TSI-01
Instrument Tube Fittings

Twin-Ferrule Compression Fittings
Technical Catalogue

Technical data, product configurations, materials and standards



HIGH PERFORMANCE

WIDE MATERIAL RANGE

SEVERE SERVICE APPLICATIONS

GLOBAL SOURCING NETWORK

ENGINEERING SUPPORT

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Master Technical Matrix — TSI-01 Instrument Tube Fittings

Twin/double-ferrule compression fittings for instrumentation tubing, organized by TSI reference code for specification and quotation.

RELIABLE CONNECTIONS FOR CRITICAL OPERATIONS

TSI-01 PRODUCT CODE MATRIX — INSTRUMENT TUBE FITTINGS

	**001 – 008** Core tube-to-tube fittings		**009 – 012** NPT connectors and elbows
	**013 – 017** Adapters, gauge and port connectors		**018 – 022** Closures and ferrule components
	**023 – 026** ISO/BSP connectors		**027 – 030** Reducers and reducing bodies
	**031 – 035** Weld and positionable fittings		**036 – 039** Special threaded tee configurations

TECHNICAL BASIS — TSI-01 — GENERAL SPECIFICATION BASIS

FAMILY SIZE RANGE	Fractional 1/16 in to 2 in; metric 2 mm to 50 mm.
STANDARD MATERIAL	316 / 316L stainless steel.
SPECIAL MATERIALS	UNS N06625, UNS N08825, UNS S32750, UNS N04400, UNS N10276, 6Mo, Titanium.
PRESSURE BASIS	Tube-fitting ends are governed by tube OD, wall thickness, material and temperature; threaded ends may be the limiting component.
TUBING / DESIGN BASIS	ASTM A269, ASTM A213, ASME B31.3.
THREADS	NPT to ASME B1.20.1, BSPT to ISO 7 / EN 10226-1, BSPP to ISO 228-1, SAE/MS straight thread / O-ring style where applicable.
CERTIFICATION	EN 10204 3.1 available; NACE MR0175 / ISO 15156 on request.

Note: Final size combinations and ratings are confirmed against selected manufacturer and quotation.

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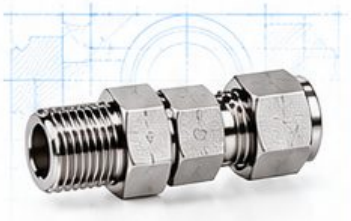
Core Tube-to-Tube Fittings

Codes TSI-01-001 to TSI-01-008

Primary tube-to-tube configurations for instrumentation tubing systems.



TSI-01-001
Straight Union



TSI-01-002
Reducing Union



TSI-01-003
Bulkhead Union



TSI-01-004
90° Union Elbow



TSI-01-005
45° Union Elbow



TSI-01-006
Union Tee



TSI-01-007
Reducing Tee



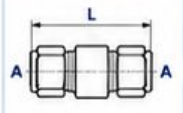
TSI-01-008
Union Cross

TECHNICAL DATA — CORE TUBE-TO-TUBE FITTINGS

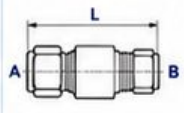
Code	Product	Connection / Configuration	Size Basis	Pressure Basis	Standard Material	Key Standards
TSI-01-001	Straight Union	Tube x tube (equal OD)	Fractional and metric tube sizes	Governed by tube selection and fitting system	316/316L stainless steel (std.)	ASTM A269/A213, ASME B31.3 basis
TSI-01-002	Reducing Union	Tube x tube (reducing)	Fractional and metric tube combinations	Governed by tube selection and fitting system	316/316L stainless steel (std.)	ASTM A269/A213, ASME B31.3 basis
TSI-01-003	Bulkhead Union	Tube x tube (bulkhead through panel)	Fractional and metric tube sizes	Governed by tube selection and fitting system	316/316L stainless steel (std.)	ASTM A269/A213, ASME B31.3 basis
TSI-01-004	90° Union Elbow	Tube x tube (90°)	Fractional and metric tube sizes	Governed by tube selection and fitting system	316/316L stainless steel (std.)	ASTM A269/A213, ASME B31.3 basis
TSI-01-005	45° Union Elbow	Tube x tube (45°)	Fractional and metric tube sizes	Governed by tube selection and fitting system	316/316L stainless steel (std.)	ASTM A269/A213, ASME B31.3 basis
TSI-01-006	Union Tee	Tube x tube x tube (equal OD)	Fractional and metric tube sizes	Governed by tube selection and fitting system	316/316L stainless steel (std.)	ASTM A269/A213, ASME B31.3 basis
TSI-01-007	Reducing Tee	Run tube x run tube x reduced branch	Fractional and metric tube combinations	Governed by tube selection and fitting system	316/316L stainless steel (std.)	ASTM A269/A213, ASME B31.3 basis
TSI-01-008	Union Cross	Tube x tube x tube x tube (equal OD)	Fractional and metric tube sizes	Governed by tube selection and fitting system	316/316L stainless steel (std.)	ASTM A269/A213, ASME B31.3 basis

REPRESENTATIVE DIMENSIONAL REFERENCES (TYPICAL CONFIGURATIONS)

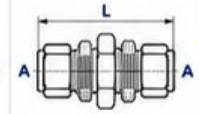
TSI-01-001



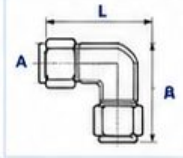
TSI-01-002



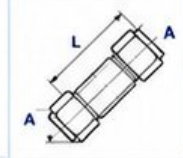
TSI-01-003



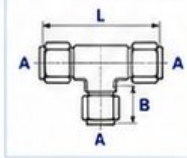
TSI-01-004



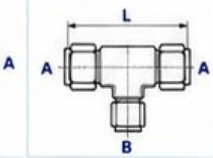
TSI-01-005



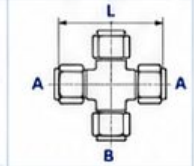
TSI-01-006



TSI-01-007



TSI-01-008



Note: Dimensional details, tube OD ranges and configuration options are confirmed against the selected manufacturer.

NPT Connectors and Elbows

Codes TSI-01-009 to TSI-01-012

High-quality twin-ferrule tube fittings with NPT threaded connections for reliable, leak-tight performance in instrumentation and process applications.



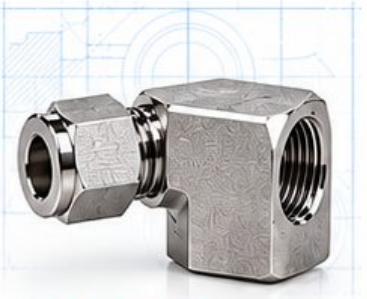
TSI-01-009
Male Connector — NPT



TSI-01-010
Female Connector — NPT



TSI-01-011
90° Male Elbow — NPT



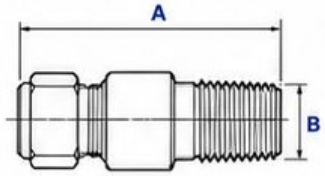
TSI-01-012
90° Female Elbow — NPT

TECHNICAL DATA — NPT CONNECTORS AND ELBOWS

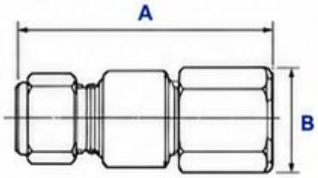
Code	Product	Connection / Configuration	Size Basis	Pressure Basis	Standard Material	Key Standards
TSI-01-009	Male Connector — NPT	Tube fitting x male NPT	Tube OD x NPT thread size	Lower of tube / NPT end rating	316/316L stainless steel (std.)	ASTM A269/A213, ASME B1.20.1, ASME B31.3 basis
TSI-01-010	Female Connector — NPT	Tube fitting x female NPT	Tube OD x NPT thread size	Lower of tube / NPT end rating	316/316L stainless steel (std.)	ASTM A269/A213, ASME B1.20.1, ASME B31.3 basis
TSI-01-011	90° Male Elbow — NPT	Tube fitting x male NPT at 90°	Tube OD x NPT thread size	Lower of tube / NPT end rating	316/316L stainless steel (std.)	ASTM A269/A213, ASME B1.20.1, ASME B31.3 basis
TSI-01-012	90° Female Elbow — NPT	Tube fitting x female NPT at 90°	Tube OD x NPT thread size	Lower of tube / NPT end rating	316/316L stainless steel (std.)	ASTM A269/A213, ASME B1.20.1, ASME B31.3 basis

REPRESENTATIVE DIMENSIONAL REFERENCES (TYPICAL CONFIGURATIONS)

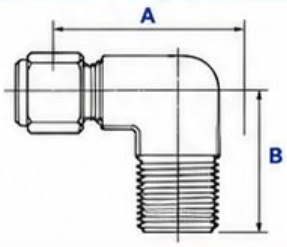
TSI-01-009



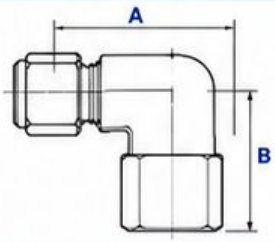
TSI-01-010



TSI-01-011



TSI-01-012



Note: Final NPT thread orientation and dimensional details are confirmed against the selected manufacturer.

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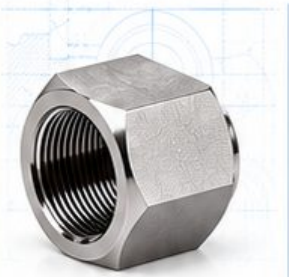
Adapters, Gauge and Port Connectors

Codes TSI-01-013 to TSI-01-017

Adapters, gauge and port connectors for tube fitting, NPT and BSPP threaded instrumentation connections.



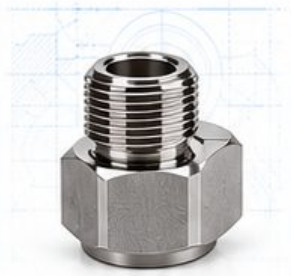
TSI-01-013
Male Tube Adapter



TSI-01-014
Female Tube Adapter



TSI-01-015
Reducing Port Connector



TSI-01-016
Gauge Connector — BSPP

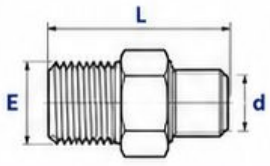
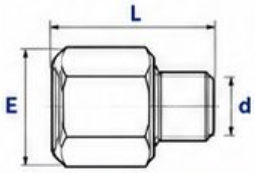
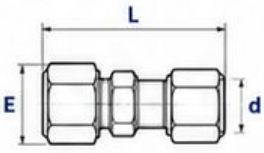
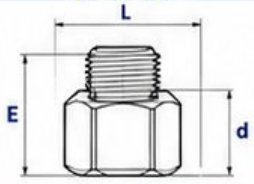
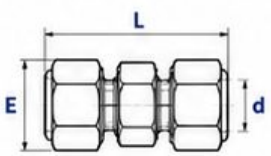


TSI-01-017
Port Connector

TECHNICAL DATA — ADAPTERS, GAUGE AND PORT CONNECTORS

Code	Product	Connection / Configuration	Size Basis	Pressure Basis	Standard Material	Key Standards
TSI-01-013	Male Tube Adapter	Tube adapter — tube stub x male NPT	Tube / thread size combinations	Lower of tube / port / thread rating	316/316L stainless steel (std.)	ASME B1.20.1 (NPT) ASME B31.3 basis
TSI-01-014	Female Tube Adapter	Tube adapter — tube stub x female NPT	Tube / thread size combinations	Lower of tube / port / thread rating	316/316L stainless steel (std.)	ASME B1.20.1 (NPT) ASME B31.3 basis
TSI-01-015	Reducing Port Connector	Reduced tube-adapter / port connector	Tube / port size combinations	Lower of tube / port / thread rating	316/316L stainless steel (std.)	ASME B31.3 basis
TSI-01-016	Gauge Connector — BSPP	Tube fitting x female BSPP gauge connection	Tube / thread size combinations	Lower of tube / port / thread rating	316/316L stainless steel (std.)	ISO 228-1 (BSPP) ASME B31.3 basis
TSI-01-017	Port Connector	Tube-adapter / port-to-port connector	Tube / port size combinations	Lower of tube / port / thread rating	316/316L stainless steel (std.)	ASME B1.20.1 (NPT) where applicable ASME B31.3 basis

REPRESENTATIVE DIMENSIONAL REFERENCES (TYPICAL CONFIGURATIONS)

TSI-01-013	TSI-01-014	TSI-01-015	TSI-01-016	TSI-01-017
				

Note: Exact dimensional values depend on the selected manufacturer and size combination. Refer to manufacturer technical data for details.

Closures and Ferrule Components

Codes TSI-01-018 to TSI-01-022

Assembly and closure components within the twin-ferrule fitting system.

ASSEMBLY COMPONENTS FOR RELIABLE CONNECTIONS



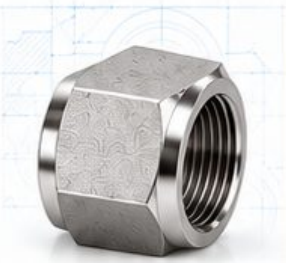
TSI-01-018
Cap

- Closes tube end using fitting assembly.
- Hex for easy installation.
- Precision machining



TSI-01-019
Plug

- Plugs unused tube-fitting body port.
- Standard pipe threads.
- Hex for installation.



TSI-01-020
Nut

- Compression fitting nut.
- Precision internal threads.
- For twin-ferrule assembly



TSI-01-021
Front Ferrule

- Front sealing ferrule.
- Forms primary seal
- Precision conical geometry



TSI-01-022
Back Ferrule

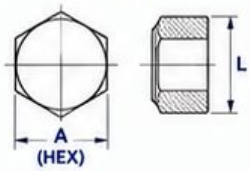
- Back grip ferrule.
- Provides tube support.
- Precision machined geometry

TECHNICAL DATA — CLOSURES AND FERRULE COMPONENTS

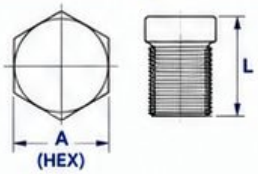
Code	Product	Configuration / Function	Size Basis	Pressure Basis	Standard Material	Key Standards
TSI-01-018	Cap	Closes tube end using fitting assembly.	According to system size.	According to mating fitting assembly.	316 / 316L stainless steel (std.)	Manufacturer fitting system ASME B31.3 basis
TSI-01-019	Plug	Plugs unused tube-fitting body port.	According to system size.	According to mating fitting assembly.	316 / 316L stainless steel (std.)	Manufacturer fitting system ASME B31.3 basis
TSI-01-020	Nut	Compression fitting nut.	According to system size.	According to mating fitting assembly.	316 / 316L stainless steel (std.)	Manufacturer fitting system ASME B31.3 basis
TSI-01-021	Front Ferrule	Front sealing ferrule.	According to system size.	According to mating fitting assembly.	316 / 316L stainless steel (std.)	Manufacturer fitting system ASME B31.3 basis
TSI-01-022	Back Ferrule	Back grip ferrule.	According to system size.	According to mating fitting assembly.	316 / 316L stainless steel (std.)	Manufacturer fitting system ASME B31.3 basis

REPRESENTATIVE DIMENSIONAL REFERENCES (TYPICAL CONFIGURATIONS)

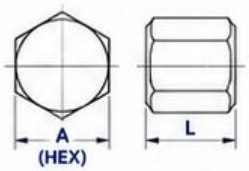
TSI-01-018 Cap



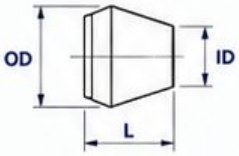
TSI-01-019 Plug



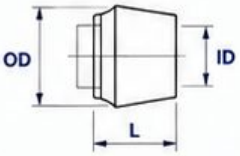
TSI-01-020 Nut



TSI-01-021 Front Ferrule



TSI-01-022 Back Ferrule

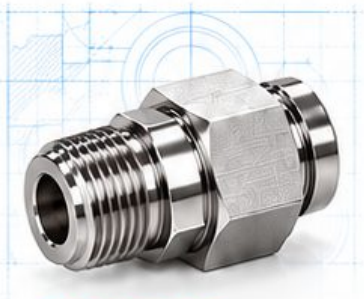


Note: Dimensions are manufacturer-specific. Final dimensions and configurations to be confirmed against the selected manufacturer.

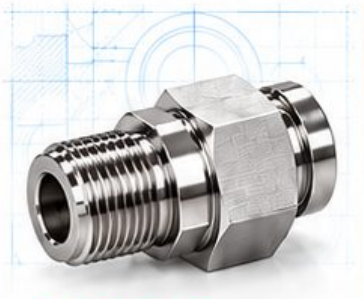
ISO / BSP Connectors

Codes TSI-01-023 to TSI-01-026

Male and female ISO/BSP connectors for reliable connections between instrumentation tubing and ISO/BSP threaded equipment.



TSI-01-023
Male Connector
ISO/BSP Tapered (RT)



TSI-01-024
Male Connector
ISO/BSP Parallel (RS)



TSI-01-025
Female Connector
ISO/BSP Tapered (RT)



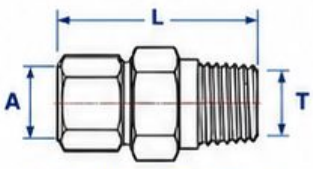
TSI-01-026
Female Connector
ISO/BSP Parallel

TECHNICAL DATA — ISO / BSP CONNECTORS

Code	Product	Connection / Configuration	Size Basis	Pressure Basis	Standard Material	Key Standards
TSI-01-023	Male Connector	Tube fitting x male BSPT / ISO tapered thread	Tube size and thread combinations	Depends on tube selection and the threaded end.	316/316L stainless steel (std.)	ISO 7 / EN 10226-1, ASTM A269/A213, ASME B31.3.
TSI-01-024	Male Connector	Tube fitting x male BSPP / parallel thread	Tube size and thread combinations	Depends on tube selection and the threaded end.	316/316L stainless steel (std.)	ISO 228-1, ASTM A269/A213, ASME B31.3.
TSI-01-025	Female Connector	Tube fitting x female BSPT / ISO tapered thread	Tube size and thread combinations	Depends on tube selection and the threaded end.	316/316L stainless steel (std.)	ISO 7 / EN 10226-1, ASTM A269/A213, ASME B31.3.
TSI-01-026	Female Connector	Tube fitting x female BSPP / parallel thread	Tube size and thread combinations	Depends on tube selection and the threaded end.	316/316L stainless steel (std.)	ISO 228-1, ASTM A269/A213, ASME B31.3.

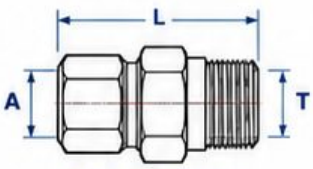
REPRESENTATIVE DIMENSIONAL REFERENCES (TYPICAL CONFIGURATIONS)

TSI-01-023



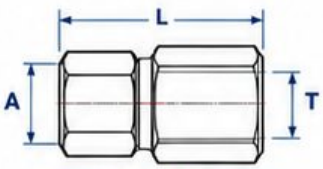
(Male BSPT / ISO Tapered)

TSI-01-024



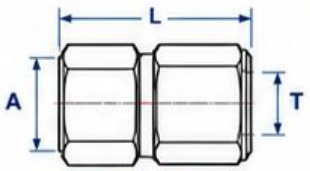
(Male BSPP / Parallel)

TSI-01-025



(Female BSPT / ISO Tapered)

TSI-01-026



(Female BSPP / Parallel)

Note: Gauge-specific BSPP connection is covered separately under TSI-01-016.

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Reducers and Reducing Bodies

Codes TSI-01-027 to TSI-01-030

Reducers and reducing bodies provide reliable transitions between different tube sizes in instrumentation systems.



TSI-01-027
Reducer



TSI-01-028
Long Reducer



TSI-01-029
Bulkhead Reducer



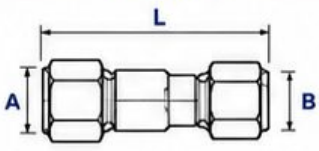
TSI-01-030
Reducing Elbow

TECHNICAL DATA — REDUCERS AND REDUCING BODIES

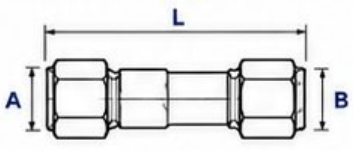
Code	Product	Connection / Configuration	Size Basis	Pressure Basis	Standard Material	Key Standards
TSI-01-027	Reducer	Inline reducing configuration	Fractional and metric reducing combinations	Pressure governed by selected tube sizes and body/end configuration.	316/316L stainless steel (std.)	ASTM A269/A213, ASME B31.3 basis
TSI-01-028	Long Reducer	Extended-length inline reducing configuration	Reducing combinations	Pressure governed by selected tube sizes and body/end configuration.	316/316L stainless steel (std.)	ASTM A269/A213, ASME B31.3 basis
TSI-01-029	Bulkhead Reducer	Reducing configuration for panel / bulkhead installation	Reducing size combinations	Pressure governed by selected tube sizes and body/end configuration.	316/316L stainless steel (std.)	ASTM A269/A213, ASME B31.3 basis
TSI-01-030	Reducing Elbow	Elbow with reducing side	Reducing size combinations	Pressure governed by selected tube sizes and body/end configuration.	316/316L stainless steel (std.)	ASTM A269/A213, ASME B31.3 basis

REPRESENTATIVE DIMENSIONAL REFERENCES (TYPICAL CONFIGURATIONS)

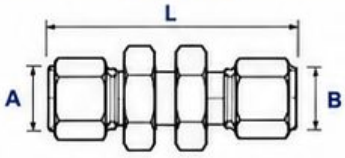
TSI-01-027



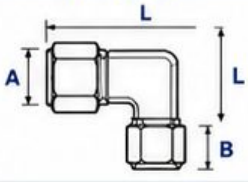
TSI-01-028



TSI-01-029



TSI-01-030



Note: Common combinations are supplied according to manufacturer range and quotation.

Weld and Positionable Fittings

Codes TSI-01-031 to TSI-01-035

Weld and positionable fittings for specialized instrumentation connections where welded ends or SAE/MS straight-thread positioning is required.



TSI-01-031
Tube Socket Weld Connector



TSI-01-032
Male Pipe Weld Connector



TSI-01-033
Tube Socket Weld Elbow



TSI-01-034
Male Pipe Weld Elbow



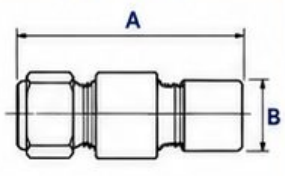
TSI-01-035
Positionable Male Elbow — SAE/MS

TECHNICAL DATA — WELD AND POSITIONABLE FITTINGS

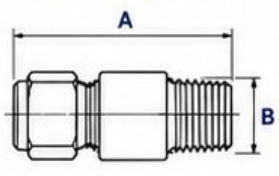
Code	Product	Connection / Configuration	Size Basis	Pressure Basis	Standard Material	Key Standards
TSI-01-031	Tube Socket Weld Connector	Tube fitting x tube socket-weld end	Tube OD x weld end	Lower of tube / weld end rating	316/316L stainless steel (std.)	ASME B31.3 project basis
TSI-01-032	Male Pipe Weld Connector	Tube fitting x male pipe-weld end	Tube OD x pipe size	Lower of tube / pipe-weld end rating	316/316L stainless steel (std.)	ASME B31.3 project basis
TSI-01-033	Tube Socket Weld Elbow	90° tube fitting x tube socket-weld end	Tube OD x weld end	Lower of tube / weld end rating	316/316L stainless steel (std.)	ASME B31.3 project basis
TSI-01-034	Male Pipe Weld Elbow	90° tube fitting x male pipe-weld end	Tube OD x pipe size	Lower of tube / pipe-weld end rating	316/316L stainless steel (std.)	ASME B31.3 project basis
TSI-01-035	Positionable Male Elbow — SAE/MS	Tube fitting x SAE/MS straight thread, O-ring style	Tube OD x UN thread	Lower of tube / SAE end rating	316/316L stainless steel (std.)	SAE J1926 / ASME B1.1; ASME B31.3 project basis

REPRESENTATIVE DIMENSIONAL REFERENCES (TYPICAL CONFIGURATIONS)

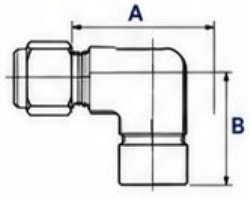
TSI-01-031



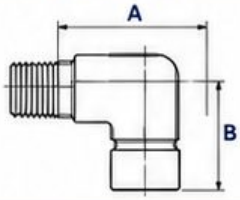
TSI-01-032



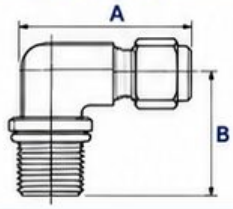
TSI-01-033



TSI-01-034



TSI-01-035



Note: Final weld-end preparation and SAE thread details are confirmed against the selected manufacturer.

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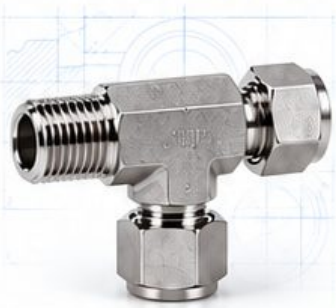
Special Threaded Tee Configurations

Codes TSI-01-036 to TSI-01-039

Special tee configurations for mixed tube-fitting and NPT threaded instrumentation connections.



TSI-01-036
Male Branch Tee — NPT (TTM)



TSI-01-037
Male Run Tee — NPT (TMT)



TSI-01-038
Female Run Tee — NPT (TFT)



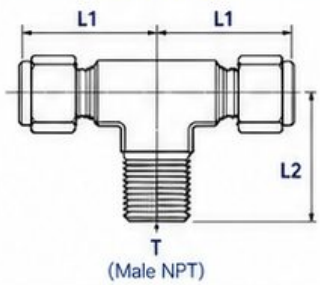
TSI-01-039
Female Branch Tee — NPT (TTF)

TECHNICAL DATA — SPECIAL THREADED TEE CONFIGURATIONS

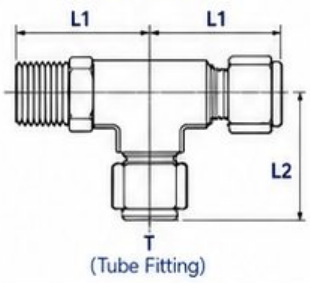
Code	Product	Connection / Configuration	Size Basis	Pressure Basis	Standard Material	Key Standards
TSI-01-036	Male Branch Tee — NPT (TTM)	Two tube-fitting run ends + male NPT branch	Tube OD x NPT thread size	Lower of tube / NPT end rating	316/316L stainless steel (std.)	ASTM A269/A213, ASME B1.20.1, ASME B31.3 basis
TSI-01-037	Male Run Tee — NPT (TMT)	Tube fitting x male NPT x tube fitting	Tube OD x NPT thread size	Lower of tube / NPT end rating	316/316L stainless steel (std.)	ASTM A269/A213, ASME B1.20.1, ASME B31.3 basis
TSI-01-038	Female Run Tee — NPT (TFT)	Tube fitting x female NPT x tube fitting	Tube OD x NPT thread size	Lower of tube / NPT end rating	316/316L stainless steel (std.)	ASTM A269/A213, ASME B1.20.1, ASME B31.3 basis
TSI-01-039	Female Branch Tee — NPT (TTF)	Two tube-fitting run ends + female NPT branch	Tube OD x NPT thread size	Lower of tube / NPT end rating	316/316L stainless steel (std.)	ASTM A269/A213, ASME B1.20.1, ASME B31.3 basis

REPRESENTATIVE DIMENSIONAL REFERENCES (TYPICAL CONFIGURATIONS)

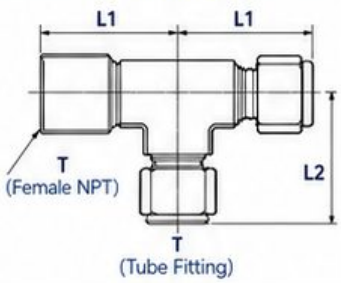
TSI-01-036



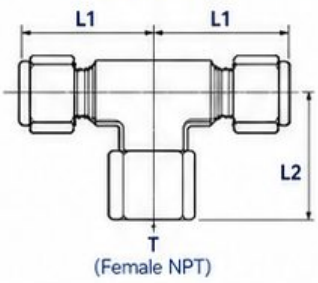
TSI-01-037



TSI-01-038



TSI-01-039



Note: Final NPT branch/run orientation and dimensional details are confirmed against the selected manufacturer.