



ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T006

Eaton Germany GmbH  
Hydraulics Group  
Dr.-Reckeweg-Str. 1  
76532 Baden-Baden, GERMANY

**TITEL:** EC210 Winner Hose Summary Test Report  
For external Distribution

**DATUM:** 27.02.2018

**WRITTEN: SPECIALIST ENGINEER**

Bjoern Theberath

**APPROVED: ENGINEERING DIRECTOR HH&F**

Juergen Schmidt

This report shall not be reproduced, except in full without the written approval of  
Eaton Test Laboratory



**PURPOSE:**

This test report summarizes EC210 Winner Hose Qualification results in combination with the 2 Piece EATON Winner Fitting (03310 socket) as well as the EATON Global Braided TTC Fitting (1A socket).

**REFERENCES:**

**SPECIFICATIONS:**

- EN 853 Type 2SN

**INTERNAL TEST REPORTS:**

- TR-008233B
- TR-010174A
- TR-008234B
- TR-008235B
- TR-010175A
- TR-008236B
- TR-008237B
- TR-011147A
- TR-011148A
- TR-011149A
- TR-011840A
- TR-011735A
- TR-011306A
- TR-011307A
- TR-011308A
- TR-011309A
- TR-011310A

**TEST SPECIMENS:**

Hose EC210-4  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 03310-04 / 18,85±0,15mm  
Socket / Crimp Diameter 1A4 / 17,2±0,15mm

Hose EC210-5  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 03310-05 / 19,95±0,15mm  
Socket / Crimp Diameter 1A5 / 18,6±0,15mm

Hose EC210-6  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 03310-06 / 21,65±0,15mm  
Socket / Crimp Diameter 1A6 / 21,6±0,15mm

Hose EC210-8  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 03310-08 / 24,25±0,15mm  
Socket / Crimp Diameter 1A8 / 25,3±0,15mm

Hose EC210-10  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 03310-10 / 28,85±0,15mm  
Socket / Crimp Diameter 1A10 / 28,7±0,15mm

Hose EC210-12  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 03310-12 / 31,55±0,15mm  
Socket / Crimp Diameter 1A12 / 32,5±0,15mm



**TEST SPECIMENS:**

Hose EC210-16  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 03310-16 / 40,05±0,15mm  
Socket / Crimp Diameter 1A16 / 40,5±0,15mm

Hose EC210-20  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 03310-20 / 50,25±0,15mm  
Socket / Crimp Diameter 1A20 / 50,2±0,15mm

Hose EC210-24  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 03310-24 / 57,85±0,15mm  
Socket / Crimp Diameter 1A24 / 57,7±0,15mm

Hose EC210-32  
Hose Manufacturing Location EATON POLİMER KAÜÇUK (Turkey)  
Socket / Crimp Diameter 03310-32 / 70,45±0,15mm  
Socket / Crimp Diameter 1A32 / 70,9±0,15mm



ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T006

**ELONGATION / CONTRACTION TEST**

<b>SAMPLE</b>	EC210 Hose
<b>SPECIFICATION</b>	EN853 Type 2SN 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



ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T006

SAMPLE	TEST PRESSURE [bar]	PASSED YES / NO
EC210-4	400	YES
EC210-5	350	YES
EC210-6	330	YES
EC210-8	275	YES
EC210-10	250	YES
EC210-12	215	YES
EC210-16	165	YES
EC210-20	125	YES
EC210-24	90	YES
EC210-32	80	YES



## HYDRAULIC LEAKAGE

<b>SAMPLE</b>	EC210 Hose
<b>SPECIFICATION</b>	EN853 Type 2SN 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.



ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T006

SAMPLE	TEST PRESSURE [bar]	LEAKAGE OBSERVED YES / NO	PASSED YES / NO
EC210-4	1120	NO	YES
EC210-5	980	NO	YES
EC210-6	924	NO	YES
EC210-8	770	NO	YES
EC210-10	700	NO	YES
EC210-12	602	NO	YES
EC210-16	462	NO	YES
EC210-20	350	NO	YES
EC210-24	252	NO	YES
EC210-32	224	NO	YES





ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T006

## BURST PRESSURE

<b>SAMPLE</b>	EC210 Hose
<b>SPECIFICATION</b>	EN853 Type 2SN EN ISO 1402
<b>MEDIUM TYPE</b>	Hydraulic Oil
<b>TEMPERATURE</b>	Room temperature



ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T006

SAMPLE	MIN. BURST PRESSURE REQUIRED [bar]	PASSED YES / NO
EC210-4	1600	YES
EC210-5	1400	YES
EC210-6	1320	YES
EC210-8	1100	YES
EC210-10	1000	YES
EC210-12	860	YES
EC210-16	660	YES
EC210-20	500	YES
EC210-24	360	YES
EC210-32	320	YES



ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T006

**STANDARD IMPULSE TEST**

<b>SAMPLE</b>	EC210 Hose
<b>SPECIFICATIONS</b>	EN853 TYPE 2SN ISO 6803
<b>MIN. IMPULSE CYCLES</b>	200.000
<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



ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T006

SAMPLE	IMPULSE PRESSURE [bar]	MIN. BEND RADIUS [mm]	MIN. CYCLES REQUIRED	PASSED YES / NO
EC210-4	532	100	200.000	YES
EC210-5	466	115	200.000	YES
EC210-6	439	130	200.000	YES
EC210-8	366	180	200.000	YES
EC210-10	333	200	200.000	YES
EC210-12	286	240	200.000	YES
EC210-16	219	300	200.000	YES
EC210-20	166	420	200.000	YES
EC210-24	120	500	200.000	YES
EC210-32	106	630	200.000	YES



ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T006

## COLD FLEXIBILITY

<b>SAMPLE</b>	EC210 Hose
<b>SPECIFICATION</b>	EN853 TYPE 2SN ISO 10619-2 Method B
<b>AGING TEMPERATURE</b>	-40°C
<b>AGING DURATION</b>	24 hrs



ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T006

SAMPLE	BEND RADIUS [mm]	PROOF PRESSURE [bar]	LEAKAGE OR COVER CRACKING OBSERVED YES/NO	PASSED YES / NO
EC210-4	100	800	NO	YES
EC210-5	115	700	NO	YES
EC210-6	130	660	NO	YES
EC210-8	180	550	NO	YES
EC210-10	200	500	NO	YES
EC210-12	240	430	NO	YES
EC210-16	300	330	NO	YES
EC210-20	420	250	NO	YES
EC210-24	500	180	NO	YES
EC210-32	630	160	NO	YES



ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T006

**ABRASION**

<b>SAMPLE</b>	EC210 Hose
<b>SPECIFICATION</b>	EN853 TYPE 2SN 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



ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T006

### OZONE RESISTANCE

<b>SAMPLE</b>	EC210 Hose
<b>SPECIFICATION</b>	EN853 TYPE 2SN 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





ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T006

### ADHESION TESTING

<b>SAMPLE</b>	EC210 Hose
<b>SPECIFICATION</b>	EN853 TYPE 2SN 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



ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T006

## VACUUM TESTING

<b>SAMPLE</b>	EC210 Hose
<b>SPECIFICATION</b>	EN853 TYPE 2SN EN ISO 7233 Method A
<b>VACUUM</b>	-0,95 bar up to size -10 -0,80 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 -10	-0,95	No failure	<10	YES
Size -12 to -32	-0,80	No failure	<10	YES



ENGINEERING  
TEST REPORT

REPORT NUMBER:  
2018 – T006

### OIL COMPATIBILITY

<b>SAMPLE</b>	EC210 Hose
<b>SPECIFICATION</b>	EN853 TYPE 2SN 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.



ENGINEERING  
TEST REPORT

REPORT NUMBER:  
2018 – T006

### ETHANOL-WATER COMPATIBILITY

<b>SAMPLE</b>	EC210 Hose
<b>SPECIFICATION</b>	EN853 TYPE 2SN 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>	EC210 Hose
<b>SPECIFICATION</b>	EN853 TYPE 2SN 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.



ENGINEERING  
TEST REPORT

REPORT NUMBER:

2018 – T006

**SUMMARY:**

This test report shows, that the EATON Winner Hose EC210 meets requirements according to EN853 Type 2SN and can be released for production.