

TEST CERTIFICATE

Certificate Number: TC/03/09/03/C1

Original date of issue: 5th September 2003

Report Numbers: 709, 709.1PCT, 130920 & IFCA02124A Date of test: March to June 2003

This is to certify that samples of: **D-2150 Overhead Door Closers**

Manufactured by: **Ryobi**

have been successfully type tested according to:

EN 1154: 1996 - Building hardware - Controlled door closing devices - Requirements and test methods

Classification:

4	8	5	1	1	3
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by the examination and application of the performance tests for :-

5.1 Product information
5.2.2 Durability
5.2.3 Closing moment
5.2.4 Opening moment
5.2.5 Efficiency
5.2.6 Closing time
5.2.7 Angles of operation
5.2.8 Overload
5.2.9 Temperature
5.2.10 Fluid leakage
5.2.11 Damage
5.2.17 Corrosion resistance
8 Marking

and the additional performance tests for :-

5.2.12 Latch control
5.2.13 Backcheck
5.2.15 Adjustable closing force
5.2.18 Additional requirements for fire doors

Issued by *Steve Wilkes* Date 05/09/03
Steve Wilkes, Test Engineer

Authorised by *John Saberton* Date 5-9-03
John Saberton, Laboratory Manager

for and on behalf of :- Warrington APT Laboratories Ltd.



Report No. 130920

Test of Ryobi D-2150 Overhead Door Closer Mounted in Regular and Parallel Arm Fixing applications.

Tested to BS EN 1154:1997 Building Hardware Controlled Door Closing Devices.

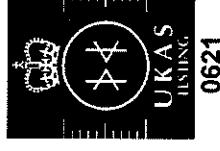
For International Fire Consultants Ltd
20 Park Street,
Princes Risborough,
Buckinghamshire,
England,
HP27 9AH

Warrington
WAPT
laboratories
architectural product testing

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**TESTS OF ADJUSTABLE STRENGTH SINGLE ACTION CONTROLLED DOOR
CLOSING DEVICES TO BSEN 1154: 1997 + A1 2002**

TEST CONCLUSIONS

Samples of:

Product: Overhead Closer

Model: D-2150

Manufactured by Ryobi

Size 3 to 5

have been tested in accordance with: BSEN 1154: 1997. (Building hardware - Controlled door closing devices.) In arm applications detailed.

By Warrington APT Laboratories Ltd. [A UKAS accredited Testing Laboratory (No. 0621). EU Notified Body number 1104]

At Key Industrial Park, Fernside Rd., Willenhall., West Midlands. WV13 3YA,

Results as detailed below:

Clause No.	Description	Compliance
5.1	Product information instructions shall contain	YES
5.1.1	Instructions for installation, regulation and maintenance	YES
5.1.1	Details of Limitation of opening angle	YES
5.1.2	Power sizes for non-standard applications	YES
5.2	Performance requirements	YES
5.2.2	Durability	YES
5.2.3	Closing moment after 5000 cycles and 500 000 cycles	YES
5.2.4	Opening moment after 5000 cycles	YES
5.2.5	Efficiency after 5000 cycles and 500 000 cycles	YES
5.2.6	Max & min closing time after 5000 & 500 000 cycles	YES
5.2.6	Change of closing time 5000 cycles to 500 000 cycles	YES
5.2.7	Angles of operation	YES
5.2.8	Overload performance at 5000 cycles & 500 000 cycles	YES
5.2.8	Overload performance for delayed action closers	N/A
5.2.9	Temperature dependence	N/T
5.2.10	Fluid leakage	YES
5.2.11	Damage	YES
5.2.12	Latch control (optional)	YES
5.2.13	Backcheck (optional)	YES
5.2.14	Delayed closing (optional)	N/A
5.2.15	Adjustable closing force (optional)	N/A
5.2.16	Zero position (double action closers only)	N/A
5.2.17	Corrosion resistance	YES
5.2.18	Additional requirements for fire door closers	YES
8	Marking.	YES

No inferences can be made regarding performance against other requirements of this standard

Test Engineer : Steve Wilkes

Date : 3rd Sept 2003



Report authorised by : John Saberton (Laboratory Manager)

Date : 3rd Sept 2003



NOTE.

Tests marked "Not UKAS Accredited" are not covered by the Laboratory UKAS accreditation schedule.

Tests marked NT were not tested

Tests marked N/A are not applicable to the product on test.

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**TESTS OF ADJUSTABLE STRENGTH SINGLE ACTION CONTROLLED DOOR
CLOSING DEVICES TO BSEN 1154: 1997 + A1 2002**

CLIENT DETAILS

Company Name International Fire Consultants Ltd
 Address 20 Park Street ,
 Princes Risborough,
 Bucks,
 HP27 9AH
 Post code
 Contact Mr Brian Mawdsley

ORDER DETAILS

Order No. 20162
 Dated 19th December 2002

DEVICE DETAILS

Manufacturer Ryobi
 Model No D-2150
 Closer type: With latch action.
 Adjustable backcheck intensity variable.
 Delayed action Not possible.
 Arm configuration: Projecting
 Mounting: Overhead Surface Fixed in Standard and Parallel arm Applications

TEST DETAILS

Test specification BSEN 1154: 1997 Building hardware - controlled door closing devices.
 Test to clauses: only
 Closer strength: Size 5 Regular Position, Size 4 Parallel arm application, and Size 3 Min corrosion.
 Corrosion resistance grade: Grade 3 (96hrs)
 Special test requirements: Max sample durability test, Inc Parallel arm, & Corrosion min power
 Test reference numbers: 130920
 Date sample received: 13th March 2003
 Date test started: 13th March 2003
 Other reports to be used in conjunction with this report: 709PCT, 709.1PCT & IFCA02124A
 Date test completed: 17th June 2003

STANDARD REQUIREMENTS

Test door mass:	60Kg.	80Kg	100Kg
No of cycles:	500,000	500,000	500,000
Closing torque 0 - 4°:	18-26Nm	26-37Nm	37-54Nm
88 - 92°:	6Nm	9Nm	12Nm
any angle:	4Nm	6Nm	8Nm
Opening torque 0 - 60°:	47Nm	62Nm	83Nm
Efficiency 0 - 4°:	55%	60%	65%

INITIAL OBSERVATIONS

Definitons, Clause 3.1, controlled door closing device must contain all parts necessary for installation and operation.

This sample of door closing device contained:-

	Supplied	Details
Body	YES	Ryobi body
Arms	YES	Projecting
Fixing brackets	YES	Backplate & Parallel arm bracket
Shoes or straps	NO	N/A
Top centres	NO	N/A
Floor pivots	NO	N/A
Fixing screws	YES	Wood & Machine screws
Covers	NO	Not supplied
Special tools	NO	Not Supplied

Clause 5.1: Requirements with regard to product information

Device must be supplied with instructions which must contain the following:-

	Supplied	Details
Clear fixing instructions.	YES	Clear fixing instructions supplied.
Instructions for regulation.	YES	Regulation instructions visible
Instructions for maintenance.	YES	Maintenance instructions visible
Limitations of opening angle.	YES	Limitations of opening shown
Details of closer power for each application and fixing position.	YES	Closer power for each application shown

Clause 8 Requirements for marking of closing devices and accessories.

Every closer and accessory must be marked with:-

	Marked	Details
Manufacturers name or trademark or other means of identification.	YES	Ryobi
Product model identification.	YES	D-2150
Standard number	YES	EN 1154 : 1996
Week and year of manufacture.	YES	1 st digit-Year, 2 nd digit-month, 3 rd &4 th digit-date

Every closer must be marked with Classification according to clause 4:-

Category	Number of test cycles	Test door mass	Fire resistance	Safety	Corrosion resistance
4	8	5	1	1	3
YES	YES	YES	YES	YES	YES

TESTS OF ADJUSTABLE STRENGTH SINGLE ACTION CONTROLLED DOOR
CLOSING DEVICES TO BSEN 1154: 1997 + A1 2002

SAMPLE "A" General requirements and operations at extremes of temperature.

CLAUSE 7.2.1 General requirements

Clause 5.1: Reported on previous page for all samples.

Clause 8: Reported on previous page for all samples.

Clause 5.2.12 Latch angle. (Effective over a maximum range of 15°)

Regular arm application	Latch angle	P = Pass F = Fail
Sample "A1" closer set to minimum	14°	P#
Sample "A2" closer set to maximum	12°	P#

P# = Assessed from 709 PCT

CLAUSE 5.2.18. Additional requirements for closers intended for fire or smoke doors.

Requirement	Test information	P = Pass F = Fail
Capable of closing door from any angle to which it may open	A1 min strength A2 max strength	P
Size 1 and 2 closers not permitted Adjustable closers must be adjustable up to size 3	A1 min strength A2 max strength	P
No hold open unless electrically powered.	A1 min strength A2 max strength	P
Regulators must be either concealed or operated by a tool	A1 min strength A2 max strength	P
It must not be possible to inhibit closing action without use if a tool.	A1 min strength A2 max strength	P
Delayed action closers must be capable of adjustment to <120 secs from 120°	A1 min strength A2 max strength	N/A
Must have been subjected to a fire / smoke test	A1 min strength A2 max strength	P

TESTS OF ADJUSTABLE STRENGTH SINGLE ACTION CONTROLLED DOOR
CLOSING DEVICES TO BSEN 1154: 1997 + A1 2002

CLAUSE 7.2.2 Operation at extremes of temperature.

Regular arm application

Closer temperature	Conditioning time (8 hours)	Test requirement	Measured closing time - seconds			P = Pass F = Fail
			1	2	3	
Sample "A.1" Minimum strength closer Size 3						
Test door mass 60 Kg						
+20°C	67 hrs	set to 5 secs	4.90 secs	4.88 secs	4.88 secs	4.89 secs
-15°C	16 hrs	3 secs min	18.31 secs	17.78 secs	17.47 secs	17.85 secs
+40°C	8 hrs	2.5 secs max	3.28 secs	3.28 secs	3.28 secs	3.28 secs
Sample "A.2" Maximum strength closer Size 5						
Test door mass 100 Kg						
+20°C	8 hrs	set to 5 secs	4.94 secs	4.91 secs	4.90 secs	4.92 secs
-15°C	16 hrs	3 secs min	14.78 secs	13.84 secs	13.50 secs	14.04 secs
+40°C	8 hrs	2.5 secs max	3.87 secs	3.85 secs	3.84 secs	3.85 secs

P# = Assessed from 709 PCT

Parallel arm application

Closer temperature	Conditioning time (8 hours)	Test requirement	Measured closing time - seconds			P = Pass F = Fail
			1	2	3	
Sample "A.2" Maximum strength closer Size 4						
Test door mass 80 Kg						
+20°C	16.5 hrs	set to 5 secs	4.97 secs	4.93 secs	4.90 secs	4.93 secs
-15°C	17 hrs	3 secs min	20.22 secs	18.94 secs	18.35 secs	19.17 secs
+40°C	8 hrs	2.5 secs max	3.72 secs	3.68 secs	3.69 secs	3.70 secs

P# = Assessed from 709.1 PCT

Closer condition after thermal compensation test: Satisfactory

SAMPLE "B.1" Minimum strength closer Mechanical performance and durability.

Operating angle and test settings.

	Test requirement	Test result Sample B 1	P = Pass F =Fail
Closer strength - size	Test door mass	60 Kg.	P#
Maximum opening angle	105° grade 3, 180° grade 4	180 °	P#
Door closes from	105° grade 3, 180° grade 4	180 °	P#
Door under control from	70° minimum	150 °	P#
Set closing time 90° to 0°	3 - 7 secs	4.92 secs	P#
Set opening time 0 - 90°	2 - 3 secs	2.31 secs	P#

Observations on initial cycling of closer up to 5000 cycles:- No Problems
 P# = Assessed from 709 PCT

Clause 7.3.4 tests after 5,000 cycles

Specification	Requirement	Test result	P = Pass F = Fail
Sample "B.1" Minimum strength closer Regular arm application			
Cycles completed	5,000	5,063 cycles	P#
Ambient temp.	15 - 30° C	21°C	P#
Closer temp	Within 2° of ambient	21°C	P#
Opening moment. (ave of 3 tests)	Max opening torque 0 - 4°	26.47 Nm	N/A#
	Max opening torque 0 - 60° < 47 Nm	27.71 Nm	P#
Closer size 3	Max opening torque 88 - 92°	18.00 Nm	N/A#
Closing moment. (ave of 3 tests)	Max closing moment 0 - 4° > = 18 < 26 Nm	20.32 Nm	P#
	Max closing torque 88 - 92° > = 6 Nm	13.16 Nm	P#
Closer size 3	Minimum closing torque at any angle > 4 Nm	9.70 Nm	P#
Efficiency	Size 3 closer min value	77%	P#
Closing time	Min 3 secs.	2.06 secs 2 mins to 15°	P#
	Max > = 20 secs.		

P# = Assessed from 709 PCT

TESTS OF ADJUSTABLE STRENGTH SINGLE ACTION CONTROLLED DOOR
CLOSING DEVICES TO BSEN 1154: 1997 + A1 2002

Clause 7.3.4 tests after 5000 cycles (continued)

Specification	Requirement	Test result	P = Pass F = Fail
Sample "B.1" Regular application			
Closing overload test	Abuse weight Closing time 90° - 0° set to 10 secs. Overload abuse weight arrest at 15° 10 abuse tests performed	21 kg 9.89 secs 15° 10 Performed	P#
Delayed action tests	Torque to push door from delay zone max 150 Nm, min 2*90° torque for size of closer Position of end of delay zone. Delay time adjustable to >20 secs		N/A
Cycling continued			
Closing time	Closing time 90° - 0° set to 3 -7 secs	3.87 secs	P#
Delayed cycling	20 secs delay, 500 cycles. Last 5 cycles delay time 10 - 30 secs.		
Backcheck	Opening speed at 60° between 51.6 and 63° / sec. Arrest angle < 80°	55 °/sec 86°	N/A P#
Backcheck closers cycle up to 100000 cycles with backcheck as set.		100,086 cycles	P#
Backcheck	Opening speed at 60° between 51.6 and 63° / sec. Arrest angle < 80°	55 °/sec 89°	P#
Cycling	Continue to 500,000 cycles without backcheck	501,939 cycles	P#

P# = Assessed from 709 PCT

**TESTS OF ADJUSTABLE STRENGTH SINGLE ACTION CONTROLLED DOOR
CLOSING DEVICES TO BSEN 1154: 1997 + A1 2002**

Clause 7.3.4 tests after 500,000 cycles

Specification	Requirement	Test result	P = Pass F = Fail
Sample "B.1" Regular arm application			
Cycles completed	500,000	501,939 cycles	P#
Ambient temp.	15 - 30° C	21°C	P#
Closer temp	Within 2° of original ambient.	21°C	P#
Closing time	< 2* original > 0.7* original	3.30 Secs (0.85*)	P#
Opening moment	Max opening torque 0 - 4°	24.94 Nm	N/A#
Closer size 3	Max opening torque 0 - 60° < 47 Nm	25.63 Nm	P#
	.Max opening torque 88 - 92°	17.33 Nm	N/A#
Closing moment	Max closing torque 0 - 4° $\geq 18 < 26$ Nm	20.47 Nm	P#
Closer size 3	Max closing torque 88 - 92° ≥ 6 Nm	13.85 Nm	P#
	Min closing torque at any angle > 4 Nm	9.70 Nm	P#
Efficiency	Size 3 Minimum value	82 %	P#
Closing time Max Min	> 20 secs	1 min 10.35 secs	P#
	> 3 secs	2.58 secs	
Delayed action tests	Torque to push door from delay zone max 150 Nm min 2*90° torque for size of closer. Position of end of delay. Delay time adjustable to >20 secs.		N/A
Closing overload test	Abuse weight,	21 kg	
	Closing time 90° - 0° set to 10 secs	10.16 secs	P#
	Overload arrest at 15° 10 abuse tests performed.	15° 10 Performed	

P# = Assessed from 709 PCT

Details of damage or leaks, comments on condition of closer after test : No Problems

**TESTS OF ADJUSTABLE STRENGTH SINGLE ACTION CONTROLLED DOOR
CLOSING DEVICES TO BSEN 1154: 1997 + A1 2002**

SAMPLE "B.2" Maximum strength closer Mechanical performance and durability.

Operating angle and test settings.

Test requirement	Test result	P = Pass F = Fail
Closer strength - size	100 Kg.	P
Maximum opening angle	180°	P
Door closes from	180°	P
Door under control from	157°	P
Set closing time 90° to 0°	4.92 secs	P
Set opening time 0 - 90°	2.41 secs	P

Observations on initial cycling of closer up to 5000 cycles:- No Problems

Clause 7.3.4 tests after 5,000 cycles

Specification	Requirement	Test result	P = Pass F = Fail
Sample "B.2" Maximum strength closer Regular arm application			
Cycles completed	5,000	5,334 cycles	P
Ambient temp.	15 - 30° C	23°C	P
Closer temp	Within 2° of ambient	23°C	P
Opening moment. (ave of 3 tests)	Max opening torque 0 - 4°	64.87 Nm	P
Closer size 5	Max opening torque 0 - 60° < 83 Nm	64.87 Nm	P
	Max opening torque 88 - 92°	20.40 Nm	P
Closing moment. (ave of 3 tests)	Max closing moment 0 - 4° > = 37 < 54 Nm	47.33 Nm	P
	Max closing torque 88 - 92° > = 12 Nm	15.24 Nm	P
Closer size 5	Minimum closing torque at any angle > 8 Nm	9.85 Nm	P
	Size 5 closer min value 65%	73 %	P
Closing time	Min < = 3 secs.	2.62 secs	P
	Max > = 20 secs.	2 mins to 15°	

Sample "B.2" Maximum strength closer Parallel arm application

Cycles completed	5,000	5,334 cycles	P*
Ambient temp.	15 - 30° C	23°C	P
Closer temp	Within 2° of ambient	23°C	P
Opening moment. (ave of 3 tests)	Max opening torque 0 - 4°	38.32 Nm	N/A
	Max opening torque 0 - 60° < 62 Nm	38.32 Nm	P
Closer size 4	Max opening torque 88 - 92°	16.53 Nm	N/A
	Max closing moment 0 - 4° > = 26 < 37 Nm	31.32 Nm	P
Closing moment. (ave of 3 tests)	Max closing torque 88 - 92° > = 9 Nm	12.85 Nm	P
	Minimum closing torque at any angle > 6 Nm	7.70 Nm	P
Efficiency	Size 4 closer min value 60%	82 %	P
	Min < = 3 secs. Max > = 20 secs.	2.43 secs 1 min 47.16	P

Comments on condition closers after 5000 Cycles : No Problems

P* = Durability performed in regular fixing application.

**TESTS OF ADJUSTABLE STRENGTH SINGLE ACTION CONTROLLED DOOR
CLOSING DEVICES TO BSEN 1154: 1997 + A1 2002**

Clause 7.3.4 tests after 5000 cycles (continued)

Specification	Requirement	Test result	P = Pass F = Fail
Sample "B.2" Regular arm application			
Closing overload test	Abuse weight Closing time 90° - 0° set to 10 secs. Overload abuse weight arrest at 15° 10 abuse tests performed	27 kg 9.99 secs 15 ° 10 Performed	P
Delayed action tests	Torque to push door from delay zone max 150 Nm min 2*90° torque for size of closer Position of end of delay zone. Delay time adjustable to >20 secs		N/A
Cycling continued			
Closing time	Closing time 90° - 0° set to 3 -7 secs	4.00 secs	P
Delayed cycling	20 secs delay, 500 cycles. Last 5 cycles delay time 10 - 30 secs.		N/A
Backcheck	Opening speed at 60° between 51.6 and 63° / sec. Arrest angle < 80°	54°/Sec 79°	P
Backcheck closers	Cycle to 100,000 cycles with backcheck set	100,00 cycles	P
Backcheck	Opening speed at 60° between 51.6 and 63° / sec. Arrest angle < 90°	54°/sec 89°	P
Cycling	Continue to 500,000 cycles without backcheck	501,497 cycles	P

Clause 7.3.4 tests after 500,000 cycles

Specification	Requirement	Test result	P = Pass F = Fail
Sample "B.2" Regular arm application			
Cycles completed	500,000	501,497 cycles	P
Ambient temp.	15 - 30° C	23°C	P
Closer temp	Within 2° of original ambient.	23°C	P
Closing time	< 2* original > 0.7* original	4.25 Secs (1.06*)	P
Opening moment	Max opening torque 0 - 4°	57.83 Nm	N/A
Closer size 5	Max opening torque 0 - 60° < 83 Nm	57.83 Nm	P
	Max opening torque 88 - 92°	17.97 Nm	N/A
	Max closing torque 0 - 4° ≥ 37 < 54 Nm	44.36 Nm	P
Closer size 5	Max closing torque 88 - 92° ≥ 12 Nm	14.73 Nm	P
	Min closing torque at any angle > 8 Nm	8.80 Nm	P
Efficiency	Size 5 Minimum value 65%	77 %	P
Closing time Max	> 20 secs	49.47 secs	P
	> 3 secs	2.64 secs	P
Delayed action tests	Torque to push door from delay zone max 150 Nm min 2*90° torque for size of closer. Position of end of delay. Delay time adjustable to >20 secs.	Nm Nm ° secs	N/A
Closing overload test	Abuse weight,	27 kg	P
	Closing time 90° - 0° set to 10 secs Overload arrest at 15° 10 abuse tests performed.	9.94 secs 15° 10 Performed	P
Sample "B.2" Parallel arm application			
Cycles completed	500,000	501,497 cycles	P*
Ambient temp.	15 -- 30° C	22°C	P
Closer temp	Within 2° of original ambient.	22°C	P
Opening moment Closer size 4	Max opening torque 0 - 4°	38.33 Nm	N/A
	Max opening torque 0 - 60° < 62 Nm	38.33 Nm	P
	Max opening torque 88 - 92°	14.70 Nm	N/A
Closing moment Closer size 4	Max closing torque 0 - 4° ≥ 26 < 37 Nm	30.94 Nm	P
	Max closing torque 88 - 92° ≥ 9Nm	11.78 Nm	P
Efficiency	Min closing torque at any angle > 6 Nm	6.39 Nm	P
	Size 4 Minimum value 60%	81 %	P
Closing time Max	> 20 secs	24.84 secs	P
	Min < 3 secs	2.47 secs	P
Closing overload test	Abuse weight	24 kg	P
	Closing time 90° - 0° set to 10 secs Overload abuse weight, arrest at 15° 20 abuse tests performed.	10.02 secs 15° 20 Performed	P

Details of damage or leaks, comments on condition of closer after test: Minor signs of oil leakage around end plug.

P* = Durability performed in regular fixing application.

**TESTS OF ADJUSTABLE STRENGTH SINGLE ACTION CONTROLLED DOOR
CLOSING DEVICES TO BSEN 1154: 1997 + A1 2002**

Clause 7.4 Corrosion resistance tests

Specification	Requirement	Test result	P = Pass F = Fail
Sample "C" Minimum strength closer			
Ambient temp.	15 - 30° C	22°C	P
Closer temp	Within 2° of ambient	22°C	P
Closing moment. (ave of 3 tests)	Max closing moment 0 - 4° > = 18 < 26 Nm	24.85 Nm	P
Closer size	Max closing torque 88 - 92° > = 6 Nm	13.16 Nm	P
Grade of corrosion resistance	Minimum closing torque at any angle>	10.39 Nm	P
Ambient temp.	Exposure time	96 hours	P
Closer temp	15 - 30° C	23°C	P
Closing moment. (ave of 3 tests)	Within 2° of ambient	23°C	P
Closer size	Max closing moment 0 - 4° > 80% of above	25.21Nm (101%)	P
	Max closing torque 88 - 92°> 80% of above	13.62 Nm (103%)	P
	Minimum closing torque at any angle> 80% of above	10.39 Nm (100%)	P

Details of any Visual corrosion or damage during test : No Problems.

Uncertainty of measurement

Clause 7.1.1 of the standard specifies the following tolerances on values:

Mass in kg	± 2%	length in mm	± 2%	Angular position	± 2°
Force in N	± 2%	time in secs	± 5%	temp °C	± 2°C
Moment in Nm	± 2%				

The uncertainty of measurements calculated for a confidence level of 95% throughout these tests are within the limits of these tolerances.

OBSERVATIONS AND COMMENTS

The Ryobi D-2150 Overhead Door Closer met with all the mechanical testing requirements of BS EN 1154 in both regular and parallel arm fixing applications,

NOTE : All Cycling was performed in regular fixing application.
Thermal compensation results were assessed from 709PCT & 709.1PCT.
Minimum Sample results shown in this report were assessed from 709PCT.

----- END OF REPORT -----