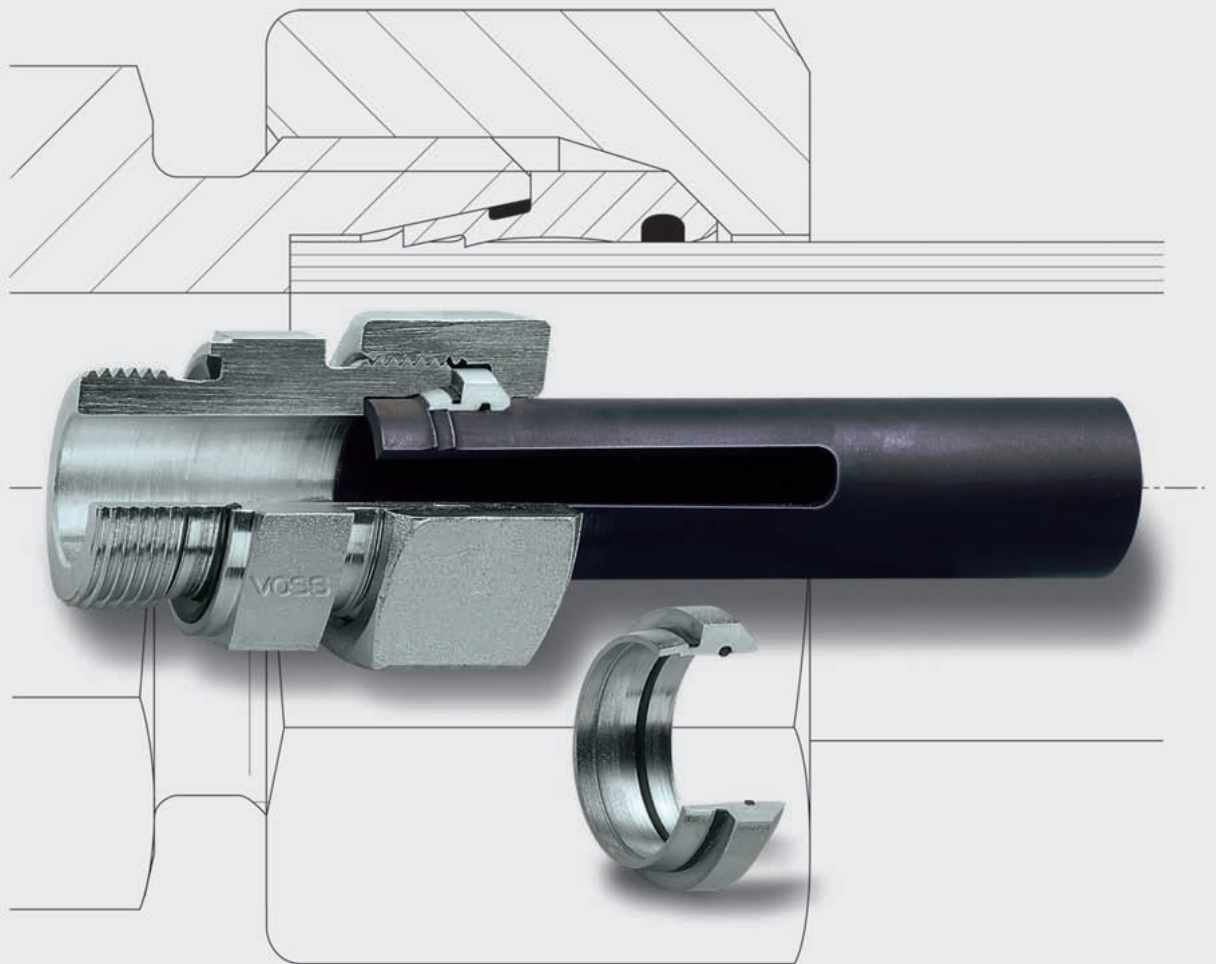


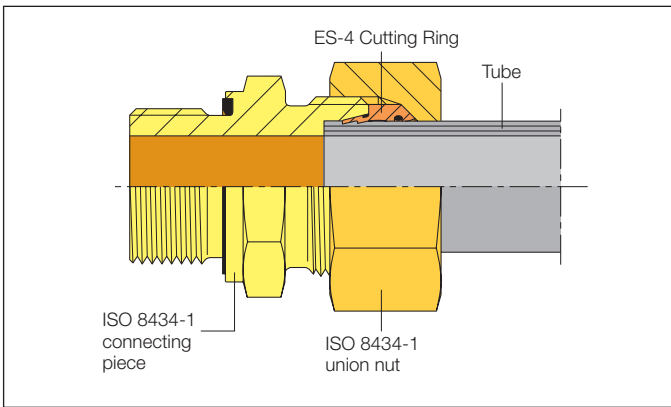
VOSS ES-4 – the soft seal connection with 4-fold benefits



Description of function

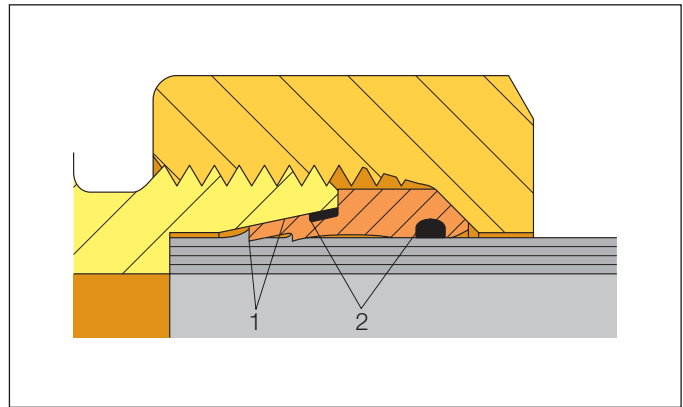
VOSS ES-4: The soft seal couplings in accordance with DIN/ISO with 4-fold benefits:

1. The basis is the proven VOSS 2S Cutting Ring.
2. Additional precision sealing with soft sealing elements of FPM/FKM in the secondary area.
3. Reliable freedom from leaks with gap-free chambering of the soft seals.
4. Guided assembly up to the tightening limit.



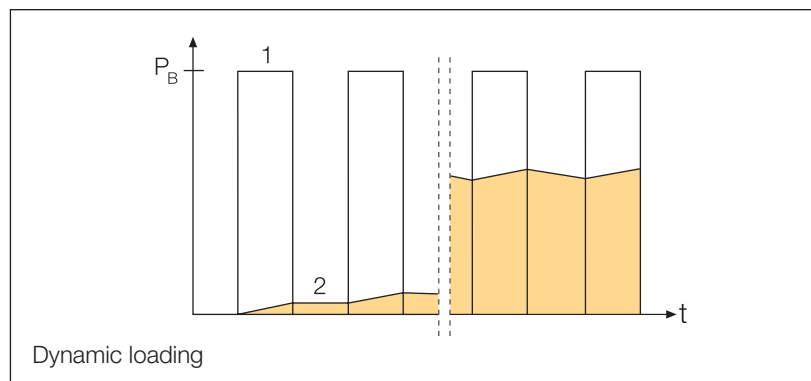
Dynamic loading

If the medium succeeds in overcoming the metallic sealing zone (No. 1) under alternating pressure loads, it is caught by the soft seals (No. 2) located behind the zone. The arrangement of the elastomer seals in the secondary area behind the metallic sealing zone results in the alternating pressure load only reaching the soft seal in a highly vaporised state. This quasi-static load on a lower level compared to the operating pressure ensures an excellent long-term stability of the elastomers.



Avoid leaks

The special moulded seal in the groove on the cutting ring taper and the additional O-ring between the cutting ring and the tube eliminate leaks resulting from slackening of the metallic sealing, e.g. due to creep characteristics. The diagram shows the reliable functioning of the VOSS ES-4 couplings under dynamic and static loads.



Static loading

With static pressure loading and an assumed leak in the metallic sealing zone, the full operating pressure nevertheless builds up in front of the soft seal following a major time delay. In this case the completely gap-free chambering of the soft seal elements ensures reliable sealing in the secondary zone.

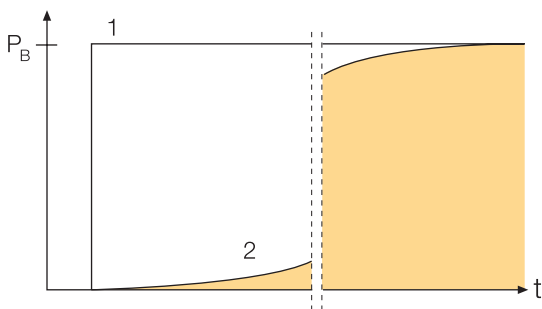
VOSS ES-4 applications

With "ES-4", VOSS engineers have developed a soft seal coupling that not only offers an additional potential for reliability, but is also considerably more economical.

The ES-4 coupling covers the application range on the tube connection side between the proven 2S Cutting Ring coupling for standard applications and the 10° flared coupling for heavy loading.

VOSS 2S ring as the basis

The basis for the soft seal coupling is the proven VOSS tube connection in accordance with DIN 2353/ISO 8434-1. In the process, the 2S Cutting Ring is supplemented with soft seals fitted on the secondary side.



Static loading

The reliable functional properties of the 2S Cutting Ring are completely preserved:

- In the final assembly state, the attacking moment of flexion is counteracted with sufficient resistance by the broad support and by the closed power flux.
- In addition, the first, strong cutting edge and the additional second cutting edge provide for a stable hold in the case of sudden pressure increases, i.e. for tear-out protection.

Additional precision seal with clear chambering

The precision seals prevent the familiar sweating effects of purely metallic seals:

- The special moulded seal of the ES-4 Cutting Ring, which is captively integrated in a groove on the cutting ring taper, seals off the possible leakage path between the cutting ring and the connecting piece.
- An additional O-ring prevents possible leakage between the cutting ring and the tube.

As a result, both soft seals lie in the secondary area behind the proven metallic seal. With this arrangement, dynamic and static loads are intercepted in the primary zones, i.e. at the metallic sealing points, and only reach the soft seals in virtually static form.

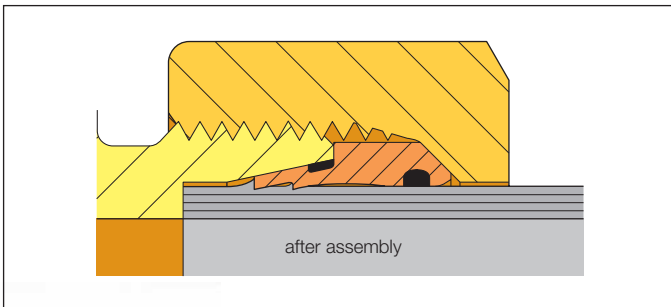
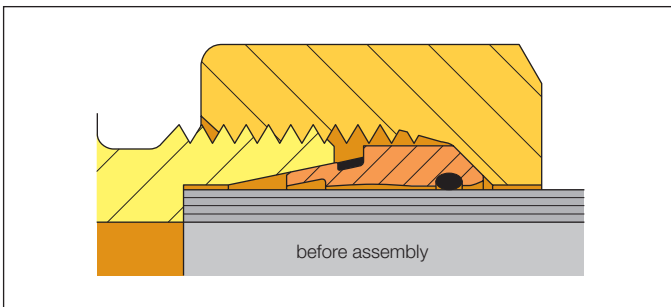
Another advantage is that the soft seals are chambered instable, gap-free installation spaces after the cutting rings are fitted. This prevents the extrusion of the soft seal, even at full system pressure.



Safety through block installation

The stable, gap-free chambering of the fine seal is achieved with the block installation of the ES-4 Cutting Ring. To be specific, this is achieved with a stronger pressing of the moulded seal onto the coupling taper, and with the gap-free, radial contact of the cutting ring on the outside tube diameter in the area of the O-ring seal. For this purpose, the cutting ring geometry is designed so that the maximum possible elasticity results despite the block effect. Block installation also ensures an incision limitation, which counteracts tube constriction with thin-walled tubes. This makes over-tightening of the connection considerably more difficult.

For block installation the same assembly forces apply as for 2S Cutting Rings. The checking of the correct cutting ring incision required by the standard can also be carried out unchanged. The fitter can continue to use the same working methods and tools.

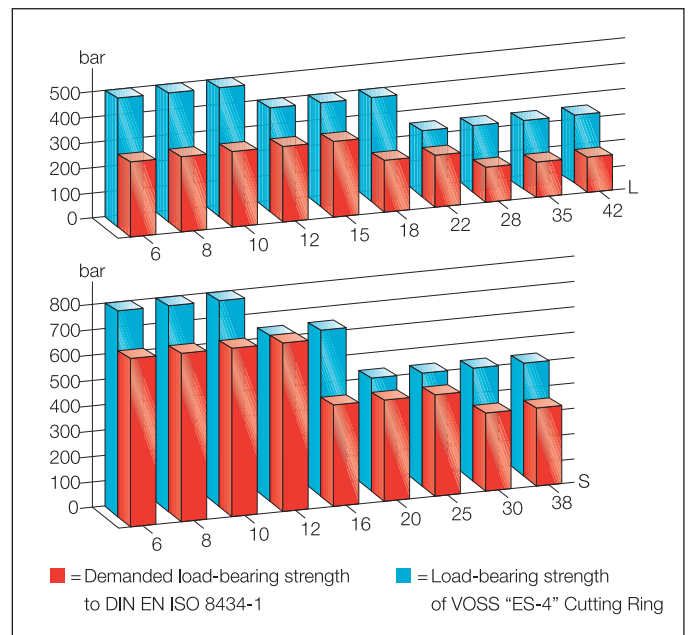


The economic advantages:

ES-4 couplings not only offer a high degree of security against leaks, but also additional economic benefits:

- Cost and time-intensive corrections are no longer required. Production failures are avoided.
- Dry connections help improve the image of the final product. The final customer achieves a competitive advantage over its competitors.
- With the ES-4 couplings, VOSS offers a uniform soft seal system. The user can considerably reduce the number of suppliers and minimise the number of orders required.
- Because ES-4 couplings consist of DIN/ISO connecting pieces and DIN/ISO nuts, the user does not need to establish and maintain a stock of special parts.
- As the user does not need to change either its assembly habits or its tools, additional costs for training and tools are eliminated.

Conclusion: In view of the advantages offered by the ES-4 couplings with regard to the greatest possible protection against leaks, they represent an interesting economical alternative in a cost-benefit comparison.



The "ES-4" Cutting Ring can be used even with the most extreme system pressures, up to 500 bar in the light "L" Series and up to 800 bar in the heavy "S" Series – and that with four-fold safety!

The demands of the applicable standards are thus far surpassed.

Design features

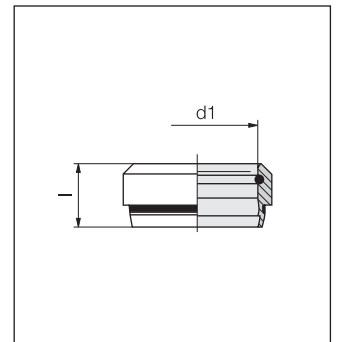
The soft sealed ES-4 cutting ring from VOSS brings the following advantages through the hydraulic coupling technology:

- **Proven double cutting edge technology** that guarantees a firm seat for the cutting ring with the massive material accumulation, distributes the force uniformly over the whole conical surface and ensures maximum protection against the cutting ring being torn out of the tube.
- **Additional precision seal** by a special moulded seal in the groove on the cutting ring taper and the additional O-ring between the cutting ring and the tube. Here leaks are eliminated which may be resulting from slackening of the metallic sealing.
- **Highest assembly reliability thanks to improved block stop** that causes the tightening torque to increase significantly if any over-assembly starts to occur, providing an unmistakable signal effect for the user and thus reliably preventing the risk of leaks.
- **Safe for use even with the most extreme system pressures** that can be up to 500 bar for the light “L” Series and up to 800 bar for the heavy “S” Series, and with its four-fold safety far surpassing the demands of DIN EN ISO 8434-1.
- **VOSS spring effect to compensate settling phenomena** that ensures lasting maintenance of the preloading forces occurring at the end of the assembly, compensates all settling effects of the joint under dynamic loads and permits its use also under elevated vibrational and reversed bending loads.
- **Reliable repeat assemblies** during which the union nut can be simply tightened with the same force as for the original assembly. The assembly procedures for the “ES-4” are identical with those for the “2S”.

Dimensions and pressure stage

Series	Tube-OD d1	Pressure	l	Order No.
L	6	PN 500	8.8	0 0 11 00 20 39
L	8	PN 500	8.8	0 0 11 05 20 39
L	10	PN 500	9.8	0 0 11 10 20 39
L	12	PN 400	9.8	0 0 11 15 20 39
L	15	PN 400	10.2	0 0 11 20 20 39
L	18	PN 400	10.2	0 0 11 25 20 39
L	22	PN 250	11.5	0 0 11 30 20 39
L	28	PN 250	11.5	0 0 11 35 20 39
L	35	PN 250	13.5	0 0 11 40 20 39
L	42	PN 250	13.5	0 0 11 45 20 39

Series	Tube-OD d1	Pressure	l	Order No.
S	6	PN 800	8.8	0 0 11 00 20 39
S	8	PN 800	8.8	0 0 11 05 20 39
S	10	PN 800	9.8	0 0 11 10 20 39
S	12	PN 630	9.8	0 0 11 15 20 39
S	14	PN 630	10.2	0 0 11 70 20 39
S	16	PN 630	10.2	0 0 11 75 20 39
S	20	PN 420	12.5	0 0 11 80 20 39
S	25	PN 420	12.5	0 0 11 85 20 39
S	30	PN 420	13.5	0 0 11 90 20 39
S	38	PN 420	13.5	0 0 11 95 20 39



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