CUSTOMER: MISSION RUBBER CO.
ADDRESS: 1660 LEESON LANE
CORONA, CA 92879-2061

1.0 TEST ITEMS
1.1 TWO HUBLESS COUPLINGS NOTED BELOW:
1.1.1 MISSION RUBBER CO. C1200-HW (HEAVYWEIGHT), 12"
1.1.2 MISSION RUBBER CO. C1500-HW (HEAVYWEIGHT), 15"

2.0 MANUFACTURER OF RUBBER GASKET
2.1 MISSION RUBBER CO.
1660 LEESON LANE
CORONA, CA 92879-2061

3.0 MANUFACTURER OF SHIELD
3.1 PRECISION SPECIALTY METALS, INC.
3301 MEDFORD STREET
LOS ANGELES, CA 90063

4.0 MANUFACTURER OF CLAMP ASSEMBLY
4.1 BREEZE INDUSTRIAL PRODUCTS CORPORATION
3582 TUNNELTON ROAD
SALTSBURG, PA 15681-8594

5.0 PRIMARY STANDARD
5.1 ASTM C 1277-03

6.0 OTHER APPLICABLE DOCUMENTS
6.1 ISO 17025
6.2 ASTM C 564-95a
6.3 ASTM A 48/48M-00

7.0 PURPOSE OF TESTING
7.1 THE PURPOSE OF TESTING WAS TO DETERMINE IF THE TWO HUBLESS
COUPLINGS WOULD MEET THE REQUIREMENTS OF ASTM C1277-03. ACTUAL
TESTING WAS PERFORMED AT MISSION RUBBER CO., TEST SITE, WITH
MISSION RUBBER TECHNICIANS PERFORMING THE TESTS, BUT WITH
FRANK PICKELL OF TCC MONITORING THE WHOLE PROCEEDINGS. TESTING
WAS PERFORMED ON JUNE 03 2002.
8.0 CONCLUSION
8.1 IT IS TRUE THAT THE GASKET ON EITHER 12" AND 15" COUPLING DO NOT SHOW THE CURRENT ISSUE OF ASTM C 564, WHICH IS THE 03 REVISION, BUT IT IS UNDERSTANDABLE WHY THAT IS SO, BECAUSE WHEN THE COUPLINGS WERE TESTED IN JUNE 2002, THE CURRENT ISSUE OF ASTM C 564 WAS NOT IN EXISTENCE THEN. THEREFORE THAT BEING THE CASE, IT SHOULD BE ACCEPTED THAT BOTH THE 12" AND 15" COUPLINGS MEET THE REQUIREMENTS OF ASTM C 564-03, AS TESTED.

FRANCIS PICKELL, SR., P.E.
OWNER/TEST ENGINEER
I. MATERIALS AND MANUFACTURE PER SECTION 4 AND SUBSECTIONS 4.1 AND 4.2

4.1. REQUIRED: PHYSICAL PROPERTIES OF GASKETS SHALL COMPLY WITH SPECIFICATION C 564 AND THE DIMENSIONS, MATERIAL SPECIFICATIONS, PHYSICAL AND CHEMICAL PROPERTIES AS SHOWN IN FIG 1, FIG. 2, TABLE 1 AND TABLE 2.
(SEE PAGES 7 TO 10).

Both the 12" and 15" couplings have a gasket that meets the requirements of subsection 4.1 of ASTM C 1277-03.

4.2. REQUIRED: CLAMP ASSEMBLY SCREWS OR BOLTS SHALL NOT HAVE SCREWDRIVER SLOTS.

ACTUAL: THE CLAMP ASSEMBLY ON BOTH 12" AND 15" COUPLINGS HAVE NO SCREWDRIVER SLOTS.

Both the 12" and 15" couplings meet the requirements of subsection 4.2 of ASTM C 1277-03.

II. ELASTOMERIC GASKET REQUIREMENTS PER SECTION 5 AND SUBSECTIONS 5.1 AND 5.1.1

5.1. REQUIRED: THE ELASTOMERIC GASKET SHALL CONSIST OF ONE PIECE, CONFORMING TO THE PHYSICAL REQUIREMENTS OF SPECIFICATION C 564.

ACTUAL: THE ELASTOMERIC GASKET OF BOTH THE 12" AND 15" COUPLINGS CONSIST OF ONE PIECE AND CONFORMS TO THE PHYSICAL REQUIREMENTS OF ASTM C 564. (SEE PAGES 7 TO 10).

Both of the 12" and the 15" couplings meet the requirements of subsection 5.1 of ASTM C 1277-03.

5.1.1. REQUIRED: THE ELASTOMERIC GASKET SHALL HAVE AN INSIDE CENTER STOP THAT DOES NOT CREATE AN ENLARGEMENT OR ROOMS WITH A LEDGE, SHOULDER OR REDUCTION OF PIPE AREA OR OFFER AN OBSTRUCTION TO FLOW.

ACTUAL: EACH ELASTOMERIC GASKET HAS AN INSIDE CENTER STOP THAT DOES NOT CREATE AN ENLARGEMENT OR ROOMS WITH A LEDGE, SHOULDER OR REDUCTION OF PIPE AREA OR OFFER AN OBSTRUCTION TO FLOW.

Both of the 12" and 15" couplings meet the requirements of subsection 5.1.1 of ASTM C 1277-03.

III. CLAMP ASSEMBLY REQUIREMENTS PER SECTION 6 AND SUBSECTIONS 6.1-6.1.4

6.1. REQUIRED: THE SHIELD AND CLAMP ASSEMBLY SHALL BE MADE OF MATERIAL CONFORMING TO THE REQUIREMENTS AS OUTLINED IN SECTION 6, TABLE 3 AND FIG. 3. (SEE PAGES)

Both of the 12" and 15" couplings meet the requirements of subsection 6.1 of ASTM C 1277-03.

6.1.1. REQUIRED: ALL PARTS SHALL BE OF 300 SERIES STAINLESS STEEL. ALL PARTS MADE FROM ROUND STOCK SHALL BE OF 300 SERIES STAINLESS STEEL (EXCEPT COPPER BEARING ALLOYS). THE SHIELD SHALL BE CORRUGATED OR OTHERWISE PROVIDED WITH A MECHANISM TO ACCOMODATE MAXIMUM AND MINIMUM OD'S OF PIPE AND FITTINGS AND INCLUDE 2 STAINLESS BANDS FOR SIZES 1-1/2 TO 4 IN., AND 4 BANDS FOR 5 TO 10 IN., AND 6 BANDS FOR 12" AND 15" EACH. EACH TIGHTENING DEVICE HOUSING SHALL INTERLOCK WITH A BAND AT THE UNSLOTTED END. THE BANDS ARE TO BE FASTENED TO THE SHIELD BY RIVETING OR SUCH OTHER METHOD THAT WILL INSURE THAT THE BANDS WILL NOT BECOME SEPARATED.
TEST SUMMARY SHEET

FROM THE SHIELD. THE SHIELD AND CLAMP CLAMP ASSEMBLY SHALL COMPLY WITH DIMENSIONS AND MATERIAL SPECIFICATIONS, AS ARE GIVEN IN TABLE 3, FIG. 3 AND TABLE 3.

ACTUAL: EACH OF THE 12" AND 15" COUPLINGS HAVE SIX 300 SERIES STAINLESS STEEL BANDS. THE BANDS ARE RIVETED TO THE CORRUGATED SHIELD, SUCH THAT THE BANDS WILL NOT SEPARATE FROM THE SHIELD. EACH TIGHTENING DEVICE HOUSING INTERLOCKS WITH A BAND AT THE UNSLOTTED END. THE CLAMP ASSEMBLY COMPLIES WITH THE DIMENSIONS AND MATERIAL SPECIFICATIONS, AS ARE GIVEN IN TABLE IN TABLE 3, FIG. 3 AND FIG. 4. (SEE PAGES 11 TO 19).

BOTH 12" AND 15" COUPLINGS MEET THE REQUIREMENTS OF SUBSECTION 6.1.1 OF ASTM C 1277-03.

6.1.2 REQUICK: CLAMP ASSEMBLIES SHALL BE TESTED TO WITHSTAND NO LESS THAN 125% OF MANUFACTURER'S STATED INSTALLATION TORQUE OR A MINIMUM OF 60 LBF-IN., OF APPLIED TORQUE, WHICHEVER IS GREATER, WITHOUT VISIBLE SIGNS OF FAILURE. THE CLAMP ASSEMBLY SHALL BE TESTED OVER A STEEL MAN- DREL OF THE APPROPRIATE DIAMETER AND TORQUED AS REQUIRED.

ACTUAL: THE 12" AND 15" COUPLINGS WERE EACH PLACED OVER A STEEL MAN-DREL OF THE APPROPRIATE DIAMETER AND TORQUED TO 80 LBF-IN. THERE WERE NO VISIBLE SIGNS OF FAILURE.

BOTH 12" AND 15" COUPLINGS MEET THE REQUIREMENTS OF SUBSECTION 6.1.2 OF ASTM C 1277-03.

6.1.3 REQUIRED: THE CLAMPED SHIELD SHALL MEET THE REQUIREMENTS OF TABLE 3.


BOTH 12" AND 15" COUPLINGS MEET THE REQUIREMENTS OF SUBSECTION 6.1.3 OF ASTM C 1277-03.

IV. COUPLINGS REQUIREMENTS AND TEST METHODS PER SECTION 7 AND SUB-SECTIONS 7.1 TO 7.1.4.2

7.1 REQUIRED: ASSEMBLE EACH COUPLING TESTS ACCORDING TO THE MANUFAC-TURER'S INSTRUCTIONS, BETWEEN TWO SECTIONS OF RANDOMLY SELECTED HUB-LESS CAST IRON SOIL pipe MEETING THE REQUIREMENTS OF CISPI 301 OR SPECIFICATION A 888 AND CONDUCT THE FOLLOWING TESTS: DEFORMATION AND SHEAR. IN ADDITION, AN UNRESTRAINED HYDROSTATIC TEST WILL BE PERFORMED BETWEEN TWO SECTIONS OF MACHINED STEEL PIPE.

7.1.1 DEFORMATION TEST

ACTUAL TEST: EACH COUPLING WAS ASSEMBLED PER SUBSECTION 7.1 AND SUB-JECTED TO THE DEFORMATION TEST PER SUBSECTION 7.1.1-7.1.1.2

TEST RESULTS: AT NO TIME DURING THE 5 MINUTE PERIOD WHEN EACH COUPLING WAS SUBMITTED TO THE DEFORMATION TEST WAS THERE ANY EVIDENCE OF LEAKAGE.

BOTH 12" AND 15" COUPLINGS MEET THE REQUIREMENTS FOR THE DEFORMATION TEST IN ACCORDANCE WITH ASTM C 1277-03.

7.1.2 SHEAR TEST: FOLLOWING THE DEFORMATION TEST, EACH COUPLING WAS SUB-JECTED TO THE SHEAR TEST PER SUBSECTIONS 7.1.2-7.1.2.2.

TEST RESULTS: AT NO TIME DURING THE 15 MINUTE PERIOD, WITH THE PROPER PRESSURE AND LOAD MAINTAINED ON EACH COUPLING, WAS THERE ANY EVIDENCE OF LEAKAGE. FURTHERMORE A DISPLACEMENT OF 1/16", WELL BELOW THE MAXI-
TEST SUMMARY SHEET

NUM OF 3/8" WAS RECORDED FOR EACH COUPLING.

BOTH 12" AND 15" COUPLINGS MEET THE REQUIREMENTS FOR THE SHEAR TEST IN ACCORDANCE WITH ASTM C 1277-03.

7.1.3, UNRESTRAINED HYDROSTATIC TEST

ACTUAL TEST: EACH COUPLING WAS ASSEMBLED SO AS TO CONFORM TO FIGURE 4. WATER WAS INTRODUCED INTO EACH TEST ASSEMBLY SO AS TO EXPEL ALL AIR, AFTER WHICH THE TEST SYSTEM WAS PRESSURIZED TO 6 PSI AT A RATE OF 1 PSI PER 30 SECONDS, AFTER WHICH THE PRESSURE WAS HELD FOR 10 MINUTES. ANY MOVEMENT OR DEFLECTION OF EACH COUPLING WAS NOTED ON THE DIAL GAGE.

TEST RESULTS: BOTH 12" AND 15" COUPLINGS HELD THE 6 PSI PRESSURE WITHOUT ANY EVIDENCE OF LEAKAGE DURING THE TEST PERIOD. THE DEFLECTION IN EITHER CASE WAS 0.063" WELLS BELOW THE MAXIMUM REQUIREMENT OF 0.150".

BOTH 12" AND 15" COUPLINGS MEET THE REQUIREMENTS IN ACCORDANCE WITH ASTM C 1277-03.

V. MARKINGS AND IDENTIFICATION PER SECTION 8 AND SUBSECTIONS 8.1 AND 8.2

8.1, REQUIRED: THE GASKET SHALL BE MARKED WITH RAISED LETTERS. THIS MARKING SHALL CONSIST OF PIPE SIZE, COUNTRY OF ORIGIN, MANUFACTURER'S IDENTIFYING MARK AND SPECIFICATION C 564, LATEST REVISION. SUCH MARKING SHALL NOT EXCEED 0.02 IN. IN RELIEF.

ACTUAL: EACH GASKET SHOWS THE MANUFACTURER'S NAME, COUNTRY OF ORIGIN, ASTM C 564, WITH NO REVISION NUMBER; HOWEVER IT SHOULD BE NOTED THAT WHEN THE TESTS WERE PERFORMED, THE CURRENT REVISION OF ASTM C 564 WAS NOT IN EXISTENCE. THE RAISED LETTERS ARE ABOUT 0.02". (SEE PAGE 19) EXCEPT FOR THE FACT THAT EITHER GASKET DOES NOT SHOW A REVISION NUMBER FOR ASTM C 564.

BOTH 12" AND 15" COUPLINGS MEET THE REQUIREMENTS OF SUBSECTION 8.1 OF ASTM C 1277-03.

8.2, REQUIRED: THE SHIELD AND CLAMP ASSEMBLY SHALL BE MARKED WITH INDETCHED LETTERS. ALL MARKINGS SHALL BE PLACED ON THE BAND ASSEMBLIES.

MARKINGS ON THE BAND SHALL CONSIST OF PIPE SIZE. MARKINGS ON THE SCREW HOUSING SHALL CONSIST OF COUPLING MANUFACTURER'S NAME OR TRADEMARK WITH NATIONAL REGISTRY OF TRADEMARK IN THE COUNTRY IN WHICH THE PRODUCT INSTALLED, THE WORDS ALL STAINLESS, COUNTRY OF ORIGIN. NO MARKING IS PERMITTED ON COUPLINGS WITH CORRUGATED SHIELD.

CUSTOMER: MISSION RUBBER CO.
ADDRESS: 1660 LEESON LANE
CORONA, CA 92871-2061

RE: MONITORING BY FRANCIS PICKELL, SR., OF TCC OF TESTS PERFORMED ON HUBLESS COUPLINGS AT MISSION RUBBER CO., ON JULY 8th AND 9th, 2003.

1.0 TEST ITEMS
1.1 MISSION RUBBER C215 HEAVYWEIGHT, 2" X 1-1/2"
1.2 MISSION RUBBER C320 HEAVYWEIGHT, 3" X 2"
1.3 MISSION RUBBER C430 HEAVYWEIGHT, 4" X 3"

2.0 TEST SPECIFICATION
2.1 ASTM C 1540-02

3.0 TESTS PERFORMED
3.1 DEFLECTION TEST PER SECTION 7.1.1 AND SUB-SECTIONS 7.1.1.1 AND 7.1.1.2
3.2 SHEAR TEST PER SECTION 7.1.2 AND SUB-SECTIONS 7.1.2.1 AND 7.1.2.2
3.3 UNRESTRAINED HYDROSTATIC JOINT TEST PER SECTION 7.2 AND SUB-SECTIONS 7.2.1-7.2.4 AND SECTION 7.2.4 AND SUB-SECTIONS 7.2.4.1 AND 7.2.4.2

4.0 TEST RESULTS

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SHEAR TEST

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<tr>
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<td>3/8&quot; MAX.</td>
</tr>
<tr>
<td>C430</td>
<td>3/8&quot; MAX.</td>
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UNRESTRAINED HYDROSTATIC JOINT TEST

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<tr>
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5.0 CONCLUSION

5.1 ALL THREE HUBLESS COUPLINGS MEET THE REQUIREMENTS FOR DEFLECTION TEST, SHEAR TEST AND UNRESTRAINED HYDROSTATIC JOINT TEST IN ACCORDANCE WITH ASTM C 1540-02.