

SPIR STAR® AG

Recommended Tightening Torques

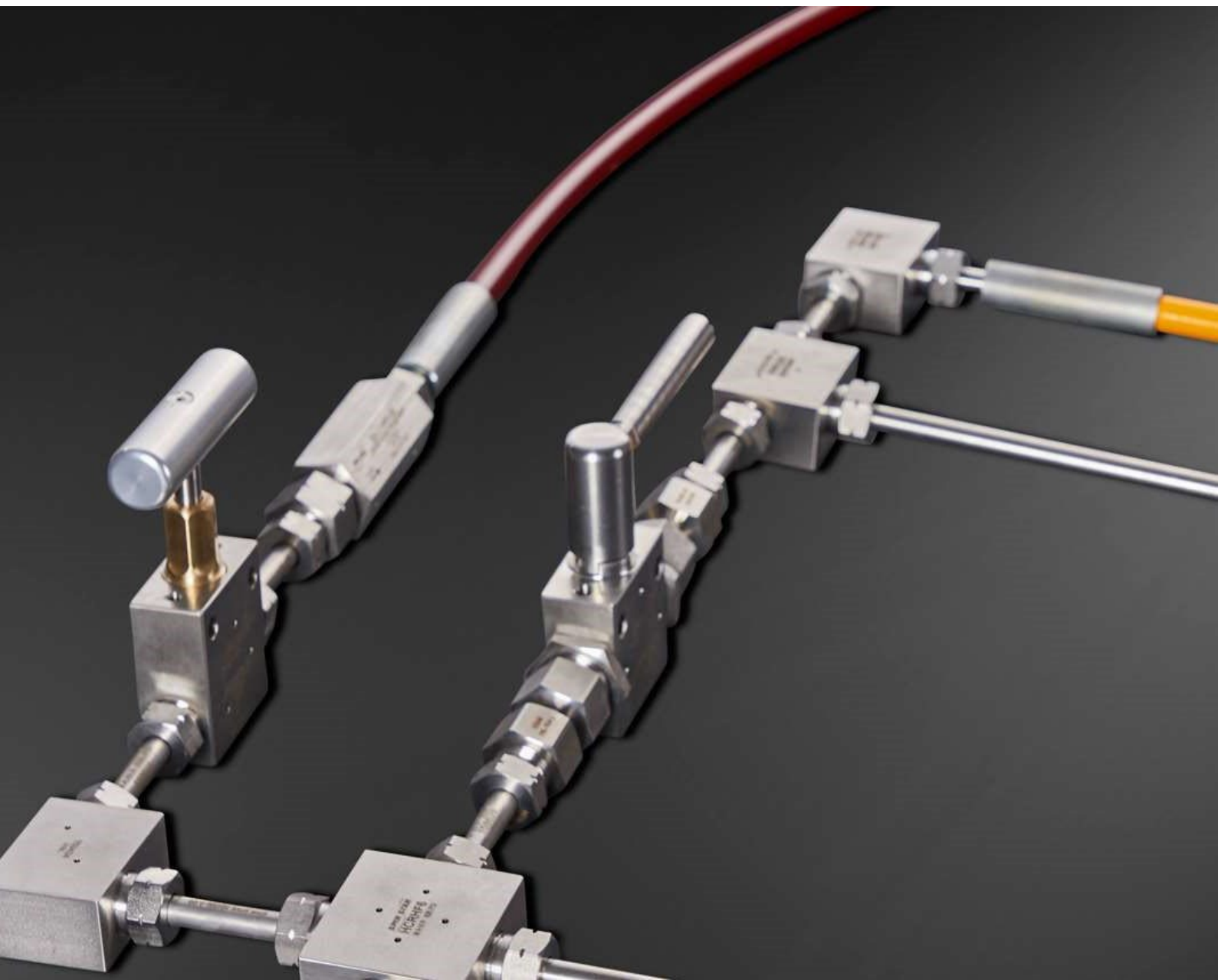


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General

For the assembly of SPIR STAR® AG connectors and the associated adapters it is important to observe the recommended tightening torques. This not only ensures a safe, reliable and leak-proof connection but also greatly contributes to the longevity of the components. Observing the recommended tightening torques prevents the deformation and damage and a loose fit of the connections and thus minimizes the risk of leaks and failures. This is especially important to ensure safe and efficient performance in demanding applications such as ultra-high pressure technology. The tightening torques specified below are therefore essential for the reliable function and maximum safety of the connections.

In addition to the tightening torques specified it needs to be remembered that not all possible types and sizes of connectors are contained in this list. Should you be using a connector not contained in the list, we recommend contacting the manufacturer directly to enquire about the recommended tightening torques.

Please note that SPIR STAR® AG does not assume any responsibility for the recommendations provided. The correct application of the tightening torques is the user's responsibility and if in doubt the user should always consult the manufacturer in order to ensure the safety and durability of the connections.

Connector with tapered pipe thread (NPTF)

Connectors of the NPTF (National Pipe Taper Fuel) type seal through the contact of the threads without additional sealing tape. When NPT-NPT and NPT-NPTF thread combinations are assembled, three to five layers of a thread sealing tape should be used. During assembly, it must be made sure that the minimum depth of engagement is achieved. If this is not the case, this indicates damage or deformation of the threads.

NPTF thread size	Recommended tightening torque	
1/16"x27 NPTF	5-7 Nm	4-5 ft·lb
1/8"x27 NPTF	14-20 Nm	10-15 ft·lb
1/4"x18 NPTF	24-29 Nm	18-21 ft·lb
3/8"x18 NPTF	27-34 Nm	20-25 ft·lb
1/2"x14 NPTF	54-68 Nm	40-50 ft·lb
3/4"x14 NPTF	102-108 Nm	75-80 ft·lb
1"x11 NPTF	136-156 Nm	100-115 ft·lb

Flat-sealing male fitting (metric / BSPP)

SPIR STAR® AG offers male fittings with two thread types: the metric thread and the BSPP (British Standard Parallel Pipe) thread. The use of a sealing ring is necessary with a flat-sealing male fitting in order to ensure a leak-tight connection between the flat surfaces of the connector and its counterpart. The sealing ring which is compressed when the connector is tightened ensures a reliable seal. The sealing effect is not achieved by the thread itself but through the compression of the sealing ring all over the surface.

Metric thread size	Recommended tightening torque	
M5x0.8	3-4 Nm	2-3 ft·lb
M7x1	4-5 Nm	3-4 ft·lb
M8x1.25	6-7 Nm	5-6 ft·lb
M10x1	8-9 Nm	6-7 ft·lb
BSPP thread size	Recommended tightening torque	
G 1/8"	20-22 Nm	15-16 ft·lb
G 1/4"	30-35 Nm	22-26 ft·lb
G 3/8"	40-50 Nm	30-37 ft·lb
G 1/2"	55-65 Nm	41-48 ft·lb

Male fitting with USIT ring (BSPP)

The male fitting with USIT ring ensures a leak-proof connection through a special sealing ring which is firmly attached to a metal washer. When the fitting is tightened, the elastic part of the USIT ring is compressed between the flat surfaces of the fitting and its counterpart and thus reliable leak-tightness is achieved.

Male fittings with USIT ring must only be used for hydraulic applications!

BSPP thread size	Recommended tightening torque	
G 1/4"	20-35 Nm	15-26 ft·lb
G 3/8"	30-50 Nm	22-37 ft·lb

Female swivel 24°/60° (metric / BSPP)

SPIR STAR® AG female swivel 24°/60° fittings are available with either a metric or a BSPP thread. Except for thread size M14x1.5, SPIR STAR® AG exclusively offers the heavy type. A female swivel 24°/60° fitting seals through the combination of a conical sealing head with an accordingly shaped counterpart. When assembled, the cone with an angle of 24° or 60° respectively ensures a friction-type joint where the sealing effect is produced by the positive metallic contact of the cone surfaces. This design provides reliable leak-tightness and does not need any further sealing materials.

Metric thread size	Recommended tightening torque	
M12x1.5	20-30 Nm	15-22 ft·lb
M14x1.5 (light)	15-17 Nm	11-13 ft·lb
M16x1.5	40-44 Nm	30-33 ft·lb
M18x1.5	50-55 Nm	37-41 ft·lb
M20x1.5	60-66 Nm	44-49 ft·lb
M24x1.5	80-88 Nm	59-65 ft·lb
M30x2	120-132 Nm	89-97 ft·lb
M36x2	170-187 Nm	125-138 ft·lb
M42x2	250-275 Nm	184-203 ft·lb
BSPP thread size	Recommended tightening torque	
G 1/4"	15-25 Nm	11-18 ft·lb
G 3/8"	27-41 Nm	20-30 ft·lb
G 1/2"	42-76 Nm	31-56 ft·lb
G 3/4"	95-135 Nm	70-100 ft·lb
G 1"	115-165 Nm	85-122 ft·lb
G1 1/4"	140-280 Nm	103-207 ft·lb

Female swivel with O-ring – DKOS (metric)

The female swivel with O-ring seals via its conical connection where the O-ring is located between the cone flank and the matching counterpart. When the swivel nut is tightened, the fitting is pressed into its counterpart. In the process, the O-ring is compressed, which ensures a reliable, leak-tight connection. Here it is always the heavy version of the fitting that is used.

Metric thread size	Recommended tightening torque	
M18x1.5	30-50 Nm	22-37 ft·lb
M20x1.5	40-60 Nm	30-44 ft·lb
M22x1.5	50-70 Nm	37-52 ft·lb
M24x1.5	60-80 Nm	44-59 ft·lb
M30x2	80-100 Nm	59-74 ft·lb
M36x2	110-140 Nm	81-103 ft·lb
M42x2	120-150 Nm	89-111 ft·lb

Medium-pressure fitting – MP (UNF)

The medium-pressure fitting seals through the combination of a collar and a gland nut. The collar is located in front of the gland nut and is screwed onto the pipe end. When the gland nut is tightened, the fitting (58°) is pressed against its counterpart (60°). In the process, the fitting is firmly pressed into the connector, which ensures a reliable seal. For the assembly of the medium-pressure fitting in combination with the collar, we recommend leaving the first two threads of the fitting free so that they are not covered by the collar.

UNF thread size	Recommended tightening torque	
1/4"x28 UNF LH	25-30 Nm	18-22 ft·lb
3/8"x24 UNF LH	35-45 Nm	26-33 ft·lb
9/16"x18 UNF LH	110-120 Nm	81-89 ft·lb
3/4"x16 UNF LH	120-130 Nm	89-96 ft·lb
1"x12 UNF LH	150-180 Nm	111-133 ft·lb

High-pressure fitting – HP (metric / UNF)

The high-pressure fitting seals through the combination of a collar and a gland nut and the collar is located inside the gland nut. Similar to the medium-pressure fitting, the collar is screwed onto the fitting. When the gland nut is tightened, the fitting (58°) is pressed against its counterpart (60°). For the assembly of the high-pressure fitting in combination with the collar, we recommend leaving the first two threads of the fitting free so that they are not covered by the collar. The major difference lies in the higher strength of the high-pressure fitting. The collar and the gland nut have been specially designed for higher pressures to ensure a particularly reliable seal and a firm mechanical connection under extreme pressure. The use of high-pressure fittings made by SPIR STAR® AG is permissible for pressures of up to 4,140 bar. Please note that the maximum allowable working pressure of the hose assembly is decisive.

Metric thread size	Recommended tightening torque	
M14x1.5	50-70 Nm	22-37 ft·lb
M18x1.5	100-120 Nm	30-44 ft·lb
M20x1.5	120-150 Nm	37-52 ft·lb
UNF thread size	Recommended tightening torque	
1/4"x28 UNF LH	30-35 Nm	22-26 ft·lb
3/8"x24 UNF LH	65-75 Nm	48-55 ft·lb
9/16"x18 UNF LH	100-120 Nm	74-89 ft·lb

High-pressure nozzle fitting Blast-Pro® (UNF)

The SPIR STAR® AG Blast-Pro® fitting has been specially developed for pipe cleaning applications, and as a nozzle fitting it must only be used in pipes. Leak-tightness is achieved through precise conical surfaces which are directly pressed onto each other when the nozzle is tightened to the male thread of the hose connector. A collar and gland nut are not necessary. Both components, i.e. the nozzle and the hose connector are equipped with a wrench flat that allows safe assembly.

UNF thread size	Recommended tightening torque	
1/4"x28 UNF LH	4-6 Nm	3-5 ft·lb
3/8"x24 UNF LH	15-22 Nm	11-16 ft·lb
9/16"x18 UNF LH	40-50 Nm	30-37 ft·lb

JIC fitting (UNF)

JIC fittings (Joint Industrial Council) use a combination of a tapered male thread and a conical nipple with swivel nut to achieve leak-tightness. The fitting is screwed into its counterpart by tightening the swivel nut; the conical surfaces match precisely, thus creating a leak-tight connection. What distinguishes the JIC fitting from other connectors is its 74-degree conical geometry which ensures high leak-tightness and mechanical stability under compressive loads.

JIC fittings must only be used for hydraulic applications!

UNF thread size	Recommended tightening torque	
7/16"x20 UNF	15-16 Nm	11-12 ft·lb
9/16"x18 UNF	24-28 Nm	18-21 ft·lb
3/4"x16 UNF	49-53 Nm	36-39 ft·lb
1 1/16"x12 UNF	108-119 Nm	80-88 ft·lb
1 5/16"x12 UNF	136-146 Nm	100-108 ft·lb

Type M (UNF)

Type M high-pressure fittings with UNF thread make use of metal-to-metal sealing via conical surfaces in order to achieve reliable leak-tightness. When the swivel nut is tightened, the nipple (58°) is pulled towards the sealing surface of its conical counterpart (60°) and firmly pressed against it.

UNF thread size	Recommended tightening torque	
9/16"x18 UNF	34-41 Nm	25-30 ft·lb
3/4"x16 UNF	54-68 Nm	40-50 ft·lb
7/8"x14 UNF	68-81 Nm	50-60 ft·lb
1"x12 UNF	102-115 Nm	75-85 ft·lb
1 1/8"x12 UNF	135-150 Nm	100-111 ft·lb
1 5/16"x12 UNF	136-163 Nm	100-120 ft·lb