



WIRE AND CABLE FOR HARSH ENVIRONMENTS

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COMPARISON OF CHAMPLAIN CAN BUS AND TWISTED TXL WIRES

TEST REPORT

- Photos
- Impedance
- Insertion Loss
- Return Loss
- Conclusion

PHOTOS

CCC CAN Cable



Note the uniform twist length. The spacing between the two conductors is very uniform. (wires are touching each other the entire length of the cable)

Twisted SAE TXL Cable

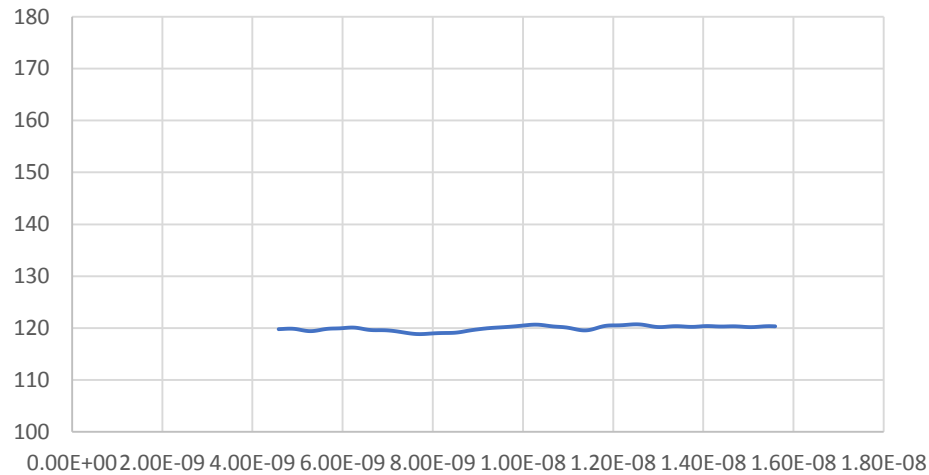


Note how the twist length is not uniform and the spacing between the two conductors is very inconsistent.

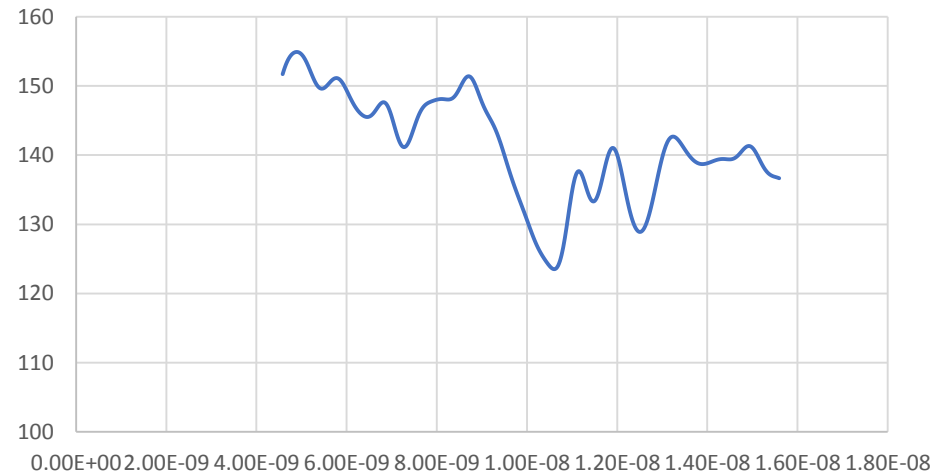
The spacing between the conductor determines the impedance at any one particular point of the cable.

INPUT IMPEDANCE RESULTS TDR MEASUREMENT

Champlain Cable CAN Bus Input Impedance



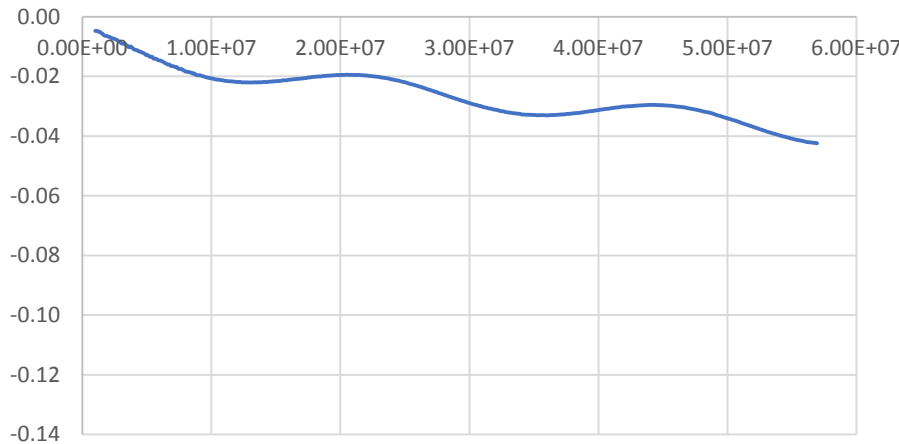
Twisted TXL Input Impedance



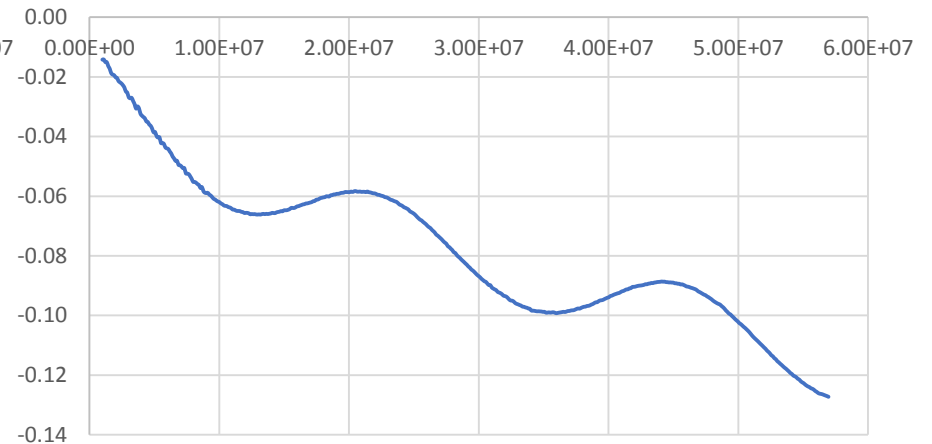
- SAE J-1939 requires an impedance of 120 OHMs + /-12 Ohms.
- This test measures the impedance at different points along the cable.
- The CCC cable impedance is almost exactly 120 ohms through the 5 foot length of cable.
- The twisted TXL cable does not conform to the SAE J-1939 requirements. The impedance changes from 123 ohms to 154 ohms over the 5 foot length.

INSERTION LOSS

CCC Insertion Loss dB/ft



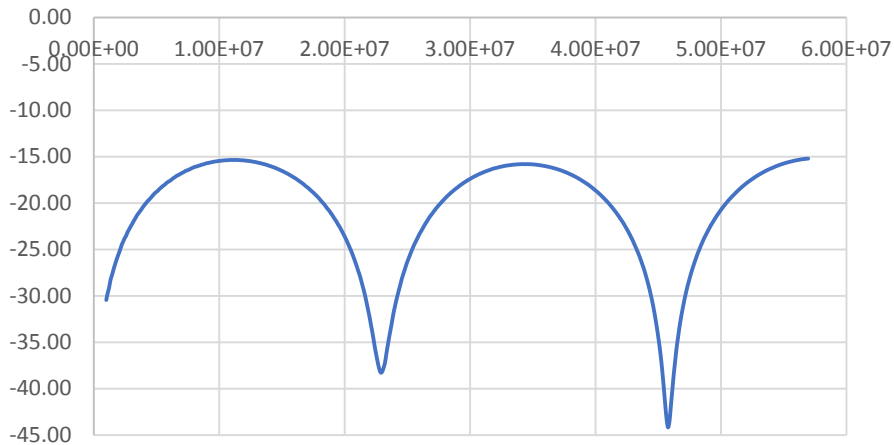
Twisted TXL Insertion Loss dB/ft



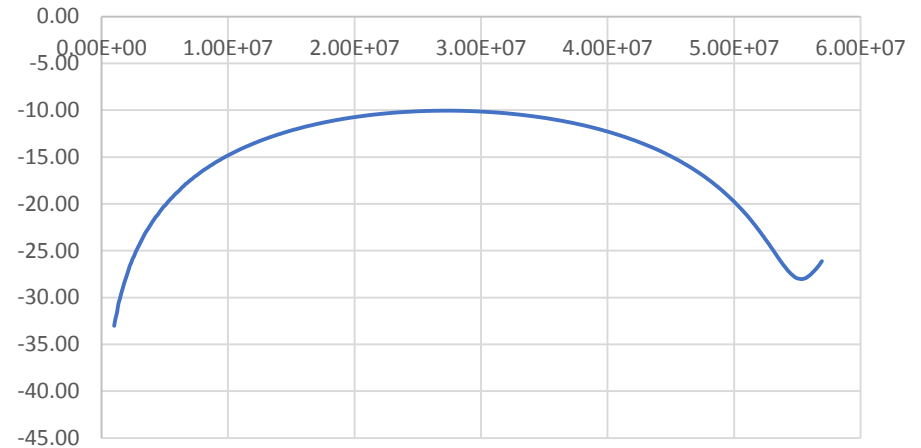
- Insertion Loss is the signal loss per unit length.
- The longer the length, the more signal loss.
- The dielectric insulation is a major contributor to insertion loss.
- The Twisted TXL cable has much higher insertion loss than the CCC CAN cable

RETURN LOSS

CCC Return Loss dB



Twisted TXL Return Loss dB



- Return Loss is loss caused in large part by impedance mismatch.
- Return loss is expressed in dB and is the reflection of the signal from the cable itself due to variation in the impedance.
- The lower the return loss the better
- In this chart, the Champlain CAN bus has a much better return loss than the twisted TXL (-15dB vs -10dB)

CONCLUSION

- The Twisted TXL cable does not meet the requirements of SAE J-1939.
- Based on the results, it may be possible to measure a section of twisted TXL cable that meets the requirements, but most cable lengths will fail.
- Insertion Loss, and Return Loss values are such that the twisted TXL cable will likely not be reliable in the application.
- We are of the strong belief that if twisted TXL cable is used in the field, there will be failures ranging from intermittent failure to not working immediately after the cable is installed.
- Proper CAN Bus cable is designed and manufactured with the end result in mind. (Conductor, Extrusion, Cross-linking, Twisting, Packaging, etc). Twisted TXL wire is a power wire, which is not designed and manufactured to be used as a CAN component.