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Meridian Institute
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In Support of:





*The **AflaSTOP: Storage and Drying for Aflatoxin Prevention (AflaSTOP)** project is identifying the most promising storage options to arrest the growth of aflatoxin and designing viable drying options that will allow smallholder farmers to dry their grain to safe storage levels. The project works to ensure that businesses operating in Africa are able to provide these devices to smallholder farmers. It is jointly implemented by ACDI/VOCA and its affiliate Agribusiness Systems International (ASI) under the direction of Meridian Institute. For more information on AflaSTOP and other key reports and resources, visit: www.acdivoca.org/aflastop-publications.*

This work was carried out as a partnership with Marius Rossouw and Catapult Design to identify potential drying technology suited to support post-harvest handling devices for maize smallholder farmers.

For any inquiries about the EasyDry M500, please contact us at info@easydry.org.

A video detailing how to incorporate the EasyDry M500 into your post-harvest workflow can also be found at XXXXX.

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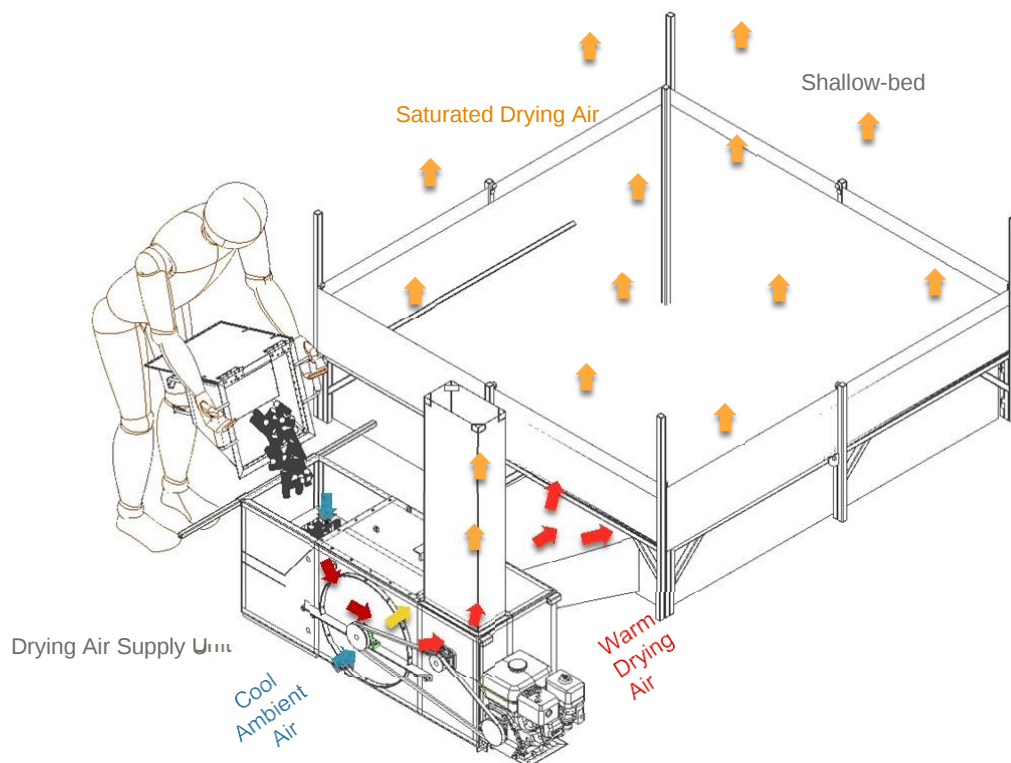
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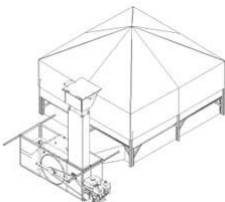
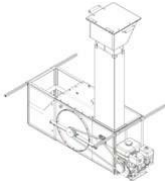
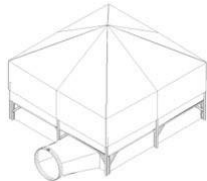
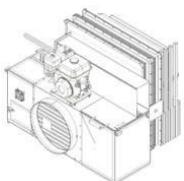
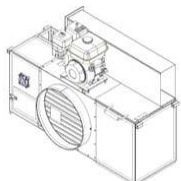
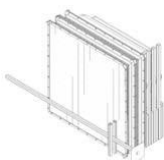
1. Product Overview

The dryer is a portable, on-farm drying solution that enables smallholder farmers to dry their maize down post-harvest to the recommended moisture levels. It offers a solution that closely resembles the traditional method of lying shelled maize out in the sun to dry, with the major difference in that forced hot air is used as the drying mechanism and is capable of operating under inclement weather conditions since it relies on burning biomass to generate the required heat, and not the sun.



The dryer is either transported (as a service) on two motor bikes, pickup, truck, trailer or hand cart to or stored at the location (as an on-farm investment) where maize is shelled or dried. The dryer can be assembled within 10 minutes by erecting the modular shallow-bed and connecting it to the drying air supply unit. ± 500 Kg of “wet” maize (10 x 50 kg bags, 5 $\frac{1}{2}$ x 90 kg bags, 4 $\frac{1}{4}$ x 120 kg bags - ± 50 kgs will not effect drying performance) are loaded onto the shallow-bed and the furnace is ignited. Five (5) to six (6) bags of 90 kg (± 500 kg) of “wet” maize are loaded onto the shallow-bed and the furnace is ignited. The heated clean air needed for drying is generated through convection heat transfer by blowing ambient air over heated heat exchanger (HX) channels. The HX channels are heated by drawing hot furnace exhaust gasses through them and out the chimney. The hot exhaust gasses are constantly generated by steadily burning fuel (maize cobs) in the downdraft furnace. The heated air is blown into a canvas plenum with maize suspended on a perforated mesh bed above it. The air pressure builds up in the canvas plenum and forces heated air past the maize kernels with dryer can dry the 500 kg “wet” maize ($\sim 20\%$ moisture content) down a safe storage moisture content of $\pm 13.5\%$ within four (4) hours ($\pm$ an hour depending on the actual moisture content of the maize) and 500 kg of maize of $\sim 16\%$ moisture content to below 13.5% within 90 minutes. Multiple batches can be handled per day depending on starting moisture levels and operating hours.

Table 1: EasyDry M500 Dryer attributes

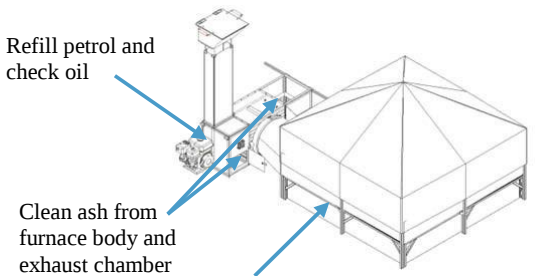
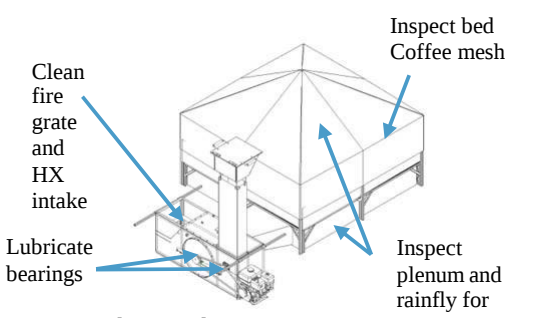
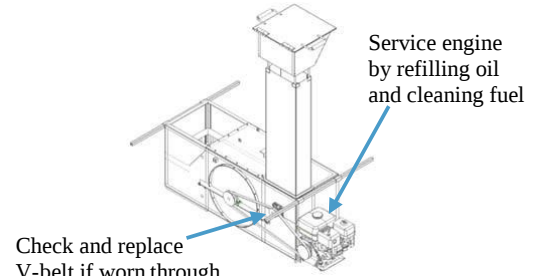
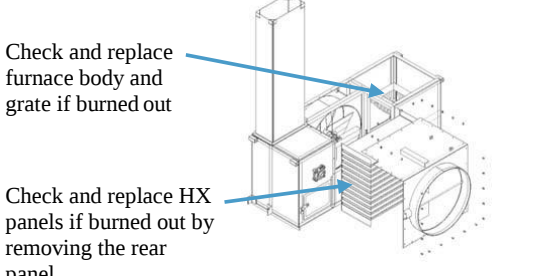
Attribute	Complete Dryer	Drying Air Supply Unit	Shallow-bed Unit
Tangible			
Size - Operation	 2.4 m (W) x 3.3 m (L) x 1.8 m (H)	 1.0 m (W) x 1.6 m (L) x 1.8 m (H)	 1.9 m (W) x 2.5 m (L) x 1.2 m (H)
Size - Transportation	 1.5 m (W) x 1.5 m (L) x 0.9 m (H)	 0.5 m (W) x 1.3 m (L) x 0.9 m (H)	 1.0 m (W) x 1.5 m (L) x 0.9 m (H)
Color/s	Various	Agricultural colors – Heat resistant	Stock PVC and Canvas Agricultural colors - Bed
Weight	190 kg	120 kg	70 kg
Material composition	Local, low cost material to promote sustainability	Mild Steel, Cast Iron, Plastic, Copper, Aluminum	Mild Steel, Canvas, Rubber, Leather, Plastic
Finish	Stock, Painted/ Painted Heat Resistant	Stock, Painted/ Painted Heat Resistant	Stock, Painted
Intangible			
Efficiency/Capacity	Dry 500 kg wet maize (+/- 20% moisture content) down to 13.5% in +/- four (4) hours (+/- 2 hours depending on actual moisture content of the maize)	Consumes 12 - 15 kg cobs and 450 ml petrol/hour.	Recommended capacity of 500 kg
Projected Durability/Longevity*	5 years	5 years	5 years**
Projected Maintenance Schedule		Lubricate bearings and check engine oil weekly, Service engine monthly, Replace HX panels every 2 years.	Repair lesions in canvas and coffee mesh as they occur.

* Durability/Longevity with proper care, maintenance and associated cost.

** Canvas plenum and coffee mesh may wear through first and may need repair/replacing more often.

2. Maintenance Schedule

Table 2: EasyDry M500 Dryer Maintenance Schedule

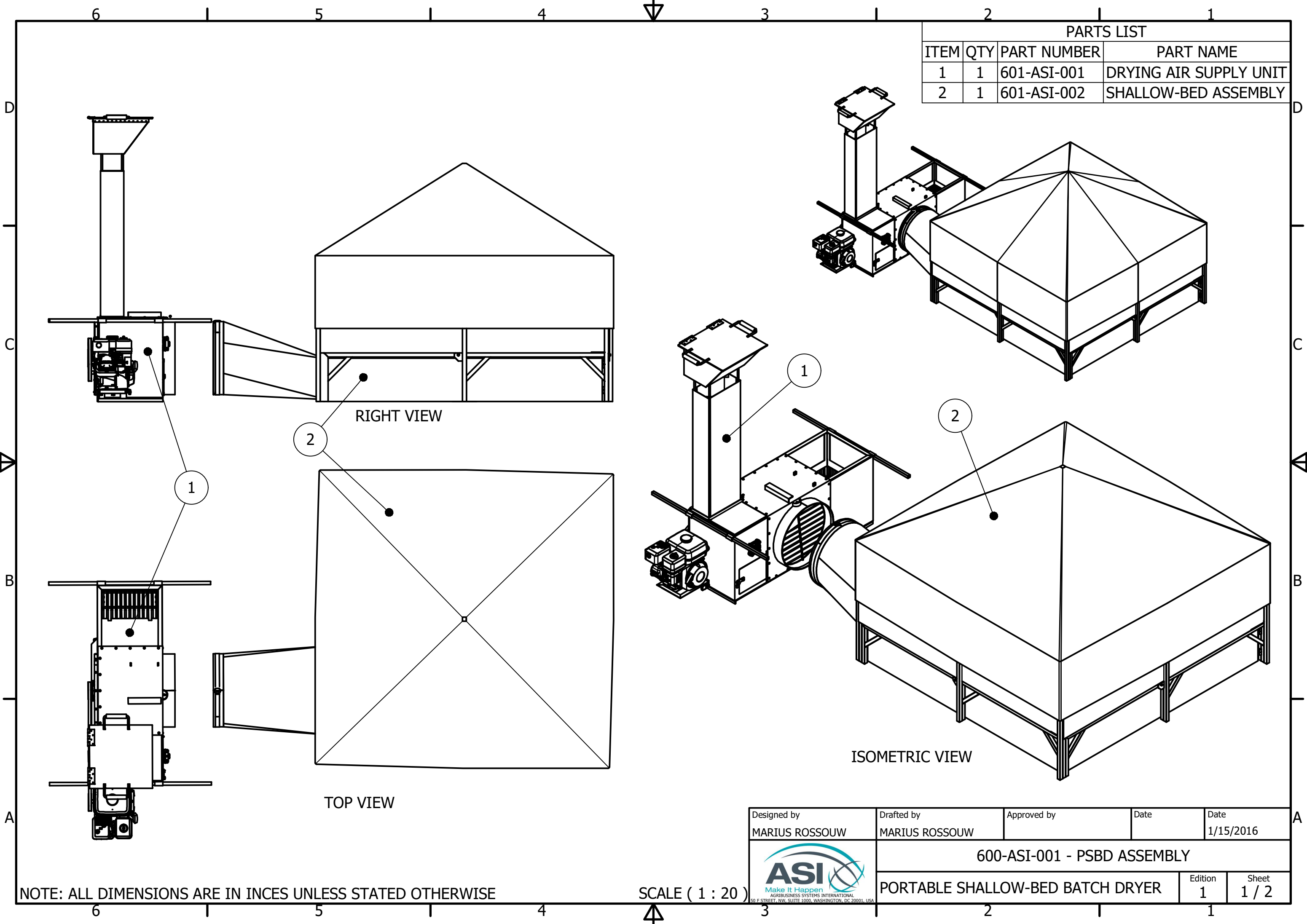
Daily Schedule:  • Refill petrol @ 0.45 l/hour of operation • Remove ash and charcoal • Clean plenum	Weekly Schedule:  • Lubricate bearings • Clean fire grate and HX intake • Check plenum and repair holes if required • Check bed mesh and repair holes if required
Monthly Schedule:  • Service engine. • Check v-belt.	Yearly Schedule:  • Check and replace HX panels if required. • Check and replace furnace body if required. • Check and replace fire grate if required. • Check and replace bed mesh.

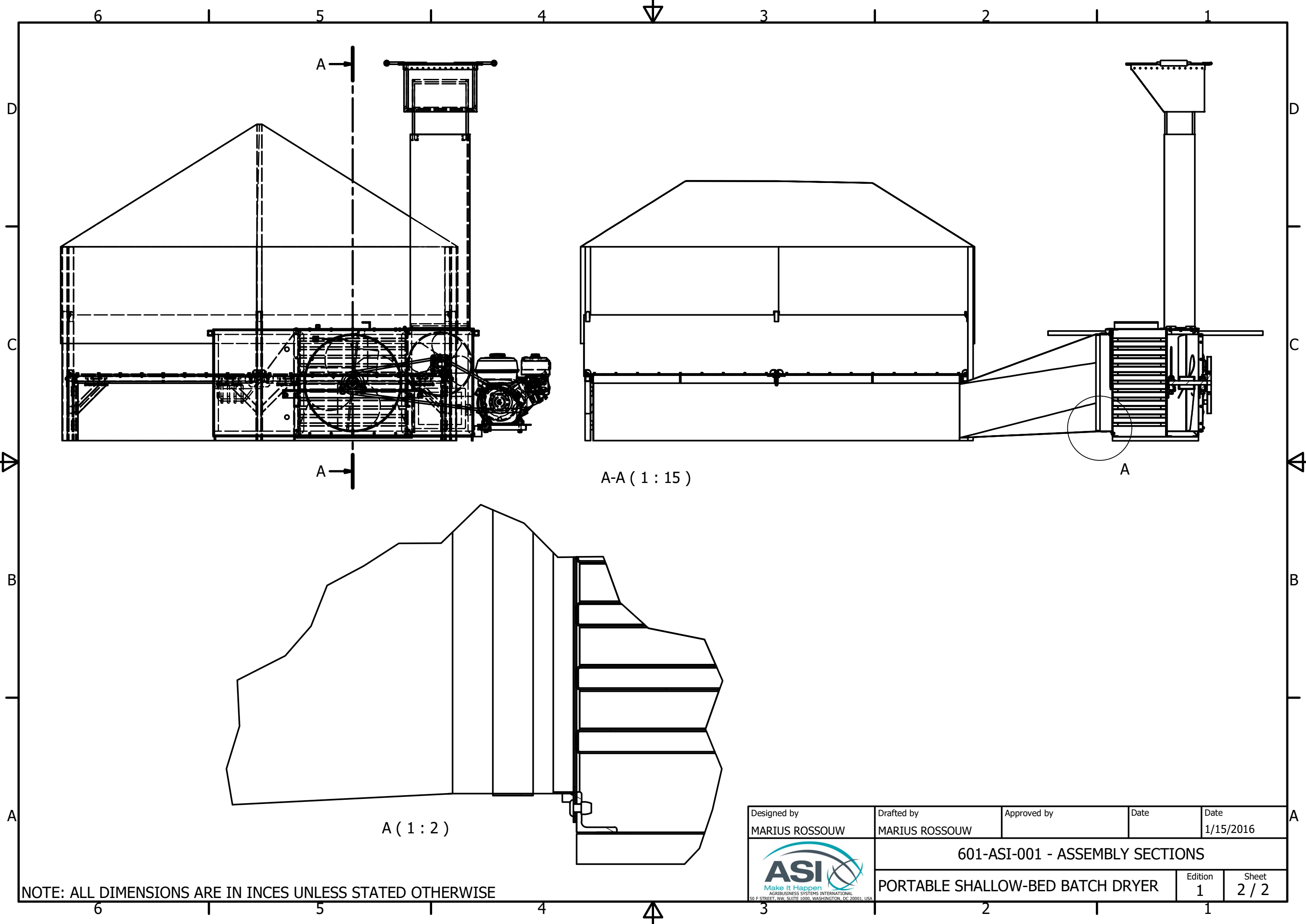
3. Engineering Drawing Schedule

Table 3: Portable Shallow-bed Batch Dryer Engineering Drawing Schedule

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NOTE: ALL DIMENSIONS ARE IN INCES UNLESS STATED OTHERWISE

Designed by MARIUS ROSSOUW	Drafted by MARIUS ROSSOUW	Approved by	Date 1/15/2016	Date 1/15/2016
601-ASI-001 - ASSEMBLY SECTIONS				
PORTABLE SHALLOW-BED BATCH DRYER			Edition 1	Sheet 2 / 2



