







Atlas™ Lightweight  
Evacuatable Pellet Dies

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*User Manual*

2I-25410 Issue 1

# *Atlas™ Lightweight Evacuatable Pellet Dies*

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## 1. Introduction

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Thank you for purchasing a Specac product.

The Atlas™ Lightweight Evacuatable Pellet Dies have been specifically designed to work with the range of Atlas™ automatic presses up to a maximum load rating of 25 tons. The dies are also compatible for use with Specac's 15 and 25 ton manual hydraulic presses and also the 40 ton automatic press, provided a loading of 25 tons is not exceeded in this press.

The dies are made of 440C stainless steel and offered to prepare pellet discs of 32mm or 40mm diameter size. They are well suited for the preparation of solid pellets for study by X-Ray Fluorescence spectroscopy. When many samples are to be prepared for study, the physical effort required to load and remove an Atlas™ Lightweight Evacuatable Pellet Die into a press is greatly reduced, as the dies themselves are physically smaller and lighter in weight by comparison to conventional 32mm and 40mm diameter pellet dies.

To aid in the weight reduction there are no individual internal pressing pellets as with conventional dies and so a sample is compressed between the plunger and the base pieces of the die assembly. For this reason both the plunger and base have a highly polished surface that makes contact with the sample. The highly polished faces help in producing an even surface to the sample pellet and in release of the sample from the die components.

The dies have an evacuation port and can be operated using a partial vacuum for the compression of samples into pellets that may be moisture sensitive.

## *2. Unpacking and Checklist*

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Remove the Atlas™ Lightweight Evacuable Pellet Die from its protective packaging.

Please check that the following have been supplied:

- 32mm or 40mm Lightweight Evacuable Pellet Die complete.  
To include:-
- Die body
- Plunger
- Base
- O-ring kit (2 O-rings)
- Extractor cap

## *3. Safety and Die Care*

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### **Safety**

The Atlas™ Lightweight Evacuable Pellet Dies are inherently safe but when being used in a press, any safety precautions involved with operation must be observed.

Never exceed the stated maximum safe load of 25 when pressing.

### **Die Care**

The dies are made from corrosion resistant steel (440C), but because of the nature of certain materials that may be used with the dies, it is necessary to take certain precautions.

When not in use always ensure that the die and its component parts are thoroughly clean and dry, and if possible store in a desiccator.

When cleaning the plunger face and die base, do not wipe their polished faces with a cloth that has a hard abrasive texture. Always use a soft cloth or tissue.

## 4. Preparing The Die For Use

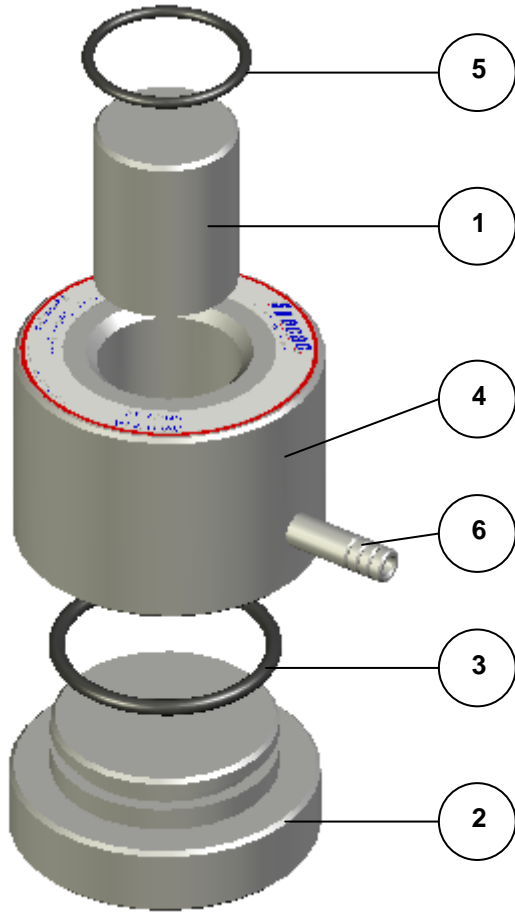
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The Atlas™ Lightweight Evacuatable Pellet Die and its component parts are packed from the factory in such a way that they do not suffer damage during transit. The optically polished surfaces of the plunger and the base are covered in a protective material and the die may be lightly coated with oil.

- 1) Before use the protective material on the plunger (1) and base (2) should be removed and all component parts must be thoroughly cleaned with an organic solvent to ensure that the protective oil is fully removed. The parts should be wiped dry taking care to use non-abrasive cleaning cloths on the polished faces of the plunger (1) and the base (2).
- 2) Place the base (2) onto the bench top. Ensure the base O-ring seal (3) is correctly positioned in the groove on the base (2) and is not damaged.
- 3) Assemble the Cylinder Body (4) by pressing down onto the base (2). A tight fit between the parts is achieved from contact with the base O-ring seal (3). (See diagram page 8.)

The die is now ready to accept a sample for compression. The sample can be either a solid powder material alone or a solid powder material contained in a support cup.

**Note:** *For X-Ray Fluorescence analysis solid powder samples are usually contained in an aluminium or plastic support cup of 32mm or 40mm diameter corresponding to the particular diameter size of die. A variety of support cups for this purpose can be purchased through Specac.*



Exploded diagram of Atlas™ Lightweight Evacuatable Pellet Die



## 5. Filling The Die With Sample

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A solid powder sample can be transferred for filling the die using a spatula or a by making a paper chute or funnel.

If you are using an aluminium or plastic support cup with a solid sample, ensure that an empty support cup is first placed into the die and pushed towards the base (2). You can use the plunger (1) to gently guide the support cup down inside the cylinder body (4). If using a support cup the amount of solid sample powder that you can place into the die should never be at a level higher than the lip of the support cup.

When all of the sample powder to be compressed has been placed into the cylinder body (4) use the tip of a spatula to spread the powder such that it has a flat, evenly distributed surface. Preparation of the uncompacted powder surface helps to produce a more homogeneously compressed sample pellet.

The plunger (1) is now inserted into the cylinder body (4) ensuring that the optically polished face of the plunger is contacting the sample powder.

When the plunger (1) has reached the limit of its travel take the plunger O-ring seal (5) and press it into place around and over the plunger (1) and into the recessed chamfer at the top of the cylinder body (4).

The complete die assembly is now ready to be placed in a press.

## 6. Making the Pellet

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Place the prepared die assembly in its upright position (as diagram) into a hydraulic press.

At this stage the die assembly may be connected to a vacuum pumping system via the evacuation port (6) on the cylinder body (4). Vacuum quality rubber tubing can be routed through to the pressing area of any Specac press to fit over the evacuation port (6) whilst the die is being compressed. A regime for evacuation time and application may be devised for a specific sample or set of samples to be compressed. If using a vacuum, apply evacuation to the die assembly prior to compression in the press.

**Note:** *Evacuation of the die assembly can help in the production quality of certain pellets depending on the dryness of a sample.*

Follow the specific instructions for operation of your press to apply a load to the die assembly. The Atlas™ Lightweight Evacuatable Pellet dies have a maximum load limit of 25 tons.

**Warning:** DO NOT EXCEED THE MAXIMUM LOAD.

Keep the load applied to the die assembly for however long it is necessary to produce an acceptable sample pellet.

If using a vacuum pump system, evacuation should proceed during the application of load and be maintained for a further minute after the load has been released.

## 7. Removing The Pellet From The Die

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When the die assembly with powder sample has been compressed and the load has been released, remove the die assembly from the press. (Disconnect any vacuum tubing to the die if this has been used.)

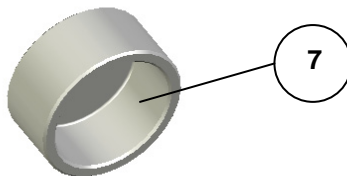
The following procedure is adopted to remove the compacted powder pellet from the die.

- 1) Remove the base (2) from the cylinder body (4) leaving the plunger in position.
- 2) Invert the die assembly and place the hollow, open end of the extractor cap (7) onto the underside of the cylinder body (4). This configuration of parts creates a space for the compacted pellet to be pushed into after further travel of the plunger (1).
- 3) Place this new inverted assembly back into the press and apply a light load between the extractor cap (7) and the plunger (1).

**Note:** *The compacted pellet will emerge first from the cylinder body (4) followed by the plunger (1).*

- 4) When the compacted pellet is accessible, release any applied load and remove the die assembly from the press.

The prepared compacted pellet sample can now be analysed by an appropriate technique.



**View of hollow end of extractor cap used for pellet removal**

## *8. Cleaning And Storage Of The Die*

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When the Atlas™ Lightweight Evacuatable Pellet Die is not in use, ensure it is clean and stored correctly.

Depending on the sample types (inorganic or organic chemicals) that have come into contact with the parts of the die, all can usually be removed by a combination of washing with warm water, then distilled water and finally with methanol.

The die parts are then dried and can be stored in a desiccator, warming cabinet or left on a warm (35C) hot plate. When drying with a cloth ensure the material is non-abrasive to protect from scratches to the polished faces of the plunger (1) and die base (2).

## *9. Legend For The Die*

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- 1) Plunger.
  - 2) Base.
  - 3) Base O-ring seal.
  - 4) Cylinder body.
  - 5) Plunger O-ring seal.
  - 6) Evacuation port.
- Extractor cap

## *10. Spare Parts For The Die*

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### **Complete Dies**

P/N GS25410 Atlas™ 32mm Lightweight Evacuable Pellet Die

P/N GS25411 Atlas™ 40mm Lightweight Evacuable Pellet Die

### **Individual Spares**

P/N GS25412 Atlas™ 32mm die body

P/N GS25413 Atlas™ 32mm die plunger

P/N GS25414 Atlas™ 32mm die base

P/N GS25415 Atlas™ 32mm die O-ring kit

P/N GS25416 Atlas™ 40mm die body

P/N GS25417 Atlas™ 40mm die plunger

P/N GS25418 Atlas™ 40mm die base

P/N GS25419 Atlas™ 40mm die O-ring kit

P/N GS03297 Extractor cap for Atlas™ Lightweight Evacuable Pellet Dies









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