



ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T004

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**TITEL:** EC110 Winner Hose Summary Test Report  
For external Distribution

**DATUM:** 26.02.2018

**WRITTEN: SPECIALIST ENGINEER**

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**APPROVED: ENGINEERING DIRECTOR HH&F**

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**PURPOSE:**

This test report summarizes EC110 Winner Hose Qualification results in combination with the 2 Piece EATON Winner Fitting (00110 socket) as well as the EATON Global Braided TTC Fitting (1A socket).

**REFERENCES:**

**SPECIFICATIONS:**

- EN 853 Type 1SN

**INTERNAL TEST REPORTS:**

- TR-008228B
- TR-010169A
- TR-008229B
- TR-008230B
- TR-010170A
- TR-008231B
- TR-008232B
- TR-011136A
- TR-011145A
- TR-011146A
- TR-011291A
- TR-011293A
- TR-011294A
- TR-011733A
- TR-011296A
- TR-011297A
- TR-011303A

**TEST SPECIMENS:**

Hose EC110-4  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 00110-04 / 17,45±0,15mm  
Socket / Crimp Diameter 1A4 / 15,9±0,15mm

Hose EC110-5  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 00110-05 / 18,05±0,15mm  
Socket / Crimp Diameter 1A5 / 18,0±0,15mm

Hose EC110-6  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 00110-06 / 20,45±0,15mm  
Socket / Crimp Diameter 1A6 / 20,1±0,15mm

Hose EC110-8  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 00110-08 / 23,55±0,15mm  
Socket / Crimp Diameter 1A8 / 23,3±0,15mm

Hose EC110-10  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 00110-10 / 26,75±0,15mm  
Socket / Crimp Diameter 1A10 / 26,8±0,15mm

Hose EC110-12  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 00110-12 / 30,85±0,15mm  
Socket / Crimp Diameter 1A12 / 31,5±0,15mm



**TEST SPECIMENS:**

Hose EC110-16  
Hose Manufacturing Location EATON POLİMER KAUCUK (Turkey)  
Socket / Crimp Diameter 00110-16 / 38,75±0,15mm  
Socket / Crimp Diameter 1A16 / 40,6±0,15mm

Hose EC110-20  
Hose Manufacturing Location EATON POLİMER KAUCUK (Turkey)  
Socket / Crimp Diameter 00110-20 / 47,05±0,15mm  
Socket / Crimp Diameter 1A20 / 46,95±0,15mm

Hose EC110-24  
Hose Manufacturing Location EATON POLİMER KAUCUK (Turkey)  
Socket / Crimp Diameter 00110-24 / 53,15±0,15mm  
Socket / Crimp Diameter 1A24 / 55,4±0,15mm

Hose EC110-32  
Hose Manufacturing Location EATON POLİMER KAUCUK (Turkey)  
Socket / Crimp Diameter 00110-32 / 67,45±0,15mm  
Socket / Crimp Diameter 1A32 / 68,8±0,15mm



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## ELONGATION / CONTRACTION TEST

<b>SAMPLE</b>	EC110 Hose
<b>SPECIFICATION</b>	EN853 Type 1SN EN ISO 1402
<b>TEST FLUID</b>	Hydraulic Oil
<b>TEMPERATURE</b>	Room temperature
<b>TEST PRESSURE</b>	Operating Pressure
<b>TOLERANCE</b>	+2% Elongation -4% Contraction



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SAMPLE	TEST PRESSURE [bar]	PASSED YES / NO
EC110-4	225	YES
EC110-5	215	YES
EC110-6	180	YES
EC110-8	160	YES
EC110-10	130	YES
EC110-12	105	YES
EC110-16	88	YES
EC110-20	63	YES
EC110-24	50	YES
EC110-32	40	YES



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**HYDRAULIC LEAKAGE**

<b>SAMPLE</b>	EC110 Hose
<b>SPECIFICATION</b>	EN853 Type 1SN EN ISO 1402
<b>MEDIUM TYPE</b>	Hydraulic Oil
<b>TEMPERATURE</b>	Room temperature
<b>TEST PRESSURE</b>	70% of related burst pressure
<b>TEST TIME</b>	5min.



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SAMPLE	TEST PRESSURE [bar]	LEAKAGE OBSERVED YES / NO	PASSED YES / NO
EC110-4	630	NO	YES
EC110-5	602	NO	YES
EC110-6	504	NO	YES
EC110-8	448	NO	YES
EC110-10	364	NO	YES
EC110-12	294	NO	YES
EC110-16	246	NO	YES
EC110-20	176	NO	YES
EC110-24	140	NO	YES
EC110-32	112	NO	YES





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## BURST PRESSURE

<b>SAMPLE</b>	EC110 Hose
<b>SPECIFICATION</b>	EN853 Type 1SN EN ISO 1402
<b>MEDIUM TYPE</b>	Hydraulic Oil
<b>TEMPERATURE</b>	Room temperature



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SAMPLE	MIN. BURST PRESSURE REQUIRED [bar]	PASSED YES / NO
EC110-4	900	YES
EC110-5	860	YES
EC110-6	720	YES
EC110-8	640	YES
EC110-10	520	YES
EC110-12	420	YES
EC110-16	352	YES
EC110-20	252	YES
EC110-24	200	YES
EC110-32	160	YES



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**STANDARD IMPULSE TEST**

<b>SAMPLE</b>	EC110 Hose
<b>SPECIFICATIONS</b>	EN853 TYPE 1SN ISO 6803
<b>MIN. IMPULSE CYCLES</b>	150.000
<b>MEDIUM</b>	Hydraulic Oil
<b>BEND ANGLE</b>	180° size -4 to -12 90° size -16 to -32
<b>OIL TEMPERATURE</b>	100°C
<b>FREQUENCY</b>	1,0 Hz ± 0,25



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SAMPLE	IMPULSE PRESSURE [bar]	MIN. BEND RADIUS [mm]	MIN. CYCLES REQUIRED	PASSED YES / NO
EC110-4	281	100	150.000	YES
EC110-5	269	115	150.000	YES
EC110-6	225	130	150.000	YES
EC110-8	200	180	150.000	YES
EC110-10	163	200	150.000	YES
EC110-12	131	240	150.000	YES
EC110-16	110	300	150.000	YES
EC110-20	63	420	150.000	YES
EC110-24	50	500	150.000	YES
EC110-32	40	630	150.000	YES



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### COLD FLEXIBILITY

<b>SAMPLE</b>	EC110 Hose
<b>SPECIFICATION</b>	EN853 TYPE 1SN ISO 10619-2 Method B
<b>AGING TEMPERATURE</b>	-40°C
<b>AGING DURATION</b>	24 hrs



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SAMPLE	BEND RADIUS [mm]	PROOF PRESSURE [bar]	LEAKAGE OR COVER CRACKING OBSERVED YES/NO	PASSED YES / NO
EC110-4	100	450	NO	YES
EC110-5	115	430	NO	YES
EC110-6	130	360	NO	YES
EC110-8	180	320	NO	YES
EC110-10	200	260	NO	YES
EC110-12	240	210	NO	YES
EC110-16	300	176	NO	YES
EC110-20	420	126	NO	YES
EC110-24	500	100	NO	YES
EC110-32	630	80	NO	YES



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**ABRASION**

<b>SAMPLE</b>	EC110 Hose
<b>SPECIFICATION</b>	EN853 TYPE 1SN ISO 6945
<b>WEIGHT</b>	25N ± 0,5
<b>MIN CYCLES REQUIRED</b>	2.000
<b>MAX. WEIGHT LOSS</b>	0,5g
<b>TEST TEMPERATURE</b>	Room temperature

<b>SAMPLE</b>	<b>MAX. ALLOWED WEIGHT LOSS [g]</b>	<b>PASSED YES / NO</b>
All sizes	0,5	YES



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### OZONE RESISTANCE

<b>SAMPLE</b>	EC110 Hose
<b>SPECIFICATION</b>	EN853 TYPE 1SN EN 27326 ISO 7326
<b>OZONE CONCENTRATION</b>	50pphm
<b>TEST TEMPERATURE</b>	40°C
<b>TEST TIME</b>	72 hrs

<b>SAMPLE</b>	<b>COVER CRACKING OBSERVED</b>	<b>PASSED YES / NO</b>
All sizes	No	YES





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### ADHESION TESTING

<b>SAMPLE</b>	EC110 Hose
<b>SPECIFICATION</b>	EN853 TYPE 1SN EN 28033
<b>ADHESION REQUIRED</b>	>2,5N/mm

<b>SAMPLE</b>	<b>ADHESION [N/mm]</b>	<b>PASSED YES / NO</b>
Hose Inner Tube to Reinforcement	>2,5	YES
Hose Cover to Reinforcement	>2,5	YES



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## VACUUM TESTING

<b>SAMPLE</b>	EC110 Hose
<b>SPECIFICATION</b>	EN853 TYPE 1SN EN ISO 7233 Method A
<b>VACUUM</b>	-0,8 bar up to size -16 -0,6 bar up to size -32
<b>TEST TEMPERATURE</b>	Room temperature

<b>SAMPLE</b>	<b>VACUUM [bar]</b>	<b>RESULT</b>	<b>HOSE COLLAPSE [%]</b>	<b>PASSED YES / NO</b>
Size -4 to -16	-0,8	No failure	<10	YES
Size -20 to -32	-0,6	No failure	<10	YES



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### OIL COMPATIBILITY

<b>SAMPLE</b>	EC110 Hose
<b>SPECIFICATION</b>	EN853 TYPE 1SN ISO 1817
<b>MEDIUM</b>	IRM 903 (oil number 3)
<b>TEST TIME</b>	168h
<b>TEST TEMPERATURE</b>	100°C Hose Inner Tube 70°C Hose Cover

<b>SAMPLE</b>	<b>MAX ALLOWED VOLUME SWELL [%]</b>	<b>PASSED YES / NO</b>
Inner Tube	25	YES
Hose Cover	100	YES

**Note:**

Fluid compatibility testing is independent from the hose size as the compounds are the same. Therefore there is no specific size indicated.



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### ETHANOL-WATER COMPATIBILITY

<b>SAMPLE</b>	EC110 Hose
<b>SPECIFICATION</b>	EN853 TYPE 1SN ISO 1817
<b>MEDIUM</b>	Ethanol:Water [50:50]
<b>TEST TIME</b>	168h
<b>TEST TEMPERATURE</b>	70°C

<b>SAMPLE</b>	<b>MAX ALLOWED VOLUME SWELL [%]</b>	<b>PASSED YES / NO</b>
Inner Tube	25	YES
Hose Cover	100	YES

**Note:**

Fluid compatibility testing is independent from the hose size as the compounds are the same. Therefore there is no specific size indicated.



**WATER COMPATIBILITY**

<b>SAMPLE</b>	EC110 Hose
<b>SPECIFICATION</b>	EN853 TYPE 1SN ISO 1817
<b>MEDIUM</b>	Water
<b>TEST TIME</b>	168h
<b>TEST TEMPERATURE</b>	70°C

<b>SAMPLE</b>	<b>MAX ALLOWED VOLUME SWELL [%]</b>	<b>PASSED YES / NO</b>
Inner Tube	25	YES
Hose Cover	100	YES

**Note:**  
Fluid compatibility testing is independent from the hose size as the compounds are the same. Therefore there is no specific size indicated.



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**SUMMARY:**

This test report shows, that the EATON Winner Hose EC110 meets requirements according to EN853 Type 1SN and can be released for production.