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SUBMITTAL COVER SHEET HIGHGATE STP 0297 (8) ECI Project Number 130546

Date 6/20/2013 (supplement 7/16/2013)
ECI Submittal Reference No: 900.620-29
Revision Number: 1
Submittal Title: Rock Anchors / Soil Anchor Testing (Supplement)
Manufacturer Name: Williams Form Engineering Corp
Subcontractor: Midwest Rockfall
Specification Section/Paragraph No: Special Conditions 29, 48
Contract Drawing/Detail Reference:
Plan Sheet: 15 OF 20
Submittal Notes:

Revision No: 1

Revision Date: 08/19/2013

This Submittal Prepared By: Chris Belanger, Project Manager

Indicate one of the following:

- This submission is not a proposed substitution or deviation from the Contract Documents.
- This submission includes a proposed deviation from the Contract Documents as clearly identified in this submittal.

The undersigned attests that the undersigned has carefully examined this entire submission, and that the requirements of the Contract Documents have been met.

By: Chris Belanger
Chris Belanger
Project Manager

END OF SUBMITTAL COVER SHEET



10401 E 102nd ave
Henderson, CO 80640
p 303.288.4970
f 303.288.4986

July 18, 2013

Highgate STP 0297(8)

To:
Chris Belanger
ECI
From:
Luke Fetzer
MWR Project Manager
10401 East 102nd Avenue
Henderson, CO 80640
303-288-4970
Fax: 303-288-4970

MWR Project Manager

Mr. Belanger,

This letter is to inform you that Midwest Rockfall Inc. intends to follow the specification for submittal requirements for anchor proof and performance testing and according to the Post Tensioning Institute Manual. To our knowledge we have met and or exceeded the specification. Please see previous calibration data for testing apparatus equipment submitted previously for load to PSI equations. It is Midwest Rockfalls understanding that for Item 900.640 rock anchor, the DL is 11.2 kips which would be 2083 PSI according to documents previously submitted and for soil anchors, a DL of 5.6 kips would be 1103 PSI according to the documentation. It is also noted that the locations of the test anchors will be unknown until either the layout is complete an or when a verification test anchor has been tested and the drilling is completed and the anchors that were drilled in the areas of excessive discontinuity than other areas are depicted to test to ensure that all anchors meet and or exceed the DL shown in the plans.

Grout cube testing will be performed by Vermont Testing & Consulting Corp. in compliance with the specifications.

Grout mixing procedure will meet the specifications by using 5 gallons of potable water per 94 lbs. of type II Portland cement utilizing a paddle type mixer and being pumped through a hose attached to tremmie tube until encapsulation is achieved.

Luke Fetzer,

VERMONT TESTING & CONSULTING CORP.

P.O. Box 420 • 1841 US Route 2 • Waterbury, Vermont 05676
 Work 1-800-244-6131 • Fax (802) 244-5097 • Cell (802) 229-8685
 email: info@vermonttesting.com

WE ARE COMMITTED TO PROVIDING OUR CLIENTS WITH THE BEST QUALITY SERVICES AND IMMEDIATE TURNAROUND OF FIELD AND LABORATORY REPORTS.

Jacques B. Bouramia
 President

Linda H. Bouramia
 Vice President

Introduction

The Vermont Testing & Consulting Group has been providing complete materials testing, and field inspections since April 07, 1997.

Our services include investigation, studies, reports, consultation, planning, design, research, preparations, specifications, and services during construction and operation.

The Vermont Testing Group has an experienced staff of professional engineers, land surveyors, designers, technicians, which can manage and coordinate your entire engineering program, or assist you with any specific phase. The expertise of our people, our years of experience, and our extensive resources combine to provide you with quality assurance throughout your program.

We totally commit ourselves to completing your project efficiently, quickly, and economically.

Soil and Aggregate Testing

Test	ASTM No.
Sieve analysis of soil or aggregate	C136
Material finer than No. 200 sieve by washing	C117
Hydrometer Analysis	D422
Atterburg Limits	
Liquid Limit of Soils	D4318
Plastic Limit & Plasticity Index	D4318
Moisture Density relationships of soils	
Standard	D698
Modified	D1557
Hydraulic Conductivity of granular soils	
Constant Head	D2434
Falling Head Rigid Wall	---

Scope of Services

Our services include engineering and design services for:

- Engineering Feasibility Studies
- Predesign Engineering Consultations
- Foundation Structural Design
- Corrective Designs and Investigations
- Sedimentation Control Services
- Surveying, Plotting and Mapping
- Geotechnical Studies and Investigation
- Solid and Hazardous Waste Management
- Groundwater Hydraulic
- Construction Materials Testing, Inspection and Research
- Soil and Aggregate Testing
- Concrete Control
- Reinforced Masonry, Brick, Mortar, and Grout Testing
- Bolt Tension Testing
- Structural Steel and Welding Inspection
- Fireproofing Testing
- Field Density Testing (Soils, Asphalt)
- Roofing Inspection
- Subsurface Explorations
- Vibration and Blast Monitoring
- Foundation Support and Stabilization
- Other Services are also Available...

Falling Head Shelby Tube	---
Flexi-Wall	D5984
Specific Gravity	
Fine Aggregate	C128
Coarse Aggregate	C127
Unit Weight and Voids in Aggregate	C29
Soundness by Use of Magnesium Sulfate	C88
Organic Impurities	
Fine Aggregate for Concrete	C40
Clay Lumps & Friable Particles	C142
Moisture Content of Aggregate	C56
PH of Soils	D4972
Flat and/or Elongated Pieces	
% Fracture	D2488
Classification of Soils	D2487
L.A. Abrasion	
Large Size Coarse Aggregate	C535
Small Size Coarse Aggregate	C131
Field Density Testing of Soils	
Nuclear Method	D2922

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The Sullair 375HH Portable Air Compressor

375 cfm at 200 psig ■ 10.6 m³/min at 14 bar

- Rotary screw compressor
- Removable modular canopy
- Adjustable height hitch
- E-Z lube axle
- Large tool box compartment
- Curbside instrument panel
- SSAM—Shutdown System and Annunciation Module
- Battery disconnect switch
- Idle warm-up valve
- Emergency stop
- Rocker type start switch
- Protective shutdown switches
- Fuel/Water separator
- Three-Stage air filters
- 0 to 100% capacity control
- Pneumatic inlet valve
- AWF Compressor Fluid
- Durable powder coat finish
- Wide track
- Galvanneal sheet metal
- Recessed tail lights
- Rear bumper


SULLAIR.
Always air. Always there.™



Total Accessibility
Routine maintenance is simplified.



Large Tool Box Compartment
Sullair pneumatic tool sold separately.



Rotary Screw Compressor by Sullair
The pioneer in rotary screw technology.



Sullair AWF Compressor Fluid
Improved hot and cold weather lubrication. Longer compressor fluid life. Extended air end warranty.

Designed for Total Accessibility and Reliability

Rotary Screw Compressor

Ample Service Doors

- Large service doors provide access to fuel tank, engine, compressor air filters and tool compartment
- Rear service panel provides access to side-by-side compressor fluid cooler, engine air cooler and engine radiator
- Serviceable components within easy reach
- Routine maintenance is simplified
- Reduced downtime and service cost
- Service doors feature non-rusting hinges and stainless steel T-type door retainers

Multi-Piece Canopy

- Modular design reduces replacement costs
- Easily removed as one assembly for major service
- Exposed, single point lifting bail

0 to 100% Capacity Control

- Pneumatic inlet valve and unloaded starting

Highway Towable Running Gear

- 3" x 5" drawbar
- Adjustable height hitch (15", 17", 19")
- Quick-change hitch
- Screw jack with pad
- Transport security chains
- E-Z lube axle lubrication
- Heavy duty leaf spring suspension

Curbside Instrument Panel

- Hinged, padlockable cover
- Powerview gauge module with mechanical air pressure gauge
- Rocker type engine start switch
- Idle warm-up valve
- High/low pressure selector valve allows dual pressure capability without making mechanical adjustments

SSAM—Shutdown System & Annunciation Module

- Shutdown with annunciator light for high compressor temperature, high engine coolant temperature, low engine oil pressure and engine underspeed
- Low fuel shutdown

Three-Stage Dry Type Air Filters

- Separate filters for engine and compressor

Durable, Baked-On Powder Coat Finish

Tier 3 Emission Compliant Engines

Air End Warranty

- 2-year standard warranty
- 5-year or 10,000-hour warranty when continuously serviced at the recommended intervals with Sullair AWF Compressor Fluid and filters

Quiet Operation

- Meets US EPA sound requirements of 76 dBA @ 7 meters

Customize the compressor to meet your specific requirements with Sullair's options

Filtration for instrument quality air
Aftercooler
Special paint
Hose reels, single and dual
Spark arrestor

Cold weather starting aid
Fuel level gauge
Brakes (recommended where required by law)
Mechanical parking brakes

Ball hitch
Air filter maintenance indicators
Block heater
Either starting aid

SPECIFICATIONS, WEIGHTS AND DIMENSIONS—SULLAIR 375HH PORTABLE COMPRESSOR

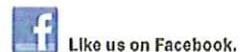
Delivery @ Rated Pressure	Rated Pressure psig bar	Pressure Range psig bar	Designated Model	Weight (wet) lbs kg	Weight (dry) lbs kg	Length (drawbar) in mm	Length (canopy) in mm	Width in mm	Height in mm	Track Width in mm	Tire Size (load range)
375 acfm 177 l/s 10.6 m ³ /min	200 14	80-200 5.5-14	2-Wheel	4440 2014	4050 1837	156.1 3966	98.8 2510	77.2 1960	74 1880	67.5 1715	225/75D15
			Less Running Gear	4195 1903	3805 1726	-- --	98.8 2510	59.3 1506	63.6 1616	-- --	--
Engine Make	Engine Type	Engine Model	Displacement in ³ cc	Cylinders	Bore and Stroke in mm	Rated Speed rpm	Rated Power hp kW				
John Deere (Tier 3 emission compliant)	Diesel	4045HF285	275 4507	4	4.19 x 5.00 106 x 127	2200	140 104				

Capacity per CAGI/PNEUROP PN2CPTC3. (Annex D to ISO 1217)



Sullair
3700 East Michigan Boulevard
Michigan City, IN 46360
Telephone: 219-879-5451
www.sullair.com

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SSL-1173 1209R

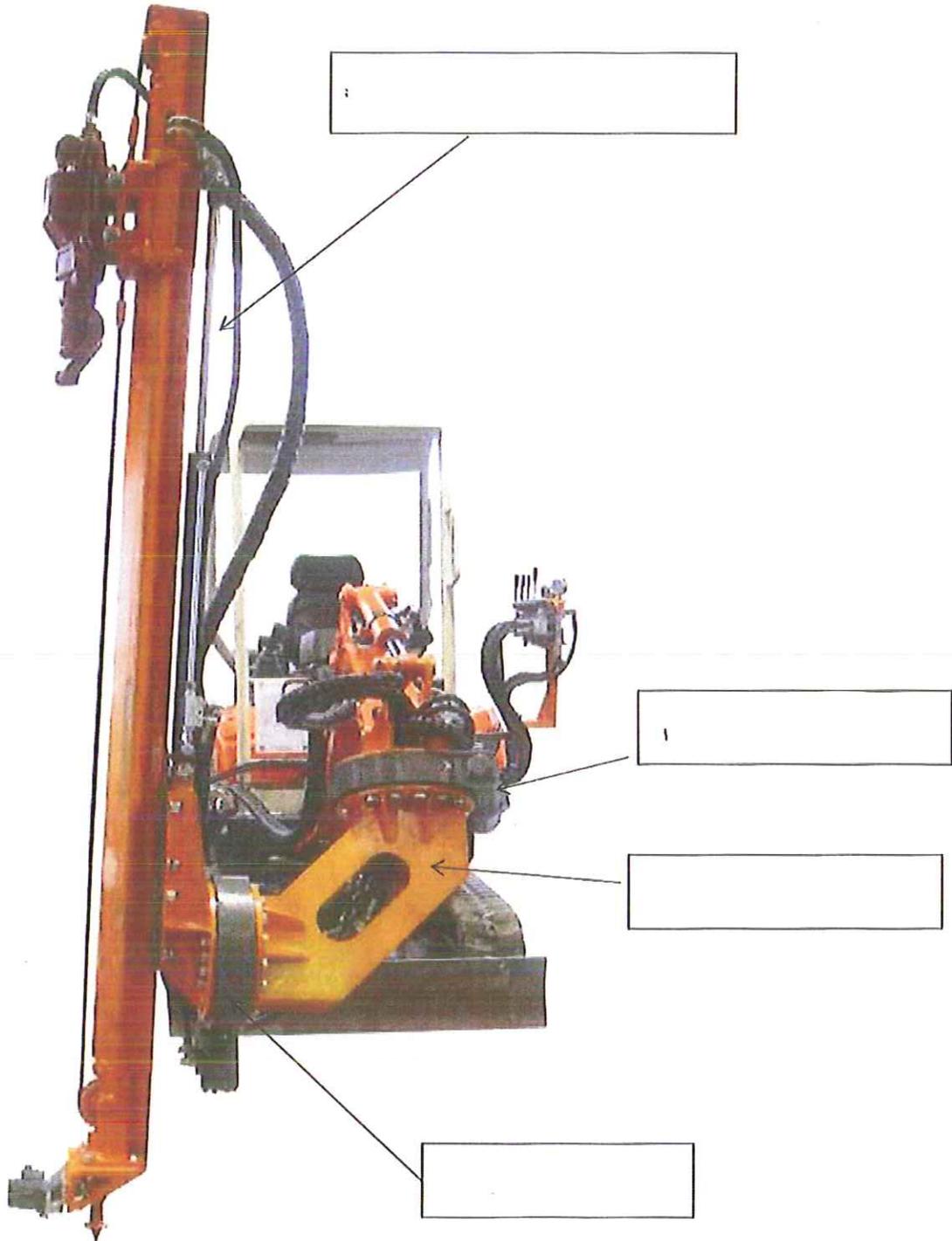


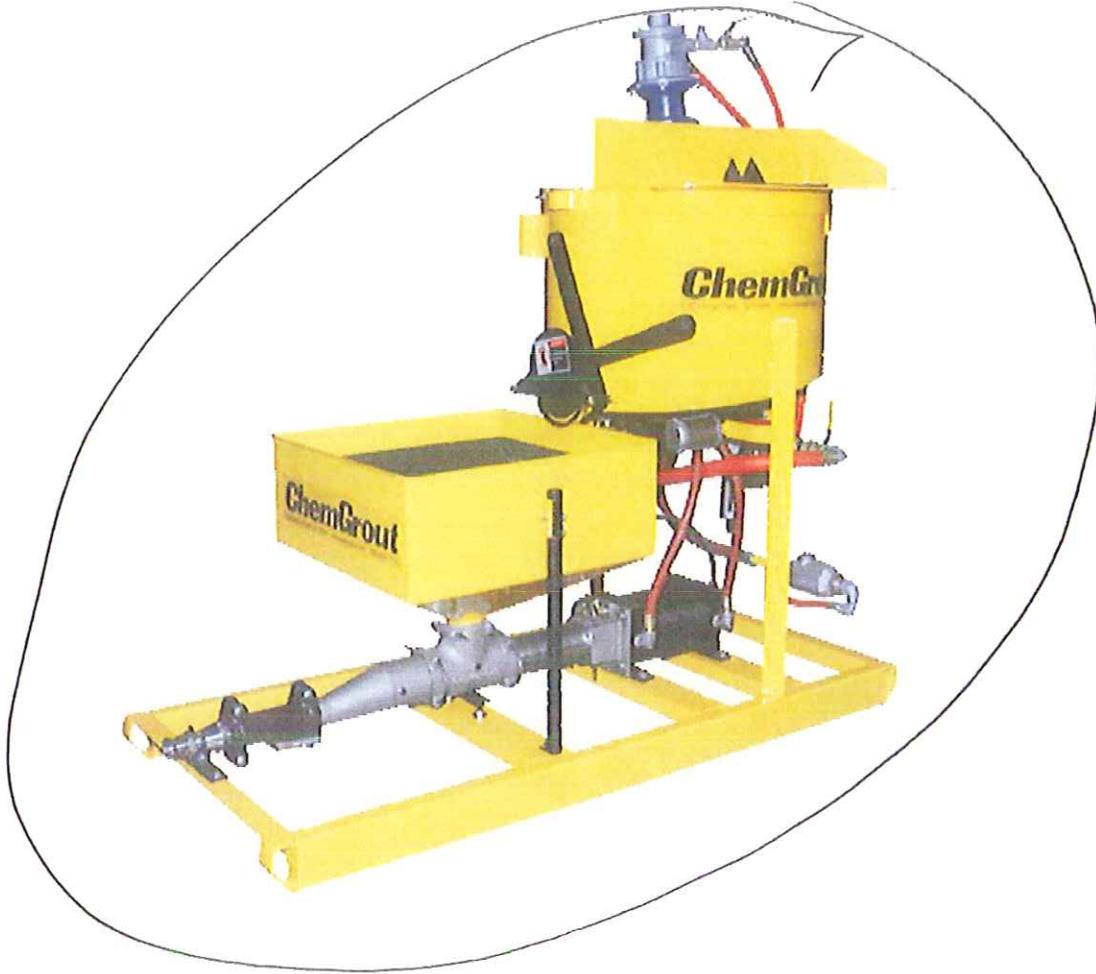
The paper used in printing this literature was manufactured using recycled fiber, either pre-consumer or post-consumer waste, therefore less harmful to the environment because less virgin fiber is used, thereby reducing tree harvesting, water usage, energy consumption, emission of greenhouse gases and pollution.

MARINI
QUARRIES GROUP

9

Item	Q.ty	Description	Unit price EURO	Total price EURO
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**CG-030
Rapid U-clip
Disassembly**

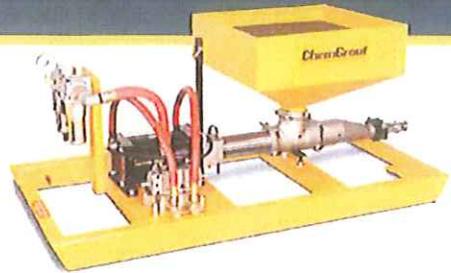


The Rugged Series features a single acting, variable speed 3" piston pump that provides the versatility to handle materials ranging from fluid slurries to heavily sanded grouts. Materials commonly used with the CG-030 include cement slurries, sanded cement mixes, bentonite mixes (with or without sand), most repair mortars, high-strength non-shrink grouts and self-leveling products.

The CG-030 is engineered for ease of operation and low cost maintenance. The unique staple lock construction holds all working components together allowing parts to be easily accessed for cleaning and maintenance.

The large capacity hopper is mounted above the suction housing, enabling a new batch to be mixed while the first is being pumped. This helps to provide a consistent "non-stop" discharge of material, virtually eliminating the clogging of tremmie lines.

**CG-030
Piston
Pump Skid
Mounted**



Complete grouting systems combine the CG-030 piston pump with a high efficiency paddle mixer to provide a continuous output of material. Both mixer and pump are equipped with their own variable speed control.

The large 45-gallon mix tank features specially designed blades and baffles that develop a high shearing action, insuring rapid and thorough mixing. After mixing, the material is transferred to a holding hopper through a slide gate designed to handle the most difficult materials. Holding hoppers are available in 15-gallon (57 liter) or 30-gallon (113 liter) sizes and are matched based on material flow.

The compact, skid mounted CG-550/030 is available in either air or hydraulic power. Hydraulic power units with either a gasoline/diesel engine or an electric motor can also be mounted on a separate skid. The trailer mounted CG-555 is a fully integrated system combining mixer, pump and power system, all in a single road worthy package.

Specifications

CG030 Skid - Power	Max. Output/Pressure	Required	Weight	Size
Air	16 gpm (60 lpm), 400 psi (27 bar)	100 cfm, 100 psi	310 lbs	64" x 31" x 29"
Hydraulic	14 gpm (53 lpm), 400 psi (27 bar)	9 gpm, 2000 psi	290 lbs	64" x 31" x 29"
CG550/030 Skid Power	Max. Output/Pressure	Required	Weight	Size
Air	16 gpm (60 lpm), 400 psi (27 bar)	150 cfm, 100 psi	490 lbs	66" x 31" x 56"
Hydraulic	14 gpm (53 lpm), 400 psi (27 bar)	2 Supplies each of 9gpm, 2000 psi	450 lbs	66" x 31" x 56"
Electric/Hydraulic	14 gpm (53 lpm), 400 psi (27 bar)	*3 Phase	955 lbs	84" x 34" x 56"
Gas/Hydraulic, Electric Start	14 gpm (53 lpm), 400 psi (27 bar)	Self-Contained	955 lbs	84" x 34" x 56"
Diesel/Hydraulic	14 gpm (53 lpm), 400 psi (27 bar)	Self-Contained	1050 lbs	84" x 34" x 56"
CG555/030 Trailer - Pwr	Max. Output/Pressure	Required	Weight	Size
Gas/Hydraulic	14 gpm (53 lpm), 400 psi (27 bar)	Self-Contained	1400 lbs	110" x 60" x 70"
Diesel/Hydraulic	14 gpm (53 lpm), 400 psi (27 bar)	Self-Contained	1495 lbs	110" x 60" x 70"

* Several Voltages Available

Accessories

Grout Hose. Equipped with quick disconnect fittings. Available in 25 and 50 foot lengths.



Water Meters. Available in manual or automatic. Accurately measures the water for each batch.



Diaphragm Protected Pressure Gauge.



Mechanical Surface Packer. Equipped with shut-off valve and a quick disconnect fitting.

Applications include:

Soil nails, tiebacks, earth anchors, cable & rock bolts, foundation stabilization, soil compaction, pavement undersealing, slabjacking, slab raising, underwater foundations, piers, deep well casing, well sealing, abandonment and geothermal.

ChemGrout®

Widest Selection of Grouting Equipment In the World

ChemGrout

CG-550 Rugged Series

Combines ease of operation and low maintenance to provide the ultimate in performance.

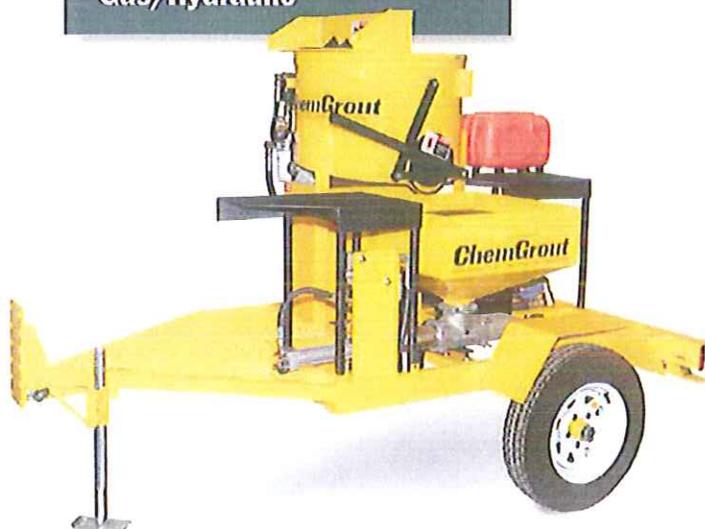
CG550/030/A
Air Powered



CG550/030/GHES
Gas/Hydraulic



CG555/030/GHES
Gas/Hydraulic



Single operator system – 45 gallon (170 liter) mixing tank, large holding hopper and centrally located controls allow a single operator to mix, transfer and pump for continuous production.

Efficiently mixes and pumps most pre-packed non-shrink grouts and repair mortars. Materials include bentonites, cement/sand and most slurry products.

Outputs to 16 gpm (60 lpm), 400 psi (27 bar).

Power options include air, electric/hydraulic, hydraulic, gas/hydraulic and diesel/hydraulic.

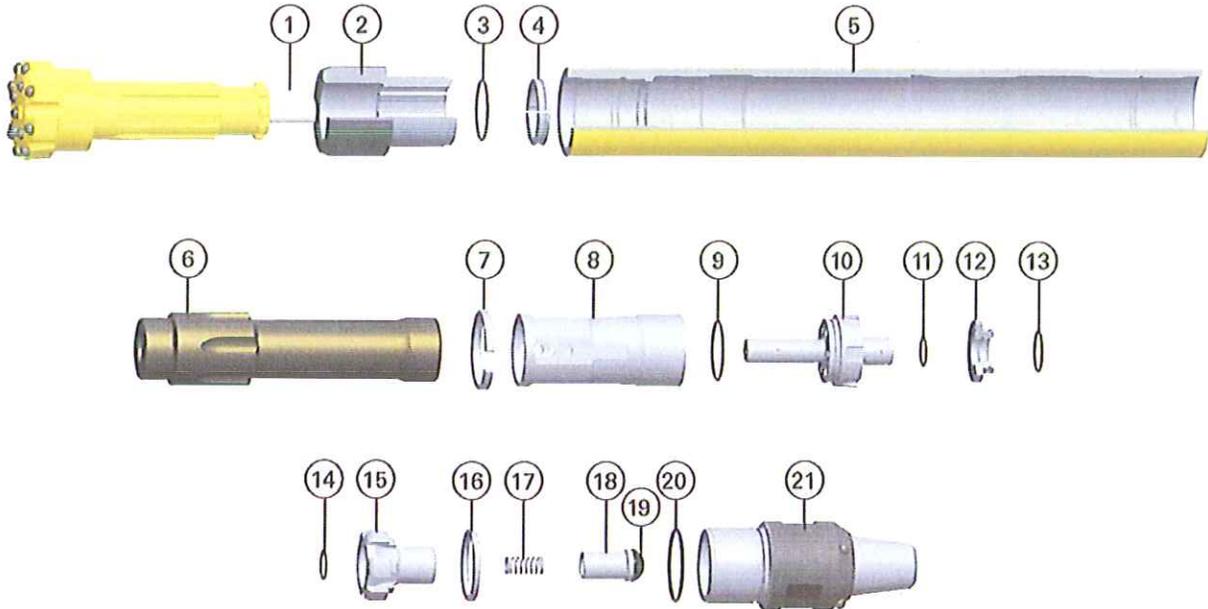
Pump completely disassembles with only a hammer for fast and thorough cleaning.

ChemGrout[®]

Widest Selection of Grouting Equipment In The World

Secoroc QL 340

Down-the-hole hammer



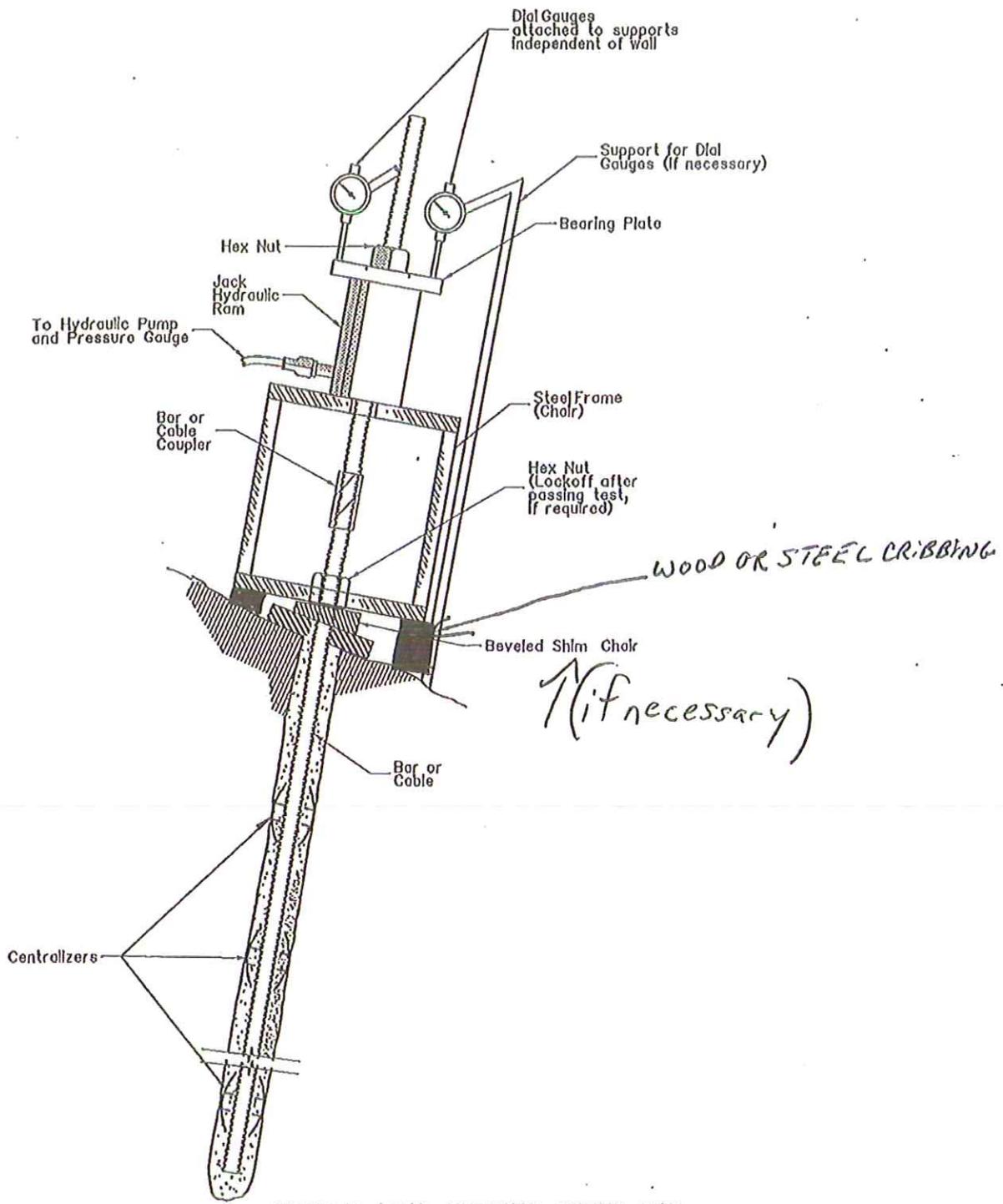
Ref.	Part	Prod. No.	Product code
1	Foot valve	86002883	9227
2	Chuck	92050398	9704-03-54-00-001
3	O-ring (bit retain)	92050396	9704-03-54-00-003
4	Ring- bit retain	92050395	9704-03-54-00-002
5	Casing	92050397	9704-03-54-00-004
6	Piston	92050403	9704-03-54-00-005
7	Cylinder retain ring	92050400	9704-03-54-00-062
8	Cylinder	92050399	9704-03-54-00-048
9	O-ring (distributor)	92050402	9704-03-54-00-038
10	Distributor	92050401	9704-03-54-00-042
11	O-ring (inner valve)	92050409	9704-03-54-00-027
12	Valve	92050404	9704-03-54-00-044
13	O-ring (outer valve)	92050408	9704-03-54-00-036
14	O-ring (valve cap)	92050406	9704-03-54-00-037
15	Valve cap	92050405	9704-03-54-00-074
16	Shim	92050414	9704-03-54-00-026
17	Spring	92050411	9704-03-54-00-016
18	Check valve	92050407	9704-03-54-00-015
19	Check valve cap	92050238	970D-00-82-00-036
20	O-ring backhead	92050394	9704-00-54-00-019
21	Backhead	92050393	9704-03-54-00-020

Hammers and Kits	Prod. No.	Product code
QL 340 hammer, complete	92050412	9704-03-54-00
Valve assembly	92050442	9704-00-54-00-045
O-ring kit, 1x3, 1x9, 1x11, 1x12, 1x13, 1x14, 1x20	92050441	9704-00-54-00-047
E-kit	92050440	9704-03-54-00-040

Wear limits		
Casing	Min.OD	92mm
Piston/Casing clearance	Max	0.2mm
Piston/Control tube	Max	0.2mm
Foot valve	Min.OD	26.3mm
Foot valve protrusion		57±.1mm

Atlas Copco Secoroc AB
 Box 521, SE-737 25 Fagersta, Sweden
 Phone +46 223 461 00
 E-mail: secoroc@se.atlascopco.com
 www.atlascopco.com

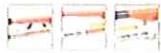






>Power Team

P: Manual 1-Speed



PRODUCT TYPE:
HAND MANUAL

12 to 55 cu. in. Single-Speed, Single-Acting

RETURN TO PREVIOUS PAGE

Features

BEST SUITED FOR APPLICATIONS WHERE THERE IS LITTLE OR NO FREE TRAVEL.

- All metal construction, won't burn through in welding environments.
- Formed metal handle provides less flex, and reduces operator fatigue.
- Convenient fill port on P23 and P55 allows pumps to be filled in a horizontal or vertical position.
- Fill cap seal acts as safety valve preventing over-pressurizing of reservoir.
- Relief valve inboard of check valve prevents loads from drifting down.
- Large valve knob gives added control for slowly metering loads down.

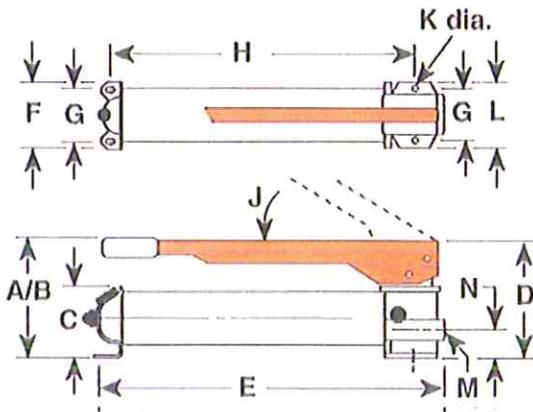
Power Team hand pumps, with the angled fill port, have a built in "relief valve" protection system. This system is designed to protect over-pressurization of the reservoir from sudden back pressure. This system also works as a seal to prevent of leaks.

Specifications

Order No.	For Use With	Speed	Volume per Stroke (cu. in.)		Maximum Pressure (psi)		Handle Effort (lbs.)	Reservoir		Oil Port (in.)	Weight (lbs.)
			LP	HP	LP	HP		Oil Cap. (cu. in.)	Usable Oil Cap. (cu. in.)		
P12	Single	1	—	0.069	—	10,000	75	12	9	3/8 NPTF	5.7
P23	Acting	1	—	0.16	—	3,000	70	23.8	20.3	3/8 NPTF	12.0
P55	Cylinders*	1	—	0.16	—	10,000	145	55	45	3/8 NPTF	15.8

* Pump includes 2-Way Valve
LP = Low Pressure
HP = High Pressure

Dimensions



Order No.	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)
P12	4	13	2 1/16	4	13 1/2	3 3/8	2 3/16
P23*	5 1/4	13	3 1/2	5 9/16	13 5/8	4 1/4	3 1/4
P55	5 1/2	21	3 1/2	5 9/16	23	4 1/4	3 1/4

The P23 pump maximum pressure is 3000 psi only.

Order No.	H (in.)	J (deg.)	K (in.)	L (in.)	M (in.)	N (in.)	P (in.)
P12	11 1/2	45	3/16	3 3/8	3/8 NPTF	1 1/8	—
P23*	10 5/16	38	3/16	4 3/4	3/8 NPTF	1 5/8	—



>Power Team[®]

RH: 10-100T S/A



PRODUCT TYPE:
CENTER HOLE

[RETURN TO PREVIOUS PAGE](#)

Single-Acting, Spring-Return. Ideal for pulling and tensioning of cables, anchor bolts, forcing screws, etc.

Features

IDEAL FOR PULLING AND PRESSING.

Interchangeable piston head inserts provide versatility of application.

12, 20, 30, 60, 60 ton single-acting models feature threaded collar

Withstands full "dead-end" loads.

Corrosion resistant standpipe has "Power Tech" treatment

All cylinders except RH120 are furnished with a 9798 3/8" NPT female half coupler

Aluminum cylinder body and piston are featured on the RHA306 Cylinder

Model RH203 and RHA306 do not feature the collar thread. See charts in Specifications.

ASME B30.1 10,000 PSI

Specifications

Order No.	Cyl. Cap. (tons)	Stroke (in.)	Oil Cap. (cu. in.)	Mounting Holes and Bolt Circle (in.)	Cylinder Effective Area (sq. in.)	Internal Pressure at Cap. (psi)	Tons at 10,000 psi (in.)	Weight (lbs.)
RH102	10	2 1/2	5.52	1/4-20x2 3/8	2.21	9,054	11	9.0
RH108	10	3	17.68	1/4-20x2 3/8	2.21	9,054	11	18.7
RH120**	12	5/16	87	5/16-18x2	2.76	3,692	13.8	3.0
RH121	12	1 5/8	4.49	None	2.76	3,692	13.8	6.6
RH121T*	12	1 5/8	4.49	None	2.76	3,692	13.8	6.6
RH123	12	3	3.29	None	2.76	3,692	13.8	3.9
RH202	20	2	9.45	3/8-16x3 1/4	4.72	3,466	23.6	16.1
RH203	20	3	11.76	3/8-16x3 1/4	3.92	10,186	19.6	20.0
RH206	20	3	28.35	3/8-16x3 1/4	4.72	3,466	23.6	30.2
RH302	30	2 1/2	15.85	7/16-20x3 5/8	3.34	9,457	31.7	25.6
RHA306	30	5 7/8	38.1	None	3.34	9,457	31.7	21.9
RH306	30	3	38.1	7/16-20x3 5/8	3.34	9,457	31.7	39.0
RH503	50	3	32.58	5/8-18x4 3/4	10.86	9,208	54.3	16.6
RH603*	50	3	37	1/2-13x5 1/8	12.31	9,750	51.6	60.0
RH606*	50	3	73.86	1/2-13x5 1/8	12.31	9,750	51.6	78.0
RH1003*	100	3	51.8	None	20.62	9,700	103.1	115.0

* Supplied with carrying handles.

** RH120 and RH121T do not have an internal threaded insert, but do have 3/4-16 internal thread. The RH120 inlet port is 1/4" NPTF.

Dimensions



HYDRAULIC RAM CALIBRATION

Client: Midwest Rockfall, Inc.
10401 E. 102nd Avenue
Unit 3
Henderson, Colorado, 80640

Report Date: May 14, 2013
Calibration Date: May 7, 2013
Project Name: Ram Calibration

Attention: Doug Fetzer

Project No. CT15565.001-435

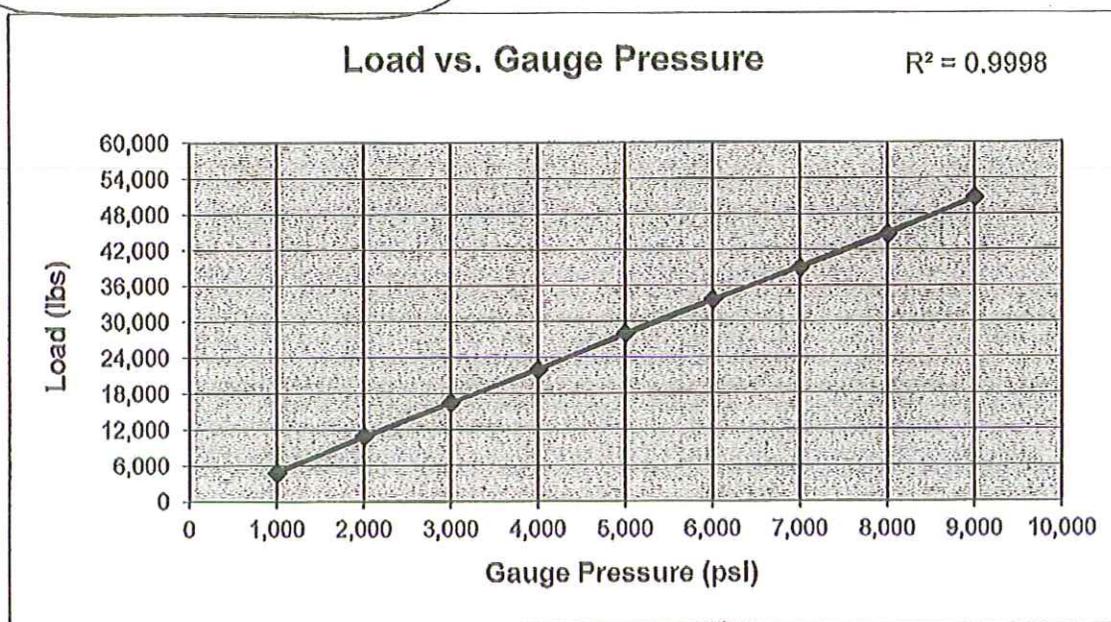
Ram ID: SPX Power Team RH 302, Model C 30 Ton
Pump ID: BVA SN: S1111002290
Gauge ID: SPX Power Team SN: 9040, 2", 15,000 psi

Laboratory Equipment: Tinius Olsen 300K S/N 19962-CTO 191 Calibrated January 2013

Equations

Gauge Pressure = $0.175 * \text{Load} + 123$

Load = $5.70 * \text{Gauge Pressure} - 698$



Damon B. Thomas, P.E.

QUIKRETE 47 lbs II Portland Cement

Item #: 81523 | Model #: 112547

★★★★★ Be the first to write a review!

\$6.00



 Enlarged Image

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Description Specifications Reviews Community Q&A

47 lbs II Portland Cement

- To make concrete: mix 3 parts gravel, 2 parts all purpose sand and 1 part Portland cement by volume
- Can be mixed with other ingredients to make mortar mix and base coat stucco
- Complies with ASTM C150
- Complies with Federal specifications for Portland cement

