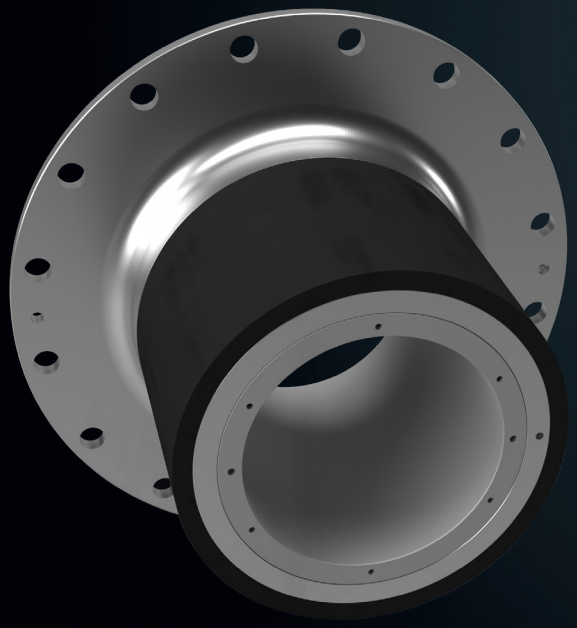
GEISLINGER
HUB



LIGHTWEIGHT

TORSIONAL VIBRATION CENTER

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Index

Geislinger Hub Description

• Application

The use of fibre-reinforced composite shafts is a major benefit for lightweight powertrains due to their low mass. The innovative Geislinger Hub (patents pending) connects a cylindrical solid shaft by means of a bolted flange and helps to further reduce the weight of the whole driveline. Compared to conventional hub designs, the Geislinger Hub also facilitates the design of shaftlines that are much more compact due to higher torque transmission within the same installation space.

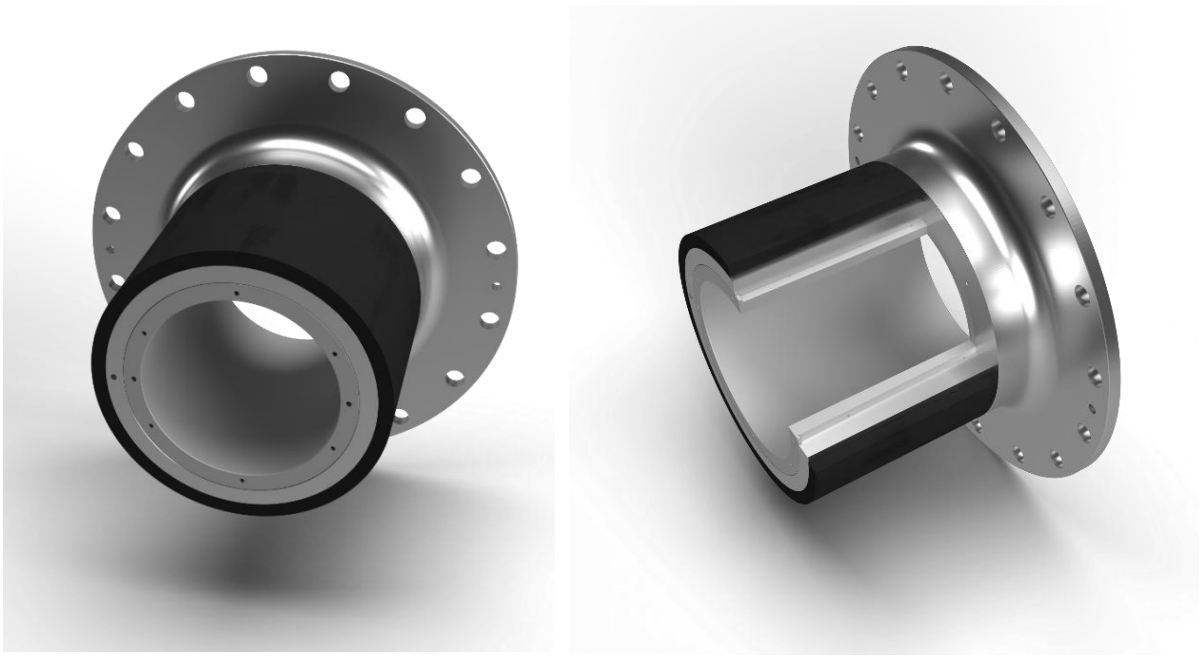
• Advantages

- ☐ Very low mass
- ☐ Very low mass moment of inertia
- ☐ Easy installation
- ☐ Maintenance free
- ☐ Long service life
- ☐ Fire-resistant version available

• Design and Materials

Drawing on Geislinger's decades of experience in the field of fibre-reinforced composite technology, the Geislinger Hub features an outer reinforcement of the hub shell. This reinforcement ring, as shown in Fig. 1, achieves a significantly higher stiffness within the same connection dimensions while weighing less in comparison to conventional designs. Notably, this ring is made of the same reliable, high-performance material used for Gesilco® shaftlines.

Fig. 1

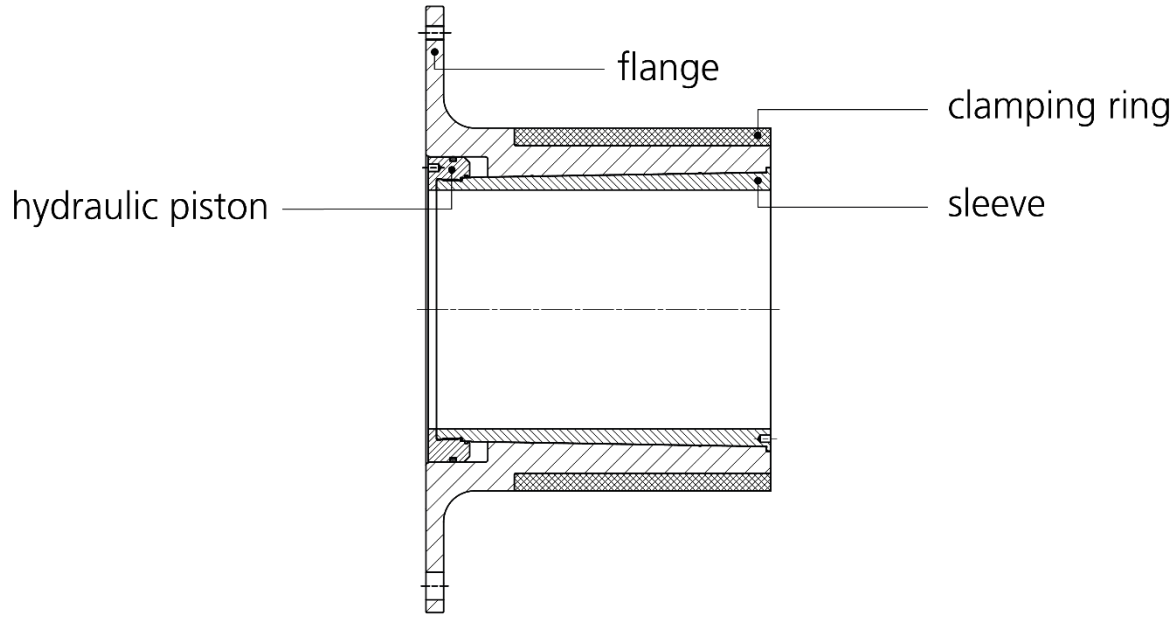


To optimise the frictional connection of torque transmission, the surfaces are treated with a special friction-enhancing measure, which has been used reliably for years in various Geislinger products. This advantageous design produces a high coefficient of friction. Importantly, the special design quality comes from modifying the base material itself, and not from coating it. As a result, adhesion problems do not arise with any connecting layers.

The Geislinger Hub is characterised by its easy assembly process, which involves expanding and closing the compression joint axially using high-pressure pumps. This technique of expansion is state of the art for the assembly of shaft-hub connections. An additional hydraulic mechanism makes it easy and reliable to generate joint pressure in the connecting surfaces.

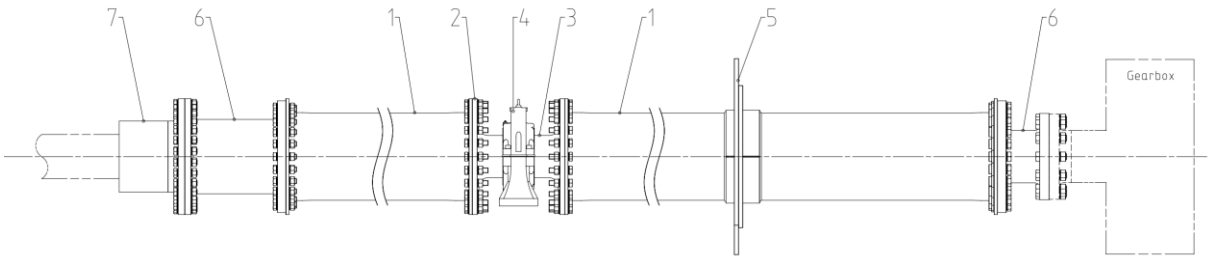
The Geislinger Hub in Fig. 2 consists of three main components: the fibre-reinforced composite clamping ring, a steel flange and a sleeve with a friction-enhanced surface, which optimally transmits the torque to the shaft. For easy assembly, the Geislinger Hub features a hydraulic piston for generating the necessary mounting pressure. The design ensures uniform pressure across the sleeve in order to reliably distribute the applied loads.

Fig.2



As shown in Fig. 3, a typical lightweight drivetrain comprises: (1) Gesilco® shafts with integrated flanges or (2) steel flanges, (3) steel intermediate shafts, (4) bearings, (5) bulkhead seal, (6) steel adapters, (7) Geislinger Hub and, where applicable, additional Gesilco® misalignment couplings. Notably, each Geislinger component is selected on the basis of durability, robustness and lightweight design.

Fig. 3



The Gesilco® shaft (1) and the pressure ring of the Geislinger Hub (7) are manufactured from carbon fibres and epoxy resin using filament winding technology. The epoxy resin is cured at a high temperature resulting in a service temperature of up to 100°C.

The connecting flange of the Geislinger Hub is optimised for minimal weight but can also be manufactured to customer specifications.

Additionally, the Geislinger Hub can be supplied with a special fire-resistant outer layer. When combined with a sprinkler system mounted above the Geislinger Hub, the SOLAS® fire resistance requirements can be met without the need for an additional housing.

- ## Installation

The Geislinger Hub can be customised to meet standard installation requirements. The connecting diameter can be tailored to the customer's specific needs.

- ## Geislinger Calculation Services

As a manufacturer of torsional elastic damping couplings, Geislinger has extensive experience in Torsional Vibration Calculations (TVCs). Using proprietary software, Geislinger provides its customers with TVCs for Geislinger products.

- ## Approvals

The development of the Geislinger Hub adheres to the standards of ISO 9001. Furthermore, certificates from major classification societies as well as ATEX certification can be provided upon delivery.

Designation

- **Designation**

The Geislinger Hub, as presented in this catalogue, is subdivided into different inner diameters. There are two versions available for each specified inner diameter, which differ in design. Version A is more compact and longer, while version B is shorter and its clamping ring has a larger radial size (see Table 1 in the "Technical Data" section). The length of the hub is also included in the product designation.

Designation Example:

GH 240/350/UB

G	Geislinger
H	Hub
240	Inner diameter of hub
350	Length of hub
U	Reversible torque transmission
B	Bolted (with flange for screw connection)

Selection

• Selection

The technical data of the above-mentioned Geislinger Hub is listed in the "Technical Data" section (Table 1).

For a given driveline, the data in Table 1 and the information below will help to select and size a Geislinger Hub with an optimum weight and connection dimensions.

- Nominal torque
- Outer diameter of the steel shaft to be connected
- Connection dimensions

A Geislinger Hub is usually selected according to the order listed above and as described in the following chapters.

• Nominal Torque T_{KN}

The mean torque T of the driveline is calculated from the engine power P and the rotational speed n using the following formula:

$$T = 9.55 \cdot \frac{P}{n}$$

T	mean torque	kNm
P	engine power	kW
n	rotational speed	min^{-1}

The Geislinger Hub should be selected in such a way that the nominal torque of the shaft T_{KN} is higher than the mean torque T to be transmitted:

$$T_{KN} > T$$

• Permissible Vibratory Torque T_v

The permissible vibratory torque T_v shall be considered as follows:

$$T_v \leq T_{KN} \cdot 0.3$$

T_v	vibratory torque	kNm
T_{KN}	nominal torque	kNm

- **Maximum Transmissible Torque T_{MAX}**

The maximum transmissible torque T_{MAX} for the Geislinger Hub is calculated using an in-house developed software tool in order to accurately predict its properties. The mathematical relation between the maximum transmissible torque T_{MAX} and the given nominal torque T_{KN} is as follows:

$$T_{MAX} = 2.5 \cdot T_{KN}$$

T_{MAX}	maximum transmissible torque	kNm
T_{KN}	nominal torque	kNm

For marine applications, classification societies may require higher safety factors, which are described in the corresponding rules.

- **Maximum Rotational Speed n_{max}**

The maximum rotational speed of the Geislinger Hub can be simulated upon request.

- **Temperature and Humidity**

Proper selection of raw materials for the couplings depends on the desired service temperature and humidity. Normally, the Geislinger Hub is designed for an ambient temperature of 80°C for continuous engine room operation and 100°C for a short-term engine room environment. Raw materials with a higher temperature resistance can be delivered upon request.

- **Flange Connections**

To connect the Geislinger Hub using the best possible method, predefined flange designs are available. In addition, Geislinger is always prepared to manufacture other connections if economically and technically feasible. Should other assembly dimensions be required, please contact Geislinger.

- **Torsional Stiffness C_T**

The Geislinger Hub can be considered torsionally rigid compared to torsionally soft couplings. If needed, more accurate data can be provided upon request.

- **Axial Stiffness C_a**

The Geislinger Hub can be considered axially rigid compared to misalignment compensating couplings. If needed, more accurate data can be provided upon request.

- **Axial Load**

It is important to take axial load into consideration, as it reduces the transmissible torque. Please consult Geislinger engineers for a suitable solution for your specific use case.

- **Radial Load**

Radial loads do not affect the transmissible torque. Radial load conditions can be checked upon request.

Technical Data

- **Table 1: Technical Data of the Geislinger Hub**

Designation	Version	Shaft diameter	Maximum torque	Nominal torque	Press-fit outer diameter	Flange outer diameter	Minimum flange radius acc. to DNV	Minimum flange thickness acc. to DNV	Total length	Mass moment of inertia	Total weight
		mm	kNm	kNm	mm	mm	mm	mm	mm	kgm²	kg
GH 180 / 260	A	180	221	88	310	435	19	27	263	1.8	98
GH 180 / 190	B	180	140	56	300	399	16	20	191	1.1	64
GH 190 / 280	A	190	260	104	330	449	20	28	277	2.1	106
GH 190 / 200	B	190	163	65	315	416	17	21	201	1.3	69
GH 200 / 290	A	200	300	120	340	472	21	30	292	2.8	127
GH 200 / 210	B	200	186	74	325	435	18	23	212	1.6	80
GH 210 / 310	A	210	350	140	353	498	22	32	306	3.3	137
GH 210 / 220	B	210	205	82	330	442	18	24	222	1.7	80
GH 220 / 320	A	220	410	164	370	517	23	34	321	4.4	165
GH 220 / 230	B	220	245	98	350	468	19	25	233	2.4	100
GH 230 / 340	A	230	470	188	380	549	24	36	336	5.2	176
GH 230 / 240	B	230	270	108	355	485	20	27	244	2.6	103
GH 240 / 350	A	240	522	209	395	566	25	37	350	6.5	209
GH 240 / 250	B	240	307	123	370	502	21	28	254	3.3	123
GH 250 / 370	A	250	600	240	410	595	26	39	365	7.7	223
GH 250 / 270	B	250	345	138	380	525	22	29	265	3.8	129
GH 260 / 380	A	260	655	262	425	611	27	40	379	9.5	260
GH 260 / 280	B	260	410	164	410	557	23	30	275	5.3	161
GH 270 / 390	A	270	745	298	440	638	28	42	394	11.0	276
GH 270 / 290	B	270	449	180	425	574	24	31	286	6.2	174

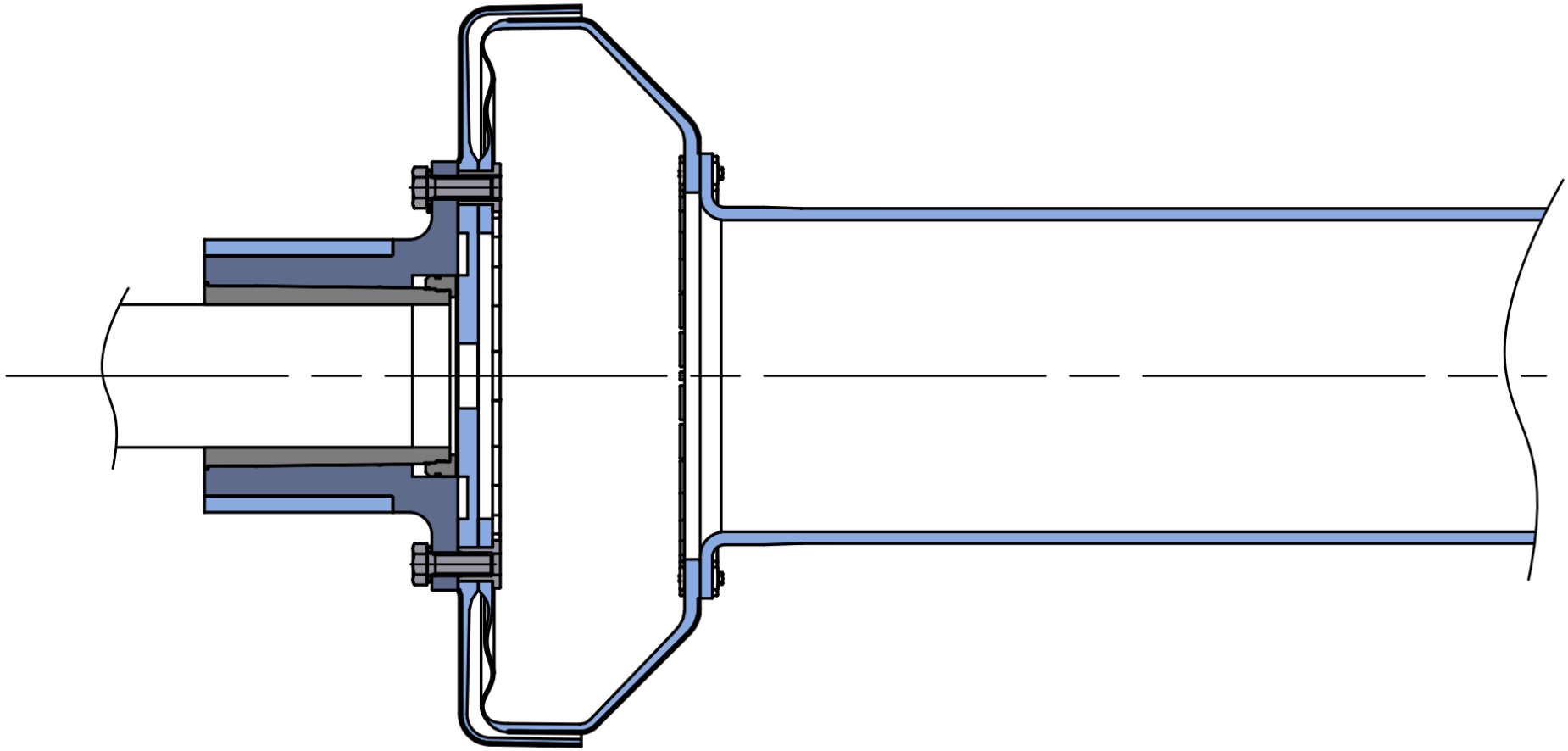
The technical data provided is subject to change without prior notice and is not accompanied by any warranty. Any modifications to the dimensions or design are reserved.

Table 1 lists the Geislinger Hub with a nominal torque rating that exceeds the mean torque of the application. To optimise weight, Table 1 provides options for Geislinger Hubs with equal shaft diameters but different nominal torque ratings. The selection can be made between a compact, longer version that is axially oriented and a shorter, radially larger version depending on the available installation space.

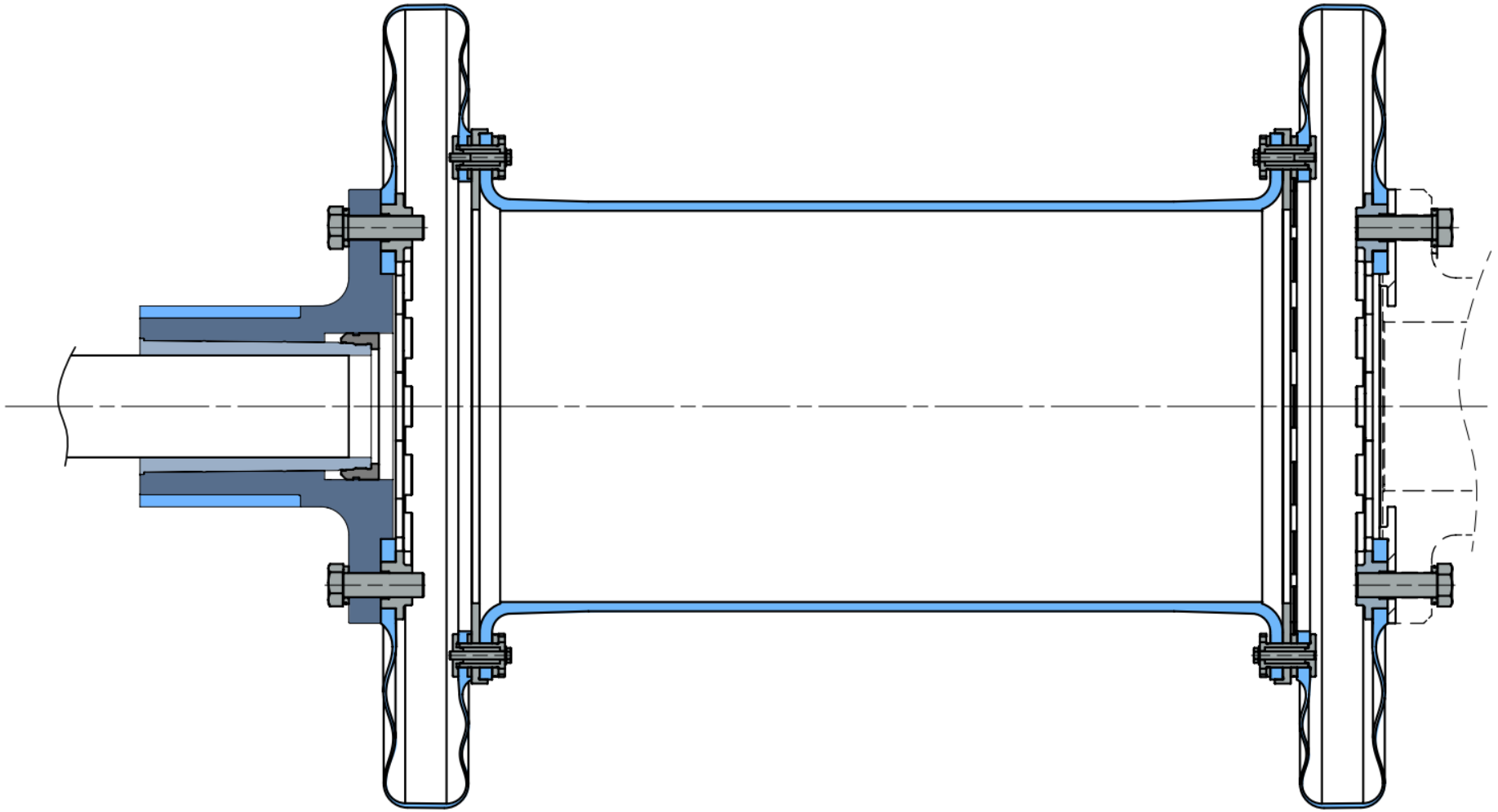
Geislinger can develop customised solutions based on the information presented in Table 1, taking into consideration the specific requirements of the application and the customer.

Examples

- **Geislinger Hub and Gesilco® Shaftline with Gesilco® MB Coupling in Fire-resistant Version**



- **Geislinger Hub and Gesilco® CS Coupling**



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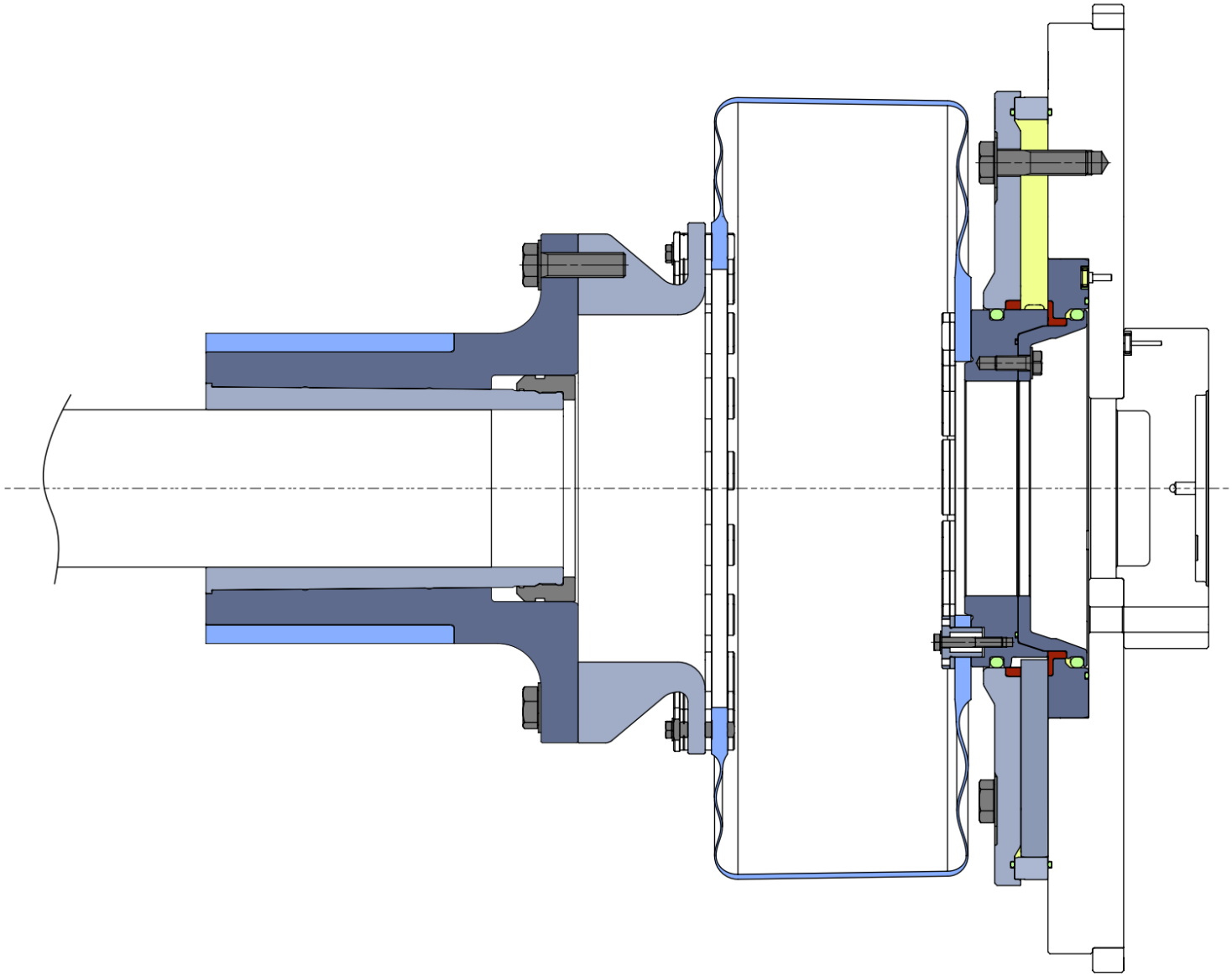
- **Geislinger Hub, Geislinger BE Coupling and Gesilco® CS Coupling**



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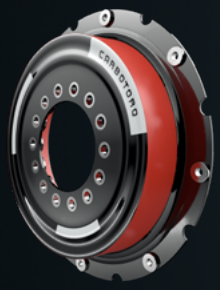
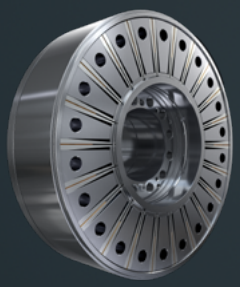
Geislinger Coupling

Geislinger Silenco®

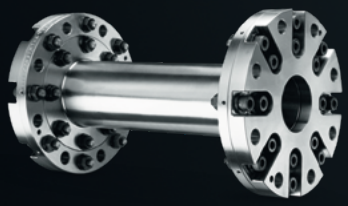


Geislinger Carbotorq®

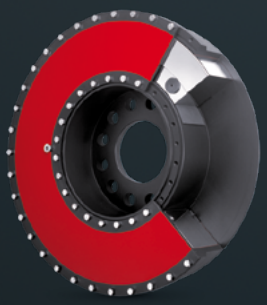
Geislinger Digital Solutions



Geislinger Damper



Geislinger Flexlink



Geislinger Vdamp®

Geislinger Gesilco®

Geislinger Gesilco® Shaft

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