


Morko Co., Ltd.



Korean

What's News

- *Ultrasonic Scale Preventer appointed as "LABCON(from Laboratory to Containership) Plan" by the Ministry of Commerce, Industry and Energy.
- *Ultrasonic Bird Exterminator appointed as "LABCON(from Laboratory to Containership) Plan" by the Ministry of Commerce, Industry and Energy.
- * USP was selected as Energy Winner 2002
- * CE Mark Acquired(USP Models) 
- * Designated to be energy - saving equipment (Korea Energy Management Corporation)

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Corporate history

what is ultrasound

what is USP

USP Model

Use of USP

Ultrasonic Birds Exterminator


Use of ultrasonic for dyeing processing equipment

Comparison of DIFERAL magnetostrictive

Business Showings of USP

Good

Equipment & Result




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● What is ultrasound ?

Sound waves with frequency of about 20kHz and what are more than 20kHz is called ultrasound. Ultrasound is applied to various industrial technologies.

Now, we introduce a new word in ultrasonic technology, based on magnetostrictive material - DIFERAL.

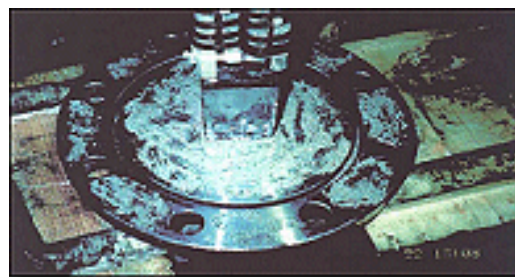
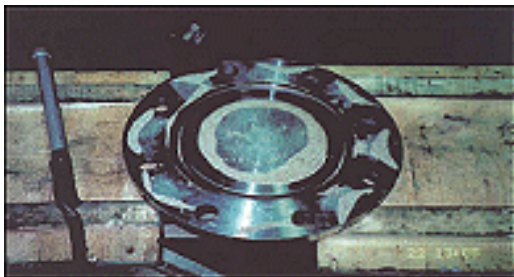
● What is DIFERAL ?

This is a new kind of iron - aluminum (Fe - Al) alloy, contains 8 ~ 14% Al, produced by the non - metallurgic technology.

The main problem of ultrasonic technologies (in case of magnetostrictive transducer) is high cost of magnetostrictive materials - nickel (Ni) or iron - cobalt (Fe - Co) alloy. It is known iron - aluminum (Fe - Al) alloy - Alfer, but some problems of production limit its using in real practice.

DIFERAL, which is good for soldering and welding, has higher efficiency than Ni or Fe - Co alloy, and also it has higher working temperature than Ni.

The important point more than anything else is that it is cheap.



● SCALE

Managers usually don't know the scale problem, but it is the problem of safety, durability of equipment, energy conservation, and environment preservation - that is, in the end, the problem of money.

Water treatment can't solve the problems of scale completely, and sometimes it's impossible or unprofitable to use it.

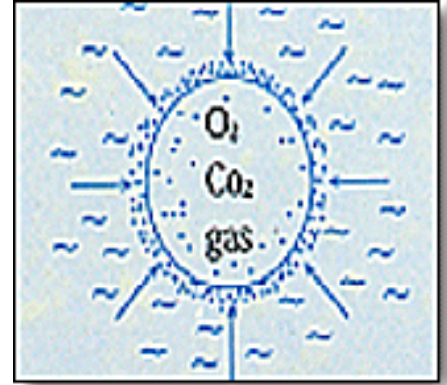
Water treatment is usually computed for basis regime of equipment's working, but some times, for example in winter, it is necessary to use peak regimes.

In this case salt's hardness ions can flow through water treatment system and then scale layer is formed.

During cycle time between regeneration, the capacity of ions - exchange decreases.

Sometimes operators are not so attentive. Average leakage of fuel, as a result, is about 4 ~ 20%.

It needs to stop operating the equipment and to make mechanical or chemical cleaning.



● SCALE PREVENTION

Scale prevention by ultrasonic device makes sure as follows:

- increase the interval stopping of equipment for cleaning, or exclude cleaning work;
- increase the safety factor of equipment;
- decrease the cost of fuel;
- decrease the pollution of chemical substances.

Basic principles of scale preventing and removing are as follows.

It is known that crystals of salts of hardness are forming on the surfaces of heat exchange or on the surfaces of crystal centers.

Volume of scale depends on salts of hardness concentration in water.

Ultrasound can increase number of crystal centers in water and decrease concentration of salts of hardness by influence of cavitation.

● CAVITATION

Ultrasonic cavitation is the formation of bubbles (cavities) in liquids at the low - pressure part of wave cycle. The bubbles are filled with gases or vapor coming out of water.

When sizes of bubbles reach a resonance sizes, collapse of bubbles takes place.

The collapse formed extremely high stress shock waves in water. Shock waves are formed in water a lot of crystal centers, and centers became overgrown by crystallization of salts dissolved in water, destroyed by influence of shock wave in

several solid particles - new crystal centers and s.o.

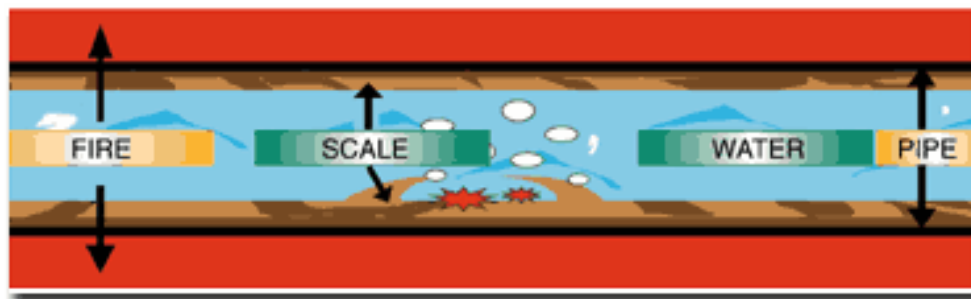
At the same time, decontamination of water takes place. Oxygenium, nitrogenium, CO₂ (CO₂ formed in water like result of disintegration of metastable hydrocarbonates of calcium and magnesium) are removed by the influence of cavitation from water. Inside bubbles, free chemical radicals are produced.

The processes change chemical data of water, including pH, salts and gases concentration.

Experiments show that the main part of scale in water (not on the heat exchange surfaces) forms like shape of small crystals by influence of cavitation. Its sizes are about 1 μm.

Depend of water speed and designs of equipment, crystals can be removed by water flow or fall down to the bottom like slime and can be removed by blow down.

Scale layers, including what are formed before installation of ultrasonic devices, will be destroyed by influence of cavitation.



● MICRO - FLOWS IN WATER

Ultrasound is radiated in water by metallic details of equipment shells, walls of tubes and others. Micro - flows in the water are formed by process of radiation and they are directed from metallic surfaces into the water.

Micro - flows in the water are moving the particles of scale from surfaces of heat - exchange into the water.

In layers of water close to radiated surfaces, the turbulence of water will increase.

Micro - flow and turbulence in the water help scale prevention and increase heat transfer.

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Company History

● CORPORATE HISTORY

05. 91	Founding JINBO CO.
04. 96	Making an agreement with Russian partner regarding joint development of a new ultrasonic equipment and acquiring copyright in Asia.
03. 97	Exporting USP Model to Indonesia.
04. 98	Acquiring patent of Diferal magnetostrictive material in Russia.
07. 98	Making an agreement on full sponsorship for production technologies (Korea institute of industrial technology) - Technologies for preventing scale and preventing scale and slime of cool water at a freezing equipment by ultrasonic waves.
07. 98	Applying for local patent (2 trade - mark, 3 designs, 4 practical utility models)
08. 98	Exporting USP Model samples to Czech Republic.
09. 98	Founding a joint company for local manufacturing of Diferal Magnetostrictive material and other business with Russian partner.
09. 98	Exporting USP Model samples to USA.
12. 98	Granted export support for small and medium companies located in Daegu and Kyungpook.
02. 99	Designated a representative company of Daegu and participating in 99'India Engineering Trade Fair.
04. 99	Making an agreement on support for technology development of small and medium companies (Korea institute of industrial technology evaluation and planning,Ministry of Commerce Industry and Energy) - Developing ultrasonic sewing processor.
05. 99	Making an agreement on industrial technology development (Korea institute of industrial technology evaluation and planning,Ministry of Commerce Industry and Energy). - Developing an ultrasonic welder and applied technology.
06. 99	Making an agreement on industrial technology development (Korea institute of industrial technology evaluation and planning,Ministry of Commerce Industry and Energy). - Developing liquid dying technology and equipments by combining magnetostrictive type of ultrasonic equipment.
06. 99	Founding Morko Corporation.
07. 99	Participating in Guangzhou Fair 99' as a Daegu representative.
07. 99	Making an agreement on developing technology for energy efficiency (the Korea energy management corporation,Ministry of Commerce Industry and Energy) - Improving fuel liquid by using ultrasonic wave of magnetostrictive transducer
07. 99	Making an agreement on developing technology of small and medium venture firms (Korea health industry development institute,Ministry of Health and Welfare) - Developing an ultrasonic sterilizer
08. 99	Conclusion of contract for agency in 3 states of western U.S.A
09. 99	Conclusion of contract for agency in Germany, Czech Republic, Poland, Hungary, Slovak Republic, Austria

10. 99	Participation in 2 nd Superior Goods Sample Fair of Circum - Yellow sea and the Parts Exhibition in Tokyo
11. 99	Submit a thesis in the 14 th Energy Saving Technology Workshop.
11. 99	Certification of enterprise by Taegu & Kyungpook (NO.1999132535 - 0289)
11. 99	Participating in New Tech Korea '99
12. 99	Participating in korea patent exhibition '99
01. 00	Publication of research report on technology of preventing scale and slime of cooling water line at a freezing equipment by ultrasonic wave
02. 00	Publication of research report on liquor - flow loss weight technology development of polyester textile by combing ultrasonic wave
04. 00	Exporting USP model (Ultrasonic Scale Preventer) to czech Republic
06. 00	Participating in Malaysia Kuala Lumpur Machine Exhibition(ITM 2000 : Int'l Trade Fair Malaysia)
07. 00	Publication of research report on is developing liquor - flow dyeing technology & equipment by combing magnetostrictive type ultrasonic wave.
08. 00	Acquiring CE certification for USP models(USP - 1000, 900, 500, 300)
09. 00	Participating in group of developing Chinese market.
11. 00	Participating in the 3rd pan yellow sea industry and technology fair.
11. 00	Participated in Grand Art Exhibition of Korea
4. 01	Participated in Venture Industry Exhibition of Korea
5. 01	Made an agreement to export a fish - dispersing machine to a multi - purpose power station of 450MW at Meghnaghat, Bangladesh
6. 01	Developed a technology for a new synthetic textile
7. 01	Developed a ultrasonic - wave welding machine and its applied technology
7. 01	Participated in Energy Exhibition
10. 01	Participated in World First Class Goods Exhibition
11. 01	Achieved a prize of Energy Winner 2002 in its green equipment and appliances
11. 01	Participated in Asian Industrial Exchange Fair 2001 (held at Kitakyushu, Japan)

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What is USP ?

USP is name of ultrasonic power supply system that Morko Co., Ltd. apply for trade mark right.

This device used DIFERAL magnetostrictive transducers for ultrasonic energy production.

Device contains generator, magnetostrictive transducers and electric wires. Generator produced electric pulses, wires are transmitted electric pulses to transducers and transducers are transforming power of electric pulses to power of ultrasonic vibration.

USP uses AC 220V, 50 or 60Hz single phase.

It is possible to use another voltage depend on order.

Signal lamps and hour meter checked working process.

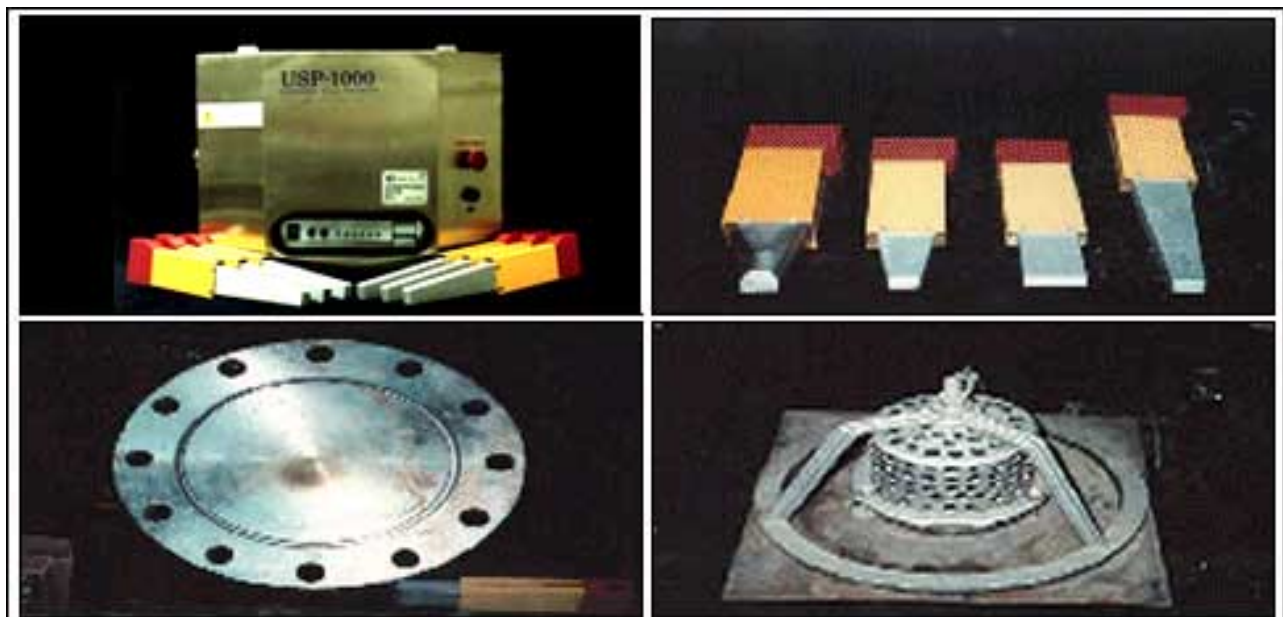
Protection of circuit contains fuses and system makes sure to use USP in case of unstable net voltage.

Transducers are connected to part of equipment by welding and temperature of this parts of equipment must be less 200

After installation, USP tune in to resonance frequency depends on equipment type.

Life time of some electronic parts of generators is a semi - permanent.

Life time of transducers is about 20 years.



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● USP MODEL

MODEL	power (w) consumption	transducer	generator	application
USP - 300	100	2	1	under 1 T/H boiler, etc.
USP - 500	300	3	1	1.5 - 3.5T/H boiler, etc.
USP - 900	600	4	1	4 - 6T/H boiler, etc.
USP - 1000	700	6	1	7 - 20T/H boiler, etc.
USP - 3	300	3	1	equipment of dyeing processing, etc.
USP - 4	600	4	1	equipment of dyeing processing, etc.
USP - 6	700	6	1	equipment of dyeing processing, etc.
USP - 8	1000	8	1	equipment of dyeing processing, etc.
UMP - 1	1000	1	1	pipe line of cooling water, etc.
UMP - 2	2000	2	1	pipe line of cooling water, etc.
UMP - 3	4000	3	1	pipe line of cooling water, etc.
UMP - 4	5000	4	1	pipe line of cooling water, etc.

Equipment dyeing processing - dyeing machine, weight loss machine, washing machine, high pressure rotary washer, etc.

We can make USP in compliance with order for ship, pipe line of seawater and improving quality of oil.



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● Use of ultrasound (USP)

- Preventing and removal of scale for boiler
- Improving the efficiency due to preventing and removal of scale for heat exchange
- Improving quality of textile processing, reduction time of processing and decreasing chemical pollutant and water pollutant (applying to dyeing machine, weight loss machine, and washing etc.)
- Preventing scale and slime in pipe of cooling water.
- Preventing living of a shellfish inside pipe using sea water.
- Improving oil quality (reduction air pollutant and rising efficiency of combustion due to improvement quality of B - C oil.
- Preventing scale and living of a shellfish of boiler and cooling water pipe in ship preventing scale in boilers and living of shellfish in water pipes of ships.
- Improving efficiency of washing (possibility washing higher temperature than existing ultrasonic washing machine.)
- Pasteurization of bacteria.
- Processing and welding using vibration and etc.

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Ultrasonic Birds Exterminator

Ultrasonic

Where to use it:

- To prevent magpies and other birds from coming to or disperse them in orchard.
- To prevent rats and other similar animals coming to or disperse them in a storage or a farm.
- To prevent any damage by wild animals.
- To prevent any damage by birds around at the budding time
- To disperse birds on the airfield



Model	Number of generator	Number of voice converter	Voltage	Consumption of electronic power	Coverage area
USP-BD1	1	1	220V	150W	About more than 5,000m ²
USP-BD2	1	2	220V	300W	About more than 10,000m ²

Specification is changable in accordance with order.



(Voice converter)



(Generator)

***We already submitted an application for a patent from Japanese authority as well as our Korean authority**

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● Use of ultrasonic for dyeing processing equipment

When we apply ultrasonic to process of weight loss, washing and dyeing that textile contact water to set temperature during be fixed time, we can see a effect by action of cavitation.

The effect are follows; processing time shorten. Efficiency of weight loss, washing and dyeing is improved because ultrasonic pulverizes minutely particles in water. Energy for rising and upkeep of temperature is saved.

Rate of badness by residue reduces because ultrasonic wash well remaining residue after dyeing processing. Chemicals and environment pollutant reduces because input of chemical is repressed.

● Object of application

Ultrasonic is applied to equipment for dyeing, weight loss, and washing that textile contact water above set time (working action of ultrasonic).

- rapid dyeing machine, liquid weight loss machine, washing machine, high pressure rotary washer, high pressure cheese dyeing machine, etc. -

● Method of application

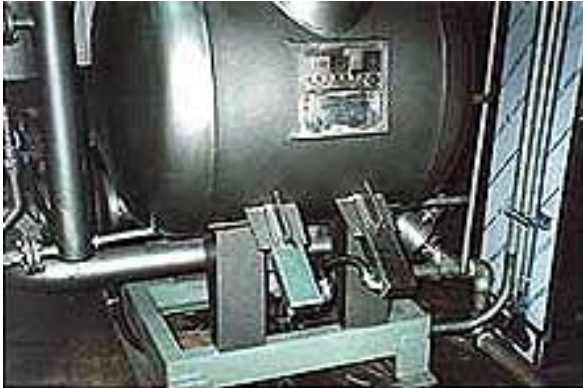
We weld and attach the transducer at a proper place (working regularly ultrasonic). The generator is placed in a well - ventilated area, and we must control proper vibration frequency considering structure of equipment.

When we works after operation of ultrasonic device, we have to work after we analyzes processing time, input of chemical, level of washing and weight loss, considering method of processing and characteristic of textile, and write out standard of the work for the best.

● The effect of expectation

Reduction of dyeing processing time.
 Improvement quality of goods
 Reduction inferior goods.

Energy saving
 Reduction environment pollutant.
 Reduction chemical cost.



● Constitution of Ultrasonic M/C

- Generator
- Transducer
- Electronic wire

● Installation

Just remove a necessary area (necessary to welding work) of temperature - maintaining material on a dyeing machine and completely remove any foreign objects on the main body. Later then on a certain part of the dyeing machine body you can attach a special converter with an argon welding machine. Four or six special converters would be attached per one tube by welding and it is necessary to tune a resonance frequency by using a ultrasonic wave sensor.

● Specification

Model	GENERATOR	TRANSDUCER	Power	Consumption of power (MAX)
USP - D4	1	4	220V single phase	1(kW)
USP - D6	1	6	220V single phase	1.5(kW)

● Example of installation

Type of dying M/C(Rapid)	SET (Model)
1TUBE	1SET (USP - D4,D6)
2TUBE	2SET (USP - D4,D6)
3TUBE	3SET (USP - D4,D6)

● Merits

- P/NP synthetic threads or polyester :
 saving time : about 38%
 amount to be used : dyeing possible without addition
 saving energy : as of fuel more than 6%, and electricity more than 30%
- Every textile :
 Excellent effect in water washing, water saving, and saving cost for sewage process

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- Comparison of transducers, produced on the base of DIFERAL, ORDINARI magnetostrictive materials and piezoelectric ceramic

DIFERAL magnetostrictive material	ORDINARY magnetostrictive materials	PIEZOELECTRIC ceramic
<p>Performance properties NEVER degrade Welded or brazed transducers NEVER disbond NOT sensitive to mechanical shock</p> <p>High weight of active part: Not susceptible to variable loads</p> <p>Life time: LONG High temperature (in case of boilers): Performance properties DON'T degrade by 200</p>	<p>Performance properties NEVER degrade Welded or brazed transducers NEVER disbond Ni is sensitive, Fe - Co is VERY sensitive to mechanical shock High weight of active part: Not susceptible to variable loads Life time: LONG High temperature (in case of boilers): Ni performance properties DO degrade by temperature more high as 80</p>	<p>Performance properties DO degrade. Epoxied or bolted transducers DO disbond Sensitive to mechanical shock</p> <p>Low weight of active part: susceptible to variable loads</p> <p>Life time: SHORT High temperature: Epoxied transducers IMPOSSIBLE to use in case of high temperature</p>

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Result Good Equipment and Result **Result**

 Business showings of
USP

buyer company	capacity, form	sale quantity	note
Hundai automobile institute .	10 t/h smoketube boiler save	9	installation 1.'97 after test
Daewoo heavy industry corp.	10 t/h water tube boiler save	3	installation 7.'97 after test
Aegeung department store.	8 t/h smoke tube boiler save	3	installation 7.'97
Hyosung corp.	20 t/h water tube boiler save	2	installation 5.'98
Seoul university.	20 t/h water tube boiler save	2	installation 10.'95
Dong shin special - steel. corp.	10 t/h smoke tube boiler save	4	installation 9.'96
Hundai heavy industry corp.	3.5 t/h smoke tube boiler save	3	installation 12.'97
Hundai hotel.	5 t/h smoke tube boiler save	2	installation 10.'97
INDONESIA.	5 t/h smoke tube boiler save	5	installation 3.'97
CZECH REPUBLIC.	heat exchanger save	10	export 4.'00
U.S.A.	equipment of oil separation	1	sample export 8.'98
Korea institute of industrial technology.	heat exchanger	1	installation 7.'99
Korea textile development institute.	liquid weight loss machine save	1	installation 8.'99
Works more than 400 etc. Siemens automotive.	boiler save	more than 420	installation '93 - '98

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● Advantages of USP

Boiler and heat exchange

- 1) Reduction energy consumption due to preventing scale
- 2) Preventing environment pollution due to decrease of chemicals using
- 3) Extension lifetime of equipment
- 4) Reduction cost and time for complete equipment

Equipment of dyeing processing

- 1) Improvement quality of goods
- 2) Reduction chemical cost
- 3) Decreasing rate of badness
- 4) Reduction textile processing time
- 5) Saving energy
- 6) Reduction environment pollutant

Etc.

Improvement efficiency of equipment, reduction processing time, reduction cost for complete equipment.

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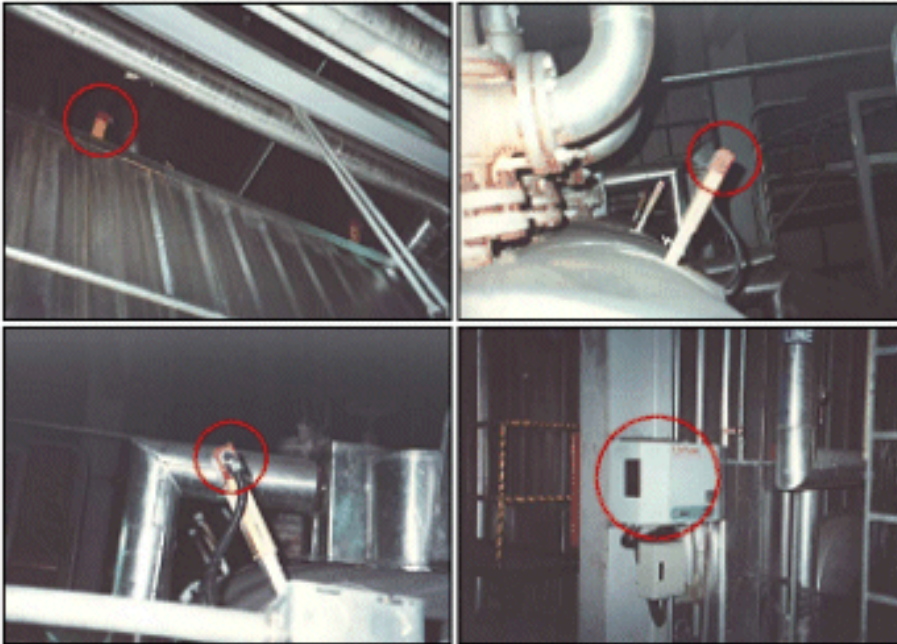
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Ultrasonic Results

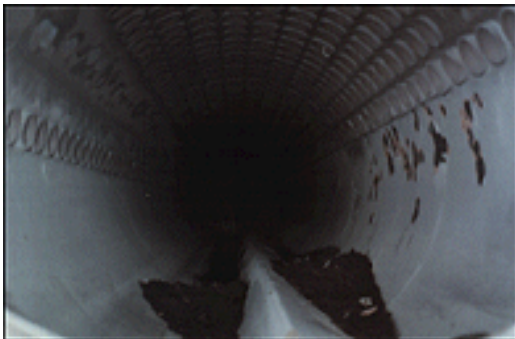
Result Good Equipment and Result **Result**

• The form of USP installed to water tube boiler

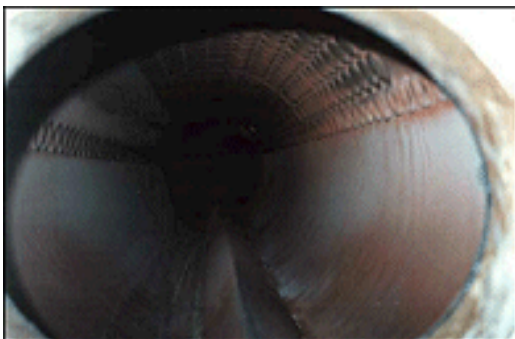


The form of USP installed to water tube boiler (Hyosung Corp. 5.'98) Transducer were welded and attached to upper and lower drum of 20 t/h water tube boiler. Generator installed aside boiler.

• The result after USP installation

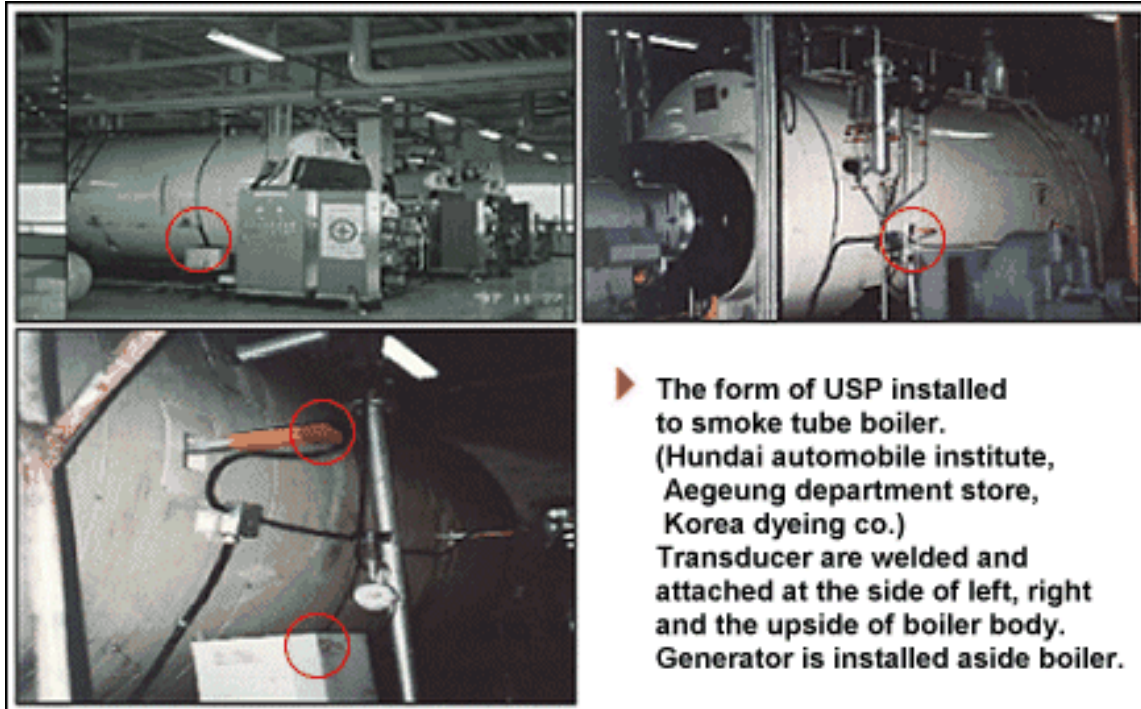


Inner form of boiler passed 1 month after installation USP to water tube boiler. Being prevent scale and progressing scale removal.



Inner form of boiler passed 3 months after installation USP to water tube boiler . Boiler need only washing because all scale fall off inside boiler.

● The form of USP installed to smoke tube boiler



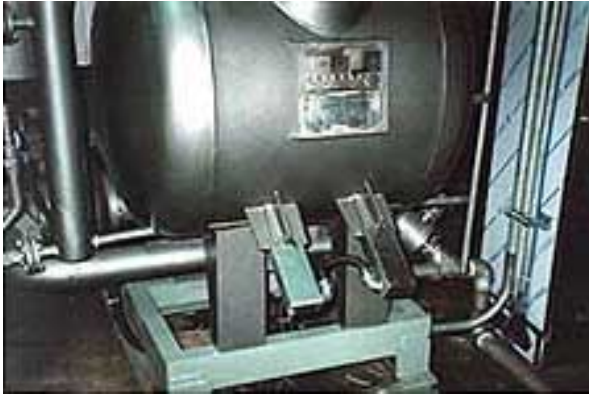
Left upper: before installation USP (passage 2 months after chemical tube cleaning)

Right upper: inner form of boiler passed 40 days after installation USP. (progressing scale removal)

Left lower: inner form of boiler passed 54 days after installation USP (after washing)

Right lower: the picture washing inside boiler 54 days after installation USP

Equipment & Result

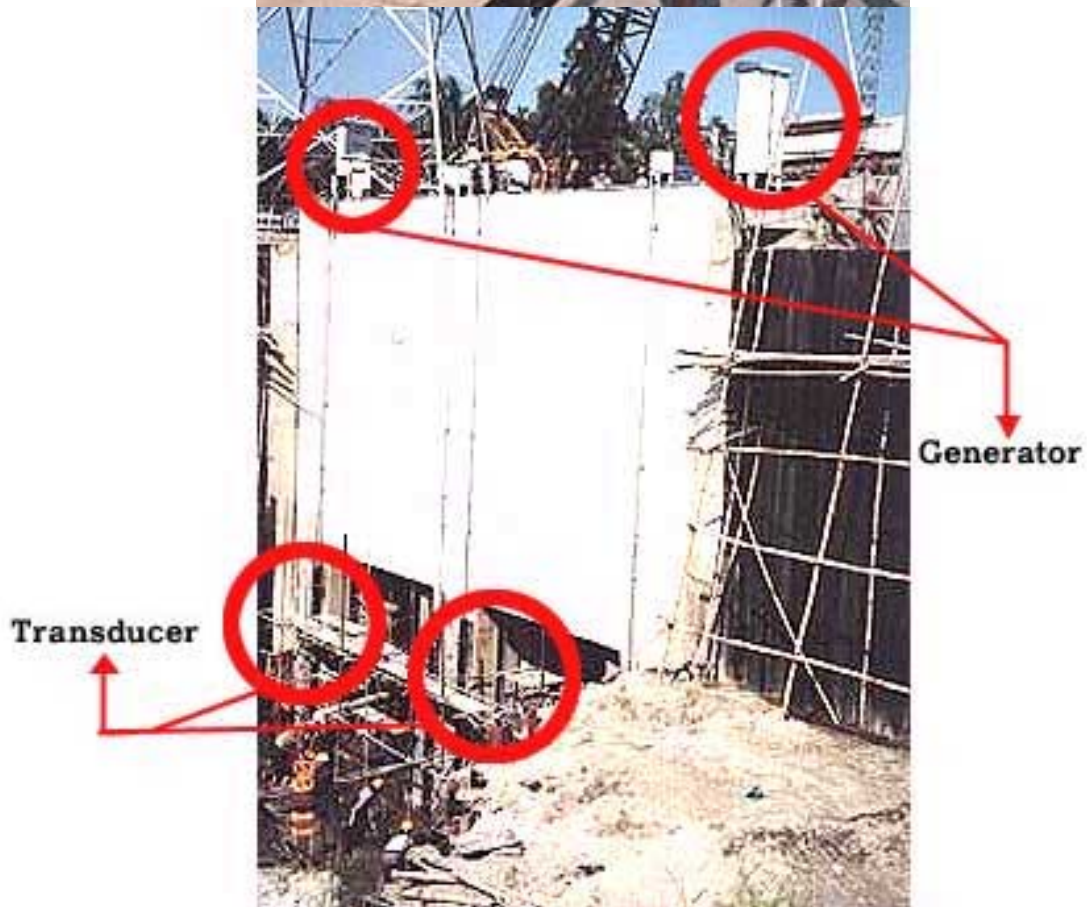


left-upper : Picture of transducer

right-upper : Picture of transducer and oscillator

left-down : Generator

right-down : Picture of transducer attached at the nozzle pipe and mail body



upper : Picture of USP-FDD generator installed at the Haripur power station in Bangladesh

down : Installed at the in-take of power station of Haripur in Bangladesh.

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초음파전문기업
(주)몰코



ENGLISH

공지사항

- * (LABCON Plan) ()
- * (LABCON Plan) ()
- * 2002
- * USP CE 
- *

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USP

USP Model

가

USP



Company History

91. 05	
96. 04	RUSSIA PARTNER
97. 03	USP - MODEL INDONESIA
98. 04	DIFERAL RUSSIA
98. 07	- (Scale Slime)
98. 07	(:2 , :3 , :4)
98. 08	CZECH REPUBLIC USP - MODEL SAMPLE
98. 09	RUSSIA PARTNER
98. 09	U.S.A USP - MODEL SAMPLE
98. 12	.
99. 02	INDIA ENGINEERING TRADE FAIR'99 가
99. 04	(가 ,) - 가
99. 05	- (가 ,)
99. 06	- Magnetostrictive (가 ,)
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00. 04	
00. 06	가 가
00. 07	Magnetostrictive 가
00. 08	USP (USP - 1000, 900, 500, 300) CE
00. 09	가
00. 11	3 가
00.11	가
01.04	가
01.05	Meghnaghat 450MW 가
01.06	
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01.07	가
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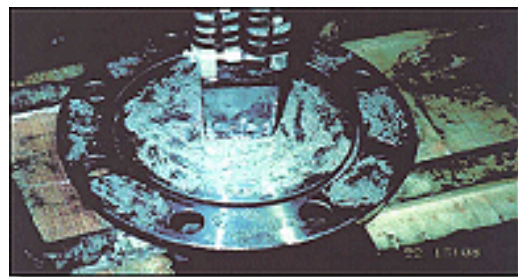
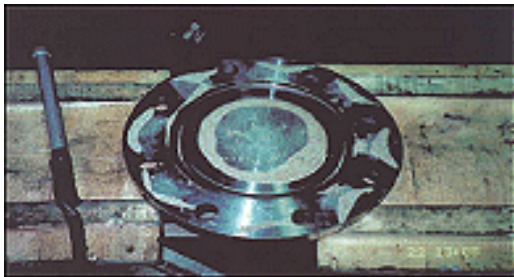
● ?

가

20kHz

● , , 가

cavitation
cavitation



(cavitation)

가 가 가

K

pilot

가

cavitation

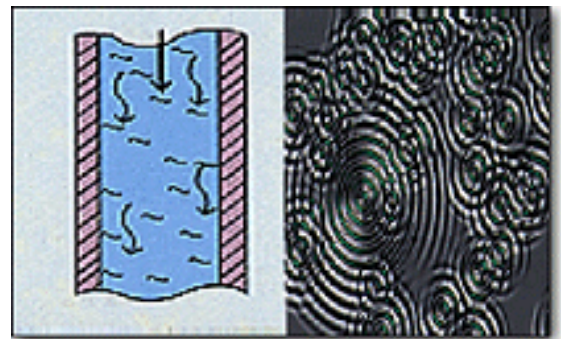
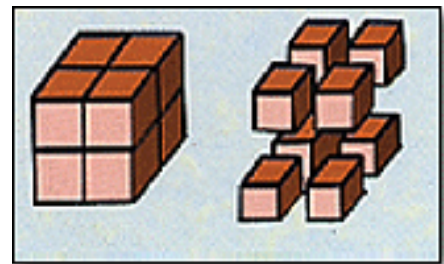
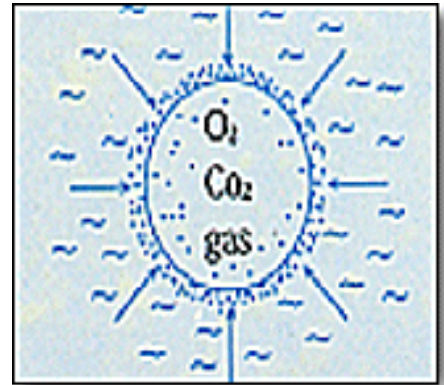
cavitation

가

가

가

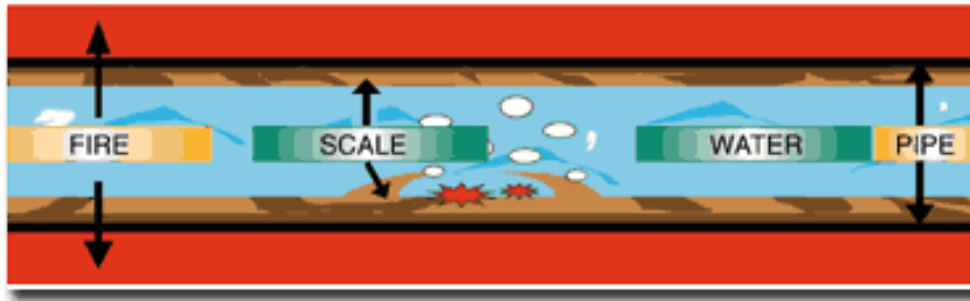
pilot



가 가 가

가

가



가 , 가 가 . 가

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USP란

USP MODEL

USP란

● USP ?

USP ()
. USP 가

ULTRASONIC POWER SUPPLY SYSTEM

DIFERAL

● (generator)

220V

가

● (transducer)

DIFERAL

wave guide

200

가

20

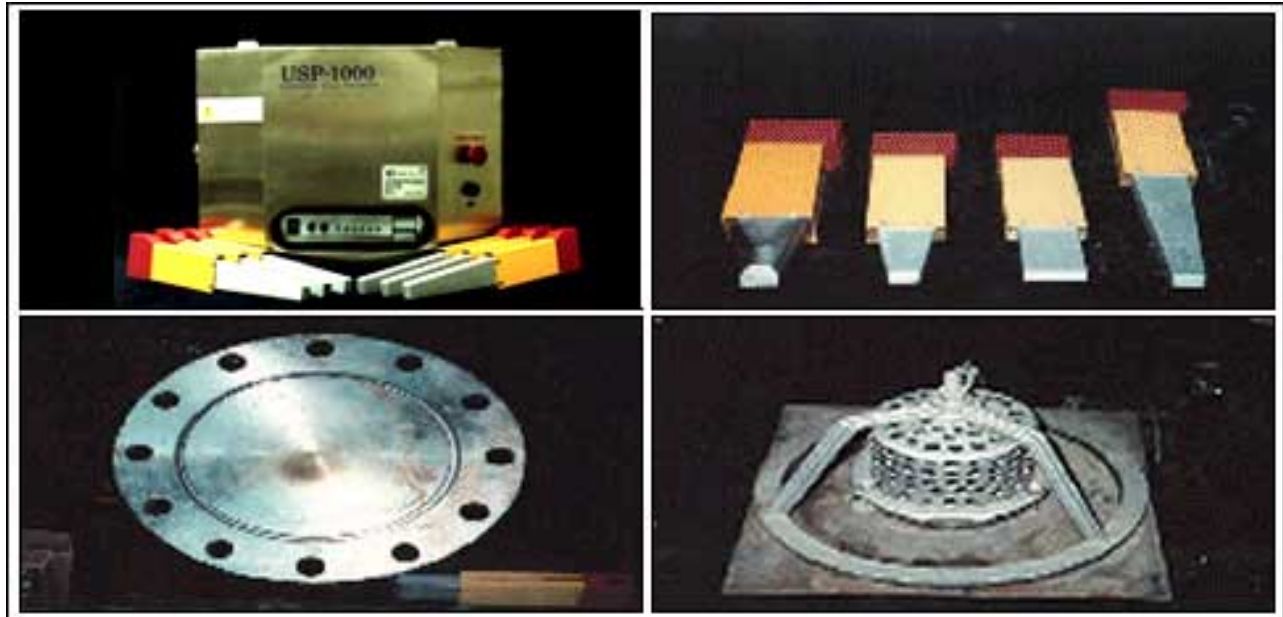
가

● (electric wire)

Acoustic power
가

가

noise



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USP란

USP MODEL

USP란

● USP MODEL

MODEL	power (w) consumption	transducer	generator	application
USP - 300	100	2	1	1T/H boiler under
USP - 500	300	3	1	1.5 - 3.5T/H boiler
USP - 900	600	4	1	4 - 6T/H boiler
USP - 1000	700	6	1	7 - 20T/H boiler
USP - 3	300	3	1	가
USP - 4	600	4	1	가
USP - 6	700	6	1	가
USP - 8	1000	8	1	가
UMP - 1	1000	1	1	
UMP - 2	2000	2	1	
UMP - 3	4000	3	1	
UMP - 4	5000	4	1	

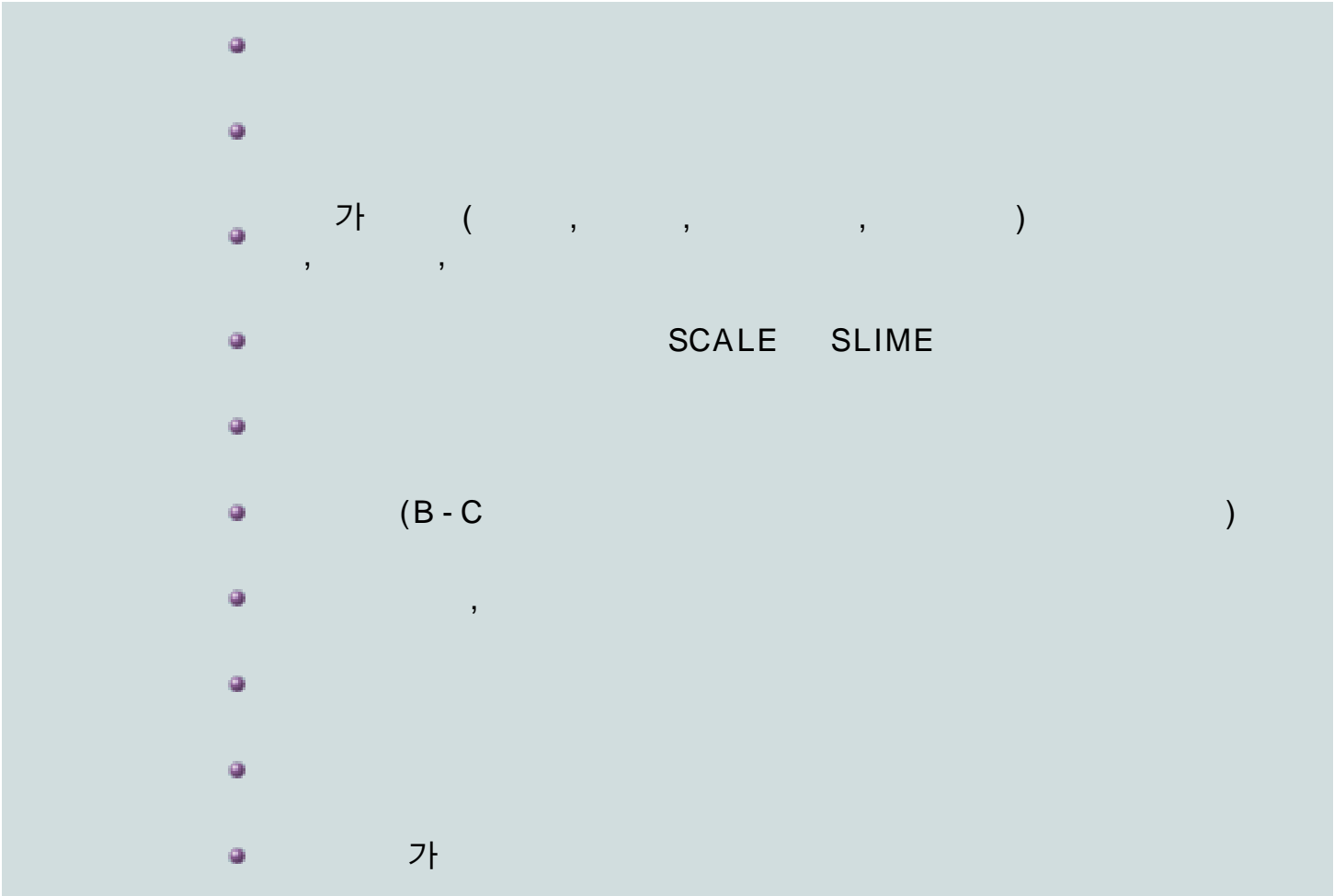
가 (, , , ,), , .
 , ,



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가 ()
 가 ()
 가 ()
 가 ()



					가
USP - BD1	1	1	220V	150W	5,000m ²
USP - BD2	1	2	220V	300W	10,000m ²



* : 10 - 2000 - 0060937 * : 2001 - 314934

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염색가공 설비의 초음파

가 (USP)

가 ,
cavitation 가

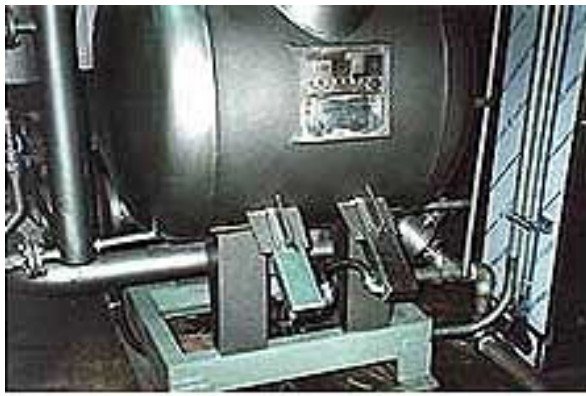
가 . 가

가 , 가 가 ()

() transducer

가 , 가 가 가 가

가



- Generator
- Transducer
- Electric wire



가 ()

1TUBE

4 - 6



	GENERATOR	TRANSDUCER		(MAX)
--	-----------	------------	--	-------

USP - D4	1	4	220V	1(kW)
USP - D6	1	6	220V	1.5(kW)



()	
1 TUBE	1SET (USP - D4,D6)
2 TUBE	2SET (USP - D4,D6)
3 TUBE	3SET (USP - D4,D6)



- P/NP : : 38%
 : 가 가
 :10%
 : 6%, 30%

- : ,

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● DIFERAL

DIFERAL		
<ul style="list-style-type: none"> () WAVE GUIDE 가 가 가 가 가 (200) 가 	<ul style="list-style-type: none"> () SOLD 가 ERING 가 SOLDERING 가 	<ul style="list-style-type: none"> () 가 가 가 가 (cavitation)

[top]

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[설치실적](#)
[설치장점](#)
[설치모습과 결과](#)
USP의 설치실적
● USP

	. 10T/H	9	'97.1	가
	10T/H	3	'97.7	가
	. 8T/H	3	'97.7	
	20T/H	2	'98.5	
	20T/H	2	'95.10	
	. 10T/H	4	'96.9	가
	. 3.5T/H	3	'97.12	가
	. 7T/H	2	'97.10	
INDONESIA	. 5T/H	5	'97.3	
CZECH REPUBLIC		2	'98.8	SAMPLE
U.S.A	OIL	1	'98.8	SAMPLE
		1	'99.7	
		1	'99.8	
400		420	'93 - 98	

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Ultrasonic Results

설치실적

설치장점

설치모습과 결과

USP의 설치실적



- 1)
- 2)
- 3)
- 4)

가

- 1)
- 2)
- 3)
- 4)
- 5)
- 6)

가

가, ,

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Ultrasonic Results

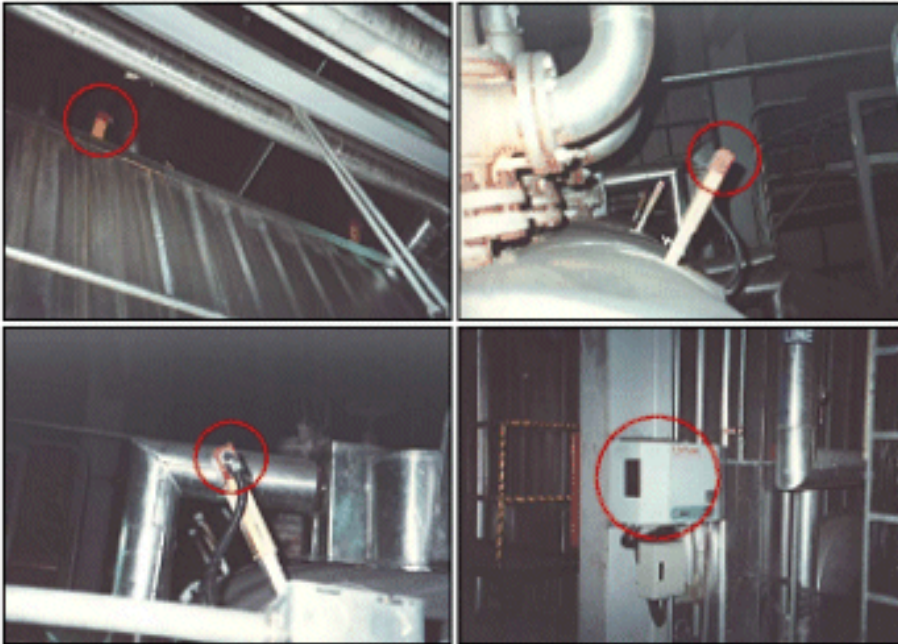
설치실적

설치장점

설치모습과 결과

USP의 설치실적

● USP

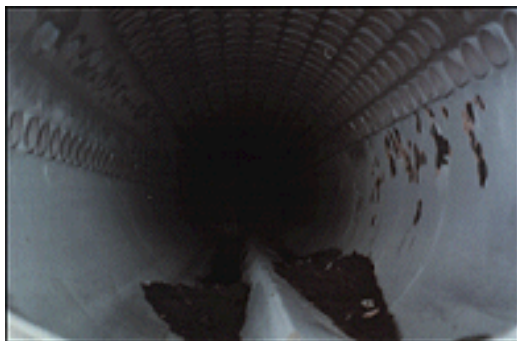


USP

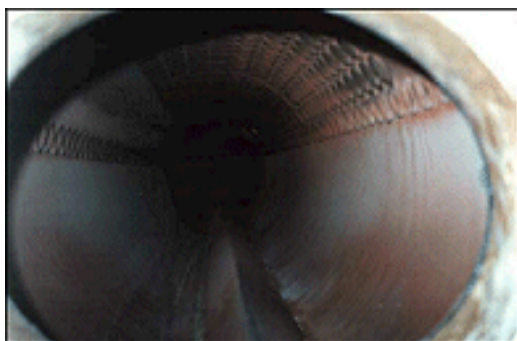
'98,5 - () 20T/
H .

transducer
generator

● USP

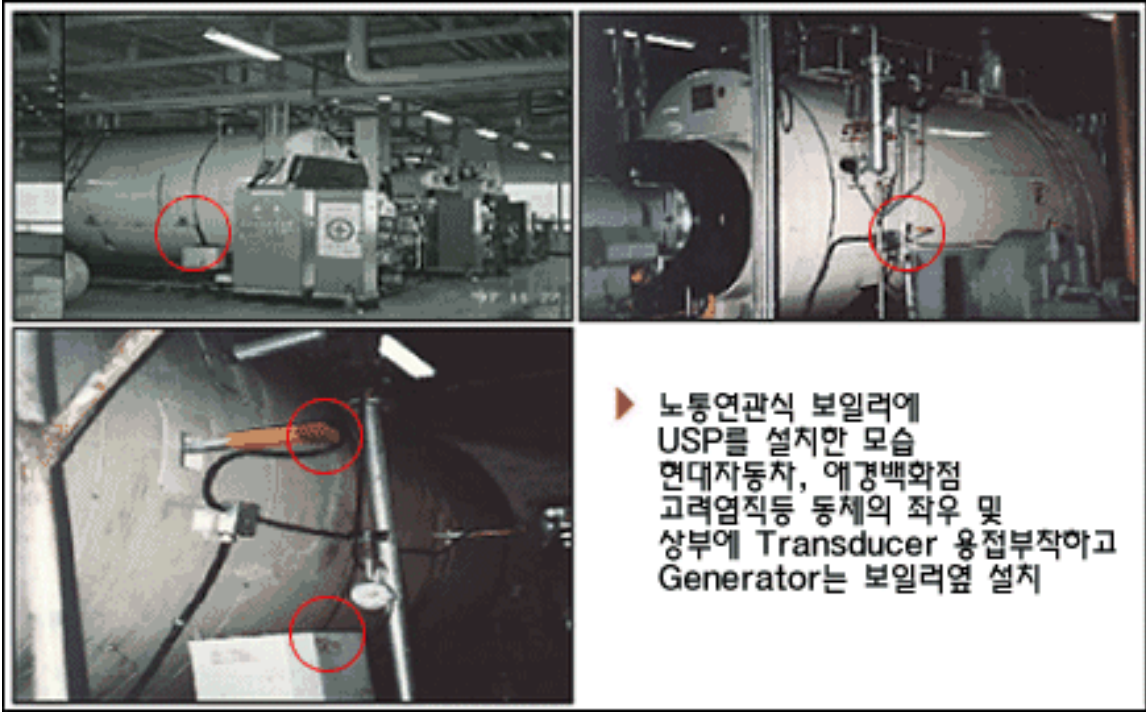


USP 1



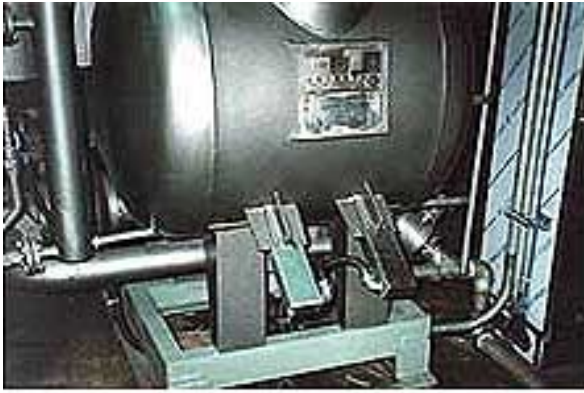
USP 3
가

● USP

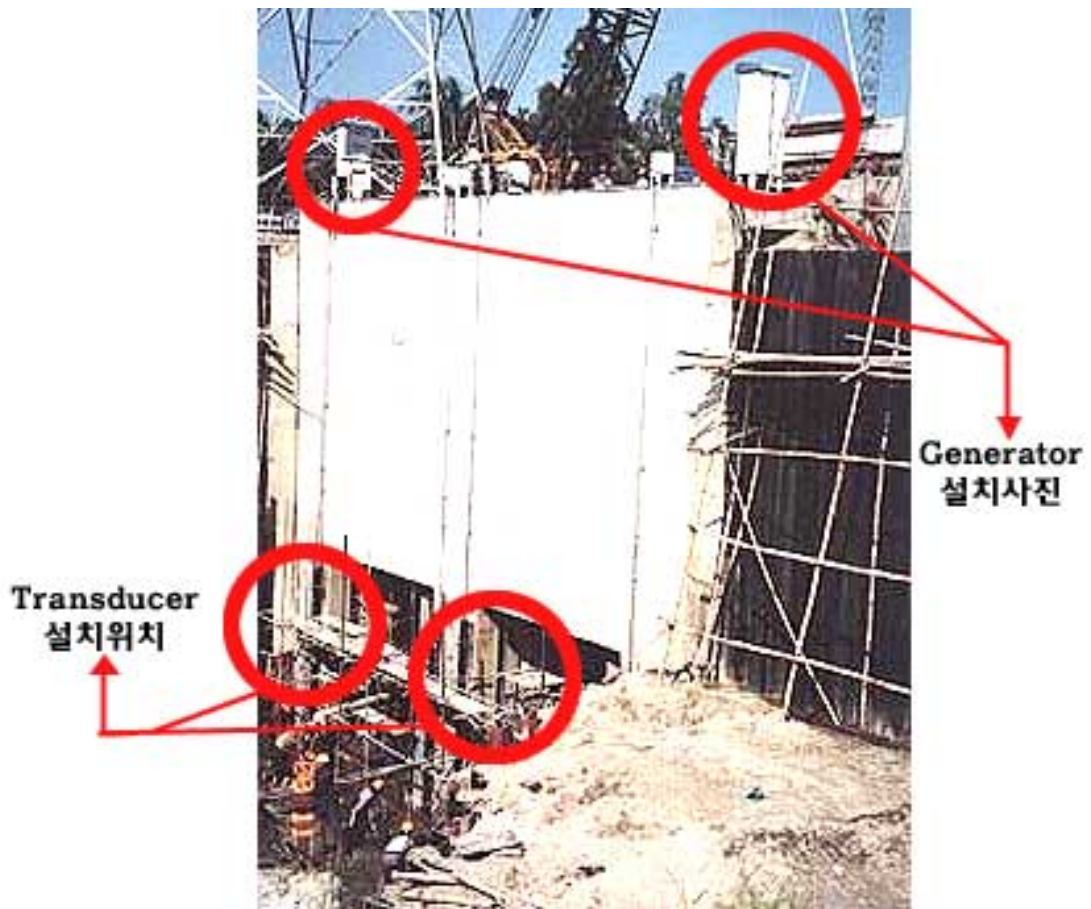


: (2)
 : 40 ()
 : 54 ()
 : 54

가 () USP



:
:
: Generator
:



: Haripur USP - FDD Generator

: Haripur In - take Transducer

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(주)몰코



ENGLISH

공지사항

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- * USP CE 
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