



COMPRESSED GAS ASSOCIATION, INC.

TECHNICAL BULLETIN

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TORQUE GUIDELINES FOR SEALING CGA VALVE OUTLET CONNECTIONS

Purpose

The purpose of this publication is to provide fillers and users of compressed gases with torque guidelines for sealing various CGA cylinder valve outlet connections except for the 630/710 connections covered in CGA TB-9, *Guidelines for the Proper Handling and Use of the CGA 630/710 Series Ultra High Integrity Service Connections*, medical yoke connections, medical DISS connections, and scuba connections [1]. By following these guidelines, users can expect to reduce leaks and damage to the connections.

General

Although the listed connections were not originally designed to be assembled with specified torque values, the use of suitable torque wrenches with crow's-foot-type adapters is helpful for spot checking operator-applied torques and evaluating connection leakage problems. The expected nominal sealing torques and maximum recommended applied torques for various CGA outlet connections are listed in Table 1. These torque values are based on the results of the CGA tests on new, unused connecting parts as illustrated in Section A of CGA V-1, *Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections* [2].

Applied torques significantly less than those listed in the table might not be sufficient to consistently accomplish a seal of the connection.¹ Applied torques greater than the maximum values listed in Table 1 can shorten the life of the connecting parts.

CAUTION: *Testing was completed in a laboratory environment using new, unused connecting parts. Due to the infinite number of variables to which a connection in the field can be subjected, results can vary. Therefore, it must be the responsibility of the end user to verify the leak integrity of a connection before putting any cylinder into service.*

The tested torque values in Table 1 for metal-to-metal connections are based on the CGA outlet connecting parts manufactured from the same metal, either brass or 300 series stainless steel. For connections using washers to seal, polytetrafluoroethylene and polychlorotrifluoroethylene were the washer materials used during testing. Dissimilar metals, metals not listed, and/or other washer materials may influence the torque requirement.

Other variables can affect the torques listed in Table 1 such as the number of cycles the connections have seen and the conditions of the connecting parts, particularly the sealing surfaces. Therefore, the information provided must be applied with this in mind and is intended for the purpose of guidance only.

References

Unless otherwise specified, the latest edition shall apply.

[1] CGA TB-9, *Guidelines for the Proper Handling and Use of the CGA 630/710 Series Ultra High Integrity Service Connections*, Compressed Gas Association, Inc., 4221 Walney Rd., 5th Floor, Chantilly, VA 20151. www.cganet.com

[2] CGA V-1, *Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections*, Compressed Gas Association, Inc., 4221 Walney Rd., 5th Floor, Chantilly, VA 20151. www.cganet.com

[3] ARI Guideline M, 1997, *45° Refrigeration Flare Fittings and Copper Tubing*, American National Standards Institute, 25 W. 43rd St., New York, NY 10036. www.ansi.org

¹ Bubble tested with nitrogen for 3 minutes at the service pressure of the connection.

Table 1—Torque guidelines for sealing CGA outlet connections

Connection number (W = Washer)	Recommended torque		Recommended maximum torque	
	ft-lb _f	N•m	ft-lb _f	N•m
110(W)	10	14	15	20
160	NA ¹⁾	NA ¹⁾	NA ¹⁾	NA ¹⁾
165 ²⁾	8 ²⁾	11	10 ²⁾	14
167	NA ¹⁾	NA ¹⁾	NA ¹⁾	NA ¹⁾
170(W)	10	14	15	20
180(W)	10	14	15	20
182 ²⁾	15 ²⁾	20	25 ²⁾	34
200	25	34	35	47
240	NA ¹⁾	NA ¹⁾	NA ¹⁾	NA ¹⁾
280	25	34	35	47
290	30	41	45	61
295 ²⁾	25 ²⁾	34	35 ²⁾	47
296	35	47	50	68
300	35	47	50	68
320(W)	20	27	30	41
323	NT ³⁾	NT ³⁾	NT ³⁾	NT ³⁾
326	25	34	35	47
330(W)	20	27	30	41
346	35	47	50	68
347	35	47	50	68
350	35	47	50	68
410	35	47	50	68
440 ²⁾	40 ²⁾	54	55 ²⁾	75
450 ²⁾	40 ²⁾	54	55 ²⁾	75
500	35	47	50	68
510	35	47	50	68
520	35	47	50	68
540	40	54	60	81
555	40	54	60	81
577	40	54	60	81
580	40	54	60	81
590	40	54	60	81
599	NT ³⁾	NT ³⁾	NT ³⁾	NT ³⁾
600	NT ³⁾	NT ³⁾	NT ³⁾	NT ³⁾
601	NT ³⁾	NT ³⁾	NT ³⁾	NT ³⁾
621	35	47	50	68
622	35	47	50	68
624	35	47	50	68
625	35	47	50	68
626	35	47	50	68
660(W)	30	41	45	61
670(W)	30	41	45	61
677	40	54	60	81
678(W)	25	34	35	47
679(W)	25	34	35	47
680	40	54	60	81
695	40	54	60	81