FLENDER COUPLINGS

ARPEX plate packs with close-fitting bolt connection

Compact assembly instructions M4200-01en
Edition 09/2022

ARS-6; 78-6...722-6
K430; 80...820

FLENDER

Compact assembly instructions

M4200-01
Edition 09/2022

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Introduction 1

1.1 Legal information

Warning system

These instructions contain information you must observe for your own personal safety as well as to avoid damage to property and persons. The information regarding your personal safety is highlighted with a warning triangle. Information exclusively regarding property damage alone is not marked with a warning triangle. Depending on the hazard class, the warnings shall be depicted as follows, in descending order.

⚠ DANGER

means that death or severe physical injury **will** occur if the relevant precautionary measures are not taken.

⚠ WARNING

means that death or severe physical injury **may** occur if the relevant precautionary measures are not taken.

⚠ CAUTION

means that mild physical injury may occur if the relevant precautionary measures are not taken.

NOTICE

means that damage to property may occur if the relevant precautionary measures are not taken.

If multiple hazard classes come into play, the warning for the highest level in question shall always be used. If a warning containing the warning triangle warns of harm to individuals, the same warning may also include a warning regarding damage to property.

Information

Information

Information offers additional notes, assistance and tips for handling the product.

Qualified personnel

The product/system associated with this documentation may only be used by **qualified personnel** trained to perform the relevant tasks, taking into account the associated documentation for the relevant tasks, particularly the safety information and warnings included therein. Due to their qualification and experience, qualified personnel are capable of detecting risks and avoiding potential hazards when dealing with these products/systems.

Intended use of Flender products

Please note the following:

⚠ WARNING

Flender products are only suitable for the uses set out in the catalogue and associated technical documentation. If third-party products and components are used, these must be recommended and/or authorised by Flender. Safe and flawless operation of the products requires proper transport, proper storage, setup, assembly, installation, commissioning, operation and maintenance. The permissible environmental conditions must be adhered to. Instructions in the associated documentation must be followed.

Trademarks

All designations marked with the trademark symbol ® are registered trademarks of Flender GmbH. Other designations in this document may be trademarks whose use by third parties for their own purposes may violate the rights of the owner.

Liability disclaimer

We have assessed the contents of these instructions for compliance with the hardware and software described. However, deviations cannot be ruled out, so we are unable to accept liability for full compliance. The details in these instructions are regularly reviewed and necessary corrections are contained in subsequent editions.

1.2 Superordinate operating instructions

These assembly instructions are only valid in connection with the following operating instructions:

- **Operating instructions M8704-01 for series ARS-6**
- **Operating instructions M8700-01 for series K430**

1.3 General information

These instructions are part of the delivery. Always keep these instructions close to the coupling.

Observe the notes and regulations in these assembly instructions and in the superordinate operating instructions.

Make sure that every person who is commissioned to work on the coupling has read and understood these instructions and the superordinate operating instructions prior to handling the coupling and observes all of the points.

Only the knowledge of these instructions can avoid faults on the coupling and ensure fault-free and safe operation. Non-adherence to the instructions can cause product or property damage or personal injury. Flender does not accept any liability for damage or operating failures that are due to non-adherence to these instructions.

1.4 Protective coating

The parts delivered with these instructions are preserved. Please observe the notes and regulations in the superordinate operating instructions (Page 6).

1.5 Marking of the coupling parts in accordance with Explosion Protection Directive

⚠ DANGER

Risk of explosion when using coupling parts without Ex marking according to the Explosion Protection Directive

Coupling parts without marking have not been approved for use in potentially explosive atmospheres. These coupling parts can lead to an explosion during operation.

- Only use couplings with marking in accordance with the Explosion Protection Directive in potentially explosive atmospheres.

The marking of the coupling and information about the usage conditions can be found in the superordinate operating instructions (Page 6).

Assembly 2

⚠ DANGER

Danger due to bursting of the coupling

If you do not carefully observe the assembly specifications, then this can cause the coupling to fracture in operation. There is a risk of fatal injury from flying fragments. Bursting of the coupling can lead to an explosion in potentially explosive atmospheres.

- Carefully observe all of the specifications relating to assembly.

Notes regarding assembly of the coupling

- Only use undamaged components when assembling the coupling.
- Follow the assembly sequence.
- Please ensure that there is sufficient space at the assembly location and that the location is tidy and clean in order to be able to assemble and maintain the coupling without any risk.
- If a dimension drawing has been created for the coupling, please follow the information it contains as a matter of priority.

⚠ WARNING

Risk of chemical burns from chemical substances

There is a risk of chemical burns when handling corrosive cleaning agents.

- Please follow the manufacturer's guidelines on how to handle cleaning agents and solvents.
- Wear suitable protective equipment (gloves, safety goggles).

2.1 Design of the bolt fastening point

Information

The plate pack (3) comprises plates, bushings (9) and rings (8). The parts are firmly crimped together.

Optionally, couplings of type ARS-6 from size 280-6 can be ordered in a locking element design. With the locking element design, a bushing (9) and a ring (8) are supplied loose. The bushing (9) and the ring (8) are inserted when assembling.

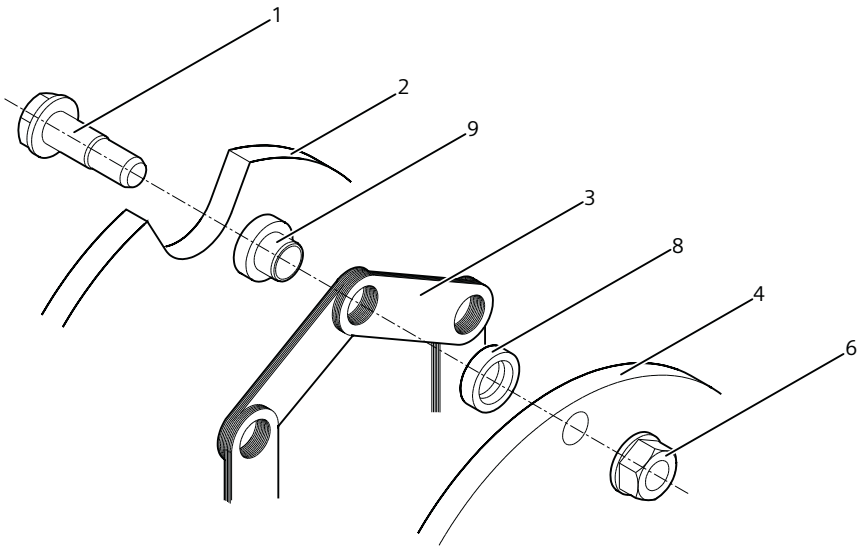

Figure 2-1: Design of the bolt fastening point

1	Close-fitting bolt	6	Flanged nut
2	Flange	8	Ring
3	Plate pack	9	Bushing
4	Flange		

2.2 Detailed view of the close-fitting bolt connection

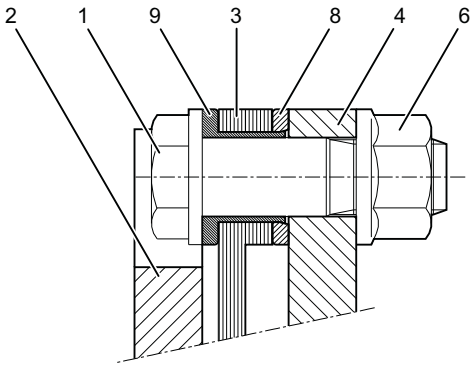

Figure 2-2: Detailed view of the fitting bolt connection

1	Fitting bolt	6	Flange nut
2	Flange	8	Ring
3	Plate pack	9	Bushing
4	Flange		

2.3 Assembling the plate pack

Depending on the coupling series and the coupling size, the procedure for mounting the plate packs differs in the following way:

- Series K430: Sizes 80 to 215: Torque-controlled tightening of the bolt fastening (Page 11)

- Series ARS-6: Sizes 78-6 to 240-6: Torque-controlled tightening of the bolt fastening (Page 11)
- Series K430: Sizes 235 to 820: Torque-controlled tightening of the bolt fastening (Page 11)
- Series ARS-6: Sizes 255-6 to 722-6: Torque-controlled tightening of the bolt fastening (Page 11)

2.3.1 Torque-controlled tightening of the bolt fastening

You apply this procedure for the following series and sizes:

- K430 series: Sizes 80 to 215
- ARS-6 series: Sizes 78-6 to 240-6

Procedure

1. Clean the locating holes of the flanges (2) and (4).
2. Clean the contact surfaces for the close-fitting bolts (1), flanged nuts (6) and rings (8).
3. If you are using plate packs with integrated axial play limiting or a vertical brace, then also note the following section: Assembling integrated axial play limiting or vertical braces (Page 13).
4. Screw the plate pack (3) to the flanges (2) and (4), alternating. Arrange the bolt fastening as follows:
   - The plate pack (3) is located between the flanges (2) and (4).
   - The rings (8) of the plate pack (3) are in contact with flange (2) or (4).
   - The flanged nuts (6) are preferably in contact with the flange (2) or (4).
     If space is restricted, interchange the position of the flanged nuts (6) and close-fitting bolts (1).

NOTICE
Insert the bolts in the delivery condition. Do **not** use additional grease/lubrication on the bolt fastening.

5. Preload the flanged nut (6). Secure the head of the close-fitting bolt (1) to prevent it from rotating. Brace the anti-rotation device (counter holder) on the flange to which the plate pack is screwed.
6. In the 1st pass, tighten the flanged nuts (6) one after the other with half of the tightening torque specified in Section Tightening torques and widths A/F (Page 17).
7. In the 2nd pass, tighten the flanged nuts (6) one after the other with the full tightening torque specified in Section Tightening torques and widths A/F (Page 17).

2.3.2 Torque-controlled tightening of the bolt fastening

You apply this procedure for the following series and sizes:

- K430 series: Sizes 235 to 820

- ARS-6 series: Sizes 255-6 to 722-6

Procedure

1. Clean the locating holes of the flanges (2) and (4).
2. Clean the contact surfaces for the closed-fitting bolts (1), flanged nuts (6) and rings (8).
3. Grease the contact surface of the flanged nut (6) the close-fitting bolt (1) and the thread of the close-fitting bolt (1). A list of lubricants is provided in Section Lubricant (Page 19).
4. If you are using plate packs with integrated axial play limiting or a vertical brace, then also note the following section: Assembling integrated axial play limiting or vertical braces (Page 13).
5. Screw the plate pack (3) to the flanges (2) and (4), alternating. Arrange the bolt fastening as follows:
   - The plate pack (3) is located between the flanges (2) and (4).
   - The rings (8) of the plate pack (3) are in contact with flange (2) or (4).
   - The flanged nuts (6) are preferably in contact with the flange (2) or (4).
     If space is restricted, interchange the position of the flanged nuts (6) and close-fitting bolts (1).
6. Preload the flanged nut (6). Secure the head of the close-fitting bolt (1) to prevent it from rotating. Brace the anti-rotation device (counter holder) on the flange to which the plate pack is screwed.
7. Tighten the flanged nuts (6) one after the other with the tightening torque T_0 specified in Section Tightening torques and widths A/F (Page 17).
8. Mark the zero position at the collar of the flanged nut (6) and at the flange. As zero position, select a corner point of the hexagon profile of the flanged nut (6).
9. Starting from the zero position, mark the angle of rotation α/2 and α or the arc length b/2 and b in the counterclockwise direction around the circumference of the collar of the flanged nut (6). Refer to Section Torque-controlled tightening of the bolt fastening (Page 17) for the angle of rotation and arc dimension.
10. You can also transfer the angle of rotation to a socket insert so that you do not have to mark each individual flanged nut (6).

NOTICE

Incorrect tightening torques by using the arc dimension

To mark the socket insert, use the angle specified in column "Angle of rotation" from Section Torque-controlled tightening of the bolt fastening (Page 17).

11. Turn the flanged nuts (6) one after the other until the first angle marking on the flanged nut (6) or the socket insert lines up with the zero mark at the flange.
12. Turn the flanged nuts (6) one after the other until the second angle marking on the flanged nut (6) or the socket insert lines up with the zero mark at the flange.

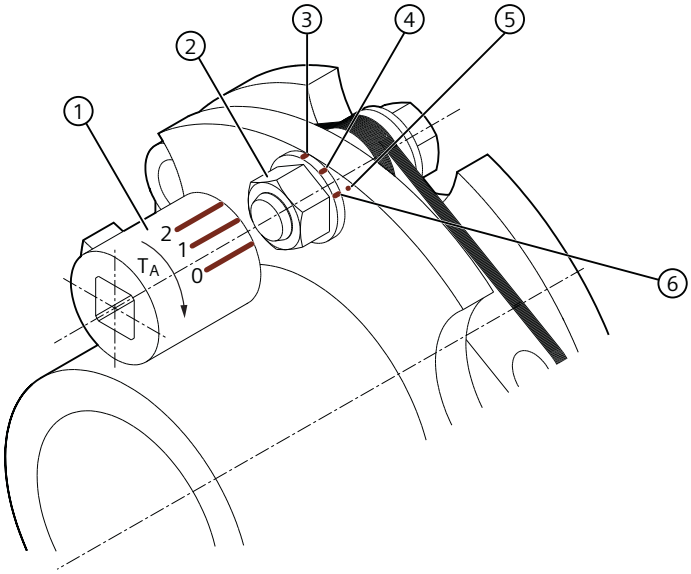

Figure 2-3: Angle markings

① Socket wrench insert
② Flanged nut
③ Second angle marking: Corresponds to angle of rotation α in degrees or arc length b in mm
④ First angle marking: Corresponds to angle of rotation α/2 in degrees or arc length b/2 in mm
⑤ Zero position at the flange
⑥ Zero position at the flanged nut

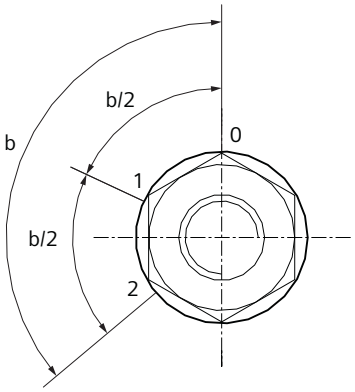

Figure 2-4: Angle in the arc length b at the circumference of the flanged nut collar

2.3.3 Assembling integrated axial play limiting or vertical braces

To assemble the plate packs with integrated axial play limiting or vertical braces, the same procedure applies as described in Section Assembling the plate pack (Page 10). Follow the subsequent notes:

- The axial play limiting or vertical brace is assembled and is firmly crimped with the plates and the bushings (9).

- The face flanges (10) and (11) of the axial play limiting or the vertical brace replace the rings (8) in the plate pack.
- The lugs (12) of face flanges (10) and (11) are in contact with flange (2) or (4). The bushings (9) of the plate pack lie in the recesses of flanges (2) and (4).

The correct functioning of the axial play limiting or vertical brace is only guaranteed in this installation position.

NOTICE

An incorrectly installed axial play limiting or vertical brace will result in coupling damage in operation.

Observe the position of face flanges (10) and (11) with respect to flanges (2) and (4).

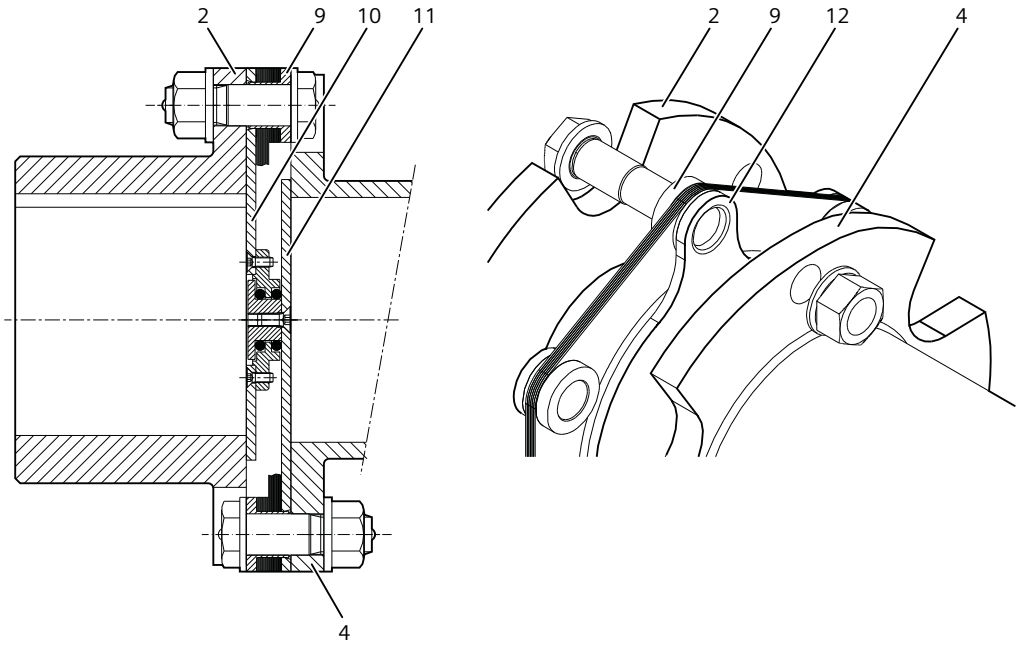

Figure 2-5: Assembling plate packs with integrated axial play limiting or vertical brace

2	Flange	10	Face flange
4	Flange	11	Face flange
9	Bushing	12	Lug of face flange (10) or (11)

2.4 Aligning the coupling

2.4.1 Purpose of alignment

The shafts that are joined by the coupling are never on an ideal precise axis but have a certain amount of misalignment.

Misalignment in the coupling leads to restoring forces that can stress adjacent machine parts (e.g. the bearings) to an unacceptable extent.

The misalignment values in operation result from the following:

- Misalignment due to assembly
  Incorrect position due to a lack of precision when aligning
- Misalignment due to operation
  Example: Load-related deformation, thermal expansion

You can minimise misalignment by aligning after assembly. A lower misalignment in the coupling has the following advantages:

- Reduced wear
- Reduced restoring forces
- Misalignment reserves for operation of the coupling

Alignment values can be found in Section Alignment values (Page 19).

2.4.2 Aligning

ARPEX couplings with 2 plate packs absorb axial, radial and angular misalignment.

ARPEX couplings with a plate pack only absorb axial and angular misalignment.

Procedure

At several locations along the outer diameter, measure the clearance S1 between the coupling parts.

If the measured clearances lie between the value range of $S1_{min}$ and $S1_{max}$, then the machines are adequately aligned.

You can find the values for $S1_{min}$ and $S1_{max}$ in Section Alignment values (Page 19).

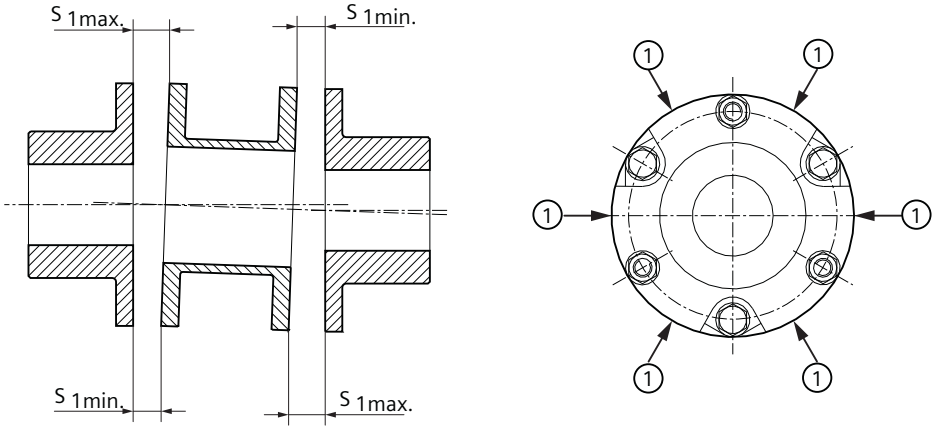

Figure 2-6: Aligning the machine parts

① Measurement location

Technical specifications

A

A.1 Tightening torques and widths A/F

Apply the specified tightening torques as listed in Section Tightening procedure (Page 18).

A.1.1 Torque-controlled tightening of the bolt fastening

Series K430 Size	Series ARS-6 Size	Thread	Width A/F SW [mm]	Tightening torque T_A [Nm]
80 92 102	78-6 105-6	M6	10	12
128 145	125-6 140-6	M8	13	30
168	165-6	M10	17	60
180	175-6	M12	19	100
-	195-6	M14	21	160
200	210-6	M16	24	250
205 215	-	M16	24	250
-	240-6	M18	27	350

Table A-1: Tightening torques and widths A/F for torque-controlled tightening of the bolt connection

A.1.2 Torque-controlled tightening of the bolt fastening

Series K430 Size	Series ARS-6 Size	Thread	Width A/F SW [mm]	Tightening torque T_0 [Nm]	Rotation angle		Arc measure	
					First angle mark α/2 [Degrees]	Second angle mark α [Degrees]	First angle mark b/2 [mm]	Second angle mark b [mm]
235 250 270	255-6	M20	30	50	25	50	8	16
-	280-6	M22	32	70	27.5	55	9.5	19

Series K430 Size	Series ARS-6 Size	Thread	Width A/F SW [mm]	Tightening torque T_0 [Nm]	Rotation angle		Arc measure	
					First angle mark α/2 [Degrees]	Second angle mark α [Degrees]	First angle mark b/2 [mm]	Second angle mark b [mm]
300 320	305-6	M24	36	90	25	50	10	20
-	335-6	M27	41	120	27.5	55	12	24
350 370 400	372-6	M30	46	170	25	50	13	26
-	407-6	M33	50	240	35	70	20	40
440 460 480 500	442-6	M36	55	310	37.5	75	23	46
-	487-6	M39	60	400	40	80	26	52
520 540 560	522-6	M42	65	500	42.5	85	29.5	59
-	572-6	M45	70	630	45	90	35.5	71
600 620 660 690	602-6	M48	75	770	47.5	95	39.5	79
-	667-6	M52	80	950	37.5	75	32.5	65
720 740 770 820	722-6	M56	85	1200	42.5	85	41	82

Table A-2: Tightening torques, rotation angles and arc measures for tightening of the bolt connection with rotation-angle control

A.2 Tightening procedure

Tightening torques must be observed taking into account the following table:

Scatter of the torque applied at the tool	Tightening procedure (As a rule, the tightening procedures listed are within the specified tool torque scatter)
±5 %	• Hydraulic tightening with mechanical screwdriver • Torque-controlled tightening with a torque wrench or a torque wrench that gives a signal • Tightening with a precision mechanical screwdriver with dynamic torque measurement

Table A-3: Tightening procedure

The tightening torques apply to screws/bolts with untreated surfaces that are not oiled or are only lightly oiled, and for screws/bolts that are used with a liquid screw locking agent in accordance with these instructions. Use with lubricant paint or lubricant is not permitted.

A.3 Lubricant

Lubricant paste	Manufacturer
OPTIMOL OPTIMOLY PASTE PL	Castrol Industrie GmbH 41179 Mönchengladbach Germany
LP 430	Microgleit GmbH 74357 Bönnigheim Germany
Klüberpaste ALTEMP QNB 50	Klüber Lubrication KG 81379 Munich Germany
Klüberpaste 46 MR 401	Klüber Lubrication KG 81379 Munich Germany
MOLYCOTE G-RAPID PLUS PASTE	Dow Corning Europe S.A. 7180 Seneffe Belgium

A.4 Alignment values

Series K430 Size	Series ARS-6 Size	S1 [mm]	$S1_{min}$ [mm]	$S1_{max}$ [mm]
80 92 102	78-6 105-6	8	7.8	8.2

Series K430 Size	Series ARS-6 Size	S1 [mm]	$S1_{min}$ [mm]	$S1_{max}$ [mm]
128 145	125-6 140-6	11	10.7	11.3
168	165-6	14	13.6	14.4
180	175-6	15	14.5	15.5
-	195-6	15	14.5	15.5
200	210-6	15	14.5	15.5
205 215	-	20	19.6	20.4
-	240-6	18	17.4	18.6
235 250 270	255-6	23	22.4	23.6
-	280-6	25	24.3	25.7
300 320	305-6	27	26.3	27.7
-	335-6	30	29.2	30.8
350 370 400	372-6	32	31.2	32.8
-	407-6	35	34.1	35.9
440 460 480 500	442-6	38	37.0	39.0
-	487-6	41	39.9	42.1
520 540 560	522-6	44	42.8	45.2
-	572-6	47	45.7	48.3
600 620 660 690	602-6	50	48.6	51.4
-	667-6	55	53.4	56.6

Series K430 Size	Series ARS-6 Size	S1 [mm]	$S1_{min}$ [mm]	$S1_{max}$ [mm]
720	722-6	60	58.3	61.7
740				
770				
820				

Table A-4: Alignment values

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