

# GEMSTAR-A™ Benchtop GAS Anneal



GEMSTAR™ *Meeting the challenge of high aspect ratio deposition over a broad range of substrates in a small package*

*Economical systems engineered for heavyweight tasks and lightweight budgets*

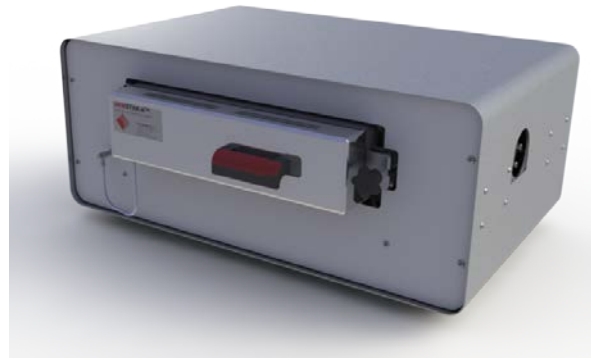
## GEMSTAR™ Benchtop Anneal

The product line anneals substrates in a vacuum controlled user selectable gas environment.

The uniformity of thin films can determine whether a process or device works, the system is designed to provide the user with the most uniform films possible even in challenging HAR through-hole applications.

Some key features of the system include:

- ◆ Up to 200mm sq substrates and 3D objects 60mm tall.
- ◆ Customizable end effector allows clean, simple and repeatable loading of substrates
- ◆ Up to 500°C dual zone process reactor with substrate thermal control to  $\pm 5^\circ\text{C}$
- ◆ Distributed gas delivery insures uniform gas distribution over the entire substrate
- ◆ System pressure monitoring
- ◆ All metal seal gas handling
- ◆ MFC controlled user selectable gas input
- ◆ CF 2.75 flange reactor interface for easy attachment of optional QCM or mass spectrometer



## GEMFlow™ Process Control

Precise films require state-of-the-art controls. Our system maintains control over key parameters such as exposure, purge, background pressure and temperature at all zones.

- ◆ User created/saved process recipes allows substrate to substrate and batch to batch consistency without sacrificing flexibility
- ◆ Diagnostic system logging allows creation of traceable data of all system parameters during all process runs
- ◆ Dell Vostro 3700 Laptop with Genuine Windows® 7 Professional 64-Bit
- ◆ Internal GEMStar USB control module

## Easy Maintenance

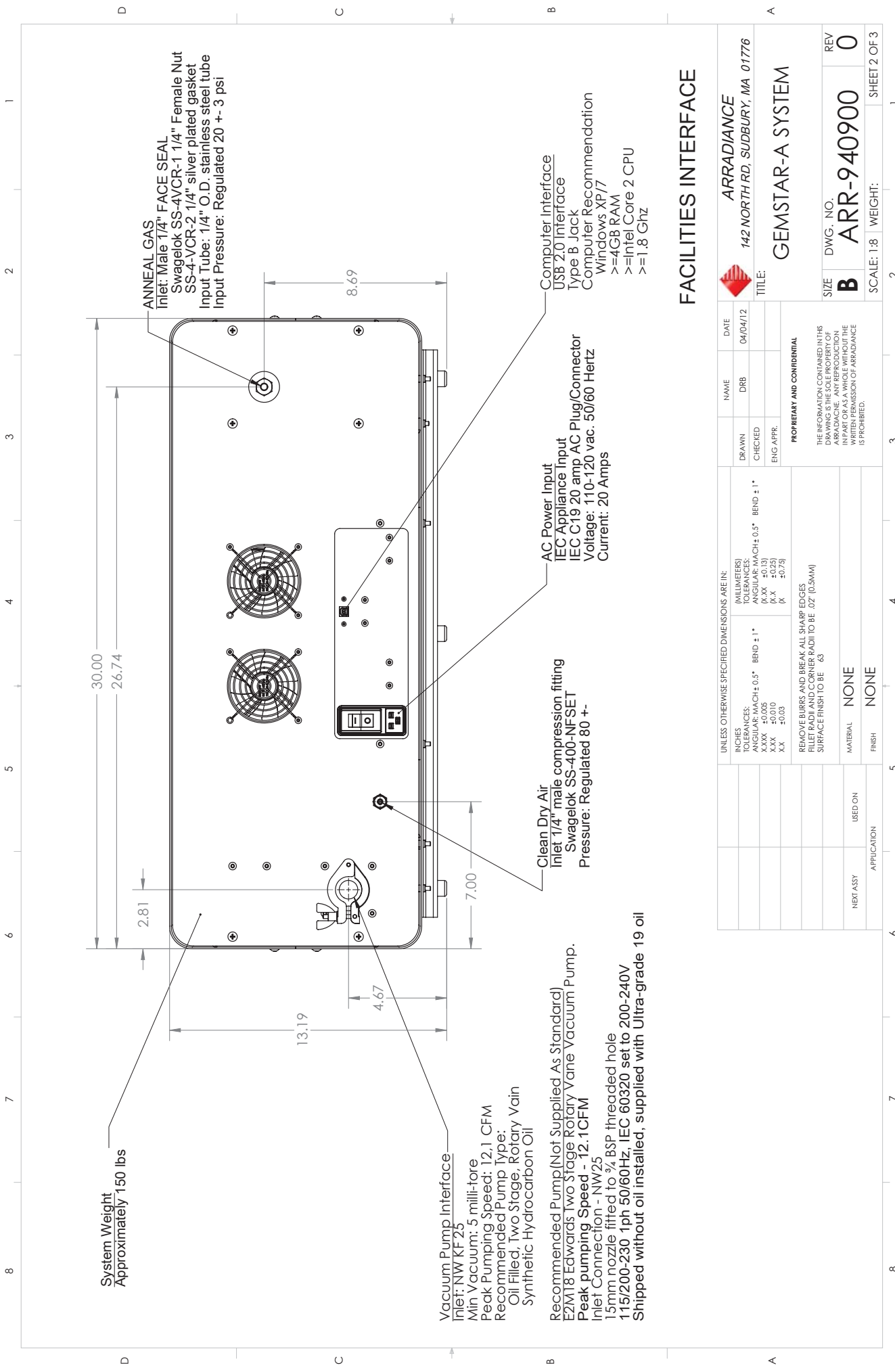
Simplified tool maintenance results from the use of a modular system design with benchtop access to all critical components

- ◆ Critical system components can be removed allowing for cleaning of unwanted contaminants with little down time.
- ◆ Rear access to vacuum, power and gas line connections
- ◆ Small system footprint and light weight allows benchtop placement in any lab environment

Molecular Innovation™

# GEMSTAR-A™ Benchtop GAS Anneal

ARR-940900 GEMSTAR-A Specifications	
Substrate Size	Up to 200mm Square Up to 50mm Thick 3-D solids Standard retained 200mm Ø end effector
Reactor area/volume	Approximately 250 in <sup>2</sup> / 132 in <sup>3</sup>
System Dimensions	32" W x 25" D x 12 H" (fits on a standard desktop or lab bench) Weight 150lbs
Reactor Thermal Control	1800W reactor zone with up to 500°C ± 1°C 300W door zone with up to 300°C ± 1°C <15 minutes from room temperature to 175°C
Carrier/Vent Gas Control	Script settable high speed mass flow controller (MFC) 0-200 SCCM calibrated
Control System	Dell Vostro 3700 Laptop with Genuine Windows® 7 Professional 64-Bit GEMFlow™ software suite providing user process scripting and logging Internal GEMStar USB control module
Shell/Cabinet	Tool removable top panel with rear facilities interface CF 2.75 Metrology/Custom Chamber Interface
Facilities Requirements (See Documentation)	
N2/Purge Gas	20 ± 5 psi High purity N <sub>2</sub> (>99.999%) N <sub>2</sub> purifier recommended
AIR	80 ± 5 psi regulated clean dry air
AC Power	IEC Appliance Input IEC C19 20 amp AC Plug/Connector Voltage: 110-120 vac. 50/60 Hertz Current: 20 Amps
Vacuum Port	NW KF 25 Recommended Vacuum Pump: 12 CFM Synthetic Hydrocarbon Oil, Two Stage, Rotary Vain



**System Weight**  
Approximately 150 lbs

**ANNEAL GAS**  
Inlet: Male 1/4" FACE SEAL  
Swagelok SS-4VCR-1 1/4" Female Nut  
SS-4-YCR-2 1/4" silver plated gasket  
Input Tube: 1/4" O.D. stainless steel tube  
Input Pressure: Regulated 20 +/- 3 psi

**Vacuum Pump Interface**  
Inlet: NW KF 25  
Min Vacuum: 5 milli-tore  
Peak Pumping Speed: 12.1 CFM  
Recommended Pump Type:  
Oil Filled, Two Stage, Rotary Vain  
Synthetic Hydrocarbon Oil


**Recommended Pump (Not Supplied As Standard)**  
E2M18 Edwards Two Stage Rotary Vane Vacuum Pump.  
Peak pumping Speed - 12.1 CFM  
Inlet Connection - NW25  
15mm nozzle fitted to 3/4" BSP threaded hole  
115/200-230 1ph 50/60Hz, IEC 60320 set to 200-240V  
Shipped without oil installed, supplied with Ultra-grade 19 oil

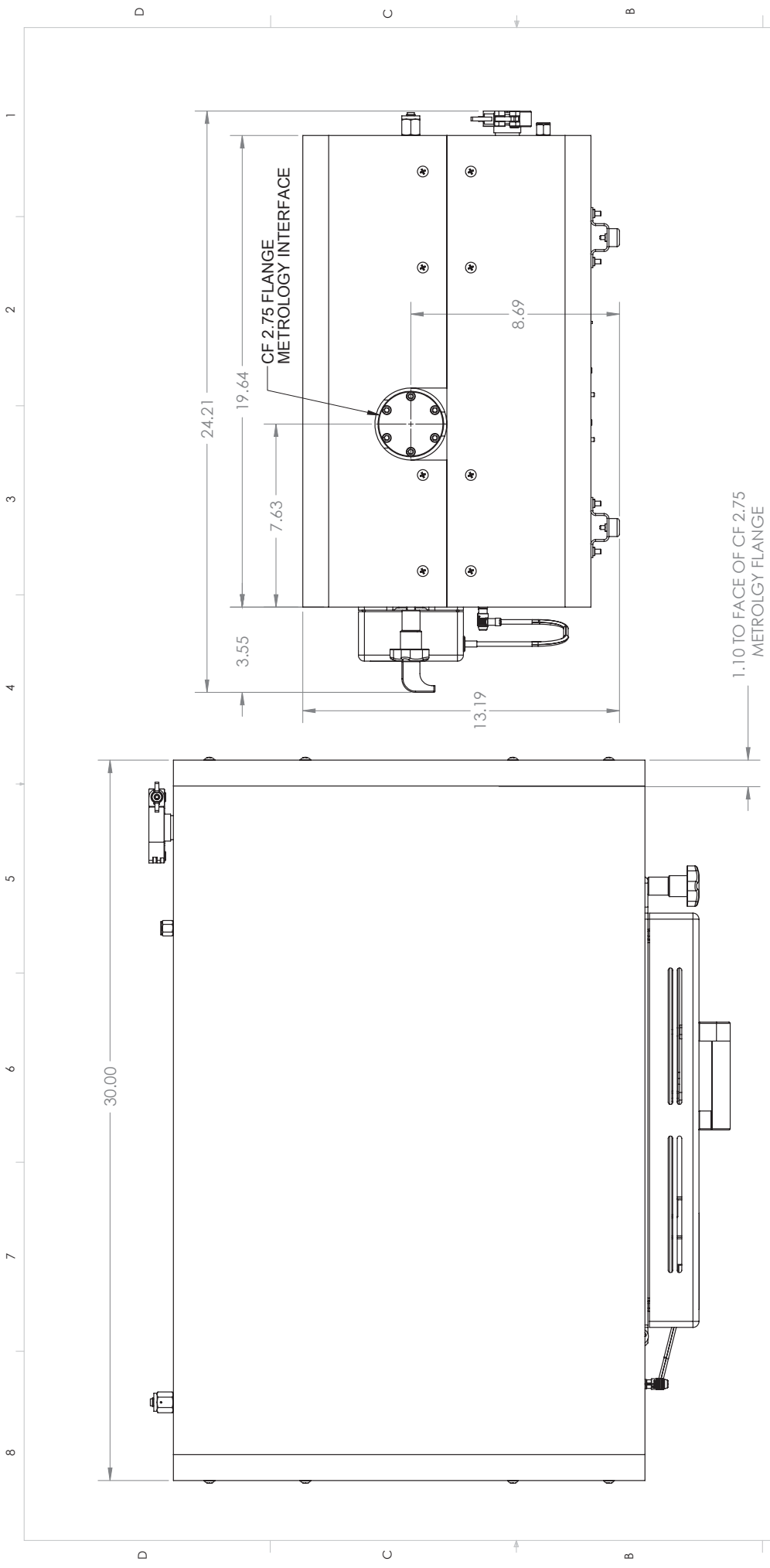
**Clean Dry Air**  
Inlet 1/4" male compression fitting  
Swagelok SS-400-NFSET  
Pressure: Regulated 80 +/-

**AC Power Input**  
IEC Appliance Input  
IEC C19 20 amp AC Plug/Connector  
Voltage: 110-120 vac. 50/60 Hertz  
Current: 20 Amps

**Computer Interface**  
USB 2.0 Interface  
Type B Jack  
Computer Recommendation  
Windows XP/7  
>=4GB RAM  
>=Intel Core 2 CPU  
>=1.8 Ghz

## FACILITIES INTERFACE

 <b>ARRADIANCE</b> 142 NORTH RD, SUDBURY, MA 01776		DATE 04/04/12
DRAWN DRB	NAME DRB	TITLE <b>GEMSTAR-A SYSTEM</b>
CHECKED ENG APPR.	DRAWN DRB	DATE 04/04/12
<b>PROPRIETARY AND CONFIDENTIAL</b> THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF ARRADIANCE. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF ARRADIANCE IS PROHIBITED.		
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN: INCHES: ANGULAR: MACH: ±0.5° BEND: ±1° MILLIMETERS: ANGULAR: MACH: ±0.5° BEND: ±1° XXXX ±0.005 (P.XX ±0.13) XXXX ±0.010 (P.XX ±0.25) XX ±0.03 (P ±0.75)		
REMOVE BURRS AND BREAK ALL SHARP EDGES FILE ALL SHARP CORNER RADI TO BE .02 (0.5MM) SURFACE FINISH TO BE .63		
NEXT ASSTY	MATERIAL NONE	FINISH NONE
APPLICATION	USED ON	NONE
SCALE: 1:8	WEIGHT:	SHEET 2 OF 3
SIZE <b>B</b>	DWG. NO. <b>ARR-940900</b>	REV <b>0</b>



# METROLOGY INTERFACE

<b>ARRADIANCE</b> 142 NORTH RD, SUDBURY, MA 01776		DATE 04/04/12
<b>GEMSTAR-A SYSTEM</b>		TITLE:
SIZE <b>B</b>		DWG. NO. <b>ARR-940900</b>
REV <b>0</b>		SHEET 3 OF 3
SCALE: 1:8		WEIGHT:
<b>PROPRIETARY AND CONFIDENTIAL</b> THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF ARRADIANCE. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF ARRADIANCE IS PROHIBITED.		
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN: INCHES DECIMALS ANGLES DECIMALS X.XXX ±0.005 XXX ±0.010 XX ±0.03	(MILLIMETERS) ANGLES DECIMALS ANGULARS ±0.05° BEND ± 1° (X.XX ±0.13) (X.X ±0.25) (X ±0.75)	NAME DRB
REMOVE BURRS AND BREAK ALL SHARP EDGES FILE ALL SHARP CORNER RADI TO BE .02 (0.5MM) SURFACE FINISH TO BE .63	MATERIAL NONE	DRAWN CHECKED ENG. APPR.
NEXT ASSTY	USED ON	PROPRIETARY AND CONFIDENTIAL
APPLICATION	FINISH NONE	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF ARRADIANCE. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF ARRADIANCE IS PROHIBITED.