

Glider Prep and Deployment Checklists

Glider -
deployment

RW34-20230303T1521

Project

~~SWOT~~ SFW Jasco Red
Orsted

Deployment
dates

3/3/23 - 3/27/23

Location/notes

South Fork Wind
lease area
off R.I.

Extant

Notes

1) Glider check-out sheet



2) Ballasting/dunk sheets



3) Deployment checklists
(on boat, shore side)



4) Glider check-in sheet



5) Misc. (science, etc.)



CTD



Optode



LISST

6) Other



Compass



GLIDER	2034
PREPARER	DAVE A.
PREP DATE	11/9/2022
LOCATION / MISSION	ORSTED JASCO COO
DENSITY @ TEMP	
INSURED?	

SCIENCE BAY SERIAL NUMBERS	1) CTD 9698	Calibration Date (user/factory)
	2) FLBB CD 6649	3/18/22
	3) OXY 4 4831 SN 644	1/27/21
	4)	
	5)	
	6)	

100m Orsted pump

PRE-SEAL TAKE PICTURES OF CONNECTORS AT EACH SEALING JOINT

FORE CHECK

Check pump & pitch threaded rods (clean and grease)

Grounded nose?

Dessicant Exposed?

Leak detect in place, batteries

secure, grab & wiggle pitch battery to

check secure, white guides free, no

metal shavings, bottles installed

PAYLOAD CHECK

Special Sensors / Additional Sensors?

Grounded?

Corrosion?

Fore Sci Ring

Aft Sci Ring

CTD cable clear, no leak at CTD joint, no leak at pucks

CTD

Other?

AFT CHECK

Iridium Card Installed (SIM #) (if not standard)

Flash Card Check (remove old files, backed up? See **Software** section)

Inspect strain on connectors/worn connectors

Battery secured

Ballast bottle present

Aft cap clean/clear of leak

Ejection weight stem grounded? Should it be? (Version specific)

Thruster greased?

Ensure safety of ballast pump prior to powering glider

Battery check: G2/G1 turn glider on with only 1 battery connected; G3 use BMS current

Aft Pack Voltage

Pitch Pack Voltage

Nose Packs Voltage

Emer (if possible) Voltage

Cabling/connectors - lithium vs. alkaline circuit correct?

POST-SEAL, pre-ballast

GENERAL

Pick Point Present?

Special Cargo?

HARDWARE

Nose cone and pump bladder inspection

Anode grounded?

Pressure Sensor Check (corrosion, clear)

Aft sensor

Ejection weight assembly ok/not seized?

Anode size / remainder

Payload sensor

12/9 VAC 6.29 @ Ball @ 23.98'

POWERED

Put m_coulomb_amphr_total accordingly (0 = new batteries)
Put f_coulomb_battery_capacity (Alk=155, Lilon=200, li=450,625)
Vacuum @ T @ ballast 6.29 @ 23.98' Ball Stabilized m_battery
Get m_tot_num_inflections. Verify relative < 20000 or sufficient
Get m_leakdetect_voltage, science, forward (>2.3)
Get m_digifin_leakdetect_reading (less than 1019 requires service)
Altimeter test - put c_alt_time 0, verify chirp, note m_altimeter_voltage
Verify Argos ping ✓ Wiggle for 5 minutes

181 Alt

450

83981

1023

✓

✓

✓

✓

SOFTWARE

(paths are RU specific)

GENERAL

Backup Glider and Science Cards
COOL//gliderData//glider_OS_backups/"glider name"
Format both CF cards - FAT Format
Apply new copy of latest TWR Software Image
For Glider: COOL//gliderData//gliderDos_releases/archived/"version"/target-glider
For Science: COOL//gliderData//gliderDos_releases/archived/"version"/target-science

Copy/overwrite STATE and CONFIG Folders
FW Transfer latest RU Software Image

COOL//GliderData//Glider Software Image/"use most recent image"

Software Version 10.08
Date OK? ✓

Configure TBDlist
Configure NBDlist

CONFIG

simul.sim deleted

MAFILES

goto_l10.ma (set x_last...)
yo*.ma, surfac*.ma pertinent for each glider and test missions

MISSIONS

b_arg: undervolts: 10.75V alkaline, 9-10 V Li3S, 13.5V Li4S, 12.75V Lilon
Remove unused sample behaviors in missions

AUTOEXEC.MI

Iridium: Numbers may vary. Listed: Main - Rutgers Alternate - TWR

Irid Main: 88160000592 ✓

Irid Alt: 17818711614 ✓

u_iridium_failover_retries = 10 7

u_sequence_start_delay 240 ✓

sci timestamp sensors (ctd41cp) ✓

Calibration coefficients ✓

Reset the glider, observe any errors

get f_max_working_depth 102

CACHE MANAGEMENT

del ..\state\cache*.*
after *bdlist.dat are set (exit reset):
logging on; logging off
send ..\state\cache*.cac
send *.mbd *.sbd *.tbd

DOCKSERVER

Version ✓
Check script ✓

TWR BACKUP

Confirm to-glider folder clear ✓
Confirm correct script running ✓

* **Software Burning Tips** : if using Procomm or local folder, copy all the files from the software image locally. Then proceed to edit them for the glider and do a mass freewave transfer of the files. Save these files or prepare the to-glider with these files

* Do a logging on for all these checks, take note of log and transfer before deployment

SENSOR RETURN

put c_science_send_all 1
put c_science_all_on 8
put c_science_on 3
All sensors reporting values?

CTD

Tank static comparison OK?
Pumped CTD operational?
Plot ballast *BD log, sci_water_pressure non-noisy and near < .5 m

OPTODE

Check in completed?
Saturation reading in air

_____ 1026390

OPTICS

Check max return using fluoro sticks
Check dark counts with sensor covered
Optics file name

LISST

Clean LISST and perform ZSCAT

OTHER

OUTSIDE

GPS Alamanc/firmware updated?

GPS check Latitude

Longitude

Iridium connect

Alternate number

zero_ocean_pressure

Get m_pressure

Air bladder shutoff (time)?

Sync_time (proper date?)

Compass calibration

Compass check

For deep gliders, put c_de_oil_vol -1000 to fully retract oil inside reservoir

_____ 0.0

ADDITIONAL

I ***WARNING: Advanced knowledge required to avoid damage/injury

Check burn wire - disconnect, then put c_weight_drop 1, confirm 12 V

Fore leakdetect _____ Science _____ Aft leakdetect _____

THRUSTER

Report ++ m_thruster_current

Put c_thruster_on 20

Verify thruster spins clockwise and current value updates regularly

Put c_thruster_on 0 to turn off

NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

pump silicon ✓

altner clip ✓

pump aspect ✓

+490

-1°

-200

~~2.5~~ -2.5

-290

-1.5

MASS (g) COMMENTS

<u>Deployment</u>		FORE STEM (minus FBB1,2)	11999.8	
JASCO COD 1		FORE HULL	4780.8	w/ebatt, fbb3, 2x 1 unit dessicant
<u>Glider</u>		AFT STEM (red plug, card)	8190	
ru34		AFT HULL	4760	
		COWLING	1188.2	
		SCREWS (vacuum, cowling, aft battery)	15	
<u>Date</u>		PAYLOAD BAY	11458.4	
3/1/2023		WINGS	452.6	
		JASCO	785.3	mount+bracket, hose clamp, hydrophone, cable
<u>Preparer</u>		AFT BATTERY	10121	
Dave		PITCH BATTERY	8987.5	
		FORE BATTERY 1, 2, EMER		
		AFT BOTTLE	64	
		FORE BOTTLE 1 (stbd) (FBB1)	101.3	
		FORE BOTTLE 2 (port) (FBB2)	100.5	
		OTHER		

FINAL

ENTIRE VEHICLE (Ohaus Scale)

Tank Specifics		Glider Specifics	
Tank Density (kg/m^3)	1018.43	Glider Volume (L)	61.070
Tank Temperature (C)	22.42	Total Mass (kg)	63.004
Weight in Tank (g)	352.00	Glider Density (in air)	1031.68
Target Specifics		Volume Change (temperature induced)	
Target Density (kg/m^3)	1024.50	Volume Change (target) (mL)	-34.1
Target Temperature (C)	10.00	Coefficient of Thermal Expansion	4.50E-05
		Carbon hulls	4.50E-05
		Aluminum hulls	7.50E-05
Glider Volume (at lab temp) (L)		61.519	

Ballasting Using Volume		Ballasting Using Mass	
Should Hang (in tank) (g)	335.7	Adjust Glider Mass (entered volume) (g)	-473.2
Adjust by (g)	-16.3	Glider Density (target water, using mass)	1032.3
Weight Change (no dunk) (g)	-44.0	-17 g (added some foam squares to nose cone)	
Glider Density (target)	1024.0	-13.5 * 2 removed 2 wrw port	

moved 3 port WRW to aft for trim

H MOMENT (rad)	(deg)
Angle of Rotation (before)	-0
Angle of Rotation (after)	0.0
Angle of Rotation	-0
Weight on Spring (after)	
Weight added	
Radius of Hull	125
H-distance	0.0

125 for G2+, deeps

MISC MASSES & VOLUMES
Pick point - 40 mL - 107 g air - 66 g water
Wing Rail Weights - 1.8 mL @ 15.4 g each ~ 13.5 g in water
VMT Transceiver - 173 mL - 162 g water
FIRE Shroud SN02 (ru01) - 266 mL - 112 g water
Optode - 130 mL - 92 or 190 g (plastic or titanium)
LISST Bay - roughly 6.55 L
Carbon Fiber wing Air -> Water Ratio 0.437209
Plastic Wing Air -> Water ratio 0.487603
2622-10-19 ru34-Crested-Jaseed-Ged.xls-Balast Sheet (5)
2k syntactic foam 100 g gives you 155 buoyancy

MASS (g)		COMMENTS
<u>Deployment</u>	FORE STEM (minus FBB1,2)	11999.8
	FORE HULL	4780.8
	AFT STEM (red plug, card)	890.0
	AFT HULL	4760.0
	COWLING	1188.2
<u>Glider</u>	SCREWS (vacuum, cowling, aft battery)	
	PAYLOAD BAY	11458.4
	WINGS	452.6
	OTHER JASLO	785.3
		10082.0
<u>Date</u>	AFT BATTERY	R026 swat = 9934.6, Alaska = 10121
	PITCH BATTERY	R026 pitch swat = 8986.4, Alaska = 8958.7 8987.5
	FORE BATTERY 1, 2, EMER	(spreadsheet)
	AFT BOTTLE	64.0
	FORE BOTTLE 1 (std) (FBB1)	101.3
<u>Preparer</u>	FORE BOTTLE 2 (port) (FBB2)	100.5
	OTHER	
		(modified) aft = 10122.0 pitch =
ENTIRE VEHICLE (Ohaus Scale)		

H MOMENT (rad)	(deg)
Angle of Rotation (before)	0.0
Angle of Rotation (after)	0.0
Angle of Rotation	0 0.0
Weight on Spring (after)	
Weight added	290
Radius of Hull	107
H-distance	####

MISC MASSES & VOLUMES
Pick point - 40 mL - 107 g air - 66 g water
VMT Transceiver - 173 mL - 162 g water
FIRE Shroud SN02 (ru01) - 266 mL - 112 g water
Optode - 130 mL - 92 gr 190 g (plastic or titanium) Cylinder Ballasting Template - Ballast S

Tank Specifics		Glider Specifics	
Tank Density (kg/m^3)		Glider Volume (L)	
Tank Temperature (C)		Total Mass (kg)	0.000
Weight in Tank (g)		Glider Density (in air)	#DIV/0!
Target Specifics		Volume Change (temperature induced)	
Target Density (kg/m^3)		Volume Change (target) (mL)	0.0
Target Temperature (C)		Coefficient of Thermal Expansion	7.00E-05
		Carbon hulls	2.35E-05
		Aluminum hulls	7.00E-05
Glider Volume (at lab temp) (L)		#DIV/0!	

Ballasting Using Volume		Ballasting Using Mass	
Should Hang (in tank) (g)	0.0	Adjust Glider Mass (entered volume) (g)	0.0
Adjust by (g)	0.0	Glider Density (target water, using mass)	#DIV/0!
Weight Change (no dunk) (g)			
Glider Density (target)	#DIV/0!		

GLIDER: Ru34Iteration 3 Log File 0145.0000 Date / Location Nov 8, 2022

Ballast				Notes
FORE	EB	SB	AFT	
FBB1 stbd <u>15.3 (-86)</u>				<u>190 -72</u>
FBB2 Port <u>NC</u>				<u>-131 +131</u>
Aft BB <u>68</u>				<u>-26 -26</u>
Battery <u>65.7</u>				<u>-157 +105</u>

Front Scale 196 Aft Scale 94

Instrument: 1581 Instrument: Glider

T = 28.993 T = 28.992 Roll -0.035 rad = -2°

C = 4.704 C = 4.701 Ballast 3.077 cc Offhaus = 76.55 - 13.85 kg (cont)

D = 1022.49 D = Battery 0.005 in ● = 168
▲ = 172

Iteration 3 Log File 0146 Date / Location 11/8/22

Ballast				Notes
FORE	EB	SB	AFT	
FBB1 stbd				<u>Hall: +.16</u>
FBB2 Port				<u>scale: 246 255</u>
Aft BB <u>1</u>				<u>mass: 344</u>

Front Scale Aft Scale

Instrument: Instrument:

T = T = Roll

C = C = Ballast

D = D = Battery

Iteration 5? Log File Date / Location

Ballast				Notes
FORE	EB	SB	AFT	
FBB1 stbd <u>53.3</u>				<u>F A want +120</u>
FBB2 Port <u>NC</u>				<u>28 -78</u>
Aft BB <u>164.5</u>				<u>-53 +53 trim</u>
Roll <u>-0.03</u>				<u>+60 +60 ballast</u>
Ballast <u>10.3</u>				<u>+20 -20 note here</u>
Battery <u>0.02</u>				<u>+27 +93 → +120 g</u>

Front Scale 222 Aft Scale 130

Instrument: 1581 Instrument:

T = 22.420 T =

C = 4.067 C =

D = 1018.43 D =

+7 +7 to 1024.5

scales equal @ -0.2 in bp+34 +100

GLIDER: R034Iteration 1 Log File _____Date / Location 10/11/2022

Ballast			
FORE	EB	SB	AFT
Front Scale		Aft Scale	
<u>80</u>		<u>530</u>	
Instrument: <u>1581</u>		Instrument: _____	
T = <u>21.714</u>		T = <u>21.714</u>	
C = <u>4.531</u>		C = <u>4.528</u>	
D = <u>1021.68</u>		D = _____	
FBB1 stbd _____			
FBB2 Port _____			
Aft BB _____			
Roll <u>+ .1 rad</u>			
Ballast <u>3.1</u>			
Battery <u>-0.35</u>			

Notes OHAUS = 78.45 (cart + wings + straps)
(13.85 + wings + 1.60)

AZEP hull: adds 1.5 L buoyancy

Iteration _____ Log File _____

Date / Location _____

Ballast			
FORE	EB	SB	AFT
Front Scale		Aft Scale	
_____		_____	
Instrument: _____		Instrument: _____	
T = _____		T = _____	
C = _____		C = _____	
D = _____		D = _____	
FBB1 stbd _____			
FBB2 Port _____			
Aft BB _____			
Roll _____			
Ballast _____			
Battery _____			

Notes Unit - 538g

F A

80 530

+225 -225

-269 -269

-44 -494

-450 } lower sci. plate

-186 } car foam

+112 } to get to -494

Iteration 2 Log File 0144Date / Location 10/26 RU

Ballast			
FORE	EB	SB	AFT
Front Scale		Aft Scale	
<u>190</u>		<u>42</u>	
Instrument: _____		Instrument: _____	
T = <u>23.044</u>		T = _____	
C = <u>4.723</u>		C = _____	
D = <u>1021.71</u>		D = _____	
FBB1 stbd <u>101.4</u>			
FBB2 Port <u>100.7</u>			
Aft BB _____			
Roll <u>+ .087</u>			
Ballast _____			
Battery _____			

Notes

H: roll = +.087

scale = 425

roll w/ wings = +.36

mass = 296g

A = 114

Glider / Mission: RU34 / Jasco

Cal Location

DMCS Gantry

Date

12/8/2022

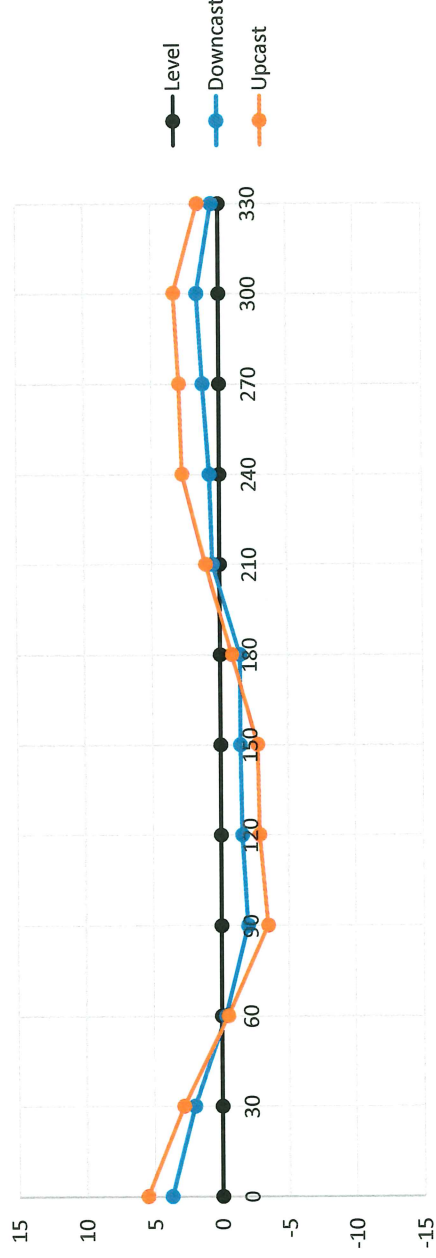
Operator

ivid, Nicole, Brian, Jam

LEVEL		
HAND	GLIDER	ERROR
0		0
30		0
60		0
90		0
120		0
150		0
180		0
210		0
240		0
270		0
300		0
330		0

DOWNCAST		
HAND	GLIDER	ERROR
0	1.2	3.7
30	29	2
60	57.2	-0.3
90	81	-2
120	117.4	-1.6
150	144.5	-1.5
180	179	-1.5
210	215	0.5
240	237.2	0.7
270	271.2	1.2
300	298.6	1.6
330	334.5	0.5

UPCAST		
HAND	GLIDER	ERROR
0	2	5.5
30	31.3	2.8
60	57	-0.5
90	85	-3.5
120	115.1	-2.9
150	148.7	-2.8
180	178.6	-0.9
210	213.5	1
240	242.2	2.7
270	272.9	2.9
300	301.8	3.3
330	329.5	1.5



Slocum Glider Check-IN

DATE: May 9th, 2023 GLIDER: A034 SB: 9698

Vehicle Powered

1. Power on vehicle in order to fully retract pump, and/or to deflate air bladder. ✓
2. Wiggle vehicle for 5 minutes. ✓ log: 0171.0000

Vehicle Cleaning (hose down with pressure)

Nose cone ✓

1. Remove nose cone. ✓ *find recover system part looks like it has bent pins / the plug has been compressed inside the rubber*
2. Loosen altimeter screws, and remove altimeter or leave temporarily attached ✓
3. Retract pump ✓
4. Remove altimeter and hose diaphragm removing all sand, sediment, bio oils ✓
5. Clean nose cone and altimeter ✓

Tail cone ✓

1. Remove tail cone ✓
2. Hose and clean anode and air bladder making sure air bladder is completely clean ✓
3. Clean cowling ✓

Wing rails ✓

1. Remove wing rails and hose down

Tail plug cleaning ✓

1. Dip red plug in alcohol and clean plug if especially dirty ✓
2. Re-dip red plug and repeatedly insert and remove to clean the glider plug ✓
3. Compress air glider female connector ✓
4. Lightly silicon red plug and replace in glider once silicon has been dispersed evenly in the plugs ✓

CTD Comparison Check ✓

1. Inspect CTD sensor for any sediment buildup, take pictures of anything suspicious or make note. —
2. Record results of Static Tank Test on CTD Check-in/out sheet ✓ *A034 1581*

Optode Check/Calibration ✓

1. Record results on Optode Check Sheet

*cond: 4.5218 cond: 4.5247
temp: 22.3423 temp: 22.3477
|ac| = 0.0029 |at| = 0.0054*

Vehicle Disassembled ✓

1. Check leak points for water or salt buildup ✓
2. **BACKUP FLASH CARDS** in ✓
/coolgroup/gliderData/glider_OS_backups/<glider>/<glider-deploymentID>/<from glider>,<from sb_0xxx> ***** DO NOT DELETE DATA OFF CARDS *****
3. Change permissions on <glider-deploymentID> folder to read, write, execute for owner and group, and read, execute for everyone ✓
4. Remove used batteries and place in return crate ✓
5. Re-assemble glider with a vacuum ✓

3. Change permissions on <glider-deploymentID> folder to read, write, execute for owner and group, and read, execute for everyone _____
4. Remove used batteries and place in return crate _____
5. Re-assemble glider with a vacuum _____

Update Glider/Sensor History/Notes/Inventory _____

1. If needed, add notes to deployment page, glider binder, payloads binder, etc. _____

Compile Deployment Checklist Packet Check _____

2. Print/fill out checklist packet title page
3. Make sure all pages are accounted for.
4. Scan entire packet and save to:
/coolgroup/gliderData/deployments/<YEAR>/<glider-missionID>/meta/<Glider-missionID_checklists>
5. Put packet into the appropriate year deployment binder.

Slocum CTD Comparison Check

GLIDER: RU34 SB: 9698P DEPLOYMENT: Jasco Coo 1

Date: 11/8/2022

Pre-Deployment

SBE19 s/n: <u>1581</u>	Glider:
Temperature: <u>21.993</u>	Temperature: <u>21.992</u>
Conductivity: <u>4.704</u>	Conductivity: <u>4.701</u>

Notes: vacuum = 1.0 @ ambient
bubbles - front .25" chamber ~~is~~ to be removed if wanted
att is good, no chance room

Post-Deployment

Date: 5/9/2023

SBE19 s/n: <u>1581</u>	Glider:
Temperature: <u>22.3477</u>	Temperature: <u>22.3423</u>
Conductivity: <u>4.5247</u>	Conductivity: <u>4.5218</u>

Notes:

*** CTD Maintenance if comparison is not acceptable (reference SeaBird Application Note 2D)

1. Perform CTD backward/forward flush with 1% Triton X-100 solution
2. Perform CTD backward/forward flush with 500 – 1000 ppm bleach solution
3. Perform the same on a pumped unit, just different approach
4. Repeat comparison test if above results not within $T < .01$ C, $C < .005$ S/m

Oxygen Optode Check & Calibration

pre Ruz4 Jisco

OPTODE SN	644	DATE	11/18/2022
FOIL ID	1517M	AIR PRESSURE (hPa)	29.93 mmHg = 1013.546 hPa =
PRE SALINITY	35	CALIBRATED?	No 760.222 mmHg

* REMEMBER TO ISSUE THE SAVE COMMAND AFTER CHANGING VALUES

100% SOLUBILITY	289.82 μM = 9.27 ppm	TITRATION	8 ppm, 8.4 ppm
* μM = ppm * 1000 / 32	EPA Na2S2O3 Check	2.2	mL
	Sodium Sulfite / mL	17.9g / 800 mL	%

PRE-CHECK			
100%		0%	
Conc (μM) =	287.262	Conc (μM) =	1.317
Saturation (%) =	99.463	Saturation (%) =	0.453
Temp (°C) =	19.144	Temp (°C) =	15.762
Phase =	30.748	Phase =	59.828

POST-CAL			
100%		0%	
Conc (μM) =		Conc (μM) =	
Saturation (%) =		Saturation (%) =	
Temp (°C) =		Temp (°C) =	
Phase =		Phase =	

GLIDER CONFIG	
POST SALINITY	35
TEXT OUTPUT OFF	✓

* REMEMBER TO ISSUE THE SAVE COMMAND AFTER CHANGING VALUES

Oxygen Optode Check & Calibration

Oxy 4831

RUB34 Post Jasco
check-in

OPTODE SN	644	DATE	4/17/2023
FOIL ID	1517m	AIR PRESSURE (hPa)	27.45 mHg = 997.2 hPa = 748.03 mmHg
PRE SALINITY	35	CALIBRATED?	No

* REMEMBER TO ISSUE THE SAVE COMMAND AFTER CHANGING VALUES

100% SOLUBILITY	257.98 μ M = 8.26 ppm	TITRATION	7.2 ppm, 7.2 ppm
	* μ M = ppm * 1000 / 32	EPA Na2S2O3 Check	2.1 mL
		Sodium Sulfite / mL	20g / 700mL %

PRE-CHECK			
100%		0%	
Conc (μ M) =	256.581	Conc (μ M) =	1.019
Saturation (%) =	97.228	Saturation (%) =	0.462
Temp ($^{\circ}$ C) =	23.774	Temp ($^{\circ}$ C) =	22.575
Phase =	30.090	Phase =	59.442

POST-CAL			
100%		0%	
Conc (μ M) =		Conc (μ M) =	
Saturation (%) =		Saturation (%) =	
Temp ($^{\circ}$ C) =		Temp ($^{\circ}$ C) =	
Phase =		Phase =	

GLIDER CONFIG	
POST SALINITY	35
TEXT OUTPUT OFF	yes

* REMEMBER TO ISSUE THE SAVE COMMAND AFTER CHANGING VALUES