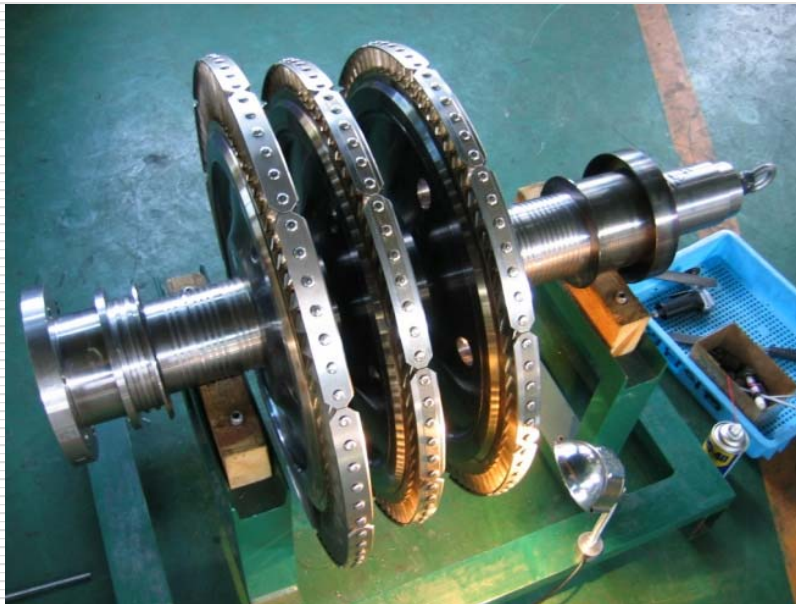
Project Experience (**DOOSAN**)



▲두산중공업 가스터빈

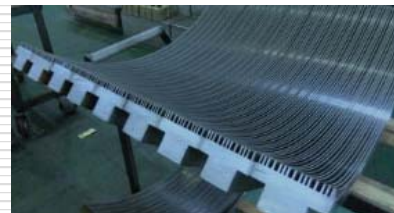
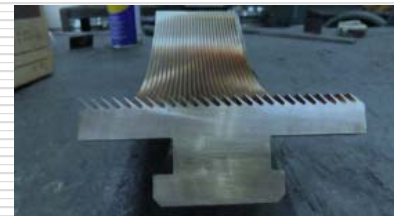
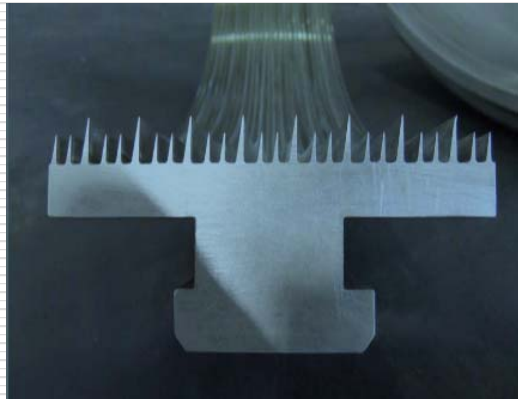
Other Project

- ❑ Small Rotors for BFPT/FWPT/COPT/WBPT



Other Project – on going

□ Packing Ring – General



Major Machining capability



[Major Capability with high speed machining]

| No. | Product | Max. part dia. | Tailstock length | Maker | Others |
|-----|----------------------|----------------|------------------|---------|--------------------------|
| 1 | Turbomill 1400 i | 400 mm | 1400 mm | LIECHTI | Installed
April. 2015 |
| 2 | Integrex e-420H-S II | 420 mm | 1354 mm | MAZAK | Installed |

Latest Turbine parts manufacturing capability



Blade Machining Tools – over 200 machines

Forging capability (with partner)

Forging Facilities

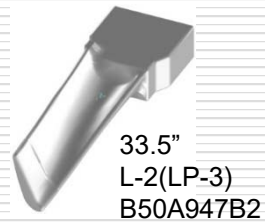
- 1 - 50 ton Counter Blow Hammer Line
(25,000ton Forging Press Equivalent)
- 1 - 35 ton Counter Blow Hammer Line
- 1 - 10 ton Air Drop Hammer Line
- 1 - 6 ton Air Drop Hammer Line
- 1 - 1600 ton (6.5") Upsetter Line
- 1 - 450 ton (3.0") Upsetter Line
- 1 - 1300 ton Forging Press Line
- 1 - 1600 ton Forging Press Line
- 1 - 2500 ton Forging Press Line
- 1 - 3000 ton Forging Press Line



Forging capability (with partner)

- Forged Bucket up to 1400MW Nuclear

-Type : L-0(LSB), L-1, L-2 Forged Bucket



Forging capability (with partner)

- Forged Nozzle Partition for 1400MW Nuclear

-Type : L-0(LSB), L-1, L-2 Forged Nozzle Partition



52" L-2 BKT



52" L-2 PTT
593L



52" L-1 PTT
880L



52" LSB PTT
1370L – 180.7kg

Forging capability (with partner)

- Forged Blade & Vane for Compressor of Gas Turbine



Rotor stg.
Diamond Base



Rotor stg.
Square Base



Stator stg.
Diamond Base

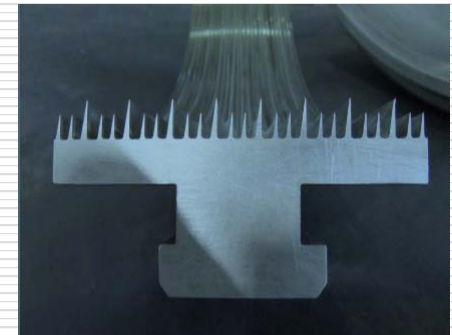


Stator stg.
Square Base

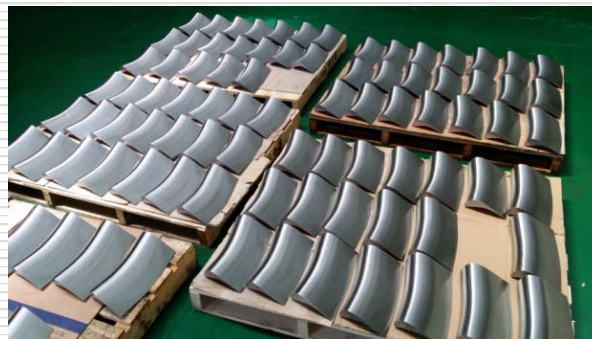
Summary

□ ST/GT Products

- Bucket/Partition
- Diaphragm (Assembly/Welding)
- Packing Ring

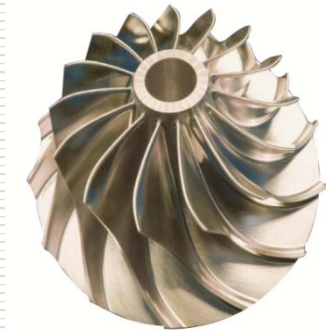
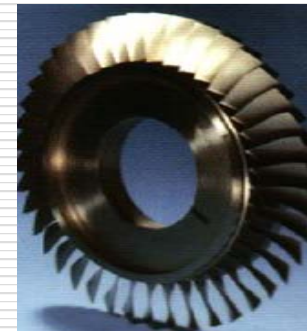


□ Material



Turbo machinery

□ Blisk / Impeller / Blade / Nozzle Ring / Diffuser



Over 30 Years Experience

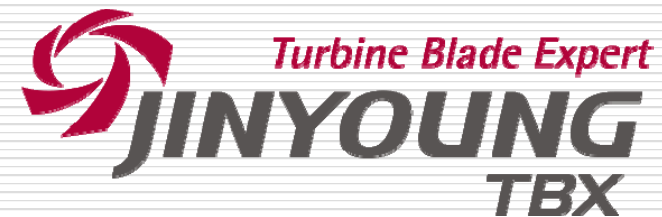


Turbine Blade Expert



創意, 信賴
Creativity, Trust

Cooperation with Global OEMs



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