DESIGN SPECIFICATIONS

Part Number: 904-220 **Date:** 10/26/09
Revision: A
Product: Engine Boot Kit **Author:** Jessica Casey

Fit & Function Overview
The kit includes the two boots that connect the intercooler pipes to the intake manifold, and the two boots that seal the intake manifold to the heads. It includes four T-bolt spring clamps for the upper boots and four heavy duty stainless steel clamps for the lower boots.

Design Objective:

Vendor will document performance and dimensions based on analysis of the supplied reference sample(s) and based on the included technical & material specifications given below. The vendor will submit the documentation for approval by Dorman Engineering Services. The vendor will produce the requested product based on the approved vendor documentation. The vendor will provide process information and material certification for their submitted product sample. Dorman Engineering Services will review and approve all vendor documentation prior to accepting a first article (FAI) sample(s) for inspection.

Patent Disclaimer:

Vendor is responsible for performing patent search to identify any relevant US patent that applies or potentially applies to the reference sample provided. A report of the research must be provided to Dorman Engineering Services at the time of the drawing submittal. The patent search report must include details of:

- Research procedure
- Patent numbers which were identified as being applicable or potentially applicable
- The design differences contained in the vendor design and how they eliminate any patent infringements.

In the event any conflicts and/or discrepancies exist in the information provided contact Dorman Products for clarification. Final approval concerning any conflicts and/or discrepancies is the decision of Dorman Products.

Reference Samples:

The following Approved Reference Sample is part of this specification: Competitor Sample

Reference Documents:
Note: International equivalents to American standards such as SAE may be used with Dorman Products Engineering Services review and approval.

SAE J 403: Chemical Compositions of SAE Carbon Steels
SAE J 405: Chemical Compositions of SAE Wrought Stainless Steels
ASTM B663: Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
ASTM B117: Test Method of Salt Spray [Fog] Testing

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Materials and Finish Definition: As set forth by California State Proposition 65: The Safe Drinking Water and Toxic Enforcement Act of 1986; Material, Paint or other type of coatings are not to exceed <0.06% (600 **ppm**) **lead** by weight.

Metal

904-220-3 Strap:
Material: Stainless Steel
Grade: 304 per SAE J 405
Finish: None

904-220-3 Spring Stopper and Cap:
Material: Stainless Steel
Grade: 304 per SAE J 405
Finish: None

904-220-3 Spring:
Material: High Carbon Steel
Grade: 1070 per SAE J 403
Finish: Zinc Plated, Clear Chromate

904-220-3 T-Bolt:
Material: Medium Carbon Steel
Grade: 1040 per SAE J 403
Hardness: HRC 15-20
Finish: Zinc Plated, Yellow Chromate

904-220-3 Nut:
Material: Medium Carbon Steel
Grade: 1040 per SAE J 403
Hardness: HRB 90-95
Finish: Zinc Plated, Yellow Chromate

904-220-4 Hose Clamp (All Components):
Material: Stainless Steel
Grade: 304 per SAE J 405
Finish: None

Zinc plated components are to be plated per ASTM B633, minimum plating thickness 7.5um
Chromate using trivalent chromium, thickness range 0.3um to 0.5um ***(Hexavalent Chromium not permitted)***

Rubber

Boot Outer Layer:
Material: Silicone Rubber
Color: Black
Durometer: Shore A 65-70

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Boot Middle Layer:
Material: Silicone Rubber with 5-Ply, Braided Synthetic Fiber Reinforcement
Color: Blue
Durometer: Shore A 55-60

Boot Inner Layer:
Material: Viton Grade B Fluoroelastomer
Color: Black
Durometer: Shore A 55-60

Plastic

904-220-3 Nut Locking Washer:
Material: Nylon PA6
Color: White
Surface Finish: To match OE, No regrind material allowed

Exception to Sample:
- Alternative material use is acceptable, but only with the approval of Dorman Products Engineering Services.
- Alternative finishes are acceptable, but only with the approval of Dorman Products Engineering Services.

Dimensions and Measurements:

This section contains information regarding significant dimensions, characteristics, or measurements that that are required to manufacture this product.

- Part or Assembly Weight: 1.05kg
- Unless otherwise specified, all part dimensions to match the supplied samples.
- Unless otherwise specified, dimensions specified in Bid Package are for reference only.
- Surface finishes to match supplied samples.
- Spring Constant of Spring in 904-220-3 Clamp: 260N/mm
- Length of Spring in 904-220-3 Clamp: 19.1mm
- Outer Diameter of Spring in 904-220-3 Clamp: 14.3mm
- Diameter of Spring Wire Coil in 904-220-3 Clamp: 3.7mm

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Images of Product Sample:

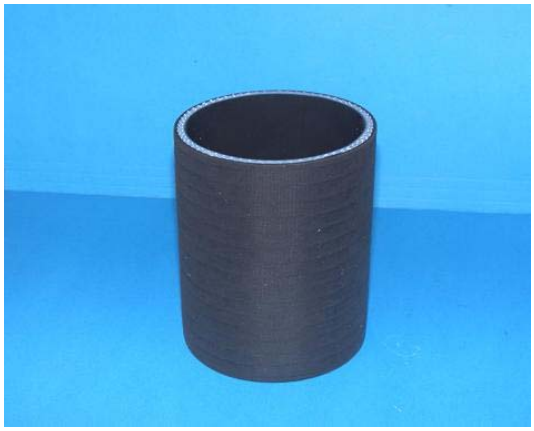

Figure 1: 904-220-1 Large Boot

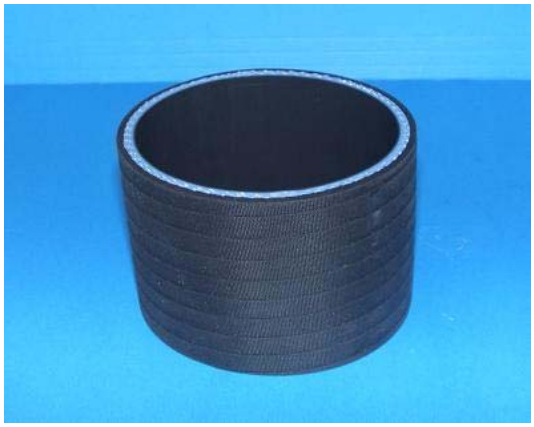

Figure 2: 904-220-2 Small Boot

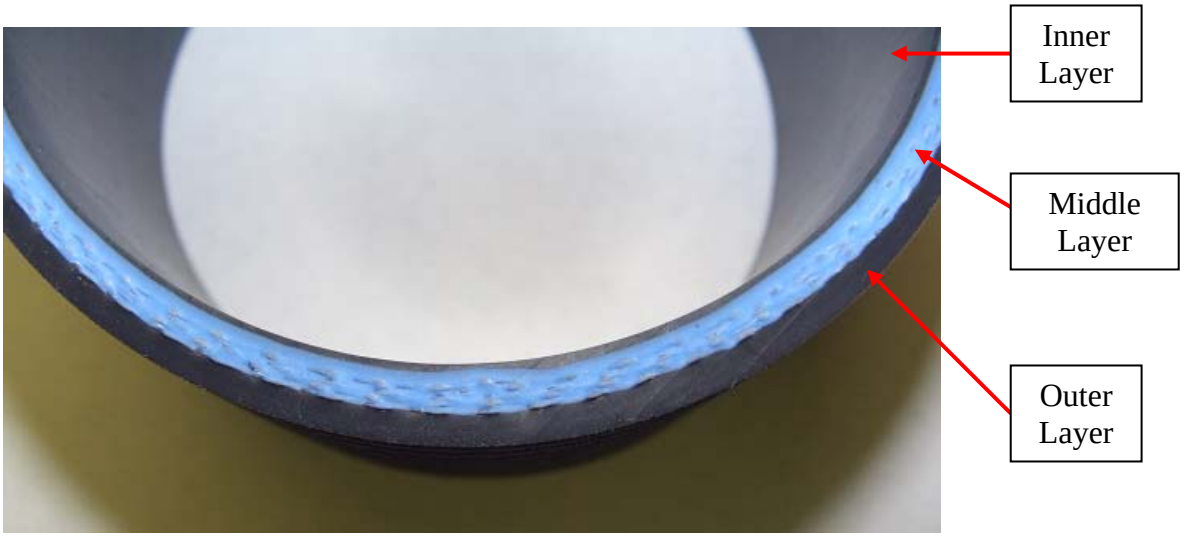

Figure 3: Boot Layers

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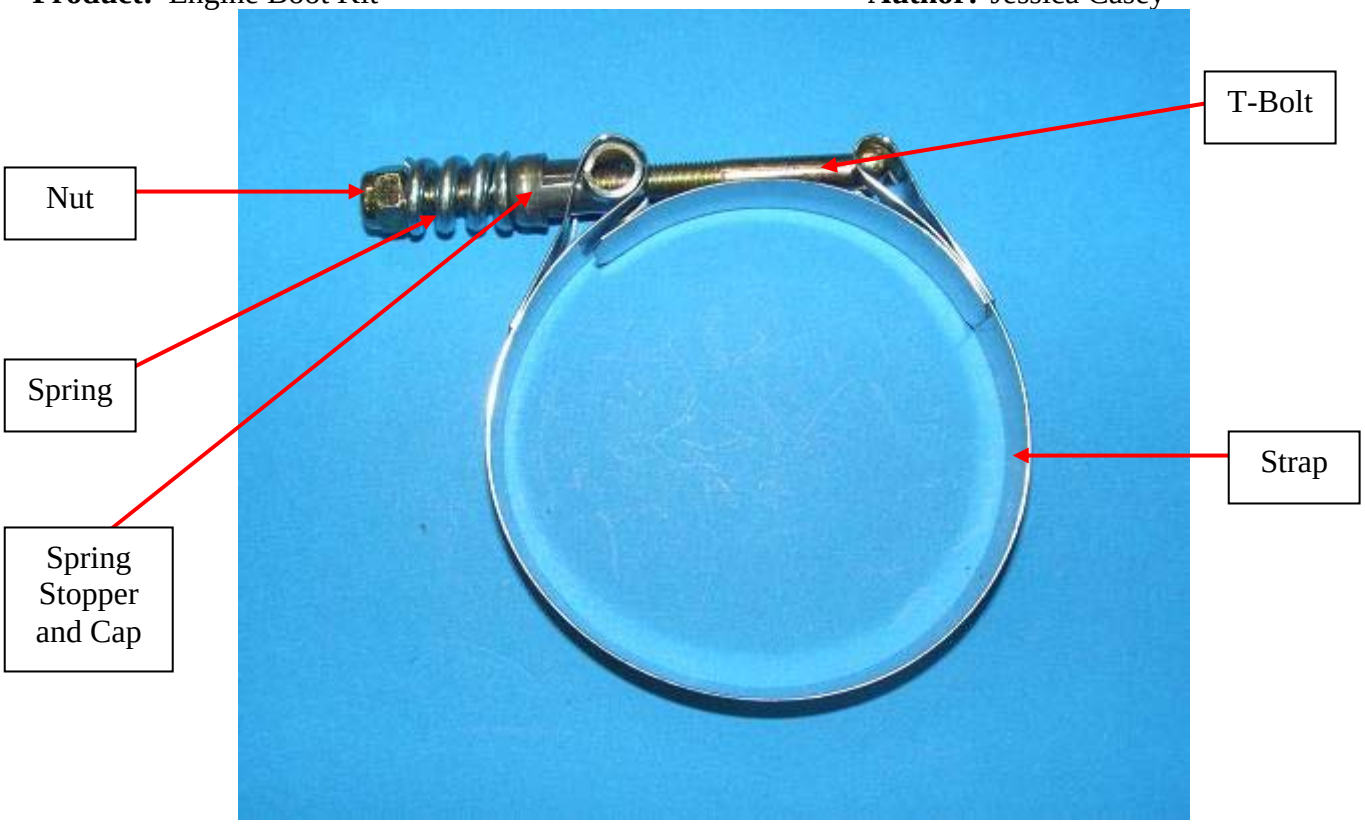

Figure 4: 904-220-3 T-Clamp

Figure 5: 904-220-4 Hose Clamp

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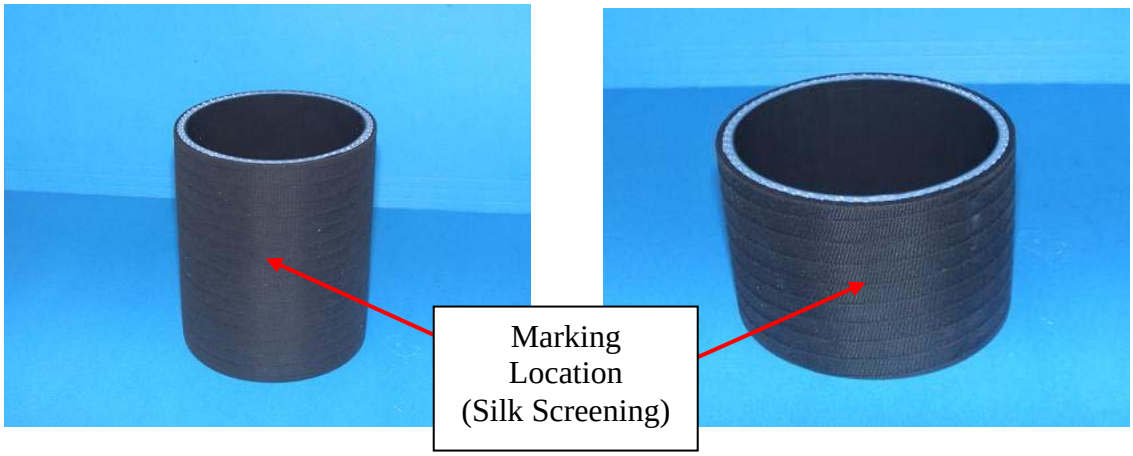
Process & Performance Information:

This section contains information regarding significant performance requirements and / or manufacturing processes that are required to manufacture this product.

- *All Graded / Class hardware are to be manufactured and in compliance with the United States Fastener Quality Act.*
  (http://ts.nist.gov/WeightsAndMeasures/fqa.cfm)
- Zinc plated parts to be tested in accordance with ASTM B117.
  Minimum corrosion resistance:
  96 hours: no white corrosion
  240 hours: no red corrosion of base metal
- Part must withstand exposure to -40 to 120 C without loss in performance or construction
- Outer layer of boot material must be textured to match the OE
- Minimum Burst Pressure of Boots: 100psi
- Minimum Clamp Strength of 904-220-3 T-Clamp: 300lb
- Minimum Breakage Torque of 904-220-3 T-Clamp: 60 in-lb

Marking and Identification:

- Unless otherwise specified, part is to be marked in accordance to *Dorman Products Inc. Marking Requirements.*
- Unless otherwise specified; part numbers, logos, recycling marks, date codes or other marking found on the approved product samples are not to be copied.
- Part to be marked with the Dorman Wings Logo, Country of Origin, date code, vendor code and part number on locations shown below.



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