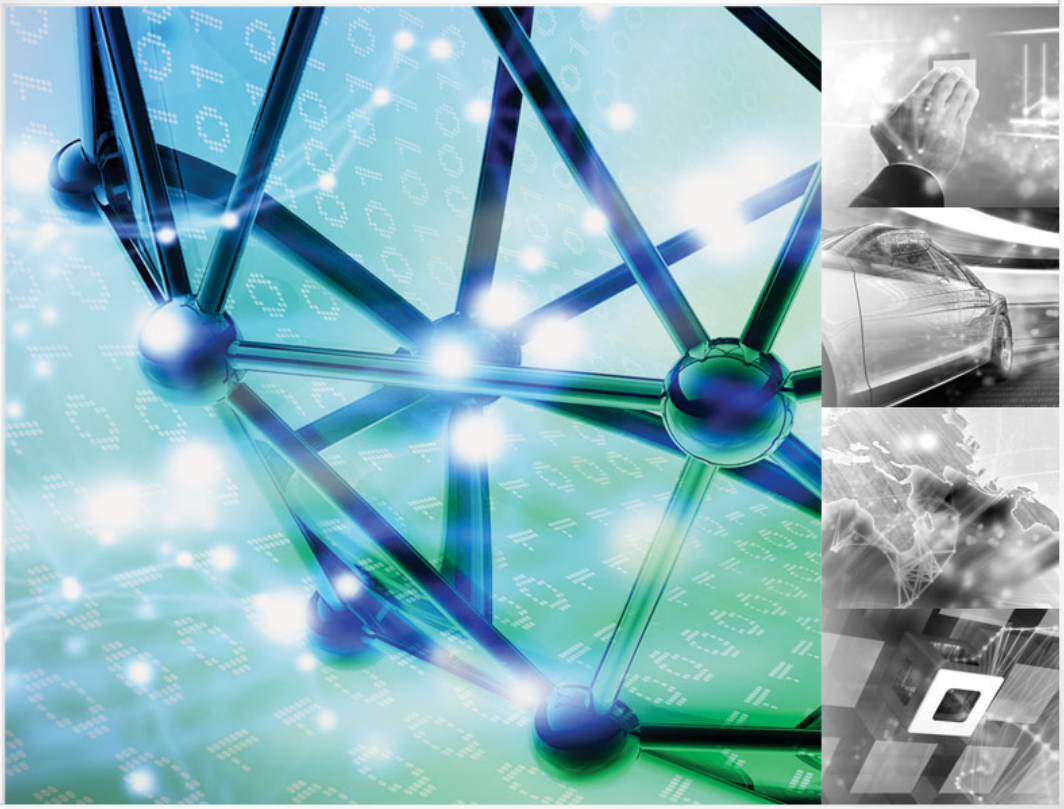

Caterpillar 1N Cooling Cart

Cart Overview & Data Review

23 February 2018

Summary

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- Cart Overview
- Data Review
- Proposal

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Cart Overview

Cart Overview: General Setup

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Cart Overview: General Setup

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Cart Overview: Engine Mods

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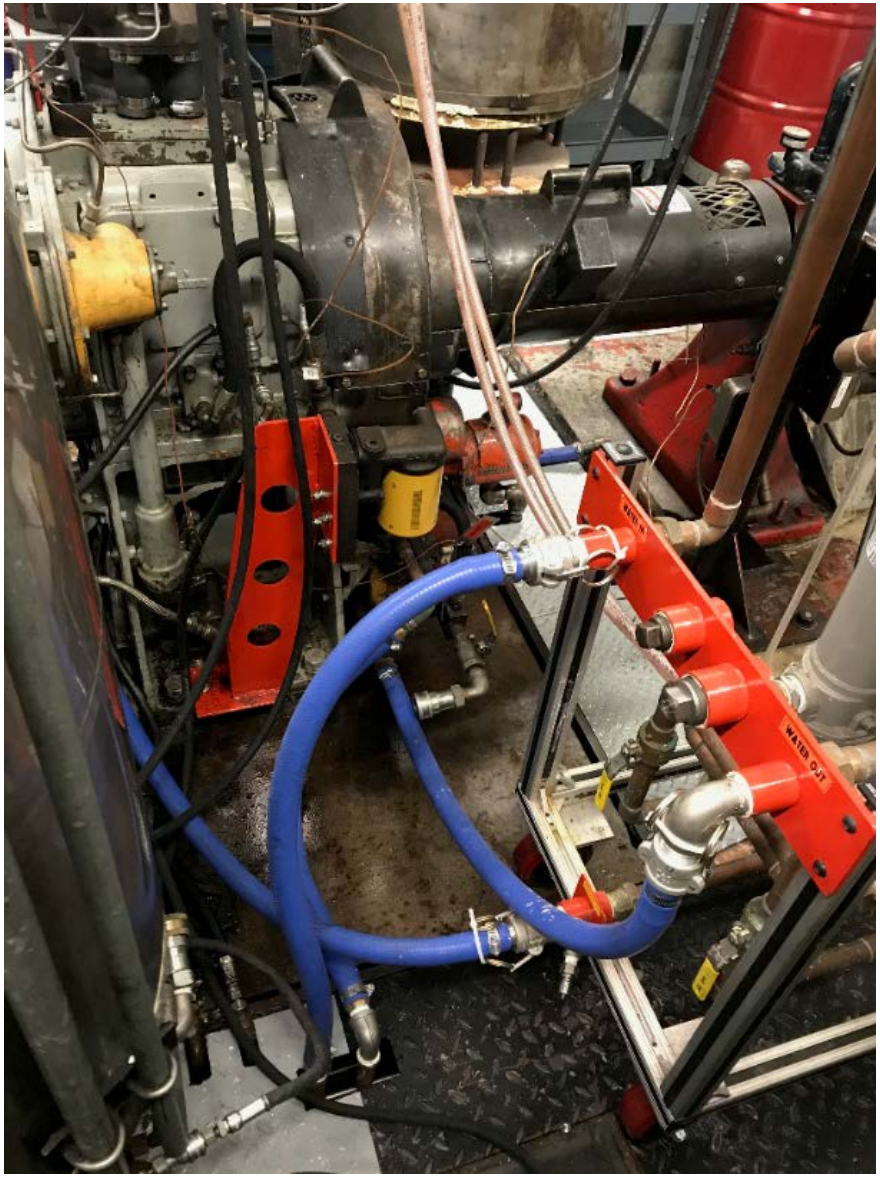

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Cart Overview: Engine Mods

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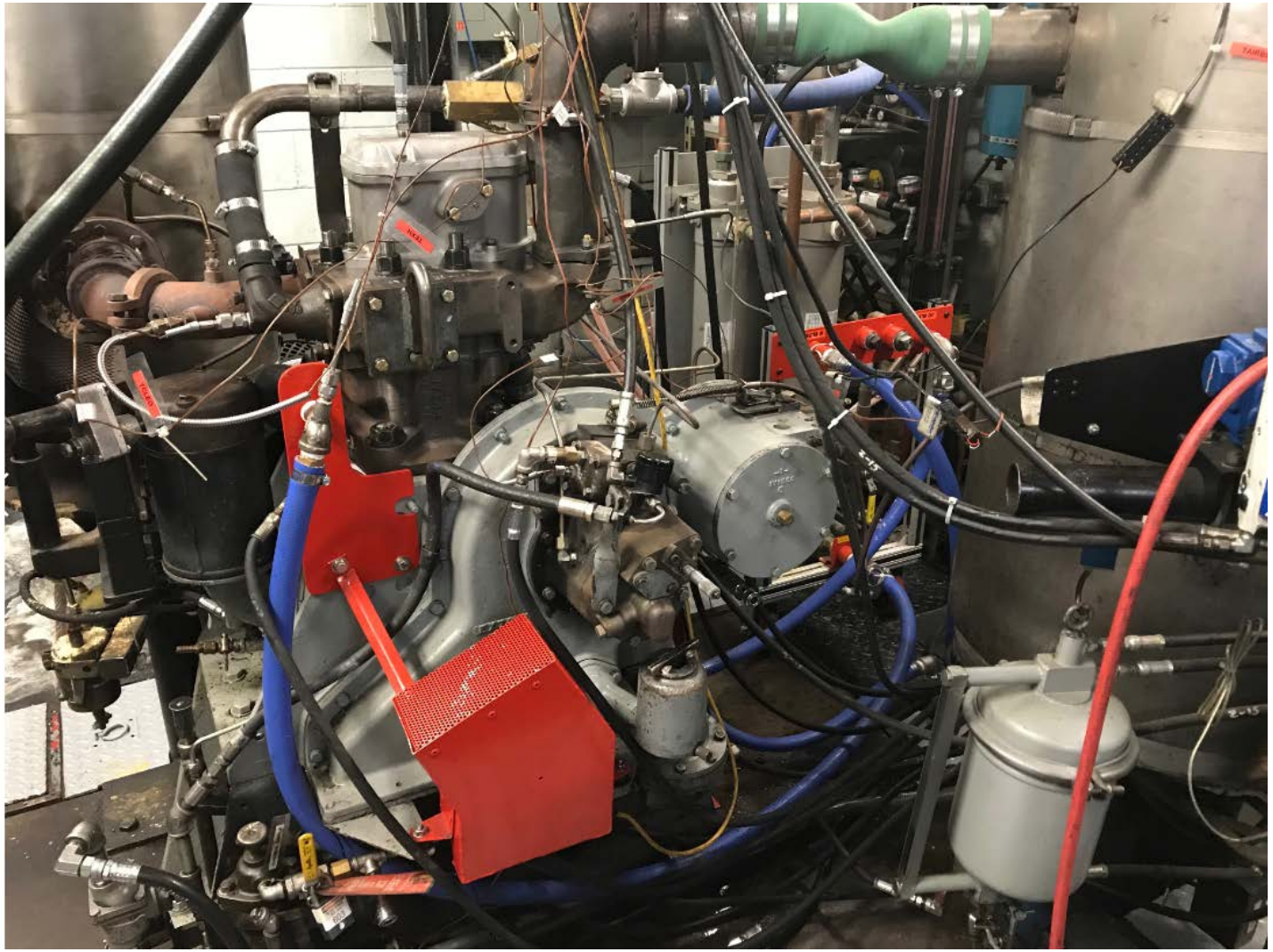

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Data Review

Warmup Coolant Flow Comparisons

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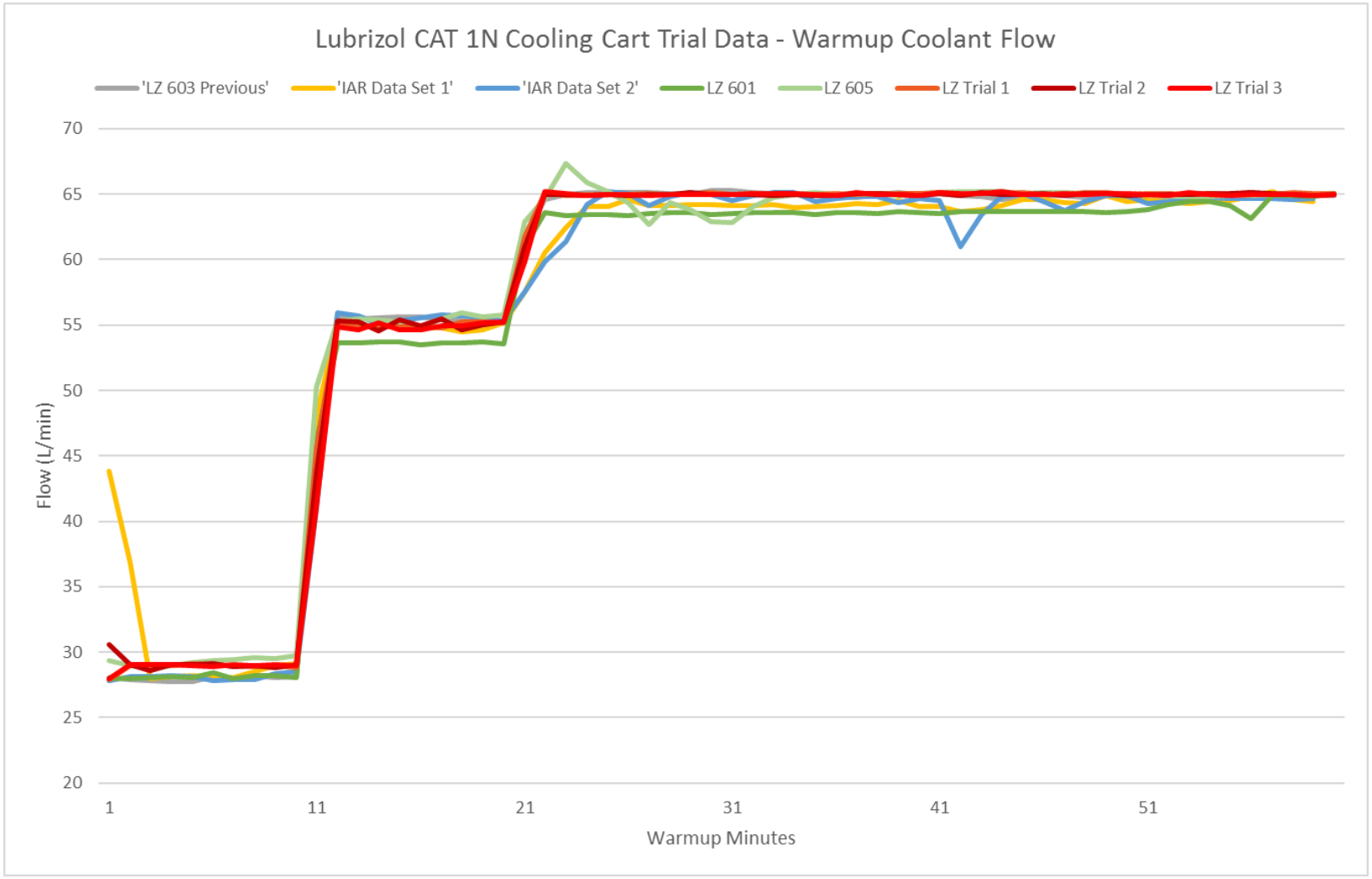

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Cooldown Coolant Flow Comparisons

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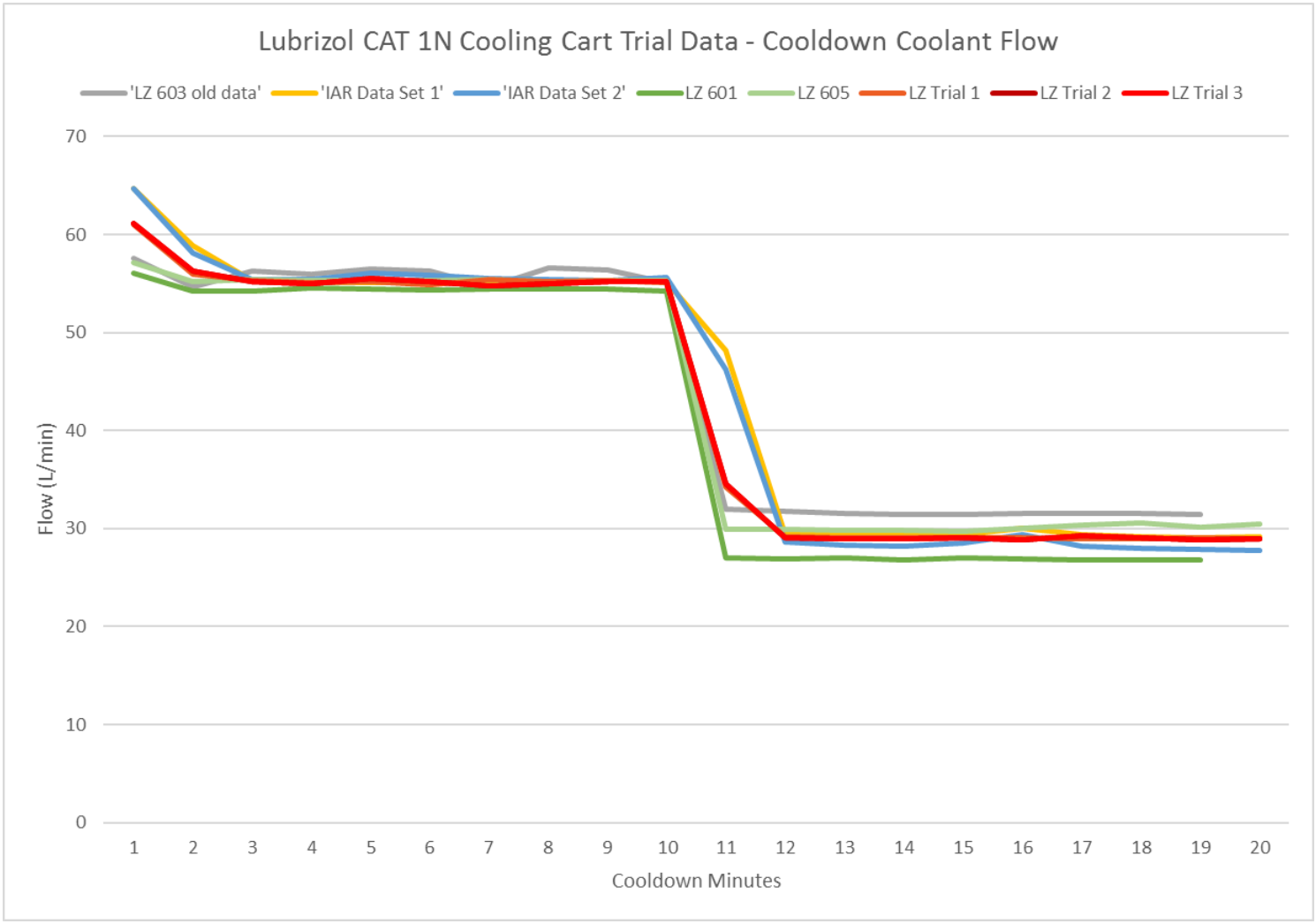

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Proposal

Proposed Procedure Changes

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6.3.3 Cooling System—Provide a closed circulating cooling system. ~~with an engine-driven centrifugal water pump.~~ An engine-driven centrifugal water pump, original coolant heat exchanger, original cooling tower, and coolant pump bypass valve may be used. When using these components, follow the specifications outlined in 6.3.3.1 and 6.3.3.2. An equivalent replacement system that could include an electrically-driven pump, replacement heat exchanger, replacement coolant tower, and automated flow control may be used. A suitable electric-motor-driven water pump from MP Pumps is recommended by Caterpillar. Pump details are as follows: MP Part number: 30885, CF1PMP SS 3-3 56C 6.0 T-2100, stainless steel pump, 3hp e phase; 230/460 VAC motor. An equivalent replacement system must meet all steady-state test temperature and pressure specifications (coolant outlet temperature: 93°C ±2.5°C; coolant delta temperature: 5°C ± 1°C; coolant inlet temperature: 88°C; coolant flow: 65 L/min ± 2 L/min; pressure drop across heat exchanger: 1.5 kPa maximum; coolant at jug pressure: 50 kPa). System details given in Fig. A8.1 show cooling system modifications; Fig. A8.2 shows coolant temperature, flow, and pressure measurement locations; ~~and~~ Fig. A8.3 shows a water pump bypass arrangement; and Fig. A8.4 shows the pressurized coolant system. See 6.3.3.5 regarding system cleaning.

6.3.3.1 Cooling System Modification—Modify the cooling system as shown in Fig. A8.4.

6.3.3.2 Coolant Flow, Control and Measurement—Modify the engine coolant lines from the cylinder head to the standpipe in accordance with Fig. A8.1. As shown, the coolant line contains (*1*) a calibrated Barco flowmeter, P/N BR 12705-16-31[11,12], 25.4 mm in diameter to measure the coolant flow and (*2*) a P/N 1Y496 orifice, 15.797 mm in diameter before the flowmeter to develop cooling system pressure and thereby to eliminate coolant cavitation. A system using original components must control coolant flow at 65 L/min ± 2.0 L/min at Step 5 (see Table A14.1) by a bypass valve downstream of the water pump, 19 mm in diameter. Replace the production hose and the restrictive 90° elbows that connect the bypass valve to the cylinder block by a Gates 20777 hose[13,12] or equivalent (see Fig. A8.3). An equivalent replacement system may omit the use of a bypass valve to control coolant flow. Measure the coolant pressure at the block to ensure that proper cooling system operation has been attained (see Fig. A8.2).

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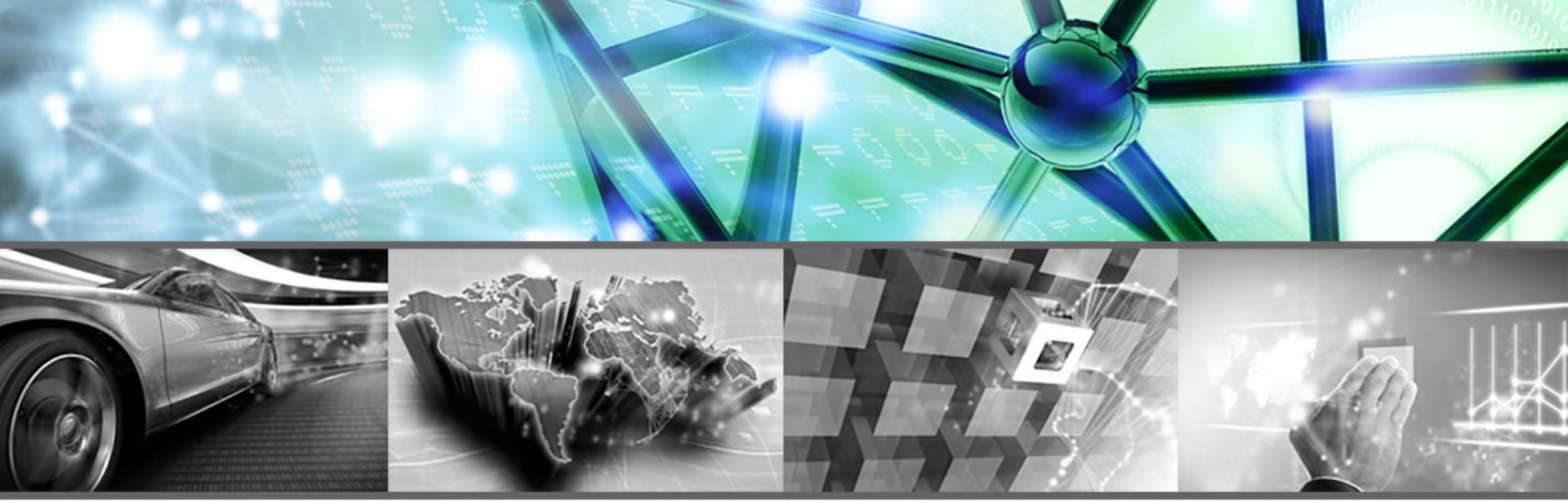

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When your company and ours combine energies, great things can happen. You bring ideas, challenges and opportunities. We'll bring powerful additive and market expertise, unmatched testing capabilities, integrated global supply and an independent approach to help you differentiate and succeed.

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Appendix

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