

Once-through boiler

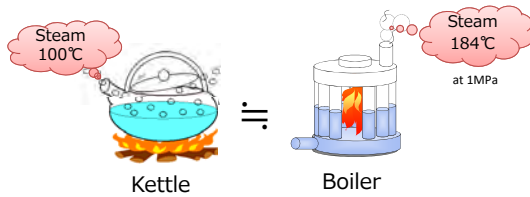
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Miura Co.,Ltd

What is a Steam Boiler?

- Equipment which generates steam
- The most important heat source for factories, hotels, hospitals, buildings, etc.

Application of steam : Heating, boiling, drying, sterilizing, etc.

Production of steam : The same principal as a kettle



<Example of industrial use>



Food



Brewery



Textile



Chemical



Automobile manufacturing



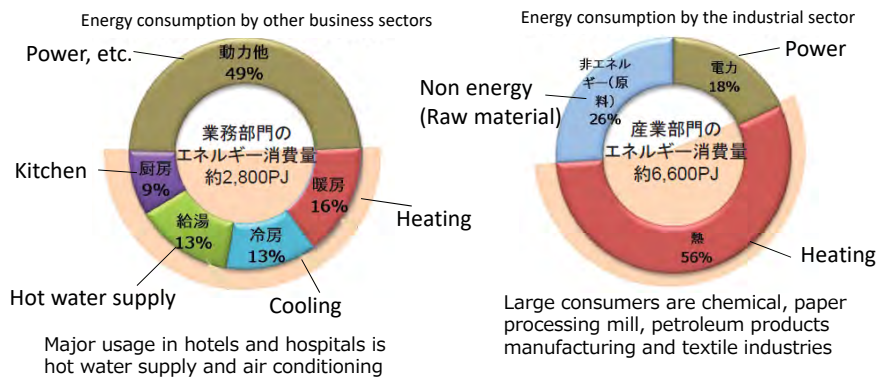
Paper

【Advantages of steam】

- More heat stored than hot water (almost 6 times)
= Hot Water : 419kJ/kg Steam : 2,676kJ/kg at 100°C
- Conveyed easily by compression
- Made from an easily-available resource (water)
- Reusable when condensates to water after losing heat
- Safe & hygienic; no toxicity and not inflammable

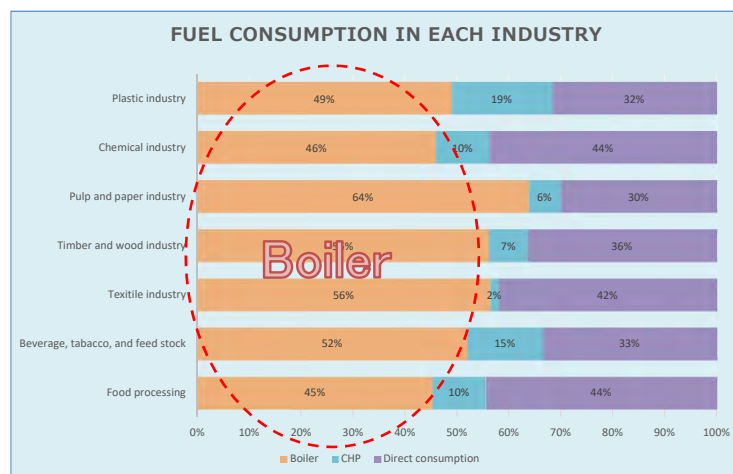
Energy consumption ratio by usage (Japan)

- In Japan approximately 40% of the total energy consumption is in the form of heat.
- The usage of heat is approximately 56% of the total energy consumption of the industrial sector and 50% of other business sectors.
- Efficient use of heat energy is important for cost competitiveness, greenhouse gas emission reduction, and the energy security.



Fuel consumption by industry (Japan)

- Major industries consume large amount of energy by boilers to generate heat. Thus, improving the boiler efficiency is important.



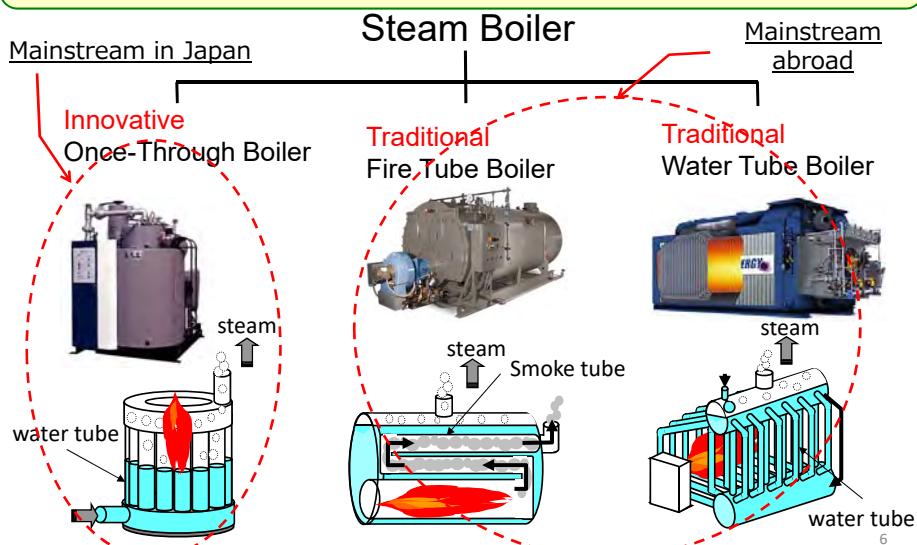
Types of Boilers and the Characteristics of Once-Through Boiler



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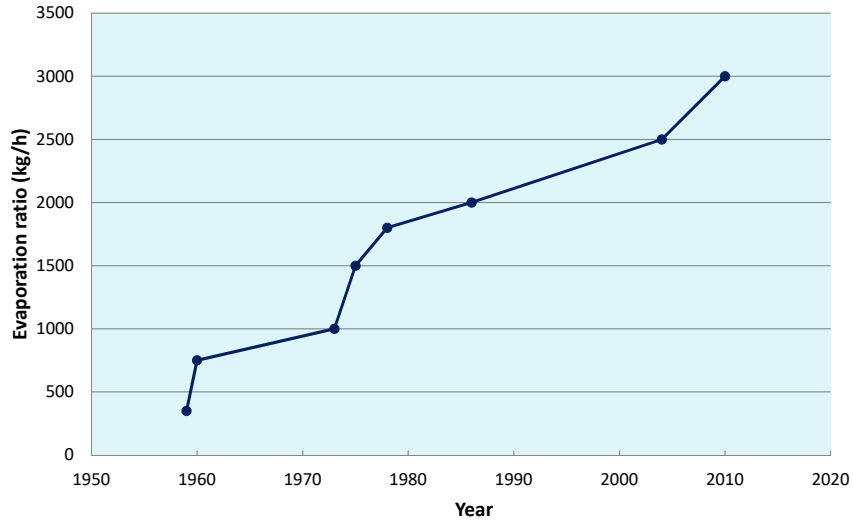
Types of Boilers

- Among the industrial boilers in Japan, **innovative** once-through boiler is the mainstream type; on the other hand, **traditional** fire-tube boiler and water-tube boiler are widely used abroad.



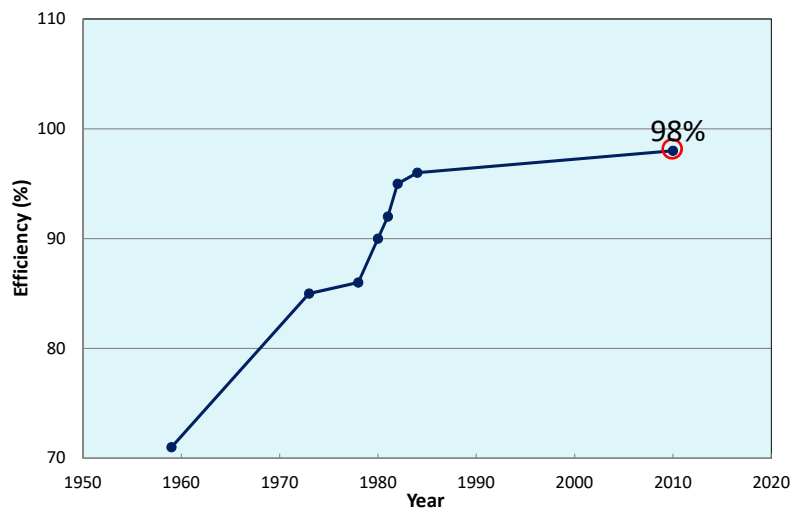
Transition of the evaporation ratio of once-through boiler (technology advancement)

■ Once-through boiler was developed in Japan in 1959. Through the development of a new heat conductive structure (with multiple water tube arrangement), at present the evaporation rate has reached 3 ton/h with a heat transfer area of 10m² or less.



Transition of once-through boiler's efficiency (technology advancement)

■ Efficiency of the once-through boiler was around 70% at the beginning; but it has improved to 98% through adopting a new water tube arrangement structure and an economizer.



Transition of once-through boiler's efficiency

Characteristics of the Once-Through Boiler

- Once-through boilers have multiple features other than the high efficiency.



Gas fired boiler



Gas/oil fired boiler

■ High Efficiency

- Boiler rated efficiency of 98% (Gas fired boiler)
- Improvement of operation efficiency is possible by adopting the Multiple Installation (MI) System.

■ Greater Safety

- Extremely safe against pressure breakdown due to the assorted water tube arrangement
- Highly safe with the multiple safety controls and the fail-safe sensor

■ Easy Operation

- Simple operation by the automatic operation control and the short start-up time

■ Light-weight, space-saving

- Compact-size and light-weight; large space-saving is possible.

■ Preventive maintenance and high efficiency retained by the communication system

(Microcomputer model)

- Prior maintenance through the communication monitoring enables prevention of failure and retention of high efficiency

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Boilers in Japan



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Regulations and standards of boilers in Japan

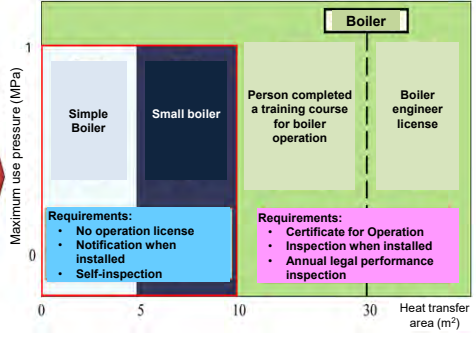
- Regulation of small one-through boiler for the installation and handling has been relaxed due to its safety record.
- Since then, once-through boiler became even more popular with its high efficiency and easy operation.

Laws, regulations and standards of boiler

Regulation	Law	Technical standard (Ministerial decree)	Standard	Design & manufacturing	Usage
Mandatory	Electricity Business Act	Technical Standards for Welding of Electric Facilities	Interpretation of the technical standard	⊙	⊙
	Industrial Safety and Health Act	Ordinance on Safety against Boilers and Pressure Vessels	Boiler structural code Small boiler structural code	⊙ ⊙	⊙ ⊙
Voluntary	---	---	JISB8201	⊙	N.A.

- Compliance with the Industrial Safety and Health Act is required for designing, manufacturing and using boilers in Japan except for the power generation purpose

Range of application by the Industrial Safety and Health Act



- Small once-through boiler, with a heat transfer area of 10 m² or less and a maximum pressure of 1 Mp or less, have greatly relaxed regulation for the design, manufacturing and operation due to its safe structure and simple and easy operation.

The Multiple Installation System



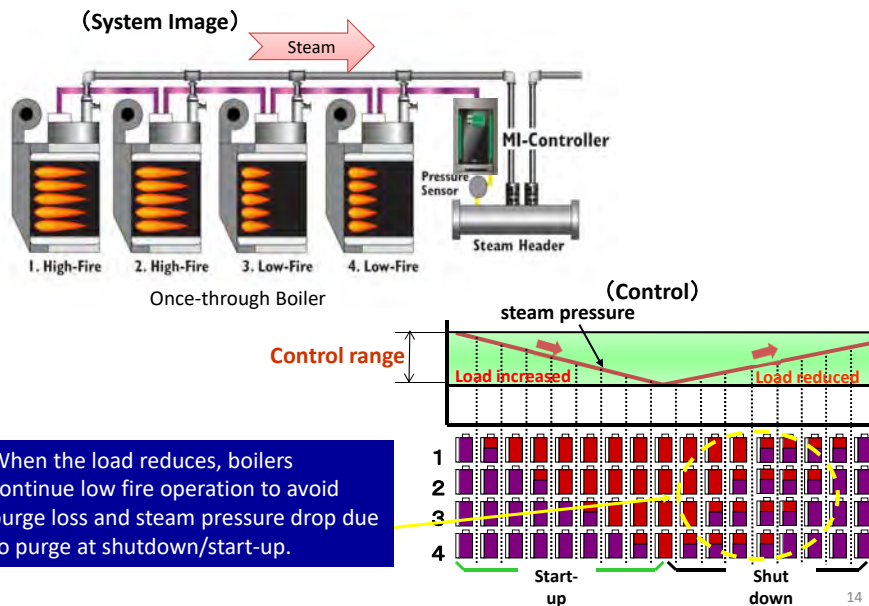
Comparison of Once-through Boiler & Fire tube Boiler

		2 ton/h : 2 ton/h	
	Once-through boiler		Fire tube boiler
Water holding capacity (Liter)	Low	120 < 2500	High
Time required to generate steam (min)	Short	5 < 50	Long
Radiation loss	Low	1 < 3	High
Energy saving / Design efficiency		High	Low

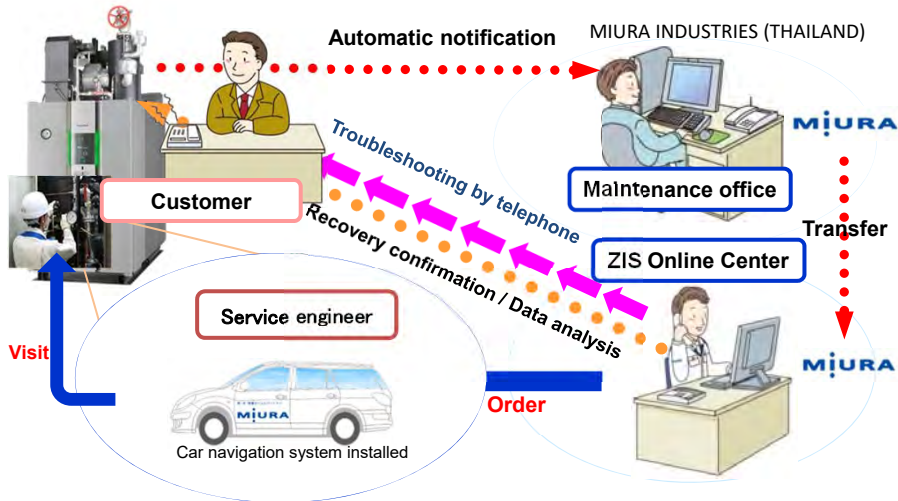
Note: Ratio with the same quantity of evaporation.
All values are actual measurement values based on Miura data.

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Multiple Installation(MI) System of Once-through Boiler



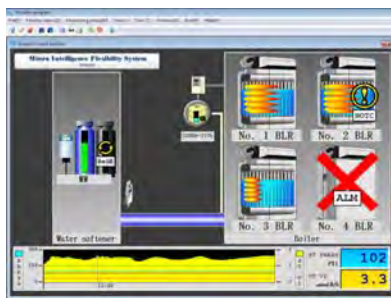
MIURA Online Maintenance Overview



Features of Miura Energy Management System

Monitoring Display

Monitoring of the overall equipment installed in boiler room.



Automatic Report Generation

Operation data collected automatically for each boiler on the PC hard disk in the form of daily and monthly reports .

Maintenance Notification

If an "Alarm" or "Notice" happens , automatically provided to the operator.

Saving energy



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Energy, Water and Environment

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