ROI

RAGNAR ORIGINAL INNOVATION

For Wood and Vegetation Conversion

RAGNAR ORIGINAL INNOVATION

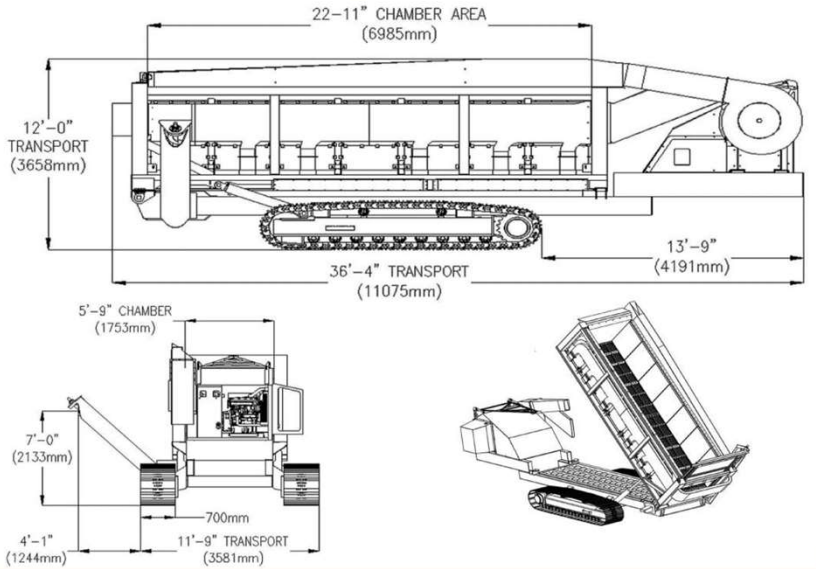
Equipment

RAGNAR ORIGINAL INNOVATION

ENVIROSAVER 350

RAGNAR ORIGINAL INNOVATION

ENVIROSAVER 350



- **Dimensions and weight:**
- **Length 36’-4’’OAL**
- **Width 11’-9’’**
- **Height 12’**
- **Weight 73,000 lbs.**

RAGNAR ORIGINAL INNOVATION

ENVIROSAVER 350

- **Conversion:** Estimated10-12+ tons per hour
- **Portability:** Standard self-propelled track drive
- **Transportation:** Easily transportable on low boy with standard well.
- **Setup:** Self contained - NO on site assembly required.

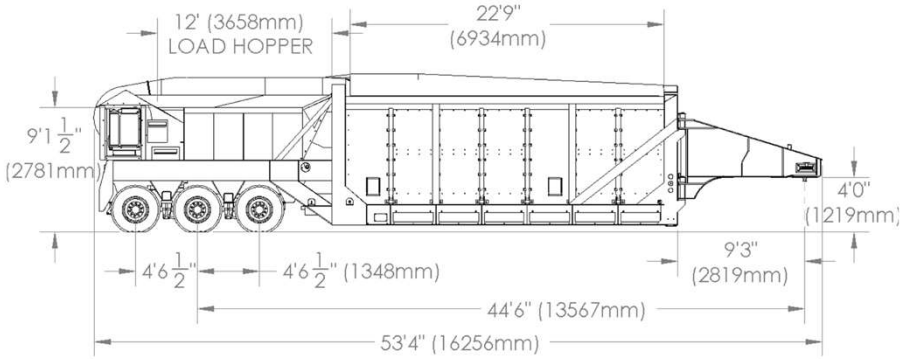
RAGNAR ORIGINAL INNOVATION

ENVIROSAVER 400

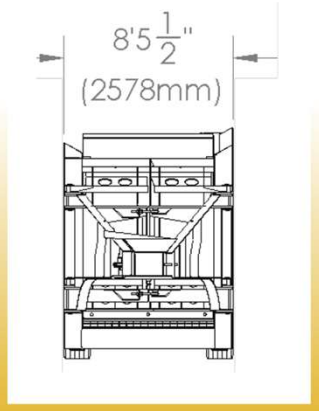
RAGNAR ORIGINAL INNOVATION

EnviroSaver

ENVIROSAVER 400



- **Dimensions and weight:**
- **Length 53’-4’’OAL**
- **Width 8’-5-1/2’’**
- **Height 12’-4’’**
- **Weight 83,000 lbs.**



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RAGNAR ORIGINAL INNOVATION

EnviroSaver

ENVIROSAVER 400

- **Conversion:** Estimated 10-15+ tons per hour
- **Portability:** Standard wheeled for on and off-road travel.
- **Transportation:** Easily transportable with standard truck.
- **Setup:** Self contained requiring NO on site assembly

RAGNAR ORIGINAL INNOVATION

EnviroSaver

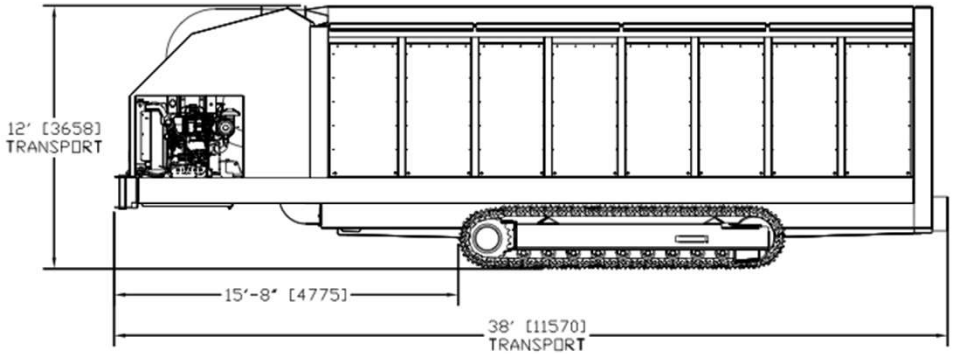
CARBONATOR 500

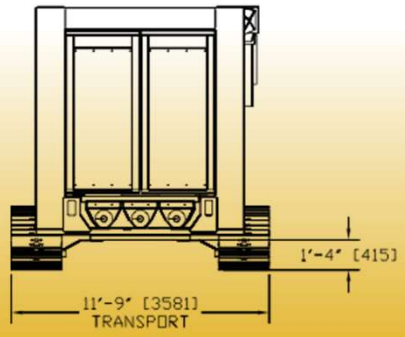
RAGNAR ORIGINAL INNOVATION

EnviroSaver

CARBONATOR 500

- **Dimensions and weight:**
- **Length 38’ OAL**
- **Width 11’-9’’**
- **Height 12’**
- **Weight 83,000 lbs.**





RAGNAR ORIGINAL INNOVATION

EnviroSaver

CARBONATOR 500

- **Conversion:** Estimated 15-20+ tons per hour
- **Portability:** Standard self-propelled track drive
- **Transportation:** Easily transportable on low boy with standard well.
- **Setup:** Self contained - NO on site assembly required.

RAGNAR ORIGINAL INNOVATION

How the *CARBONATOR* works

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- All of ROI's machines are operated by loading continually and can be operated for extended periods of time.

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Above Chamber Air Curtain:

- A high velocity over-chamber air
- Air Curtain Stalls particulates
- Introduces oxygen for primary combustion efficiency.

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Pre-Heated Under-Chamber Air:

- Provides oxygen for increased primary combustion efficiency
- Eliminates smoldering effects of denser materials
- Assists with char production extraction.
- Assists with systems cooling

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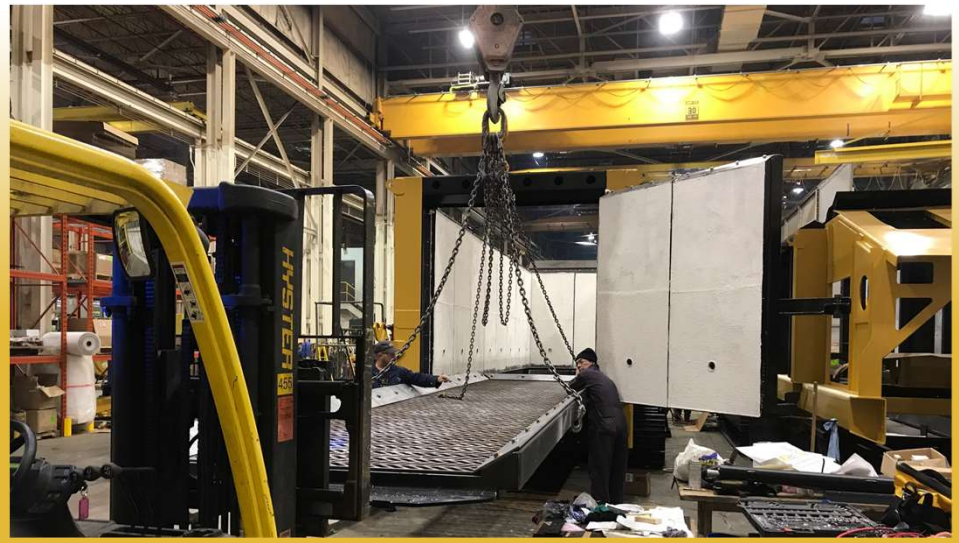
Elevated Primary Combustion Chamber:

- Equalizes temperatures throughout
- Supports pyrolysis of biomass Reduced Emissions
- Increases throughput



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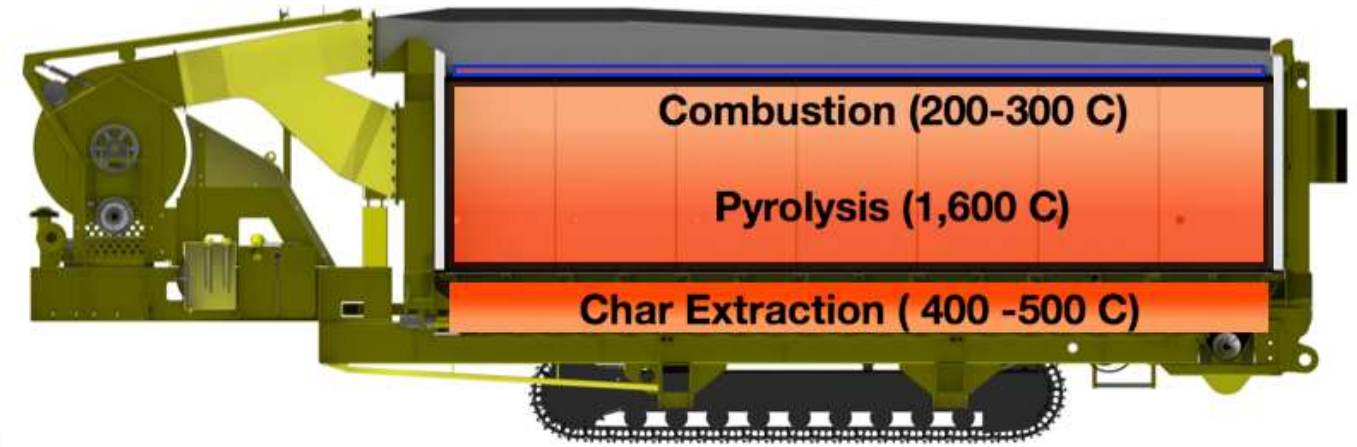
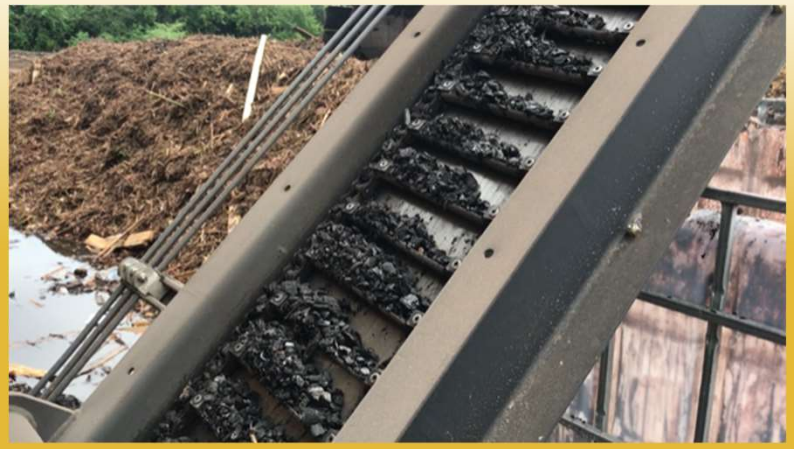
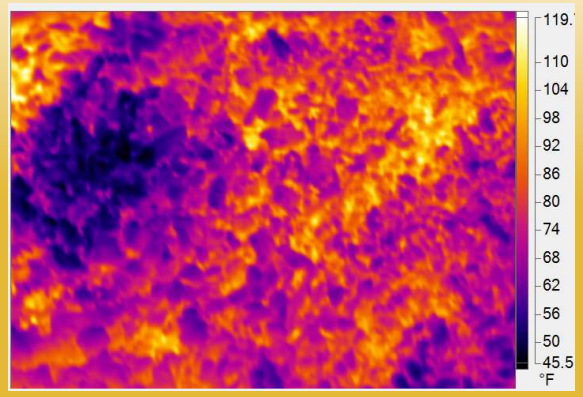




Biochar



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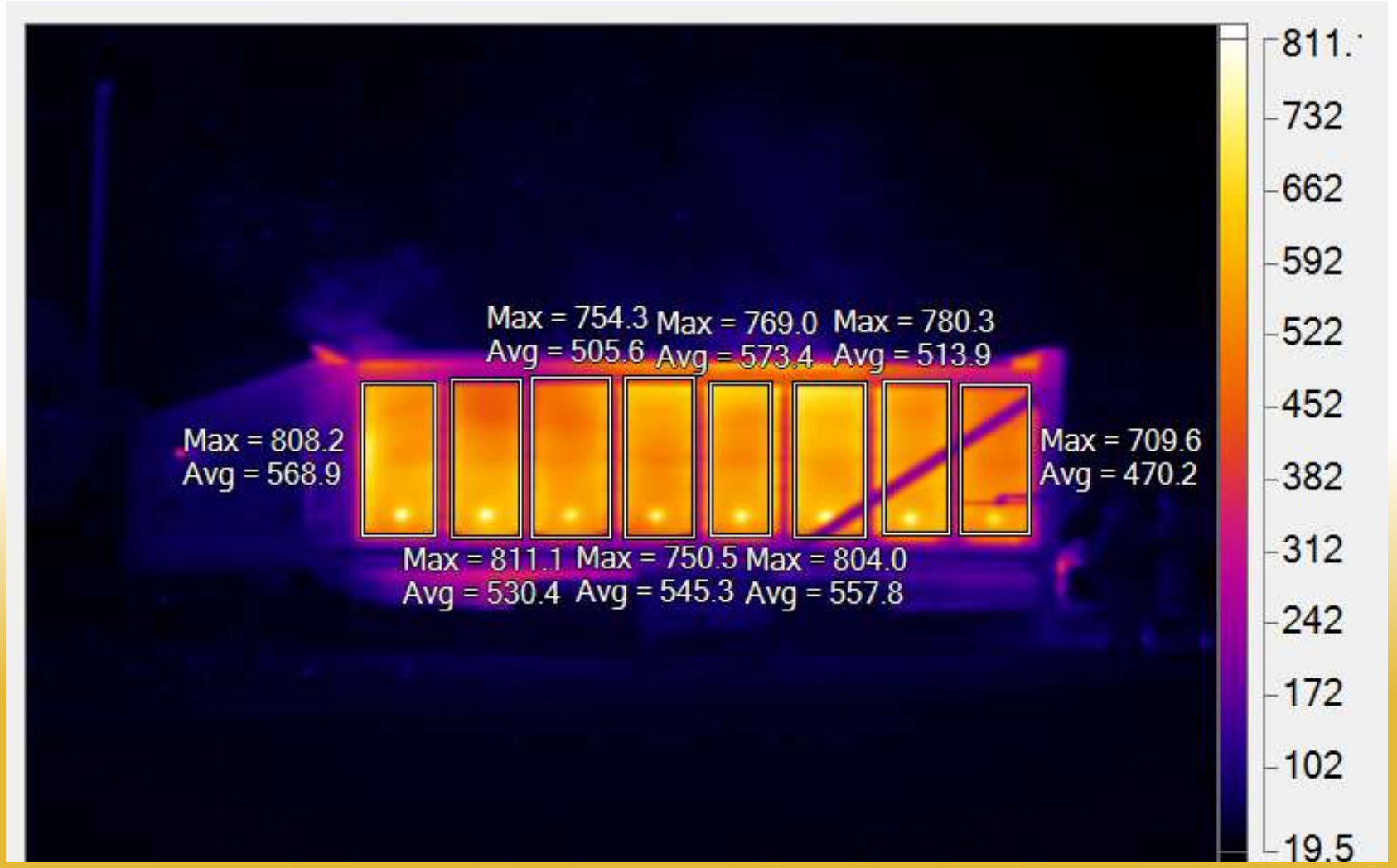


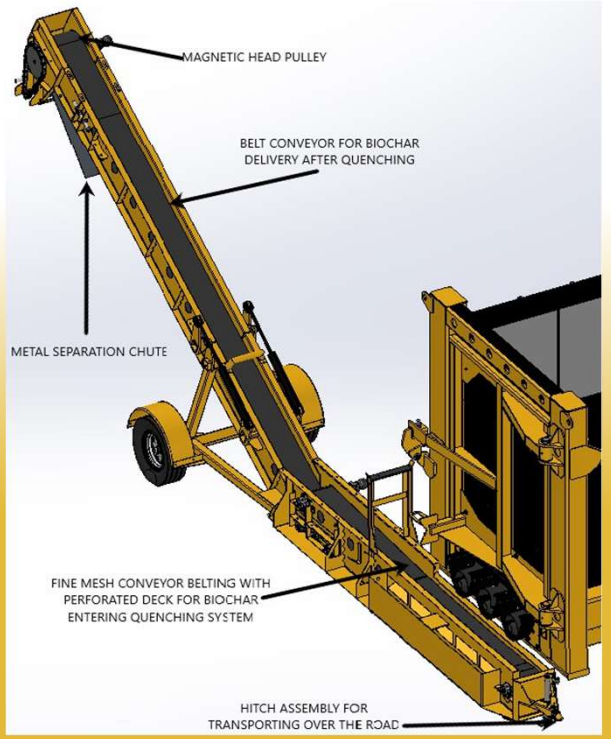
RAGNAR ORIGINAL INNOVATION

Char Pan and Augers:

- Contained area beneath the combustion chamber.
- Allows the process to be mobile while operating
- Automatically dispenses biochar

(Optional) Stacking Auger:

- Complete biochar handling mobile or attached to for on-site mobility while operating.
- Biochar Quenching
- Metal Separation
- Biochar sizing heads



RAGNAR ORIGINAL INNOVATION

Transporting:

- Easily loads and off loads from any low boy with RGN.
- Designed to fit in well of standard lowboy trailer.
- Points provided for easy and quick tie-down.

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Environmental Benefits

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Environmental Benefits

Table 1: Non-Biogenic CO_2 emissions	lb/ton Handling and Processing Non-Biogenic GHG Emissions					
Emission Source	Transport CO_2 Emissions lb/ton	Material Loader CO_2 Emissions lb/ton	Grinder CO_2 Emissions lb/ton	Site Processing $CO_2(e)$ Emissions lb/ton	Load-out CO_2 Emissions lb/ton	Total Non-Biogenic CO_2 Emissions lb/ton
Scenario 1: Composting Facility	16.4	5.968	38.068	35	16.4	111.836
Scenario 2: Grinding/hauling		5.968	38.068		16.4	60.436
Scenario 3: Hauling/ Landfilling	16.4	5.968		2,000		2022.368
Scenario 4: ROI CARBONATOR 500		5.968		3.916		9.884

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Environmental Benefits

Table 2: PM Emissions	GHG Emissions (Metric tons CO_2 per ton of yard waste)					
Emission Source	Transport PM Emissions	Material Loader PM Emissions	Grinder PM Emissions	Site Processing PM Emissions	Load-out PM Emissions	Total PM Emissions
Scenario 1: Composting Facility			1763.7	0.9		1764.6
Scenario 2: Grinding/hauling			1763.7			1763.7
Scenario 3: Hauling/ Landfilling						0
Scenario 4: ROI CARBONATOR 500				130		130

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Woody Biomass Conversion

High-volume carbonizing systems producing a superior end-product, Biochar