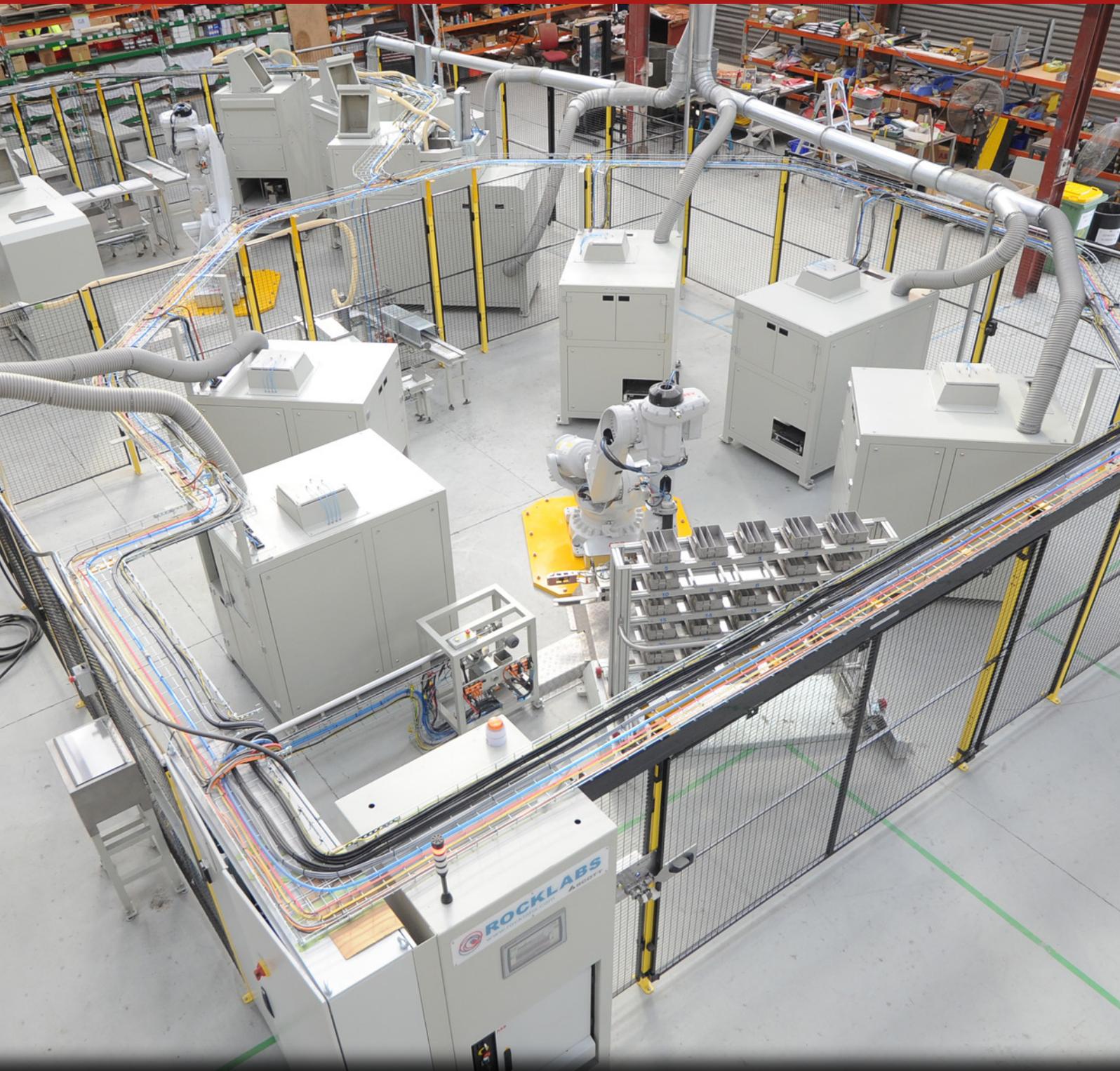




## MINING & SAMPLE PREPARATION SOLUTIONS



# SCOTT & ROCKLABS - A CENTURY OF INNOVATION AND INVENTION

## 1913 - The Beginning



Scottish immigrant engineer John Scott joined his engineer sons Andrew & John Scott in establishing a business in Leith Street, Dunedin in April 1913

## 1933 - Challenging Times



The economic woes of the 1930's had only a limited effect on the company. Machinery was now being serviced in many Dunedin factories like Shacklock's and Cadbury's and work on motor cars and trucks increased

## 1953 - Change in Direction



During the 1950's, while motoring work continued, the firm set up a washing machine manufacturing plant and the Scott washing machine (soon branded Whirlpool) became a sought after item during the 1950's boom years

## 1969 - Rocklabs



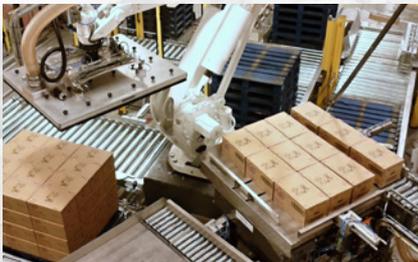
Rocklabs was established as a commercial laboratory specialising in geochemical analysis and fire assaying. Since 1975 Rocklabs has been a global innovator in sample preparation equipment

## 1973 - Reputation for Excellence



Scott moved to new premises and focussed on the core business of designing and producing machines for industry

## 1993 - Going Global



Scott establishes itself as a major player in the international market in spite of the distance from customers. In 1997 Scott Technology listed on the NZ stock exchange

## 2013 - Growth & Diversification



Exports now account for over 90% of the company's revenue and expansion has continued by the acquisition of several carefully selected companies

## 2018 - US & European Expansion



Scott group strategically positioned to grow the US market, while increasing the global Scott team to over 750 employees

## THE SCOTT GROUP

At Scott we automate the future. For over 100 years Scott has looked to tomorrow and rapidly responded to shifting needs. Today, we have production bases in the United States, Germany, France, Czech Republic, Belgium, China, Australia and New Zealand and customers in over 88 countries.

The production machinery we design and build delivers productivity gains and exceptional reliability to many of the world's leading businesses. We also go a step beyond engineering production solutions to revolutionising entire industries - using technology and robotics to automate manual processes and create a genuine competitive advantage.

We have a real commitment to developing new technology and bringing it to market. Across everything Scott does you will discover true quality, advanced engineering and a renowned design aesthetic.

In 2008 Rocklabs became part of Scott allowing us to deliver sample preparation equipment to mining clients, commercial laboratories and research institutions. Scott is now a leading supplier of crushers, pulverisers and sample dividers for the mining of gold, silver, platinum and palladium.

Our research and development teams can also create custom solutions to fit unique needs and situations, adapting and producing new technology to suit a wide variety of environments.

Scott export our Rocklabs equipment to over 100 countries and is also a world-leading producer of high-quality Certified Reference Materials, recognised as the most accurate and reliable reference materials globally and are tested and certified.



# SAMPLE PREPARATION EQUIPMENT

## BOYD CRUSHERS

The Rocklabs Boyd crusher, the world's first double acting jaw crusher that revolutionised sample processing, is available in a range of size and configuration options. The Boyd remains the crusher of choice for countless laboratories globally, renowned for its high performance, ease of maintenance and operational reliability. Featuring top & bottom moving jaws, each Boyd system delivers maximum crushing performance, reducing samples by up to 35times their original size. The Boyd Elite consistently performs to a 90% passing 2mm result - no other crusher can consistently achieve this pass rate. Characterized by ease of maintenance and cleaning and equipped with stringent safety mechanisms each the Boyd range reduces the time and cost associated with the crushing process. Designed to function as a stand alone machine or in combination with a Rocklabs Rotating Sample Divider (RSD) or Linear Sample Divider (LSD) machine.

## BOYD RANGE



### Boyd Elite

- » Increased infeed sample size to 70mm
- » Greater adjustment range on jaw gap, down to 1mm
- » Lower running temperatures
- » Increased shaft and bearing diameters for improved reliability
- » Improved Safety and ergonomics

### Smart Boyd RSD/LSD Combo

- » The Smart Boyd Crusher RSD Combo has all of the benefits of the Boyd RSD combo but also includes automation to accurately split to a consistent output mass.
- » Smart Boyd also available as an LSD combo featuring touch screen & linear sample dividing technology



### Big Boyd

- » Jaws hold up to 20kg of sample in a single load.
- » Options for either manual loading, or mechanical sample lifting device to handling heavy samples.
- » Other configuration options include Waste conveyors and an outfeed RSD.

### Mid Boyd

- » Accepts direct feed of full drill core, including PQ/ HQ/ NQ/ BQ sizes.

### BOYD RANGE COMPARISON

	Boyd Elite	Mid Boyd	Big Boyd
Input Size	70mm	110mm	160mm
Output	2mm	4mm	10mm
Jaw Width	300mm	300mm	400mm
Capacity	5kg	15kg	20kg

### WARRANTY & LIFE EXTENSION

Scotts range of Rocklabs Boyd Crushers come with a 2000 hour or 12 month warranty (whichever comes first), covering all parts (excluding wear parts) and labour if used under normal laboratory conditions.

The Boyd Elite is backed with a 3000 hour or 18 month warranty (which ever comes first)

## OTHER CRUSHERS

### Hammer Mill

- » This machine is a reliable, safe and robust rock crusher designed to crush samples from 60 mm down to 2 mm with a 95% pass. This is the perfect machine for processing a wide variety of materials including samples with high moisture content or the ones that tend to form lumps such as coal, limestone, laterite, saprolite, bauxite, gypsum rock or other related soft to medium-hard minerals.



### Hydraulic Crusher

- » This machine provides a very efficient, low-contamination means of processing small trace metal samples prior to pulverising in a Rocklabs Ring Mill or similar piece of equipment. Rock samples up to 50mm diameter can be crushed down to minus 5mm or less. It can also break rocks up to 150mm diameter, replacing a jaw crusher in the preparation of trace metal samples.



## ROTATING SAMPLE DIVIDERS

The Rocklabs Rotating Sample Divider is designed to split out a representative portion of the sample, providing best practice unbiased, proportional sub-sampling with adjustable split ratio and either single or duplicate outputs.



### Standalone RSD

- » This divider is designed to split out a representative portion of the sample with a proportion of 2-50%. There are two splitting options available, the first is a single split & remainder. The second option is a duplicate split & remainder, with a bypass bin available for option two.

### Benchtop RSD

- » Designed to be placed on a work bench and can be used in conjunction with Benchtop Ring Mill. This machine takes a representative split of any proportion from 2-50% (sample and remainder).

### RSD RANGE COMPARISON

	Standalone RSD	Benchtop RSD
Input Size	10mm	10mm
Capacity	25kg	5kg
Weight	135kg	85kg

### DIVIDING

Method	Standard Deviation %
Cone & Quartering	6.810
Scoop Sampling	5.140
Riffle Splitting	1.010
Table Sampling	2.090
<b>Rotating Splitting</b>	<b>0.125</b>
Random Variation	0.076

A rotating sample divider is demonstrated to provided the best results, in comparison to alternative splitting methods. \*\*Critical evaluation of powder sample procedures". Allen T& Khan A.A "The chemical Engineer", May 1979, pp108 - 112

## ROCKLABS LINEAR SAMPLE DIVIDERS

The Rocklabs Linear Sample Divider provides similarly unbiased splits to an RSD, and is well suited to automation, multiple splits, and split ratio adjustment.

## PULVERISERS

The range of Rocklabs Pulverisers is designed to process a variety of materials from 1g-10kgs for subsequent analysis by instrumental methods or wet chemistry. They are reliable, safe and robust and designed to process samples to a final size of -75 microns with very low contamination of samples.

### PULVERISER RANGE COMPARISON

	Max Input Size	Product Size	Sample Size	Machine Mass
CRM	8mm	Single tier: -300µm (+80%) Double tier: -100µm (+95%)	1-10kg	475kg
ABM 3000	5mm	95% -75µm	1500g	
RM1000	8mm	75µm	1-1000g	390kg
RM2000	10mm	75µm	200-1500g	390kg
Benchtop Ring Mill	8mm	100µm (95%)	1-100g	67kg

### PULVERISER RANGE



#### RM1000

- » For samples 1g-1000g with either a Pneumatic Airbag clamp or Rotoclamp Mechanical clamp.



#### RM 2000

- » For samples 200g-1500g with a two handed head clamping operation and an optional pneumatically operated lifter for assisted head locating during loading and unloading of each sample.



### Continuous Ring Mill

- » For pulverising large samples from 1kg to 10kg.
- » Single tier head option for coarse pulverising, and Double tier for fine processing.
- » Integrated RSD, with many outfeed split configurations available.



### ABM 3000

- » Batch loading of up to 30 samples at a time without intervention.
- » A variety of head sizes, material, and configuration available.
- » Touch screen panel and PLC control with flexibility and configuration for different sample types.
- » Auto sand wash, compressed air blow down, and vacuum for automated cleaning between samples.



### Benchtop Ring Mill

- » Small and compact.
- » Very low contamination of samples.
- » Low maintenance.
- » Noise level less than 80 decibels.

## SPARE PARTS & CONSUMABLES

ROCKLABS pulveriser heads are available for all our pulverisers, with many size, configuration and material options available to suit our Bench Top, Manual and Automated mills. Bench Top Ring Mill and the Standard Ring Mill with the choice of head determined by the size and type of sample being pulverised. Compositions can be provided with an adaptor plate to suit all types of pulverisers and range from chrome and carbon steel, tungsten carbide, agate and zirconia, with sizes from as small as 40g through to 1.5kg.

Apart from the Range of Heads, there is also a variety of spare parts for standard equipment on offer.

Contact our agents or sales team for any options not listed below, or to discuss customised configurations.

## RANGE OF HEADS - SPECIFICATIONS & PART NUMBERS

key	B	L	SRM	D	P	R	SPD	BTRM
	Bowl	Lid	Standard Ring Mill	Single Discus	Puck	Ring	Split Discus Set	Benchtop Ring Mill

	Machine	Complete Head	Bowl	Lid	Ring and/or Puck Set	Split Discus Set	Single Discus Set	Rec Sample Weight	Bowl Outer
Carbon Heads	BTRM/SRM	CARB-40-BLP	CARB-40-B	CARB-40-L	CARB-40-P	NA	NA	Min 1g / Max 40g	102mm
	BTRM/SRM	CARB-100-BLSPD	CARB-100-B	CARB-100-L	NA	CARB-100-SPD	NA	Min 20g / Max 100g	110mm
	SRM	CARB-200-BRP	CARB-200-B	CARB-200-L	CARB-200-RP	NA	NA	Min 5g / Max 200g	164mm
	SRM	CARB-250-BLSPD	CARB-250-B	CARB-250-L	NA	CARB-250-SPD	NA	Min 20g / Max 250g	164mm
	SRM	CARB-350-BLRRP	CARB-350-B	CARB-350-L	CARB-350-RRP	NA	NA	Min 20g / Max 350g	218mm
	SRM	CARB-500-BLRPPP	CARB-500-B	CARB-500-L	CARB-500-RPPP	NA	NA	Min 20g / Max 500g	218mm
	SRM	CARB-600-BLSPD	CARB-600-B	CARB-600-L	NA	CARB-600-SPD	NA	Min 100g /Max 600g	218mm
	SRM	CARB-800-BLD	CARB-800-B	CARB-800-L	NA	NA	CARB-800-D	Min 200g /Max 800g	254mm
	SRM	CARB-1000-BLSPD	CARB-1000-B	CARB-1000-L	NA	CARB-1000-SPD	NA	Min 200g / Max 1000g	254mm
Chrome Heads	BTRM/SRM	CHRO-40-BLP	CHRO-40-B	CHRO-40-L	CHRO-40-P	NA	NA	Min 1g / Max 40g	102mm
	BTRM/SRM	CHRO-100-BLSPD	CHRO-100-B	CHRO-100-L	NA	CHRO-100-SPD	NA	Min 20g / Max 100g	110mm
	SRM	CHRO-200-BLRP	CHRO-200-B	CHRO-200-L	CHRO-200-P	NA	NA	Min 5g / Max 200g	164mm
	SRM	CHRO-250-BLSPD	CHRO-250-B	CHRO-250-L	NA	CHRO-250-SPD	NA	Min 20g / Max 250g	164mm
	SRM	CHRO-350-BLRRP	CHRO-350-B	CHRO-350-L	CHRO-350-P	NA	NA	Min 20g / Max 350g	218mm
	SRM	CHRO-500-BLRPPP	CHRO-500-B	CHRO-500-L	CHRO-500-P	NA	NA	Min 20g / Max 500g	218mm
	SRM	CHRO-600-BLSPD	CHRO-600-B	CHRO600-L	NA	CHRO-600-SPD	NA	Min 100g /Max 600g	218mm
	SRM	CHRO-800-BLD	CHRO-800-B	CHRO-800-L	NA	NA	CHRO-800-D	Min 200g /Max 800g	254mm
	SRM	CHRO-1000-BLSPD	CHRO-1000-B	CHRO-1000-L	NA	CHRO-1000-SPD	NA	Min 200g / Max 1000g	254mm
Agate, Tungsten Carbide & Zirconia Heads	BTRM/SRM	TC-40-BLP	TC-40-B	TC-40-L	TC-40-P	NA	NA	Min 1g / Max 40g	102mm
	SRM	TC-200-BLRP	TC-200-B	TC-200-L	TC-200-RP	NA	NA	Min 10g / Max 200g	170mm
	BTRM/SRM	ZIRC-40-BLP	ZIRC-40-B	ZIRC-40-L	ZIRC-40-P	NA	NA	Min 1g / Max 40g	102mm
	SRM	ZIRC-200-BLRP	ZIRC-200-B	ZIRC-200-L	ZIRC-200-RP	NA	NA	Min 10g / Max 200g	157mm
	SRM	AGAT-50-BLP	AGAT-50-B	AGAT-50-L	AGAT-50-P	NA	NA	Min 10g / Max 50g	150mm
	SRM	AGAT-200-BLRP	AGAT-200-B	AGAT-200-L	AGAT-200-RP	NA	NA	Min 40g / Max 200g	190mm

**COMPOSITION OF MATERIALS**

All figures presented in ppm, except where noted are typical to maximum values

Symbol	Element	Agate	Carbon Steel	Chrome Steel	Tungsten Carbide	Zirconia
Ag	Silver		0.3			<0.2
Al	Aluminium	Trace	300	300	30	70
As	Arsenic			<100	<10	<1
Au	Gold		<0.2			0.04
B	Boron				<10	
Ba	Barium				<10	160
Br	Bromine					1
C	Carbon		0.48%	2%	5.50%	
Ca	Calcium		40		50	150
Cl	Chlorine					<10
Co	Cobalt		30	200	10%	3
Cr	Chromium		1200	12%	50	<10
Cs	Caesium					<1
Cu	Copper		250	200	30	<10
Fe	Iron	Trace	98%	86%	100	70
Ga	Gallium					1
Hf	Hafnium					1.30%
In	Indium					0.01
K	Pottasium	Trace			30	<20
La	Lanthanum					7
Mg	Magnesium					2%
Mn	Manganese	Trace	7000	3500	50	3
Mo	Molybdenum		100	100	50	<10
N	Nitrogen				100	40
Na	Sodium	Trace		<500	30	
Nb	Niobium		2	50	100	<10
Ni	Nickel		200	800	50	
P	Phosphorus		<100	140	30	
Pb	Lead		5	<100	30	<10
Rb	Rubidium					<10
Re	Rhenium					<0.05
S	Sulphur		<350	100	50	
Sb	Antimony		10		10	3
Sc	Scandium					1
Se	Selenium					<10
Si	Silicon		2500	4500	50	220
Sn	Tin		20	<100		
Sr	Strontium		0.3			1000
Ta	Tantalum		0.4		30	<1
Th	Thorium		0.4			4
Ti	Titanium			<100	30	450
U	Uranium		<1			0.6
V	Vanadium		<100	200	30	0.1
W	Tungsten		7	200	84,50%	<2
Zn	Zinc		10	<100	30	<10
Zr	Zirconium		<1	<100	<10	70,30%
Ce	Cerium					<10
Eu	Europium					0.5
Gd	Gadolinium					<0.5
Lu	Lutetium					0.3
Nd	Neodymium					<1
Sm	Samarium					<0.1
Tb	Terbium					<0.3
Y	Yttrium					0.1
Yb	Ytterbium					1

Rare Earths

## OTHER STANDARD EQUIPMENT

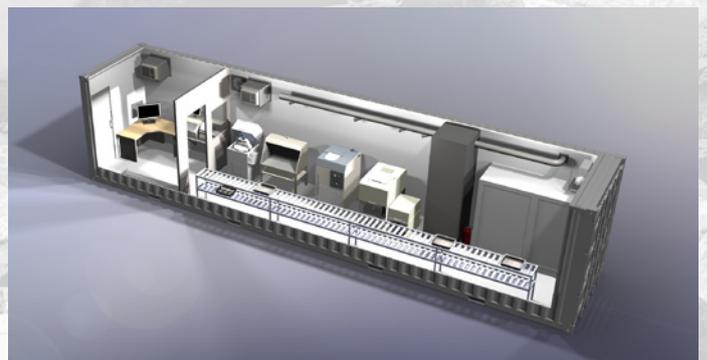
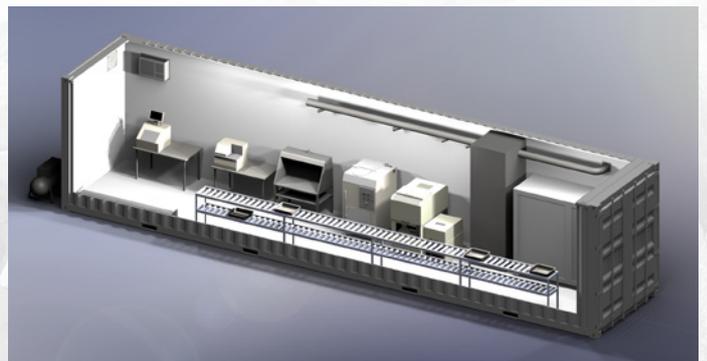
### Gravity Gold Concentrator

- » This machine is designed to eliminate problems associated with achieving accurate analysis of coarse gold samples. Traditionally when processing samples containing large gold particles, extraction has been difficult to ensure all gold is absorbed and an accurate analysis achieved. The Gravity Gold Concentrator allows a more accurate analysis of the true amount of gold in a sample. Working with samples of up to 10kg, coarse gold samples can be analysed quickly and accurately, and low grade sample results can be recorded that would otherwise fall below instrument detection limits.



### Container Labs

- » Fully self contained, transportable container laboratories are almost limitless with their applications and they can be fully operational within hours of arriving on site. Used on exploration projects for the pre-screening of samples or as an on-site mining laboratory. They are customisable and made to withstand even the harshest of climates with operators able to work in complete protection from external conditions in a controlled environment. Fully certified to meet international shipping requirements and can be designed for 20ft or 40ft containers.



## REFERENCE MATERIALS

### CERTIFIED REFERENCE MATERIALS

Also known as laboratory standards, Reference Materials, are pulverised rock with known gold content suitable for analysis by fire assay or aqua regia digest. They are low-cost aids used by laboratories and exploration companies for quality assurance and quality control management.

Rocklabs Reference Materials are recognised as being the most accurate and reliable reference materials globally and certified for Gold, Silver and Platinum Group Elements. The certificate, which includes details of the production and characterisation of the Reference Material, is issued with each consignment of sachets or jars sold.

Scott has a team of chemists, geologists and statisticians to advise on the use of the reference materials and the analysis of results. Typically exploration and mine geologists can submit one sachet with each batch of samples they send to the laboratory for gold analysis, or one sachet with every 50 samples (for large batches). Our broad range of Au-Ag and Pt-Pd-Au are available in 30, 50 and 100 gram sachets or 2.5 kg jars.



## ADVANCED & CUSTOM PROJECTS

Scott is much more than just an equipment vendor; we are a total solution partner. Our innovation projects always retain a commercial focus to ensure success and industry adoption. Scott collaborates and develops solutions that provide productivity, safety and quality benefits to meet the specific requirements of our clients.

### Examples & Simulations

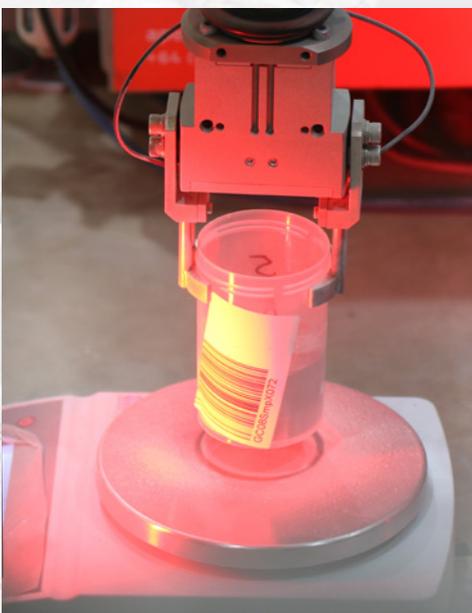


# LAB AUTOMATION SOLUTIONS

## ROBOPREP AUTOMATED SAMPLE PREPARATION SYSTEM

Roboprep robotic sample preparation solutions provide provides an efficient and productive process for continuous preparation of high quality samples for analysis. It is designed to accept Drill Core, Reverse Circulation and Blast Hole samples, providing enhanced capability and flexibility for both commercial and minesite laboratories. The system layout typically features robot cells, performing crushing of samples up to 20kg, followed by splitting and pulverising.

RoboPrep systems are a custom lab solution so each is custom built to suit the unique needs and requirements of our clients.



## LINEAR AUTOMATION

Linear automated sample preparation systems typically include linked machine modules to control and automate sample handling and processing across crushing, splitting, pulverising and weighing stages. These systems can be configured from 10 to 40+ samples per hour, and provide safe, reliable, repeatable, low contamination sample preparation. Our Linear Automation Systems can be designed and a machine built to your specific requirements.

- » The system below features two Boyd Crushers and Linear Sample Dividers (Smart Boyd LSD's), four automated batch mills (ABM3000), an automated tracking and weighing system and RFID tracking



## DOSING

The AD3000 Automated Dosing system is capable of accurately dosing up to 3000 samples into test tubes and crucibles every 24 hours. Developed for base metal dosing at a mine site laboratory to deliver significant productivity improvements without increasing labour, and with a short payback period. The machine uses a cartesian gantry robot to pick and place test tubes and crucibles from rack positions and into the dosing units. Dosing systems can be configured to meet the specific volumetric, gravimetric, and output receptacle requirements of our clients.



# MINING AUTOMATION

## ROBOFUEL

Automated refuelling involves the application of a robotic arm to refuel conventional mining equipment to both increase productive hours and efficiency of trucks and reduce cash costs on site. Typically, refuel facilities are manned by at least one person at all times but Robofuel eliminates exposure to flammable liquid and repetitive strain injuries by removing this manual process from site. Trucks can spend up to one hour per day travelling to refuel in isolated areas away from the pit. As there is no manning required for an automated solution, refuelling stations are able to be placed “on the circuit” or even “in-pit” so fleet productivity can be significantly enhanced.

Robofuel uses a state-of-the-art vision sensing and detection system which allows the robot to locate the position and orientation of the truck’s fuel tank. This information is used to couple the fuel nozzle with the tank. Fuel spillages are minimised through controlled coupling, pumping and monitoring mitigating the risk of environmental contamination.

Robofuel may also be utilised for mobile applications including the replenishment of drills and excavators, and in other sectors including road, rail, marine and aviation.



### Robofuel

- » Automated refuelling gives sites the ability to refuel without the use of an operator. This increases safety and the availability of mine site trucks.

## ROBOTIC IDLER CHANGE

The RIC system is capable of replacing idlers on loaded, operational conveyors, providing your mine site with the ability to conduct predictive maintenance on conveyors without downtime. This innovative and non-intrusive method assists in increasing conveyor up-time and removes workplace health and safety risks currently associated with conveyor servicing, maintenance and breakdowns.

The robotic system is integrated onto a mine specified vehicle for surface and underground operations. Presenting its manipulator to the conveyor stringer, the RIC scans the conveyor idler frame, stringer and belt and then uses this information to position a lift unit under the belt, with options to lift either off the conveyor structure, the vehicle, or the ground, depending on the conveyor layout. Possessing the ability to change tooling throughout the conveyor idler removal process the RIC then removes and replaces the failed idlers, stowing replaced idlers on the vehicle.



# RESEARCH & DEVELOPMENT

## Solutions

Scott specialises in the design and manufacture of automated production, robotics and process machinery. A leading expert in automation & robotic solutions globally that improve productivity, reliability, yield, and safety for manufacturers and processors in industries. Widely recognised, as a world-class builder of advanced automation systems, not just for mining but also for the appliance, meat processing and superconductor industries globally. The Scott team is constantly researching and developing ideas and solutions to revolutionise not just processes but entire industries.



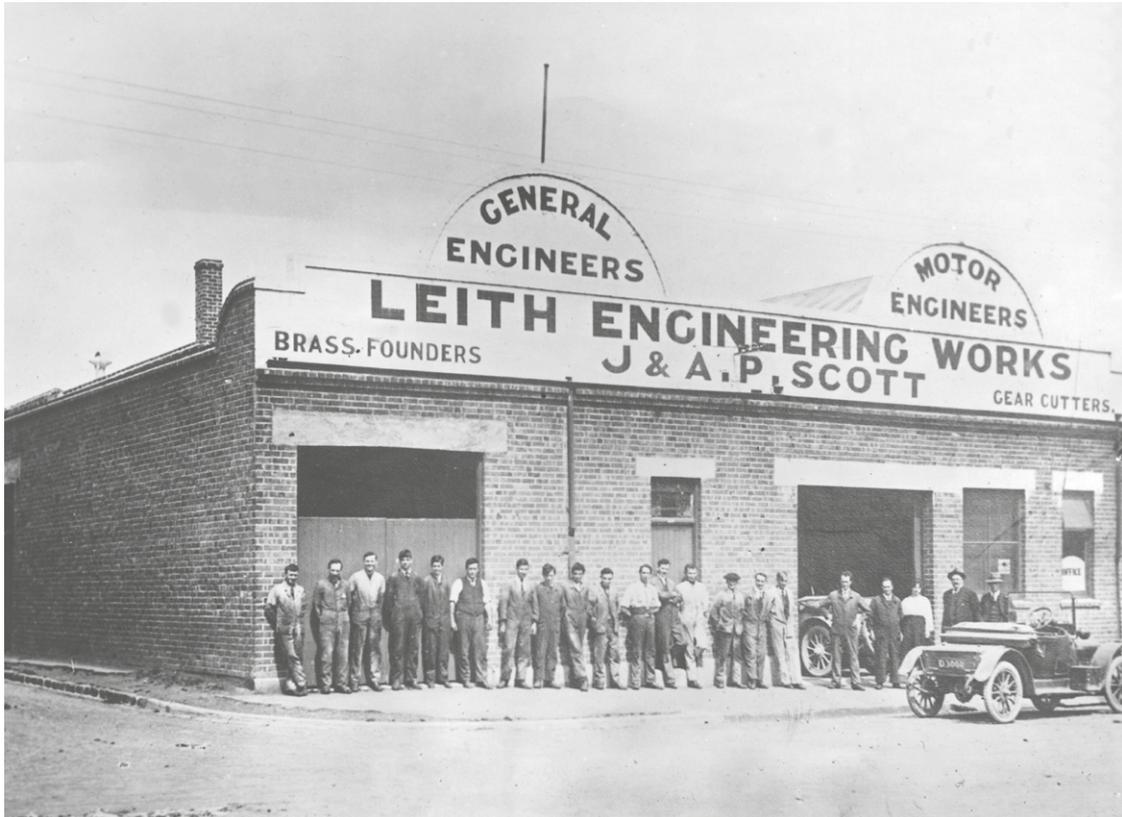
# SCOTT SERVICE

## Our Team

Scott has a dedicated international team that provides servicing, upgrades, preventative maintenance and breakdown support throughout the world, fully supported by Scott engineers in our global offices. Our engineering expertise is founded on many years of experience in design and manufacturing in automation and robotics; partnered with an attitude and drive for excellence in engineering and service.



SCOTT & ROCKLABS - A CENTURY OF INNOVATION AND INVENTION



## Rocklabs Laboratory Ring Mills

# The Proven Pulveriser



Two Way Air Control Valve  
Clamp Dust Cover  
Clamp Mounting Plate  
Flexible Air Line  
Laminated Timber Noise  
Reduction Cabinet



Rocklabs Laboratory Ring Mills have proven their superior pulverising capabilities since 1969 in 400 laboratories throughout the world. Consider Rocklab's unique quality features and you'll understand why!

- Largest range of heads in the world — one gram to 1000 grams in steel, tungsten carbide, ceramic and agate.
- All heads incorporate one-piece bowls with rounded corners for maximum pulverising efficiency, easy cleaning and long maintenance-free life.
- Pneumatic or mechanical clamping options.
- All heads are made of high purity materials, all exclusive to Rocklabs, for lowest sample contamination.
- Noise reduction enclosure, to better the international 85 dB maximum noise level, included in price.
- Competitive Pricing.
- Urgent replacement parts service.

## ROCKLABS

For further information on Rocklabs Laboratory Ring Mills, contact Rocklabs PO Box 18-142 Auckland 6, New Zealand. Telephone (09) 574-698. Telegraphic "Rocklabs" Telex NZ 60550 "ROCKLAB".  
Agents in Australia, Canada, Chile, Indonesia, Peru, Philippines, UK, USA.

# MINING & SAMPLE PREPARATION SOLUTIONS

