Print Media Academy

HEIDELBERG

Profi Tip
Rollers in Inking and Dampening Systems

Foreword

DEAR READER,

In our current Profi Tip we focus on the inking and dampening systems of your Heidelberg presses. We will give you some information on the critical importance of the rollers for the quality and efficiency of your print processes. The articles explain the principles of the manufacture and use of rollers and we answer the question of how they have to be inserted, adjusted and maintained. Using this knowledge you can make cost savings and will obtain an impressive consistency of print quality. On top of that, you will increase roller service life as well as print shop productivity. We are sure you will find this of great interest.

Sincerely yours, Bernd Schopp

Print Media Academy

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Roller Manufacture

Synthetic rubber is used in roller manufacture: a complex mix of natural rubber and various chemicals that obtain their stability and elasticity through the vulcanization process. It is the raw rubber that gives the rubbery material its basic characteristics. The vulcanization agents are added to this for the subsequent vulcanization process. Plasticizers (fluid oils) play a major role as they – along with the extenders and the vulcanization agents – determine the subsequent degree of hardness of the material. The more plasticizers are added, the softer the rubber after the vulcanization process.

- If possible, do not expose rollers to direct natural or artificial light.
- The special paper that the rollers come delivered in prevents light penetrating and therefore helps retain the rubber's characteristics. For this reason, do not remove the paper before inserting the roller in the printing press.
- Always put the roller with its pivots on a frame support: Putting it down directly onto the rubber can result in permanent deformations (pressure marks).
- Store rubber rollers in a cool and dry place.
- Under certain circumstances ozone causes microscopic scratches on the rubber surface. For this reason do not store rollers in the vicinity of motors or other electrical devices.

Shore Hardness

- In line with their task of transferring ink, inking rollers must be adjusted to be oil-friendly (or oleophilic). In an inking system with conventional inks, rollers of Shore A hardness between 30° and 35° are used. For UV inks, rollers with Shore A hardness of 25° and between 40° and 45° are used.
- Dampening rollers should be water-friendly (hydrophilic). For alcohol dampening systems, Shore A hardness of between 25° and 30° is suitable. In direct dampening systems, hard rubber rollers are used.

The Shore hardness of a roller determined with a Shore meter designates the resistance against penetration of a needle taking the form of either a conic section (Shore A) or a point (Shore D), pressed with a defined force (1 kp) for a period of three seconds against the rubber surface. Soft rollers are measured with Shore A, and hard rollers with Shore D. The general hardness tolerances according to DIN/EN are +/– 5° Shore A.

Shore hardness can be easily measured and gives the printer information on the condition of the rollers. Rollers tend to become harder with use, as they are exposed to inks, dampening agents and detergents, as well as the atmosphere. Additional hardening of 5° Shore in the first months of use should be regarded as normal. Accelerated hardening in use can be a sign that the rollers are gradually shrinking. If you adjust a roller that has been subject to hardening and shrinkage to its original gap width, it may well be that its original transfer characteristics will be reproduced. At the same time, however, the gap width is closer than previously. This leads to higher pressure and higher temperatures – and thereby to higher wear on the roller.

Increased hardness can also indicate that a hard film of paper coating and dampening agents has become deposited on the roller surface. This film should be regularly removed to prevent the roller hardening and glazing with use.

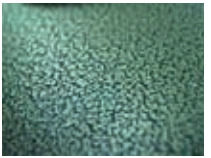
THE CLEAN AND SATIN-LIKE SURFACE OF A ROLLER IS EVEN MORE IMPORTANT THAN ITS HARDNESS.

Roller Maintenance

For optimum maintenance of rollers, the roller manufacturers recommend a universal group A-III-agent that can be mixed with water. Alternatively, high solids alkyd resins or biological detergent may be used. Long service life of the rollers can only be achieved with proper handling and maintenance (On UV printing, the service-life is, as a rule, shorter).

Ageing cracks

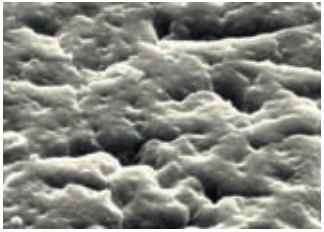
Ozone cracks



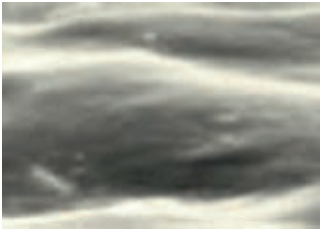
Cracking due to chemicals

- The choice of detergent plays an essential role in roller service life. Highly volatile cleaners remove the plasticizer from the rubber, which leads to shrinkage and hardening. Other possible consequences of using unsuitable detergents are swollen rollers or corroded hoses, seals, machinery paintwork and blankets. Suitable detergents are certified by FOGRA and may be selected from the relevant list (cf. www.fogra.org)
- Various applications (standard inks, UV, hybrid) each require specific roller materials and these in turn require detergents that are specially suited to them
- Along with print chemicals that affect the roller directly, external factors such as UV light, damp and room temperature may result in premature ageing of the rubber

Glazing



Clean roller with porous surface



Glazed roller with calcification on the surface

Over time, rollers pick up particles from the ink, the paper coating and the dampening agent which block their pores. This contamination results in a smooth shiny surface. Inappropriate detergents and hard water contribute to this effect. Transfer of ink and dampening solution is noticeably inhibited as a result.

By using a special decalcifying agent, scaling can be removed and the rollers regenerated. It is recommended you discuss with the roller manufacturer which agents have the least long-term effects on the rubber.

Inking/Dampening System Adjustment

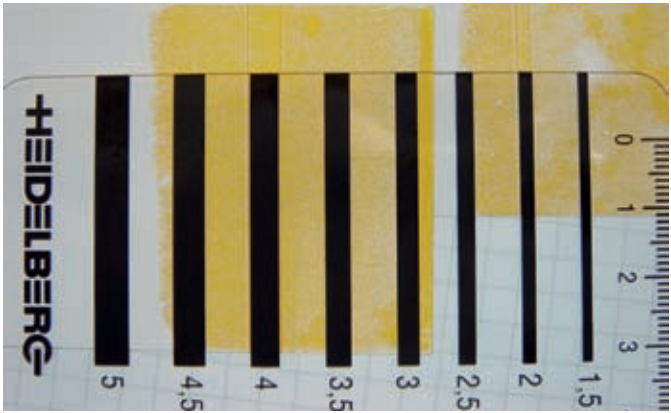
- Carry out adjustment work on rollers once they have run warm, or else calculate in an increase of the adjustment strips.
- As a rule, set the damping form roller and inking form roller nearer to the distributor than to the printing plate – but not so near that a pressure strip in the form of a cigar occurs with the plate. This would indicate that the roller is being bent towards the cylinder channel.
- Only adjust the rollers according to manufacturer specifications.
- Always adjust from minus to plus, so as to eliminate thread play on adjustment.
- On “Vario“ set the ink form roller nearer to the distributor, so that it is decelerated by the dampener oscillator roller.
- When setting the ink form roller to the plate, high pressure is momentarily exerted (impact), which generates a stronger press strip. For precise adjustment of the print plate, first ink up and set down the rollers after waiting for around 10 seconds.
- Precise roller adjustment is best carried out via the press strip. For this, coat the rollers equally with a light-colored ink (yellow). After the ink has distributed and a waiting time of around 10 seconds, with a piece of paper squeeze off the press strip generated.
- Always measure between the dot fringes as these are more evident with increased ink.
- Always set the rollers parallel to each other (tolerance 0.5 mm).

Operating end Drive end

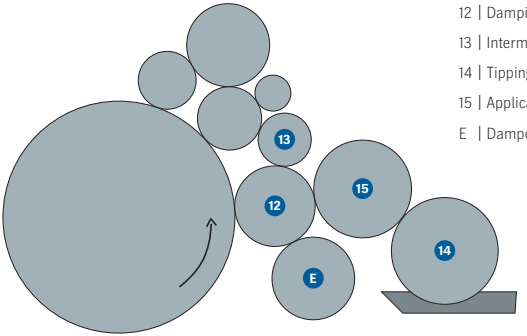
Press Strip Adjustment

Heidelberg provides an adjusting gauge which allows precise measurement of the press strips (this can be ordered over the Internet at www.heidelberg-selection.com or via the relevant distributor, part no. G2.024.001). A paper template print of the press strip makes measuring easier and can be used for documentation purposes.

By making a professional adjustment, the printer ensures the right pressure between the rollers. This then ensures ink distribution and a consistent supply of dampening agent.



Alcolor Dampening System

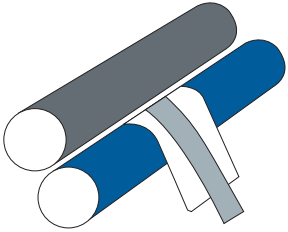


12 | Damping form roller
13 | Intermediate roller
14 | Tipping roller
15 | Application roller
E | Dampener oscillator roller

Print quality starts with the interaction of the inking and dampening system: Consistently good results assume a stable ink-water balance. Precise adjustment ensures thin and equal distribution of the dampening agent film on the printing plate. This reduces sheet drying time, allowing the sheets to get to the print finishing process sooner. A responsible printer checks the adjustments every three months and adjusts in line with the operating manual.

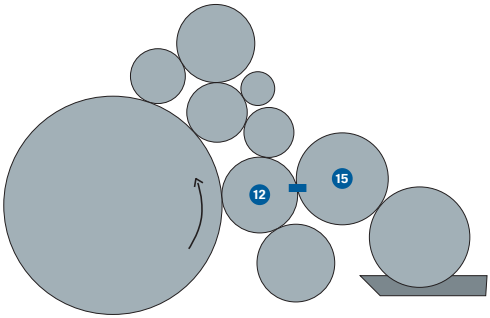
The dampening agent ideally has a water hardness of 8° to 12° on the German scale (dH) and a pH value of 4.8 to 5.5. The usual dampening agent temperature is deemed to be between 10 °C and 15 °C. To prevent the occurrence of print problems, it is recommended that the dampening agent be renewed every 14 days.

Alcolor Dampening System Adjustment



Basic adjustment of the dampening system should be performed with a clean roller using two thin paper strips (approximately 0.05 mm thick). The wide paper strip covers the rubber roller, while the narrow strip acts as a feeler gauge. This means that the greater resistance of the rubber roller is not felt. The narrow strip slips between the wide paper strip and the smooth distributor roller. There is an exact description of the method in the operating instructions.

If the Alcolor dampening system is adjusted or checked with ink, be aware that when the strip is formed an unintended rolling movement occurs from the application roller to the damping form roller. This makes the press strip wider. If there is a suitable waiting time (approximately 30 seconds), the “inner” strip can be properly assessed.



12 | Damping form roller

15 | Application roller

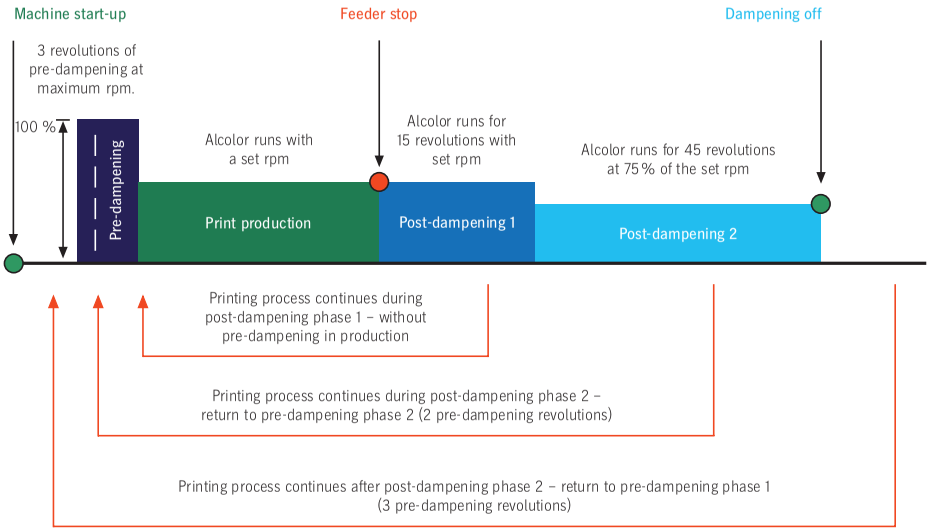
Pre-/Post-Dampening with Alcolor

Using automatic pre-dampening, the Alcolor dampening system ensures there is adequate dampening agent film on the printing plate. When printing is interrupted (washing, stopper etc.) the dampening system is automatically switched off by the plate as part of a post-dampening phase. The duration of the automatic pre- and post-dampening phases can be set by the machine control system and is thereby adapted to the many different materials in use and the conditions that exist around the world. Good adjustment ensures an optimum amount of dampening agent when printing starts and after printing has been interrupted.

The pre- and post-dampening phase with Alcolor

Mode	Standard settings	Revolutions	Adjustment range max. revolutions	Adjustment range min. revolutions
Pre-dampening phase 1	3	3	18	0
Pre-dampening phase 2	2	2	18	0
Post-dampening phase 1	15	15	50	0
Post-dampening phase 2	45	45	100	0

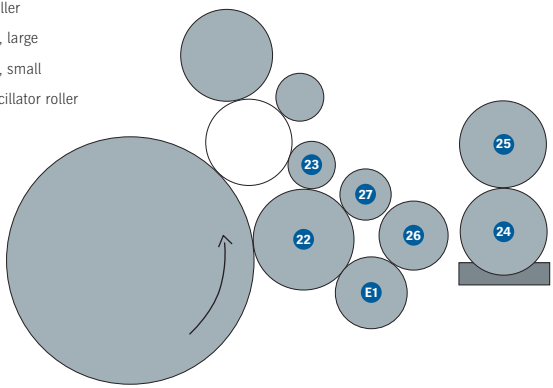
TO AVOID EXCESS DAMPENING AGENT ON THE PRINTING PLATE, THE PRE- AND POST-DAMPENING PHASES SHOULD BE SET TO THE MINIMUM.


Machine start-up
Feeder stop
Dampening off
3 revolutions of pre-dampening at maximum rpm.
100 %
Pre-dampening
Alcolor runs with a set rpm
Print production
Alcolor runs for 15 revolutions with set rpm
Post-dampening 1
Alcolor runs for 45 revolutions at 75 % of the set rpm
Post-dampening 2
Printing process continues during post-dampening phase 1 – without pre-dampening in production
Printing process continues during post-dampening phase 2 – return to pre-dampening phase 2 (2 pre-dampening revolutions)
Printing process continues after post-dampening phase 2 – return to pre-dampening phase 1 (3 pre-dampening revolutions)

IPA-Free Ecocolor Dampening System

100 % IPA-free printing with the Ecocolor dampening system reduces emissions, improves the print shop atmosphere and at the same time saves alcohol costs. Ecocolor ensures quick and stable ink/water balance. Dampening agent control is via a potentiometer. Dampening agent temperature is set to 18 to 20 °C.

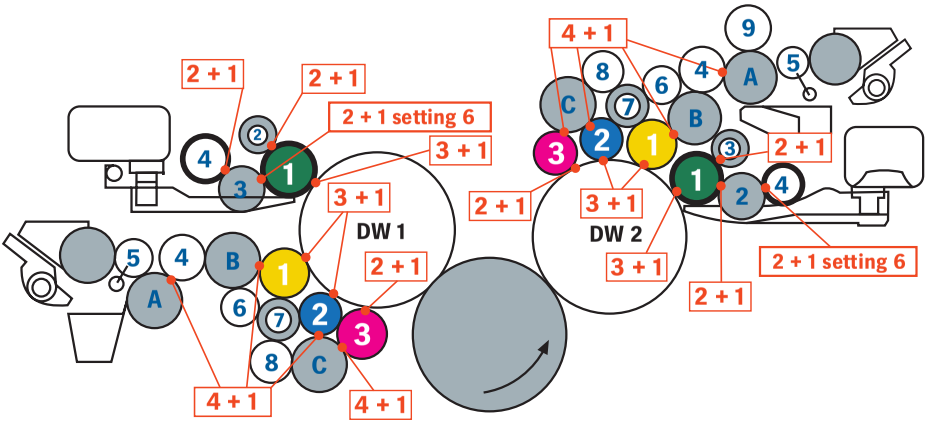
22 | Damping form roller
23 | Intermediate roller
24 | Tipping roller
25 | Application roller
26 | Transfer roller, large
27 | Transfer roller, small
E1 | Dampener oscillator roller



On IPA-free printing, the degreasing action of the alcohol in the dampening agent is not present. This means that oily detergent residues may remain on the rollers, and these can inhibit dampening agent transfer. This is why absolutely faultless washing procedures are needed. The basic cleaning agent must under no circumstances contain aromatic compounds, as these may damage the rollers. You should ask your ink supplier about a suitable cleaning agent.

CLEAN THE ROLLERS BY HAND AFTER EACH WASH. TO DO THIS, RUN THE PRESS TO WASH SPEED, SWITCH THE INTERMEDIATE ROLLER ON THE PRESS TO CONNECT BY DOUBLE-CLICKING (IT FLASHES). THEN, USING A SPRAY BOTTLE, SPRAY A WATER/ALCOHOL MIXTURE (80 %/20 %) ONTO THE ROLLERS. SET WASH-UP BLADES VIA THE SERVICE MENU AND LET THEM WIPE. CLEAN THE TIPPING ROLLER AND APPLICATOR ROLLER WITH ALCOHOL (ON THE FRONT SURFACES AS WELL).

Quickmaster QM 46-2



Roller diameter

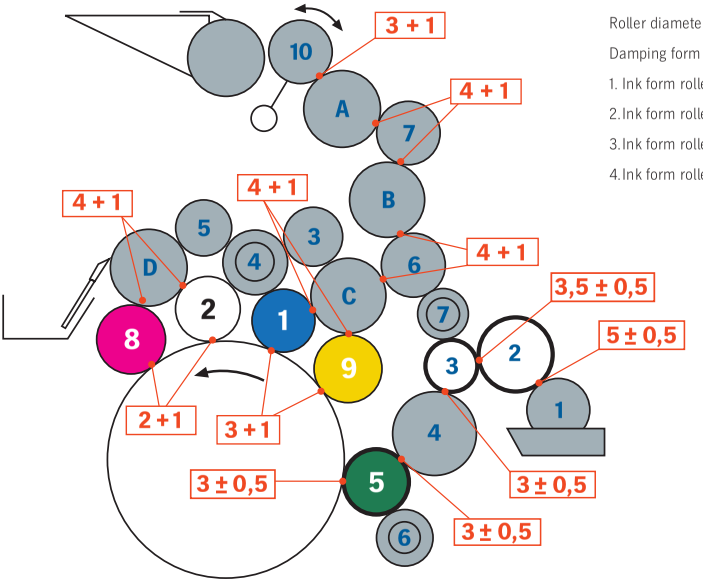
Damping form roller | 63 mm

1. Ink form roller | 54,7 mm

2. Ink form roller | 45 mm

3. Ink form roller | 50 mm

Printmaster GTO with Direct Film Dampening System



Roller diameter

Damping form roller | 55 mm

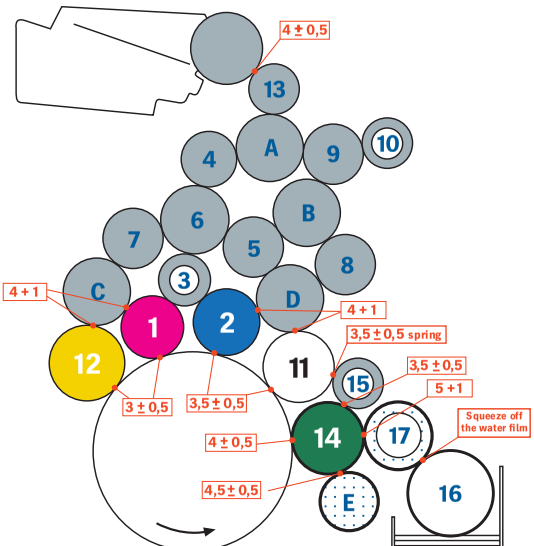
1. Ink form roller | 49 mm

2. Ink form roller | 45 mm

3. Ink form roller | 47 mm

4. Ink form roller | 51 mm

Printmaster PM 52/Speedmaster SM 52



Roller diameter

Damping form roller | 68 mm

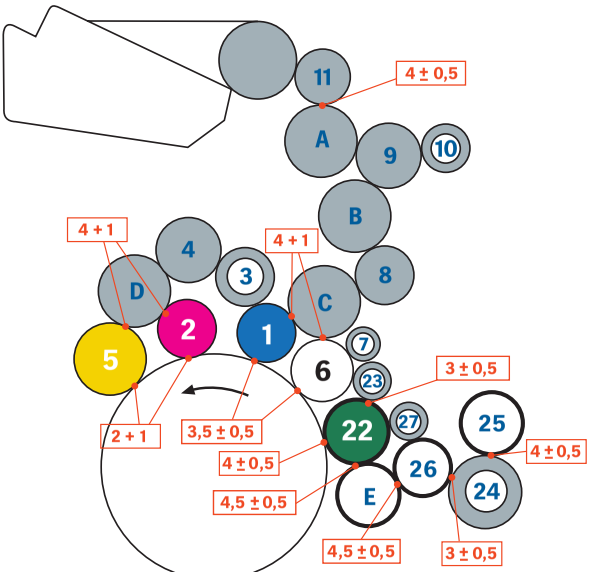
1. Ink form roller | 64,5 mm

2. Ink form roller | 61 mm

3. Ink form roller | 54 mm

4. Ink form roller | 68 mm

Printmaster PM 74 with Ecocolor



Roller diameter

Damping form roller | 75 mm

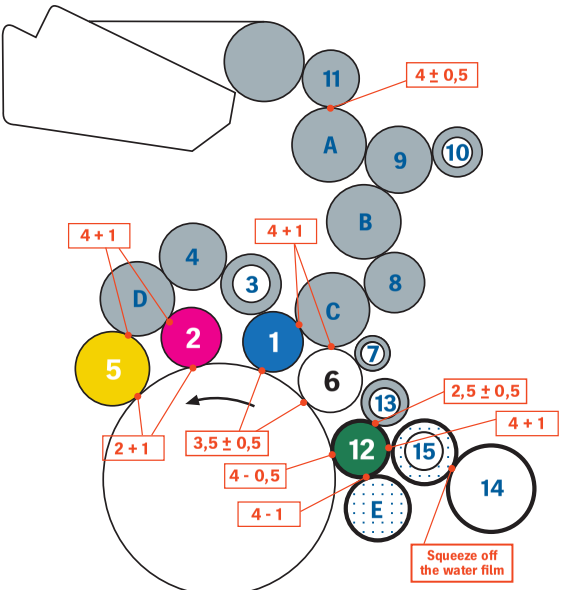
1. Ink form roller | 65 mm

2.Ink form roller | 60 mm

3.Ink form roller | 55 mm

4.Ink form roller | 70 mm

Speedmaster SM 74 with Alcolor



Roller diameter

Damping form roller | 48 mm

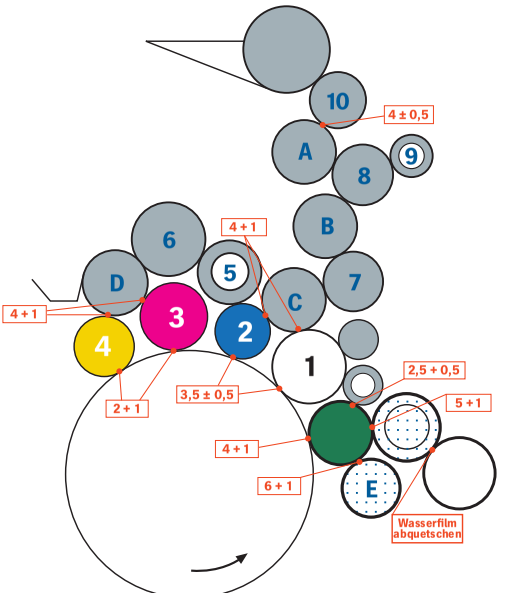
1. Ink form roller | 65 mm

2.Ink form roller | 60 mm

3.Ink form roller | 55 mm

4.Ink form roller | 70 mm

Speedmaster CD 74



Roller diameter

Damping form roller | 70 mm

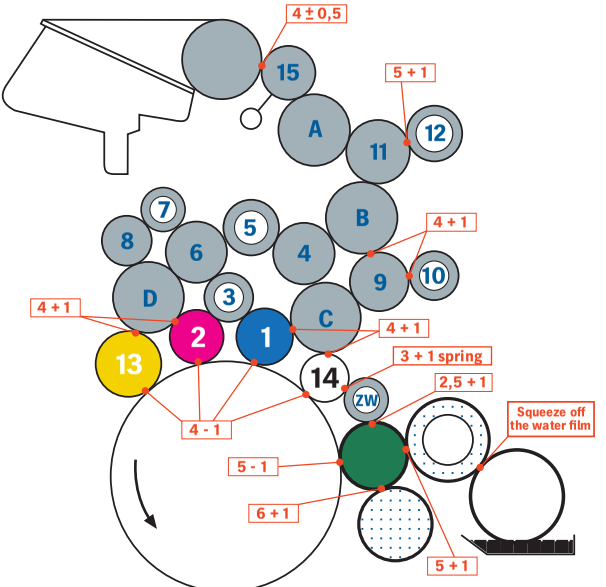
1. Ink form roller | 78 mm

2.Ink form roller | 60 mm

3.Ink form roller | 72 mm

4.Ink form roller | 66 mm

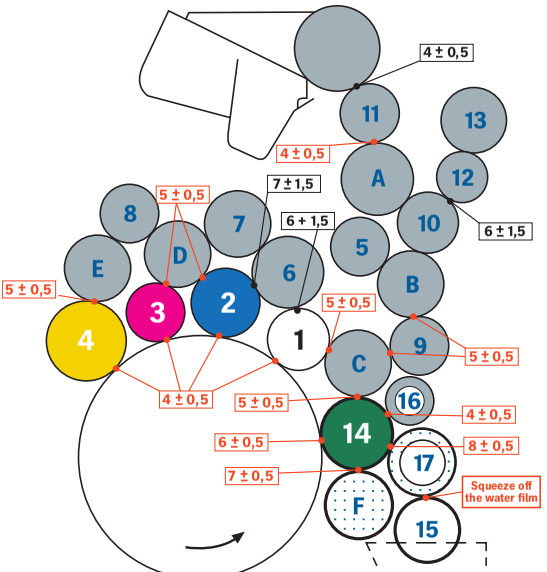
Speedmaster SM 102/Speedmaster CD 102



Roller diameter

Damping form roller	78 mm
1. Ink form roller	60 mm
2.Ink form roller	72 mm
3.Ink form roller	66 mm
4.Ink form roller	80 mm

Speedmaster XL 105 Hycolor Inking and Dampening System



Roller diameter

Damping form roller | 92 mm

1. Ink form roller | 80 mm

2.Ink form roller | 86 mm

3.Ink form roller | 74 mm

4.Ink form roller | 102 mm

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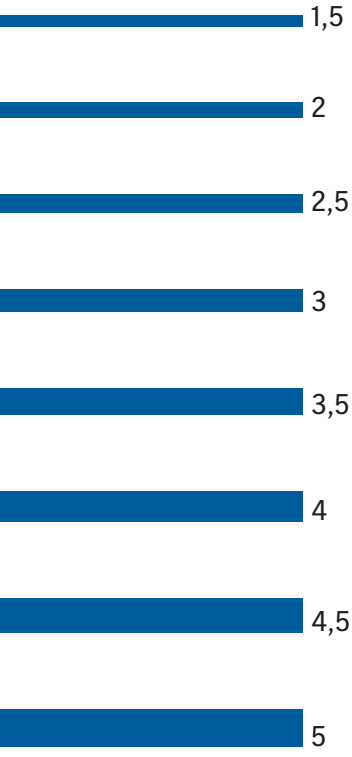
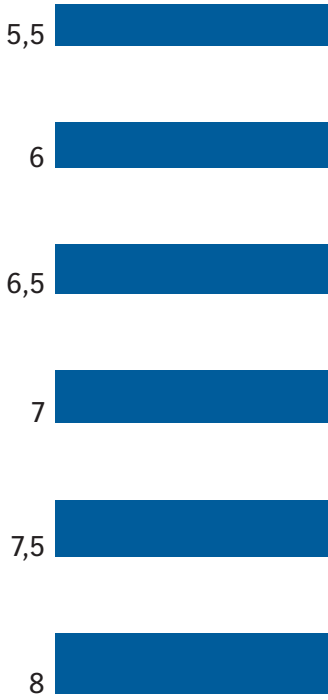
Notes





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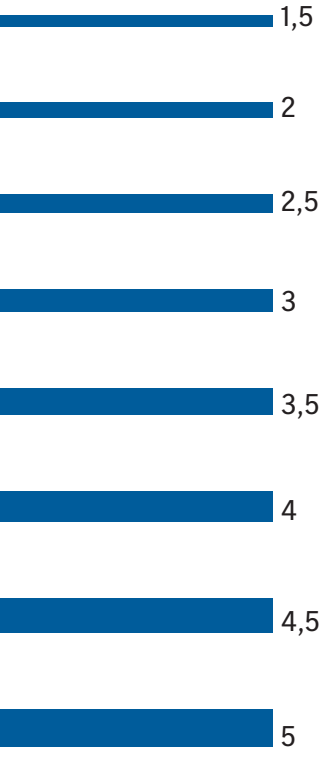

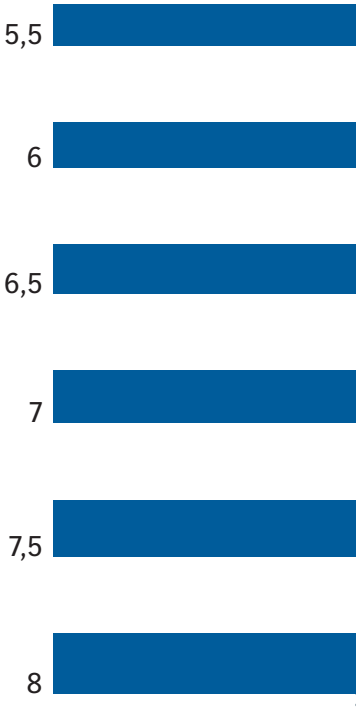

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