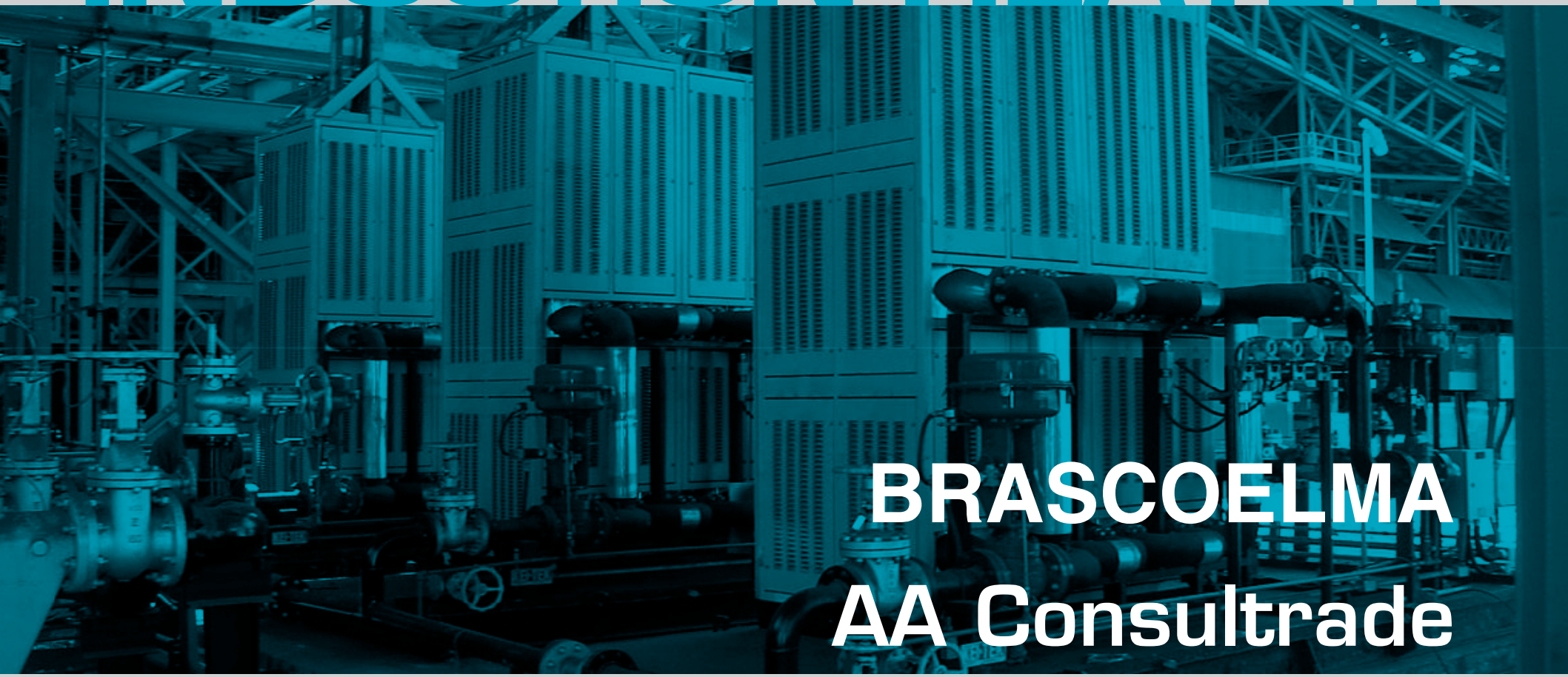
Save the Environment!
Decrease the Emissions Right Away!
USE **DIFHEMI** TO HEAT YOUR FLUIDS.

BRASCOELMA **AA Consultrade**

INDUCTION HEATER



BRASCOELMA
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NEW ADVANCED TECHNOLOGY TO HEAT ANY FLUID
DIRECTLY BY ELECTROMAGNETIC INDUCTION

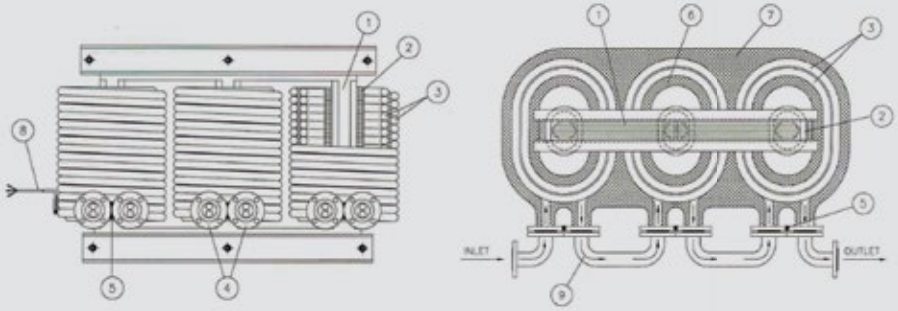
INTRODUCTION

In 1983, while the world economy was looking for alternatives to avoid global warming, with the implementation of the new guidelines initiated by the Kyoto Protocol in 1997**, at the same time having to face an increasingly competitive market, our society, anticipating the future, decided to innovate by starting the production of DIFHEMI (acronym of Direct Fluid Heating by Electromagnetic Induction).
After countless calculations and practical experiences, the Thermal Engineering Department has successfully developed and created its own equation for accurate calculation of DIFHEMI in any fluid inductive heating situation, aligned with an experimental prototype, introduced on the market this current, innovative and revolutionary heating industry technology, whose equipment allows achieving unprecedented Exergetics*income, typically greater than 98% and heating directly any kind of fluid, liquid or gas.

Steam or thermal oil has been used all around the world and for a long time now, heated by means of nonrenewable energy sources, such as fossil fuels or electrical resistances, which indirectly, usually by heat exchangers, heat fluids (liquids and gases) in industrial processes. These systems, though valid, has many deficiencies. Burners are pollutants that go against the Kyoto Protocol and generate high thermal losses over the heating processes and, consequently, low Exergetic* value.
For instance, in the first stage of use of a boiler to heat up any fluid, energy is lost by the burning fuel process. In the second stage, more energy is lost in order to transfer the heat generated by the flame to the wall of the vessel containing water. On the other hand, more energy is lost in the third stage when the container transfers its energy to vaporize the water. In the fourth stage, even more energy is lost to heat the pipes and the heat exchanger; when steam heats, indirectly, any kind of fluid resulting in another energy loss. If we perform an Exergoeconomic* analysis, adding these losses, in other words, an Exergetic* control of the various components, a low utilization of the thermal potential is found, and consequently, a high operating cost, ingeneral.

THE ORIGIN, THE CONCEPT AND HOW IT WORKS

The origin of its conception goes back on the principles of Electrical Power Transformer with the use of Exergy* generated by magnetic induction. Its heating system transcends all others due to its simplicity and security, considering its predecessors to be thermodynamically obsolete. By comparison, if we want to heat any fluid with the DIFHEMI, it will not be necessary to go through all those stages described above, we simply use Exergy* generated by electromagnetic induction and the fluid will be warmed up in only one stage. With DIFHEMI, fluid enters the inlet tube, goes through the long internal tube bundles and goes out the outlet tube, immediately heated to the target temperature, pressure and flow, with great use of energy and operational simplicity. The DIFHEMI does not generates pollution of any kind, has no noise, is static, does not require any peripheral equipment, is naturally cooled, needs no complicated government and environmental agency permissions and controls, does not provide risks of explosion and does not require maintenance, just like an Electrical Transformer. Extremely superior from a thermodynamic standpoint of 10-30%, compared to traditional heaters, the equipment works automatically, is compact, easy to install and requires little investment and low operating costs. So, why not make it easier? Instead of going through all four stages losing a lot of energy, why not going through only one stage gaining energy? For a better goal and wider use of Exergy* available, we introduced this heating system to the market, eliminating the losses of conventional systems of indirect heat exchange and its respective transportation, since it can be located close to the points of consumption due to its reduced installation space. The concept can be summarized in applying voltage in the primary coil, getting heat from the secondary coil tube bundle, which through Joule effect, since the coil has its terminals short-circuited, all energy applied to the primary will be transformed into thermal energy in the secondary, where the fluid circulates, providing high an Exergetic* thermoelectric efficiency of at least 98%. See below:



1 MAGNETIC GRAINS ORIENTED STEEL LAMINATION CORE
2 INDUCTOR COIL
3 STAINLESS STEEL TUBE COIL HEATER
4 STAINLESS STEEL FLANGES WELDED AT THE ENDS OF TUBE COIL
5 FLANGE WELDED CONTACT (TUBE COIL SHORT-CIRCUIT)
6 INTERNAL HEATING COIL INSULATION
7 EXTERNAL HEATING COIL INSULATION
8 TUBE WALL OVER TEMPERATURE DETECTOR
9 INLET-OUTLET HEATING COILS CONNECTIONS

DIFHEMI APPLICATIONS

The **DIFHEMI** presents the best solution for the direct heating of any type of fluid among dozens of applications in the field of Thermal Engineering. List of the most common ones:

Thermal fluid heating for:
- molding tools,
- thermal traces,
- chemical reactors,
- oils or chemical storage tanks, tunnels and presses for vulcanization of rubber.

Direct heating of corrosive solutions, acid or basic.

Direct heating of easily cracking and ultra-viscous oils, such as:
- Heavy Combustible oils,
- Pitches, tar and binders.

Direct heating of any type of gas, such as:
- Room air,
- Air for dryers, compressed air,
- Propane, butane and natural gas Hydrogen, oxygen, nitrogen.

Direct heating of any type of flammable fluid, such as:
- Gasoline,
- Ethanol,
- Aviation kerosene; Industrial solvents; Alcohols groups etc.

OTHER APPLICATIONS:
- Bath heating for surface treatment (pickling, cleaning etc.),
- Distillation and concentration of chemicals,
- Laundries and car washes,
- Pharmaceutical processes,
- High purity water,
- Super steam heating and generation of steam,
- Pasteurization of juices, HTST and UHT milk,
- Manufacturing of resins and pigments,
- Deodorization of edible oils,
- Biodiesel production,
- Manufacturing of fibers, polyester,
- Application in glass, aluminium, mining, iron pelletizing and cement production, pulp production and cathodes Soderberg for aluminium industry,
- Operations in hazardous areas in the chemical and oil industries,
- Recycling in the refining of used automotive oils,
- In all industrial processes that require directly or indirectly fluids heating.

(*) EXERGY, or maximum work potential, can be defined as "the maximum amount of work obtained by a system where the flow of a substance is conducted from an initial state to an end and can be compared to the Gibbs free energy, where: UGo=UHo+ TUSo, or also as a measure of the degree of allocation between the system and its environment and the standard state. EXERGY concept according to Rant and Kotas: where (energy) is a property of a system according to the first law of thermodynamics and cannot be destroyed (conservation of energy), in each transformation one part is lost, that is, the part that is not used to do work. Rant proposed the word ANERGY to refer to the portion of energy that is not used. So, we can say that Energy is the sum of the portion of all energy that is used (Exergy) and the portion that cannot be used (Anergy) as shown in the equation: ENERGY = EXERGY + ANERGY According by Rant, Exergy is the portion of the energy that can be converted into any other energy source, that is, the portion that can be transformed into heat or work. According to Kotas, this measure means the maximum work performed by the system in its interaction with the environment to reach the balance.

(**) 1997 Kyoto Protocol, going against the production of harmful gases such as dioxins, furans, NOx, VOC, PCDD / F 1/96 / CE and CO / CO2, action that legitimized an economically viable mechanism to large international polluters to reduce the GHG emissions, inventorying emissions with the CER certificate, issued when there is demonstrably emissions of gases reduction that cause global warming, the regulatory environmental protection agencies issue these certificates. Companies that manage to reduce the emission of greenhouse gases can profit from the sale of these carbon credits.

DIFHEMI ADVANTAGES COMPARED TO OTHERS HEATING SYSTEMS

Advantages of DIFHEMI over other fluid heating systems:

01 It is safe because it operates with ZERO voltage between the mains and the equipment because the tubular bundles are isolated from the electrical system,
02 It can be operated in hazardous areas,
03 It needs no maintenance, it has no moving parts, it works 24/7, 365 days/year.
04 It can operate at high temperatures and pressures, as well as at high powers (no limit power, just at size),
05 Compact format and modular installation, it can be installed near the place where heating is needed, saving space.
06 Low temperature on the walls of the inner tubes avoiding hot point, cracking, carbonization or chemical alteration of the fluid to be heated.
07 Zero fluctuations in operating temperature, which means, constant temperature during the process.
08 Dry working system and it is cooled naturally.
09 Free from generation of waste in the thermal fluid heating due to non-corrosiveness.
10 Elimination of all maintenance costs, installations and related contracts, as in boilers.
11 Complete safety for the operator and the whole process.
12 Elimination of steam transport tubes.
13 Low thermal inertia, immediate response after energizing, fluid heats up quickly.
14 There's no need for vents or anti-pollution system.
15 It has no elements such as electrical resistance that require maintenance (replacements).
16 The fluid is heated homogeneously and at strictly controlled temperature
17 It does not produce any noise.
18 It does not provide risk of explosion.
19 Environmental and financial gain from issuance of CERs (carbon credits) by reducing polluting emissions **

CONCLUSIONS AND WHY CHANGE TO DIFHEMI:

Taking into account the operational advantages of DIFHEMI such as quality, strength of the equipment, security, heating output, as well as versatility in heating, direct or indirectly, any type of fluid, makes DIFHEMI the most efficient, advanced, modern and revolutionary heating equipment in the field of Thermal Engineering. Since 1983, for 32 years, DIFHEMI has been sold for over 100 satisfied companies, such as:

Saint-Gobain, International Paper, Petrobras, Alcoa, Gillette, Air Liquide, da Embraer, Vale, Eletrobras, Ajinomoto, CSN, Unipar, Monsanto, Eucatex, Belgo, Tupy, Lwarcel, CBC, Anglogold, Elkem, CBA, Ibar, Klabin, West Pharmaceutical, TAM, Citroflavour, Jakko Poyry, Magnesita, Labortex, Ucar, AkzoNobel, Mahle, Gerdau, Bechtel, Fosfertil, ABB, Cargil, Rhodia-Solvay, Dupon, Votorantin, Alcan, Fiat, Okko, Esmaltec, suzanoPapel & Celulose, Café Uniao, Kinross, AngloGold Ashanti and so on.

DIFHEMI TO HEAT DIRECTLY THERMAL FLUIDS (*)

TYPE	ELECTRIC POWER KWh	THERMAL POWER Kcal/hs	SURFACE POWER DENSITY W/cm2	PRESSURE IN Bar	WORKING TEMPERATURE °C	DIMENSION (H/W/T)	NET WEIGHT Kg
GEI-50TF	50	42140	from 2,0 to 2,5	ffrom 2 to 100	from 60 to 400	900 x 1430 x 940	680
GEI-75TF	75	63210	from 2,0 to 2,5	from 2 to 100	from 60 to 400	940 x 1600 x 1000	765
GEI-100TF	100	84280	from 2,0 to 2,5	from 2 to 100	from 60 to 400	1100 x 1520 x 1100	615
GEI-150TF	150	126420	from 2,0 to 2,5	from 2 to 100	from 60 to 400	1210 x 1550 x 960	1100
GEI-200TF	200	168560	from 2,0 to 2,5	from 2 to 100	from 60 to 400	1310 x 1700 x 1000	1210
GEI-300TF	300	252840	from 2,0 to 2,5	from 2 to 100	from 60 to 400	1450 x 1780 x 1300	1546
GEI-450TF	450	379260	from 2,0 to 2,5	from 2 to 100	from 60 to 400	1720 x 1800 x 1380	1644
GEI-600TF	600	505680	from 2,0 to 2,5	from 2 to 100	from 60 to 400	2140 x 1880 x 1500	1920
GEI-750TF	750	632100	from 2,0 to 2,5	from 2 to 100	from 60 to 400	2510 x 1920 x 1640	2970
GEI-1000TF	1000	842800	from 2,0 to 2,5	from 2 to 100	from 60 to 400	2460 x 2070 x 1800	3840
GEI-1250TF	1250	1053500	from 2,0 to 2,5	from 2 to 100	from 60 to 400	2810 x 2100 x 1800	4330
GEI-1500TF	1500	1264200	from 2,0 to 2,5	from 2 to 100	from 60 to 400	3360 x 2100 x 1838	5180

(*)The Dimensions above have been calculated taken into consideration pressure classes of 300 lbs, 10 Bar and temperature 250 ° C. There could be variation in the dimensions due to the change of these variables, for other pressures, flow rates and temperatures.If you needs an Induction Heater DIFHEMI for a thermal power between the interval of types specified above, or, as well if you should have DIFHEMI of more capacity higher than the maximum level above specified, please ask us. We will be able to build the DIFHEMI tailor-made for your needs without limit of power.

DIFHEMI – ALCOA Italy,
990KW for Thermal Fluid at 300 °C, pressure 6 Bar

DIFHEMI TO HEAT DIRECTLY FUEL OILS, HEAVY FUEL OILS, TALLOW AND VEGETABLE OILS (*)

TYPE (**)	ELECTRIC POWER KWh	THERMAL POWER Kcal/hs	SURFACE POWER DENSITY W/cm2	PRESSURE Bar	WORKING TEMPERATURE °C	DIMENSION (H/W/T)	NET WEIGHT Kg
GEI-30CO	30	25284	from 0,8 to 1,8	from 4 to 80	from 60 to 350	780 x 1600 x 1100	680
GEI-60CO	60	50568	from 0,8 to 1,8	from 4 to 80	from 60 to 350	1170 x 1550 x 1165	770
GEI-120CO	120	101136	from 0,8 to 1,8	from 4 to 80	from 60 to 350	1302 x 1700 x 1315	1200
GEI-180CO	180	151704	from 0,8 to 1,8	from 4 to 80	from 60 to 350	1610 x 1700 x 1380	1350
GEI-240CO	240	202272	from 0,8 to 1,8	from 4 to 80	from 60 to 350	1852 x 1800 x 1430	1480
GEI-300CO	300	252840	from 0,8 to 1,8	from 4 to 80	from 60 to 350	2000 x 1800 x 1720	2150
GEI-400CO	400	337120	from 0,8 to 1,8	from 4 to 80	from 60 to 350	2400 x 2000 x 1830	2740
GEI-600CO	600	505680	from 0,8 to 1,8	from 4 to 80	from 60 to 350	2800 x 2000 x 1740	4300
GEI-800CO	800	674240	from 0,8 to 1,8	from 4 to 80	from 60 to 350	2910 x 1900 x 1788	4820
GEI-1000CO	1000	842800	from 0,8 to 1,8	from 4 to 80	from 60 to 350	3340 x 2200 x 1810	5180

(*)The Dimensions above have been calculated taken into consideration pressure classes of 300 lbs, 15 Bar and temperature 200 ° C. There could be variation in the dimensions due to the change of these variables, for other pressures, flow rates and temperatures.
If you needs an Induction Heater DIFHEMI for a thermal power between the interval of types specified above, or, as well if you should have DIFHEMI of more capacity higher than the maximum level above specified, please ask us. We will be able to build the DIFHEMI tailor-made for your needs without limit of power.

(**) Depending of each kind of fluid may change the terminology as below:

GEI-25HO for heavy oil
GEI-25T for tallow
GEI-25VO for vegetable oil

DIFHEMI - Biotins 45KW,
120 ° C, for heating bovine tallow

DIFHEMI TO HEAT DIRECTLY GASES: OXYGEN, NITROGEN, NATURAL GAS, SUPERHEATED STEAM, HYDROGEN, COMPRESSED AIR, HIGH FLOW RATE OF AIR AND LOW PRESSURE AIR (*)

TYPE (**)	ELECTRIC POWER KWh	THERMAL POWER Kcal/hs	SURFACE POWER DENSITY W/cm2	PRESSURE IN Bar	WORKING TEMPERATURE °C	DIMENSION (H/W/T)	NET WEIGHT Kg
GEI-15G	15	12642	from 1,1 to 2,0	from 0,2 to 120	from 60 to 450	610 x 1320 x 800	430
GEI-30G	30	25284	from 1,1 to 2,0	from 0,2 to 120	from 60 to 450	776 x 1440 x 1010	620
GEI-60G	60	50568	from 1,1 to 2,0	from 0,2 to 120	from 60 to 450	940 x 1400 x 1200	800
GEI-90G	90	75852	from 1,1 to 2,0	from 0,2 to 120	from 60 to 450	1360 x 1470 x 1320	1230
GEI-120G	120	101136	from 1,1 to 2,0	from 0,2 to 120	from 60 to 450	1550 x 1470 x 1360	1480
GEI-150G	150	126420	from 1,1 to 2,0	from 0,2 to 120	from 60 to 450	1750 x 1490 x 1400	1550
GEI-200G	200	168560	from 1,1 to 2,0	from 0,2 to 120	from 60 to 450	1800 x 1620 x 1400	1740
GEI-300G	300	252840	from 1,1 to 2,0	from 0,2 to 120	from 60 to 450	1800 x 1750 x 1680	1810
GEI-400G	400	337120	from 1,1 to 2,0	from 0,2 to 120	from 60 to 450	2100 x 1860 x 1800	2350
GEI-500G	500	421400	from 1,1 to 2,0	from 0,2 to 120	from 60 to 450	2200 x 2100 x 1800	2630
GEI-600G	600	505680	from 1,1 to 2,0	from 0,2 to 120	from 60 to 450	2420 x 2200 x 1840	3120

(*)The Dimensions above have been calculated taken into consideration pressure classes of 300/600 lbs, 10/20 Bar and temperature 200 ° C. There could be variation in the dimensions due to the change of these variables, for other pressures, flow rates and temperatures.
If you needs an Induction Heater DIFHEMI for a thermal power between the interval of types specified above, or, as well if you should have DIFHEMI of more capacity higher than the maximum level above specified, please ask us. We will be able to build the DIFHEMI tailor-made for your needs without limit of power.

(**) Depending of each kind of fluid may change the terminology as below:

GEI-25Ox/N/NG/H	for oxigen, nitrogen, natural gas, hydrogen
GEI-25SS	for super steam
GEI-25CA	for compressed air
GEI-25HFA/LPA	for high flow rate air, low pressure air

DIFHEMI - Petrobras 200KW natural gas,
100 bar, 90 ° C, Ex-oil platform in hazardous area

DIFHEMI TO HEATING DIRECTLY WATER, HIGH PURITY WATER, CHEMICAL SOLUTIONS, ETHANOL, SOLVENTS AND MILK AND JUICE PASTEURIZATIONS (*)

TYPE (**)	ELECTRIC POWER KWh	THERMAL POWER Kcal/hs	SURFACE POWER DENSITY W/cm2	PRESSURE IN Bar	WORKING TEMPERATURE °C	DIMENSION (H/W/T)	NET WEIGHT Kg
GEI-25W	25	21070	from 2,5 to 4,0	from 2 to 100	from 60 to 250	510 x 1130 x 780	310
GEI-40W	40	33712	from 2,5 to 4,0	from 2 to 100	from 60 to 250	746 x 1080 x 880	510
GEI-60W	60	50568	from 2,5 to 4,0	from 2 to 100	from 60 to 250	780 x 1100 x 880	535
GEI-100W	100	84280	from 2,5 to 4,0	from 2 to 100	from 60 to 250	926 x 1200 x 900	585
GEI-150W	150	126420	from 2,5 to 4,0	from 2 to 100	from 60 to 250	1176 x 1450 x 890	910
GEI-200W	200	168560	from 2,5 to 4,0	from 2 to 100	from 60 to 250	1200 x 1450 x 1100	1210
GEI-300W	300	252840	from 2,5 to 4,0	from 2 to 100	from 60 to 250	1420 x 1610 x 1200	1411
GEI-400W	400	337120	from 2,5 to 4,0	from 2 to 100	from 60 to 250	1580 x 1600 x 1300	1540
GEI-500W	500	421400	from 2,5 to 4,0	from 2 to 100	from 60 to 250	1700 x 1600 x 1400	1610

(*)The Dimensions above have been calculated taken into consideration pressure classes of 150 lbs, 7 Bar and temperature 150 ° C. There could be variation in the dimensions due to the change of these variables, for other pressures, flow rates and temperatures.
If you needs an Induction Heater DIFHEMI for a thermal power between the interval of types specified above, or, as well if you should have DIFHEMI of more capacity higher than the maximum level above specified, please ask us. We will be able to build the DIFHEMI tailor-made for your needs without limit of power.

(**) Depending of each kind of fluid may change the terminology as below:

GEI-25HPW	for high purity water
GEI-25CS	for chemical solutions
GEI-25Sol	for solvents
GEI-25MP	for milk pasteurazion
GEI-25JP	for juice parteurization

DIFHEMI – VILLARES 120 KW
Sulphuric Acid Solution at 90 °C, 3 Bar – pipe of Teflon coated.

DIFHEMI FOR STEAM GENERATION (*)

TYPE	ELECTRIC POWER KWh	THERMAL POWER Kcal/hs	SURFACE POWER DENSITY W/cm2	PRESSURE IN Bar	WORKING TEMPERATURE ºC	DIMENSION (H/W/T)	NET WEIGHT Kg
GEI-10SG	10	8428	4,0	from 1 to 30	from 110 to 235	400 x 900 x 600	270
GEI-20SG	20	16856	4,0	from 1 to 30	from 110 to 235	530 x 1140 x 810	340
GEI-40SG	40	33712	4,0	from 1 to 30	from 110 to 235	760 x 1100 x 900	580
GEI-60SG	60	50568	4,0	from 1 to 30	from 110 to 235	800 x 1240 x 910	620
GEI-100SG	100	84280	4,0	from 1 to 30	from 110 to 235	950 x 1400 x 1000	780
GEI-200SG	200	168560	4,0	from 1 to 30	from 110 to 235	1300 x 1580 x 1240	1380
GEI-300SG	300	252840	4,0	from 1 to 30	from 110 to 235	1510 x 1700 x 1300	1580
GEI-400SG	400	337120	4,0	from 1 to 30	from 110 to 235	1640 x 1700 x 1380	1670

(*)The Dimensions above have been calculated taken into consideration pressure classes of 300/600 lbs, 20/40 Bar and temperature 200 ° C. There could be variation in the dimensions due to the change of these variables, for other pressures, flow rates and temperatures.
If you needs an Induction Heater DIFHEMI for a thermal power between the interval of types specified above, or, as well if you should have DIFHEMI of more capacity higher than the maximum level above specified, please ask us. We will be able to build the DIFHEMI tailor-made for your needs without limit of power.

DIFHEMI - 180 KW – PETROBRAS,
Steam superheating at 600 °C, 9 Bar

DOES NOT HAVE IN THE WORLD AN EQUIPMENT SIMILAR TO THE DIFHEMI TO HEAT ANY KIND OF FLUID, LIQUID OR GASEOUS.
MORE THAN 300 COMPANIES HAVE BEEN SATISFIED, LIKE SOME ONES BELOW:

Induction Heater 4 Fluids & more... that's a joint-venture one performed among Brascoelma, the factory and AA Consultrade, the sale.

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