Design Check List - Section VIII, Division 1

Manufacturer:		Project/Order:		
Drawing No. / Rev.:		Place / Date:		
Inspector:		Reference Paragraph	Remarks	OK / Not OK
1	**Drawing + bill of material (BOM)**			
1.1	drawing no./rev. (revision used in the calculation?/in compliance with Quality Manual?)			
1.2	reference on the drawing to other required documents, e.g. welding doc., BOM etc.			
1.3	ASME Code Edition /Code Cases			
1.4	units: SI/U.S. Customary/local customary units	U-4		
1.5	design data: internal / external pr./ MAWP / design temperature / MDMT / test pressure etc.	UG-20 , 21		
1.6	corrosion / erosion allowance	UG-25		
1.7	materials (for all pressure parts: all permitted?/additional requirements, e.g. UT, PT, MT?)	UG-4 thru UG-15,		
1.8	dimensions (ID, t, OD etc.)	UG-16		
1.9	loads (use separate checklist as well)	UG-22 (a) to (j)		
1.10	service restrictions (unfired steam boiler, cyclic, lethal, compressed air, steam, water service)	UW-2, UG-16		
1.11	joint identification on the drw. /assignment of WPS to joints/ref. to the ext. welding doc.			
1.12	name plate	UG-115, 116, 118, 119		
2	**Tolerances / Dimensions**	U-5, UG-16(c)		
2.1	minimum thickness, plate and pipe tolerances	UG-16		
2.2	misalignment	UW-33		
2.3	tapered transitions	UW-9		
2.4	staggered longitudinal joints	UW-9		
2.5	out-of-roundness for internal pressure	UG-80(a)		
2.6	out-of-roundness for external pressure	UG-80(b)		
2.7	head skirt length	UG-32-33,UW-13		
2.8	tolerance for formed heads	UG-81		
2.9	exposed inside edges chamfered or rounded	UG-76(c)		
3	**Calculation**			
3.1	computer program verification incl. evidence of alternate calculation per method applied	Foreword		
3.2	allowable stress values used in the calculation	UG-23, Sec.II		
3.3	external (stiffening rings if appl.) / internal pressure calculation for all pressure bearing parts	UG-27 ff		
3.4	joint efficiencies E	UW-11, 12		
3.5	corrosion allowance / static head considered in the calculation?	UG-16, 21		
3.6	required thickness values >= minimum wall thickness (UG-16) + corrosion allowance	UG-16, 25		
3.7	any external loadings considered: e.g. ex. nozzle loads, seismic, wind, ...	UG-22		
3.8	extreme fibre elongation	UCS-79, UG-79, UHA-44, UNF-79		
3.9	fittings considered?	UG-44, Table U-3		
3.10	Flanges ASME B16.5: PT Rating @ Tdes >= design pressure (incl. static head)	UG-44		
3.11	non-standard:	App.2, App.Y		
3.12	material: bar? / hubbed flanges from rolled plate?	UG-14, 2-2(d)(2)		
3.13	bolt requirements	UG-12, 2-2(e)		
3.14	Nozzles size: → ligaments, if any ---> ligament efficiency considered	UG-53		
3.15	→ small openings, if any ---> no reinforcement calculation needed	UG-36(c)(3)		
3.16	→ reinforcement calculation needed ---> for shells / dished heads	UG-37, App.1-9,10 (shell)		
3.17	→ for flat heads	UG-39		
3.18	→ for large openings	App. 1-7, App.1-10		
3.19	limits of reinforcement, overlapping areas of reinforcement	UG-37, 40		
3.20	multiple openings	UG-42		
3.21	openings in or adjacent to welds	UG-37, UW-14		
3.22	split/ segmental reinf. plates considered	UG-37		
3.23	nozzle weld strength calculation	UG-41, UW-15		
3.24	minimum nozzle neck thickness	UG-45		
3.25	telltale holes in nozzle reinf. plates	UG-37(g)		
3.26	Studded openings → reinforcement calculation available?	UG-37		
3.27	→ threaded connection	UG-12,UG-43(e),(g), UG-46(i)		
3.28	→ remaining wall thickness underneath tapped holes	UG-43(d)		
3.29	Stayed surfaces	UG-47		
3.30	→ Staybolts	UG-14, 48-50, UG-83, UW-19		
3.31	Vessel support calculation (lugs, legs, saddles…)	UG-4(b), UG-22, UG-54,55		
4	**Drains**	UG-25(f)		
5	**Telltale holes for corrosion**	UG-25(e)		

Design Check List - Section VIII, Division 1

6	**Studs & bolts**		UG-12, UCS-10, UNF-12, UHA-12, 2-2(e)		
7	**Inspection openings**		UG-46		
8	**Flued openings**		UG-38		
9	**Heat exchangers**		UHX, App. A, UW-20		
10	**Dimpled and embossed assemblies**		App.17		
11	**Electric immersion heater support plates**		App.41		
12	**Bellow joints**		App.26, App.5		
13	**Rectangular vessels**		App.13		
14	**Clamp connections**		App.24		
15	**Quick-actuating closures**		UG-35.2		
16	**Jacketed vessels**		App. 9, UG-27(f), 28(i), 47		
17	**Miniature pressure vessel - check the constraints!**		U-1(j), UG-116		
18	**Mass production of pressure vessels**		App. 35		
19	**Welds**				
19.1	Joint categories		UW-3		
19.2	Nozzle attachment to the shell or head		UW-16		
19.3	Attachment of flat heads + covers to cylinders		UW-13, UG-34,		
19.4	Corner joints		UW-13(e), UG-93(d)(3)-(4)		
19.5	Fillet welds from one side only		UW-8,13, UG-34		
19.6	Flange attachment to the nozzle		Fig. 2-4 App. 2		
19.7	Tubesheet to shell welds		UW-13.2		
19.8	Tube to tubesheet welds		UW-20, App. A		
19.9	Plug welds		UW-17, 37		
19.10	Fillet welds		UW-18		
19.11	Welded stays		UW-19		
19.12	B16.5 SO and socket flange welds		UW-21		
20	**Heat treatment requirements**		UG-85		
20.1	PWHT carbon and low alloy steels		UCS-56		
20.2	high alloy steels		UHA-32		
20.3	nonferrous materials		UNF-56		
20.4	HT after forming due to straining		UCS-79, UHA-44, UNF-79		
21	**Impact Test Requirements**		UG-84, UW-48		
21.1	carbon and low alloy steels		UG-20(f), UCS-66-67		
21.2	high alloy steels		UHA-51		
21.3	nonferrous materials		UNF-65		
22	**NDE**		UW-11, App.6, App.8		
22.1	RT: carbon and low alloy steels		UCS-57, UNF-57		
22.2	high alloy steels		UHA-33		
22.3	nonferrous materials		UNF-57		
22.4	radiographic technique		UW-51, 52		
22.5	ultrasonic examination		UW-53, App.12		
22.6	selection and location of "spots"		UW-52		
22.7	hubs machined from plate		App.20		
22.8	PT / MT mandatory		UHA-34,UW-13(b)(4),UNF-58		
22.9	NDE (PT/MT) on corner joints		UG-93(d), UW-13(e)		
23	**Test pressure** Hydrostatic Test		UG-99		
23.1	→ based on MAWP		UG-99(b)		
23.2	→ based on calculated pressure		UG-99(c)		
23.3	Pneumatic Test		UG-100		
24	**Overpressure Protection**		UG-125-140, App.11, App.M		
25	**Referenced Standards**		Table U-3		
26	**Proof Test**		UG-101		
27	**Marking and Stamping** / Name plate location		UG-115, 116, 118-119		
28	**NB registration number**				
29	**Canadian registration number**				
30	**Partial Data Report / Data Report**		UG-120		
31	**Comments/Additional Notes**				

This check list has been prepared by CIS GmbH. It refers to vessels made of carbon, low alloy, high alloy steels and nonferrous metals. For other types of constuction see the Code. However, this check list is intended to be used as a help and guidance only, it cannot replace profound knowledge of the Code.