Eco-Clamp™

Magnetic Fuel Conditioning for Combustion Efficiency

Product Overview

Eco-Clamp™ is a non-intrusive magnetic fuel-conditioning system that improves combustion efficiency and reduces emissions in natural-gas, propane, and liquid-fuel systems. It installs externally on the fuel line — no wiring, power, or modification required — and delivers measurable fuel savings across multi-family, commercial, and industrial heating applications.

Operating Principle

Eco-Clamp™ applies a rotational magnetic flux field to the fuel stream just before combustion, producing four conditioning effects:

- **Molecular Realignment** — aligns hydrocarbon chains for finer atomization.
- **Ionization Effect** — charges hydrogen / oxygen molecules for cleaner oxidation.
- **Carbon Deposit Reduction** — minimizes fouling in burners and heat exchangers.
- **Improved Air–Fuel Mix** — produces a stable, high-temperature, low-emission flame.

Independent Validation

ONspex Laboratories (Cleveland, OH) tested Eco-Clamp™ per ASHRAE 103-1993 on a Luxair 90% up-flow furnace:

CONDITION	COMBUSTION EFFICIENCY	CO_2 (%)	CO (PPM)	TEMP RISE (°F)
Without Eco-Clamp™	89.55%	6.6	8	50
With Eco-Clamp™	90.97% (+1.42%)	7.3	0	52.5

> Results: complete CO elimination, higher heat output, and improved combustion stability.

Typical Applications

EQUIPMENT TYPE	BTU RANGE	PIPE SIZE	RECOMMENDED MODELS
Residential / Commercial HVAC	1k – 120k	¼″ – ½″	**AFS-LD / AFS-HD**
Rooftop MUA / Unit Heaters	250k – 600k	1″ – 1¾″	**AFS-1 / AFS-1A**
Boilers / DHW Systems	600k – 3MM	1½″ – 3″	**AFS-1A / AFS-2**
Industrial Burners / Generators	3 – 9MM	3″ – 8″	**AFS-2 – AFS-8 (Custom)**

Custom assemblies are available for pipe diameters to 8″ and thermal loads greater than 9MM BTU/h.

Technical Specifications

PARAMETER	SPECIFICATION	NOTES
Magnetic Field Intensity	10,000–12,500 Gauss	NdFeB N42 or Ceramic Grade 5–8
Field Geometry	Helical, alternating N–S array	—
Housing	Aluminum alloy body	PVC-coated
Fasteners	Stainless A2 / A4	Non-magnetic
Operating Temperature	−40°C to +200°C	Continuous
Service Life	>20 years	No flux loss
Maintenance	None required	Passive operation
Warranty	20-year limited	30-day registration required

Installation Guidelines

Eco-Clamp™ installs externally on existing fuel lines and requires no system modification or power source.

1. Ensure the pipe surface is clean and free of oil and debris before installation.
2. Position the clamp as close as practical to the burner or manifold connection.
3. Secure the halves evenly using the supplied fasteners; do not overtighten.
4. Once installed, visually confirm proper seating and clearance around adjacent components.

For detailed step-by-step procedures and verification steps, refer to the Eco-Clamp™ Installation Instructions and Site Assessment Guide.

Verified Performance

5–17%
Fuel-efficiency improvement (up to 20% depending on conditions)

60–90%
Emission reductions: CO 60–80%, HC 80–90%, NO_x ~20%

6–18
Months to ROI, depending on load profile and runtime

Magnetic Science & Mechanism

Eco-Clamp™ uses opposing magnetic poles to create a gradient that:

1. Pulls positively charged carbon atoms toward the pipe wall.
2. Pushes negatively charged hydrogen atoms toward the centerline.
3. Promotes faster electron exchange and more complete oxidation.

This molecular-separation effect improves combustion stability, reduces unburned hydrocarbons and CO, and enhances thermal efficiency without modifying fuel-delivery components.

Regional Compliance & Market Alignment

Code Compatibility

Eco-Clamp™ installs externally on existing fuel lines and does not alter or penetrate the gas system or appliance connection. It therefore does not require certification under CSA B149.1 (Canada) or NFPA 54 / ANSI Z223.1 (U.S.), and is fully compatible with these codes when installed according to standard fuel-system safety practices.

Energy & ESG Program Relevance

Recognized as a passive, non-intrusive fuel-efficiency measure suitable for custom incentive review under:

- NRCan Greener Buildings Initiative (Canada)
- IESO Save-on-Energy Custom Programs (Ontario)
- U.S. DOE Better Buildings Challenge

Supports Scope 1 emission-reduction reporting through measurable combustion-efficiency gains.

Ideal Applications & Users

Deployed across multi-family, institutional, and light-industrial facilities. Ideal for:

- **Property & Asset Managers** seeking verifiable fuel savings.
- **Mechanical Contractors and Retrofit Integrators** pursuing low-carbon solutions.
- **Utilities and ESCOs** implementing custom efficiency projects.
- **OEM Manufacturers** integrating embedded energy-improvement technologies.

Environmental & Economic Impact

METRIC	VERIFIED BENEFIT
CO_2 Reduction	Up to 15% per site
Fuel Efficiency Improvement	Up to 20%, typically 5–17% depending on system conditions
Equipment Longevity	Reduced fouling / extended service life
Maintenance Savings	Fewer cleanings and less downtime

Magna-Tek Solutions Inc. · info@magna-tek.com · www.magna-tek.com