

Buckley Powder Co.

BLAST REPORT

SERVICE SITE LOCATION: Louviers ORDER NO.: D7403517BLAST NUMBER: 7 BLAST TIME: 11:35 am BLAST DATE: 10/06/2017CUSTOMER: MARTIN MARIETTA MATERIA MINE: RED CANYON ADDRESS: Colorado Springs, COROCK TYPE: Granite Tons/Yd3: 2.00 EXPECTED VIBRATION: 0.000 IPS

LOCATION OF BLAST

LOCATION OF BLAST IN MINE: North BENCH: Bench 5BLAST GPS POINTS: N 038 36 25.20000 & W -104 56 47.94000

WEATHER

WEATHER: Partly Cloudy CEILING: High TEMPERATURE: 70 F WIND DIRECTION & SPEED: Northeast 5 MPH

NEAREST NON-OWNED STRUCTURE

NAME: Front Entrance GPS Points: N 038 36 03.70020 & W -104 56 58.92000DISTANCE: 2,348 (FT) DIRECTION: 201°

SEISMOGRAPH DATA

LOCATION		DISTANCE	GPS POINTS		CALIBRATION DATE		
1	Front Entrance	2,348 (FT)	N 038 36 03.70020 & W -104 56 58.92000		04/20/2016		
	L (F)	T (F)	V (F)	AIR (db)	SEISMOGRAPH	SERIAL	OPERATOR
1	0.055	10	0.050	9	0.043	63	129
					VibraTech 9656	9656	

BLAST DATA

NUMBER OF HOLES (EA)		EXPLOSIVES SIZE, TYPE & WEIGHT		
		SIZE	TYPE	WEIGHT
HOLE DIAMETER (IN)	5	0.75	SPARTAN 350SR	90
HOLE DEPTH (FT)	50	BULK	TITAN 1000 XL	23,900
FACE HEIGHT (FT)	47			
SUB DRILLING (FT)	3			
AVG. STEM FACE HOLES (FT)	14.519			
STEM OTHER HOLES (FT)	12.5			
BURDEN FRONT ROW (FT)	17			
BURDEN OTHER ROWS (FT)	13			
SPACING FRONT ROW (FT)	13			
SPACING OTHER ROWS (FT)	17			
TOTAL WEIGHT (LB):				23,990

DETONATORS USED IN BLAST: Electronic MATS USED: No STEM TYPE: 3/4 x 1/2 CRUSHED TOTAL DRILL DEPTH: 3,000 (FT)

TYPE	MFG	DATE CODE	USED	TYPE	MFG	DATE CODE	USED
DIGISHOT DETONATOR 50FT	Dyno Nobel Global	28AU17	120	SPARTAN 350SR	Dyno Nobel Global	06FE17	120

CU YDS IN SHOT: 23,082 SCALED DISTANCE FACTOR: 63 % OF ANFO: 0TONS IN SHOT: 46,164 HOLES/DELAY: 4 FUEL OIL % (BULK): 0MAX LBS/DELAY: 1,353 AVERAGE LBS/HOLE: 400POWDER FACTOR (TONS/LB): 1.92 POWDER FACTOR POUNDS/YD3: 1.04BLASTERS NAME: Farmer, Jimmie BLASTERS NUMBER & STATE: 1-035-0748 ColoradoBLASTERS SIGNATURE: [Signature] SITE SAFETY INSPECTION PERFORMED: YesNUMBER OF PERSONNEL ON SITE: 5

REMARKS : Matt Klepfer profiled the face with the drone 12.5' stemming and all production holes The three special holes were decked 5' bottom loaded stemmed to 20' five feet of powder stemming at 15'. The back break is a little jagged and we had db of 129 at the North Hill Side. Larry Mirabelli will look at the video. 11' backbreak.

START TIME	END TIME	TOTAL TIME	TRUCK NUMBERS
8:00 AM	11:00 AM	03:00	5013

APPENDIX A

Date: 10/6/2017

Location: MM Red Canyon

shot #: 7



BLASTER'S CHECKLIST

Must be filled out as you go!

PRE-TRIP CHECKLIST

☒	Measuring Tapes and lead ends
☒	Burden pole Tape/ Profiler
☒	Loading Poles
☒	Marking Paint
☒	Starter and primers
☒	Blasting Signs & cones
☒	Sirens in working order
☒	Set back stakes
☒	Digital video camera & Tripod

yes / no / NA

☒	Scientific Calculator
☒	Pocket Mirror
☒	Empty Shot bags
☒	Powder Punch
☒	GPS
☒	Non sparking Knife
☒	Wire strippers
☒	Splices
☒	Flash Light & Batteries

yes / no / NA

☒	Drill Logs
☒	Shot reports
☒	Hold Harnesses
☒	Seismographs
☒	Density Cup and Scales
☒	Two Way Radios / fully
☒	Wheel Chocks
☒	Harness & Lanyard / "T" post
☒	First Aid Kits

PRESHIFT CHECKLIST

☒	Inspect blast area for Unsafe Working Conditions (including face) for voids, cracks, caves, etc..
☒	Ensure all employees have their site specific training.
☒	Secure blast site with warning signs and cones (including floor in front of face)
☒	Check shot access including traffic activity
☒	Pre shift inspections on all equipment -OK and safe to operate (includes back up alarms, brakes, horns, etc..)
☒	Mark fall zone area at least six(6) feet from the crest
☒	Inspect Harness/ Lanyard before each use if needed for fall zone or on top of trucks
☒	Insure all needed products are present-enough boosters, detonators etc
☒	Calculate Minimum Burden and Measure front row burden with burden pole or profiler (Document)
☒	Check drill log and all holes for proper depth and blockage
☒	Insure blast design is consistent with closest structures requirements
☒	Any need for calling assistance (Hold Harmless, equipment to close, drilling problems, etc...)
☒	Conduct pre-blast safety meeting with blast crew. If there is not a timing diagram, detonator tie-in must be discussed at the
	Calculate pounds per delay: Expl density x expl diam ² x .3405 = _____ lbs/ ft x avg powder column= _____
	lbs/hole x expected _____ holes / delay = _____ lbs/delay
	Calculate scale distance: 1) Distance _____ 2) divided by lbs/delay _____ 3) hit square root then equals _____ =S.D. (4)
	Calculate expected vibration: S.D.(4) _____ Push 1/x on calculator. Push (yx) key then 1.8 hit equals x 160 = _____ exp. vib.

TIE-IN CHECKLIST

☒	Shot tie inspected and signed off by two persons prior to shot including lead line (include names below)
	<u>JD</u> <u>Luke Reel</u> <u>Matt K</u>
☒	Blast area is cleared and blocked before attaching starter cap and lead line
☒	Blaster in charge in communication with all guards at this time
☒	Blaster in charge will insure blast area has been cleared and guarded before the siren is sounded
☒	After proper waiting time blaster in charge will contact all guards before firing blast
☒	Seismograph located at nearest off site structure or at the Property Line related to nearest off-site
☒	Video Recording Made of Shot

POST BLAST CHECKLIST

☒	Maintain guards until shot is cleared and "all clear" is sounded
☒	Check for misfires, undetonated explosives or burning product and other dangers
☒	Sound all clear that is audible to all parties
☒	Dispose of lead line in approved manner
☒	Dispose of empty boxes in approved methods only
☒	Complete all required paper work prior to leaving customer location- shipping Papers, delivery ticket, Blaster's
	Make one final check of blast site before leaving property to insure no materials have been left
	and that no hazards are present that may have been missed during clearing process

Must completed and turned in daily- end of shift

Blaster In Charge

J.D. Famer

Seismic Analysis

Velocity Waveform Analysis

Serial Number: 9835
 Firmware Version: 0C-06.05
 Event Date: 10/06/2017 11:35:17 (UTC -06:00)
 Event number: 15
 Recording Time: 5 s
 Client: Martin Marietta
 Operation: Red Canyon Quarry
 Location: North Hill Side
 Distance:
 Operator: Vibra Tech
 Comment: Pueblo, Colorado
 Seismic Trigger: 0.02 in/s
 Sound Trigger: 133 dB

Additional Info:

j-GEO-16060
 N38 36 22 W104 56 31

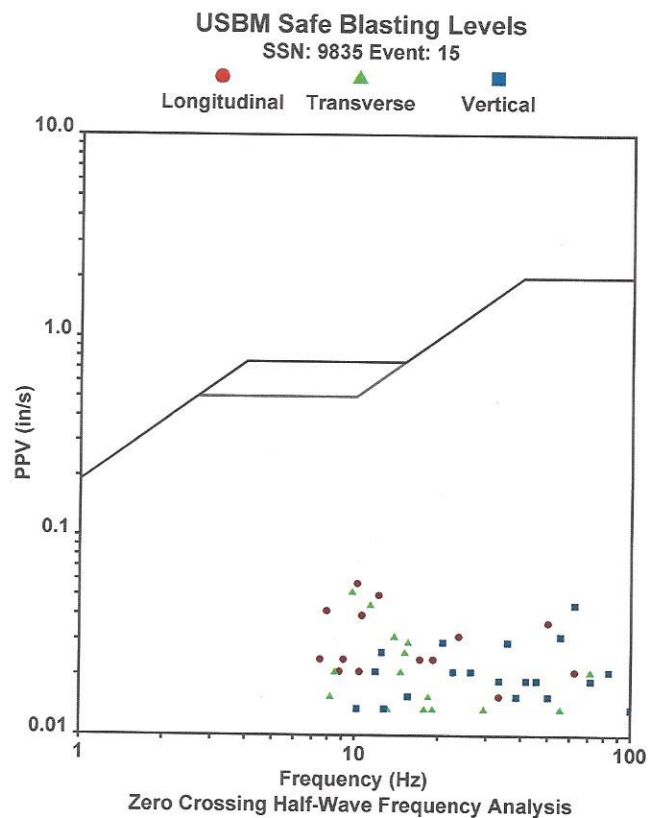
Summary Data

	L	T	V
PPV (in/s):	0.055	0.05	0.043
FREQ (HZ):	10	9.4	62.5
PD (.001"):	0.7	0.64	0.37
PPA (g):	0.026	0.02	0.039

Peak Vector Sum: 0.07 in/s
 Peak Air Pressure: 129 dB
 0.0079 psi @ 3.2 HZ

Shaketable Calibrated

On: 10/21/2016 (UTC -06:00)
 By: Vibra-Tech, Inc.
 2700 Holloway Road - Suite 113
 Louisville, KY 40203 U.S.A.

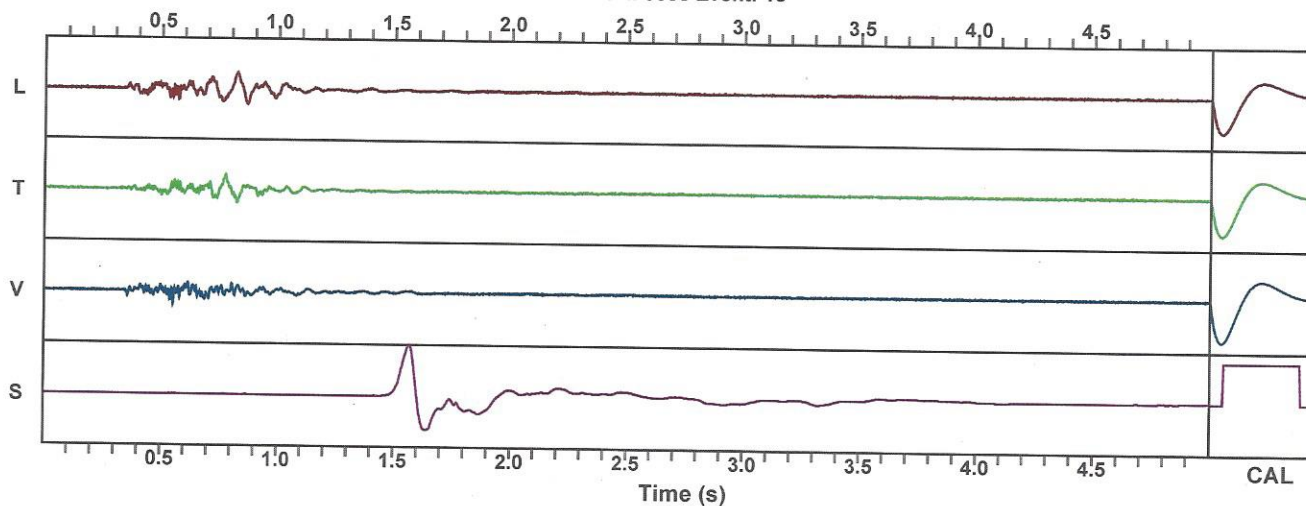


Waveform Graph Scale

Time Scale: 0.1 s
 Seismic Scale: +/- 0.16 in/s
 Sound Scale: +/- 0.0079 psi

Velocity Waveform

SSN: 9835 Event: 15



Seismic Analysis

Velocity Waveform Analysis

Serial Number: 10696
 Firmware Version: 0C-06.05
 Event Date: 10/06/2017 11:35:17 (UTC -06:00)
 Event number: 7
 Recording Time: 5 s
 Client: Martin Marietta
 Operation: Red Canyon Quarry
 Location: Front Entrance
 Distance:
 Operator: Vibra Tech
 Comment:
 Seismic Trigger: 0.02 in/s
 Sound Trigger: 133 dB

Additional Info:

j-GEO-16222
 N38 36 04 W104 56 59

Summary Data

	L	T	V
PPV (in/s):	0.028	0.03	0.018
FREQ (HZ):	6.6	10.4	6
PD (.001"):	0.64	0.57	0.36
PPA (g):	0.013	0.013	0.013

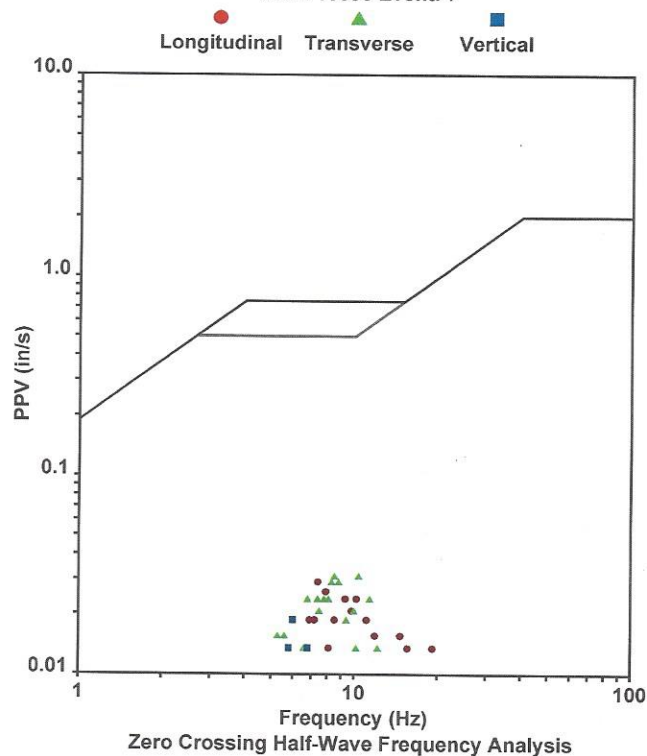
Peak Vector Sum: 0.04 in/s
 Peak Air Pressure: 119 dB
 0.0026 psi @ 4.5 HZ

Shaketable Calibrated

On: 04/13/2017 (UTC -06:00)
 By: Vibra-Tech, Inc.
 2700 Holloway Road - Suite 113
 Louisville, KY 40203 U.S.A.

USBM Safe Blasting Levels

SSN: 10696 Event: 7

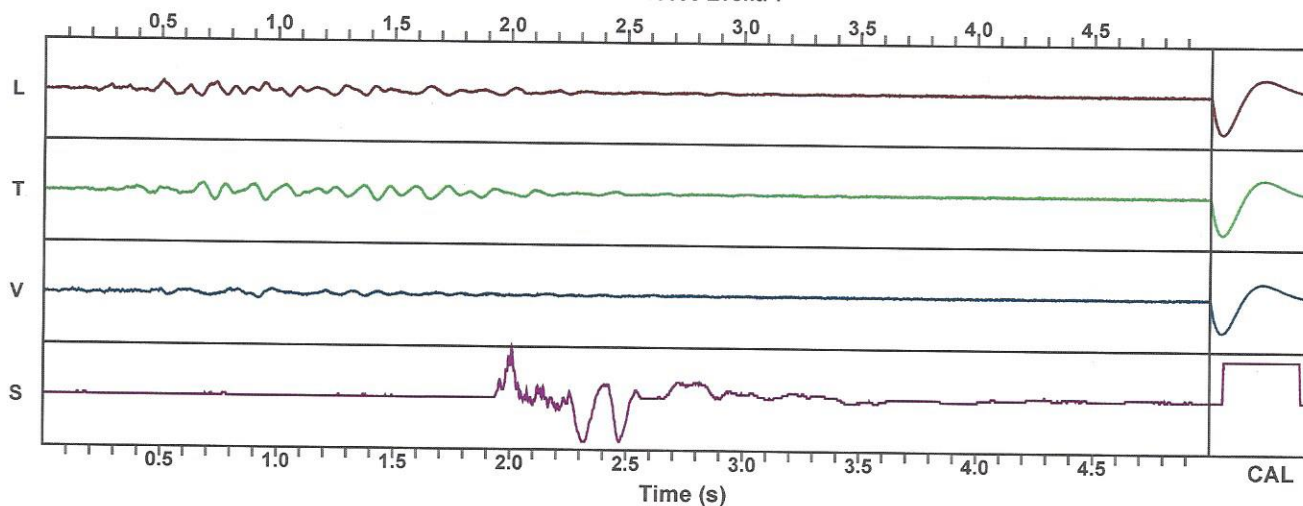


Waveform Graph Scale

Time Scale: 0.1 s
 Seismic Scale: +/- 0.16 in/s
 Sound Scale: +/- 0.0026 psi

Velocity Waveform

SSN: 10696 Event: 7

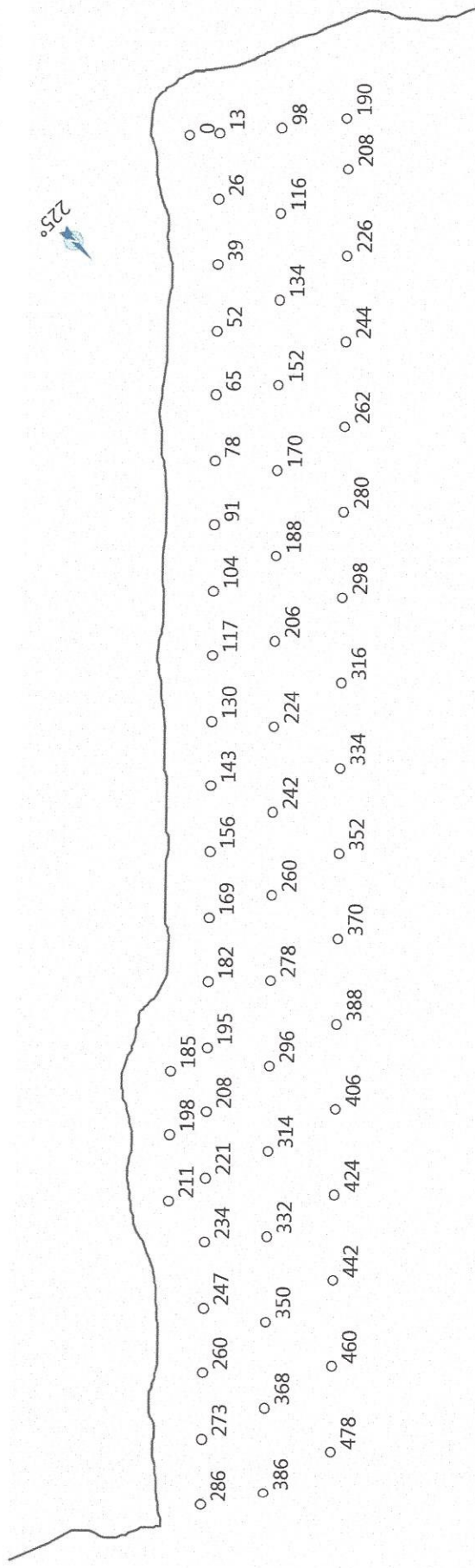


DIAGRAM

BLAST DATE: 10/06/2017

BLAST NUMBER: 7

225°



Shot: 7

Bench: Bench 5

Customer: MARTIN MARIETTA MATERIALS

Site: Louviers

Load Sheet Report



Mine: RED CANYON	Shot: 7	Date: 10/6/2017	Time: 11:35AM
Blaster: Farmer, Jimmie	License: 1-035-0748	Material: Granite	Holes: 60
Diameter: 5 (IN)	Burden: 13 (FT)	Spacing: 17 (FT)	Primers: 120
Exp. Vibration: 0.00 IPS	Fr. Burden: 17 (FT)	Fr. Spacing: 13 (FT)	Total Exp.: 23,990 (LB)
Fuel: 0 (LB)	AN: 0 (LB)	ANFO: 0 (LB)	Emulsion: 23,900 (LB)
Depth: 50 (FT)	YD3: 23,082	Tons: 46,164	Tons/Lb: 1.92
Max Lbs/Delay: 1,353 (LB)	Holes / 8ms: 4	Location: N 038 36 25.20000	& W-104 56 47.9400
Temperature: 70° F	Wind Dir: Northeast	Wind Speed: 5 MPH	Ceiling: High
Conditions: Partly Cloudy	Method of Detonation: Electronic		
Pre-Blast Inspection Performed: ☒ Yes / ☐ No	Initiation: Electronic		
Load Started: 8:00 AM	Load Ended: 11:00 AM	Total Load Time: 03:00	
Comments: Matt Klepfer profiled the face with the drone 12.5' stemming and all production holes The three special holes were decked 5' bottom loaded stemmed to 20' five feet of powder stemming at 15'. The back break is a little jagged and we had db of 129 at the North Hill Side. Larry Mirabelli will look at the video. 11' backbreak.			

Crew

Name	Hours	Name	Hours
Anthony Archelta	4	Daniel Stephens	4
Luke Reel	4	Matt Klepfer	6

Trucks Used: 5013

Inventory

Description	Date Code	Out	Description	Date Code	Out
SPARTAN 350SR	06FE17	120	DIGISHOT DETONATOR 50FT	28AU17	120

Services

Service	Quantity	Service	Quantity

Product Totals

Product	Total (LB)
SPARTAN 350SR	90
TITAN 1000 XL	23,900

Row	Col	Depth	Rise	Stem	Wet?	Product	Hole Total (LB)
A	1	50	20	30	No	SPARTAN 350SR	1.5
A	1	50	20	30	No	TITAN 1000 XL	105
A	2	50	20	30	No	SPARTAN 350SR	1.5
A	2	50	20	30	No	TITAN 1000 XL	105
A	3	50	20	30	No	SPARTAN 350SR	1.5
A	3	50	20	30	No	TITAN 1000 XL	105
A	4	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	4	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	5	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	5	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	6	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	6	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	7	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	7	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	8	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	8	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	9	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	9	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	10	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	10	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	11	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	11	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	12	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	12	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	13	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	13	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	14	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	14	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	15	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	15	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	16	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	16	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	17	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	17	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	18	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	18	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	19	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	19	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	20	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	20	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	21	50	37.5	12.5	No	SPARTAN 350SR	1.5

A	21	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	22	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	22	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	23	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	23	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	24	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	24	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	25	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	25	50	37.5	12.5	No	TITAN 1000 XL	413.772
A	26	50	37.5	12.5	No	SPARTAN 350SR	1.5
A	26	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	1	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	1	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	2	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	2	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	3	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	3	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	4	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	4	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	5	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	5	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	6	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	6	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	7	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	7	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	8	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	8	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	9	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	9	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	10	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	10	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	11	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	11	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	12	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	12	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	13	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	13	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	14	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	14	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	15	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	15	50	37.5	12.5	No	TITAN 1000 XL	413.772
B	16	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	16	50	37.5	12.5	No	TITAN 1000 XL	413.772

B	17	50	37.5	12.5	No	SPARTAN 350SR	1.5
B	17	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	1	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	1	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	2	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	2	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	3	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	3	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	4	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	4	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	5	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	5	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	6	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	6	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	7	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	7	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	8	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	8	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	9	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	9	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	10	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	10	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	11	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	11	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	12	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	12	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	13	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	13	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	14	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	14	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	15	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	15	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	16	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	16	50	37.5	12.5	No	TITAN 1000 XL	413.772
C	17	50	37.5	12.5	No	SPARTAN 350SR	1.5
C	17	50	37.5	12.5	No	TITAN 1000 XL	413.772