### ASTM A199M-89 SEAMLESS COLD DRAWN intermediate ALLOY STEEL HEAT EXCHANGER AND CONDERSER TUBES

This standard is issued under the fixed designation A 199/A 199M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This specification covers several grades of minimum-wall-thickness, chromium-molybdenum and chromium-molybdenum-silicon, seamless, cold-drawn, intermediate alloy steel tubes for heat exchangers, condensers, and similar heat transfer apparatus.

1.2 The tubing sizes usually furnished to this specification are 1/8 to 3 in. [3.2 to 76.2 mm] in outside diameter. Tubing having other dimensions may be furnished provided such tubes comply with all other requirements of this specification.

1.3 Mechanical property requirements do not apply to tubing smaller than 1/8 in [3.2 mm] in inside diameter or 0.015 in [0.4mm] in thickness.

1.4 The values stated in either inch-pound units or SO units are to be regarded separately as standard. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with the specification. The inch-pound units shall apply unless the "M" designation of this specification is specified in the order.

		KOREA/JAPANES			GERMAN				BRITISH			BELGIAN			FRENCH			ITALIAN		
ASTM Standard	UNS NO.		KS/JIS Number	Remarks			Material Number	Remarks	B.S Number		Remarks	NBN Type	NBN Grade	Remarks	AFNOR Type		Remarks	UNI Type	UNI No	Remarks
A 199 Seamless Cold Drawn Intermediate Alloy Steel Heat Exchange and Condenser Tubes																				
Т5	K41545	STHA 24 / STBA 25		(35)	12 CrMo 19 5		1.7362	(3a)	3606	CFS 625	(35)	X12Cr Mo 5	837	(35)	Z 12 CD 5.05		(3a)			(3); dalmine 234
T11	K11597	STHA 22 / STBA 23		(35)	13 CrMo 44		1.7335	(8)	3606	CFS 621	(35)				10 CD 5.05		(3a)			(3); dalmine 227(10)

### Material Comparison Tables (ASTM, KS, JIS, DIN, BS, NBN, NF, UNI)

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T22	K21590 STHA 23 STBA 24	/ D3572 / G3462 (35)	10 CrMo 1713 9 10	75 1.7380	3606	CFS 622	10 (35) M	o 9837	(35)	10 CD 9.10		(3a)	12CrMo 9 10	5462	(10)0	
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มร			ASTM	ASTM				DIN		NF			ISO			Index		
Standard Number	Grade	Туре	Standard Number	Grade	Туре	Standard Number	Grade	Туре	Standard Number	Grade	Туре	Standard Number	Grade	Туре	Standard Number	Grade	Туре	Number
G3462	STBA12	Мо	A209	T1	Мо	3606	ERW245	Мо										C011
			A250	T1	Мо		CEW245	Мо										
							CFS245	Мо										
	STBA13	Мо	A209	T1-A	Мо													
			A250	T1-a	Мо													
			A629	-	Мо													
	STBA20	CrMo	A213	T2	CrMo													
	STBA22	CrMo	A213	T12	CrMo	3059	S1 620	CrMo	17175	13CrMo44	CrMo							
							S2 620	CrMo										
						3059	ERW620	CrMo										
							CEW620	CrMo										
						3604	HFS620-460	CrMo										
							CFS620-460	CrMo										
						11	ERW620-460	CrMo										
							CEW620-460	CrMo										
						"	HFS620-440	CrMo										
						"	CFS620-440	CrMo										
						"	ERW620-440	CrMo										
							CEW620-440	CrMo										
						3606	ERW620	CrMo										

## JIS Number and Corresponding Foreign Standards

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				l		CEW620	CrMo										
			<u> </u>		-	CFW620	CrMo										
STBA23	CrMo	A199	T11	CrMo	3604	HF621	CrMo				A49-213	TU10C D	CrMo				
		A213	T11	CrMo		CFS621	CrMo				A49-215	TU10C D5.05	CrMo				
						ERW621	CrMo										
					u	CEW621	CrMo										
					3606	ERW621	CrMo										
						CEW621	CrMo										
						CFS621	CrMo										
STBA24	CrMo	A199	T22	CrMo	3059	S1-622-440	CrMo	17175	10CrMo910	CrMo	A49-213	Tu10C D9.10	CrMo				
		A213	T22	CrMo		S2-622-440	CrMo				A49-215	Tu10C D9.10	CrMo				
						S1-622-490	CrMo										
			<u> </u>		u	S2-622-490	CrMo										
STBA25	CrMo	A199	T5	CrMo	3604	HFS625	CrMo							260 4/2	TS37	CrMo	
		A213	T5	CrMo		CFS625	CrMo										
			<u> </u>		3606	CFS625	CrMo										
STBA26	CrMo	A199	Т9	CrMo	3059	S1-629-470	CrMo				A49-213	TUZ10 CD9	CrMo				
		A213	Т9	CrMo		S2-629-470	CrMo				A49-215	TUZ10 CD9	CrMo				
						S1-629-470S2 -629-590	CrMo										
						S2-629-590	CrMo									İ	
			<u> </u>		3604	HFS629-470	CrMo									İ	