

## In – Situ Metallography Kit

On site non destructive inspection kit of metallography, used where the conventional techniques of specimen preparation can not be applied. The kit of practicing metallographers for any critical site applications considering the user friendliness, weight, result and it's repeatability. Excellent result can be achieved by methodical practice and employing good consumables with little practice.

**Application areas** – Insitu technology has various applications like for the study of micro structure of localized corrosion, high temperature oxidation & hot corrosion, large/ bulky jobs on their critical areas, weldment, cracks on the structures, pipes, pressure vessels, dies, pressure parts, and so many for the purpose for their residual life / structural integrity assessments / failure investigations. It also has applications like in life in life extension strategies, original design modification, maintenance, accelerated corrosion study and safety.

### Application Industries –

Power generation, Fertilizer, petrochemical, aerospace, defense, automobile, steel, oil and gas, off shore structures and chemical processing industries, research and education.

## Portable Grinder / Polisher – PORTGRINDER

Heavy duty grinder with right angle attachment



Variable speed, flexible shaft, portable high torque grinder for heavy and light duty site application. One can attach (32mm), various coarse and fine grinding replaceable self adhesive (PSA Backed) papers and lapping cloths disc for surface preparation. Grinder has right angle grinding attachment.

### Technical data –

Motor : 0.85 HP

Main supply : 230V, AC 50Hz, single phase

Speed : step –less variation up to 10000rpm

Supplied with rubber discs, various grade emery papers, clothes, diamond pastes.

## Light weight exceedingly small portable grinder



Extremely useful when carrying weight and power supply connection is problem. The grinder delivers enough torque for site application. It has an accessory of drilling. This is useful for drilling a hole in a big job of stainless steel for anodic connection.

Technical data -

Speed – 10000-30000 rpm

Motor – 125 watts, both motor & regulation electronics built in the handle of grinder.

Weight – 450gms(for easy handling on various applications)

Accessory – flexible shaft

Supply – battery operated.

## Portable auto electro polisher -



A) Power source

Portable electro polisher finds an application of polishing especially stainless steel & caters other application.

Technical data –

Supply unit – 220 V. single phase A.C

Current rating – up to 2.5 Amp.

Voltage rating – up to 60 volts

Modes – polishing / etching (external)

Polishing timer – 0 to 99 sec



B) Electrolytic polishing cell with pen type polishing probe, associated with electrolyte reticulation system with pump

Technical data –

Circulation pump – 25 watts, 230 A.C. single phase

Electrolyte reservoir – 0.5 ltr.

Probe – recalculating pen type

Swabbing type of probe for general polishing / etching application with 200ml breaker for electrolyte storage.

## Portable Microscope –



Incident light microscope, to offer magnification up to 800X. with unique feature of stage scanning movement battery backup system etc.

### Technical data -

Total magnification – 100x to 800x

Objective – MF10x, MF20x, MF40x (achromatic objective) replaceable

Eyepieces – WF10x, 20x

Stage movement – X-Y direction with knobs for surface scanning (unique optional feature)

Light source – 6V-20W halogen bulb

Power supply – adaptor of 230V, A.C

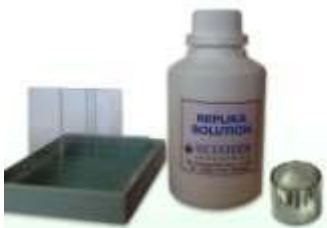
Battery – back up with battery charge

## Magnetic stand for microscope



Magnetic base stand help positioning the microscope in any position for detailed micro-observation and for photography.

## Replica Kit-



Transparent Replica Kit –

Replica roll (Transparent), glass slides, and replica liquid (This replication techniques is operator skill dependent.)

## Portable image analyzer for in-situ applications



Now one can grab and analyze the image on site with the help of powerful image analyzer. This can save the time and efforts of replica preparation, help analyzing the image on the spot, generation the vast data base, transmitting the image from the site by email etc. the software is loaded on laptop.

### Camera –

High resolution camera with built in image grabbing facility. Very low weight, small size camera that is directly attached to any lap-top computer through USB port. Attached to the microscope by “C” mount adaptor. Camera has own software for image correction, HIS, contrast, balanced bundled with image database maintenance software.

### Specification-

Image device	–	1 / 2.5”
Resolution	-	8.0 mega pixels (3264 x 2448)
Pixel size	–	1.758 x 1.75 microns
Color filter	–	RGB 24 Bit
Exposure time	–	0.1 milli seconds to 12 seconds
White balance	–	automatic, manual

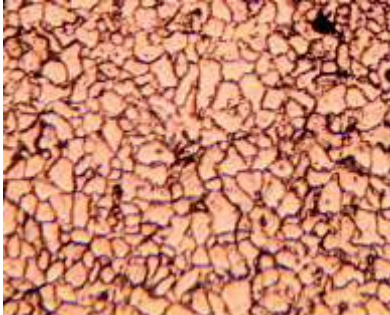
(camera model and specification are subject to availability of recent mode)



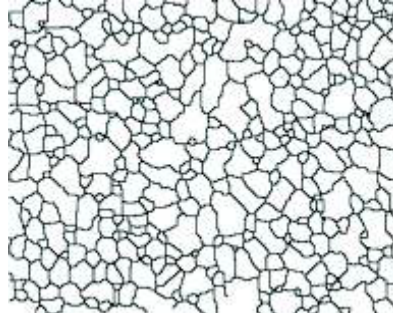
## Software modules –

Grain size estimation

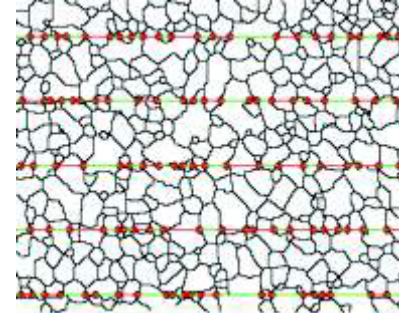
Grain size measurement with grain area cleaning and boundary reconstruction facility and auto intercept marking



Original Image



Processed Image



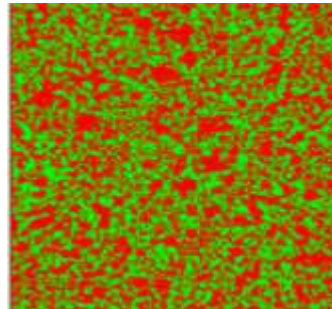
Grain size 6.5

## Phase analysis

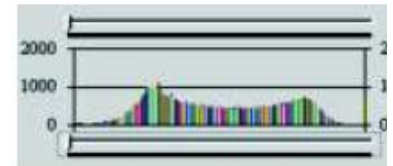
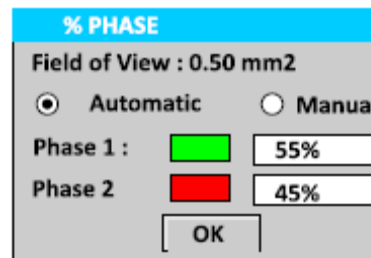
Percentage phase analysis or area fraction



Original Image

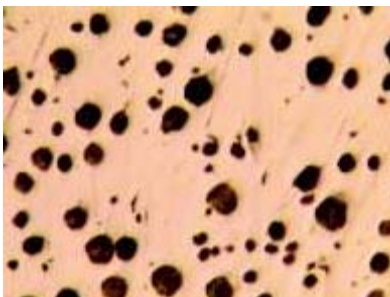


Processed Image

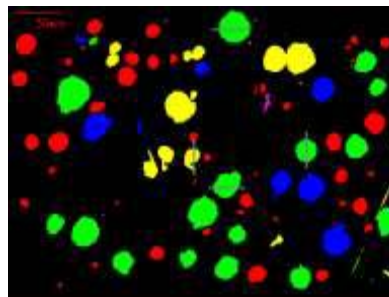


## Nodularity analysis

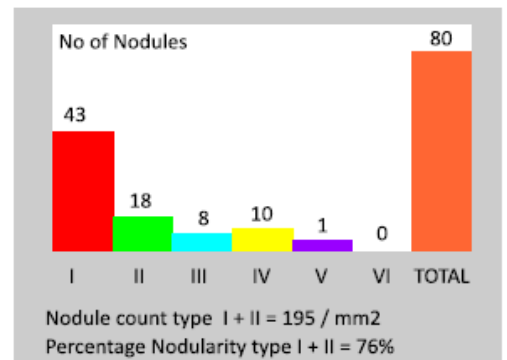
Nodule count, % nodularity analysis, distribution, nodule classification.



Original Image

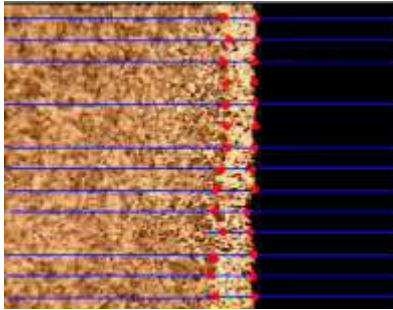


Processed Image



## Linear Measurement

Plating / coating / decarburization / banding measurement and degree of orientation / decard / interlammellar dist., distribution, dendritic arm spacing, defects etc.



L1	53.359	L6	53.359
L2	55.025	L7	55.025
L3	43.333	L8	43.333
L4	50.028	L9	50.028
L5	53.359	L10	53.359
Average		53.3508	um



### Other modules

- Serpentine crack length measurement
- Graphite flake analysis for size class analysis
- Movable micron marker
- Customized developments can be undertaken, under special contract.

### Data base maintenance, reports

Image data base maintenance / management software with facility of comparison of images and image gallery, report generation.