Buckley Powder Co. BLAST REPORT

SERVICE SITE LOCATION: Louviers ORDER NO.: D7403945

BLAST NUMBER: #7-06-22-2018 BLAST TIME: 11:29 am BLAST DATE: 06/22/2018

CUSTOMER: MARTIN MARIETTA MINE: RED CANYON ADDRESS: Colorado Springs, CO

ROCK TYPE: Granite Tons/Yd3: 2.20 EXPECTED VIBRATION: 36.290 IPS

LOCATION OF BLAST

LOCATION OF BLAST IN MINE: North BENCH: Bench 5

BLAST GPS POINTS: N 038 36 17.11200 & W -104 56 27.39600

WEATHER

WEATHER: Cloudy CEILING: Medium TEMPERATURE: 76 F WIND DIRECTION & SPEED: North 5 MPH

NEAREST NON-OWNED STRUCTURE

NAME: North Hillside GPS Points: N 038 36 22.41000 & W -104 56 31.21980

DISTANCE: 617 (FT) DIRECTION: 330°

SEISMOGRAPH DATA

	LOCATION	DISTANCE	GPS POINTS	CALIBRATION DATE
1	North Hillside	617 (FT)	N 038 36 22.41000 & W -104 56 31.21980	09/02/2017

	L	(F)	T	(F)	V	(F)	AIR (db)	SEISMOGRAPH	SERIAL	OPERATOR
1	0.040	10.4	0.030	10.6	0.020	8.9	118	VibraTech 7816	7816	

BLAST DATA

NUMBER OF HOLES (EA)	74
HOLE DIAMETER (IN)	4.5
HOLE DEPTH (FT)	37
FACE HEIGHT (FT)	34
SUB DRILLING (FT)	3
AVG. STEM FACE HOLES (FT)	16.667
STEM OTHER HOLES (FT)	12.254
BURDEN FRONT ROW (FT)	13 - 15
BURDEN OTHER ROWS (FT)	13 - 15
SPACING FRONT ROW (FT)	13 - 15
SPACING OTHER ROWS (FT)	13 - 15

EXPLOSIVES SIZE, TYPE & WEIGHT

SIZE	TYPE	WEIGHT
0.75	SPARTAN 350SR	111
BULK	TITAN 1000 XL	14,420
	TOTAL WEIGHT (LB):	14,531

DETONATORS USED IN BLAST: Electronic MATS USED: No STEM TYPE: 3/4 x 1/2 CRUSHED TOTAL DRILL DEPTH: 2,738 (FT

TYPE	MFG	DATE CODE	USED	TYPE	MFG	DATE CODE	USED
DIGISHOT 30 FT	Dyno Nobel Global	23AP18	76	DIGISHOT DETONATOR 50FT	Dyno Nobel Global	19AP18	75
SPARTAN 350SR	Dyno Nobel Global	18FE18	151				

CU YDS IN SHOT: 18,171 SCALED DISTANCE FACTOR: 22 % OF ANFO: 0

TONS IN SHOT: 39,977 HOLES/DELAY : 4 FUEL OIL % (BULK): 0

MAX LBS/DELAY: 781 AVERAGE LBS/HOLE: 197

POWDER FACTOR (TONS/LB): 2.75 POWDER FACTOR POUNDS/YD3: 0.80

BLASTER'S NAME: Farmer, Jimmie BLASTER'S NUMBER & STATE: 1-035-0748 Colorado

BLASTER'S SIGNATURE: [signature] SITE SAFETY INSPECTION PERFORMED: Yes

NUMBER OF PERSONNEL ON SITE: 5

REMARKS : This shot was GPS drilling and depth Pumping all holes with a cup density at 1.15. This shot has good breakage and movement.

START TIME	END TIME	TOTAL TIME	TRUCK NUMBERS
7:00 AM	10:30 AM	03:30	5092

APPENDIX A

Date: 6-22-18 Location: mm Red Canyon shot # : 7-

BLASTER'S CHECKLIST

Must be filled out as you go!

PRE-TRIP CHECKLIST

yes / no / NA	
✓	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
✓	Digitial 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 Harmlesses
✓	Seismographs
✓	Density Cup and Scales
✓	Two Way Radios / fully
✓	Wheel Chocks
✓	Harness & Lanyard / "T" post
✓	First Aid Kits

PRESHIFT CHECKLIST

yes / no / NA	
✓	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 1.6 hit equals x 160 = _____exp. vib.

TIE-IN CHECKLIST

yes / no / NA	
✓	Shot tie inspected and signed off by two persons prior to shot including lead line *(include names below)*
	JD Justin Charlie
✓	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

yes / no / NA	
✓	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 Farmer

Seismic Analysis
Velocity Waveform Analysis

Serial Number:	7816
Firmware Version:	0C-06.05
Event Date:	06/22/2018 11:29:23 (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:

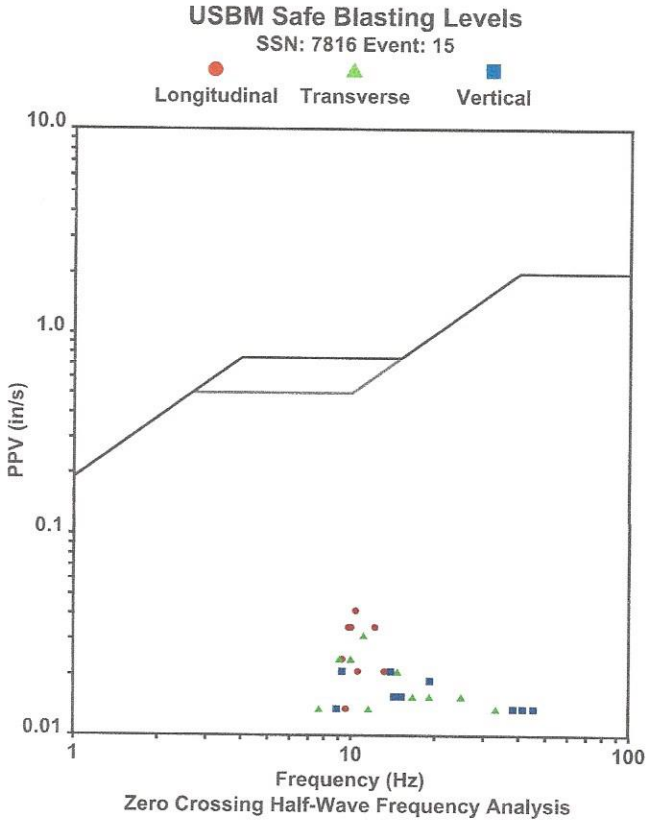
j-GEO-16060
N38 36 22 W104 56 31

Summary Data

	L	T	V
PPV (in/s):	0.04	0.03	0.02
FREQ (HZ):	10.4	10.6	8.9
PD (.001"):	0.5	0.44	0.29
PPA (g):	0.013	0.013	0.013

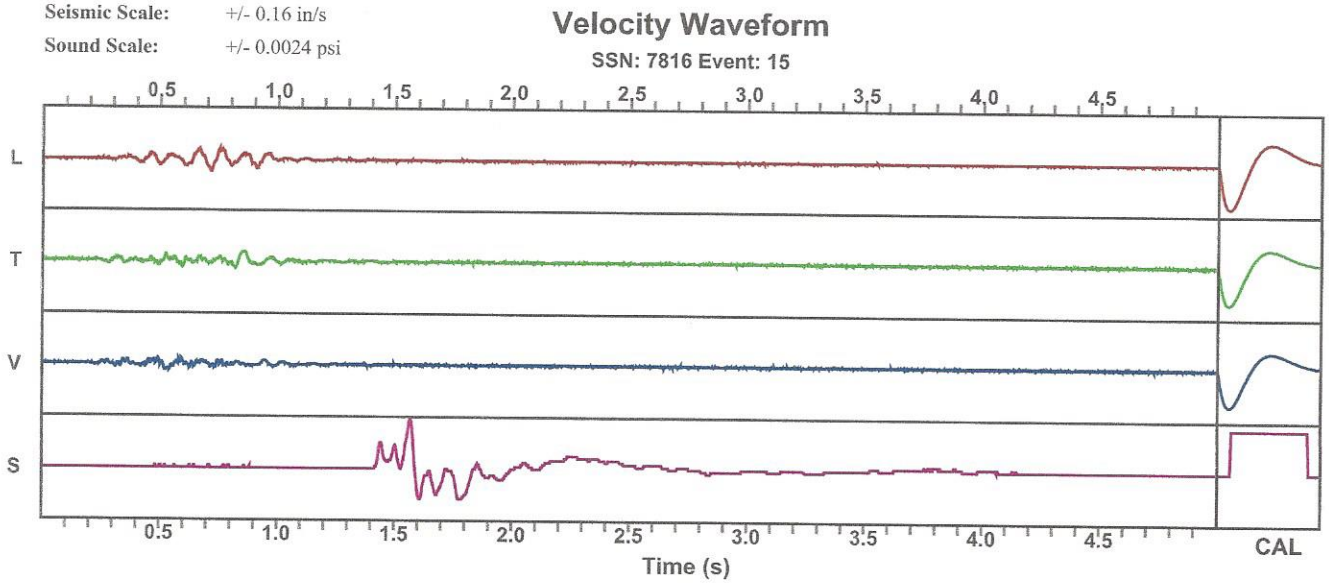
Peak Vector Sum: 0.043 in/s
Peak Air Pressure: 118 dB
0.0024 psi @ 8.6 HZ

Shaketable Calibrated
On: 09/02/2017 (UTC -06:00)
By: Vibra-Tech, Inc.
2700 Holloway Road - Suite 113
Louisville, KY 40203 U.S.A.



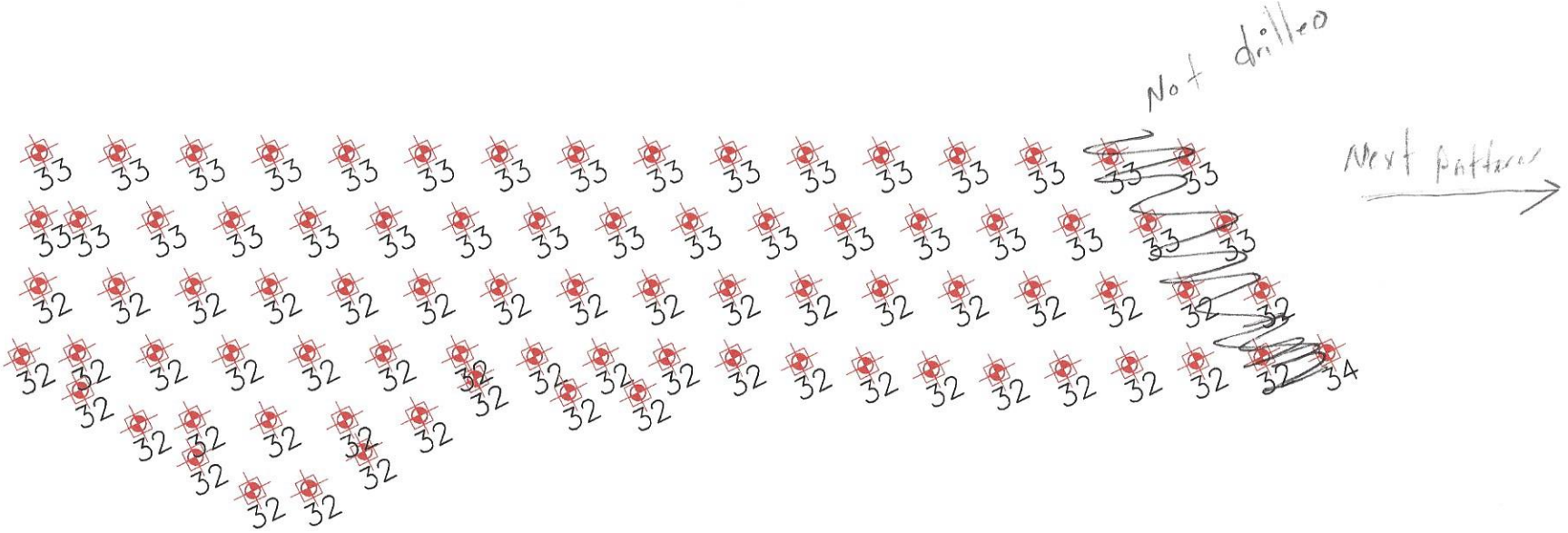
Waveform Graph Scale

Time Scale: 0.1 s
Seismic Scale: +/- 0.16 in/s
Sound Scale: +/- 0.0024 psi



Bench

Shot # 7.

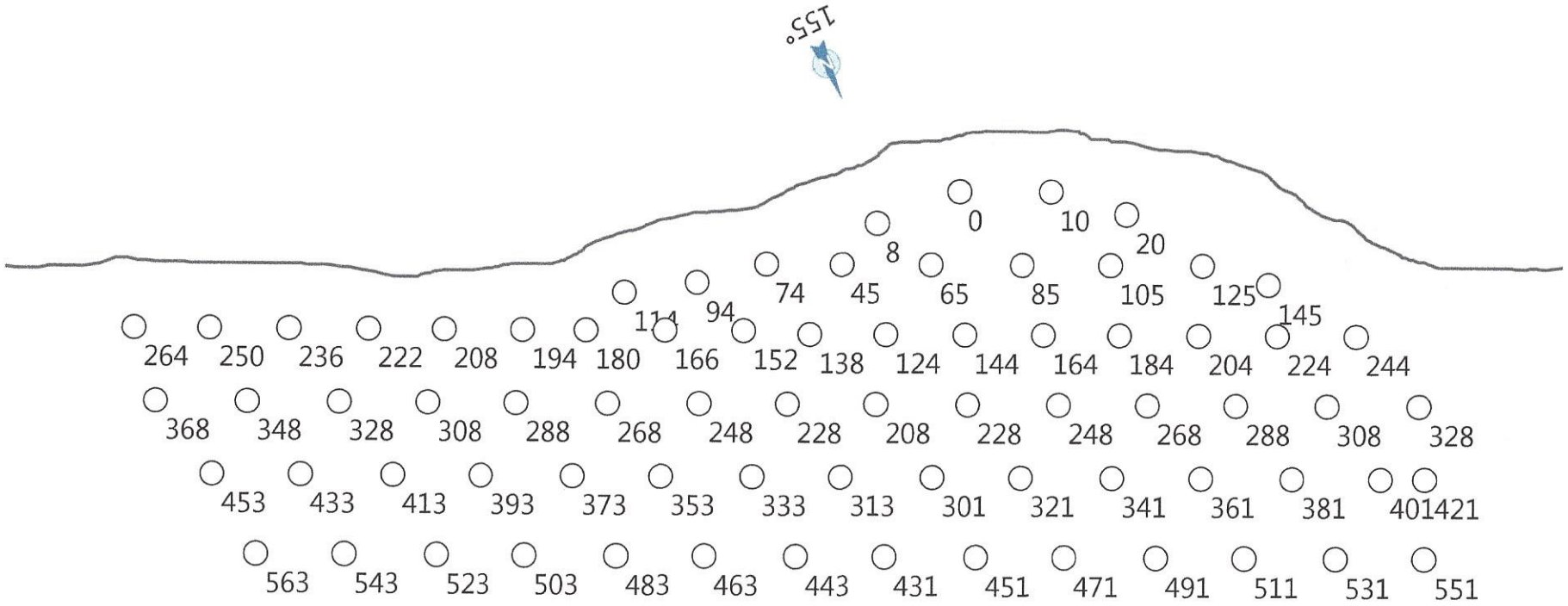


Buckley Powder Co.

CUSTOMER NAME: RED CANYON
BENCH: Bench 5
BLASTER'S NAME: Farmer, Jimmie

DIAGRAM

BLAST DATE: 06/22/2018
BLAST NUMBER: #7-06-22-2018



Shot: #7-06-22-2018
Bench: Bench 5
Customer: MARTIN MARIETTA
Site: Louviers

Load Sheet Report

Mine:	RED CANYON	Shot:	#7-06-22-2018	Date:	6/22/2018	Time:	11:29AM
Blaster:	Farmer, Jimmie	License:	1-035-0748	Material:	Granite	Holes:	74
Diameter:	4.5 (IN)	Burden:	13 (FT)	Spacing:	15 (FT)	Primers:	148
Exp. Vibration:	36.29 IPS	Fr. Burden:	14 (FT)	Fr. Spacing:	14 (FT)	Total Exp.:	14,531 (LB)
Fuel:	0 (LB)	AN:	0 (LB)	ANFO:	0 (LB)	Emulsion:	14,420 (LB)
Depth:	37 (FT)	YD3:	18,171	Tons:	39,977	Tons/Lb:	2.75
Gallons of Fuel:	0						
Max Lbs/Delay:	781 (LB)	Holes / 8ms:	4	Location:	N 038 36 17.11200	&	W-104 56 27.3960
Temperature:	76° F	Wind Dir:	North	Wind Speed:	5 MPH	Ceiling:	Medium
Conditions:	Cloudy			Method of Detonation:	Electronic		
Pre-Blast Inspection Performed:	Yes / No			Initiation:	Remote		
Load Started:	7:00 AM	Load Ended:	10:30 AM	Total Load Time:	03:30		
Comments:	This shot was GPS drilling and depth Pumping all holes with a cup density at 1.15. This shot has good breakage and movement.						

Crew

Name	Hours	Name	Hours
Charlie Mars	5	Justin Banks	5
Luke Reel	5	Matt Klepfer	5
Trevor Frogge	5	William Colby	5

Trucks Used: 5092

Inventory

Description	Date Code	Out	Description	Date Code	Out
SPARTAN 350SR	18FE18	151	DIGISHOT 30 FT	23AP18	76
DIGISHOT DETONATOR 50FT	19AP18	75			

Services

Service	Quantity	Service	Quantity

Product Totals

Product	Total (LB)
SPARTAN 350SR	111
TITAN 1000 XL	14,420

Row	Col	Depth	Rise	Stem	Wet?	Product	Hole Total (LB)
A	1	37	20	17	No	SPARTAN 350SR	1.5
A	1	37	20	17	No	TITAN 1000 XL	147.353
A	2	37	20	17	No	SPARTAN 350SR	1.5
A	2	37	20	17	No	TITAN 1000 XL	147.353
A	3	37	20	17	No	SPARTAN 350SR	1.5
A	3	37	20	17	No	TITAN 1000 XL	147.353
A	4	37	20	17	No	SPARTAN 350SR	1.5
A	4	37	20	17	No	TITAN 1000 XL	147.353
B	1	37	20	17	No	SPARTAN 350SR	1.5
B	1	37	20	17	No	TITAN 1000 XL	147.353
B	2	37	20	17	No	SPARTAN 350SR	1.5
B	2	37	20	17	No	TITAN 1000 XL	147.353
B	3	37	20	17	No	SPARTAN 350SR	1.5
B	3	37	20	17	No	TITAN 1000 XL	147.353
B	4	37	25	12	No	SPARTAN 350SR	1.5
B	4	37	25	12	No	TITAN 1000 XL	209.035
B	5	37	25	12	No	SPARTAN 350SR	1.5
B	5	37	25	12	No	TITAN 1000 XL	209.035
B	6	37	25	12	No	SPARTAN 350SR	1.5
B	6	37	25	12	No	TITAN 1000 XL	209.035
B	7	37	25	12	No	SPARTAN 350SR	1.5
B	7	37	25	12	No	TITAN 1000 XL	209.035
B	8	37	25	12	No	SPARTAN 350SR	1.5
B	8	37	25	12	No	TITAN 1000 XL	209.035
B	9	37	20	17	No	SPARTAN 350SR	1.5
B	9	37	20	17	No	TITAN 1000 XL	147.353
C	1	37	20	17	No	SPARTAN 350SR	1.5
C	1	37	20	17	No	TITAN 1000 XL	147.353
C	2	37	20	17	No	SPARTAN 350SR	1.5
C	2	37	20	17	No	TITAN 1000 XL	147.353
C	3	37	20	17	No	SPARTAN 350SR	1.5
C	3	37	20	17	No	TITAN 1000 XL	147.353
C	4	37	20	17	No	SPARTAN 350SR	1.5
C	4	37	20	17	No	TITAN 1000 XL	147.353
C	5	37	20	17	No	SPARTAN 350SR	1.5
C	5	37	20	17	No	TITAN 1000 XL	147.353
C	6	37	20	17	No	SPARTAN 350SR	1.5
C	6	37	20	17	No	TITAN 1000 XL	147.353
C	7	37	20	17	No	SPARTAN 350SR	1.5
C	7	37	20	17	No	TITAN 1000 XL	147.353
C	8	37	20	17	No	SPARTAN 350SR	1.5

C	8	37	20	17	No	TITAN 1000 XL	147.353
C	9	37	20	17	No	SPARTAN 350SR	1.5
C	9	37	20	17	No	TITAN 1000 XL	147.353
C	10	37	25	12	No	SPARTAN 350SR	1.5
C	10	37	25	12	No	TITAN 1000 XL	209.035
C	11	37	25	12	No	SPARTAN 350SR	1.5
C	11	37	25	12	No	TITAN 1000 XL	209.035
C	12	37	25	12	No	SPARTAN 350SR	1.5
C	12	37	25	12	No	TITAN 1000 XL	209.035
C	13	37	25	12	No	SPARTAN 350SR	1.5
C	13	37	25	12	No	TITAN 1000 XL	209.035
C	14	37	25	12	No	SPARTAN 350SR	1.5
C	14	37	25	12	No	TITAN 1000 XL	209.035
C	15	37	25	12	No	SPARTAN 350SR	1.5
C	15	37	25	12	No	TITAN 1000 XL	209.035
C	16	37	25	12	No	SPARTAN 350SR	1.5
C	16	37	25	12	No	TITAN 1000 XL	209.035
C	17	37	25	12	No	SPARTAN 350SR	1.5
C	17	37	25	12	No	TITAN 1000 XL	209.035
D	1	37	25	12	No	SPARTAN 350SR	1.5
D	1	37	25	12	No	TITAN 1000 XL	209.035
D	2	37	25	12	No	SPARTAN 350SR	1.5
D	2	37	25	12	No	TITAN 1000 XL	209.035
D	3	37	25	12	No	SPARTAN 350SR	1.5
D	3	37	25	12	No	TITAN 1000 XL	209.035
D	4	37	25	12	No	SPARTAN 350SR	1.5
D	4	37	25	12	No	TITAN 1000 XL	209.035
D	5	37	25	12	No	SPARTAN 350SR	1.5
D	5	37	25	12	No	TITAN 1000 XL	209.035
D	6	37	25	12	No	SPARTAN 350SR	1.5
D	6	37	25	12	No	TITAN 1000 XL	209.035
D	7	37	25	12	No	SPARTAN 350SR	1.5
D	7	37	25	12	No	TITAN 1000 XL	209.035
D	8	37	25	12	No	SPARTAN 350SR	1.5
D	8	37	25	12	No	TITAN 1000 XL	209.035
D	9	37	25	12	No	SPARTAN 350SR	1.5
D	9	37	25	12	No	TITAN 1000 XL	209.035
D	10	37	25	12	No	SPARTAN 350SR	1.5
D	10	37	25	12	No	TITAN 1000 XL	209.035
D	11	37	25	12	No	SPARTAN 350SR	1.5
D	11	37	25	12	No	TITAN 1000 XL	209.035
D	12	37	25	12	No	SPARTAN 350SR	1.5
D	12	37	25	12	No	TITAN 1000 XL	209.035

D	13	37	25	12	No	SPARTAN 350SR	1.5
D	13	37	25	12	No	TITAN 1000 XL	209.035
D	14	37	25	12	No	SPARTAN 350SR	1.5
D	14	37	25	12	No	TITAN 1000 XL	209.035
D	15	37	25	12	No	SPARTAN 350SR	1.5
D	15	37	25	12	No	TITAN 1000 XL	209.035
E	1	37	25	12	No	SPARTAN 350SR	1.5
E	1	37	25	12	No	TITAN 1000 XL	209.035
E	2	37	25	12	No	SPARTAN 350SR	1.5
E	2	37	25	12	No	TITAN 1000 XL	209.035
E	3	37	25	12	No	SPARTAN 350SR	1.5
E	3	37	25	12	No	TITAN 1000 XL	209.035
E	4	37	25	12	No	SPARTAN 350SR	1.5
E	4	37	25	12	No	TITAN 1000 XL	209.035
E	5	37	25	12	No	SPARTAN 350SR	1.5
E	5	37	25	12	No	TITAN 1000 XL	209.035
E	6	37	25	12	No	SPARTAN 350SR	1.5
E	6	37	25	12	No	TITAN 1000 XL	209.035
E	7	37	25	12	No	SPARTAN 350SR	1.5
E	7	37	25	12	No	TITAN 1000 XL	209.035
E	8	37	25	12	No	SPARTAN 350SR	1.5
E	8	37	25	12	No	TITAN 1000 XL	209.035
E	9	37	25	12	No	SPARTAN 350SR	1.5
E	9	37	25	12	No	TITAN 1000 XL	209.035
E	10	37	25	12	No	SPARTAN 350SR	1.5
E	10	37	25	12	No	TITAN 1000 XL	209.035
E	11	37	25	12	No	SPARTAN 350SR	1.5
E	11	37	25	12	No	TITAN 1000 XL	209.035
E	12	37	25	12	No	SPARTAN 350SR	1.5
E	12	37	25	12	No	TITAN 1000 XL	209.035
E	13	37	25	12	No	SPARTAN 350SR	1.5
E	13	37	25	12	No	TITAN 1000 XL	209.035
E	14	37	25	12	No	SPARTAN 350SR	1.5
E	14	37	25	12	No	TITAN 1000 XL	209.035
E	15	37	25	12	No	SPARTAN 350SR	1.5
E	15	37	25	12	No	TITAN 1000 XL	209.035
F	1	37	25	12	No	SPARTAN 350SR	1.5
F	1	37	25	12	No	TITAN 1000 XL	209.035
F	2	37	25	12	No	SPARTAN 350SR	1.5
F	2	37	25	12	No	TITAN 1000 XL	209.035
F	3	37	25	12	No	SPARTAN 350SR	1.5
F	3	37	25	12	No	TITAN 1000 XL	209.035
F	4	37	25	12	No	SPARTAN 350SR	1.5

F	4	37	25	12	No	TITAN 1000 XL	209.035
F	5	37	25	12	No	SPARTAN 350SR	1.5
F	5	37	25	12	No	TITAN 1000 XL	209.035
F	6	37	25	12	No	SPARTAN 350SR	1.5
F	6	37	25	12	No	TITAN 1000 XL	209.035
F	7	37	25	12	No	SPARTAN 350SR	1.5
F	7	37	25	12	No	TITAN 1000 XL	209.035
F	8	37	25	12	No	SPARTAN 350SR	1.5
F	8	37	25	12	No	TITAN 1000 XL	209.035
F	9	37	25	12	No	SPARTAN 350SR	1.5
F	9	37	25	12	No	TITAN 1000 XL	209.035
F	10	37	25	12	No	SPARTAN 350SR	1.5
F	10	37	25	12	No	TITAN 1000 XL	209.035
F	11	37	25	12	No	SPARTAN 350SR	1.5
F	11	37	25	12	No	TITAN 1000 XL	209.035
F	12	37	25	12	No	SPARTAN 350SR	1.5
F	12	37	25	12	No	TITAN 1000 XL	209.035
F	13	37	25	12	No	SPARTAN 350SR	1.5
F	13	37	25	12	No	TITAN 1000 XL	209.035
F	14	37	25	12	No	SPARTAN 350SR	1.5
F	14	37	25	12	No	TITAN 1000 XL	209.035