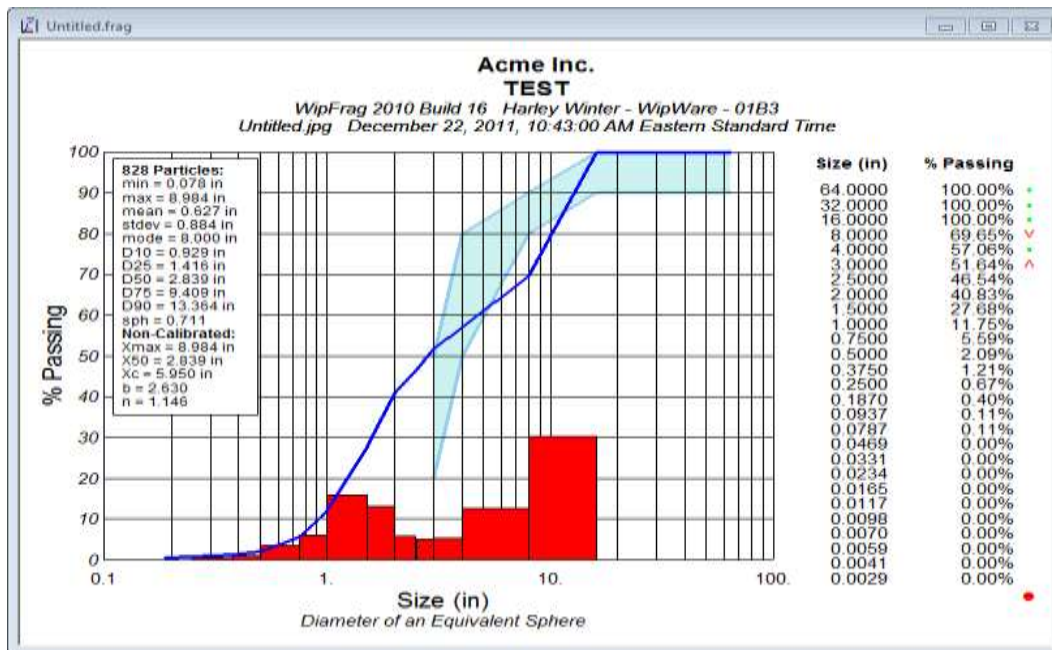


## MailFrag® Service

WipWare Inc. offers a fragmentation analysis service with images provided to us by email, or FTP. This service will allow you to experience firsthand the effectiveness of our fragmentation analysis system and the usefulness of size distribution measurements.



Analysis Includes: Easy to read data merged graphical output including Cumulative Curve, Histogram and Sieve Size Chart (ISO or US Sieve Sizes)  
 CSV Log files for importing into Excel. Custom Sieve sizes are available upon request.

Results are delivered usually within 24 hours of receiving your images!  
 Send us your images of blast fragmentation, crushing or screening results that you need measured and let us do the work!

Images for analysis are accepted in the following formats:  
**Digital camera** outputs should be saved as JPG, TIF or BMP before sending.  
**Video cassette:** DV, 8mm or VHS (S-VHS) can be sent to us as well. We have no specific picture sizing requirements. (Although we recommend 1024x768 for digital photos)

## MailFrag® Sampling Factsheet

You can only measure what you can see; so reliable results call for some basic precautions in selecting suitable viewpoints, and in photography. Develop a sampling strategy. Taking images is like taking samples for sieving or other tests. The results must statistically represent the product as a whole.

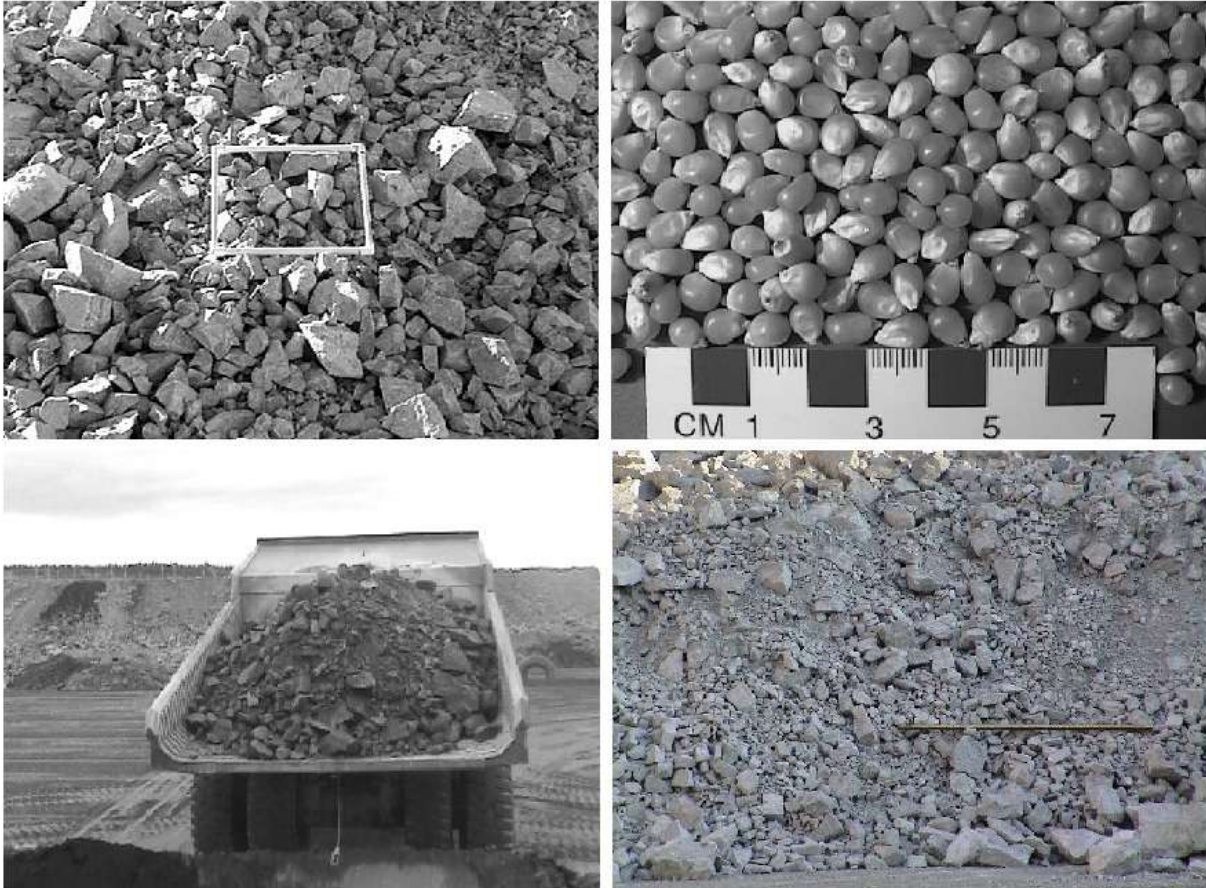
To adequately compensate for rockpile segregation and heterogeneity, each image must contain a sufficient number of fragments, and the results from tens of images per blast must be merged and averaged. Accurate estimation of larger blocks in particular requires merged data because of the scarcity of such blocks. High-fidelity, high-speed automatic edge detection is essential - methods that rely on tracing or manual editing are incapable of processing sufficient data and so are prone to large sampling errors.

- Fill the field of view with fragmented rock, preferably at least 200 particles
- Video and still images greatly improve when a tripod is used. Hand-held shots are seldom sharp particularly telephoto shots where the slightest movement causes image blur.
- Include all sizes. No single block should occupy more than 20% of the width of image. For improved resolution of fines, use WipFrag's zoom-merge capability to combine images at different scales of magnification.
- Take several shots, preferably of at least five at random locations on a large rockpile, or of several truckloads or drawpoints. For improved estimates of oversize, increase the number of full-scale shots to at least ten.
- Beware of rockpile segregation. Large blocks tend to roll to the outer edges and fines may cover the surface or become hidden as a result of gravity or rainfall. The effects can be minimized by increasing the number of images per sample but only with careful selection of image locations.
- 1024x768 is recommended for digital pictures to find an EDP easily. Good clarity and contrast is better than size. (Although, any size picture can be used.)
- Wide angle lens have edge distortion. Try to avoid them.
- Digital Zooming results in interpolated pixels and should not be used.
- You should try to use a suitable size scale for each picture. Avoid using balls as they are dimensionally unstable (i.e. Air filled balls expand/contract, softballs are too small, etc. Range rods, yard/meter sticks work well.)
- Don't waste an image. Get images of the particles in question, not the sky and area around it.
- WipFrag measures what it can see. If your pictures are far away, fines will not be resolved. If the image is taken too close, oversize may be missed. Get a good mix of images of the sample in question.

## Lighting and Photography

- Provide uniform indirect or diffuse lighting to avoid excessive shadows and "hot spots". Modern video cameras are light-sensitive and do not require brilliant illumination. WipFrag works best when each fragment is equally bright and surrounded by a thin, uniform shadow.
- For underground photography, choose area illumination with several mediumpower lamps in preference to direct flash or spotlight. Copy stand photo-analysis of prints or crushed rock samples is usually best with ambient fluorescent or window illumination. For outdoor work, choose dull days in preference to bright sunlight.
- Avoid wide-angle close-up photography and oblique shots that distort the scale.
- Include in the image at least one scaling object of known length, such as a 2 m white scale bar along the lower edge of the image.
- Position the scale near the edge of the image so as not to obscure the rock you are trying to measure. When using a video camera at a fixed object distance, the scale is required only during the initial or final frames.
- If the rockpile surface is oblique to the camera, place scaling objects at the nearest and furthest points that can be averaged or used in auto-tilt correction. When in doubt, use two scales.
- When obtaining images, imagine that you will have to "outline" the edge of each and every particle you wish to measure. This is what the software does automatically. Keep this in mind, so the image resolution will be adequate for the software to define the sizes accurately.
- Even lighting is ideal. Avoid shadows. An overcast day is good for outdoor photos.

## Typical Images



No Set-up or shipping charges, no extra cost for special software outputs, no “up charge” for 24hr service. Please check to make sure 24 hour turnaround time is possible.

Free FTP services available upon request for larger studies.

## FAQs

### **Are larger images better than smaller ones?**

- Large and small images each have their pros and cons. Fines can be delineated easier with larger images and tend to get fused together with smaller images.
- Oversize is usually analyzed properly with smaller images, but tends to get slightly disintegrated in larger images.
- Smaller images analyze and are edited much faster than large images.
- Editing the net will take longer if the image size is larger than your screen size as there is no fractional zooming capability in the software.

WipWare always recommends taking the original images at a high resolution. It is always possible to downsize the image without distortion, but nearly impossible to make an image larger while keeping clarity and definition. As a rule of thumb, if you cannot delineate the particle with your eye, the software will be unable to as well.

### **What should I use as a proper scale?**

WipWare recommends using any solid scaling device with a contrasting color to the material which can be laid down flat onto the material in question. Range rods, yard/meter sticks and customized frames can all be used. WipWare discourages the use of balls as they can expand and contract with changes in temperature and altitude. Be sure to have the scaling device perpendicular to the camera.

### **Where should I place the scaling devices?**

Scaling device(s) should be placed in an easy to see location. Depending on the size of the pile of particles being analyzed, one or two scaling devices will be needed. Larger samples and images where you cannot be perpendicular to the pile will require two scales. Two scales will allow the software to correct for tilt in the image. Scales must be separated vertically within the image and are usually placed at the foot of the pile and half way up.

### **How many images should I take of the material?**

The number of images needed to properly analyze muckpiles or other sample is dependant on a number of things and changes from condition to condition. The 2 questions to ask yourself while obtaining your images are simply 1) can I delineate all of the particles within these images and 2) when done, will I have gathered an adequate statistical representation of the material in question?

**MailFrag<sup>®</sup> Service Price List<sup>1</sup>**

<u>DESCRIPTION:</u>	<u>PRICING</u>
Single Studies - (up to 20 images per study <sup>2</sup> ), each	450.00
Single image analyses, each	40.00

University and Research Groups, please call to see if you are eligible for discount pricing.

<sup>1</sup> All prices are in US dollars. All analysis include graphs, a sieve size chart (US sieve or metric) a spreadsheet data file suitable for importation into Excel and a critique on the quality of the images. Please ask for our brochure on photographic sampling techniques & methods.

<sup>2</sup> Poor quality images will need to be manually edited, consequently fewer images may be used for an analysis. This pricing is valid for 90 days from the date it was issued. WipWare reserves the right to change specifications, products and programs at any time to better serve the needs of their clients.

The title of the project, the date of the project and the size of the scaling device(s) in each image are all important components to the analysis. For multiple samples, keep track of the images you have taken so you know which analysis to merge together.

If you have any questions or concerns please contact:

**WipWare Technical Support**

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