

3.) Wetting agent and drying

The wetting agent should not be as concentrated as is standard with conventional films. **Also, we recommend to use the wetting agent outside the development tank and to rinse the spiral thoroughly after that. Dried residues of the wetting agent might froth up and cause air bubbles possibly resulting in faulty development.** After using the wetting agent we recommend that 35 mm films be wiped carefully with kitchen roll with no colour prints on (use the soft side). This way, surplus water and possible residual dirt are soaked up very well, which speeds up the drying process.

4.) Shelf life

a) Concentrates

The developer components **Part A** and **Part B** are very durable due to their low pH-value; just like any other developer, however, they are subject to oxidation. In order to utilise the high shelf life, concentrates should be poured into clean (brown) glass bottles – full to the brim if possible – and stored in the fridge after first opening the original bottle. You should use a variety of glass bottles with different volumes (e.g. 250 ml, 150 ml, 100 ml and 50 ml) for this. You can re-use these after rinsing for the same purpose. In case you cannot fill the bottle to the brim, we recommend the supplementary use of protective gas.

If you leave the opened developer in the original bottle, the use of protective gas is hardly useful, because the original bottle is made of non-gas-tight synthetic material, so that the protective gas would be gradually replaced by air, which would shorten the shelf life!

Part B does not contain any developer substances and is, thus, not subject to oxidation. Thus, **Part B** has a virtually unlimited shelf life and can be kept in the original bottle.

b) Working solutions

In contrast to the concentrates, the working solutions have a relatively short shelf life (max. a few days in brimful bottles). **Therefore you should not prepare more working solution than required and use it soon after preparation.** Never re-use a working solution!

Exception: for the development of a roll film 500 ml working solution are needed; this amount of WS is sufficient for two films. **You may thus use one and the same WS for a second film immediately after the development of the first.**

5.) Analogue-Digital-Interface (A/D-Interface)

Due to their much lower emulsion thickness and their monodisperse grain distribution, high resolution document copy films can be scanned much easier than conventional black-and-white films. The problem with conventional black-and-white films is that their grain distribution and the considerable emulsion thickness causes light scattering which invariably comes with a reduction in quality. Scanning high resolution document copy films, on the other hand, is absolutely unproblematic (in this respect comparable to colour films); there is no reduction in quality caused by light scattering. This is why you can fully utilise the full range of digital image processing techniques in addition to analogous processing (photochemical enlargement in a conventional photographic laboratory) of high resolution document copy films.

High-performance scanners can be used to create picture files that allow of prints in absolutely outstanding quality. Such digitally created prints, however, do not match the quality of photochemically created prints. This is because the resolution of even the best high-performance scanners on the market does not even come close to the resolving power of high resolution document copy films.

DATA SHEET

Inversion Development



Speed Photography
+
Ultrahigh Resolution

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SPUR MODULAR UR

SPUR MODULAR UR – Part A, Part B, Part C – a new modular developer system for all high resolution document copy films.

SPUR MODULAR UR allows of the perfect match between emulsion and developer so that superior results are achieved with any document copy film including SPUR DSX/Agfa Copex Rapid, SPUR Orthopan UR, ADOX CMS 20, Kodak Technical Pan, Kodak Imagelink HQ and Rollei ATP 1.1.

The components Part A and Part B are used for the development of high resolution 35 mm films. Add Part C to the other two components and the new SPUR DSX roll film as well as the Agfa Copex Rapid roll film can be developed with absolutely no schlieren.

The developer can be matched to the respective emulsion through the alteration of the mixing ratio of the components (Part A, Part B and Part C) as well as through the degree of dilution and development time. **SPUR MODULAR UR** excels by its extremely long shelf life and its extreme durability. We are currently expecting a shelf life of four years. Thus, bottling in 50ml glass vials with prescriptions for replenishment is a thing of the past!

The properties of our previous document copy film developers (sharpness, fineness of grain, resolving power, exposure latitude, tonal values, speed utilisation) are retained by **SPUR MODULAR UR** or, indeed, surpassed.

Specifications of SPUR DSX:

Film type: silver halides with A.H.U (Anti-Halation-Undercoating)

Emulsion thickness: 5 μ

Spectral sensitivity: orthopanchromatic

Filter factors: yellow + 0.5 to f/number, orange + 1 to 1.5 f/numbers, red + 4 f/numbers, green + 1 to 1.5 f/numbers

Graininess: RMS-graininess at density 1.0 and aperture size of 48 μ = 9. This figure is valid for the processing with conventional microfilm chemicals.

Resolution: The resolving power attains 600 LP/mm at a contrast ratio of 1,000 : 1

Reciprocity: 1 sec + 1/2 f/number, 10 sec + 1 f/number, 1/10,000 sec + 1/3 f/number

Specifications of SPUR Orthopan UR:

Film type: silver halides with A.H.U (Anti-Halation-Undercoating)

Spectral sensitivity: orthopanchromatic

Graininess: RMS-graininess at density 1.0 and aperture size of $25 \mu = 14$. This figure is valid for the processing with conventional microfilm chemicals. A comparison with SPUR DSX based on the meter reading is not possible since the graininess of this film was gauged at a different aperture size (48μ). The graininess of the **Orthopan UR** is much smaller than that of the DSX film.

Resolution: The resolution is 800 LP/mm at a contrast ratio of 1,000 : 1.

Reciprocity: 1 sec + 1/2 f/number, 10 sec + 1 f/number, 1/1,000 sec + 1/2 f/number

Shooting: Please note that:

1) Due to the properties of the film base, flare may penetrate the cartridge along the perforation from the tip end of the film (only with 35 mm films). This may spoil the first shots. In order to avoid this, the film should be kept in an opaque film can and **must not** be exposed to light before or after exposure. Make sure that the film is not exposed to bright light when loading the camera; choose a dim environment.

2) Compared to conventional black-and-white films, high resolution document copy films have a lower emulsion thickness. Therefore you should stop down once or twice in order to make sure there is sufficient depth of focus so as to compensate for a possible drifting-off of the emulsion from the optimum focal plane. In order to fully utilise the high resolving power of the film, you should **not stop down more than is necessary!** (Naturally, this is also dependent on the desired effect.) For this reason you should use high-speed lenses.

3) The camera must allow of a manual adjustment of the film speed.

Film processing:

1) SPUR DSX / AGFA Copex Rapid, 35 mm miniature film

Film Speed: ISO 50/18°

Preparation of 250 ml WS: 50 ml Part A + 20 ml Part B, use water to bring to 250 ml

NO PRE-WASHING!

Development time at 20° C: Condenser: 7 to 7.5 minutes; **Diffuser:** 7,5 to 8 minutes

Inversion tact: steadily during the first 60 seconds, then once every 30 seconds

Fixing time: 60 to 90 seconds

Final wash: 5 minutes

2) SPUR DSX / AGFA Copex Rapid 120 roll film

The new type of schlieren-free development in combination with the larger roll film format, emulsion thickness, and monodisperse grain distribution results in a reduction of flare in the developed emulsion. This is conducive to sharpness and the avoidance of schlieren; at the same time, however, it means that gradation cannot be controlled by means of development time but **only by the degree of dilution and the mixing ratio**. Due to the low scattering, the condenser light can penetrate through the emulsion unhindered, whereas with the diffuser the lack of scattering in the developed negative is partly compensated for by the flare of the source of light. In scientific words, the value of Callier's Q-factor is increased by that – particularly so with condenser lighting. Thus, between condenser lighting and diffuser lighting a gradation difference of 3 steps (1 step is standard with conventional development) can be observed with the same negative, which cannot be levelled out through an alteration of the development time.

The following development parameters describe a normal development (*N⁻-development). A table for N-minus and N-plus development is in preparation and will be added to the data sheet soon.

Condenser:

Film speed: ISO 20/14°

Preparation of 500 ml WS: 0 ml Part A + 55 ml Part B + 125 ml Part C, use water to bring to 500 ml.

NO PRE-WASHING! Development time at 20° C: 5 minutes

Inversion tact: steadily during the first 60 seconds, then once every 30 seconds

Fixing time: 60 to 90 seconds **Final wash:** 5 minutes

Diffuser:

Film speed: ISO 25/15°

Preparation of 500 ml WS: 90 ml Part A + 50 ml Part B + 90 ml Part C, use water to bring to 500 ml.

NO PRE-WASHING! Development time at 20° C: 6 minutes

Inversion tact: steadily during the first 60 seconds, then once every 30 seconds

Fixing time: 60 to 90 seconds **Final wash:** 5 minutes

3.) SPUR Orthopan UR / ADOX CMS 20, 35 mm miniature film

Film speed: ISO 10/11° to ISO 12/12°

Preparation of 250 ml WS: 18 ml Part A + 9 ml Part B, use water to bring to 250 ml.

NO PRE-WASHING! Development time at 20° C: Condenser: 5.5 minutes; **Diffuser:** 6 minutes

Inversion tact: steadily during the first 60 seconds, then once every 30 seconds

Fixing time: 60 to 90 seconds

Final wash: 5 minutes

4.) Rollei ATP 1.1, 35 mm miniature film

Film speed: ISO 20/14°

Preparation of 250 ml WS: 11 ml Part A + 27 ml Part B, use water to bring to 250 ml.

NO PRE-WASHING! Development time at 20° C: Condenser: 5.5 minutes; **Diffuser:** 6 minutes

Inversion tact: steadily during the first 60 seconds, then once every 30 seconds

Fixing time: 60 to 90 seconds

Final wash: 5 minutes

The schlieren-free development of the ATP 1.1 roll film requires the component Part D which will be available soon.

Further processing notes:

250 ml working solution suffice for the development of 35 mm films, 500 ml for roll films. 500 ml WS will do for the development of two roll films in succession or for two roll films at the same time if developed on a spiral. **In regions with hard water the WS has to be prepared with deionised water! Rotary development is not recommended because of a loss of speed of up to 1 f/number!**

1.) Rinsing

You **must not rinse** after developing. You may either use an acidic stop bath or fix immediately after developing.

2.) Development dynamics

Due to different development dynamics, high resolution techniques are invariably more sensitive to schlieren and other artefacts than conventional development techniques. **That is why you are strongly advised to use a tank of optimal size when you develop roll films: if you need 500 ml WS, do not use a tank larger than 500 ml. If you use Jobo tanks for example, never use Multitank 1540 (which is made for 1 litre of WS). You would have to use Unitank 1520 (which is made for 500 ml of WS).** The same goes for other makes. Also, you should process only **one 35 mm film per tank and development**. With structured subjects (no sky, no backgrounds) two 35 mm films per tank at most.