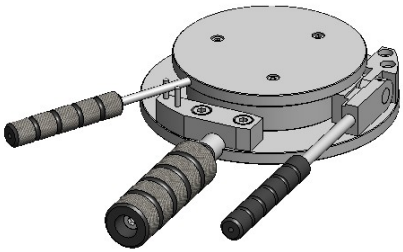
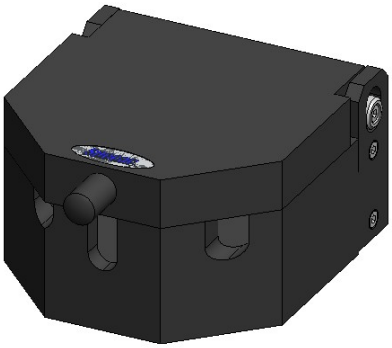
Atlas™ Constant Thickness Film Maker Accessory

User Manual





2I-15640 Issue 6

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Atlas™ Constant Thickness Film Maker Accessory P/N GS15640

CONTENTS – USER MANUAL

1. Introduction

The Atlas™ Constant Thickness Film Maker Accessory P/N GS15640 has been designed to be used in conjunction with the Specac Atlas™ Heated Platens and Automatic Temperature Controller P/N GS15515 within the following Specac presses:-

Atlas™ Manual 15T – P/N GS15011.
Atlas™ Manual 25T – P/N GS25011.
Atlas™ Power 8T – P/N GS25400.
Atlas™ Autotouch 8T – P/N GS25800.

The Atlas™ Constant Thickness Film Maker Accessory comprises a top and lower platen pressing assembly with a centralising guide ring for the specific preparation of 29mm diameter films of up to 0.5mm thickness. The thickness of the film is controlled by a specific sized spacer ring used within and between the top and lower platen pressing assemblies. The film thickness is also determined from any procedural method that is adopted. Factors that influence a method are the amount of sample introduced for pressing, the temperature and the load applied whilst pressing.

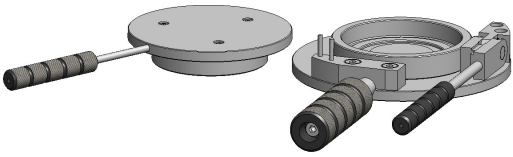
A separate cooling chamber assembly is also provided with the Atlas™ Constant Thickness Film Maker Accessory, such that the complete platen pressing assembly with a compressed film can be removed from the heated platens in the press and cooled rapidly for quicker sample preparation and handling.

The Atlas™ Constant Thickness Film Maker Accessory can be used to melt and press polymers or plastic materials into thin films at temperatures up to 300ºC and at loads of up to 4 Tons from the pressing system. The samples can be prepared in this way prior to spectral analysis via a transmission technique.

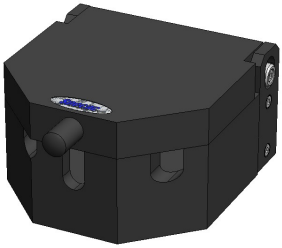
2. Unpacking and Checklist

The Atlas™ Constant Thickness Film Maker Accessory is packed in a protective plastic carry case. On receipt of your accessory please check that the following have been supplied.

- One film maker system, comprising top platen pressing assembly, lower platen pressing assembly and guiding ring.

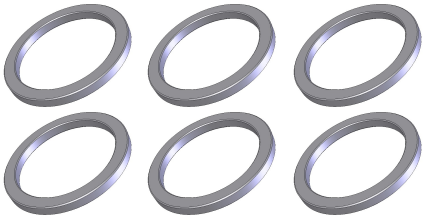


- One cooling chamber assembly.



- Set of spacer rings as listed below. These are engraved with a letter to denote the nominal thickness of film to be produced:-

A is for 0.015mm films.
B is for 0.025mm films.
C is for 0.050mm films.
D is for 0.100mm films.
E is for 0.250mm films.
F is for 0.500mm films.



- Pack of 200 aluminium foil discs (P/N GS15627)
- Stainless steel forceps.
- Packet of 20 Specacards.

Carefully unpack the Atlas™ Constant Thickness Film Maker Accessory parts from their carry case and proceed to use as follows.

3. Safety in Operation

Important Note

The Atlas™ Constant Thickness Film Maker Accessory has been designed to be as safe as possible in usage. The instructions that follow help to advise for a safe operation, but the greatest risk to safety may be presented by the actual sample itself to be heated and pressed in an exposed environment. If in any doubt of the risks involved in usage of a chemical in this way, then seek assistance.

When using the Atlas™ Constant Thickness Film Maker Accessory in an Atlas™ Manual 15T or 25T Press (P/N's GS15011 or P/N GS25011 respectively) although the tonnage loads to be applied for pressing are typically low at 1 to 2 tons, with a **maximum** load specification to 4 tons, Specac recommend that the safety guards fitted to the Press as standard **are used at all times**.

For protection against tonnage overloading the Film Maker Accessory of parts when samples are to be pressed, **it is a requirement** that the pressure relief valve assembly on a Manual Hydraulic 15T or 25T Press (the valve is located under the load gauge on the press), is set to read a 4 tons maximum load at the load gauge. You should adjust the pressure relief valve assembly as necessary following instructions for the procedure from the Presses own user instruction manual.

When using the Atlas™ Constant Thickness Film Maker Accessory in an Atlas™ Power or Autotouch 8T Press (P/N GS25400 or P/N GS25800 respectively), the front safety guard of the press **MUST** be closed to allow for the Press to operate. The Atlas™ Constant Thickness Film Maker Accessory has been designed to fit into these Presses for operation when the front safety guard is closed. When using these Presses ensure that a load of up to 4 tons maximum **ONLY** is selected to apply to the Film Maker Accessory. Any higher loads could result in damage to the Film Maker Accessory polished pressing surfaces.

4. The Cooling Chamber Assembly

The cooling chamber assembly (**1**) of the Atlas™ Constant Thickness Film Maker Accessory is used such that the complete platen pressing assembly (top platen assembly (**2**) on lower platen assembly (**3**) containing a compressed hot film sample within) can be removed from the Atlas™ Heated Platens in the press and cooled rapidly for quicker sample preparation and handling.

For installation, the cooling chamber assembly (**1**) is used in conjunction with the cooling water circuit system for use of the Atlas™ Heated Platens P/N GS15515. A cold water supply passes through the cooling chamber assembly (**1**) prior to passage through the top and lower Heated Platen assemblies fitted in the Press. The water can pass through to a drain or be re-circulated if a suitable thermo-circulating system has been employed for use in the water cooling circuit. (See water cooling thermo-circulator systems, Specac P/N's GS11127 and GS11128.)

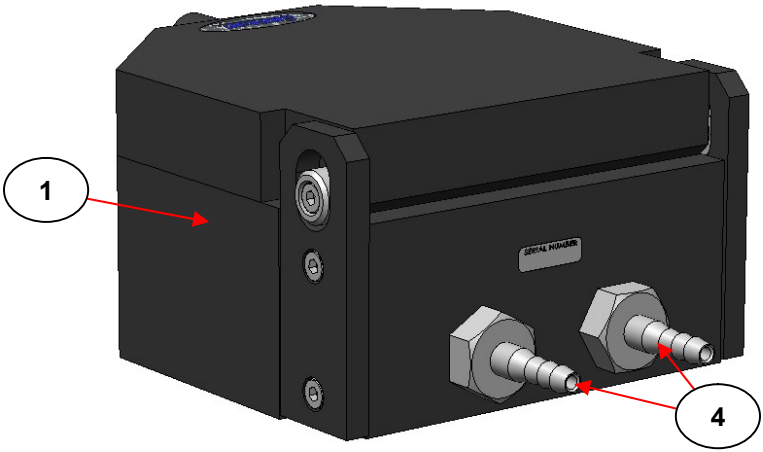


Fig 1. Cooling Chamber Water Connection Ports

The cooling chamber (**1**) has water inlet/outlet ports (**4**) at the rear of the unit and the black silicone tubing supplied with the Atlas™ Heated Platens simply pushes on to these ribbed hose type connections. (See **Fig 1.**) For additional safety, cable ties can be placed around the tubing and hose connections to prevent the tubing from becoming disconnected if the cooling water supply pressure is high. For installation of the cooling chamber (**1**) into the water cooling circuit of the Atlas™ Heated Platens, it does not matter which of the inlet/outlet port (**4**) hose connections are connected for the **water in** supply and the **water out** towards the Heated Platens first and then to a drain or the thermo-circulator unit.

Note: *In the instruction manual for the Atlas™ Heated Platens (P/N GS15515) the diagram **(Fig 4.)** shows where the cooling chamber (**1**) is connected in the water cooling circuit. It is advisable to have the cooling chamber (**1**) in-line **before** the cooling water passes through the Heated Platens, to try and ensure that any cooling water will always be at its lowest temperature when passing through the cooling chamber (**1**) first.*

5. Operation of the Film Maker Accessory

Follow the instructions from the user manual of the Atlas™ Heated Platens P/N GS15515 for their installation and operation in a Specac Press prior to use of the P/N GS15640 Atlas™ Constant Thickness Film Maker Accessory. The cooling chamber assembly (**1**) should be connected to the water cooling circuit system of the heated platens as described in Section 4. (Pages 6 and 7 of this instruction manual.)

For the formation of a thin film from a solid plastic or polymeric type sample when using the Film Maker Accessory, the temperature should be set on the temperature controller of the Heated Platens to that required for the softening and/or melting point of the sample to be reached.

Important: *A sample **must** be sufficiently soft or in its melted state **before any tonnage load** (up to 4 tons maximum) should be applied from the Press for pressing of the sample. If the sample is too hard, there is a risk of point load damage being sustained to the Film Maker Accessory parts for the polished pressing surfaces of the top (**2**) and lower (**3**) platen pressing assemblies.*

Preparing a Sample for Pressing

The top (**2**) and lower (**3**) platen pressing assemblies of the Atlas™ Film Maker Accessory each have a highly polished circular pressing surface (**5** - top and **6** - lower). (See **Fig 2**.) These polished surfaces (**5**) and (**6**) are protected from damage during transit by covering with a plastic film. When first supplied, carefully peel off the protective film and clean the polished surfaces (**5**) and (**6**) with a soft tissue and suitable solvent (foam cleaner/degreaser or acetone) before use.

Similarly clean all the spacer rings (**7**) (sizes A through to F) before their initial use in the formation of a thin film.

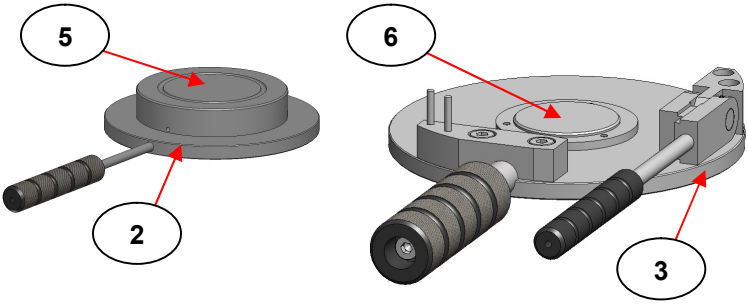


Fig 2. Top and Lower Platen Pressing Assemblies

To make a particular thickness of film sample at 29mm diameter, select the required thickness spacer ring (**7**) from the six sizes available. The spacer rings are labeled on the outer circumference edge of the ring with an engraved letter from A to F and the letter corresponds to the following **nominal** thickness of film that can be formed.

A is for 0.015mm (15 microns) thick films.
B is for 0.025mm (25 microns) thick films.
C is for 0.050mm (50 microns) thick films.
D is for 0.100mm (100 microns) thick films.
E is for 0.250mm (250 microns) thick films.
F is for 0.500mm (500 microns) thick films.

Locate the chosen spacer ring (**7**) on the lower platen pressing assembly (**3**) of the Film Maker Accessory, around the central raised polished surface (**6**). (See **Fig 3.**) It does not matter which way up the spacer ring (**7**) locates but it helps for a consistent sampling procedure if the spacer ring is **always located the same way up** between sampling. The orientation of the engraved letter on the spacer ring (**7**) (whether it is up or down when being used) can act as a reference.

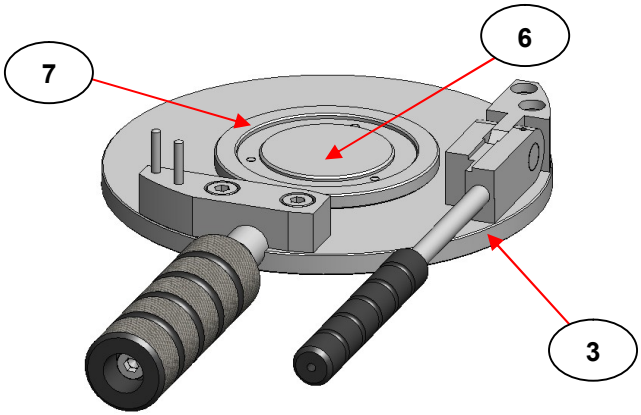


Fig 3. Spacer Ring Fitted to Lower Platen Pressing Assembly

With the spacer ring (**7**) in position, take the guide ring (**8**) and place this around the spacer ring (**7**). The smaller inner diameter edge of the guide ring (**8**) contacts with the outer diameter of the spacer ring (**7**). (See **Fig 4.**)

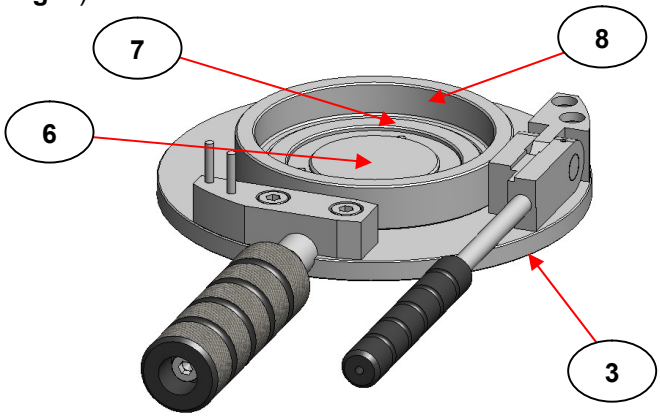


Fig 4. Guide Ring and Spacer Ring Fitted to Lower Platen Pressing Assembly

The lower pressing platen assembly (**3**) is now ready to take an aluminium foil/sample/aluminium foil “sandwich” for pressing.

The Aluminium Foil Discs

The 40mm diameter aluminium foil discs (**9**) are used to “sandwich” a sample between them, before melting and pressing of the sample in the Film Maker Accessory of parts. The spacer rings (**7**) have been specifically designed to accommodate two aluminium foil disc (**9**) thicknesses. One will be in contact with the top polished surface (**5**) and the other in contact with the lower polished surface (**6**) to produce films corresponding to a nominal thickness for the spacer ring selected.

Note: *The aluminium foil discs (**9**) have a matt surface and a shiny surface. Contact of a particular foil surface with the sample whilst pressing, will determine the amount of spectroscopic interference fringes produced by the thin film. If a reduction in spectroscopic interference fringes is sought, the matt surfaces of the two foils should be in contact with the sample. Conversely, if fringes are required, (e.g. to measure the film thickness) then the shiny surfaces should be in contact with the sample.*

Place an aluminium foil disc (**9**) on the polished surface (**6**) of the lower platen pressing assembly (**3**). If spectral fringes are required, the shiny surface of the foil disc (**9**) should be facing uppermost. The forceps supplied can be used to manipulate this foil into the correct position.

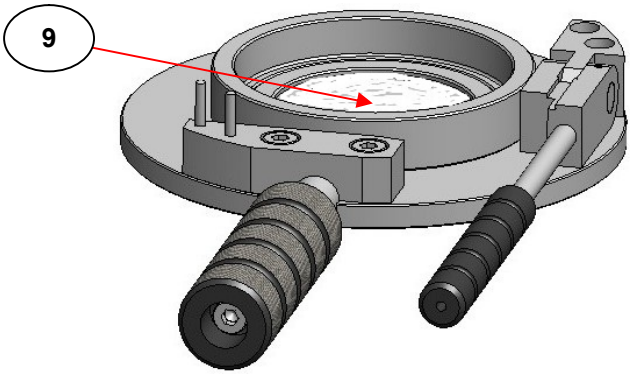


Fig 5. Lower Platen Pressing Assembly with Spacer Ring, Guide Ring and Lower Aluminium Foil

Take the sample to be melted and pressed and place it in the centre of the lower foil disc (**9**). The amount of sample to use will vary depending on the thickness of spacer ring (**7**) chosen.

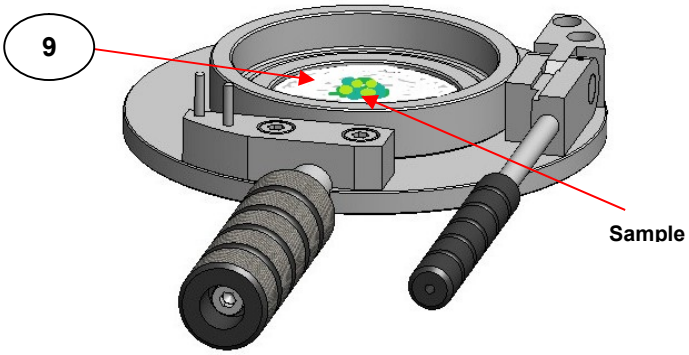


Fig 6. Lower Platen Pressing Assembly with Spacer Ring, Guide Ring, Lower Aluminium Foil and Sample

Place a second aluminium foil disc (**9**) over the sample and foil disc (**9**) already placed on the lower platen polished pressing surface (**6**) of the Film Maker Accessory. Be sure that the correct shiny surface of the top foil disc (**9**) is in contact with the sample if fringes are required.

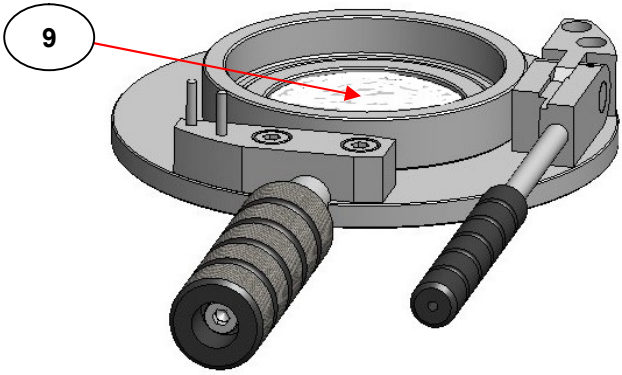


Fig 7. Lower Platen Pressing Assembly with Spacer Ring, Guide Ring, Lower Aluminium Foil and Sample

Note: *Some preliminary "test pressings" may need to be carried out when experimenting with new and differing amounts of sample to determine the* ***optimum*** *amount of the sample needed when pressing with a specific sized spacer ring for a nominal film thickness .When the correct amount of sample to be pressed is known, this helps in the production process for the reproducibility of a thin film.*

Now, very carefully take the top platen pressing assembly (**2**) and lower it with the top polished surface (**5**) coming into contact with the top aluminium foil disc (**9**), using the inside of the guide ring (**8**) for location. The handle (**10**) of the top platen pressing assembly (**2**) should be located between the guiding pins (**11**) of the lower platen pressing assembly (**3**). (See **Fig 8.**)

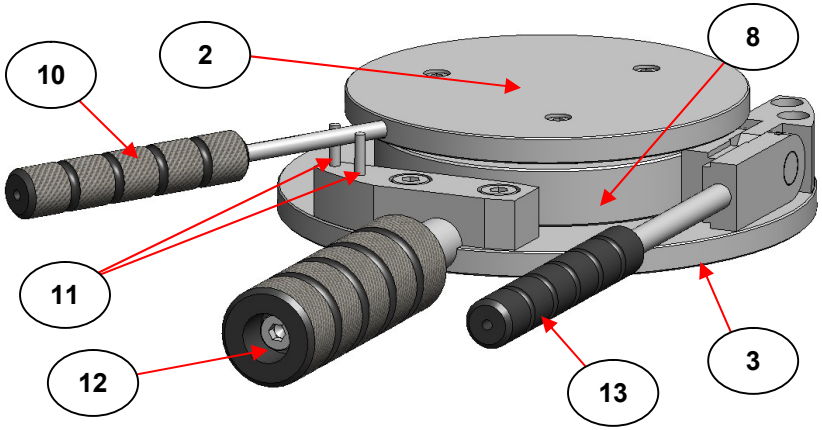


Fig 8. Complete Top Platen Pressing Assembly on Lower Platen Pressing Assembly with Aluminium Foils and Sample

The Atlas™ Film Maker Accessory with foils and a sample is now ready to be placed into the Atlas™ Heated Platens and Press for melting and pressing.

The Pressing Cycle

Make sure that there is a sufficient distance between the surfaces of the Atlas™ Heated Platens in order to insert and position correctly the prepared Atlas™ Film Maker Accessory with a sample.

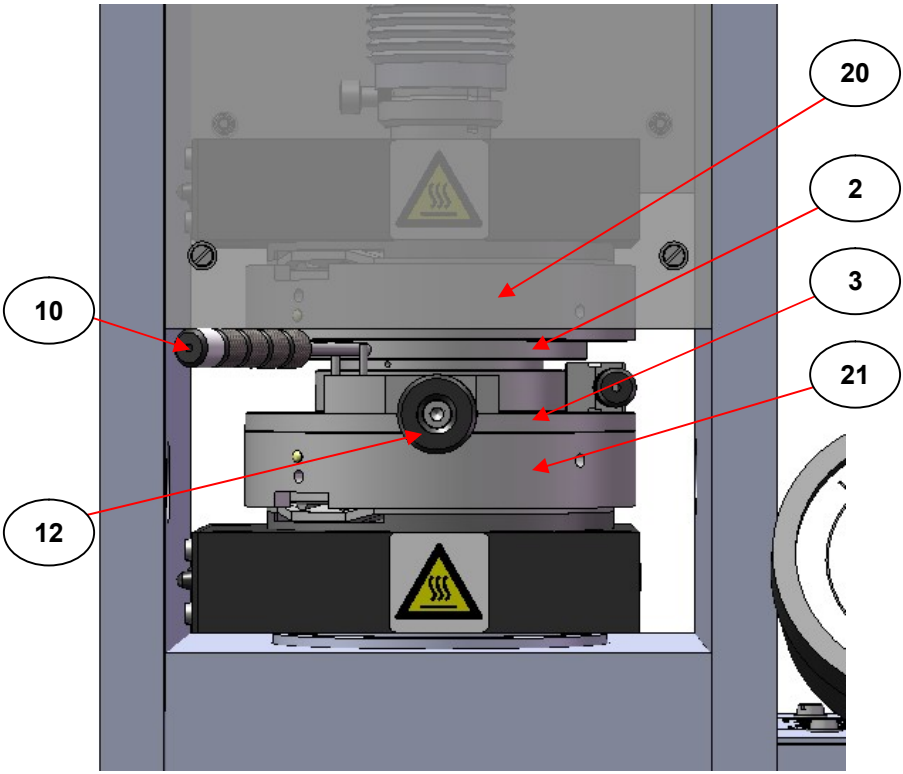


Fig 9. Film Maker Accessory Assembly of Parts in an Atlas™ Manual Hydraulic Press Fitted With Atlas™ Heated Platens

Very carefully, using the handle (**12**) on the lower platen pressing assembly (**3**), take the prepared Atlas™ Film Maker Accessory with a sample and locate it centrally between the Atlas™ Heated Platens in the Press. Raise the front safety guard of the Press to position the

assembly of film maker parts between the Atlas™ Heated Platens and then allow the front safety guard of the Press to lower and rest on top of the handle (**10**) to the top platen pressing assembly (**2**). (See **Fig 9.)**

Slowly lower the top Atlas™ Heated Platen assembly (turn the lead screw of the Press clockwise) to make contact with the upper surface of the top platen pressing assembly (**2**) until **all the components of the pressing system** (the top (**20**) and lower (**21**) heated platen surfaces, top (**2**) and lower (**3**) platen pressing assemblies, aluminium foils and sample) are just touching each other. The components should be fairly loosely held together at this stage, prior to heating and melting of the sample. (See **Fig 9**.)

Note: *A tonnage load to pressurise the components together should **NOT** be applied via pumping of the press piston at this time.*

The components are loosely clamped together to determine the melting point of the material to be pressed. When applying heat by powering the Atlas™ Heated Platens, as the sample material within the Film Maker Accessory begins to soften, the top platen pressing assembly (**2**) sinks down under its own weight and a visible gap is created between the top platen pressing assembly (**2**) and the top Heated Platen pressing surface (**20**). **Only when this phenomenon occurs** is it safe to start pressing the material via the Press piston to apply a tonnage load. Up until this point the sample material may still be too hard to compress and could preferentially rupture the aluminium foil discs (**9**) and worse, damage the highly polished pressing faces (**5**) and (**6**) of the top (**2**) and lower (**3**) platen pressing assemblies, even if loads of 1 to 2 tons are applied.

However, this visual indicator point may be reached when a material starts to soften and **before** it has actually reached its melting point. The resultant film from any pressing and tonnage load application may not be ideal. Therefore, it is most important to try and press the film at **the actual melting point** of the sample to obtain the best results.

Note: *If you know the melting point of the sample material to be pressed, that can be applied as a **set** temperature for the Atlas™ Heated Platens, it will help substantially in the whole process of the thin film preparation and production.*

Heating the Sample

Select a known melting or a “test” **set** temperature on the controller of the Atlas™ Heated Platens. When the **set** temperature has been input and accepted, the temperature controller will power the Atlas™ Heated Platens to reach this temperature. Wait for the softening or melt point to be reached. (Visual identification occurs when there is a gap between the top platen pressing assembly (**2**) and top heated platen surface (**20**)). Then turn the lead screw of the Press clockwise to lower the top heated platen surface (**20**) onto all of the components involved in the pressing, thereby closing the gap.

Allow time for the **set** temperature and **actua**l temperature to stabilise and then apply a sufficient load from the pumping system and piston of the Press. A maximum of 4 tons load can be applied to the Atlas™ Film Maker Accessory via the Atlas™ Heated Platens, but in most cases a 1 or 2 tons load is more than sufficient for the preparation of thin films. Allow the Atlas™ Film Maker Accessory assembly components to stay at the tonnage load and **actual** temperature being applied for as long as your procedure for a sample film pressing may require. Then reduce the **set** temperature on the Atlas™ Heated Platens controller back to a room temperature value (e.g. 20ºC) to stop power being applied to the heated platen surfaces (**20**) and (**21**).

Cooling the Sample

When power is cut to the Atlas™ Heated Platens to reduce the **actual** temperature and the Atlas™ Film Maker Accessory assembly components are cooling down between the heated platen surfaces (**20**) and (**21**), maintain the pressing load on the Accessory. You may observe a decrease in the load on the load gauge of the Press, which is normal when a compressed material “relaxes” on cooling. Simply re-apply the pressing load via the piston if this effect is seen and you wish to maintain the tonnage load that had been applied.

Note: *Any effect of a tonnage load application during the cooling stage may be considered as part of a particular procedure that is required for the production of consistent and reproducible thin films for the sample material type.*

When the **actual** temperature of the heated platen surfaces (**20**) and (**21**) have cooled to about 100ºC below the melting and pressing temperature, release any tonnage load that is being applied and very carefully remove the Film Maker Accessory assembly components from the Press to place in the cooling chamber (**1**). This will aid in quicker cooling of the film to be able to handle it for mounting in the spectrometer. (See **Fig 10.)**

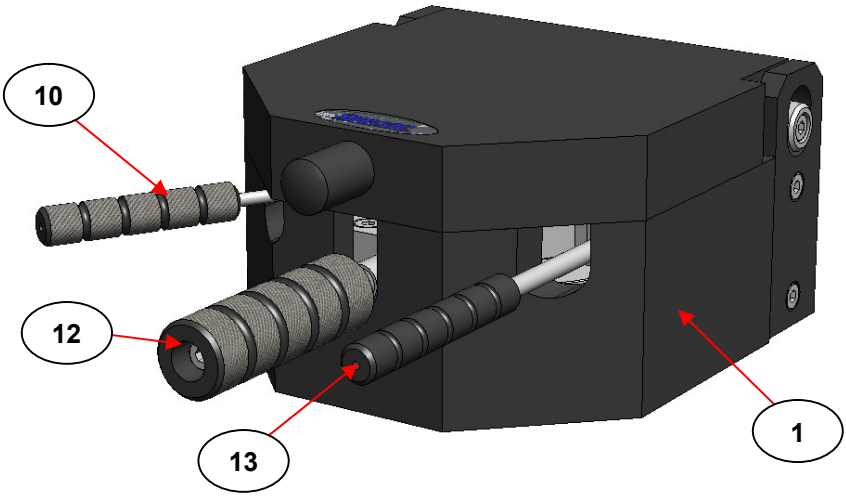


Fig 10. Film Maker Accessory Assembly Components in Cooling Chamber After Heating and Pressing

Beware: *The handle (**12**) of the lower pressing platen assembly (**3**) is used to transfer the Film Maker Accessory assembly components into and out of a Press. When taking the assembly components out of the Press if they are hot, ensure you are wearing gloves to protect your hands.*

The Film Maker Accessory assembly components may be cool to touch after 3 to 5 minutes within the cooling chamber (**1**), but this timescale is dependent upon the original temperature when transferred. Keep the lid of the cooling chamber (**1**) closed between operations to maximise the cooling effect.

Hint: *Whilst the Film Maker Accessory assembly components are cooling down in the cooling chamber (**1**), if a second Film Maker Accessory is available, this can already be prepared with a new sample ready for melting and pressing between the Atlas™ Heated Platens. This second assembly can be placed into the vacated Atlas™ Heated Platens for heating and pressing and in this way the two Film Maker Accessories can be "rotated" in operation to speed up the film making process.*

During periods when the Atlas™ Heated Platens are not being used, the top (**20**) and lower (**21**) heated platen faces should be kept close together to maintain an even temperature for both surfaces, since the thermocouple measuring the temperature and regulating the power supply is inserted in the **lower heated platen assembly only**. However, the same type of heating element is fitted to both the top and lower heated platens assemblies for independent heating.

Accessing the Film Sample

After removal of the Film Maker Accessory assembly components from the cooling chamber (**1**), dis-assemble the components to gain access to the compressed film sample by lifting off the top pressing platen assembly (**2**) by use of the handle (**10**). In most instances this should come away easily. If some resistance to separation occurs, use the release lever (**13**) provided on the right hand side of the lower pressing platen assembly (**3**) to prise the components apart. (See **Fig 8.)**

On separation of the top platen pressing assembly (**2**), the pressed thin film at 29mm diameter contained between the foil discs (**9**) may be attached to either the top (**5**) or lower (**6**) polished pressing faces. The foil "sandwich" can be removed from the top (**5**) or lower (**6**) polished pressing faces by use of the forceps that are provided. Similarly, the forceps can then be used to separate and peel away the foil discs (**9**) from the compressed thin film sample itself.

The prepared thin film can then be mounted in a Specacard (P/N GS03800 or P/N GS03810) or a magnetic film holder P/N GS03820 for spectroscopic analysis.

6. Notes for Operation of the Film Maker

This section provides some additional information, hints and tips about the Atlas™ Film Maker Accessory for its correct use in the preparation of thin films and their production.

Note 1: Using the Aluminium Foil Discs

The Atlas™ Constant Thickness Film Maker Accessory has been designed to accommodate two foil disc (**9**) thicknesses to produce films corresponding to the spacer ring (**7**) selected. The aluminium foil has been specially selected for its consistent thickness of 12 microns and grease free surface.

Certain polymeric samples, particularly those containing fillers, may give release problems. If the sample tends to stick to the aluminium foil (**9**), this may be pre-coated with a light smear of a non-silicone based releasing agent. This requires treating a batch of aluminium foils (**9**) according to the instruction of the releasing product. Any contamination of the pressed film may be removed by wiping clean.

If the sample sticks stubbornly to the aluminium foil (**9**) after heating and pressing, the foils (**9**) can be removed by immersion of the sample film and foils into a solution of concentrated sodium hydroxide.

Caution: *Wear safety spectacle and gloves when handling the foils (**9**) and using a powerful, corrosive chemical such as sodium hydroxide. Be sure to check prior to this procedure that the sample itself will not be attacked or affected by the sodium hydroxide, if using this strong chemical agent to dissolve the aluminium foils.*

Note 2: Spacer Rings - Tolerances and Film Thickness

The spacer rings (**7**) have been manufactured such that the sample thickness tolerances are +/- 3 microns for rings A and B and +/- 10 microns for all other rings. The tolerance limit relates to the absolute **overall thickness** produced for a pressed film. The spacer ring (**7**)

thickness as marked allows for a **nominal** thickness of film to be produced within a particular methodology or operational procedure and the size of the spacer ring (**7**) is an indication of, potentially, **the minimum film thickness** that can be produced using this appropriate thickness spacer ring. E.g. if a film of between 25 microns and 50 microns thickness is to be made, then the spacer ring **B** (**7**) for 25 micron thick films should be used and any film thickness produced will have an expected tolerance limit thickness of +/- 3 microns.

For a consistent “pressing cycle procedure” to be established that allows for a high degree of reproducibility for a film to be made from any spacer ring (**7**) size being used, the following factors need to be considered:-

- The size of spacer ring (**7**) used and the way up it is placed on the lower pressing platen assembly (**6**).
- The positioning of the foil discs (**9**) if thin films with fringing patterns are to be prepared.
- The quantity of sample used for the spacer ring (**7**) size that is chosen.
- The temperature of the sample (**set** on the Atlas™ Heated Platens).
- The tonnage load applied whilst the sample is hot and compressible.
- The tonnage load applied (if any) whilst the sample is cooling.
- The temperature of the cooling sample when it is transferred into the cooling chamber (**1**).

Both the top (**5**) and lower (**6**) platen polished surfaces are removable from their respective platen pressing assemblies (**2**) and (**3**) by releasing their three fixing screws in each case. If the polished surfaces deteriorate over time, it may be possible to improve their surface condition from a re-polishing (if any blemishes or imperfections are not too severe), by removal of the polished surfaces from their platens pressing assembly to use against a suitable flat polishing/lapping device. However any re-polishing of the lower polished surface (**6**) can affect the expected **tolerance limit** for the thickness of film produced in subsequent pressings, although an overall film thickness **reproducibility** will be maintained, provided an established pressing cycle procedure is followed. (See points/factors above.)

Should it be necessary, if the polished surfaces (**5**) and (**6**) have become too badly damaged from scoring and gouging in use, spare replacement polished surface parts (**5**) and (**6**) are available from Specac for a correct tolerance compatibility to the spacer rings (**7**).

The film thickness produced may sometimes deviate from the specified spacer ring (**7**) size **nominal** and/or **minimum** thickness. This is due to the nature of the material being pressed. (e.g. PTFE films have a tendency to shrink on cooling.) However, the film thickness achieved will be reproducible, provided a consistent method of preparation is adopted. (See points/factors for the pressing cycle procedure.)

Note 3: Tips on Pressing

Warning:

SAMPLES MUST NOT BE PRESSED IN THE ATLAS™ CONSTANT THICKNESS FILM MAKER ACCESSORY WHEN IT IS COLD.

Polymeric samples in bead form may require pre-crushing while cold so that the top platen pressing assembly (**2**) may be mounted more easily when constructing the overall Film Maker Accessory of parts prior to installation into the Press. (See page 12, **Fig 6.)** Pre-crushing can be done in a Specac Press itself (without the Atlas™ Heated Platens in position) using a 13mm diameter evacuable pellet die P/N GS03000.

Some experiments will be required to determine the **optimum** amount of sample to load for any given thickness of film to produce from the spacer ring (**7**) chosen. If an insufficient amount of sample is used, the melted sample when pressed will not completely cover the polished surfaces (**5**) and (**6**) and the produced film will be too thin and probably wedge-shaped. If the pressed 29mm diameter film does completely cover the polished surface areas, the central 15mm diameter area will give the required thickness. This thickness should be measured and the pressing cycle procedure can be calibrated accordingly for a particular correct amount of sample required to obtain a particular thickness of film. If too much sample is loaded, although the 29mm diameter film produced may provide a consistent thickness for the

sample over the inner 15mm diameter area, a thick rim may be obtained on the film which may make mounting of the film difficult or cause the spacer ring (**7**) to stick to the assembly of components.

Note: *An optimum amount of sample to press for the particular thickness of film required is key to thin film reproducibility.*

Careful monitoring of the temperature will be required for samples (e.g. Nylon) which oxidize at temperatures slightly above the softening temperature. If the temperature of the Atlas™ Heated Platens is raised slowly, a Nylon bead within the Film Maker Accessory can be tested for softening by “feeling” through the handle of the lead screw and top heated platen pressing surface (**20**) when gentle tightening is necessary. In general these sample types should be pressed as soon as softening is observed.

It is important to ensure that all of the components used in the pressing cycle are not over pressurised in the press when the sample is cold. Failure to observe this will result in the sample cutting through the aluminium foil discs (**9**) and, when subsequently melted and pressed, sticking to the polished surfaces (**5**) and (**6**).

Note 4: Cleaning of Components

Ensure that the polished surfaces (**5**) and (**6**) and spacer rings (**7**) are kept clean at all times between pressings of samples. Remove all sticky materials by carefully scraping with a sharp blade (avoid gouging the surface) and wipe the surfaces with lint-free tissues and a suitable solvent. Water, methanol and acetone may be suitable solvents, but DO NOT use acidic or basic solutions to clean the metal parts.

The cooling chamber (**1**) should be emptied of cooling water if being stored for a long period of time. Any trapped water inside the chamber after disconnection from the water system tubing can be expelled by directing an air line into one of the water connections (**4**) and allowing the water to drain out from the other connector into a sink.

7. Legend – Bubble Number Identification

(**1**) Cooling chamber.
(**2**) Top platen pressing assembly.
(**3**) Lower platen pressing assembly.
(**4**) Water inlet/outlet ports on cooling chamber.
(**5**) Polished surface of top platen pressing assembly.
(**6**) Polished surface of lower platen pressing assembly.
(**7**) Spacer ring.
(**8**) Guide ring.
(**9**) Aluminium foil disc.
(**10**) Handle of top platen pressing assembly.
(**11**) Guide pins on lower platen pressing assembly.
(**12**) Lifting handle of lower platen pressing assembly.
(**13**) Release handle of lower platen pressing assembly.
(**20**) Top heated surface of Atlas™ Heated Platens.
(**21**) Lower heated surface of Atlas™ Heated Platens.

8. Spare Parts for the Atlas™ Constant Thickness Film Maker Accessory

GS15640 Atlas™ Constant Thickness Film Maker with cooling system and complete set of spacers.
GS15641 Atlas™ Constant Thickness Film Maker replacement cooling block chamber.
GS15642 Atlas™ Constant Thickness Film Maker replacement top and bottom film making assemblies (no spacer rings).
GS15627 200 aluminium foil discs (1 packet).
GS15628 Stainless steel forceps.
GS15269 Atlas™ Constant Thickness Film Maker replacement spacer rings (set of 6 - sizes A to F).
GS03800 Specacards 10mm diameter aperture (packet of 100 cards).
GS03810 Specacards 10 x 25mm aperture (packet of 100 cards).
GS03820 Magnetic film holder.

Notes for Constant Thickness Film Maker Use

Worldwide Distribution

France
Eurolabo - Paris.
Tel.01 42 08 01 28
Fax 01 42 08 13 65
email: contact@eurolabo.fr

Germany
L.O.T. - Oriel GmbH & Co,
KG - Darmstadt
Tel: 06151 88060
Fax: 06151 880689
email:info@LOT-Oriel.de
Website: www.LOT-Oriel.com/de

Japan
Systems Engineering Inc. -Tokyo
Tel: 03 3946 4993
Fax: 03 3946 4983
email:systems-eng@systems-eng.co.jp
Website: www.systems-eng.co.jp

Spain
Teknokroma S.Coop C. Ltda
Barcelona
Tel: 93 674 8800
Fax: 93 675 2405
email: comercial@teknokroma.es

Switzerland
Portmann InstrumentsAG
Biel-Benken
Tel: 061 726 6555
Fax: 061 726 6550
email: info@portmann-instruments.ch
Website:www.portmann-instruments.ch

USA
SPECAC INC.
414 Commerce Drive
Suite 175,
Fort Washington,
PA 19034, USA
Tel: 215 793 4044
Fax: 215 793 4011

United Kingdom
Specac Ltd. - London
Unit 12, Science & Innovation Centre
Halo Business Park
Orpington
Kent BR5 3FQ
Tel:+44 (0) 1689 873134
Registered No. 1008689 England

Brilliant Spectroscopy™

www.specac.com

SPECAC INC.
414 Commerce Drive
Suite 175,
Fort Washington,
PA 19034, USA
Tel: 215 793 4044
Fax: 215 793 4011

SPECAC LTD.
Unit 12, Science & Innovation Centre
Halo Business Park
Orpington
Kent BR5 3FQ
Tel: +44 (0) 1689 873134
Registered No. 1008689 England