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1 Advice

1.1 General advice

Please read carefully through these run-in instructions before you start up the brake.
Please pay special attention to the safety instructions!
The run-in instructions are part of your product. Please store them carefully.
The copyright for these run-in instructions remains with KTR.

1.2 Safety and advice symbols

STOP	**Warning of personal injury**	This symbol indicates notes which may contribute to preventing bodily injuries or serious bodily injuries that may result in death.
!	**Warning of product damages**	This symbol indicates notes which may contribute to preventing material or machine damage.
☞	**General advice**	This symbol indicates notes which may contribute to preventing adverse results or conditions.

2 Instructions – Run-in of brake pads

☞ **The present run-in instructions apply for brake pads supplied by KTR only.**

2.1 General advice for the brake pads

New brake pads have a much lower coefficient of friction compared to the brake disk. That is why the brake pads have to be adapted to the brake disk by a run-in process before initial intended use of the brake system to optimise the coefficient of friction with respect to the brake disk. For that purpose the load must be applied in several stages until you reach the full performance of the brake.

⚠ **If a run-in process with rising load stages is not performed, only about 20 % of the friction lining surface bear the load which may result in impermissible surface pressure and destruction of the friction lining under operating conditions.**

Basically you should check whether all preconditions of the operating instructions with regard to setting, installation and condition of brake disk and brake have been observed. For that purpose the disk geometry and surface structure have to be inspected in particular.

☞ **Make sure the brake disk is free from any preserving agents, anticorrosives such as Tectyl, Rivolta, etc., assembly grease, packaging material, etc.**

We would recommend to run the run-in processes at different clamping forces and each 5 cycles per power level. The power levels should be made in at least five stages rising the nominal force of the brake by each 20 %. With spring-operated brakes this may be realized by maintaining a pressure against the spring force, with active brakes by generating a proportionally reduced operating pressure (see chapter 3).
Please consult with KTR for any other questions.

2.2 Run-in of organic brake pads

☞ **Make sure that organic brake pads are concerned in your case.**

The braking processes must be performed with each cycle until a surface temperature of 150 °C has been reached. The brake disk should cool down to a starting temperature of 50 °C at the maximum between the different run-in processes. If that is not possible, correspondingly more cycles per power stage from a higher starting temperature must be run. Make sure that a brake disk temperature of 200 °C is not exceeded in no case. If possible, the temperature should be measured in different positions in rotational direction behind the brake pad during the braking cycle.

☞ **A friction speed of 5 m/s as maximum speed during the run-in process must not be exceeded.**

2 Instructions – Run-in of brake pads

2.3 Run-in of sinter metal brake pads

☞ **Make sure that sinter metal brake pads are concerned in your case.**

The braking processes must be performed with each cycle until a surface temperature of 350 °C has been reached. The brake disk should cool down to a starting temperature of 100 °C at the maximum between the different run-in processes. If that is not possible, correspondingly more cycles per power stage from a higher starting temperature must be run. Make sure that a brake disk temperature of 400 °C is not exceeded in no case. If possible, the temperature should be measured in different positions in rotational direction behind the brake pad during the braking cycle.

☞ **A friction speed of 20 m/s as maximum speed during the run-in process must not be exceeded.**

2.4 Effect of run-in process

One criterion of the effect of the run-in process is that the braking torque does no longer increase significantly from one cycle to the next. If necessary, more than each 5 cycles per power level must be performed resp. the entire run-in process must be repeated. In addition, one criterion of an effective run-in process is the rising wear of the friction lining as well as a visible and uniform support surface on the brake disk surface. In this case the brake pad has a support surface of at least 80 % of the overall surface.

☞ **A friction speed of 5 m/s with organic brake pads resp. 20 m/s with sinter metal brake pads as maximum speed during the run-in process must not be exceeded.**

⚠ **Brake pads are highly sensitive to grease and oil which means that they cannot be cleaned. Brake pads having such kind of dirt need to be replaced and disposed of.**

☞ **We would recommend to store the brake pads in their package as long as possible to protect them from any kind of dirt.**

On completion of the run-in process of brake pads a proper test should be run to check whether the required braking torque resp. braking time are reached.

3 Calculation of operating pressure

The required operating pressure with reduced clamping force for hydraulically operated brakes (active brake) is calculated acc. to chapter 3.1 and for spring-operated brakes (passive brake) acc. to chapter 3.2.

F_c = Nominal clamping force [N]
$F_{c,\,requ}$ = Required clamping force [N]
$A_{K,\,eff}$ = Effective piston surface [mm^2]
p_{requ} = Required operating pressure [bar]
$p_{percent}$ = Percentage of nominal clamping force [%]

3.1 Hydraulically operated brake (active brake)

Formula for calculating the required operating pressure

$$p_{erf} = \frac{F_{c,erf}}{A_{K,wirk}} \cdot 10$$

Example of calculation

KTR-STOP® YAW M

Nominal clamping force	F_c	=	203,000 N
Effective piston surface:	$A_{K,\,eff}$	=	12,700 mm²
Percentage of nominal clamping force:	$p_{percent}$	=	10 %

$$F_{c,erf} = \frac{F_c \cdot p_{Prozent}}{100}$$

$$F_{c,erf} = \frac{203.000 \cdot 10\%}{100} [N]$$

$$F_{c,erf} = 20.300\ [N]$$

$$p_{erf} = \frac{F_{c,erf}}{A_{K,wirk}} \cdot 10$$

$$p_{erf} = \frac{20.300\ [N]}{12.700\ [mm^2]} \cdot 10$$

$$\boxed{p_{erf} \approx 16\ [bar]}$$

3.2 Spring-operated brake (passive brake)

Formula for calculating the required operating pressure

$$p_{erf} = \frac{F_c - F_{c,erf}}{A_{K,wirk}} \cdot 10$$

Example of calculation

KTR-STOP® M-xxx-F

Nominal clamping force	F_c	=	120,000 N
Effective piston surface:	$A_{K,\,eff}$	=	13,740 mm²
Percentage of nominal clamping force:	$p_{percent}$	=	20 %

$$F_{c,erf} = \frac{F_c \cdot p_{Prozent}}{100}$$

$$F_{c,erf} = \frac{120.000 \cdot 20\%}{100} [N]$$

$$F_{c,erf} = 24.000\ [N]$$

$$p_{erf} = \frac{F_c - F_{c,erf}}{A_{K,wirk}} \cdot 10$$

$$p_{erf} = \frac{(120.000 - 24.000)\ [N]}{13.740} \cdot 10$$

$$\boxed{p_{erf} \approx 70\ [bar]}$$