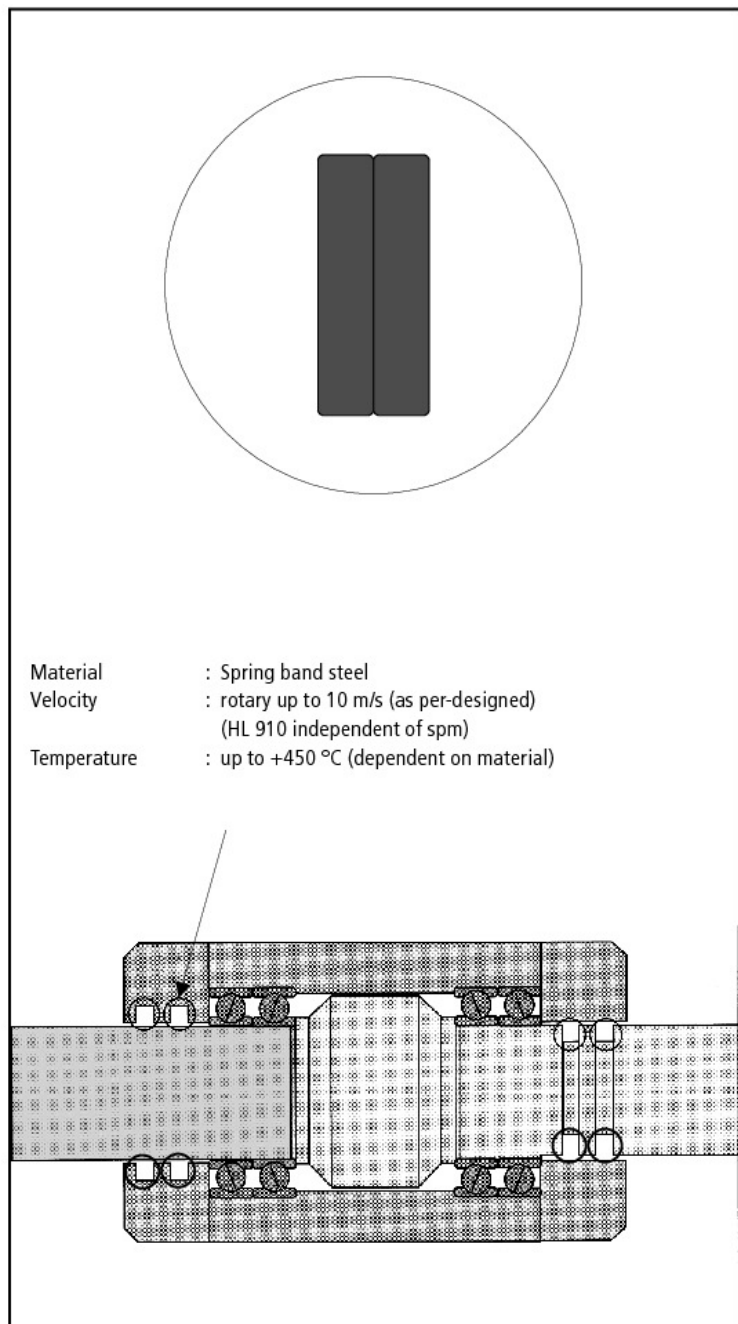




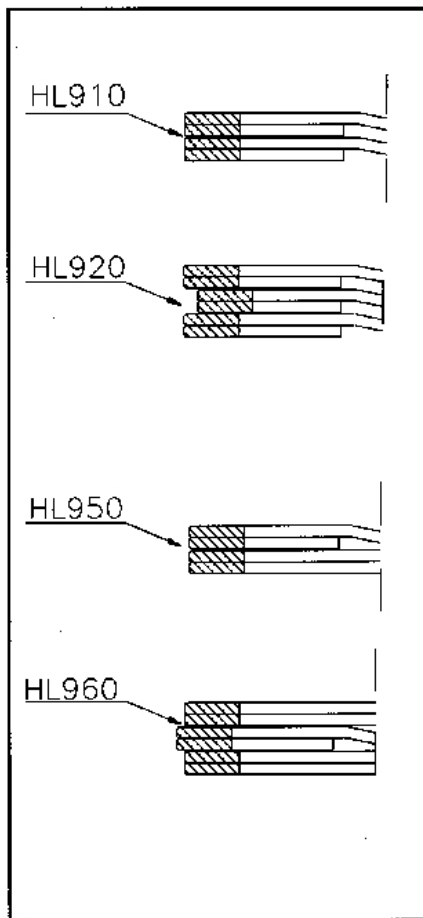
Double laminar rings of the series HL 910 to HL 960 are meant for gap seals to be used in vehicles and machine constructions. They have proven superiority in sealing for grease lubricated rolling and sliding contact bearings and also at very high velocities. These rings have been used for many years as protective rings against external dirt attack on sealing system.

Special Features:

- Sealing through labyrinth effect
- Elevated service life of downstream components like shaft seals, gaskets, roller and sliding contact bearings
- Minimal frictional losses in rotational applications
- Available in low-stress designs, also for oscillating applications like wiper-systems (see type HA 360)
- Laminar rings included on the pressure side reduce the consequences of the gradual Diesel effect
- Small equipment parts
- Very high service life period of operation
- Large range of temperature
- Sizes available up to $\varnothing = 1300$ mm



Material	: Spring band steel
Velocity	: rotary up to 10 m/s (as per-designed) (HL 910 independent of spm)
Temperature	: up to +450 °C (dependent on material)



Profile Overview

HL 910: Externally stressed double ring - two HL external-rings stretch against a housing bore. If the housing moves, the rings also move along with them. If the spindle/shaft moves, rings remain stationary.

Application: For grease sealing against splashed water and dirt. Also for special purpose seals (a.s. spindle sealing)
2 HL external rings = 1 Set HL 910

HL 920: Externally stressed combined double ring - two HL external rings stretch against a housing bore, and one HL internal ring stretches against groove root of the shaft or a special ring support. If the housing moves, both HL external rings move and the inner one remains stationary. If the shaft or ring support moves, the procedure is reversed.

Application: For grease sealing against heavy splashed water.
2 HL external rings + 1 HL internal rings = 1 Set HL 920

HL 950: Internally stressed double ring - two HL internal rings stretch against a shaft / spindle. If the shaft moves, the rings move along. If the grooved housing moves, rings remain stationary.

Application: For grease sealing against heavy splashed water and dirt .
2 HL internal rings = 1 Set HL 950

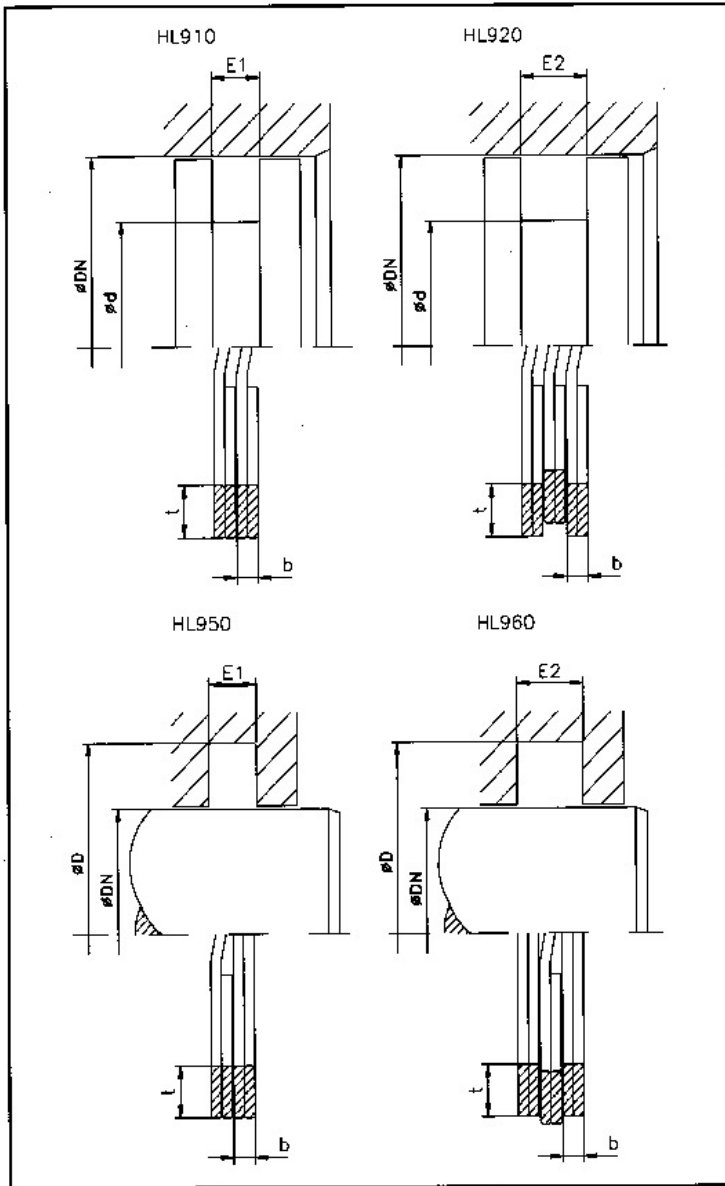
HL 960: Internally stressed combined double ring - two HL internal rings stretch against a shaft and one HL internal ring stretches against the groove root of the housing. If the shaft moves, the two HL internal rings move along and the external HL ring remains stationary. If the housing moves, the procedure is reversed.

Application: For grease sealing against heavy splashed water and dirt.
2 HL- internal rings + 1 HL- external ring = 1 Set HL 960

Material Overview:

FBS - Spring band steel C 75 or similar

CNS - Chrome nickel steel 1.4310 for special applications



Limitations on Use	
Velocity	: HL 910 (independent of spm) HL 920 6 m/s HL 950 10 m/s HL 960 6 m/s
Temperature	: material FBS up to + 300°C material CNS up to + 450°C

Media for Use	
Grease, mineral oils, flame resistant fluids (HFA, HFB, HFC), bio oils, water, air and other media depending on material	

Surface Finish			
Face	Rmax	Rz	Ra
Contact face	20,0 μ m	16,0 μ m	3,2 μ m
Groove root	20,0 μ m	16,0 μ m	3,2 μ m
Groove flank	20,0 μ m	16,0 μ m	3,2 μ m

Tolerances				
$\varnothing DN$	15-104,5 (mm)	105-149,5 (mm)	150-439 (mm)	440-1000 (mm)
t	+ 0,10 - 0,20	+ 0,10 - 0,20	+ 0,15 - 0,30	+ 0,20 - 0,40
b	+ 0,08 - 0,00	+ 0,10 - 0,00	+ 0,12 - 0,00	+ 0,14 - 0,00
E1/E2	+ 0,10 - 0,00	+ 0,15 - 0,00	+ 0,20 - 0,00	+ 0,25 - 0,00
$\varnothing d$	+ 0,00 - 0,20	+ 0,00 - 0,25	+ 0,00 - 0,30	+ 0,00 - 0,40
$\varnothing D$	+ 0,20 - 0,00	+ 0,25 - 0,00	+ 0,30 - 0,00	+ 0,40 - 0,00



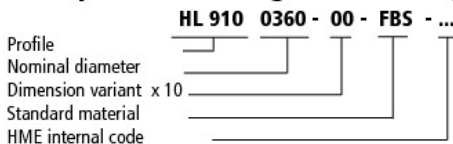
Ø DN	t	b	E1	E2	Ø d	Ø D
15,00 - 24,50	1,00	1,30	2,90	4,30	DN - 2,60	DN + 2,60
25,00 - 29,50	1,20	1,30	2,90	4,30	DN - 3,00	DN + 3,00
30,00 - 35,50	1,50	1,30	2,90	4,30	DN - 3,60	DN + 3,60
36,00 - 42,50	1,80	1,30	2,90	4,30	DN - 4,20	DN + 4,20
43,00 - 48,50	2,20	1,45	3,20	4,80	DN - 5,00	DN + 5,00
49,00 - 51,50	2,40	1,45	3,20	4,80	DN - 5,40	DN + 5,40
52,00 - 59,50	2,60	1,45	3,20	4,80	DN - 5,80	DN + 5,80
60,00 - 69,50	2,80	1,65	3,60	5,40	DN - 6,20	DN + 6,20
70,00 - 74,50	3,10	1,65	3,60	5,40	DN - 6,80	DN + 6,80
75,00 - 79,50	3,30	1,65	3,60	5,40	DN - 7,20	DN + 7,20
80,00 - 89,50	3,50	1,65	3,60	5,40	DN - 7,60	DN + 7,60
90,00 - 99,50	3,80	1,65	3,60	5,40	DN - 8,20	DN + 8,20
100,00 - 104,50	4,10	1,65	3,60	5,40	DN - 8,80	DN + 8,80
105,00 - 109,50	4,30	1,96	4,30	6,40	DN - 9,20	DN + 9,20
110,00 - 119,50	4,60	1,96	4,30	6,40	DN - 9,80	DN + 9,80
120,00 - 129,50	5,00	1,96	4,30	6,40	DN - 10,80	DN + 10,80
130,00 - 149,50	5,50	1,96	4,30	6,40	DN - 11,80	DN + 11,80
150,00 - 170,00	6,00	2,00	4,40	6,50	DN - 13,00	DN + 13,00
150,00 - 170,00*	6,00	3,00	6,40	9,60	DN - 13,00	DN + 13,00
171,00 - 199,00	7,00	2,00	4,40	6,50	DN - 15,00	DN + 15,00
171,00 - 199,00*	7,00	3,00	6,40	9,60	DN - 15,00	DN + 15,00
200,00 - 259,00	8,00	2,40	5,30	7,80	DN - 18,00	DN + 18,00
200,00 - 259,00*	8,00	3,00	6,40	9,60	DN - 18,00	DN + 18,00
260,00 - 319,00	9,00	3,00	6,40	9,60	DN - 20,00	DN + 20,00
320,00 - 399,00	10,00	3,00	6,60	9,80	DN - 22,00	DN + 22,00
400,00 - 439,00	11,00	3,00	6,60	9,80	DN - 24,00	DN + 24,00
440,00 - 600,00	12,00	3,00	6,60	9,80	DN - 26,00	DN + 26,00
440,00 - 600,00*	12,00	5,00	10,60	15,90	DN - 26,00	DN + 26,00
601,00 - 699,00	14,00	5,00	10,80	16,20	DN - 32,00	DN + 32,00
700,00 - 799,00	16,00	5,00	10,80	16,20	DN - 36,00	DN + 36,00
800,00 - 899,00	18,00	5,00	11,00	16,50	DN - 40,00	DN + 40,00
900,00 - 999,00	20,00	5,00	11,00	16,50	DN - 44,00	DN + 44,00

* = reforced design (dimension var. 01)

Standard Diameter Increase

0,50 mm	Ø	15,00 - 149,50 mm
1,00 mm	Ø	150,00 - 439,00 mm
5,00 mm	Ø	440,00 - 1300,00 mm

Example for ordering Laminar Ring:



Profile Key:

- HL910 - external stressed double ring
- HL920 - external stressed combined double ring
- HL950 - internal stressed double ring
- HL960 - internal stressed combined double ring

Material Key:

- FBS - spring band steel C 75
- CNS - Chrome Nickel Steel 1.4310

Dimension Variant.:

- 00 - standard design
- 01 - reforced design

Issue

01 05

WARNING: Limits of application stated herein are standard values. They could be individually transgressed with due consideration to respective service conditions. In the event of a large duty cycle, pulsating operation and other complex operational conditions, simultaneous transgression of these values is not recommended. Due to a large variety of service conditions that may arise in course of actual use, the company does not take responsibility of or guarantee the functional accuracy of the individual components. Rights for changes are reserved.