# هيئة التقييس لدول مجلس التعاون لدول الخليج العربية
# GCC STANDARDIZATION ORGANIZATION (GSO)

مشروع : نهائي

**GSO2/FDS/ ISO PAS 22574:2011**
**ISO PAS 22574:2007**

# مركبات الطرق ـ ـ مواد الاحتكاك ببطانات المكابح ـ ـ الفحص الظاهري

**Road vehicles — Brake linings frictions materials — Visual**

**إعداد**

**اللجنة الفنية الخليجية الفرعية لقطاع مواصفات المركبات والإطارات**

هذه الوثيقة مشروع لمواصفة قياسية خليجية تم توزيعها لإبداء الرأي والملاحظات بشأنها، لذلك فإنها عرضة للتغيير والتبديل، ولا يجوز الرجوع إليها كمواصفة قياسية خليجية إلا بعد اعتمادها من مجلس إدارة الهيئة الخليجية.

## تقديم

هيئة التقييس لدول مجلس التعاون لدول الخليج العربية هيئة إقليمية تضم في عضويتها الأجهزة الوطنية للمواصفات والمقاييس في دول الخليج العربية ، ومن مهام الهيئة إعداد المواصفات القياسية الخليجية بواسطة لجان فنية متخصصة .

وقد قامت هيئة التقييس لدول مجلس التعاون لدول الخليج العربية ضمن برنامج عمل اللجنة الفنية رقم ٢-١ " اللجنة الفنية الخليجية الفرعية لقطاع مواصفات المركبات والإطارات " بتبني المواصفة القياسية الدولية رقم آيزو **بي إى إس** ٢٠٠٧/٢٢٥٧٤ " مركبات الطرق ـ ـ مواد الاحتكاك ببطانات المكابح ـ ـ الفحص الظاهري " – والتي أصدرتها "المنظمة الدولية للتقييس" وتمت ترجمتها باللغة العربية ، وقامت المملكة العربية السعودية بإعداد مشروع هذه المواصفة.

وقد اعتمدت هذه المواصفة كمواصفة قياسية خليجية دون إدخال أية تعديلات فنية عليها وذلك في اجتماع مجلس إدارة الهيئة رقم (  ) ، الذي عقد بتاريخ /  / هـ ، الموافق /  / م.

## Foreword

GCC Standardization Organization (GSO) is a regional Organization which consists of the National Standards Bodies of GCC member States. One of GSO main functions is to issue Gulf Standards through specialized technical committees (TCs).

GSO through the technical program of committee TC No.2-1: " The Gulf technical Subcommittee for vehicles and tyres standards" has adopted the International Standard No. : ISO PAS 22574:2007 "Road vehicles — Brake linings frictions materials — Visual " issued by International Organization for Standardization which has been translated into Arabic. The Draft Standard has been prepared by Kingdom of Saudi Arabia

This standard has been approved as Gulf Standard without any technical modifications by GSO Board of Directors in its meeting No..../.... …….held on / / / H , / / G

PUBLICLY AVAILABLE SPECIFICATION

# ISO/PAS 22574

First edition
2007-02-01

# Road vehicles — Brake linings frictions materials — Visual inspection

*Véhicules routiers — Matériaux de friction des garnitures de freins — Inspection visuelle*

Reference number
ISO/PAS 22574:2007(E)

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# Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/PAS 22574 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 2, *Braking systems and equipment*.

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# Introduction

This Publicly Available Specification is based on the “Catalogue of characteristic features for friction materials” of the “FEMFM-Federation of European Manufacturers of Friction Materials” issued the first time in 1980. The FEMFM is a European organization of national associations formed by companies engaged in the development and production of friction materials of various product forms. The description of the characteristic features and their design was reviewed in 1996 when technological processes, especially safety aspects and the demands made by the brake and automobile industry, were given careful consideration.


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# Road vehicles — Brake linings frictions materials — Visual inspection

## 1 Scope

Friction linings are composite materials with complex structure. Due to their composition and their production process, visual appearance characteristics can occur which in a precisely defined design are to be regarded as specific to the product. This International Standard defines visual aspect for the identification and assessment of such product characteristics in quality assurance, as well as a basis for commercial and technical agreements. The sequence of the product characteristics represents no order of priority. The brake linings are inspected in the “as supplied” condition, meaning unused. In some characteristic features, there are differences between brake linings with an effective lining pad surface $< 120\ cm^2$ and $\geqslant 120\ cm^2$. The acceptance criteria within the International Standard do not allow any characteristics which could impair the function and performance of brake linings and are applied unless there are other agreements between the customer and the supplier.

## 2 Characteristic features for friction materials

### 2.1 Characteristic features for disc brake pads

#### 2.1.1 Gapping (between material and plate)

The gap shown in Figure 1 is not acceptable.

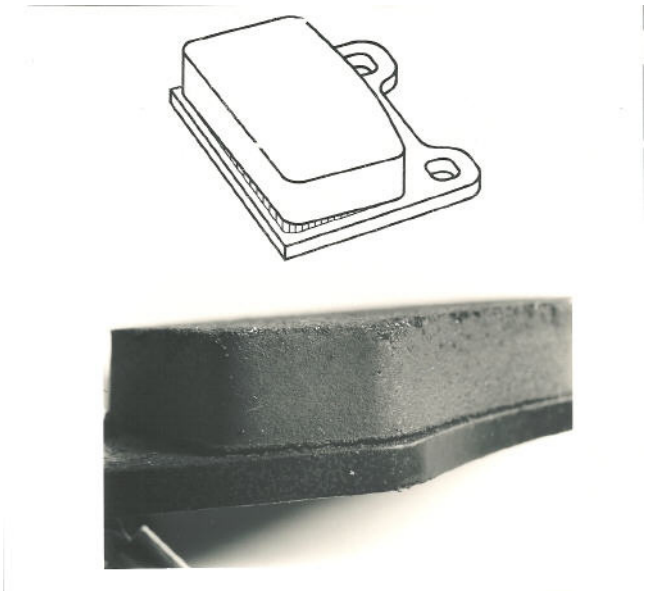

**Figure 1 — Gapping (between material and plate)**

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### 2.1.2 Edge chipping

In the case of a disc brake pad with a surface less than 120 $cm^2$ a maximum of 1 % of the edge may chip.

In the case of a disc brake pad with a surface equal or more than 120 $cm^2$ a maximum of 0,5 % of the edge may chip.

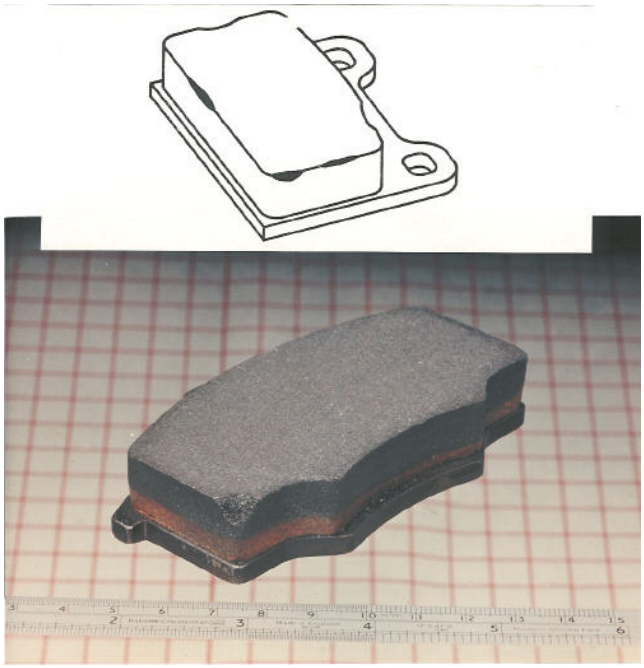

**Figure 2 — Edge chipping**

### 2.1.3 Splits

Splits having a length of more than 30 mm or more than 10 mm on corners or deeper than 1,5 mm shall not be accepted (see Figure 3).

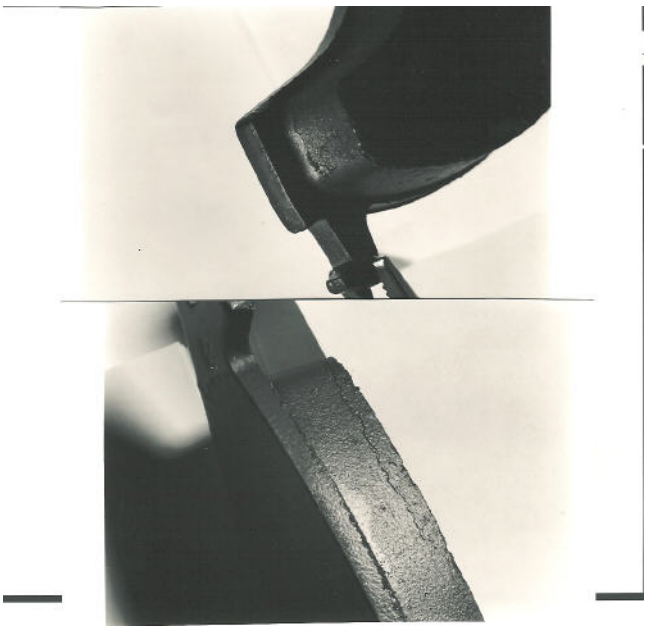

**Figure 3 — Splits**


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### 2.1.4 Minor splits

Splits having a length of less than 30 mm or less than 10 mm on corners or with a depth les than 1,5 mm may be accepted (see Figure 4).

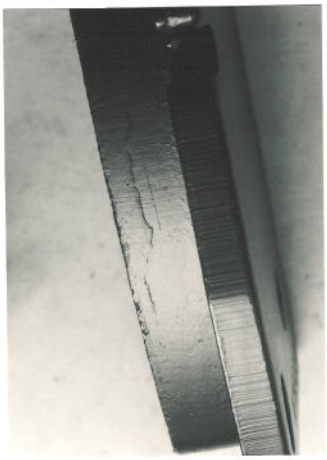

**Figure 4 — Minor splits**

### 2.1.5 Plucked and indented spigots

The disc brake pad shown in Figure 5 is acceptable on each spigot up to 50 % of area and 0,5 mm deep.

NOTE This definition also applies where spigots have been physically indented in the pad design.

**Figure 5 — Plucked and indented spigots**

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### 2.1.6 Poor consolidated spigot holes

The disc brake pad shown in Figure 6 is acceptable if only one spigot is affected with up to 20 % of the volume being low density. This definition also applies where spigots have been physically indented in the pad design.

**Figure 6 — Poor consolidated spigot holes**

### 2.1.7 Excess adhesive on plate

Excess adhesive on plate is acceptable provided the fitment of the part is not affected. (See Figure 5.)

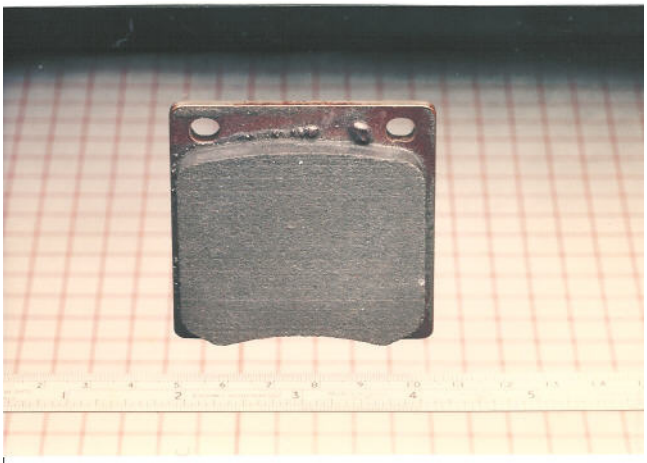

**Figure 7 — Excess adhesive on the plate**


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### 2.1.8 Material flash on plate

A material flash on plate is acceptable up to 1mm thick outside functional zones. Flash shall be secured to back plate. (See Figure 8.)

**Figure 8 — Material flash on plate**

### 2.1.9 Abrasive coating

The disc brake pad is acceptable if at least 90 % of the surface is coated. (See Figure 9.)

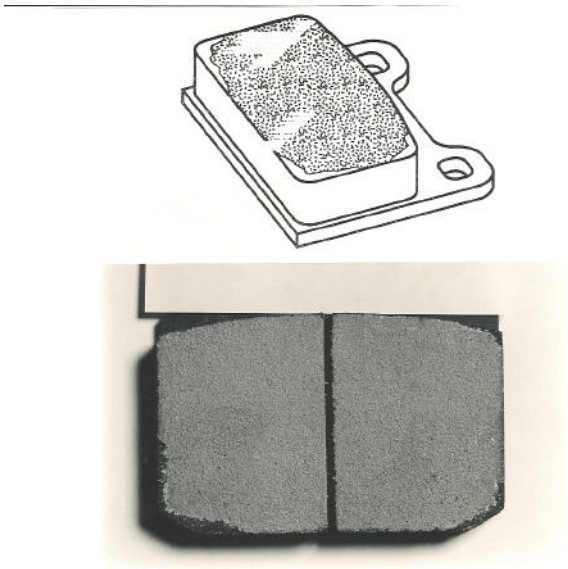

**Figure 9 — Abrasive coating**

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### 2.1.10 Anti-noise coating runs

The anti-noise coating runs is acceptable provided fitment of part is not affected. (See Figure 10.)

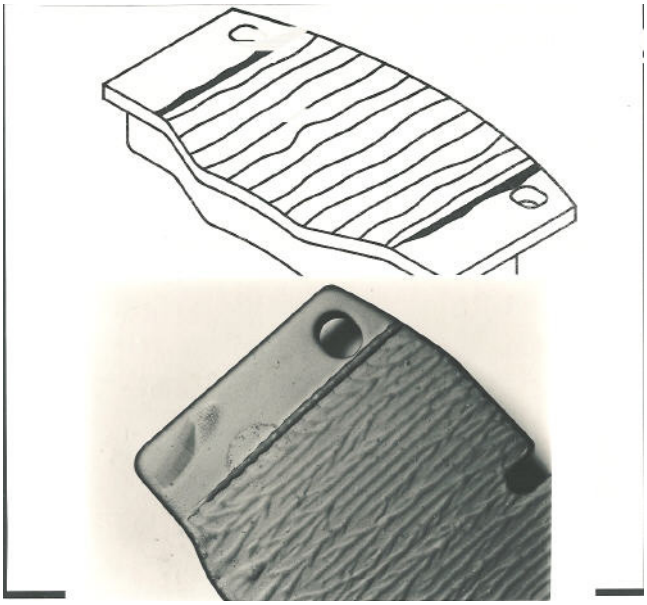

**Figure 10 — Anti-noise coating runs**

### 2.1.11 Skin crazing

Skin crazing as shown in Figure 11 is acceptable.

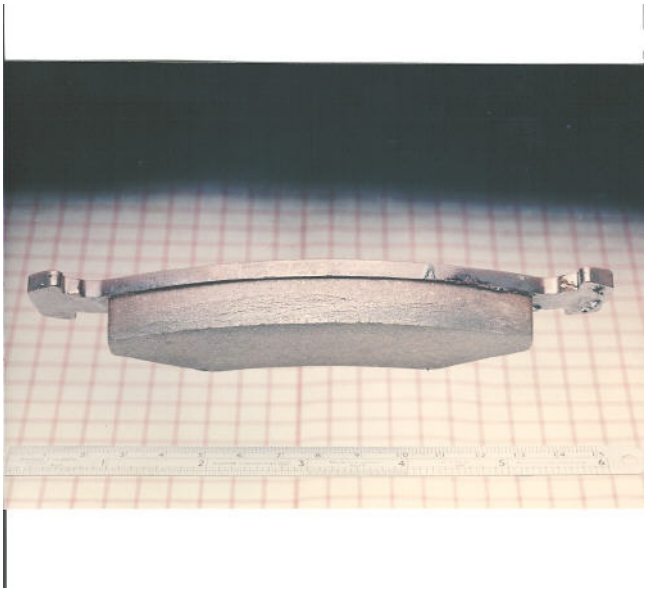

**Figure 11 — Skin crazing**


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### 2.1.12 Underlayer distribution

Presence of underlayer is acceptable on pad surface up to 2 % of area, if the distribution is according to the specification. (See Figure 12.)

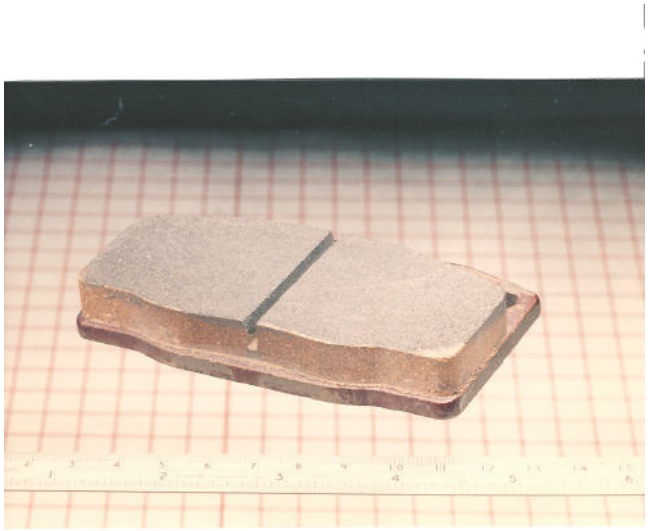

**Figure 12 — Under-layer distribution**

### 2.1.13 Marking

The marking shall be clear and legible.

**Figure 13 — Marking**

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### 2.1.14 Unground material surface

An unground material surface equal or less than 10 % of the area is acceptable provided flatness and parallelism tolerances are not exceeded. (See Figure 14.)

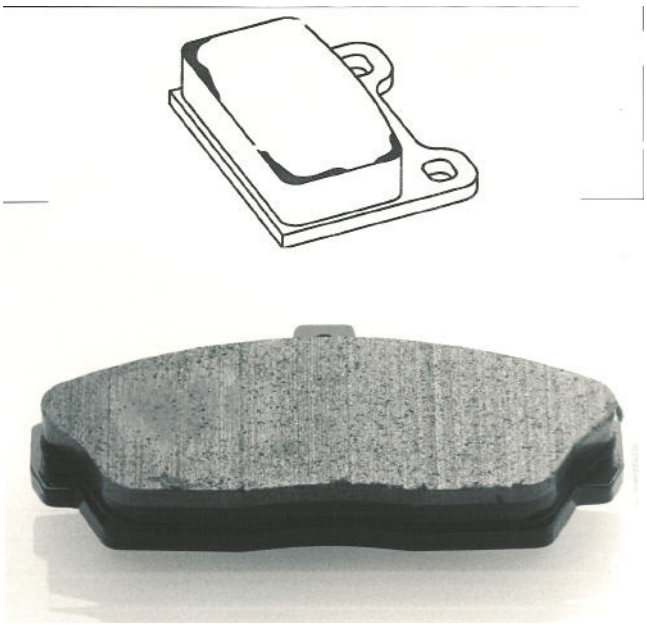

**Figure 14 — Unground material surface**

### 2.1.15 Paint on friction material surface

Paint on friction material surface is acceptable up to 10 % of the surface area. (See Figure 15.)

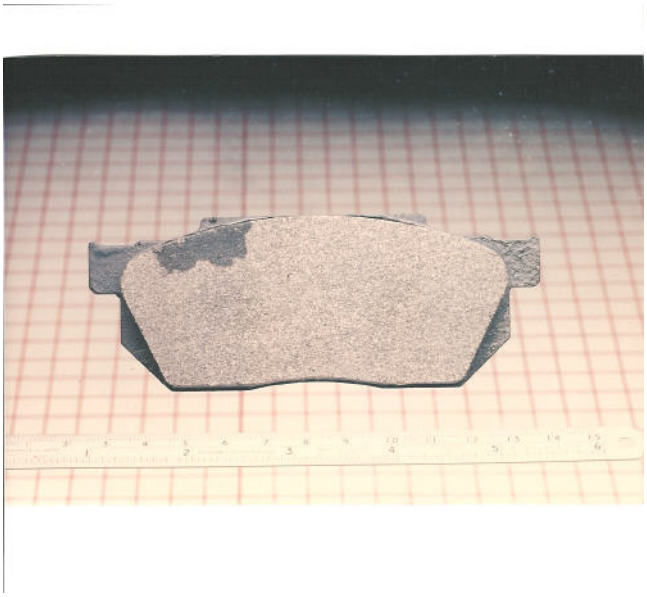

**Figure 15 — Paint on friction material surface**


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### 2.1.16 Surface blisters

Surface blisters are acceptable if no surface lift is detectable. (See Figure 16.)

**Figure 16 — Surface blisters**

### 2.1.17 Surface indentations

Surface indentations are acceptable up to 2 % of the surface in total, but a single indentation shall not exceed 1 % of the material surface; (See Figure 17.)

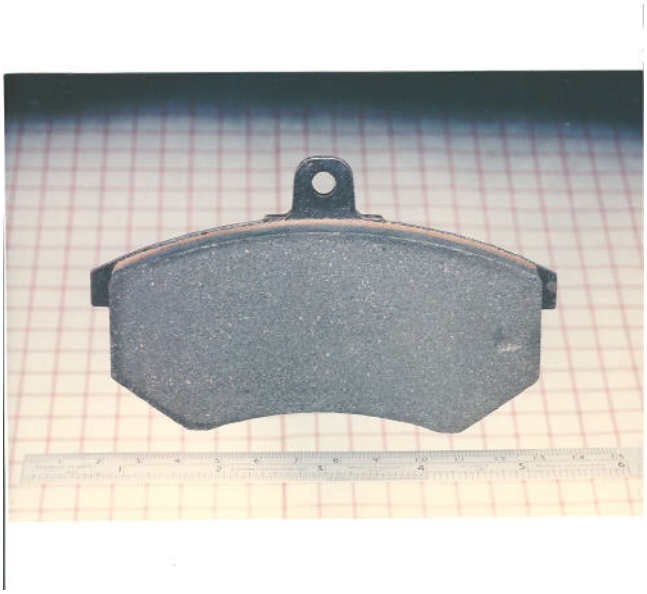

**Figure 17 — Surface indentations**

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### 2.1.18 Grinding marks on friction material surface

Grinding marks on friction material surface are acceptable. (See Figure 18.)

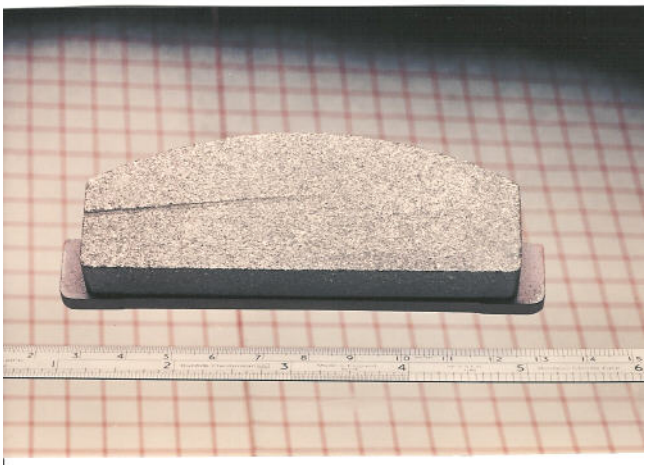

**Figure 18 — Grinding marks on friction material surface**

### 2.1.19 Higher porosity area

In the case of an effective material surface of less than 120 $cm^2$ a maximum of 5 % surface area with a higher porosity is acceptable, provided the material contours are not affected.

The percentage of allowable higher porosity shall be equal or less than 2 % in the case of an effective material surface equal or more than 120 $cm^2$. (See Figure 19.)

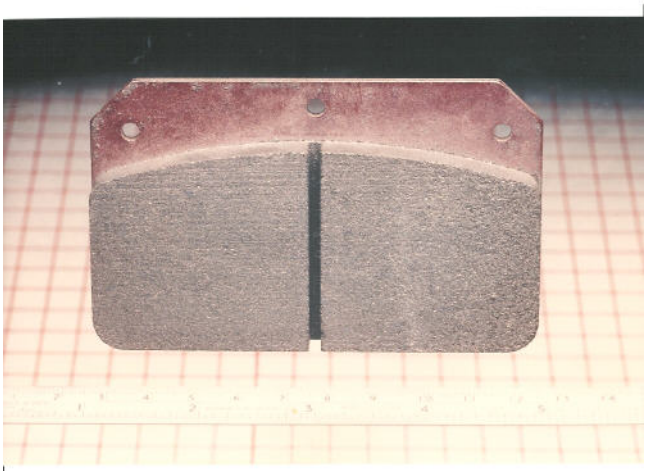

**Figure 19 — Higher porosity area**


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### 2.1.20 Poorly consolidated friction material

In the case of an effective material surface of less than 120 $cm^2$ a maximum of 1 % surface area with poorly consolidated friction material is acceptable.

The percentage of poor consolidation shall be equal or less than 0,5 % in the case of an effective lining surface equal or more than 120 $cm^2$. (See Figure 20.)

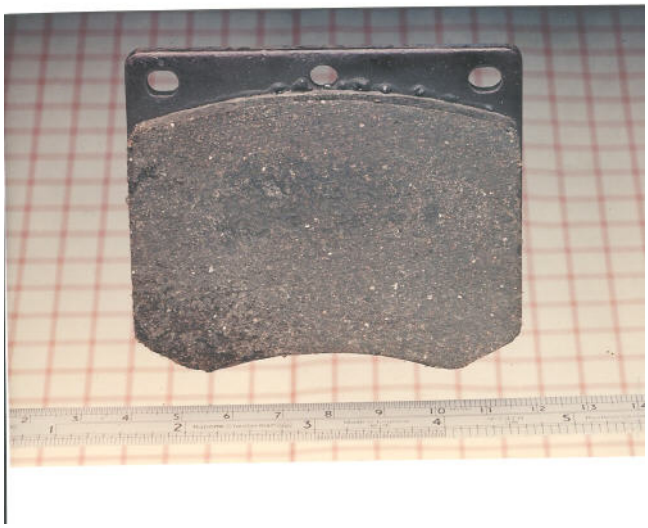

**Figure 20 — Poorly consolidated friction material**

### 2.1.21 Surface contamination with foreign matter

Such a contamination is not acceptable. (See Figure 21.)

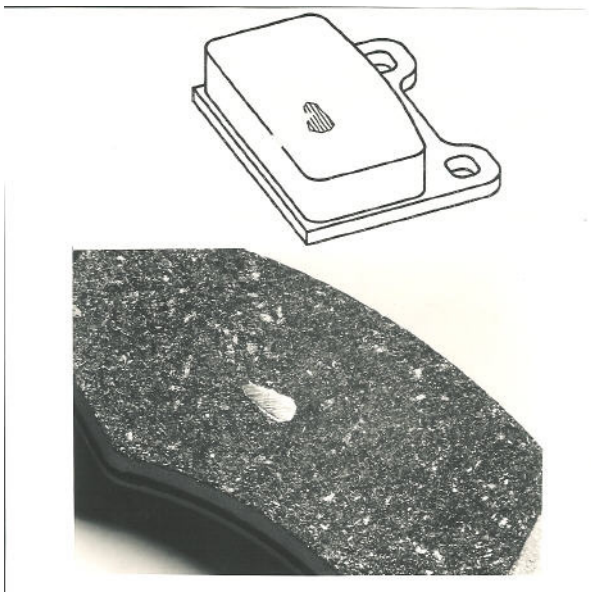

**Figure 21 — Surface contamination foreign matter**

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### 2.1.22 Surface contamination with similar friction material

Spots on friction material with a surface equal or less than 1 % of the total surface are acceptable.

Spots on friction material with a surface equal or less than 2 % of the total surface are acceptable, only if the friction properties are not affected.

### 2.1.23 Friction surface structure

In the case of an effective material surface of less than 120 $cm^2$ the concentration of self contained ingredients is acceptable up to 5 % of the surface area but not continuous.

In the case of an effective material surface equal or more than 120 $cm^2$ the concentration of self contained ingredients is acceptable up to 3 % of the surface area but not continuous. (See Figure 22.)

Non homogenous appearance is accepted for special qualities including surface plucking. (See Figure 23.)

**Figure 22 — Friction surface structure**

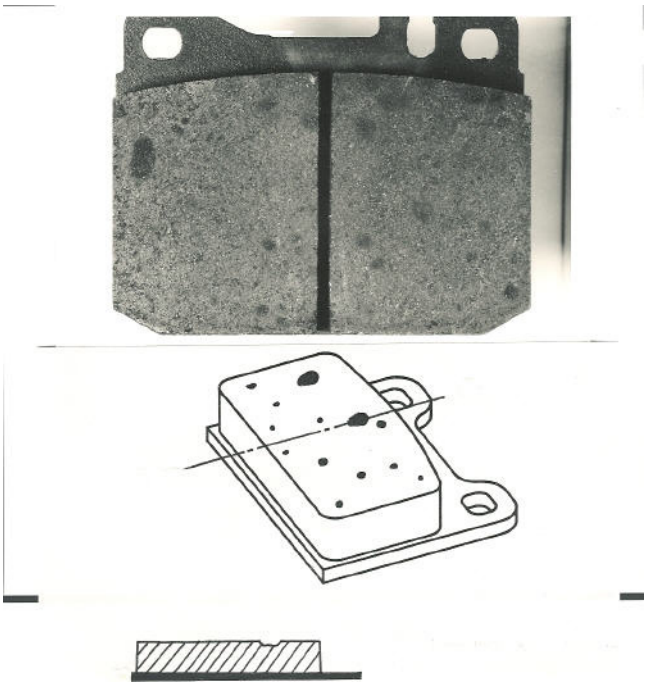

**Figure 23**


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## 2.2 Characteristic features for drum brake linings

### 2.2.1 Chipped edges/corners

In the case of a lining surface of less than 120 $cm^2$ chipped edges/corners are acceptable up to 10 $mm^2$ and half the lining thickness. No more than 2 are allowed per lining. (See Figure 24.)

In the case of a lining surface equal or more than 120 $mm^2$ chipped edges/ corners are acceptable up to 20 $mm^2$ and half the lining thickness. No more than 2 are allowed per lining. (See Figure 25.)

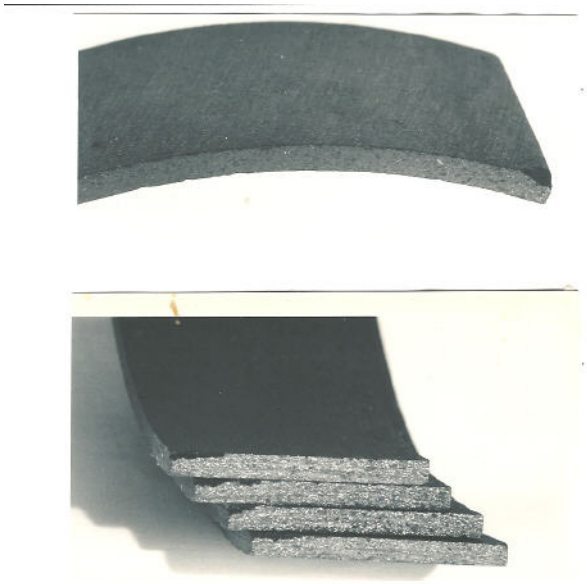

**Figure 24 — Chipped edges/corners on linings < 120 $mm^2$**

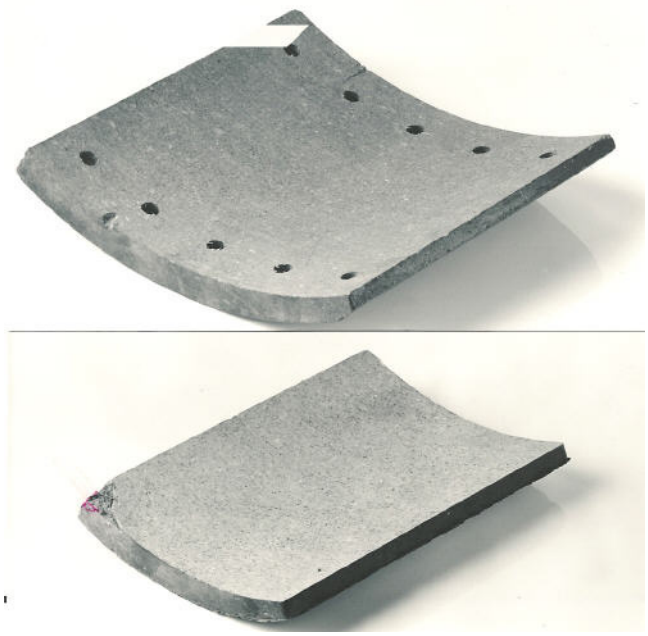

**Figure 25 — Chipped edges/ corners ⩾ 120 $mm^2$**

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### 2.2.2 Edge splits

Edge splits are not acceptable. (See Figure 26.)

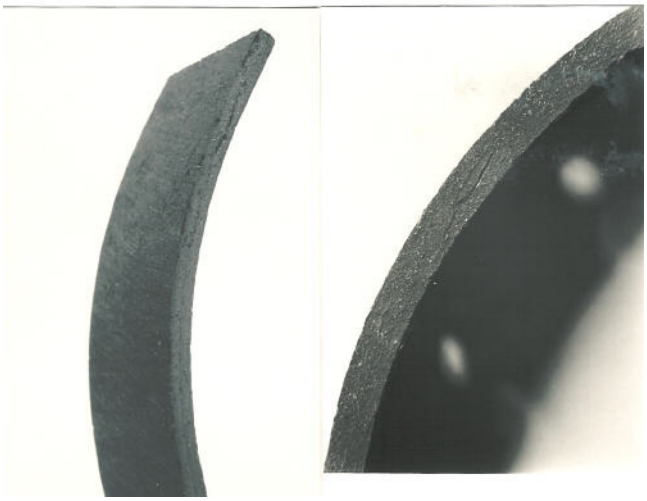

**Figure 26 — Edge splits**

### 2.2.3 Drill hole chipping at lining ends

The lining shown in Figure 27 is not acceptable.

The lining shown in Figure 28 is acceptable if one hole only is concerned.

**Figure 27 — Drill hole chipping at lining ends**


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**Figure 28 — Drill hole chipping at lining ends**

### 2.2.4 Drill hole burrs inside the surface

Drill hole burrs on the inside the surface are not acceptable. (See Figure 29.)

**Figure 29 — Drill hole burrs inside the surface**

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### 2.2.5 Drill hole burrs outside the surface

Drill hole burrs outside the surface are acceptable up to a height of 1 mm. (See Figure 30.)

**Figure 30 — Drill hole burrs outside the surface**

### 2.2.6 Cracks radiating from the rivet hole

Cracks radiating from the rivet hole are not acceptable. (See Figure 31.)

**Figure 31 — Cracks radiating from the rivet hole**


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### 2.2.7 Paint on surface – Lining for riveting and bonding

Paint on surface is acceptable up to 5 % of the area on both inside and outside surfaces, paint runs are not acceptable. (See Figure 32.)

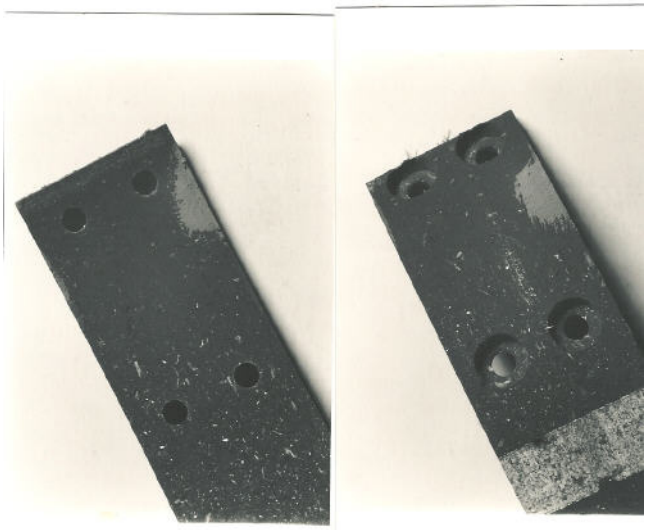

**Figure 32 — Paint on surface**

### 2.2.8 Surface cracks

Cracks are acceptable up to 25 % of the lining width but not longer than 30 mm, up to 0,2 mm deep. They are not acceptable across full lining width independent of depth. (See Figure 33.)

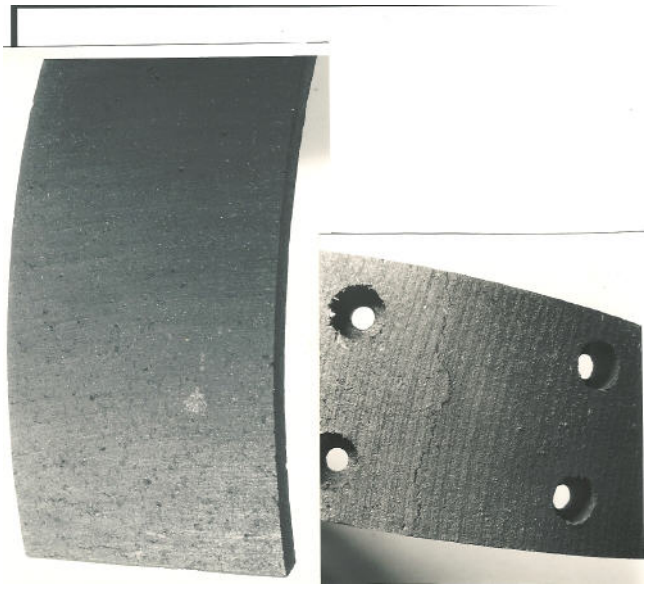

**Figure 33 — Surface cracks**

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### 2.2.9 Marking

Marking shall be legible. (See Figure 34.)

**Figure 34 — Marking**

### 2.2.10 Moulding skin on inside radius surface – Linings for bonding and riveting

Where inside ground finish is specified for linings for bonding, up to 3 % of surface are acceptable provided the unground area is not at the lining ends and dimensional specifications are maintained.

Where inside ground finish is specified for linings for riveting, up to 10 % of surface are acceptable provided the unground area is not at the lining ends and dimensional specifications are maintained. (See Figure 35.)

**Figure 35 — Moulding skin on inside radius surface**


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### 2.2.11 Moulding skin on outside radius surface – linings for riveting or bonding

Moulded skin is acceptable up to 3 % of surface area provided dimensional specifications are maintained. (See Figure 36.)

**Figure 36 — Moulding skin on outside radius surface**

### 2.2.12 Surface blisters

Surface blisters are not acceptable (See Figure 37.)

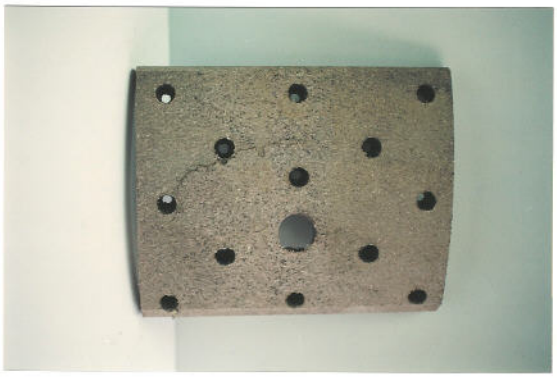

**Figure 37 — Surface blisters**

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### 2.2.13 Surface grind marks

Surface grind marks are acceptable as long as dimensional specifications are maintained. (See Figure 38.)

**Figure 38 — Surface grind marks**

### 2.2.14 Pitted surface (plucked surface)

Pitted surface which is typical of certain materials is acceptable (See Figure 39.)

**Figure 39 — Pitted surface**


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### 2.2.15 Surface structure

In case of surface contamination by self contained ingredients (poor distribution) i.e. unopened fibres the lining is acceptable if the contamination equals or is less than 2 % of the friction side area and if the contamination equals or is less than 4 % of the non friction side area. (See Figure 40.)

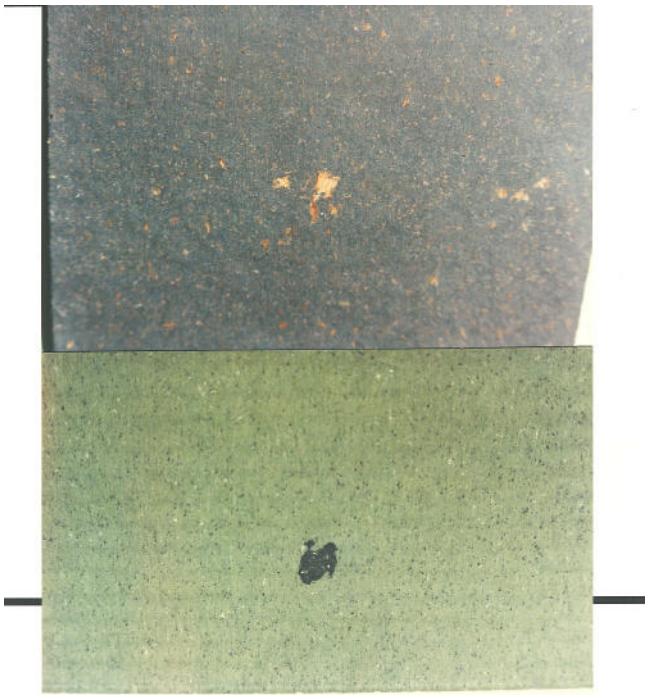

**Figure 40 — Surface structure**

### 2.2.16 Poor consolidation

The poor consolidation as shown in Figure 41 is not acceptable.

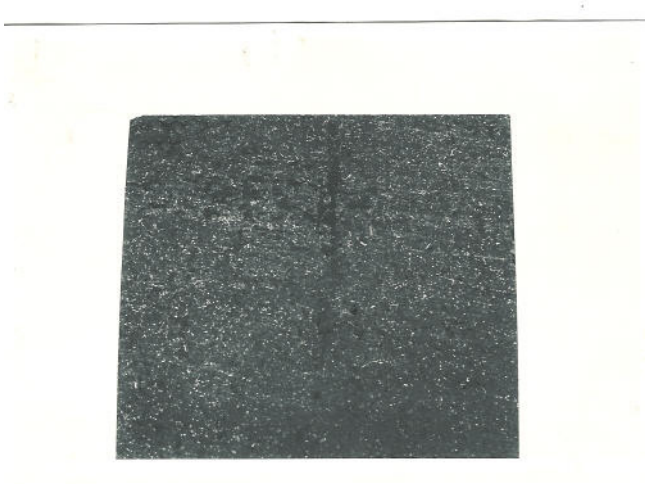

**Figure 41 — Poor consolidation**

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### 2.2.17 Inside surface indentations

In the case of an effective lining surface of less than 120 $cm^2$ inside surface indentations are acceptable up to 30 $mm^2$ and 1 mm deep. No more than 2 is allowed and each shall be more than 5 mm from a drill hole.

In the case of an effective lining surface equal or more than 120 $cm^2$ inside surface indentations are acceptable up to 30 $mm^2$ and 1 mm deep. No more than 2 are allowed and each shall be more than 10 mm from a drill hole. (See Figure 42.)

**Figure 42 — Inside surface indentations**

### 2.2.18 Outside surface indentations

#### 2.2.18.1 Linings ⩾ 120 $cm^2$

Outside surface indentations are acceptable up to 30 $mm^2$ and 1 mm deep. No more than 2 are allowed. (See Figure 43.)

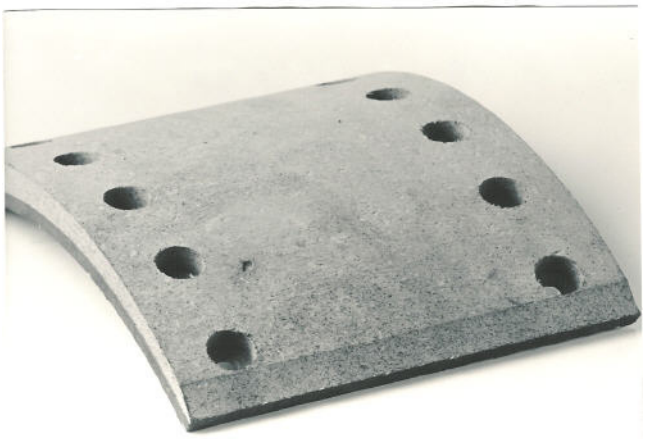

**Figure 43 — Outside surface indentations – linings ⩾ 120 $cm^2$**


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#### 2.2.18.2 Linings < 120 cm$^2$

Outside surface indentations are acceptable up to 20 mm$^2$ and 1 mm deep. No more than 2 are allowed. (See Figure 44.)

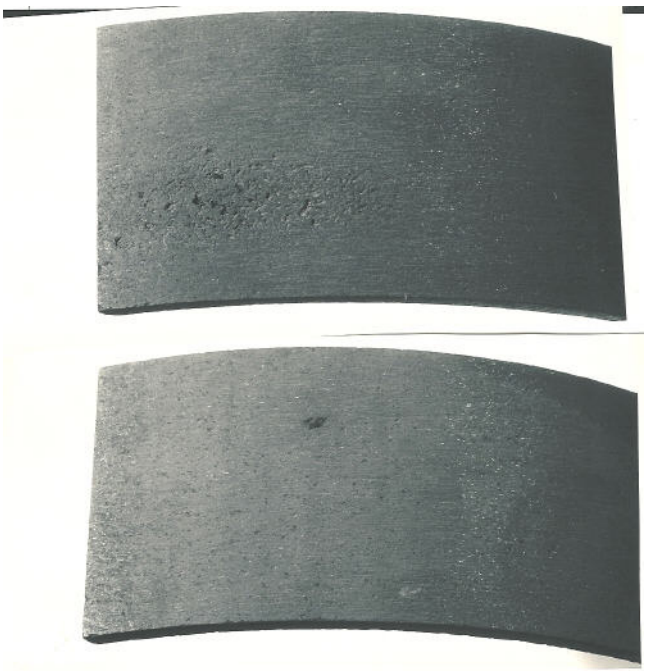

**Figure 44 — Outside surface indentations - lining < 120 cm$^2$**

### 2.2.19 Concentration of self contained ingredients unless typical of the formulation

In the outside radius a maximum of 1 % of the surface is acceptable, but each concentration area to be a maximum area of 25 mm$^2$. (See Figure 45.)

**Figure 45 — Concentration of self contained ingredients (Outside radius)**

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In the inside radius a maximum of 2 % of the surface is acceptable, each to be a maximum area of 50 $mm^2$. (See Figure 46.)

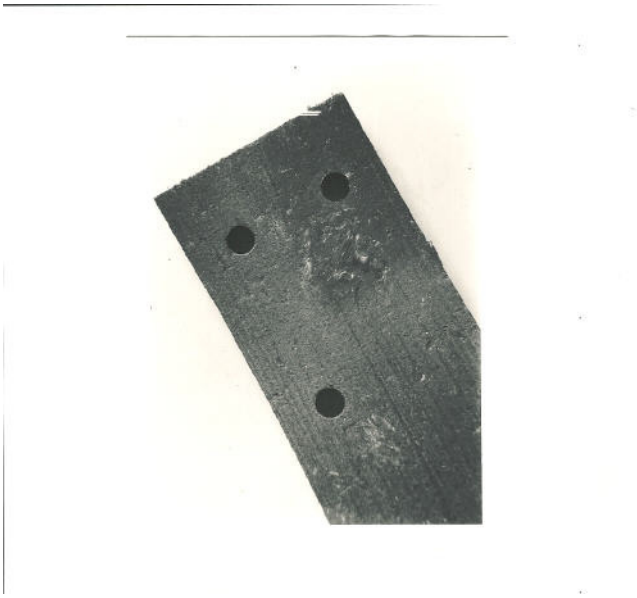

**Figure 46 — Concentration of self contained ingredients (Inside radius)**

### 2.2.20 High porosity area

A high porosity area is acceptable provided the overall density of linings is specified and the profile is not affected. (See Figure 47.)

**Figure 47 — High porosity area**


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### 2.2.21 Metal wire or plastic reinforcement

#### 2.2.21.1 Showing on the inside surface

This is acceptable. (See Figure 48.)

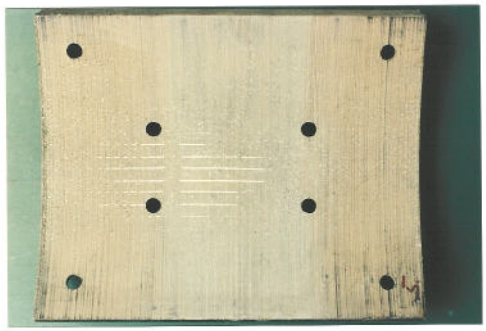

**Figure 48 — Inside surface**

#### 2.2.21.2 Showing in rivet hole

Plastic reinforcement is acceptable.

Metal reinforcement is not acceptable.

(See Figure 49.)

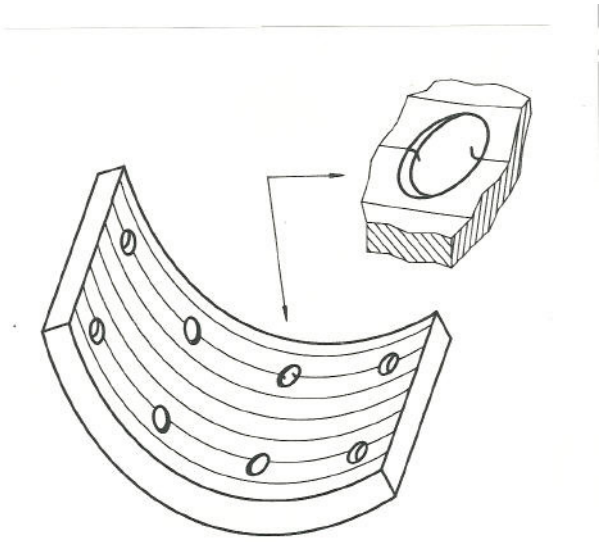

**Figure 49 — Rivet hole**

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#### 2.2.22 Foreign matter friction surface inclusion

Foreign matter friction surface inclusion is not acceptable, but for inclusions of similar friction material it may be accepted as follows (see Figure 50):

— in the case of a lining surface of less than 120 $cm^2$ an inclusion of a surface of a maximum of 25 $mm^2$ is acceptable;

— in the case of a lining surface of 120 $cm^2$ or more an inclusion of a surface of a maximum of 50 $mm^2$ is acceptable.

**Figure 50 — Inclusions**

## 2.3 Characteristics features for bonded lined shoes

### 2.3.1 Lining overhang on shoe platform edge

A lining overhang on shoe platform edge is acceptable up to a maximum of 1 mm over whole lining length on one edge only (unless otherwise stated in the specification). (See Figure 51.)

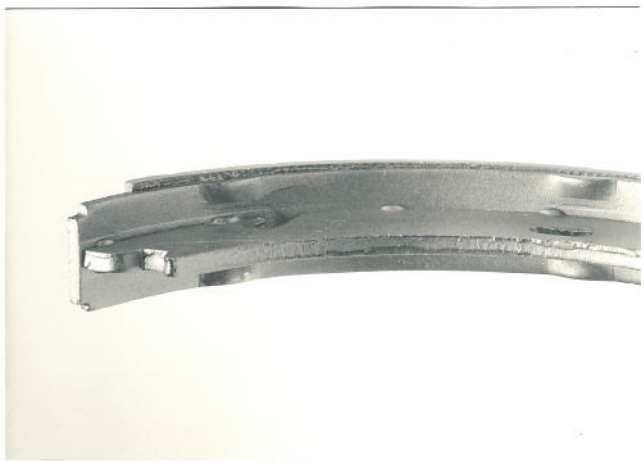

**Figure 51 — Lining overhang on shoe platform edge**


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### 2.3.2 Faulty shoes

Faulty shoes damaged in bonding process are not acceptable unless of a minor nature not affecting fitment. (See Figure 52.)

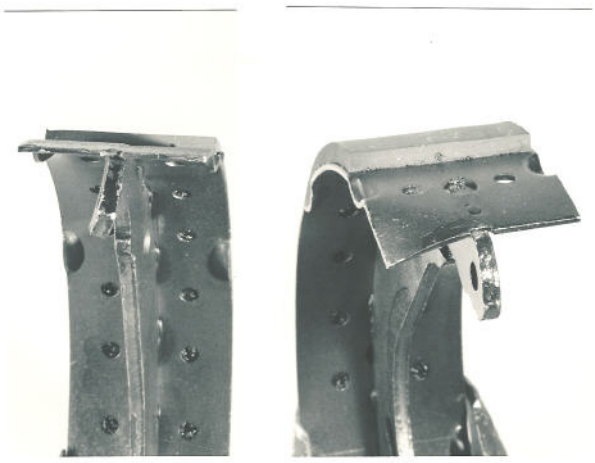

**Figure 52 — Faulty shoes**

### 2.3.3 Restricted lever movement

A restricted lever movement is not acceptable. It shall not be restricted by excess primer or incorrect riveting. (See Figure 53.)

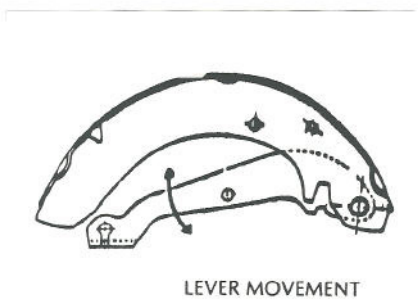


**Figure 53 — Restricted lever movement**

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### 2.3.4 Stencilled information

Lining edge and shoe web marking shall be clear. (See Figure 54.)

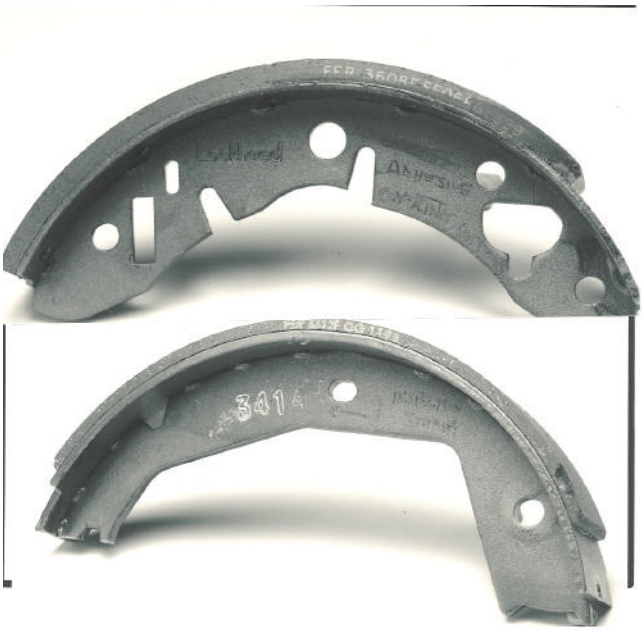


**Figure 54 — Stencilled information**

### 2.3.5 Excess adhesive exudation over shoe platform edges

A excess of adhesive exudation is acceptable up to 1,5 mm overhang on either edge of shoe platform. (See Figure 55.)

**Figure 55 — Excess adhesive exudation – shoe platform edges**


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### 2.3.6 Excess adhesive exudation from lining ends

An excess adhesive exudation from lining ends is acceptable. (See Figure 56.)

**Figure 56 — Excess adhesive exudation – lining ends**

### 2.3.7 Excess primer

The excess primer, e.g. in web location holes and abutment areas is acceptable provided the fitment and the performances are not affected. (See Figure 57.)

**Figure 57 — Excess primer**

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### 2.3.8 Lining surface condition

#### 2.3.8.1 Rigid material ground on the shoe — Unground areas

An unground area is acceptable if it is 10 % or less of the lining surface area with a depth of 0,2 mm or less. (See Figure 58.)

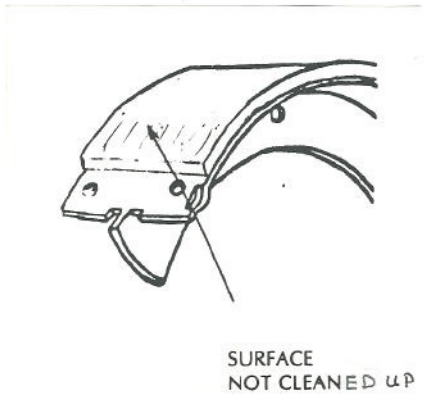


**Figure 58 — Lining surface condition**

#### 2.3.8.2 Rigid material ground on the shoe – Grinding marks

Grinding marks are acceptable if they are 20 % or less of the lining surface area with a depth of 0,2 mm or less. (See Figure 59.)

**Figure 59 — Lining surface condition**


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#### 2.3.8.3 Flexible material

Bonding band impression causing lip of material on lining edge is not acceptable. (See Figure 60.)

Bonding band impression causing reduction in material thickness is acceptable at lining ends over 5 % surface area, provided conditions of lining overhang are met. (See Figure 61.)

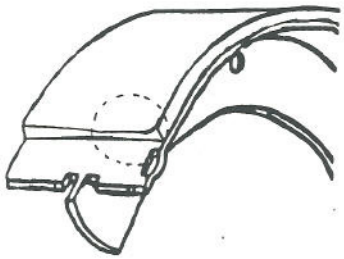

**Figure 60 — Flexible material (1)**

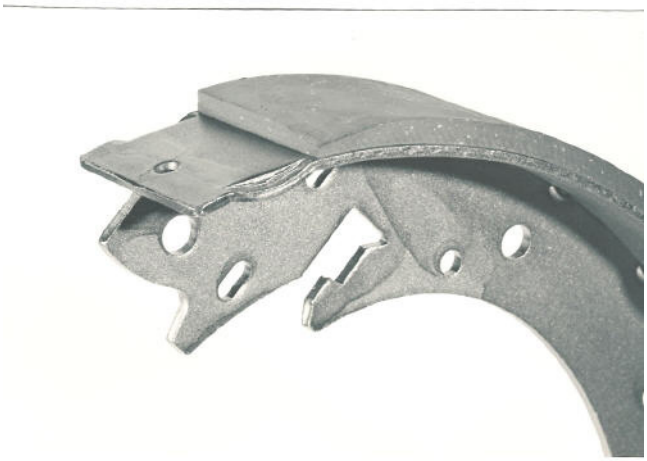

**Figure 61 — Flexible material (2)**

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### 2.3.9 Gaps between linings and shoe platform

#### 2.3.9.1 Lining edges

A gap is acceptable if it is equal or less than 0,15 mm wide, equal or less than 5,0 mm deep and up to a maximum of 25 % of one side length. (See Figure 62.)

**Figure 62 — Gap in lining edges**

#### 2.3.9.2 Lining ends (end lifts)

A gap between lining and shoe platform lining ends (end lift) is not acceptable. (See Figure 63.)

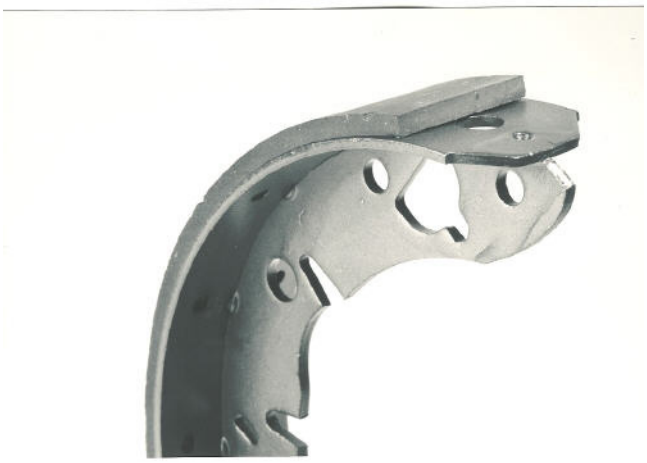

**Figure 63 — Gap in lining ends**


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