Contact in Germany
Kulzer GmbH
Leipziger Straße 2
63450 Hanau, Germany
info.dent@kulzer-dental.com

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kulzer.com

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AGFA

Troubleshooting



Agfa Dentus®
Intraoral radiography
Troubleshooting Guide

Giving a hand to oral health.

KULZER
MITSUI CHEMICALS GROUP

Table of contents

Topic		Page
1.	Error index	3
2.	Analysis of faulty X-ray images	4
3.	Storage of Agfa Dentus diagnostic films	22
4.	Darkroom work	23
5.	Technical specifications	24
6.	Tips for manual processing	25
7.	Overview of product range	26



Dear User,

This brochure will help you to interpret errors that occur on the X-ray images that you develop and to prevent them from occurring.

Correct use and processing is crucial for the quality of each image. We therefore recommend that you read the instructions and tips for correct handling (from page 22) carefully.

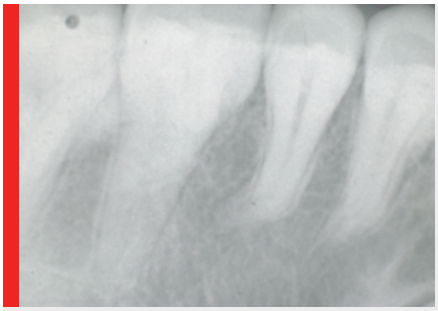
Your Kulzer Team

Error index

Errors	Page
Brown discolouration	19
Duplicate images	9
Dark fingerprints	15
Dark spots	16
Dark spots or streaks	16
Dark image – 2 Imaging	5
Dark, straight margin	9
Dark X-ray images	11
Coloured fog	20
The film is larger than the occlusal surface	13
Wide, bright spots	21
Bright image with embossing patterns	10
Bright fingerprints	14
Bright spots or streaks	12
Bright X-ray images	4
Bright, unexposed arcs	8
Bright, transparent image	4

Errors	Page
Crackled pattern	21
Inadequate transparency	5
Blackened margin	17
Crescent-shaped, dark lines	15
Crescent-shaped, bright spots	14
Transparent, straight portion	8
Transparent, bright spots	12/13
Overlapping of adjacent teeth	11
Overlapping by anatomical structures	7
Uneven surfaces	20
Blurred image	10
Blurring and distortions	7
Branching/flash burns	17/18
Teeth appear shortened	6
Elongated and blurry	6
Reduced contrast and fog	18
Obscured with contours	19

Analysis of poor quality X-ray images





Error description

- Bright X-ray images:
  - Structures are not shown.
  - Fine structures lack clear definition.
  - The image has poor contrast.

- Bright, transparent image portions in individual areas.

Solution

- Check and adjust the exposure time if necessary (done by device manufacturer).
- When using a mechanical timer, make sure the button is completely depressed to prevent mechanical errors.
- Adjust the exposure time to suit the object and the film speed rating.
- Check the development time and/or the development temperature and increase if necessary (measure temperature, stir chemicals).
- Use fresh development bath.
- Replenish or replace developer. Regularly changing the developer ensures consistent quality.

- Check that no films have been left in the fixing bath.

Cause

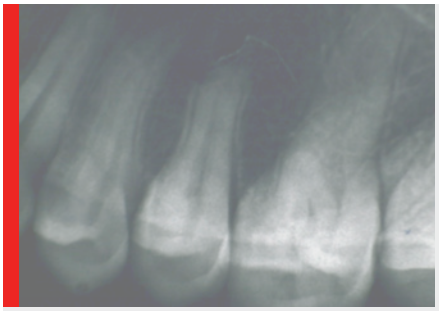
- Underexposed images.

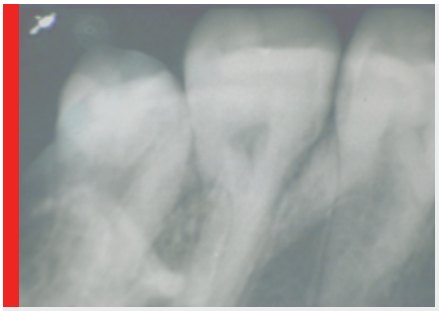
- Exposure time is too short.

- Underdevelopment:
  - soaking time in the development bath too short,
  - development bath temperature too low,
  - developer too diluted.

- Developer exhausted

- Overfixation:
  Film was left in the fixing bath too long, possibly overnight; the blackening of the “fine” image details disappear.





Error description

- Inadequate transparency.

- Dark X-ray images:
  - Blackening impairs visual detail.
  - The image is dark and contrast is poor.

Solution

- Ensure adequate fixing time.
  As a rule, time to achieve a transparent image x 2 = fixing time.
  Regularly replace the fixing bath.

- Instead of taking another X-ray, interpret the image in front of a viewing box with bright light and good collimation.
- Reduce the dose!
- Adapt exposure time (mA x sec) to suit the object and the film speed rating. Check and adjust the timer if necessary (done by device manufacturer).
- Reduce time and/or temperature of the development bath. Measure the temperature, replace thermometer if necessary.
- Check and adjust the exposure factors kV – mA – sec to the object and type of film.

Cause

- Underfixation:
  - fixation too short,
  - fixing agent exhausted.

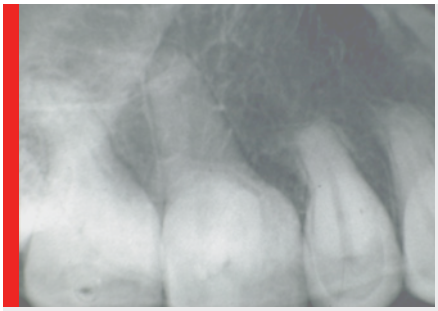
- Overexposed images.

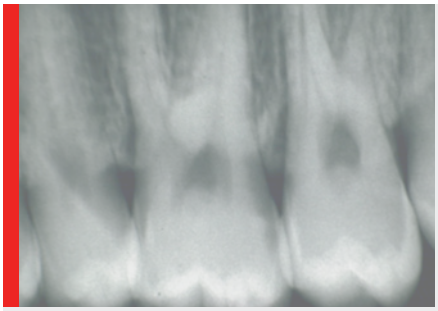
- Exposure time too long (factor mA x sec) = radiation dose too high.

- Overdevelopment:
  - development time too long,
  - temperature too high.

- Attempt to compensate for
  - overdevelopment by underexposure,
  - underdevelopment by overexposure.

Analysis of poor quality X-ray images





Error description

- Teeth foreshortened.

- Teeth lengthened and blurred.

Solution

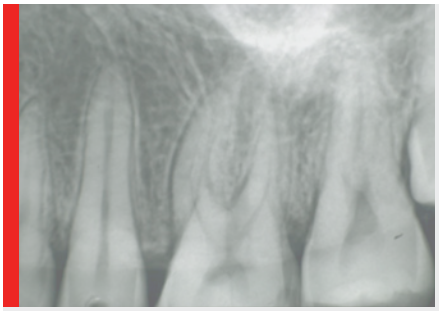
- Set the angle of the central beam precisely according to the selected imaging technique.

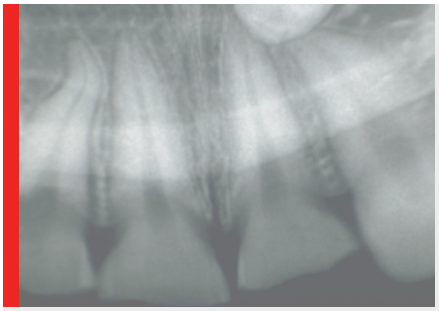
- Align precisely according to the selected imaging technique.

Cause

- Vertical angle of incidence is too steep.

- Vertical angle of incidence is too shallow.





Error description

- Area to be examined is overlapped by adjacent anatomical structures, e. g. overlap of the upper molar roots by the shadow of the zygomatic bone.

- Blurring and distortions

Solution

- Can be avoided by using the parallel technique or angulation.

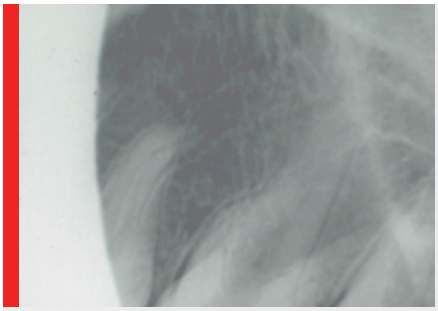
- If the patient cannot hold the firm properly with their finger, use of a bite block is recommended. Advise the patient that the film must not be bent.

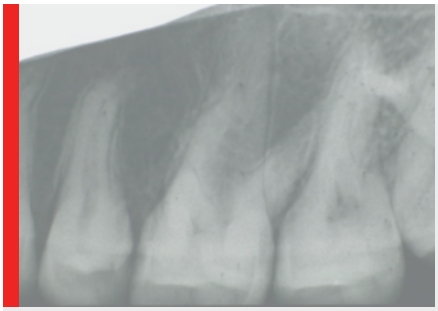
Cause

- Incorrect positioning technique (here: bisecting technique).

- Film bent during imaging by being pressed too hard by the patient.

Analysis of poor quality X-ray images





Error description

- Bright, unexposed arch at the edge of the image; a part of the images is unexposed.

- Transparent area bordered by a straight line at the edge of the image.

Solution

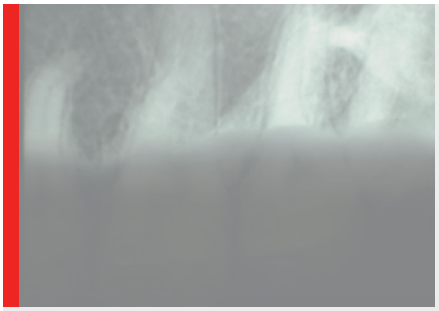
- Direct the central beam to the middle of the film, so that the area to be investigated is completely covered by the beam cone.

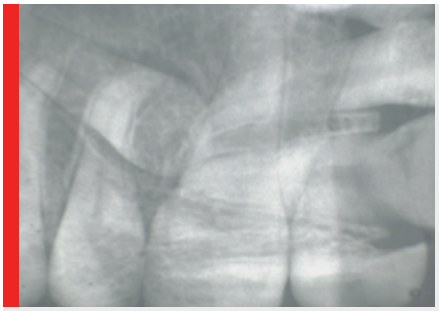
- Check the level of the developer fluid and refill the development bath if necessary.

Cause

- Film only partially fixed; the film was not completely immersed in the fixing bath.

- Only partially developed film; the film was not completely immersed in the development fluid. After fixation, the non-developed part of the film is transparent.





Error description

- Non-transparent area bordered by a straight line at the edge of the image.

- Dark image with overlapping double images.

Solution

- Check the level of liquid in the fixing bath and add if necessary.

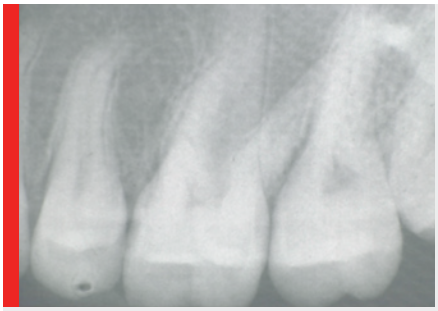
- Always remove only one film from the packaging or dispenser and close again properly.

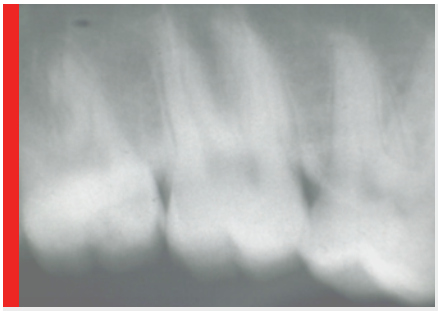
Cause

- Film only partially fixed; the film was not completely immersed in the fixing bath.

- The same film was used for 2 images.

Analysis of poor quality X-ray images





Error description

- Bright image with embossed patterns. The raised dot is facing the viewer.

- An overall blurry image.

Solution

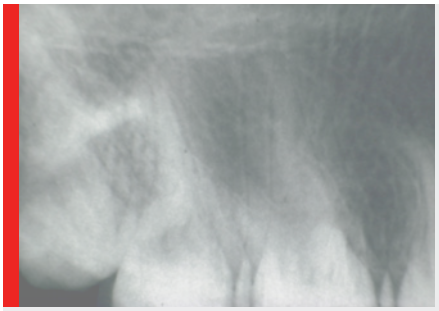
- Always place the film into the mouth with the smooth side facing the X-ray tube. The pull-tab must point towards the tongue. Please ensure that the side facing away from the tube is labelled “back side/reverse”.

- Place the patient in a fixed position. Patients may support themselves with their hands, for example.
- The exposure time can be shortened and the risk of motion blurring can be markedly reduced by using films with higher speed ratings (Agfa Dentus M2).

Cause

- The film in the Softopac was placed upside down in the patient’s mouth. The embossed tin foil placed behind film that protects it against scattered radiation has absorbed some of the X-rays and created the embossed pattern.

- The patient moved during the exposure time.





Error description

- Image has double contours.

- Overlapping of adjacent teeth in the approximal region.

Solution

- Explain the need for the patient to be absolutely still. Ask them to hold their breath briefly.

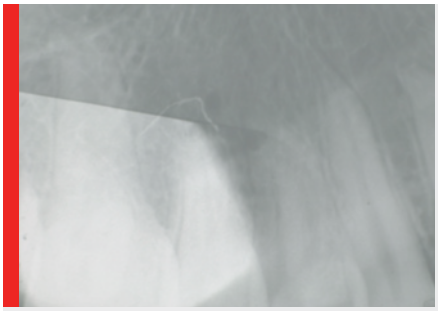
- Desirable for “free projections”: otherwise align the central beam with positioning aid if necessary.

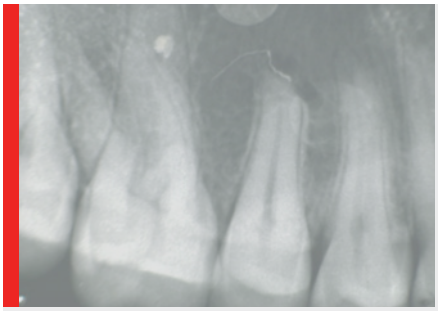
Cause

- Sudden movement of the film occurred during the exposure time. The film probably slipped in the patient’s mouth.

- The central beam is not directed orthoradially. Does not fall vertically onto the tangential plane of the area of dentition under investigation.

Analysis of poor quality X-ray images





Error description

- Bright spots or streaks.

- Bright spots or streaks.

Solution

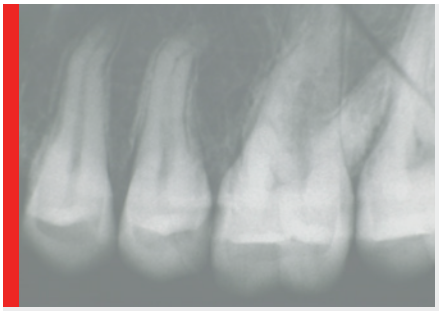
- Check the distance to the bite block in the developer bath and enlarge if necessary.

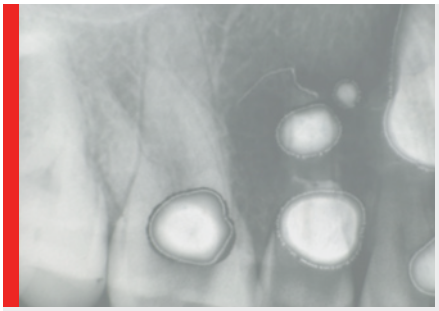
- Agitate the film in the developer to start the development process to facilitate the escape of possible air bubbles.

Cause

- Contact with other films during development.

- Air bubbles on the film surface during development.





Error description

- Film is so much larger than the occlusal that the teeth are no longer captured in their entirety.

- Transparent, bright spots on the X-ray image.

Solution

- Check the positioning of the film in the patient's mouth.

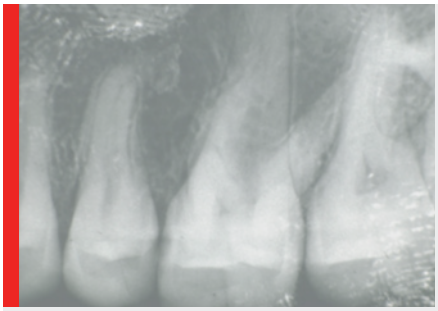
- Clean processing of the films. Keep the working area in the dark room dry.
- Avoid contact with oils and greases during development.

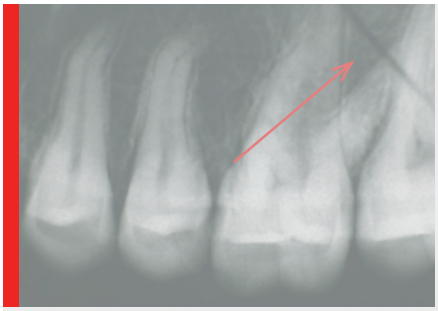
Cause

- Film incorrectly positioned in patient's mouth. Correct positioning of the film during radiographic measurement made more difficult by the rubber dam and rubber dam clamps.

- Fixing agent splashed onto the film before development.
- Grease or oil, e. g. from food, on the surface of the film prevents development.

Analysis of poor quality X-ray images





Error description

- Bright fingerprints.

- Bright, crescent-shaped spots.

Solution

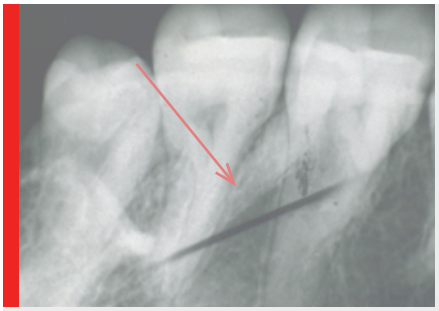
- Keep the dark room clean.
- Keep the intensifying screens in the dry area of the dark room. Hold cassettes by the edges only.

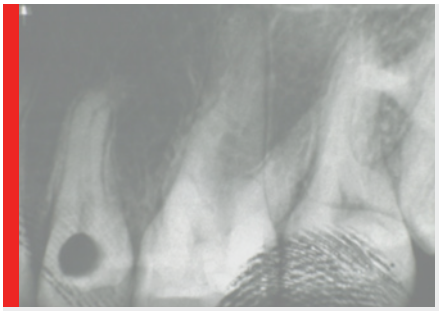
- Handle film with care. Avoid mechanical errors (bending and folding).

Cause

- Grease or other fixing agents on the user's fingers leaves impressions on the film, since development at these locations is impaired.
- Fingerprints of this kind can no longer be removed from the intensifier! They lead to imaging errors.

- Pressure marks made by fingernail impressions or deviation of the film before exposure.





Error description

- Dark, crescent-shaped lines on the image.

- Dark fingerprints.

Solution

- Handle the film without bending and avoid folding.
  Use a smaller film if necessary; advise patient regarding careful positioning.

- Always work with clean, dry hands. Check gloves if required and change when necessary.

Cause

- The error is caused by incorrect handling:
  - Fingernail impressions on exposed, undeveloped film,
  - Folding the Softopac film in the mouth.
- This causes sensitisation of the emulsion layer.

- Developer or water on the hands. The development process is accelerated at the points where the film was touched with wet fingers.

Analysis of poor quality X-ray images





Error description

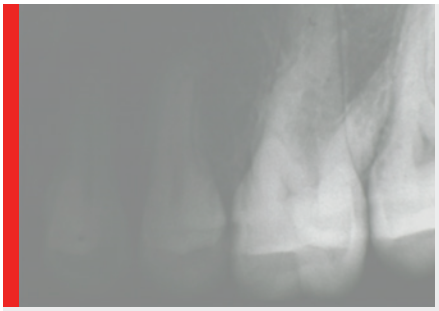
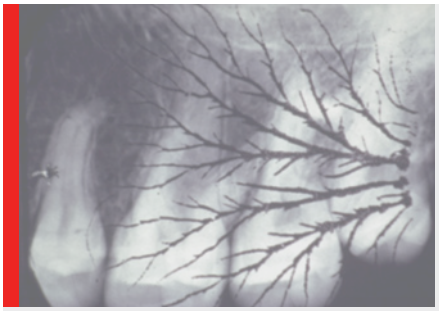
- Dark spots on the X-ray image.
- Dark spots or streaks.

Solution

- Ensure working area is kept very clean during processing. Have separate wet and dry processing area in the dark room.
- Handle films carefully when working with liquids.
- Agitate the film in the fixing bath and ensure that the film is hanging completely free in the tank.

Cause

- Development fluid is sprayed onto the film before development. The development has already started at this site before the overall development.
- Water splashed onto the undeveloped film and has wettened and softened the emulsion in these areas. Development was accelerated.
- The film came into contact with another film or the side of the tank during fixing; only one side is fixed.

		
Error description	■ Parts of the image are blackened from the margin inwards.	■ Black branching to tree-like markings (flash burns) or black dots.
Solution	■ Always open film packs and cassettes under the recommended dark room safe light. Ensure that the container is closed properly immediately after use.	■ Check the humidity in the dark room and raise the relative humidity to approximately 50 % if necessary (quickest method is to create steam). Use a humidifier.
Cause	■ Accidental exposure (daylight, artificial light in the dark room).	■ Electrostatic discharges, usually due to humidity being too low.

Analysis of poor quality X-ray images



Error description

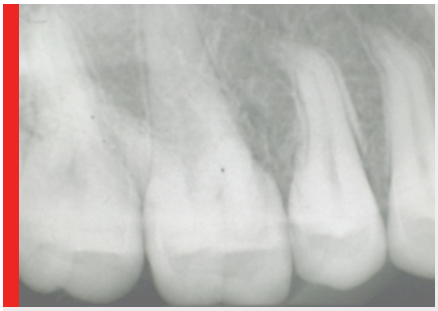
- Same findings during enlargement, see above.

Solution

- Open cassettes and film packaging slowly and remove films carefully.
- Cover plastic work surfaces with a table cloth.
- Do not use polyamide (nylon) surgery coats.

Cause

- Electrostatic discharges, usually due to humidity being too low.



Error description

- Film with a marked fog and low contrast.

Solution

- Store the film material as per the recommended storage conditions. Possible to do safely without compromising quality standards.

Cause

- Overlapping or inappropriate storage of the unexposed film material.





Error description

- Extensive fogging, possibly with weak images and contours that may be seen repeatedly on films of the same format.

- Brown discolouration of the X-ray image: gradually loses colour during storage.

Solution

- Protect the film from radiation of every kind. Always store the film outside the X-ray room; this also applies to stored cartridges.

- Achieving archive quality requires sufficient fixation (2-layer clarity) and thorough washing before drying (10 min. for statutory archives).

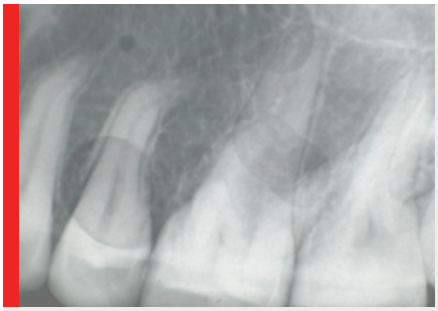
Cause

- The fog was probably caused by X-ray radiation while the film was still in its original box.

- Insufficient fixing or washing of the film during development. Post-fixation is possible in some cases.

Analysis of poor quality X-ray images





Error description

- Pink-coloured or yellow/green fog against black light; under reflected light, the fog appears as a green-blue or violet shadow on the surface of the film.

- Processed film has an uneven surface (surface appears rippled) under oblique lighting.

Solution

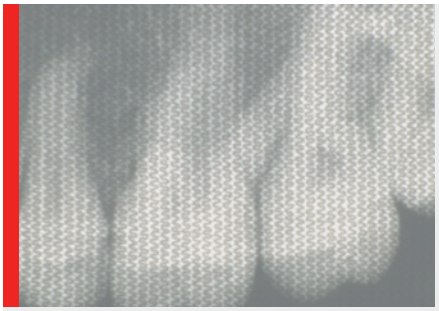
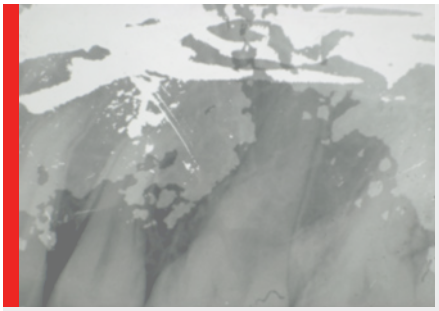
- Intermediate rinsing or stop bath between developing and fixing baths. When cleaning tanks make sure that fixer and developer baths are not contaminated. Label the tanks.

- When using automatic developing equipment or roll dryers, the fixing bath must include a hardener additive. Use running water for the final washing.

Cause

- The “dichroic fog” is caused by developer being inadvertently included in the fixing bath (pH value of the fixing agent too high).

- Dry spots due to excessive enlargement of the film in the water tank, temperature too high.

		
Error description	■ Crackly surface with fine, reticular structure.	■ Extensive bright patches.
Solution	■ Keep the two baths at the same temperature: ± 5° C.	■ Check the temperature of the developer and the fixing bath and reduce to the recommended temperature. Rinse film in flowing water. Temperature is stipulated by the manufacturer of the development chemical. ■ Clean rinsing tanks regularly, disinfection with household cleaner if necessary, and then rinse thoroughly. ■ Clean tanks thoroughly when changing the chemicals.
Cause	■ Substantial differences in temperature between the different baths causes a shock-like reaction of the emulsion with uneven shrinkage.	■ Temperature of the developer, fixing bath or water was too high and parts of the emulsion have been separated from the base. ■ Algae in the water tank. ■ Film emulsion in the developer bath, fixing bath or water tank.

Storage of the Agfa Dentus diagnostic films

The storage conditions could influence the quality of the film. The results of improper storage include premature signs of ageing of the film, such as increase in the background fog.

Stacking

Since the film is not always stored under ideal conditions by the user, we recommend keeping the stock of unexposed films small enough to facilitate rapid use. The oldest film should be used first.

Storage

Pressure points on the film can interfere with the resulting image. For this reason, film packages should be stored in such a way that no pressure is exerted on any individual film.

Extraoral films are to be stored upright and not to be stacked with the film surfaces facing one another.

It is advisable to store the packs in such a way that the emulsion number and/or expiry date are legible.

Room temperature and humidity

Dry and well-ventilated rooms should be used to store the unprocessed X-ray films.

Ideal values are:

Temperature:	+15° C ±5° C
Humidity:	55 % ±5 %

If there is no air-conditioning, the following limits should not be exceeded:

Temperature:	+23° C
Humidity:	65 %

During cold storage under +4° C, adjustment to room temperature should occur before the film is used (cf. DIN 6860).

Only Agfa Dentus diagnostic films in Softopac are protected against moisture contamination.

Radiation

Any penetrating short wave radiation is harmful to X-ray films. They lead to fog formation and reduce the diagnostic quality of the images.

Films are to be protected from X-ray exposure and shielded from other sources of radiation.

Do not store near:

- X-ray devices,
- Fuse boxes,
- High-voltage electrical devices
- or radioactive preparations.

X-ray chemicals

Films and X-ray chemicals (developer, fixer, other chemicals) must be stored separately from one another. If possible, store in separate rooms.

Chemical vapours, e. g. hydrogen sulphide, ammonia and similar products, as well as solvent vapours that are released from freshly painted or lacquered walls or varnished wood furniture, could impair the quality of the film.

Dark Room Work

Lighting:

The dark room must be impenetrable to light.
X-ray films should be exposed to the dark room lighting as briefly as possible.
The dark room lighting must be adjusted to the film to be used.
The minimum distance to the working surface should amount to approximately 0.90 m when using 15 Watt bulbs.

Defective dark room filters can lead to fog formation on the films. This is why regular checking for tears, etc. is recommended.

Bulbs with high wattage lead to more rapid bleaching out of the filter and thus to changes in the beam spectrum and light intensity.

Setting up the dark room

The darkroom should be divided into two sections:

- dry processing,
- wet processing.

Keep the darkroom scrupulously clean to avoid problems caused by impurities.

It is advisable to formulate the chemical solution outside the dark room.

Work in the dark room should always be carried out with dry hands. Films are sensitive to moisture and should only be handled at the edges.

Use only stainless steel developing frames and clips as they do not corrode. They should be thoroughly rinsed and dried after use. Residual amounts of chemicals on frames and clips can contaminate the bath.

Wet work

The tanks must be cleaned each time before changing the chemicals (approximately every 2 weeks). Under no circumstances should the tanks be used interchangeably. Even small amounts of fixer in the developer lead to marked reductions in quality and imaging errors.

The manufacturer's recommendations are to be observed when using chemicals.

The utmost care is required when working in order to reduce contamination of the developer with fixing agent.

A floating cover, e.g. with nylon balls or a tank cover, is recommended to reduce oxidation of the developer.

Checking the temperature regularly helps to ensure that the temperatures in the tanks remain constant. The solutions are to be stirred from time to time during manual processing.

Immerse the films completely in the developer and move them for 30 seconds:

- so that no air bubbles settle on the film surface,
- so that development starts across the entire film surface at the same time,
- so that the temperature in the entire bath remains constant.

This also prevents the films from sticking to one another.

Regular removal of the films from the bath during development unnecessarily strengthens the oxidation of the developer.

Ensure that the developer is regularly replenished. When the amount added to replenish the bath is three times the original volume, the developer should be totally renewed. In order to achieve the best results, the developer and fixing bath should be replaced regularly. Complete replacement of the processing chemicals every two weeks is recommended. Store the developer refill solution in air-tight bottles or tanks.

Place the film in the stopping bath or intermediate washing immediately after development, i. e. without letting it dry.

The total fixing time for a film is approximately twice as long as the time it takes for the film to become clear, i. e. for the image to become transparent. In a fresh fixing bath, the fixing time is approximately 2 minutes.

Wash the films for a minimum of 10 minutes after fixing, preferably under running water. After washing, the films can be dipped in a wetting agent to ensure they dry more quickly and evenly.

Technical specifications

Agfa Dentus E-Speed 3 x 4 cm	
Type	**SOFTOPAC INTRA-ORAL DENTAL FILM**
Size	ISO 2 = 31 x 41 mm/1 ¼ x 1 ⅝ inch
Speed group	ISO E/F – safety ISO 3665/5799
Storage	max. 23° C/max. 65 % rh, ☢ max. 90 nGy/h
Safelight	λ → 500 nm

Exposure examples in seconds AGFA DENTUS E-Speed

Maxillary

	Vertical Angle	60 kV- 7mA		70 kV- 7mA		65 kV- 10mA		70 kV- 10mA	
		8”	12”	8”	12”	8”	12”	8”	12”
Incisor	+ 40°	0.25	0.50	0.12	0.25	0.16	0.32	0.10	0.20
Canine teeth	+ 45°	0.32	0.64	0.16	0.32	0.20	0.40	0.12	0.25
Premolars	+ 30°	0.32	0.64	0.16	0.32	0.20	0.40	0.12	0.25
Molars	+ 20°	0.40	0.80	0.20	0.40	0.25	0.50	0.16	0.32

Mandibular

Incisor	– 5°	0.20	0.40	0.10	0.20	0.12	0.30	0.08	0.16
Canine teeth	–20°	0.25	0.50	0.12	0.25	0.16	0.32	0.10	0.20
Premolars	–10°	0.25	0.50	0.12	0.25	0.16	0.32	0.10	0.20
Molars	–5°	0.32	0.64	0.16	0.32	0.20	0.40	0.12	0.25
→ Children						– 1/3 (~ 33 %)			
→ edent. jaws						– 1/4 (~ 25 %)			

Processing

Automatic: **Manual:**	**Example:**
→ development	Dentus D = 20° C (68° F)/5 min Dentus D = 26° C (78.8° F)/3 min
→ rinsing	H_2O = 15 sec
→ fixing	Dentus F = 20° C (68° F)/2 min Dentus F = 26° C (78.8° F)/2 min
→ washing	H_2O = 3 min resp. 10 min

Tips for manual processing

Development →	Washing →	Fixing →	Washing
Temperature: 18–26° C Stir frequently!	Immediately, without allowing to dry. Approx. 15 seconds. Immerse in water.	Approximately twice as long as the time it takes for the film to become clear. Approximately 2 min. in a fresh bath.	Minimum of 10 minutes for legal archive quality. 3 minutes for archiving under 6 months.

Agfa Dentus E-Speed:

- Maximum image quality with minimum dose of radiation for all intraoral indications.
- More image sharpness, higher contrast, highest brilliance!



Agfa Dentus® E-Speed – not just safe, comfortable too!

Agfa Dentus E-Speed is a highly sensitive intraoral film with particularly high image quality and the lowest dosing requirement. The Agfa Dentus E-Speed can be used with all corresponding X-ray devices. The photochemical processing (manual or automated) is possible with all commercially available X-ray film chemicals. A new acceptance test (as per the X-ray Ordinance) is not required when switching to Agfa Dentus E-Speed.

Agfa Dentus E Films are not only safe, but also comfortable for patients during use thanks to the extrasoft acrylic.

Indications

- For all indications and areas of application during intraoral X-ray techniques.
- For manual and automated processing devices.

Benefits at a glance

- High contrast and high maximum density facilitates diagnoses due to an easily visible grey scale
- Motion blurs are reduced due to the short switching times
- Softopac® has a soft film margin, extra-soft acrylic, impermeable to saliva and can be disinfected
- The inner packaging guarantees secure handling, even in the dark room
- Universal processing options
- Long shelf-life: safe for archiving for up to 30 years
- Low base fog values



Product Overview

Agfa Dentus E X-ray films

3 x 4 cm

Contents
150 x 1 pieces

Art. code	6603 5581

