user manual

GD2000
Slab Gel Dryer

Vacuum Gel Dryer System

um GD2000-IM/Rev.B0/07-12

Hoefer®

Contents

Important Information – English

- If this equipment is used in a manner not specified by Hoefer, Inc. the protection provided by the equipment may be impaired.
- This instrument is designed for indoor laboratory use only.
- Only accessories and parts approved or supplied by Hoefer, Inc. may be used for operating, maintaining, and servicing this product.
- Warning! Because this instrument can develop sufficient voltage and current to produce a lethal shock, care must be exercised in its operation.
- This instrument is designed in accordance with the EN61010-1:2001 electrical safety standard. Nevertheless, it should be used only by properly trained operators. Read this entire manual before using the instrument and use only according to the instructions.
- The instrument must always be used with the earth lead of the power cord correctly grounded to earth at the mains outlet.
- Use only undamaged electrical wire and equipment specific for the voltages you will use. All equipment connected to high voltage should be in accordance with EN61010-1:2001.
- Keep the instrument as dry and clean as possible. Wipe regularly with a soft, damp cloth. Let the instrument dry completely before use.
- Do not operate the instrument in extreme humidity (above 80%). Avoid condensation by letting the unit equilibrate to ambient temperature when taking the instrument from a colder to a warmer environment.
- To permit sufficient cooling, ensure that the vents of the instrument are not covered.

Duležité Informace – Czech

- Pokud by toto zařízení je použito způsobem, který není podle Hoefer, ochrana poskytovaná na základě Inc. zařízení může být narušena.
- Tento nástroj je určen pro vnitřní použití v laboratoři pouze.
- Pouze příslušenství a části schválen, nebo poskytnutých Hoefer, Inc. mohou být použity pro provoz, údržbu, a údržbě tohoto výrobku.
- Pozor! Protože tento nástroj může vyvinout dostatečný napětí a proud, který má vyrábět a smrtiacej šok, péče musí být vykonávána v jeho provoz.
- Tento nástroj je určen v souladu s EN61010-1:2001 elektrické bezpečnostní normy. Přesto, že by měly být použity pouze řádně vyškolený operátorů. Číst celé toto ruční před použitím nástroje a použití pouze v souladu s pokyny.
- Přístroj musí být vždy používají se na výkonu zemi vést šňůra správně zemněny k zemi na síti výústce.
- Využití pouze nepoškozené elektrické dráty a vybavení pro napětí budete používat. Všechna zařízení spojené s vysokým napětím by měla být v souladu s EN61010-1:2001.
- Si ponechá nástroje jako suchý a čistý jako možné. Otřete pravidelně s a měkké, vlhkým hadříkem. Nechť je nástroj nenastavený úplně před použitím.
- Nejsou provozována na nástroj v extrémní vlhkost (nad 80%). Předešlo kondenzaci o pronájmu jednotky na okolní teplotu nechá při přijímání nástroj z chladnější do teplého prostředí.
- Pro umožnění dostatečné chlazení, zajistit, aby otvory nástroje jsou nevztahuje.

Vigtig Information – Danish

- Hvis dette udstyr bruges i en måde ikke specificeret ved Hoefer, Inc. den beskyttelse, som er blevet forsynet af udstyret kan måske svækkes.
- Dette instrument er designet for indendørs laboratoriumbrug bare.
- Bare tilbehør og del godkendede eller forsynede ved Hoefer, Inc. kan måske bruges for drive, funktionsfejl, og betjening dette produkt.
- Advare! Fordi dette instrument kan udvikle tilstrækkelig spænding og strøm at fremstille et dødbringende chok, skal pleje bruges i dets drift.
- Dette instrument er designet i overensstemmelse med EN61010-1:2001 elektrisk sikkerhedstandard. Alligevel, skulle det bruges bare af passende trænede operatører. Læs denne hel håndbog før bruging instrumentet og brug bare i henhold til instruktionerne.
- Instrumentet skal altid bruges med jordblyet af netledningen rigtigt jordede til jord på hovedledningsudløbet.
- Bruger bare uskadt elektrisk tråd og udstyr, som være specifik for spændingerne du vil bruge. Alt udstyr forbundet til høj spænding skulle være i overensstemmelse med EN61010-1:2001.
- Beholder instrumentet så tør og ren som mulig. Tør regulært med et blødt, fugtigt stof. Lad instrumenttørken komplet før brug.
- Driver ikke instrumentet i yderst fugtighed (ovenfor

80%). Undgå kondensation ved lade enheden equilibrate til omgivende temperatur ved tageen instrumentets fra et koldere til et varmere miljø.

- At tillade tilstrækkelig afkøling, forsikrer, at lufthullerne af instrumentet er ikke dækket.

Belangrijke Informatie – Dutch

- Indien deze uitrusting in een manier wordt gebruikt die niet door Hoefer is gespecificeerd, Nv. de bescherming die door de uitrusting is verzorgd kan worden geschaad.
- Dit instrument is voor binnenlaboratoriumgebruik enkel ontworpen.
- Enkel onderdelen en delen keurden goed of leverden door Hoefer, Nv. kan voor het bedienen worden gebruikt, handhavend en onderhouden van dit product.
- Waarschuwend! Omdat dit instrument voldoende spanning en stroom kan ontwikkelen om een dodelijke schok te produceren, moet zorg in zijn operatie worden geoefend.
- Dit instrument is in overeenstemming met de EN61010-1:2001 elektrische veiligheidsstandaard ontworpen. Niettemin zou het enkel door goed getrainde bedieningslieden moeten worden gebruikt. Lees dit volledige handboek voor het gebruik het instrument en gebruik enkel volgens de instructies.
- Het instrument moet altijd met de aardeleiding van het stroomsnoer correct grondde naar aarde aan het hoofdafzetgebied worden gebruikt.
- Gebruik enkel onbeschadigde elektrische draad en uitrustings specifiek voor de spanningen u zult gebruiken. Alle uitrustingen sloten aan aan hoogspanning zou in overeenstemming met EN61010-1:2001 moeten zijn.
- Houd het instrument zo droge en schone zoals mogelijk Bij. Wis regelmatig met een zacht, temper doek. Verhuur het instrument droogt volledig voor het gebruik.
- Bedien niet het instrument in extreme vochtigheid (bovenstaande 80%). Vermijd condensatie door het verhuren van de eenheid in evenwicht brengt naar omgevingstemperatuur wanneer nemen het instrument van een kouder naar een lievere omgeving.
- Om toe te staan voldoende afkoelen, verzeker dat de luchtopeningen van het instrument niet bedekt zijn.

Tärkeää Tietoa – Finnish

- Jos tätä varusteita käytetään tavassa ei määritetty Hoeferille, Inc. suojelu ehkäisty varusteille saattaa olla avuton.
- Tämä väline suunnitellaan sisälaboratoriokäytölle vain.
- Vain lisävarusteet ja osat hyväksyivät tai toimitti Hoeferin oheen, Inc.:ää voi käyttää käyttämiselle, valvoalle, ja servicing tämä tuote.
- Varoittaminen! Koska tämä väline voi kehittää riittävä jännitteen ja virran tuottaa kuolettavan järkytyksen, huolta täytyy harjoittaa toiminnossaan.
- Tämä väline suunnitellaan EN61010-1:2001 sähköturvallisuusstandardin mukaisesti. Silti pitäisi käyttää vain ohi oikeasti koulutetut käyttäjät. Lue tämä kokonainen manuaalinen ennen välinettä ja käyttö vain ohjeiden mukaan.
- Välinettä täytyy käyttää aina valtanuoran maalyijystä perusti oikein maadoittaa sähköverkkoaukossa.
- Käyttää vain undamaged sähkömetallilankaa ja varusteita, täsmällinen jännitteille käyttää. Kaikki varusteet yhdistetty korkeaan jännitteeseen pitäisi olla EN61010-1:2001IN mukaisesti.
- Pitää välineen yhtä kuiva ja puhdas kuin mahdollinen. Pyyhi säännöllisesti pehmeällä, kostealla kankaalla. Anna väline kuivua täysin ennen käyttöä.
- Ei käytä välinettä extreme-ilmankosteudessa (80%)n yläpuolella. Vältä tiivistymistä antamalla yksikön equilibrate ympäröivään lämpötilaan kun ottaminen väline kylmempi lämpimämpään ympäristöön.
- Sallia riittävän jäähdyttäminen, varmistaa että välineen ilmareiät peitetään.

Information Importante – French

- Si cet équipement est utilisé dans une manière pas spécifié par Hoefer, Inc. la protection fourni par l'équipement pourrait être diminuée.
- Cet instrument est conçu pour l'usage de laboratoire intérieur seulement.
- Seulement les accessoires et les parties ont approuvé ou ont fourni par Hoefer, Inc. pourrait être utilisé pour fonctionner, maintenir, et entretenir ce produit.
- Avertissant! Parce que cet instrument peut développer la tension et le courant suffisants pour produire un choc mortel, le soin doit être exercé dans son opération.
- Cet instrument est conformément conçu à l'EN61010-1:2001 norme de sécurité électrique. Néanmoins,

il devrait être seulement utilisé par les opérateurs convenablement entraînés. Lire ce manuel entier avant utiliser l'instrument et l'usage seulement selon les instructions.

- L'instrument toujours doit être utilisé avec l'avance de terre du cordon d'alimentation correctement a fondé à la terre à la sortie principale.
- Utiliser le fil et l'équipement électriques seulement intacts spécifiques pour les tensions que vous utiliserez. Tout équipement connecté à haute tension devrait être conformément à EN61010-1:2001.
- Garder l'instrument aussi sec et propre comme possible. Essuyer régulièrement avec un doux, étouffer du tissu. Laisser l'instrument sèche complètement avant l'usage.
- Ne pas fonctionner l'instrument dans l'extrême humidité (au-dessus de 80%). Eviter la condensation en laissant l'equilibrate d'unité à la température ambiante en prenant l'instrument d'un plus froid à un environnement plus chaud.
- Permettre le refroidissement suffisant, garantir que les conduits de l'instrument ne sont pas couverts.

Wichtige Informationen – German

- Wenn diese Ausrüstung gewissermaßen nicht angegeben durch Hoefer, Inc verwendet wird, kann der durch die Ausrüstung zur Verfügung gestellte Schutz verschlechtert werden.
- Dieses Instrument wird für den Innenlaborgebrauch nur dafür entworfen.
- Nur Zusätze und Teile genehmigten oder lieferten durch Hoefer, Inc kann für das Funktionieren, das Aufrechterhalten, und die Wartung dieses Produktes verwendet werden.
- Die Warnung! Weil dieses Instrument genügend Stromspannung und Strom entwickeln kann, um einen tödlichen Stoß zu erzeugen, muss Sorge in seiner Operation ausgeübt werden.
- Dieses Instrument wird in Übereinstimmung mit dem EN61010-1:2001 elektrischen Sicherheitsstandard dafür entworfen. Dennoch sollte es nur von richtig erzogenen Maschinenbedienern verwendet werden. Lesen Sie dieses komplette Handbuch vor dem Verwenden des Instrumentes und verwenden Sie nur gemäß den Instruktionen.
- Das Instrument muss immer mit der Erdleitung der Macht-Schnur richtig niedergelegt zur Erde am Hauptausgang verwendet werden.
- Nur unbeschädigte elektrische Leitung und Ausrüstung spezifisch für die Stromspannungen verwenden, die Sie verwenden werden. Die ganze mit der Hochspannung verbundene Ausrüstung sollte in Übereinstimmung mit EN61010-1:2001 sein.
- Das Instrument ebenso trocken halten und reinigen wie möglich. Wischen Sie regelmäßig mit einem weichen, befeuchten Sie Stoff. Lassen Sie das Instrument trocken völlig vor dem Gebrauch.
- Das Instrument in der äußersten Feuchtigkeit (über 80 %) nicht bedienen. Vermeiden Sie Kondensation, die Einheit equilibrate zur Umgebungstemperatur laßend, wenn Sie das Instrument von einem kälteren bis eine wärmere Umgebung nehmen.
- Um das genügend Abkühlen zu erlauben, stellen Sie sicher, dass die Öffnungen des Instrumentes nicht bedeckt werden.

Informazioni Importanti – Italiano

- Se quest'apparecchiatura è usata in un modo specificato da Hoefer, Inc. la protezione fornito dall'apparecchiatura potrebbe essere indebolita.
- Questo strumento è disegnato per l'uso di laboratorio interno solo.
- Solo gli accessori e le parti hanno approvato o hanno fornito da Hoefer, Inc. potrebbe essere usato per operare, per mantenere, e per revisionare questo prodotto.
- Avvertendo! Perché questo strumento può sviluppare il voltaggio sufficiente e la corrente di produrre una scossa letale, la cura deve essere esercitata nella sua operazione. Questo strumento è disegnato conformemente all'EN61010-1:2001 la norma di sicurezza elettrica. Tuttavia, dovrebbe essere usato degli operatori solo correttamente addestrati. Leggere questo manuale intero prima di usare lo strumento e l'uso solo secondo le istruzioni.
- Lo strumento deve essere sempre usato col piombo di terra della spina di alimentazione correttamente hanno messo a terra alla terra alla presa di corrente principale.
- Usa il filo metallico e l'apparecchiatura solo intatti elettrici specifici per i voltaggi che lei userà. Tutta l'apparecchiatura collegata all'alto voltaggio dovrebbe essere conformemente a EN61010-1:2001.
- Tiene lo strumento come secco e pulito come possibile. Pulire regolarmente con un morbido, per spegnere il panno. Lasciare lo strumento asciuga completamente prima dell'uso.
- Non opera lo strumento nell'umidità estrema (al di sopra di 80%). Evitare la condensazione lasciando

l'unità equilibra alla temperatura ambiente quando portare lo strumento da un più freddo a un ambiente più caldo.

- Di permettere raffreddare sufficiente, assicura che gli sbocchi dello strumento non sono coperti.

Viktig Informasjon – Norwegian

- Hvis dette utstyret blir brukt i en måte ikke spesifisert ved Hoefer, Inc. beskyttelsen som ha blitt git av utstyret kan bli svekket.
- Dette instrumentet er utformet for innendørs laboratoriumbruk bare.
- Bare tilbehør og deler godkjente eller forsynte ved Hoefer, Inc. kan bli brukt for drive, vedlikeholde, og betjene dette produktet.
- Varsler ! Fordi dette instrumentet kan utvikle tilstrekkelig spenning og strøm til å produsere et dødelig sjokk, må bli øvd bekymring i dets drift.
- Dette instrumentet er utformet i samsvar med EN61010-1:2001 elektrisk sikkerhetsstandard. Likevel burde bli brukt det bare av skikkelig utdannede operatører. Les denne hele håndboken før bruking instrumentet og bruken bare gi til instruksjonene.
- Instrumentet må alltid bli brukt med jorden blyet av kraftkabelen som riktig ha blitt jordet til jord på hovedledningen utløp.
- Bruker bare uskadd elektrisk ledningsfremføring og utstyr som er spesifikk for spenningene du vil bruke. All utstyr koplet til høyspenning burde være i samsvar med EN61010-1:2001.
- Beholder instrumentet som tørker og rengjør som mulig. Visk regulært med et mykt, fuktig stoff. La instrumentet tørker komplett før bruk.
- Driver instrumentet i ekstrem fuktighet ikke (ovenfor 80%). Unngå kondensasjon ved å la enheten equilibrate til omgivelsestemperatur ved taen instrumentets fra et kaldere til et varmere miljø.
- Til å tillate tilstrekkelig kjølig, sikrer at ventilasjonsåpningene av instrumentet er ikke dekket.

Wazne Informacje – Polish

- Jeżeli ten sprzęt jest wykorzystywany w sposób nie określone przez Hoefer, Inc. do ochrony przewidzianej przez urządzenie może zostać obniżony.
- Instrument ten jest przeznaczony do użytku w laboratoriach kryty tylko.
- Tylko akcesoriów i części zatwierdzone lub dostarczone przez Hoefer, Inc. mogą być wykorzystane do eksploatacji, utrzymania i obsługi tego produktu.
- Uwaga! Ponieważ ten akt prawny może być rozwinięcie odpowiednich napięcie i bieżących do wyprodukowania śmiertelnego szoku, opiekę musi być wykonywane w działaniu.
- Ten instrument został zaprojektowany zgodnie z tym EN61010-1: 2001 Bezpieczeństwo elektryczne standard. Niemniej jednak, należy stosować jedynie przez odpowiednio przeszkoleni operatorów. Znajdą państwo to cały podręcznika przed zastosowaniem instrumentu i stosować jedynie zgodnie z instrukcjami.
- Instrument musi zawsze być wykorzystane z ziemi doprowadzić do zasilania detonującego właściwie uzasadnione na ziemię w sieci wodociągowej rynku zbytu.
- Wykorzystanie tylko nieuszkodzona elektrycznych drutów i urządzenia specjalne do napięć zapłacą wykorzystania. Wszystkie urządzenia podłączone do wysokiego napięcia powinny być zgodne z EN61010-1: 2001.
- Kontrolować instrumentu jako suche i czyste jak to możliwe. Wytrzeć regularnie przy pomocy miękkiego wilgotnej szmatki. Niech się instrumentem całkowicie wysuszyć przed użyciem.
- Nie prowadzą do instrumentu w skrajnych wilgotności (powyżej 80%). Zapobiec kondensacji najmu przez jednostkę równoważyć do temperatury pokojowej przy podejmowaniu instrumentu z chłodniejsze w cieplejszych środowiska.
- Aby umożliwić wystarczające chłodzenia, zapewniają, że rozcięcia of the instrument nie objęte ubezpieczeniem.

Informações Importantes – Portuguese

- Se este equipamento é usado numa maneira não especificada por Hoefer, Inc. que a protecção fornecida pelo equipamento pode ser comprometida.
- Este instrumento é projectado para uso de interior de laboratório só. Só acessórios e partes aprovaram ou forneceu por Hoefer, Inc. pode ser usada para operar, manter, e servicing este produto.
- Advertindo! Porque este instrumento pode desenvolver voltagem suficiente e corrente produzir um choque letal, cuidado deve ser exercitado em

sua operação.

- Este instrumento é projectado de acordo com o EN61010-1:2001 condição de segurança eléctrica. Não obstante, deve ser usado só por operadores adequadamente treinados. Leia este manual inteiro antes de usar o instrumento e use só de acordo com as instrucções.
- O instrumento sempre deve ser usado com o chumbo de terra do cordão de poder corretamente baseou a terra nos canos saída principais.
- Usa fio eléctrico só intacto e equipamento específico para as voltagens que você usará. Todo equipamento conectado a voltagem alta deve ser de acordo com EN61010-1:2001.
- Mantem o instrumento tão seco e limpo como possível. Limpe regularmente com um pano húmido macio. Deixe o instrumento secar completamente antes de uso.
- Não opera o instrumento em humidade extrema (acima de 80%). Evite condensação deixando o equilibrate de unidade a temperatura ambiental quando tomar o instrumento de um mais frio a um ambiente mais quente.
- Permitir esfriar suficiente, assegura que as aberturas do instrumento não são cobertas.

Información Importante – Spanish

- Si este equipo es utilizado en una manera no especificado por Hoefer, S.a. la protección proporcionado por el equipo puede ser dañada.
- Este instrumento es diseñado para el uso interior del laboratorio sólo. Sólo accesorios y partes aprobaron o suministraron por Hoefer, S.a. puede ser utilizado para operar, para mantener, y para atender a este producto.
- Advirtiendo! Porque este instrumento puede desarrollar voltaje y corriente suficientes para producir un golpe mortal, el cuidado debe ser ejercitado en su operación.
- Este instrumento es diseñado de acuerdo con el EN61010-1:2001 estándar eléctrico de seguridad. No obstante, debe ser utilizado sólo por operarios adecuadamente capacitados. Lea este manual entero antes de utilizar el instrumento y el uso sólo según las instrucciones.
- El instrumento siempre debe ser utilizado con el plomo de la tierra del cable de alimentación molió correctamente a la tierra en la salida de red.
- Utiliza alambre y equipo eléctricos sólo ilesos específicos para los voltajes que usted utilizará. Todo equipo conectado al voltaje alto debe ser de acuerdo con EN61010-1:2001.
- Mantiene el instrumento tan seco y limpio como posible. Enjugue regularmente con un suave, el trapo húmedo. Permita que el instrumento seque completamente antes de uso.
- No opera el instrumento en la humedad extrema (encima de 80%). Evite condensación permitiendo la unidad equilibra a la temperatura ambiente al tomar el instrumento de un más frío a un ambiente más tibio.
- Permitir refrigeración suficiente, asegure que las aberturas del

Viktig Information – Swedish

- om denna utrustning används i ett sätt som inte har specificeras av Hoefer, Inc. skyddet tillhandahöll vid utrustningen kan skadas.
- Detta instrument formges för inomhuslaboratorium användning bara.
- Bara medhjälpare och delar godkände eller levererade vid Hoefer, Inc. kan användas för fungera, underhålla, och servicing denna produkt.
- varna! Därför att detta instrument kan utveckla tillräcklig spänning och ström att producera en dödlig stöt, måste övas omsorg i dess funktion.
- Detta instrument formges i överensstämmelse med EN61010-1:2001 elektriska säkerheten standarden. Icke desto mindre, bör det användas bara av riktigt utbildade operatörer. Läs denna hela handbok före använda instrumentet och använd bara enligt undervisningarna.
- Instrumentet måste alltid användas med jorden blyet av kraften repet riktigt grounded till jorden på det huvudutloppet.
- Använder bara undamaged elektrisk tråd och utrustning specifik för spänningarna du ska använda. All utrustning kopplats som till hög spänning skulle vara i överensstämmelse med EN61010-1:2001.
- Håller instrumentet då torkar och rengör som möjlig. Torka regelbundet med en mjuk, fuktig trasa. Låt instrumentet torka fullständigt före användningen.
- Fungerar inte instrumentet i extrem fuktighet (över 80%). Undvik kondensering vid låta enheten equilibrate till omgivande temperatur när ta instrumentet från en kallare till en varmare miljö.
- Att tillåta tillräcklig kyla, ser till att hålen av instrumentet inte täcks.

Waste Electrical and Electronic Equipment (WEEE)

English 

This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.

French 

Ce symbole indique que les déchets relatifs à l'équipement électrique et électronique ne doivent pas être jetés comme les ordures ménagères non-triées et doivent être collectés séparément. Contactez un représentant agréé du fabricant pour obtenir des informations sur la mise au rebut de votre équipement.

German 

Dieses Symbol kennzeichnet elektrische und elektronische Geräte, die nicht mit dem gewöhnlichen, unsortierten Hausmüll entsorgt werden dürfen, sondern separat behandelt werden müssen. Bitte nehmen Sie Kontakt mit einem autorisierten Beauftragten des Herstellers auf, um Informationen hinsichtlich der Entsorgung Ihres Gerätes zu erhalten.

Italian 

Questo simbolo indica che i rifiuti derivanti da apparecchiature elettriche ed elettroniche non devono essere smaltiti come rifiuti municipali indifferenziati e devono invece essere raccolti separatamente. Per informazioni relative alle modalità di smantellamento delle apparecchiature fuori uso, contattare un rappresentante autorizzato del fabbricante.

Spanish 

Este símbolo indica que el equipo eléctrico y electrónico no debe tirarse con los desechos domésticos y debe tratarse por separado. Contacte con el representante local del fabricante para obtener más información sobre la forma de desechar el equipo.

Swedish 

Denna symbol anger att elektriska och elektroniska utrustningar inte får avyttras som osorterat hushållsavfall och måste samlas in separat. Var god kontakta en auktoriserad tillverkarrepresentant för information angående avyttring av utrustningen.

1. Gel Dryer function and description

The Hoefer® GD2000 Slab Gel dryer rapidly dries acrylamide and agarose gels and permanently bonds them to filter paper or transparent porous cellophane. This is accomplished by heating the gel slab while simultaneously drawing away released moisture with an external vacuum pump. The dryer accommodates one large (34 × 44 cm) gel, up to four standard (14 × 16 cm) gels, or twelve mini (8 × 10 cm) gels.

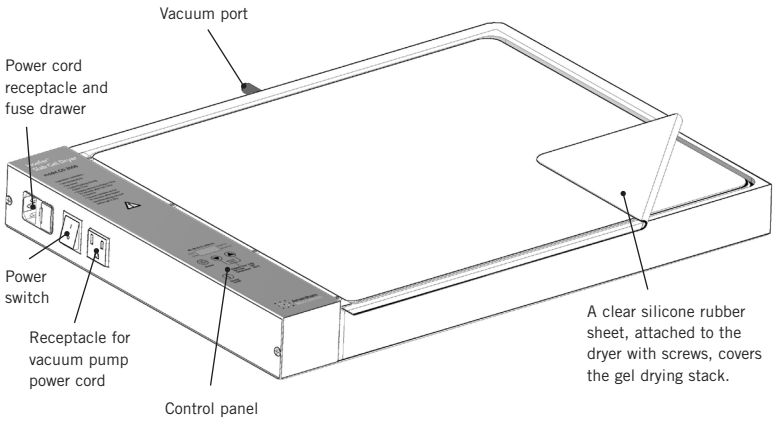


Fig 1. Features of the GD2000 Slab Gel Dryer.

- For a description of the dryer controls, see page 5.
- For diagrams of recommended drying stacks, see Fig 3 on page 9, Fig 4 on page 10, and Fig 5 on page 11.

Design Features

Drying surface

The PTFE coated, cast aluminum platen is resistant to acidic fumes that may be released while drying certain types of gels. A grid of vacuum conduits on the surface allows released moisture to be pulled away.

Vacuum port

Accepts vacuum tubing of 9-mm (3/8") ±1 mm i.d. The port for the external vacuum source is at the back of the instrument, at the center of the platen.

Mains power

The mains power module houses the power cord receptacle and one or two input fuses.

115 V~ One F 12 A, 250 V, 3 AG fuse

230 V~ Two T 6.3 A, 250 V, 5 × 20 mm

See “Care and maintenance” on page 17 for an illustration of the mains power module.

Vacuum power cord receptacle

Connects the vacuum pump to the vacuum timer.

115 V~, 50/60 Hz. Accommodates pumps that draw up to 5 A.

230 V~, 50/60 Hz. Accommodates pumps that draw up to 2.5 A.

2. Unpacking the GD2000

Carefully unwrap all packages and compare the items received with the packing list, making sure all items arrived. If any part is missing, contact your local Hoefer, Inc. sales office. Inspect all components for damage that may have occurred while the unit was in transit. If any part appears damaged, contact the carrier immediately. Be sure to keep all packing material for damage claims or to use in case you need to return the unit.

Setting Up the Vacuum System

The vacuum system must include a vacuum pump capable of moving an air volume of at least 1.5 m^3/h, but not more than 6 m^3/h. Rotary-vane-type pumps require both a chemical vapor trap and a cold trap (set to maximum cooling) to remove vapors that may damage the pump.

Note: We recommend a diaphragm vacuum pump such as the VP200 because the pump is chemically resistant to the liquids and vapors removed from the gel during drying. A water aspirator or house vacuum is insufficient for gel drying.

If you are using the VP200 Chemistry Diaphragm Pump, no traps are required because the pump is constructed of chemically resistant materials and is equipped with two vapor trap flasks. A cold trap is optional but can be installed to control the amount of vapor released to the atmosphere.

❶

Attach the vacuum tubing (9 mm ± 1 mm i.d.) from the vacuum pump to the vacuum port on the GD2000.

❷

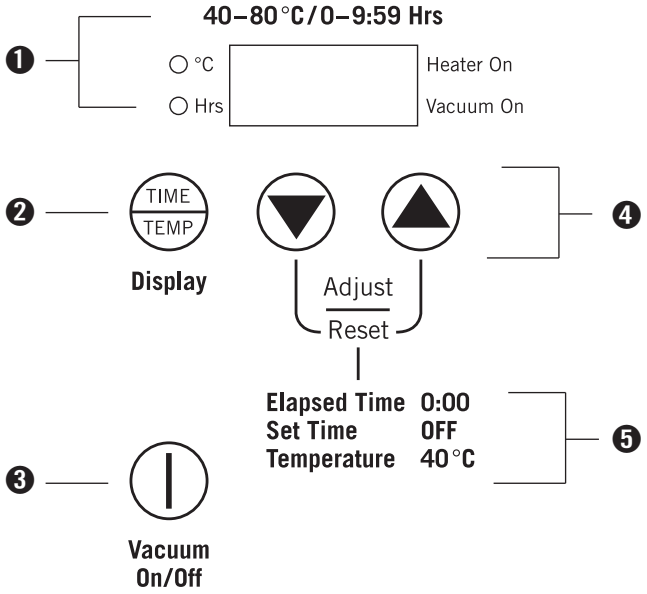
Plug the vacuum pump either into the dryer control cabinet (the power cord receptacle is on the left side of the control panel) or into a lab power receptacle.

When the pump is plugged into the dryer control cabinet, the vacuum timer automatically turns the pump on and off. The 115 V~ model pump receptacle can accommodate any pump that draws less than 5 A. The maximum rating for the 230 V~ model is 2.5 A. If your pump exceeds this rating, plug it into a lab receptacle and manually turn the power on and off.

Gel dryer controls

The GD2000 control panel is located on the top of the gel dryer. (See Fig 1). A detailed view of the features of the control panel is shown in Fig 2.

Fig 2. Gel dryer controls.



number	control feature	function
1	LED display	Shows Set Temperature, Set Time or Elapsed Time. On the left of the LED display, a light indicates whether the displayed value is °C (temperature) or Hrs (time). When the displayed value is time and the LED colon blinks, the value is Elapsed Time. When the colon is not blinking, the value is Set Time. Press either Adjust key once to go from Elapsed Time to Set Time. On the right side of the display, two red lights, labeled "Heater On" and "Vacuum On," indicate the status of the heater and vacuum.
2	Time/Temperature key	Toggles the LED display between showing time or temperature.
3	Vacuum key	Toggles the vacuum outlet On or Off. A red light appears on the right side of the LED display when the vacuum is On.
4	Adjust keys	Adjust Set Temperature and Set Time; reset Elapsed Time. Press a key once briefly to move one interval. Press and hold a key down to move in larger intervals. Press both keys simultaneously to reset Temperature or Time to the Reset values.
5	Reset values	Lists the Reset values for Elapsed Time, Set Time and Set Temperature: Elapsed Time 0:00; Set Time OFF; Temperature 40 °C.

3. Spécifications

This declaration of conformity is only valid for the instrument when it is:

- used in laboratory locations,
- used as delivered from Hoefer, Inc., except for alterations described in the user manual, and
- connected to other CE-labeled instruments or products recommended or approved by Hoefer, Inc.

Maximum Operating Ratings

Wattage	Heater: 800 W, thermostatically controlled
Pump Outlet	575 W
Power requirements	Model: 80-6428-84: 115 V~, 50/60 Hz 80-6429-03: 230 V~, 50/60 Hz

Environment

Operating environment:	Indoor use, 15–40 °C ambient Relative humidity ≤ 80% for 15–31 °C, decreasing linearly to 50% for 31–40 °C Altitude ≤ 2000 m Installation category II Pollution Degree 2
Dimensions (w × d × h)	55.0 × 43.5 × 8.5 cm (21.6 × 17 × 3.4 in.)
Weight	8 kg (17.6 lbs)
Product certifications	CE, UL61010A-1, CSA

Important! The plate surface of the GD2000 Gel Dryer reaches high temperatures during operation. Do not touch the plate surface during operation!

4. Operating instructions

After you have attached the vacuum pump to the GD2000, follow these instructions to prepare the dryer and gel drying stack. Once you set the temperature and the timer, the GD2000 automatically starts the vacuum pump and turns on the heat after 10 seconds. At the end of a timed run, the heat is turned off first and the vacuum ten minutes later.

Step 1: Prepare the dryer

Wipe away all contaminants with a soft damp cloth. See “Care and maintenance” on page 17 for recommendations on how to remove accumulations of radioactive materials. Fit the stainless steel screen into the recess on the platen and then place a sheet of filter paper on the screen slightly larger than the surface area required by the gel(s). The paper should not extend over the ridge that surrounds the platen.

Step 2: Prepare the gel drying stack

The slab dryer accommodates both agarose and polyacrylamide gels. The configuration of the gel stack layers depends on the next processing step and the thickness of the gel(s).

Drying between cellophane sheets

❶

Immerse two sheets of porous cellophane in water.

❷

Lay one cellophane sheet smoothly on top of the filter paper liner. Carefully center the gel on the cellophane. Cover the gel with the second sheet of wet cellophane.

Note: Cellophane provides a transparent support for densitometric scanning. Remove all air pockets at every step of this procedure to avoid scanning distortions.

❸

The stiff cover sheet produces a smooth gel surface that reduces scan irregularities.

❹

Check that the edges of all the sheets fall within the recess of the platen. If necessary, trim the corners of the sheets to fit within the recess.

❺

Cover the stack with the silicone rubber sealing sheet.

Drying between cellophane sheets

A filter paper liner and a stainless steel screen lie under each stack. A translucent rubber sealing sheet lies on top.

The gel type and thickness determine the cover sheet and layers used around the gel.

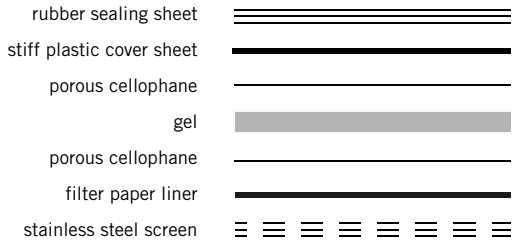


Fig 3. Gel drying stack for drying to cellophane. Use this configuration for gels to be scanned, imaged, and stored.

Drying thin or low-concentration polyacrylamide gels (≤ 1.5 mm) and agarose gels on paper

❶

Lay a sheet of filter paper on top of the filter paper liner and position the gel on this sheet, taking care to avoid trapping air beneath the gel.

❷

Cover the gel with thin plastic wrap. Do not leave wrinkles in the plastic wrap.

❸

Use the stiff plastic cover sheet with polyacrylamide gels but not with agarose gels.

❹

Check that the edges of all the sheets fall within the recess of the platen.

If necessary, trim the sheets to fit within the recess.

❺

Cover the stack with the silicone rubber sealing sheet.

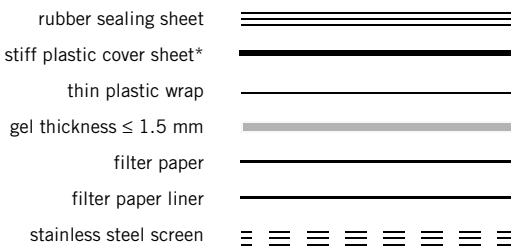


Fig 4. Stacks for drying thin or low-concentration polyacrylamide gels and agarose gels to filter paper for autoradiography.

Drying thick gels (> 1.5 mm), high concentration gels, gradient gels on paper

❶

Lay a sheet of filter paper on top of the filter paper liner and then position the gel on this sheet, taking care to avoid trapping air beneath the gel.

❷

Cover the gel with the porous polyethylene cover sheet, with the smooth side toward the gel.

❸

Check that the edges of all the sheets fall within the recess of the platen.

If necessary, trim the sheets to fit within the recess.

❹

Cover the stack with the clear silicone rubber sealing sheet.

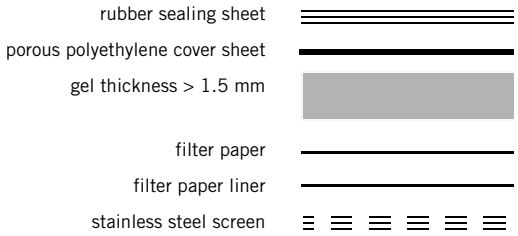


Fig 5. Stacks for drying thick gels to filter paper for autoradiography.

Step 3: Set the temperature

Note: The melting temperature of an agarose gel is dependent on its concentration and properties. The drying temperature should not exceed the melting temperature. We recommend a drying temperature of 50 °C for most agarose gels.

The highest setting, 80 °C, can be used for many types of gels for reliable, rapid drying. Use a temperature of 50 °C for agarose gels. Polyacrylamide gels prepared for fluorography may require a setting of 60 °C to protect the fluors. Follow the manufacturer's instructions. If your gels tend to crack, slower drying at a lower temperature setting may be indicated.

❶

To set the temperature, make sure the red light labeled "°C" is lit. If necessary, press the Time/Temp key to toggle between the time and temperature display.

❷

Use the Adjust keys to change the temperature. You can set the heater to any temperature from 40 to 80 °C or to OFF (room temperature).

Press the Up or Down key once briefly to change by one degree. Press and hold the key down to count five 1-degree intervals, followed by 5-degree intervals.

When the display reads 40 °C, press the Down key once to go to OFF. When the temperature is 80 °C, press the Up key once to go to OFF.

Press the Up and Down arrows simultaneously to reset the temperature to 40 °C. To use the vacuum at room temperature, turn the heater off.

Note: When the heater attains the temperature setting, the red heater light goes off. The heater light blinks when the heater comes on to maintain the set temperature.

The platen begins to heat at the same time that the vacuum pump starts— 10 seconds after you have finished setting the time. A red light next to the words "Heater On" indicates when the heating element is on.

Step 4: Set the timer

The amount of time required for a gel to dry depends on such factors as gel thickness, gel concentration, drying temperature, and vacuum applied. A typical sequencing or 1.5 mm 10% T gel can be expected to dry in approximately 45 minutes at 80 °C. Larger gels may take 2 to 3 hours. When dry, the thickness of an agarose gel seen through the silicone flap decreases to about 1 mm.

Note: Agarose gels become brittle when over-dried.

❶

Press the Time/Temp key to go to the Time mode.

The LED display reads 0:FF and the LED colon blinks to indicate Elapsed Time.

❷

Press either the Up or Down key once to go from Elapsed Time to Set Time.

❸

Press either the Up or Down key to change the Set Time.

Press Up once to set time for a continuous run. On a continuous run, the LED display reads r:un and the heater and vacuum run continuously until you manually turn them both off.

Press Up again to count up in 15-minute intervals.

Press the Up and Down keys simultaneously to reset the time to 0. When the Set Time is set to 0, the display reads 0:FF.

When you have finished setting the time, you can start the heater and vacuum.

To start the heater and the vacuum pump

- You can press the Time/Temp key to immediately start the heater and vacuum pump.
- If you don't press the Time/Temp key, ten seconds after you stop adjusting the time, the heater and vacuum pump start automatically.

As the heater and vacuum pump start, the timer begins to count Elapsed Time (Hours:Minutes). The LED colon between the hours and minutes blinks each second when the timer is in Elapsed Time.

You may change the Set Time at any point after the LED begins to count Elapsed Time.

To change the set time while the heater is on

❶

Make sure the LED displays time.

The red light labeled Hrs is lit when the LED displays time. Press the Time/Temp key to toggle between temperature and time display.

The LED colon blinks when the display shows Elapsed Time.

❷

Press the Up or Down arrow key to change the display from Elapsed Time to Set Time.

❸

Press the Up or Down arrow key to change the Set Time.

Step 5: Create a vacuum seal

Ten seconds after you set the timer, the vacuum starts automatically if it is connected through the vacuum receptacle on the dryer. Watch for a seal to form between the rubber overlay and the platen.

If the seal does not form almost immediately, check stack for misalignment. No materials should extend beyond the edge of the recess. Assist seal formation by pressing gently at each corner to ensure that the rubber sheet is pulled into the recess.

Without removing the rubber sealing sheet, periodically inspect the gel as it dries. When the gel appears dry, check the temperature of the gel by briefly touching the sealing sheet over the gel. Wet gels feel cold compared to the platen. Typically, the gel is dry when the drying surface has become evenly hot. A markedly flattened gel contour also indicates that the gel has dried.

In automatic mode, when the set time is reached, the dryer beeps once and the heater turns off. The vacuum power remains on for 10 minutes. During this cooling down period, the Elapsed Time display counts from "C:00" to "C:10". After ten minutes, the vacuum power automatically turns off and the dryer beeps once.

Note: If using a cold trap with inline valves, close the valve between the trap and gel dryer and then open the valve between the trap and the pump. After the trap is pumped down, open the valve to the gel dryer. The extra vacuum should quickly pull the sealing sheet down and accelerate the sealing process.

Important! Once the gel has begun to dry, do not break the vacuum seal until the gel is completely dry. Gels may crack if you turn off the vacuum before the gel is dry.

Note: Some gels may curl as they dry. To minimize curling, the vacuum continues for 10 minutes after the heating timer shuts off.

Note: If you manually turn off the vacuum during a continuous run, the heat remains on until you also turn it off manually.

Step 6: Disassembly

Remove each layer of the drying stack and clean the dryer according to instructions in "Care and maintenance" on page 17.

Note: If the gel contains radioactive materials and was covered with plastic wrap, dispose of the wrap according to local regulations pertaining to radioactive waste.

Note: Fluorescent compounds, such as ethidium bromide, cannot be visualized after drying.

Note: When you manually preheat the dryer, be sure the set time includes the time needed to prepare the gel stack as well as the time needed to dry the gel.

Options for manual operations

To apply a vacuum without heat. Set the Temperature to 0:FF, then set the timer. Ten seconds after you set the time, the vacuum starts without heat. The vacuum stops when the Elapsed Time equals the Set Time.

To preheat the dryer. Set the Temperature and set the Time. After ten seconds, the vacuum starts. Press the Vacuum key to turn off the vacuum and leave the heat on. To restart the vacuum, press the Vacuum key again.

5. Care and maintenance

Cleaning

❶

Turn mains power switch off and unplug the power cord.

❷

Remove the stainless steel screen and cover sheets and wash separately with a mild laboratory detergent. Do not use abrasives or solvents on any part of the dryer.

Periodically remove accumulations left by autoradiography reagents from the platen and stainless steel screen. Apply a strong detergent, such as Contrad™ 70 or Decon™ 90, for no longer than 5 minutes and rinse thoroughly.

❸

Dry with a soft towel.

Replacing fuses

Important! Fuses protect equipment by disconnecting loads too large for the circuit design. Always replace fuses with those that conform to the specified fuse rating.

Important! Detach the power cord before replacing fuses.

115 V~ Model. The fuse drawer holds one F 12A 250V 3AG fuse and one shorting coil.

230 V~ Model. The fuse drawer holds two F 6.3A 250V 5 × 20 mm fuses.

The fuse drawer is in the power entry module, found on the left side of the control panel (See Fig 6).

1

Insert a small, flat-blade screwdriver into the slot below the fuse drawer. (See Fig 6.) Push in the direction of the arrow to release the drawer. Grasp the fuse drawer with your fingers and pull it out.

2

Pull the fuse out of the drawer to inspect it. If the fuse element is burned or broken, replace it.

If the fuse appears to be intact, check it with a multimeter. A reading of 1Ω or less indicates the fuse is still usable.

3

Push the fuse drawer back into the power entry module until it snaps into place.

4

Plug the power cord in and turn the mains power switch on.

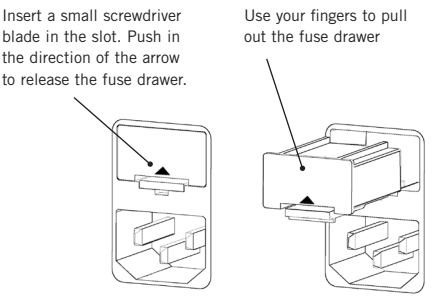


Fig 6. Mains power module.

Replacing the rubber sealing sheet

Occasionally, a tear or nick in the rubber sealing sheet (SE1143) may inhibit the formation of the vacuum seal. The rubber sealing sheet is attached to the dryer by four screws in a retaining bar along the edge of the platen. To change the sealing sheet, you also need a small tube of clear silicone adhesive, available at hardware stores.

❶

Use a Phillips-head screwdriver to remove the four screws on top of the retaining bar that holds the rubber sealing sheet in place.

❷

Lift off the retaining bar and the damaged rubber sealing sheet.

If necessary, use a sharp edge to clean out any old silicone adhesive on the inside of the retaining bar.

❸

Position the replacement sealing sheet on the platen, aligning the four holes in the overlay with the four holes for the screws.

❹

Lay a bead of clear silicone adhesive along the inside edge of the retaining bar. Replace the retaining bar, aligning the four holes of the retaining bar over the holes in the platen and sealing sheet.

❺

Screw the retaining bar and sealing sheet in place.

6. Troubleshooting

problem	solution
No power or LED Display	Check that the power switch is turned on.
	Check that the dryer is plugged into a working receptacle.
	Check the fuse(s).
No heat	Make sure time is set and the LED colon is blinking.
	Make sure the temperature is not set to OFF.
	If still no heat, contact your local Hoefer, Inc. distributor for service.
No vacuum	Make sure the tubing connects the vacuum port to the vacuum pump.
	Make sure the vacuum pump is plugged into the vacuum receptacle on the dryer.
	Check that time is set. Vacuum automatically starts 10 seconds after time is set.
	Check switches on the vacuum source.
Can't create vacuum seal	Make sure the rubber sealing sheet seals around the entire inside edge of the recess.
	Omit the mylar sheet and use plastic wrap on top of gel.
	Check for tears or punctures in the rubber sealing sheet. Replace it, if necessary.
Gels crack	Use thinner gels ($\leq$ 0.75 mm), if possible. Thin gels rarely crack.
	Reduce % T.
	Equilibrate gels with 30% ethanol, 2% glycerol for one hour before drying.
	Make sure gel is completely dry before turning off vacuum.
Gels do not dry	Do not use > 5% glycerol during pre-drying treatment.
	Empty the liquid or cold trap.
	Replenish dry ice in the cold trap.
	Make sure to place only porous cellophane or filter paper under the gel. Do not use plastic film or the stiff plastic cover sheet in the stack below the gel.
Fluors become degraded	Follow manufacturer's handling instructions, paying close attention to recommended temperature exposure.

7. Ordering information

product	quantity	code number
GD2000 Vacuum Gel Dryer System Includes: stainless steel screen, VP200 Vacuum pump, Vacuum tubing, 10 sheets of filter paper, 50 sheets of porous cellophane, one mylar sheet and one porous polyethylene sheet		
115 V~	1	GD2001
230 V~	1	GD2002
Replacement Parts		
Filter paper, 35 × 44 cm	25	SE1141
Porous cellophane, 35 × 44 cm	50	SE1142
Clear silicone rubber sealing sheet	1	SE1143
Stiff plastic cover sheet	1	SE1144
Porous polyethylene cover sheet	1	SE1145
Stainless steel screen	1	SE1146
Vacuum tubing, 8 mm i.d., 3 m	1	VT3
115 V~ model		
Detachable power cord, 115 V~, 15 A	1	PSCORD15A-115V
Fuses, F 12 A, 250 V, 3AG	5	PSF12A-FB-3AG
230 V~ model		
Detachable power cord, 230 V~	1	PSCORD-2230V
Fuses, T 6.3 A, 250 V, 5 × 20 mm	5	PSF6.3A-SB-SX20

Hoefer, Inc.
84 October Hill Road
Holliston, MA 01746

Toll Free: 1-800-227-4750
Phone: 1-508-893-8999
Fax: 1-508-893-0176
E-mail: support@hoeferinc.com
Web: www.hoeferinc.com

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