

Triage light product test and report.

As someone who is involved in the military and police arena I often find myself having a chuckle when I read product testimonials or sales blurbs that do nothing to convey to me what I see is a good product. Frankly there are manufacturers out there who really need to get a grip on the real world and test products under those real world conditions. Typically I see companies who are so enamored with their product they cannot effectively complete proper testing if not technical at least real. Reading a product will still operate after a three foot drop onto a carpeted floor does not instill product confidence nor is it a way to sell a product.

When we came across the Triage Light from Synersolutions the initial product review looked ok. With any review you have to decode it and read between the lines to get the truth. A company saying a product is waterproof does not necessarily mean waterproof at extended submerged times or at a given depth. Now as any end user will point out with any product there are some features one likes or does not like and hence companies have a range of product to suit those clientele but my interest was in seeing how good this little LED beacon light was.

To do this we had Juan, who seems to have a good grasp on what a product should be, send us a few of his Triage Lights to test. The tests were not based on what the light can or cannot do in a set scenario as that can sometimes only be determined either good or bad by the end user. We simply wanted to take the Triage light through a few paces. In essence how well will the light stand up to a little abuse. So we went ahead with our own evaluation of which we agreed to send to Juan a report at completion whatever the outcome. To note, lighting performance is subjective as a light performs differently under different conditions and can be effective or non effective based on a good number of scenarios. Sand storm, dust, smoke, fog, reflective surfaces (suburban) dark surrounding (rural), battery type, LED type, reflector type etc.

The Triage light application rests over a range of uses from natural disasters to military operations and everywhere in between therefore the tests should at least in some way extend past being carried in a slight drizzle of rain or submerged in a cup of water on the kitchen bench. The testing of products in our field either police or military, in my opinion, need to be conducted past the realms of real life use. In action it is possible such products will be exposed to those extremes and having faith in a product is a worthy ideal when you out in the real world.

Test 1/. Drop test. We started off with a shock test and no not the carpeted floor drop test.

We took our Triage light outside to the concrete area (solid, deep concrete). Having turned the light on to red constant on mode we raised and dropped the light fifty times onto that concrete from a height of 7 feet. Why 50, why not. How many times should we do it for? Result. The light did not flicker or turn off at any time during that test. After we finished this we turned the light off then ran through three full separate scroll through all colour/modes on off tests. Final results, no issues, light operates flawlessly. No separation of the two light parts (head and tail).

Test 2/. Clothes washer test. Then we put the Triage light in green constant on mode and placed it inside a clothes washer (with clothes and soap) for a 45 minute full cold water cycle. The light was still operating fine when we opened the washer. We then turned the light off then ran through three full separate scroll through all colour/modes on off tests. We then turned the light into constant on red mode and repeated the drop test (7 feet height) five times and again repeated three full separate scroll through all colour/modes on off tests. Results, no issues, light operates flawlessly.

Test 3/. Clothes dryer test. We turned the Triage light into amber constant on mode and placed it inside a clothes dryer for a 30 minute cycle with clothes. After the cycle finished we took the light out and did three full separate scroll through all colour/modes on off tests. Results, no issues, light operates flawlessly.

Test 4/. Cold test. From there we turned the Triage Light into blue flash mode and placed inside a residential freezer for 9.5 hrs. The freezer was only opened twice during that period for 5 seconds each to ensure the light was still blinking which it was. We removed the still blinking blue Triage light from the freezer after 9.5 hrs and repeated three full separate scroll through all colour/modes on off tests. No issues. Then we did another five drops from 7 feet onto the solid concrete and again repeated three full separate scroll through all colour/modes on off tests. Results, no issues, light operates flawlessly.

Test 5/. Freeze test. We purchased 5 kilos of dry ice from BOC Gases. Temp -109.3°F or -78.5°C. The dry ice was inside a polystyrene insulated chili bin type box. **Day 1.** At 12.35 pm we turned the Triage light on to constant on green and buried the light under the dry ice and replaced the lid. Over the next hour we did two checks to see if the light was still on and it was. At 1.55 pm the light had stopped to illuminate. We removed the Triage light from the dry ice and ran it under cold water for 15 seconds. Over the next 15 minutes the glow of green started up and came back to full brightness at the end of the fifteen minutes. We did three full separate scroll through all colour/modes on off tests followed by three x 7 foot drop tests onto solid concrete followed by one full separate scroll through all colour/modes on off test. Results, no issues, light operates flawlessly. (**NOTE:** We are not photographers so the pictures are not the best) Picture below of chili bin and Triage light on top (all tests in bin were Triage light buried)



Day 1. At 2.18 pm we then turned the Triage light back on into green constant on and buried the light back in the dry ice.



Picture of one very cold frozen solid Triage Light

Day 1. At 6.15 pm we removed the light which was still glowing green a little. We then took the light outside whilst frozen and did twenty x 7 foot drop tests onto the solid concrete. We waited a while for the light to thaw and then did three full separate scroll through all colour/modes on off tests. Results, no issues, light operates flawlessly. No separation of the two light parts (head and tail).

Pictures showing light coming back onto green over a few minutes.

Pictures below: Left picture and middle picture light coming on slowly. Then picture 3 back to normal intensity



Day 1. At 6.31 pm we turned the Triage light on into amber constant on and placed it back in the dry ice with the lid on. Picture below had light near top but this was for the picture, we actually buried the light down in the ice



Test 7/. Day 1. Boil test. At 8.35 pm we removed the Triage light from the dry ice which was still on in amber mode and dropped it into a pot of boiling water. Picture below.



The Triage light remained on during the boiling water test. We left it there for one minute (no longer due to battery overheating) and then dropped the still going Triage light, totally covered, back into the box of dry ice for five minutes. We then removed the Triage light which was still going and completed twenty five x 7 foot drop tests onto solid concrete followed by three full separate scroll through all colour/modes on off tests. Results No issues, light operates flawlessly. No separation of the two light parts (head and tail).

Test 8/. Day 2. Abrasion/Shock Drag test. We took our Triage light and connected the end with picture framing steel wire and the other end was tied onto a car jack which was in the boot. Hanging it out of the boot while it was in constant on green mode we drove 1 kilometer down the country road at approx 65 km and hour. Over that period the light was hitting the road and bouncing back up at the height level of the car roof. You could tell the hits of the light on the road were severe as the light swung right up and seemed to hover in the air before dropping onto the road again. The light stayed on the complete 1 kilometer test until another car come up behind us in the distance so we stopped the car and hid the light. We then started off down the road again and after about 30 seconds realized we could no longer see the light so stopped the car to find that the light had separated between the top and bottom sections. (Bottom section retained). Obviously only tying one end to the car jack and not securing the two light parts together it was plain to see why it separated and with that the battery came out and the light went off.

Additionally we completely lost the light. So a pass on a 1 kilometer road test.

Test 9/. Day 1.Triage Light Magnet Test: We placed another (**NEW**) Triage light with the magnetic bottom section on the 'weekend wreck' vehicle bonnet located about 4 inches in front of the window and in front of the driver. Picture below.



The Triage light was tied by a piece of string to the window wiper to ensure we kept the light if the magnet failed and the light fell off the bonnet. We then did a 25 kilometer motorway drive reaching speeds of 120 Kph. At no time did the Triage light move or look like moving. As the strength of a magnet and its ability to hold on during any number of scenarios can give different results we could only do this simple test to see at minimum if it held on whilst attached to a standard vehicle while on the road.

We then moved the Triage light to a location on the cross section of the front window just above the side mirror. Picture below. The reason for the move was to ensure we tested another point where the air flow may not be the same as the air flow over the bonnet which may have favored the light. We then did another motorway trip of about 20 kilometers and in that time reached a speed of 130 Kph. Result was the Triage light did not come away from the vehicle at any time. So we conclude that the magnet works reasonably well.



We finally received the second Triage Light from Juan that we had permission to again put through its paces. We did not want to beat about the bush too much with this and decided we would test the light rapidly and harshly.

Test 1/. Day 2. Drop test. We did four full separate scroll through all colour/modes on off tests to ensure the light worked before we started. Then we followed up by turning the Triage Light onto into constant on red mode and did one hundred and forty four (144) x 7 foot drop tests onto solid concrete. No separation of the two light parts (head and tail).

The light stopped working on drop 144 however after picking it up and pushing the head and bottom sections together firmly the light flickered back on. But for how long we wondered. We tried taking the light through its full colour range on off test and it flickered and played up so we thought what a waste of a light. It was noted however that if the head and bottom sections were pushed together firmly the light would work fine so we placed a small piece of paper inside the end of the Triage Light and pushed the two sections together again (top and bottom) The light was tested a few times completing full separate scroll through all colour/modes on off tests. Results No issues, light operates flawlessly.

Test 2/. Day 3. Freeze test. We then purchased another lot of dry ice inside a large chilly bin. The Triage Light was turned on into constant on Green colour mode and buried in the dry ice at 12.35 pm. Picture below taken in broad daylight.



Test 3/. Day 3. Freeze drop test. At 7.15 pm we took the Triage Light out of the dry ice and did five x 7 foot drop tests onto solid concrete.

Our concern was as the light had failed to operate properly after drop 144 despite it appearing to work after placing a little crumpled paper inside the end to make it work it may not survive even one more drop.

The dry ice test was simply to see if freezing the light would harm any components inside and additionally give some evidence that even when subject to freezing and then an immediate shock test it would still worked.

The bottom section of the light did come apart form the top on the last drop but as this is only a silicone cone with no working parts we simply pushed it back on. The Triage light was not on when it was removed from the dry ice nor did it come on during the drop test.

Another picture of a very cold Triage Light



Test 4/. Day 3. Boil test. At 7.20 pm After completing the five x 7 foot drop tests onto solid concrete the light was placed into a pot of boiling water for 30 seconds. The light did not come on or start to light up in the pot.
Picture below.



After removing the light from the pot and waiting a few minutes we tried to make the Triage Light work. We did one full separate scroll through all colour/modes on off tests. Results No issues, light operates flawlessly. We then placed the light in red constant on mode and dropped it into the boiling water again for 30 seconds. Picture below.



At 7.40 pm we placed the Triage Light back into the dry ice while in constant on Green mode.

Test 5/. Day 3. Boil test. At 9.15 pm we removed the Triage Light from the dry ice and placed it immediately into the pot of boiling water for 30 seconds.

Once removed we waited a few minutes and then completed four full separate scroll through all colour/modes on off tests. Results No issues, light operates flawlessly.

Test 5/. Day 4. Boil test 2. The following morning we then took the Triage light which had been on the kitchen table overnight and put it in constant on green mode and dropped it into a pot of boiling water for 1 minute and 30 seconds.



Once removed we waited a few minutes and then completed four full separate scroll through all colour/modes on off tests. Results No issues, light operates flawlessly.

Test 6/. Day 5. Sea water dive test. While on holiday we visited a local dive shop and asked the manager if there was a chance one of his dive teams could take the Triage light out for a test to which he said would be ok.

Stu was the dive member that attached the Triage light to his gear.

I am unsure what the exact time was that the light was in the sea water but when Stu returned the figures were as follows (the Triage light was placed in green flash mode for the complete dive as the battery lasts the longest on this colour),
30 meters for thirty minutes,
25 meters for thirty minutes,
18 minutes for fourth five minutes.

The dive trip was over 2 hours so the light was at least in the water for that amount of time.

The photos here are the Triage light when the divers got back from their trip. Unfortunately I was not able to be there on the boat to get real live pictures but these were taken inside the dive shop.



The Triage light in green mode near the tanks.



Stu holding the Triage light 1



Stu holding the Triage light 2

After the dive trip we did three full separate scroll through all colour/modes on off tests. Results, no issues, light operates flawlessly.

Test 71. Day 6. Water Submergence test. On the 16th of January 2012 at 8pm we attached some wire to the Triage light and tied that wire around wire netting lining the local stream nearby. This was only at a depth of about 4-6 inches but the idea was simply to get some time with the light fully submerged in moving water. The light was removed from the stream at 6.25am Tuesday the 24th of January. We did four full separate scroll through all colour/modes on off tests. Results, no issues, light operates flawlessly. (The light was not on during the test time).



Test 8/. Day 6. Drive test. So then we thought we would test the Triage light with a drive test. Placing the light in constant on red mode we placed the light under the left hand tire on the grassed area of the driveway. There had been no rain for some time (24 hours previous) so the ground although damp from the evening dew was still reasonably firm. We drove over the light twice and took some photos. The light was ok so we drove over the light another eight times and the light was still ok.



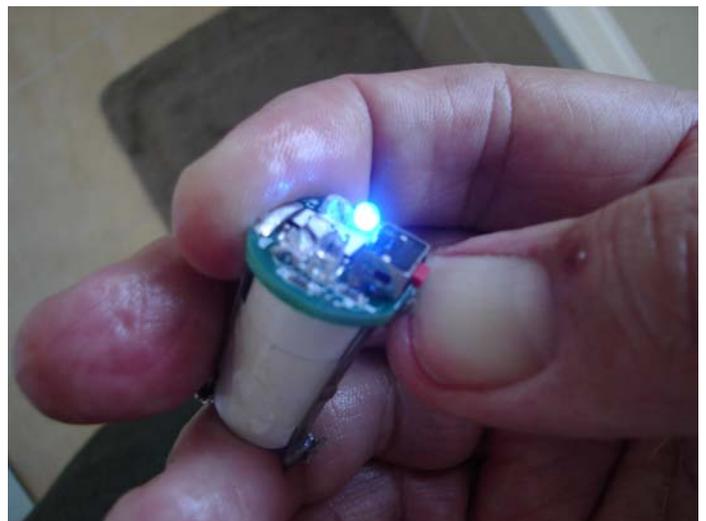
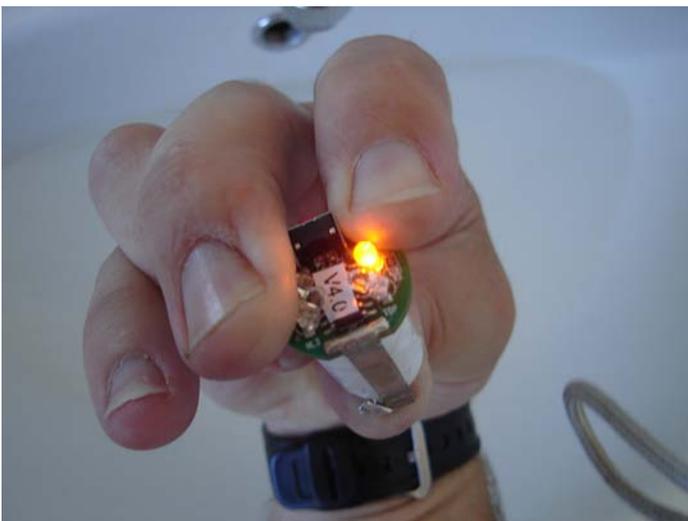
Now the reason for the grass ground drive test was the Triage light is encased in a silicone rubber housing so obviously is not going to have the same strength as an aluminum or polycarbonate plastic housing however the light was ok with this so we moved to the concrete paving stones. Again in constant on red mode we placed the Triage light under the right hand tire and drove over it once. The light broke. Broke in that the bottom part of the silicone separated from the top and the battery cover plate and battery were both dented. One of the metallic contact wires running from the battery plate to the circuit was also loose. As the plate was bent we decided to use some aluminum foil to make contact across the back of the battery and the two metallic contacts to see if the Triage light would still work. Scrolling through we managed to get both the blue constant on and flashing and amber constant on and flashing but the red and green LED's were not working at all.





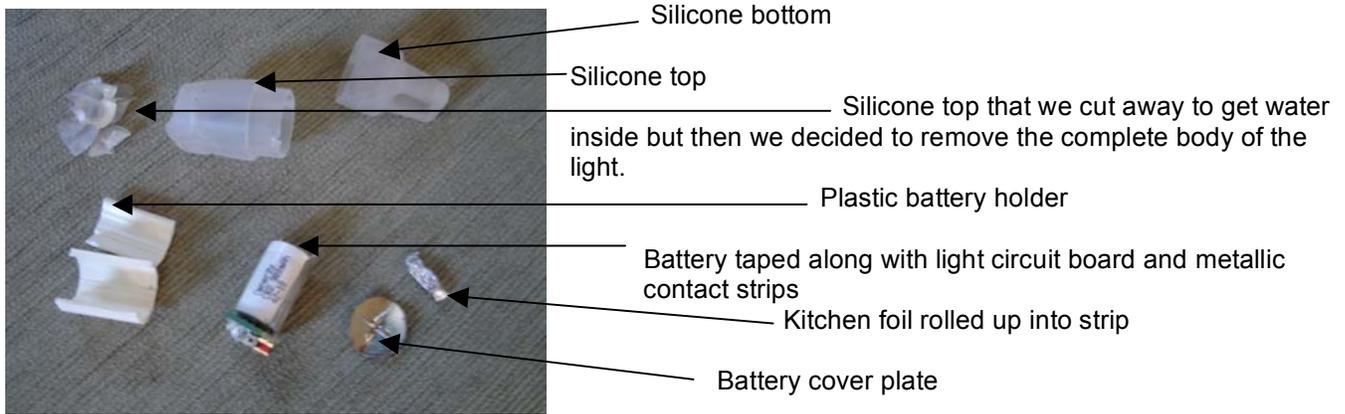
We then placed the Triage light into water for 30, seconds whilst in both the amber and blue constant on and the light stayed on.

To finish off our testing we cut off the top of the Triage light to expose the raw LED's and circuit board. We then placed the light into the bathroom sink for about 30 seconds while on the amber constant on and then again with the blue constant on.



We then wrapped the battery and foil up with a little sellotape thus allowing the button to be pressed and we managed to get back to the amber constant on. We then placed the Triage light into the water filled bathroom sink again and left the light in there for 5 minutes and then removed the light still going.

The light stopped working for a few minutes as I adjusted the metallic contact strips but then came on again into amber flash (time 8pm). The light was then placed on amber flash on the window sill where it ran on flash for another 26.5 hrs. It actually ran longer than this but I had to put an actual time for this report which is in PDF format.



Triage light after all tests completed.

The overall length of time for these tests spanned about three months as I was too busy to commit time to do this one day after the other however we wrote this report using a day to day sequence to indicate that each test or a range of tests were done on another day.

Conclusion: The Triage light is certainly a well designed LED beacon light. From my understanding there are more ideas coming up which should enhance the usability of the light.

Small, nice to carry and hold with no sharp edges the silicone body serves well in allowing performance through temperature changes and most certainly makes it robust with the ability to take hard knocks.

Obviously with it's silicone outer it does not do as well as an aluminum body when in a pressure situation like being driven over on concrete however as this is typically not what happens to a light it is not a major issue.

I am more than confident that an aluminum light would not survive a drag or drop test to the same extent the Triage light went through.

The up side to being silicone also means should the light ever fail in a mission critical scenario you at least have the ability to cut away the silicone and attempt to breathe life back into the light as I did with the piece of foil.

Having four LED colors in the one light is great with the switch encased in the silicone meaning zero chance of water migration into the light via this point even if the light is activation in deep water. The holes located at each end of the Triage light allow for easy attachment to webbing, packs or zippers etc.

Lightweight and compact with easy access to the battery.

The only negatives I can find with this light is it does not use the DL-123A 3 volt lithium battery which is found in many military applications but this would only be of concern if you were a military operator. The two silicone parts (top and bottom) could come apart but this does require some effort so in normal use not likely. The above tests only resulted in one (if my memory serves me) separation.