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THE UNITED KINGDOM VEHICLE APPROVAL AUTHORITY

Rev 1/03



COMMUNICATION CONCERNING THE APPROVAL GRANTED OF
A REPLACEMENT BRAKE LINING ASSEMBLY OR REPLACEMENT
DRUM LINING PURSUANT TO ECE REGULATION NO: 90.01

Approval No: 90R-01184 / 4090

1. Applicant's name and address:

Juratek Ltd. Unit 16, Carcroft Enterprise Park, Station Road, Doncaster DN6 8DD

2. Manufacturer's name and address:

3. Make and type of brake lining assembly: DP11643.

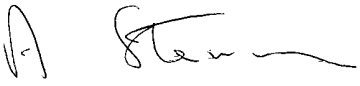
4. Make and type of brake lining: LE TD3 GG

5. Vehicles/axles/brakes for which the brake lining assembly/drum brake lining type qualifies as original brake lining assembly: Not applicable

6. Vehicles for which the brake lining assembly qualifies as replacement brake lining assembly: See manufacturers Documents :-

An executive agency of the Department for Transport



7. Submitted for approval on: 18 July 2007
8. Technical Service responsible for approval tests: Vehicle Certification Agency
- 8.1 Date of test report: 14/08/06, 20/11/06, 15/08/06.
- 8.2 Number of test report: VSG076369, VSG078081, VSG078079.
9. Approval: GRANTED
10. Place: BRISTOL
11. Date: 11 SEPTEMBER 2007
12. Signature:  A. W. STENNING
Head of Product Certification
13. Annexed to this communication is a list of documents in the approval file deposited at the administrative services having delivered the approval and which can be obtained upon request.

VSH179633



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| 18/07/07 | VCA Job No | VSH179633 |
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Dear Claire,

Please find enclosed the necessary documentation for you to submit applications for approval for various brake lining assemblies DP11643 in LE TD3 GG material pursuant to ECE Regulation No. 90/1. This application is on behalf of Juratek Ltd and cross-references to our DP LE TD3 GG application details. We would like the application made to the VCA; I have addressed the formal letter of application accordingly.

The documents contained are: -

1. Formal letter of application
2. Manufacturers declarations
3. Lab test results :-
 - Friction test results
 - Shear test results
 - Compressibility test results
4. Vehicle fitment details
5. Disc pad assembly drawings
6. General disc pad marking drawing

**Please note: Allocated with E11 90R-01184/4090 as a provisional number.
This approval is based on VSG076369, VSG078081, and VSG078079
plus additional OE Materials testing on VSG076364 and VSG078099**

Yours sincerely,



Susan Owens
Q.B.T.



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Vehicle Certification Agency
1 Eastgate Office Centre
Eastgate Road
Bristol
BS5 6XX

Letter of application for an approval pursuant to ECE Regulation No. 90/1

Dear Sirs,

Herewith we apply for an approval for our brake lining assembly pursuant to ECE Regulation No. 90/1.

Applicants name and address:

Juratek Ltd. Unit 16, Carcroft Enterprise Park, Station Road, Doncaster DN6 8DD

Manufacturers name and address:

Make and type of brake lining LE TD3 GG
Make and type of brake lining assembly as listed below

| Assembly Number | Assembly Contains...(see enclosed drawings) | Material Code |
|-----------------|---|---------------|
| DP11643 | 2 plain pads, 2 pads with spring clips, 1 with wear indicator | LE TD3 GG |
| | | |
| | | |
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For vehicles / axles / brakes for which the lining assembly qualifies as replacement brake lining assembly, see following application list.

| Assembly Number | Equivalent to | Also supplied as Assembly Number |
|-------------------|---------------|----------------------------------|
| | Equivalent to | |
| LE DP11643 TD3 GG | Equivalent to | |
| | Equivalent to | |
| | Equivalent to | |

Yours faithfully



Susan Owens
Q.B.T.



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Manufacturer's Declaration

for granting of Approval for replacement brake lining according to ECE Regulation No. 90/1.

We, the company

declare herewith that

Replacement pad assemblies LE DP11643 TD3 GG

are produced in our factory

We certify that no application has been made regarding this permission/approval by us or by companies appointed by us in countries which as contract parties would also be entitled to grant permission/approval.

We are aware of the following: -

A type marking of vehicles/vehicle components of the above mentioned type with the officially assigned approval mark can only be granted if the products have been manufactured in the above mentioned factory or at one of our listed and approved manufacturing sites, and if they comply with the official approval documents.

Companies manufacturing products for our company or under license may not use the officially assigned approval mark for vehicles/vehicle components produced at their factories unless they are listed as an approved manufacturing site, and fully comply with our quality procedures.

A marking of vehicles/vehicle components of the above mentioned type with different factory or trade marks but the same approval mark is only permissible if written consent has been obtained from the Vehicle Certification Agency.



Susan Owens
Q.B.T.



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Friction test results

Conducted in accordance with Annex 8, of ECE Regulation No. 90 Rev1 including supplement 2 to the 01 series of amendments. (TRANS/SC1/WP29/GRRF/R90 Rev 1).

Type of assembly: Part Number DP11094 in material LE TD3 GG
(Previously agreed single test reference)

| | |
|---------------|---------------------------------|
| Type of test: | Constant torque (para. 2.2.2.2) |
| $\mu_{op}: 1$ | 0.354 |
| $\mu_{op}: 2$ | 0.361 |
| μ_{min} : | 0.278 |
| μ_{max} : | 0.422 |

Test dates: 02/06/2006



Susan Owens
Q.B.T.



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Bench tests

| | | | |
|----------------------------|-------------------|------|-----|
| Manufacturer: | | | |
| Type of brake lining assy: | DP11094 LE TD3 GG | Page | 1/2 |

1. Shear strength test¹
(5.3.2.1 of ECE Regulation No. 90 Rev 1)

- Sample

Type of assembly: DP11094 LE TD3 GG
Shear area [cm²]: 43.46

- Shear strength measured

Mean value [N/cm²]: 630
Required [N/cm²]: 250

Test date: 03/06/2006

1) Test procedure according to ISO Standard 6312 (2001)



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|----------------------------|-------------------|------|-----|
| Manufacturer: | | | |
| Type of brake lining assy: | DP11094 LE TD3 GG | Page | 2/2 |

2. Compressibility test²
(5.3.2.2 of ECE Regulation No. 90 Rev 1)

- Sample

Type: III
 Type of assembly: DP11094 LE TD3
 GG
 Thickness, d_0 (nominal value) [mm]: 18.5
 Pad area [cm²]: 43.464
 Ram dia (corresponding to caliper piston dia) [mm]: 54

- Compressibility at specific surface pressure of 8000 kPa

Measured at ambient temperature

Mean value: $\frac{d_4 - d'_3}{d_0} = 0.16 \%$

Required: $\leq 2\%$

Measured at 400°C

Mean value: $\frac{d_4 - d'_3}{d_0} = 0.65\%$

Required: $\leq 5\%$

Test dates: 03/06/2006

2) Test procedure according to ISO Standard 6310 (2001)



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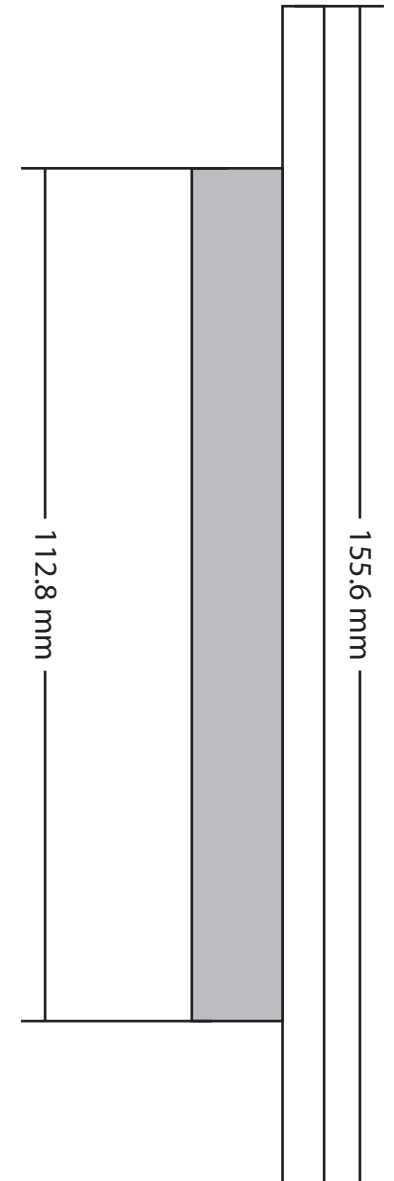
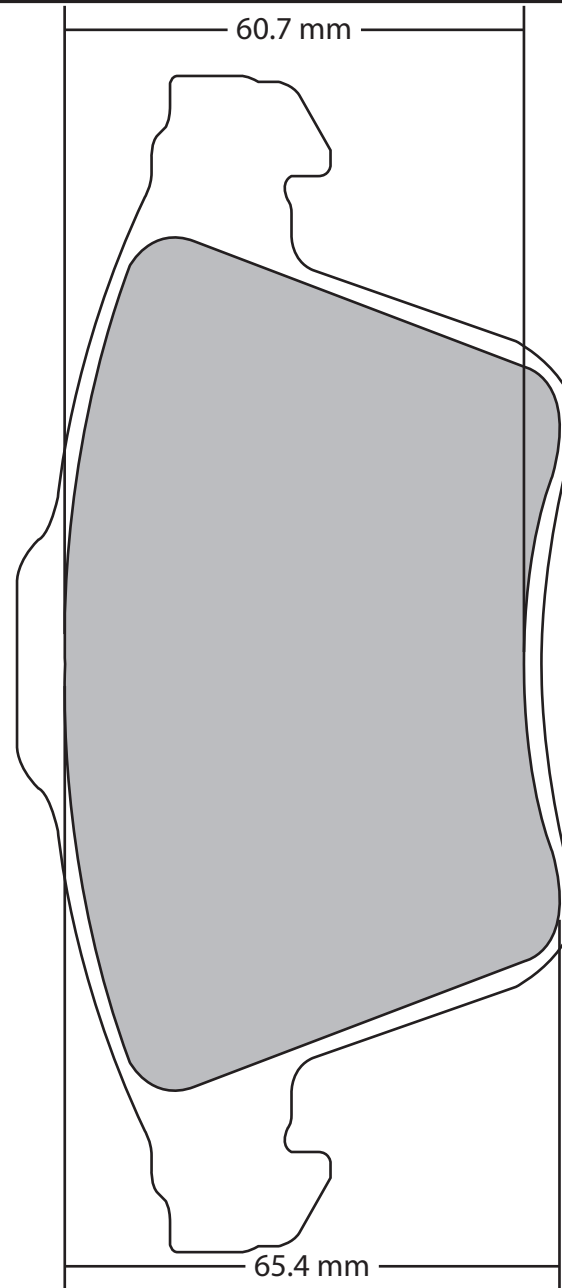
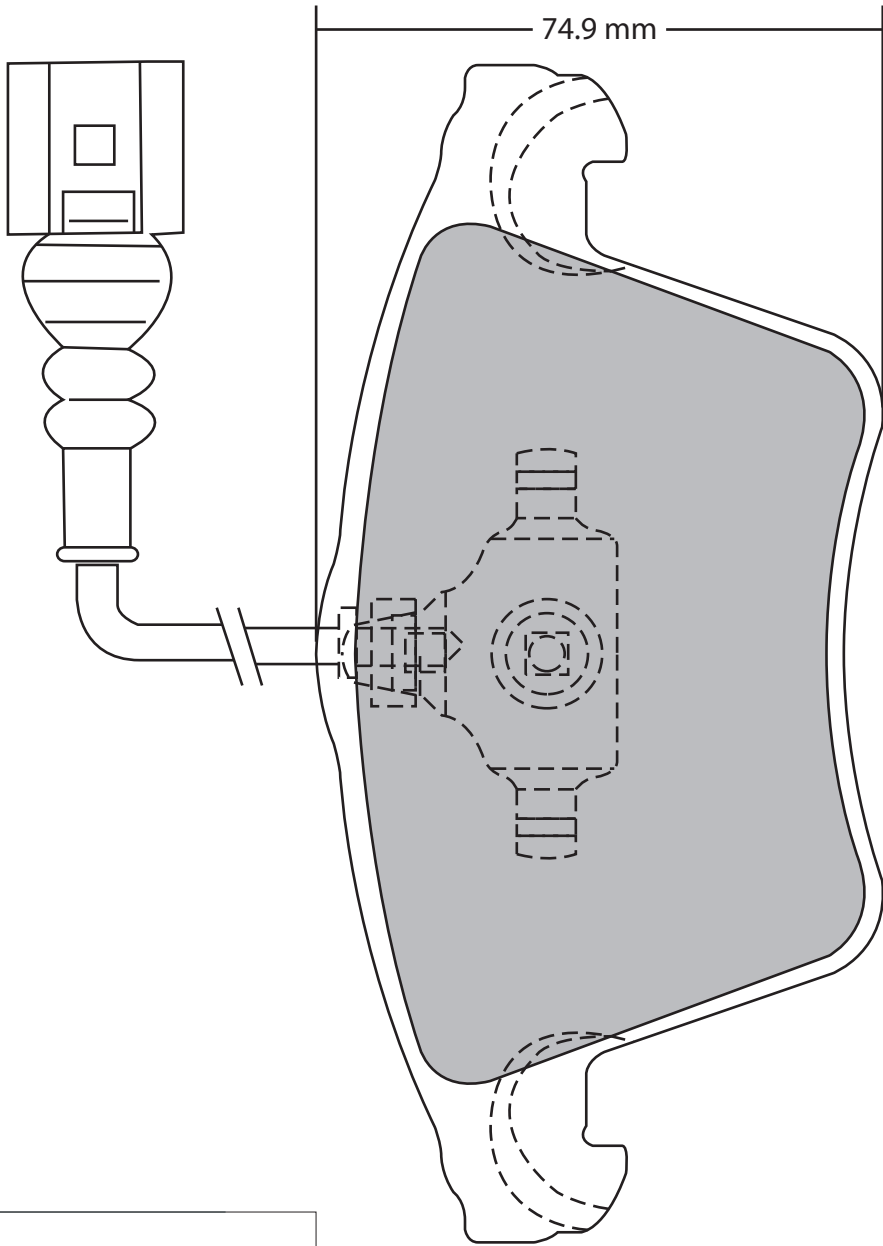


| MAKE | | MODEL 1 | MODEL 2 | MODEL 3 | MODEL 4 | MODEL 5 | F/R | D | A | T | E | OE Caliper Manufacturer | S/V Dr | Disc / Drum / Dia | Max Th Disc / Shoe Width |
|---------|------------|------------------------|------------------|------------|---------|---------|-----|----|----|---|---|----------------------------|-----------|-------------------------|-----------------------------------|
| DP11643 | VOLKSWAGEN | Caravelle (03-->) | 1.9 Turbo Diesel | 17" wheels | | | F | 11 | 03 | | | Ate | V | | |
| DP11643 | VOLKSWAGEN | Caravelle (03-->) | 2.0i | 17" wheels | | | F | 11 | 03 | | | Ate | V | | |
| DP11643 | VOLKSWAGEN | Caravelle (03-->) | 2.5 V6 TDi | 17" wheels | | | F | 11 | 03 | | | Ate | V | | |
| DP11643 | VOLKSWAGEN | Caravelle (03-->) | 3.2i V6 | 17" wheels | | | F | 11 | 03 | | | Ate | V | | |
| DP11643 | VOLKSWAGEN | Transporter (T5 03-->) | 1.9 Turbo Diesel | 17" wheels | | | F | 11 | 03 | | | Ate | V | | |
| DP11643 | VOLKSWAGEN | Transporter (T5 03-->) | 2.0i | 17" wheels | | | F | 11 | 03 | | | Ate | V | | |
| DP11643 | VOLKSWAGEN | Transporter (T5 03-->) | 2.5 V6 TDi | 17" wheels | | | F | 11 | 03 | | | Ate | V | | |
| DP11643 | VOLKSWAGEN | Transporter (T5 03-->) | 3.2i V6 | 17" wheels | | | F | 11 | 03 | | | Ate | V | | |



| CALIPER ACTUATION | BRAKING SPLIT F/R, DIAG or H / I | CALIPER PAD | | HERST NUMBER | TYP / SCHL NUMBER | MAX SPEED Km/h | 80% V MAX Km/h | VEHICLE / | | ENERGY FACTOR .5 MV 2 | MAXIMUM ROLLING RADIUS | INERTIA UNLADEN | VEHICLE INERTIA LADEN |
|-------------------|----------------------------------|-------------|--------------------|--------------|-------------------|----------------|----------------|----------------------|----------------------|-----------------------|------------------------|-----------------|-----------------------|
| | | PISTON DIA | FRICTION AREA mm^2 | | | | | AXLE WEIGHT UN-LADEN | VEHICLE WEIGHT LADEN | | | | |
| Hyd | Diag | | | 0603 | 0 | 158 | 126 | 2199 | 3000 | 23965440 | 0.33 | 92.1963735 | 125.7795 |
| Hyd | Diag | | | 0603 | 0 | 168 | 134 | 2199 | 3000 | 27095040 | 0.33 | 92.1963735 | 125.7795 |
| Hyd | Diag | | | 0603 | 0 | 187 | 150 | 2220 | 3200 | 35808256 | 0.33 | 93.07683 | 134.1648 |
| Hyd | Diag | | | 0603 | 0 | 203 | 162 | 2274 | 3000 | 39560640 | 0.33 | 95.340861 | 125.7795 |
| Hyd | Diag | | | 0603 | 0 | 158 | 126 | 2199 | 3000 | 23965440 | 0.33 | 92.1963735 | 125.7795 |
| Hyd | Diag | | | 0603 | 0 | 168 | 134 | 2199 | 3000 | 27095040 | 0.33 | 92.1963735 | 125.7795 |
| Hyd | Diag | | | 0603 | 0 | 187 | 150 | 2220 | 3200 | 35808256 | 0.33 | 93.07683 | 134.1648 |
| Hyd | Diag | | | 0603 | 0 | 203 | 162 | 2274 | 3000 | 39560640 | 0.33 | 95.340861 | 125.7795 |





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|---------------|--------------|--|
| Material Area | | |
| 6085.8 mm | | |
| Modification | Initial Date | |

| | |
|----------|--|
| Drawn By | |
| Date | |

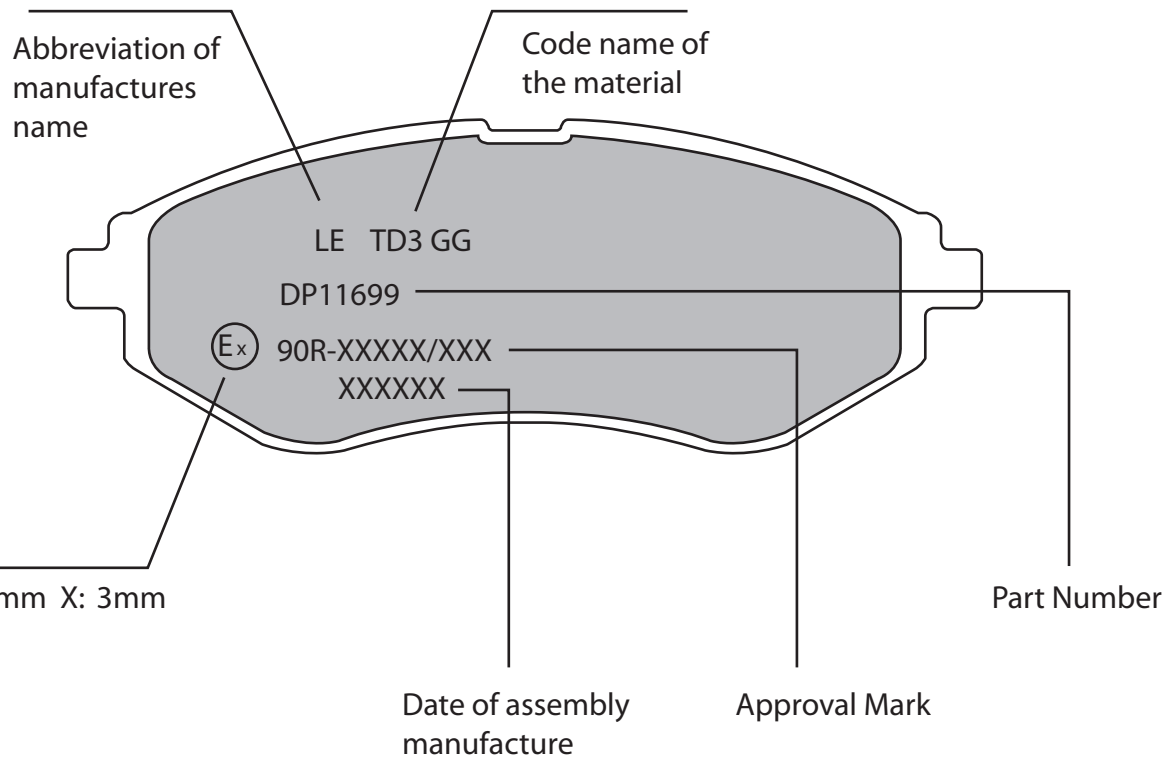
| | |
|-------------------|-------------------|
| Description | Disc Pad Assembly |
| General Tolerance | ± 0.25mm |

| | |
|-----------|---|
| Issue No. | 1 |
| ± 0.25mm | |

| | |
|----------|--|
| Part No. | |
|----------|--|

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|--------------|
| DP11643 |
| Not To Scale |





| | | | | | | |
|---------------|--------------|------|----------|--------------------------|-----------------|--------------|
| Material Area | | | Drawn By | Description | Issue No. | Part No. |
| | | | | Disc Pad Assembly | 1 | |
| Modification | Initial Date | Date | | General Tolerance | ± 0.25mm | Not To Scale |

