ETP-CLASSIC®

Key processing is not required
Any trouble caused by keys such as a keyway processing can be resolved. Furthermore, the processing tolerance of the shaft · hub is general tolerance that special finish is not required.

Single-piece construction
Easy to use by its simple single-piece construction

High Torque
The permissible transfer torque is high, and it is also tolerant of heavy thrust loading.

Zero thrust load
Only the radial load acts on the shaft and hub that the thrust load becomes zero.

Adapted to the RoHS
Adapted to the Restriction of Hazardous Substances defined by EU that bans the use of 6 substances such as mercury or lead.

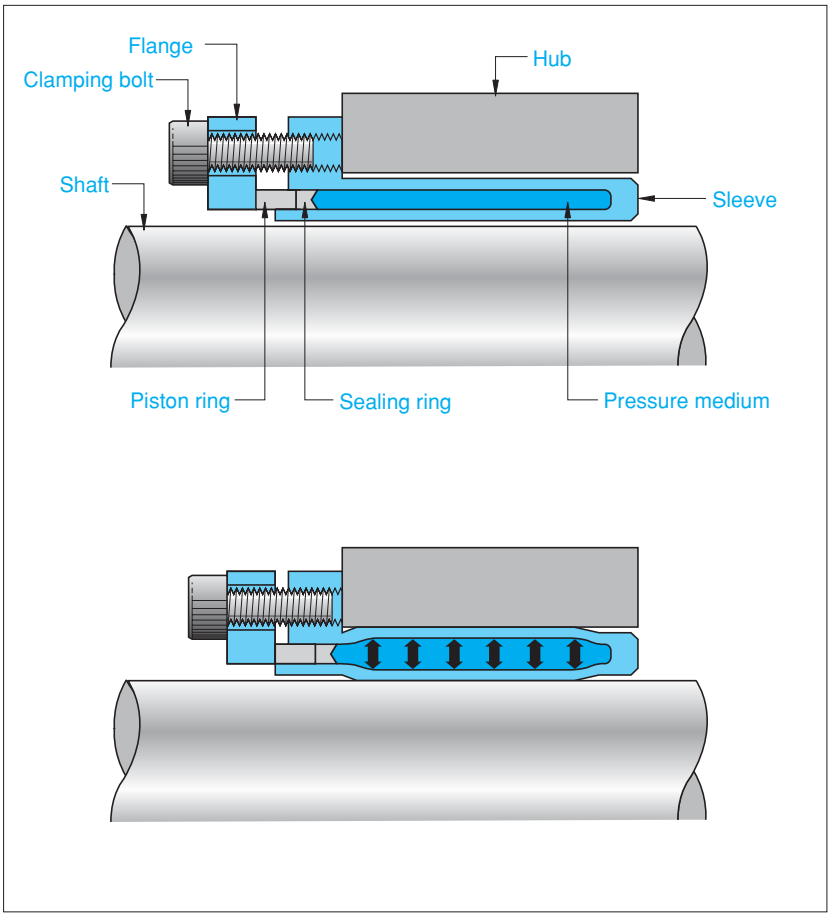
ETP Transmission AB

Max. permissible torque [N·m]	30～12500
Max. permissible thrust power [N]	4000～264000
Bore diameter [mm]	ϕ15～100
Operating temp. limit [℃]	−30～+85
Backlash	Zero
Concentricity [mm]	0.05

Principle of Operation

ETP-CLASSIC

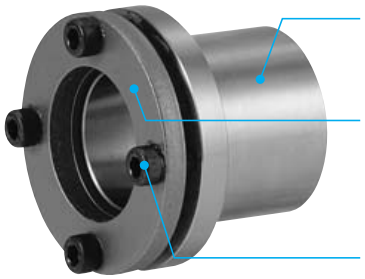
- The pressure medium contained in the sleeve is sealed with the sealing ring, and it is mechanically compressed through the flange, piston ring and sealing ring by tightening the clamping bolt. By the compression of the pressure medium, the sleeve is pressurized from inside. This makes the shaft-side sleeve expand and the hub-side sleeve enlarge that the shaft and hub are fastened through the sleeve.



Structure and material

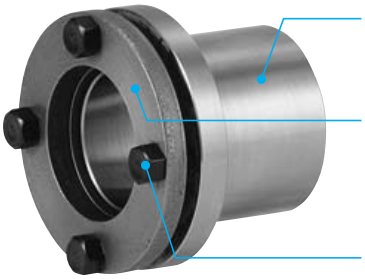
ETP-A

Compared with the mechanical-method fastening element, installation is simpler due to the number of bolts to be used. Mounting and dismounting can be easily performed due to the pressure medium.



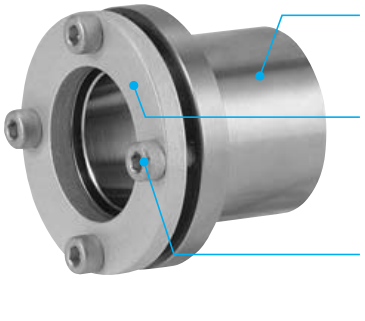
ETP-A-B (Hexagon bolt specification)

Hexagon bolt is used for the clamping bolt. The ETP-A-B can be assembled if there is not enough space in the thrust direction.



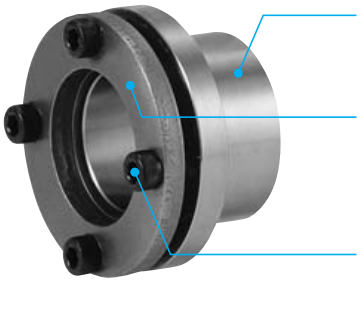
ETP-A-C (Basic antirust specification)

A basic antirust specification with electroless nickel plating coated on the body.



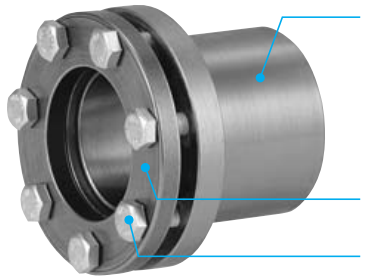
ETP-A-S (Short specification)

Short-length sleeve specification
Correspond to the parts with a thin hub.



ETP-A-R (Stainless specification)

Basic antirust specification with stainless material used on the body.



ETP-A

Single bolt tightening | Center ring | No axial direction displacement | Basic antirust | Stain less

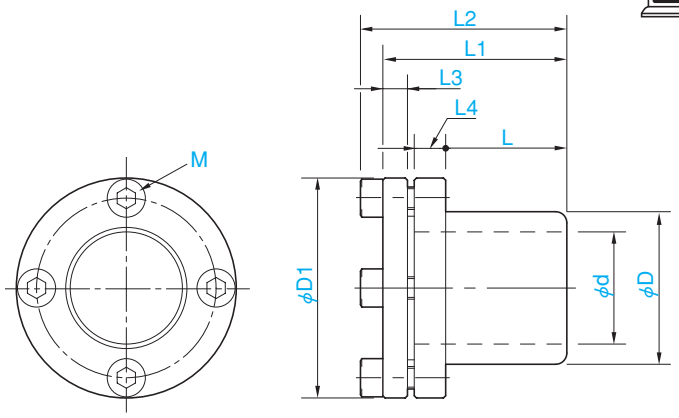
Specification

Model	Max. permissible torque [N·m]	Max. permissible thrust power [N]	Shaft-side surface pressure [N/mm²]	Hub-side surface pressure [N/mm²]	Bolt tightening torque [N·m]	Moment of inertia [kg·m²]	Mass [kg]	Price
ETP-A-15	55	7300	90	80	6	0.018×10^{-3}	0.10	—
ETP-A-19	100	10600	90	80	8	0.046×10^{-3}	0.17	—
ETP-A-20	125	12500	90	80	8	0.046×10^{-3}	0.16	—
ETP-A-22	135	12300	90	80	8	0.065×10^{-3}	0.19	—
ETP-A-24	200	16700	90	80	8	0.067×10^{-3}	0.20	—
ETP-A-25	250	20000	90	80	8	0.071×10^{-3}	0.19	—
ETP-A-28	300	21400	90	80	8	0.12×10^{-3}	0.26	—
ETP-A-30	420	28000	90	80	8	0.14×10^{-3}	0.29	—
ETP-A-32	420	26300	90	80	8	0.20×10^{-3}	0.35	—
ETP-A-35	650	37100	90	80	8	0.25×10^{-3}	0.40	—
ETP-A-38	750	39500	90	80	8	0.31×10^{-3}	0.43	—
ETP-A-40	940	47000	90	80	8	0.44×10^{-3}	0.55	—
ETP-A-42	940	44800	90	80	8	0.47×10^{-3}	0.55	—
ETP-A-45	1290	57300	90	80	13	0.69×10^{-3}	0.71	—
ETP-A-48	1570	65400	90	80	13	0.83×10^{-3}	0.78	—
ETP-A-50	1900	76000	90	80	13	1.05×10^{-3}	0.86	—
ETP-A-55	2500	90900	90	80	13	1.43×10^{-3}	1.06	—
ETP-A-60	3400	113000	90	80	13	2.15×10^{-3}	1.37	—
ETP-A-65	3500	108000	90	80	13	3.10×10^{-3}	1.67	—
ETP-A-70	5200	149000	90	80	32	4.08×10^{-3}	2.04	—
ETP-A-75	6300	168000	90	80	32	5.50×10^{-3}	2.42	—
ETP-A-80	8800	220000	90	80	32	8.10×10^{-3}	2.64	—
ETP-A-90	11000	244000	90	80	32	12.2×10^{-3}	3.54	—
ETP-A-100	15500	310000	90	80	32	19.9×10^{-3}	4.80	—

* ETP-A-65~ETP-A100 are order products.
* The maximum permissible torque is the value when the thrust power is zero, and the maximum permissible thrust power is the value when the torque is zero.
* The maximum permissible torque, the maximum permissible thrust power, the shaft-side surface pressure and the hub-side surface pressure are the values when the temperature is 20℃.

Dimensions

CAD



Ordering Information

ETP - A - □

Size

Unit [mm]

Model	d	D	D1	L	L1	L2	L3	L4	M	CAD file No.
ETP-A-15	15	23	37.5	17	28	33	5	5.4	3-M5×10	ETP-A01
ETP-A-19	19	28	45	21	34	39	5.5	6.9	3-M5×12	ETP-A02
ETP-A-20	20	28	45	22	35	40	5.5	6.4	3-M5×12	ETP-A03
ETP-A-22	22	32	49	22	35	40	5.5	6.4	4-M5×12	ETP-A04
ETP-A-24	24	34	49	25	38	43	5.5	6.4	4-M5×12	ETP-A05
ETP-A-25	25	34	49	27	41	46	5.5	6.9	4-M5×12	ETP-A06
ETP-A-28	28	39	55	29	43	48	5.5	6.9	4-M5×12	ETP-A07
ETP-A-30	30	41	57	32	46	51	5.5	6.9	4-M5×12	ETP-A08
ETP-A-32	32	43	60	34	50	55	7	7.4	4-M5×14	ETP-A09
ETP-A-35	35	47	62.5	37	53	58	7	7.4	6-M5×14	ETP-A10
ETP-A-38	38	50	65	41	57	62	7	7.4	6-M5×14	ETP-A11
ETP-A-40	40	53	70	43	60	65	7.5	8.4	6-M5×16	ETP-A12
ETP-A-42	42	55	70	45	62	67	7.5	8.4	6-M5×16	ETP-A13
ETP-A-45	45	59	77	49	66	72	8	8.4	6-M6×16	ETP-A14
ETP-A-48	48	62	80	52	70	76	8	8.4	6-M6×16	ETP-A15
ETP-A-50	50	65	83	53	72	78	8.5	9.4	6-M6×18	ETP-A16
ETP-A-55	55	71	88	58	77	83	9	9.4	8-M6×18	ETP-A17
ETP-A-60	60	77	95	64	85	91	10	10.4	8-M6×20	ETP-A18
ETP-A-65	65	84	102	68	90	96	9.5	10.9	8-M6×20	ETP-A19
ETP-A-70	70	90	113	72	94	102	9.5	10.9	6-M8×20	ETP-A20
ETP-A-75	75	95	118	85	108	116	11	11	6-M8×22	ETP-A21
ETP-A-80	80	100	123	90	114	122	11	11	6-M8×22	ETP-A22
ETP-A-90	90	112	135	100	127	135	12.5	12.5	8-M8×25	ETP-A23
ETP-A-100	100	125	148	110	139	147	13.5	13	8-M8×25	ETP-A24

* L1 and L2 are the measurements when the ETP-CLASSIC is fixed. These may be changed depending on the fit tolerance of the shaft diameter and the inside diameter of the hub.

ETP-A-B

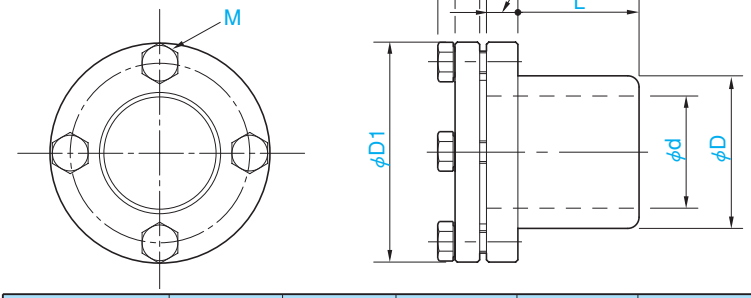
Single bolt tightening | Center ring | No axial direction displace-ment | Basic antirust | Stain less

Specification

Model	Max. permissible torque [N·m]	Max. permissible thrust power [N]	Shaft-side surface pressure [N/mm²]	Hub-side surface pressure [N/mm²]	Bolt tightening torque [N·m]	Moment of inertia [kg·m²]	Mass [kg]	Price
ETP-A-15-B	55	7300	90	80	6	0.018×10^{-3}	0.10	—
ETP-A-19-B	100	10600	90	80	8	0.046×10^{-3}	0.17	—
ETP-A-20-B	125	12500	90	80	8	0.046×10^{-3}	0.16	—
ETP-A-22-B	135	12300	90	80	8	0.065×10^{-3}	0.19	—
ETP-A-24-B	200	16700	90	80	8	0.067×10^{-3}	0.20	—
ETP-A-25-B	250	20000	90	80	8	0.071×10^{-3}	0.19	—
ETP-A-28-B	300	21400	90	80	8	0.12×10^{-3}	0.26	—
ETP-A-30-B	420	28000	90	80	8	0.14×10^{-3}	0.29	—
ETP-A-32-B	420	26300	90	80	8	0.20×10^{-3}	0.35	—
ETP-A-35-B	650	37100	90	80	8	0.25×10^{-3}	0.40	—
ETP-A-38-B	750	39500	90	80	8	0.31×10^{-3}	0.43	—
ETP-A-40-B	940	47000	90	80	8	0.44×10^{-3}	0.55	—
ETP-A-42-B	940	44800	90	80	8	0.47×10^{-3}	0.55	—
ETP-A-45-B	1290	57300	90	80	13	0.69×10^{-3}	0.71	—
ETP-A-48-B	1570	65400	90	80	13	0.83×10^{-3}	0.78	—
ETP-A-50-B	1900	76000	90	80	13	1.05×10^{-3}	0.86	—
ETP-A-55-B	2500	90900	90	80	13	1.43×10^{-3}	1.06	—
ETP-A-60-B	3400	113000	90	80	13	2.15×10^{-3}	1.37	—
ETP-A-65-B	3500	108000	90	80	13	3.10×10^{-3}	1.67	—
ETP-A-70-B	5200	149000	90	80	32	4.08×10^{-3}	2.04	—
ETP-A-75-B	6300	168000	90	80	32	5.50×10^{-3}	2.42	—
ETP-A-80-B	8800	220000	90	80	32	8.10×10^{-3}	2.64	—
ETP-A-90-B	11000	244000	90	80	32	12.2×10^{-3}	3.54	—
ETP-A-100-B	15500	310000	90	80	32	19.9×10^{-3}	4.80	—

* The ETP-A-65-B~ETP-A100-B are order products.
* The maximum permissible torque is the value when the thrust power is zero, and the maximum permissible thrust power is the value when the torque is zero.
* The maximum permissible torque, the maximum permissible thrust power, the shaft-side surface pressure and the hub-side surface pressure are the values when the temperature is 20℃.

Dimensions



Ordering Information

ETP - A - □ - B

Size

Type (B: Hexagon bolt specification)

Unit [mm]

Model	d	D	D1	L	L1	L2	L3	L4	M	CAD file No.
ETP-A-15-B	15	23	37.5	17	28	32.5	5	5.4	3-M5×10	ETP-AB01
ETP-A-19-B	19	28	45	21	34	38.5	5.5	6.9	3-M5×12	ETP-AB02
ETP-A-20-B	20	28	45	22	35	39.5	5.5	6.4	3-M5×12	ETP-AB03
ETP-A-22-B	22	32	49	22	35	39.5	5.5	6.4	4-M5×12	ETP-AB04
ETP-A-24-B	24	34	49	25	38	42.5	5.5	6.4	4-M5×12	ETP-AB05
ETP-A-25-B	25	34	49	27	41	45.5	5.5	6.9	4-M5×12	ETP-AB06
ETP-A-28-B	28	39	55	29	43	47.5	5.5	6.9	4-M5×12	ETP-AB07
ETP-A-30-B	30	41	57	32	46	50.5	5.5	6.9	4-M5×12	ETP-AB08
ETP-A-32-B	32	43	60	34	50	54.5	7	7.4	4-M5×14	ETP-AB09
ETP-A-35-B	35	47	62.5	37	53	57.5	7	7.4	6-M5×14	ETP-AB10
ETP-A-38-B	38	50	65	41	57	61.5	7	7.4	6-M5×14	ETP-AB11
ETP-A-40-B	40	53	70	43	60	64.5	7.5	8.4	6-M5×16	ETP-AB12
ETP-A-42-B	42	55	70	45	62	66.5	7.5	8.4	6-M5×16	ETP-AB13
ETP-A-45-B	45	59	77	49	66	71	8	8.4	6-M6×16	ETP-AB14
ETP-A-48-B	48	62	80	52	70	75	8	8.4	6-M6×16	ETP-AB15
ETP-A-50-B	50	65	83	53	72	77	8.5	9.4	6-M6×18	ETP-AB16
ETP-A-55-B	55	71	88	58	77	82	9	9.4	8-M6×18	ETP-AB17
ETP-A-60-B	60	77	95	64	85	90	10	10.4	8-M6×20	ETP-AB18
ETP-A-65-B	65	84	102	68	90	95	9.5	10.9	8-M6×20	ETP-AB19
ETP-A-70-B	70	90	113	72	94	100.5	9.5	10.9	6-M8×20	ETP-AB20
ETP-A-75-B	75	95	118	85	108	114.5	11	11	6-M8×22	ETP-AB21
ETP-A-80-B	80	100	123	90	114	120.5	11	11	6-M8×22	ETP-AB22
ETP-A-90-B	90	112	135	100	127	133.5	12.5	12.5	8-M8×25	ETP-AB23
ETP-A-100-B	100	125	148	110	139	145.5	13.5	13	8-M8×25	ETP-AB24

* L1 and L2 are the measurements when the ETP-CLASSIC is fixed. These may be changed depending on the fit tolerance of the shaft diameter and the inside diameter of the hub.

ETP-A-C

Single bolt tightening | Center ring | No axial direction displacement | Basic antirust | Stain less

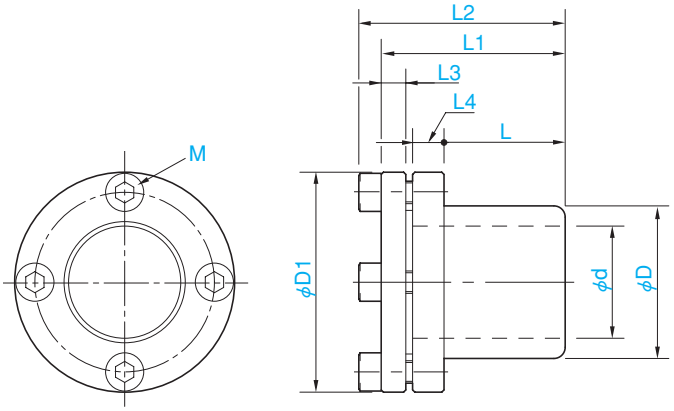
Specification

Model	Max. permissible torque [N·m]	Max. permissible thrust power [N]	Shaft-side surface pressure [N/mm²]	Hub-side surface pressure [N/mm²]	Bolt tightening torque [N·m]	Moment of inertia [kg·m²]	Mass [kg]	Price
ETP-A-15-C	41	5000	90	80	6	0.018×10^{-3}	0.10	—
ETP-A-19-C	75	7400	90	80	8	0.046×10^{-3}	0.17	—
ETP-A-20-C	94	8700	90	80	8	0.046×10^{-3}	0.16	—
ETP-A-25-C	188	14000	90	80	8	0.071×10^{-3}	0.19	—
ETP-A-30-C	315	19000	90	80	8	0.14×10^{-3}	0.29	—
ETP-A-35-C	488	26000	90	80	8	0.25×10^{-3}	0.40	—
ETP-A-40-C	705	33000	90	80	8	0.44×10^{-3}	0.55	—
ETP-A-45-C	968	40000	90	80	13	0.69×10^{-3}	0.71	—
ETP-A-50-C	1426	53000	90	80	13	1.05×10^{-3}	0.86	—

* The maximum permissible torque is the value when the thrust power is zero, and the maximum permissible thrust power is the value when the torque is zero.
* The maximum permissible torque, the maximum permissible thrust power, the shaft-side surface pressure and the hub-side surface pressure are the values when the temperature is 20℃.

Dimensions

CAD



Ordering Information

ETP - A - □ - C

Size

Type (C: Basic antirust specification)

Unit [mm]

Model	d	D	D1	L	L1	L2	L3	L4	M	CAD file No.
ETP-A-15-C	15	23	37.5	17	28	33	5	5.4	3-M5×10	ETP-A01
ETP-A-19-C	19	28	45	21	34	39	5.5	6.9	3-M5×12	ETP-A02
ETP-A-20-C	20	28	45	22	35	40	5.5	6.4	3-M5×12	ETP-A03
ETP-A-25-C	25	34	49	27	41	46	5.5	6.9	4-M5×12	ETP-A06
ETP-A-30-C	30	41	57	32	46	51	5.5	6.9	4-M5×12	ETP-A08
ETP-A-35-C	35	47	62.5	37	53	58	7	7.4	6-M5×14	ETP-A10
ETP-A-40-C	40	53	70	43	60	65	7.5	8.4	6-M5×16	ETP-A12
ETP-A-45-C	45	59	77	49	66	72	8	8.4	6-M6×16	ETP-A14
ETP-A-50-C	50	65	83	53	72	78	8.5	9.4	6-M6×18	ETP-A16

* L1 and L2 are the measurements when the ETP-CLASSIC is fixed. These may be changed depending on the fit tolerance of the shaft diameter and the inside diameter of the hub.

ETP-A-S

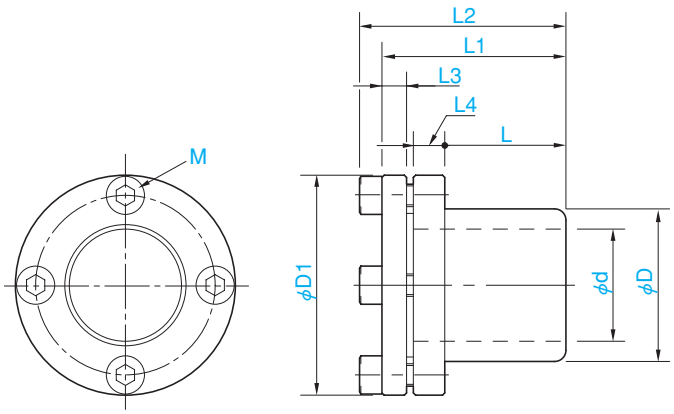
Single bolt tightening | Center ring | No axial direction displacement | Basic antirust | Stain less

Specification

Model	Max. permissible torque [N·m]	Max. permissible thrust power [N]	Shaft-side surface pressure [N/mm²]	Hub-side surface pressure [N/mm²]	Bolt tightening torque [N·m]	Moment of inertia [kg·m²]	Mass [kg]	Price
ETP-A-19-S	53	5000	90	80	8	0.044×10^{-3}	0.15	—
ETP-A-20-S	75	6000	90	80	8	0.042×10^{-3}	0.14	—
ETP-A-25-S	120	10000	90	80	8	0.065×10^{-3}	0.17	—
ETP-A-30-S	210	14000	90	80	8	0.12×10^{-3}	0.24	—
ETP-A-35-S	330	19000	90	80	8	0.22×10^{-3}	0.32	—
ETP-A-40-S	500	26000	90	80	8	0.37×10^{-3}	0.46	—
ETP-A-45-S	700	31000	90	80	13	0.56×10^{-3}	0.57	—
ETP-A-50-S	1000	40000	90	80	13	0.85×10^{-3}	0.72	—

* The maximum permissible torque is the value when the thrust power is zero, and the maximum permissible thrust power is the value when the torque is zero.
* The maximum permissible torque, the maximum permissible thrust power, the shaft-side surface pressure and the hub-side surface pressure are the values when the temperature is 20℃.

Dimensions



Ordering Information

ETP - A - □ - S

Size

Type (S: Short specification)

Unit [mm]

Model	d	D	D1	L	L1	L2	L3	L4	M	CAD file No.
ETP-A-19-S	19	28	45	13	26	31	5.5	6.9	3-M5×12	ETP-AS1
ETP-A-20-S	20	28	45	15	28	33	5.5	6.4	3-M5×12	ETP-AS2
ETP-A-25-S	25	34	49	15	29	34	5.5	6.9	4-M5×12	ETP-AS3
ETP-A-30-S	30	41	57	20	34	39	5.5	6.9	4-M5×12	ETP-AS4
ETP-A-35-S	35	47	62.5	22	38	43	7	7.4	6-M5×14	ETP-AS5
ETP-A-40-S	40	53	70	25	42	47	7.5	8.4	6-M5×16	ETP-AS6
ETP-A-45-S	45	59	77	28	45	51	8	8.4	6-M6×16	ETP-AS7
ETP-A-50-S	50	65	83	26	45	51	8.5	9.4	6-M6×18	ETP-AS8

* L1 and L2 are the measurements when the ETP-CLASSIC is fixed. These may be changed depending on the fit tolerance of the shaft diameter and the inside diameter of the hub.

ETP-A-R Make-to-order product

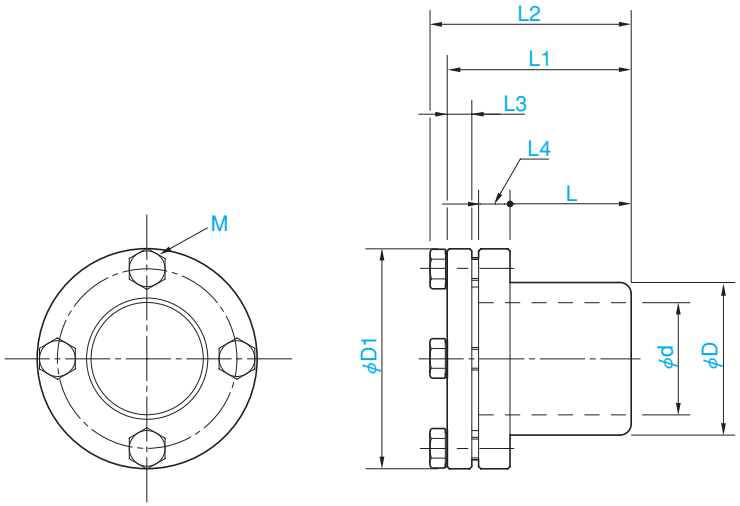
Single bolt tightening | Center ring | No axial direction displacement | Basic antirust | Stainless

Specification

Model	Max. permissible torque [N·m]	Max. permissible thrust power [N]	Shaft-side surface pressure [N/mm²]	Hub-side surface pressure [N/mm²]	Bolt tightening torque [N·m]	Moment of inertia [kg·m²]	Mass [kg]	Price
ETP-A-15-R	45	6000	90	70	4.5	0.018×10^{-3}	0.10	—
ETP-A-20-R	100	10000	90	70	4.5	0.046×10^{-3}	0.16	—
ETP-A-25-R	210	16800	90	70	4.5	0.071×10^{-3}	0.19	—
ETP-A-30-R	350	23300	90	70	4.5	0.142×10^{-3}	0.29	—
ETP-A-35-R	500	28500	90	70	4.5	0.250×10^{-3}	0.40	—
ETP-A-40-R	750	37500	90	70	4.5	0.441×10^{-3}	0.55	—
ETP-A-45-R	1100	48800	90	70	7.8	0.686×10^{-3}	0.71	—
ETP-A-50-R	1550	62000	90	70	7.8	1.045×10^{-3}	0.86	—

* The maximum permissible torque is the value when the thrust power is zero, and the maximum permissible thrust power is the value when the torque is zero.
* The maximum permissible torque, the maximum permissible thrust power, the shaft-side surface pressure and the hub-side surface pressure are the values when the temperature is 20℃.

Dimensions



Ordering Information

ETP - A - □ - R

Size

Type (R: Stainless specification)

Unit [mm]

Model	d	D	D1	L	L1	L2	L3	L4	M	CAD file No.
ETP-A-15-R	15	23	37.5	17	28	32	5	5.4	4-M5×10	ETP-AR1
ETP-A-20-R	20	28	45	22	36	40	5.5	6.4	5-M5×12	ETP-AR2
ETP-A-25-R	25	34	49	27	41	45	5.5	6.9	7-M5×12	ETP-AR3
ETP-A-30-R	30	41	57	32	46	50	5.3	6.9	7-M5×12	ETP-AR4
ETP-A-35-R	35	47	62.5	37	53	57	7	7.4	9-M5×14	ETP-AR5
ETP-A-40-R	40	53	70	43	60	64	8	8.4	9-M5×16	ETP-AR6
ETP-A-45-R	45	59	77	49	66	70	8	8.4	9-M6×16	ETP-AR7
ETP-A-50-R	50	65	83	53	72	76	8.5	9.4	9-M6×18	ETP-AR8

* L1 and L2 are the measurements when the ETP-CLASSIC is fixed. These may be changed depending on the fit tolerance of the shaft diameter and the inside diameter of the hub.

Selection

Selection Procedure

❶ The torque Ta is determined by the shaft diameter to be used, however, evaluate the torque Ta basically from the output of the power driver P and the revolution speed of the fastening element n.

$$Ta\ [N\cdot m] = \frac{9550 \times P[kW]}{n[min^{-1}]}$$

Ta: Torque added to the fastening element [N·m]
P: Output of the power driver [kW]
n: Revolution speed of the fastening element [min^{-1}]
Fa: Thrust power added to the fastening element [N]

Evaluate the thrust power Fa.

❷ Determine the service factor K1 from the loading character, and evaluate the corrective torque Td and the corrective thrust power Fd that are added to the fastening element.

$Td = Ta \times K1$
$Fd = Fa \times K1$

Td: Corrective torque added to the fastening element [N·m]
Fd: Corrective thrust power added to the fastening element [N]
K1: Service factor by loading character

❸ Perform the corrections by loading type.

(1) In the case of torque only
Compare the maximum permissible torque T of the fastening element and the evaluated corrective torque Td, by the shaft diameter to be used.

$T \geqq Td$ T: Max. permissible torque of fastening element [N·m]

(2) In the case of thrust power only
Compare the maximum permissible thrust power F of the fastening element and the evaluated corrective thrust power Fd, by the shaft diameter to be used.

$F \geqq Fd$ F: Max. permissible thrust power of fastening element [N]

(3) In case that both torque and thrust power are applied.
Evaluate the combined load Mr to compare with the maximum permissible torque T.

$$Mr = \sqrt{Td^2 + (Fd \times \frac{d}{2})^2}$$
$$T \geqq Mr$$

Mr: Combined load added to the fastening element [N·m] .
d: shaft diameter [N]

❹ Evaluate the minimum outside diameter of the hub and the maximum inside diameter of the quill.

(1) Evaluate the minimum outside diameter of the hub by the material strength of the hub to be used.

$$DO \geqq D\sqrt{\frac{\delta_{0.2N} + CP_2}{\delta_{0.2N} - CP_2}}$$

C=1 B=L
C=0.8 L<B<2L
C=0.6 B≧2L

DO : Min. hub outside dia. [mm] B: Hub length [mm]
D : Hub inside dia. [mm] L: Effective contact length [mm]
P_2 : Hub side surface pressure [N/mm^2] C: Coefficient
$\delta_{0.2N}$: Yield point stress of the hub material [N/mm^2]

If yield point stress of the hub material is high, the ratio of the min. hub outside dia. and the hub inside dia. must be 1.3 times bigger or more, concerning the deformation of hub.

(2) Evaluate the maximum inside diameter of the quill by the material strength of the quill to be used.

$$di \leqq d\sqrt{\frac{\delta_{0.2N} - 2P_1C}{\delta_{0.2N}}}$$

C=0.6 when singular number is used
C=0.8 When plural number is used

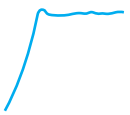
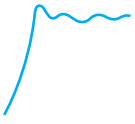
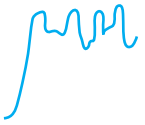
di: Max. inside dia. of the quill [mm]
$\delta_{0.2N}$: Yield point stress of the quill material [N/mm^2]
d : Shaft dia. [mm] C: Coefficient
P_1: Shaft side surface pressure [N/mm^2]

Since the shaft-side surface pressure and hub-side surface pressure is changed by the environmental temperature, temperature conditioning is necessary. Also, all the surface pressure values are based on the temperature of 20℃, therefore, if the environmental temperature is over 20℃, evaluate the minimum outside diameter of the hub and the maximum inside diameter of the quill from the formula below.

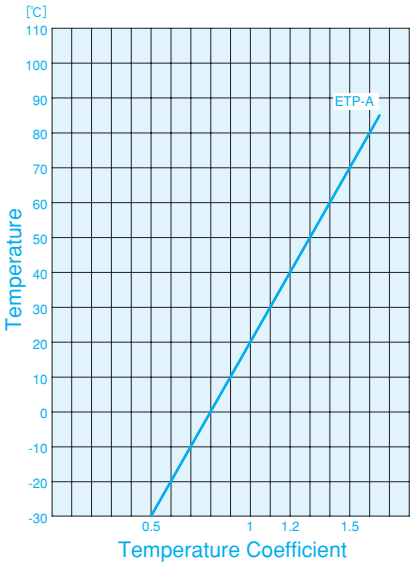
P_1 · P_2=Surface pressure when the temperature is 20℃× Temperature coefficient K2
Operating temperature limit is: -30℃~ +85℃

Service Factor

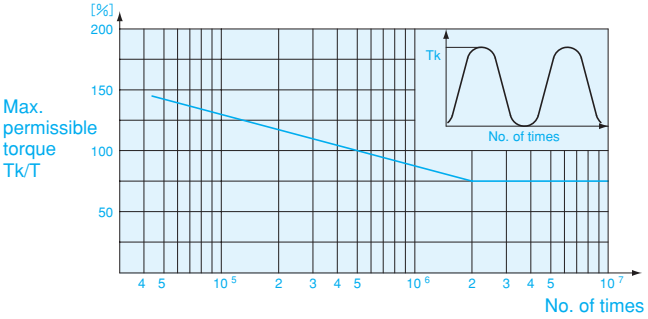
●Use factor of the loading character: K1

Loading character			
Constant	Variation: small	Variation: medium	Variation: large
			
1.0	1.25	1.75	2.25

● Coefficient by the applied environmental temperature: K2



Fatigue of periodical fluctuation torque Tk



Above chart shows the fatigue when applying the static periodical fluctuation torque Tk to the ETP-CLASSIC. The vertical line indicates the percentage of the maximum permissible torque, and the horizontal line indicates the number of times of static periodical fluctuation torque.

If the maximum permissible torque is periodically applied to the ETP-CLASSIC, its fatigue becomes 500,000 times. And if 75% of the maximum permissible torque is periodically applied, the above chart indicates that its fatigue becomes semipermanent.

Points to be checked in design

Mating shaft tolerance, mating hub tolerance and surface roughness

Model	Mating shaft tolerance	Mating hub tolerance	Surface roughness
ETP-A-15	h7	H7	25S (Ave. roughness of center line 6.3a) or less
ETP-A-19～100	k6～h8		
ETP-A-15-B	h7		
ETP-A-19-B～100-B	k6～h8		
ETP-A-15-C	h7		
ETP-A-19-C～50-C	k6～h8		
ETP-A-19-S～50-S	k6～h8		
ETP-A-15-R	h7		
ETP-A-20-R～50-R	h8		

Operating temperature limit

Model	Mounting/dismounting [times]
ETP-A	−30～+85
ETP-A-B	
ETP-A-C	
ETP-A-S	
ETP-A-R	

The No. of mounting and dismounting

Model	Mounting/dismounting [times]
ETP-A	100
ETP-A-B	
ETP-A-C	
ETP-A-S	
ETP-A-R	50

Concentricity and balance

Model	Concentricity [mm]	Balance [gmm/kg]
ETP-A	0.05	100
ETP-A-B		
ETP-A-C		
ETP-A-S		
ETP-A-R		

Torque • Thrust power coefficient

When torque and thrust power are simultaneously applied to the ETP-CLASSIC, their maximum permissible values are both reduced. The value can be evaluated by the coefficient of the cart below.

Calculation Example: When the ETP-A-30 is used at 20℃ in temperature.

The maximum permissible torque T and thrust power F at 20℃ are;

T= 340 [N·m] , F=23100 [N]

The maximum permissible torque Tmax when the thrust power is maximally (Fmax=14000 [N]) applied can be evaluated by the formula below.

Thrust factor Kf
= Fmax/F×Temperature coefficient K2
=14000/23100×1.0=0.61

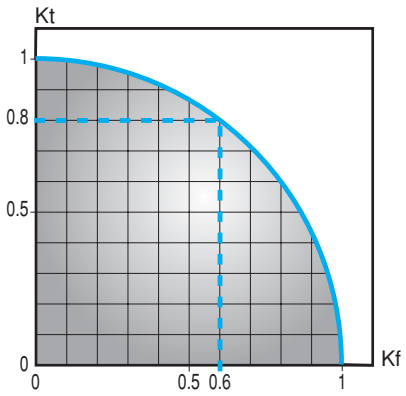
The torque coefficient Kt when Kf = 0.61 is approximately 0.8 by the chart below.

It is, therefore, the maximum permissible torque Tmax in this case is;

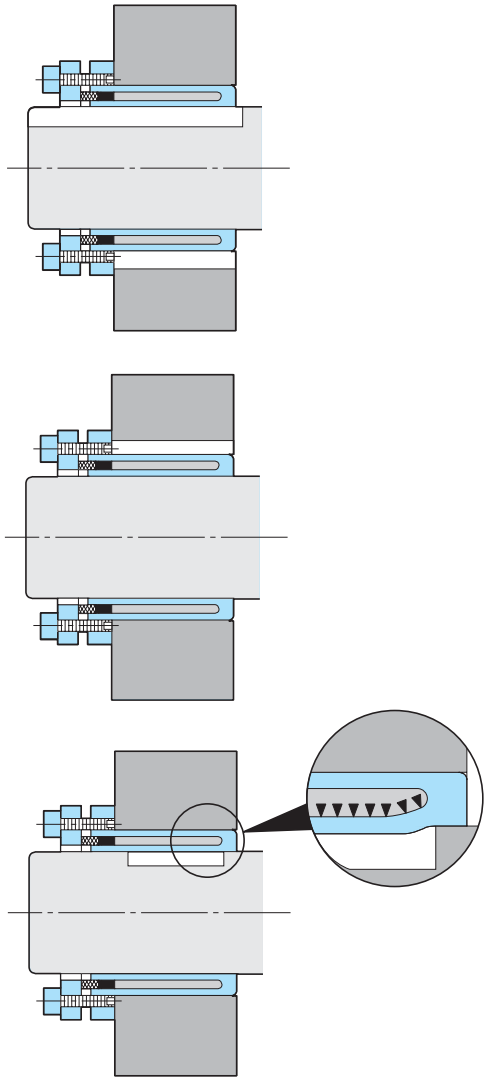
Tmax=T×K2×Kt=340×1.0×0.8=272 [N·m]

Relation between Kt and Kf can be evaluated by the formula below.

$$\sqrt{(Kt)^2+(Kf)^2=1}$$



■ Keyway shape that may become unable to disconnect by the sleeve deformation

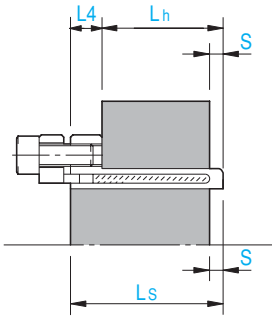


In case there is a keyway in the shaft and hub as illustrated above, ETP-CLASSIC cannot be used. However, ETP-CLASSIC can be used if the keyway is completely filled, and formed with epoxy putty (Recommendation: Bond-all AB).

■ Tolerance of the edge

The performance of the ETP-CLASSIC is defined when the shaft and hub act over the entire length for the shaft-side basic dimension Ls and the hub-side basic dimension Ln. Therefore, set out the shaft and hub to act over the entire length for the basic dimension. If the length of shaft・hub is limited in design, set the size in order that it becomes under the S sizes indicated in the chart below. In case the size is over the S size, the stress becomes concentrated at the edge of sleeve, which causes deformation of the sleeve. In that case, the ETP-CLASSIC becomes unable to disconnect.

■ ETP-A
ETP-A-B
ETP-A-C
ETP-A-S
ETP-A-R



ETP-A ETP-A-B ETP-A-C ETP-A-S ETP-A-R size	S [mm]
15	3
19	3.5
20	3.5
22	4
24	4
25	3.6
28	4.5
30	5
32	5
35	5.5
38	5.5
40	6
42	6
45	6.5
48	7
50	7
55	7.5
60	8
65	9
70	9.5
75	9.5
80	9.5
90	10.5
100	12.5

Mounting and Dismounting

Mounting the ETP-CLASSIC

1 Cleaning the shaft and hub

Wipe off the rust, dust and oil content sit on the surface of the shaft and hub with an alcohols solvent. If any grease is attached, remove the grease completely. Meanwhile, the oil content attached on the surface of the ETP-CLASSIC should be also removed.

Notice

Do not use the molybdenum-containing oil. It effects a change in the coefficient of friction.

2 Mounting on the shaft and hub

Place the ETP-CLASSIC by the hub and mount in the shaft. If a correct positioning for the shaft and hub is necessary, adjust their positions before fastening the pressure screw.

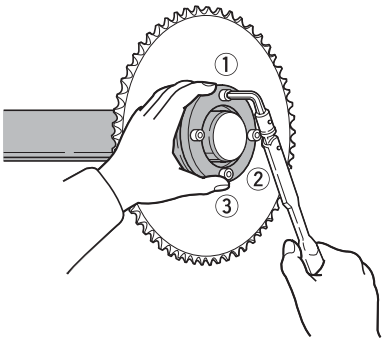
Notice

Do not fasten the pressure screw until the ETP-CLASSIC is completely set to the shaft and hub.

3 Fastening the clamping bolt

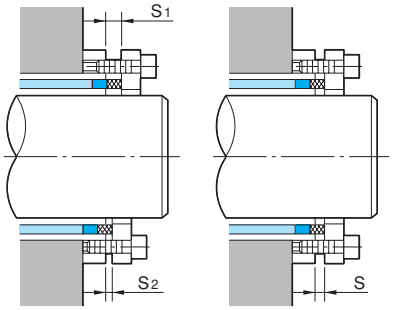
Put a hand over the ETP-CLASSIC and fasten the clamping bolt half-turn each in the order of ①②③ as below. By using a torque wrench, fasten the ETP-CLASSIC with a prescribed torque. Do not set the tightening torque by loosening the clamping bolt after fastening more than as it is prescribed.

Stainless steel that is used for the clamping bolt of the ETP-A-R is easily scratched that it requires careful handling, especially when fastening the bolt.



4 Confirming after mounting

Confirm if the gap between the flange and sleeve is even. If there is not enough gap between the flange and sleeve, the ETP-CLASSIC may not function properly. In that case, reconfirm the measurement tolerance and material of the shaft and hub.



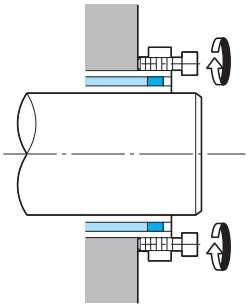
Dismounting the ETP-CLASSIC

1 Confirming safe conditions

Confirm if no torque or thrust power is applied to the ETP-CLASSIC before to start dismounting. Also, make sure if there is any danger of fall due to the empty weight of the shaft and hub. There is no self-locking mechanism for the ETP-CLASSIC. By loosening the clamping bolt, its fastening power is quickly released.

2 Dismounting

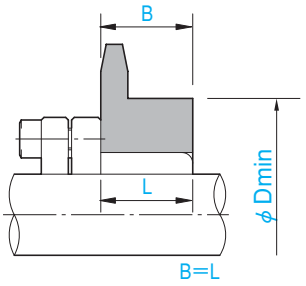
Loosen the clamping bolt until the fastening power is released. The pressure screw should be just slackened, not to be removed. If the ETP-CLASSIC can not be removed for some reason, remove all of the clamping bolts, flanges and piston rings, and use the tap hole of the sleeve as a releasing screw hole.



A list of the minimum outside diameter for a hub

A hub may be deformed if the stress value applied to it is high.
Refer to the list below to find the appropriate outside diameter.

■ ETP-A
ETP-A-B
ETP-A-C
ETP-A-S
ETP-A-R



φ Dmin Unit [mm]

ETP-A ETP-A-B ETP-A-C ETP-A-S Size	Hub-side surface pressure [N/mm²]	Yield point stress of the material $\delta_{0.2}$ [N/mm²]									
		150	180	210	230	250	280	300	350	400	450
		FC250	FC300 SS330 SC360 FCMB310	FC350 SS400 SC410 FCMB360 SUS304	SC450 S15C SF440	FCD400 SS490 SC480 S20C SF490	S30C SF540 SUS201	FCD450 S35C SF590	FCD500 S45C SUS410	FCD600 S55C SUS403	FCD700 SUS420
15	80	42	37	35	33	32	31	31	30	30	30
19	80	51	46	42	41	39	38	37	37	37	37
20	80	51	46	42	41	39	38	37	37	37	37
22	80	58	52	48	46	45	43	42	42	42	42
24	80	62	55	51	49	48	46	45	45	45	45
25	80	62	55	51	49	48	46	45	45	45	45
28	80	71	63	59	56	55	53	52	51	51	51
30	80	75	67	62	59	58	55	54	54	54	54
32	80	78	70	65	62	60	58	57	56	56	56
35	80	86	76	71	68	66	63	62	62	62	62
38	80	91	81	75	72	70	67	66	65	65	65
40	80	96	86	80	77	74	72	70	69	69	69
42	80	100	89	83	79	77	74	73	72	72	72
45	80	107	96	89	85	83	80	78	77	77	77
48	80	113	100	93	90	87	84	82	81	81	81
50	80	118	105	97	94	91	88	86	85	85	85
55	80	129	115	106	102	99	96	94	93	93	93
60	80	140	125	115	111	108	104	102	101	101	101
65	80	153	136	126	121	117	113	111	110	110	110
70	80	164	146	135	130	126	121	119	117	117	117
75	80	173	154	142	137	133	128	125	124	124	124
80	80	182	162	150	144	140	135	132	130	130	130
90	80	203	181	168	161	156	151	148	146	146	146
100	80	227	202	187	180	175	168	165	163	163	163

* The hub-side surface pressure shown in the list is when the applied environmental temperature is 20℃. The surface pressure is changed by increased temperature.
* If the applied environmental temperature is over 20℃, evaluate the minimum outside diameter by the selection procedure on page 32.
* The minimum outside diameter of the hub is evaluated by C=1 of the selection procedure on page 32.
* The above SUS values indicate their bearing force [N/mm²] after thermal refining (quenched and tempered).

φ Dmin Unit [mm]

ETP-A-R Size	Hub-side surface pressure [N/mm²]	Yield point stress of the material $\delta_{0.2}$ [N/mm²]									
		150	180	210	230	250	280	300	350	400	450
		FC250	FC300 SS330 SC360 FCMB310	FC350 SS400 SC410 FCMB360 SUS304	SC450 S15C SF440	FCD400 SS490 SC480 S20C SF490	S30C SF540 SUS201	FCD450 S35C SF590	FCD500 S45C SUS410	FCD600 S55C SUS403	FCD700 SUS420
15	70	39	35	33	32	31	30	30	30	30	30
20	70	47	43	40	39	38	37	37	37	37	37
25	70	57	52	49	47	46	45	45	45	45	45
30	70	68	62	58	57	55	54	54	54	54	54
35	70	78	71	67	65	63	62	62	62	62	62
40	70	88	80	75	73	71	69	69	69	69	69
45	70	98	89	84	81	79	77	77	77	77	77
50	70	108	98	92	90	87	85	85	85	85	85

* The hub-side surface pressure shown in the list is when the applied environmental temperature is 20℃. The surface pressure is changed by increased temperature.
* If the applied environmental temperature is over 20℃, evaluate the minimum outside diameter by the selection procedure on page 32.
* The minimum outside diameter of the hub is evaluated by C=1 of the selection procedure on page 32.
* The above SUS values indicate their bearing force [N/mm²] after thermal refining (quenched and tempered).