Table 29 — Type and extent of weld examinations and tests for carbon, carbon manganese and stainless steel

Part of tank	Type of assembly	Visual examination (19.4) %	Vacuum box test (19.5) %	Dye penetrant test (19.6) %	Magnetic particle examination (19.7) %	Soap bubble examination (19.8) %	Radiography (19.9) or Ultrasonic examination (19.10) %
Bottom plates	Butt weld	100	100	100[a] or 100[a]			
	Fillet weld[b]	100	100	100[a] or 100[a]			
Bottom annular plates	Radial joint butt weld	100	100 or 100 or 100				[c] and [d]
Bottom to shell	Fillet weld	100[e]	100[f] or 100[e] or 100[e] or 100[g]				
Shell	Butt weld	100					Tables 30 and 31
Roof to shell	Fillet weld	100		100[h] or 100[h] or 100[h]			
	Butt weld	100		100[h] or 100[h] or 100[h]			
Roof	Fillet weld[b]	100		100[h] or 100[h] or 100[h]			
	Butt weld	100		100[h] or 100[h] or 100[h]			

[a] Done when vacuum box test impractical.

[b] Fillet weld includes welds connecting lapped plates.

[c] Radiographic examination with one 400 mm full length film from the outer edge of the annular plate, or ultrasonic examination over the full length, one joint in four.

[d] For steel with yield strength $\geq$ 355 N/mm^2 and thickness > 10 mm, radiographic examination with one 400 mm full length film from the outer edge of the annular plate, or ultrasonic examination over the full length, one joint in two.

[e] On both sides.

[f] For steel with yields strength < 355 N/mm^2 and thickness $\leq$ 30 mm, on inside only.

[g] For steel with yields strength < 355 N/mm^2 and thickness $\leq$ 30 mm, on inside only.

[h] One side.

Table 29 — Type and extent of weld examinations and tests for carbon, carbon manganese and stainless steel *(continued)*

Part of tank	Type of assembly	Visual examination (19.4) %	Vacuum box test (19.5) %	Dye Penetrant test (19.6) %	Magnetic particle examination (19.7) %	Soap bubble examination (19.8) %	Radiography (19.9) or Ultrasonic examination (19.10) %
Nozzles in shell or bottom and nozzles in roof where design pressure > 60 mbar gauge	Longitudinal weld	100[i]					100
	Weld neck flange to pipe $d_n \geq 100$ mm	100[i]					10
	Weld neck flange to pipe $d_n < 100$ m	100[h i]		100[h] or 100[h]			
	Slip on flange to pipe fillet weld	100[i]		100 or 100			
Nozzle to shell or insert and nozzle with reinforcing plate	Nozzle to shell or insert weld	100[i]		100 or 100			
	Nozzle to reinforcing plate	100[i]		100 or 100			
	Reinforcing plate to shell	100[i]				100	
	Insert plate to shell	100					100

[h] One side.

[i] After post-weld heat treatment of sub-assembly, if required.

Table 29 — Type and extent of weld examinations and tests for carbon, carbon manganese and stainless steel *(continued)*

Part of tank	Type of assembly	Visual examination (19.4) %	Vacuum box test (19.5) %	Dye penetrant test (19.6) %	Magnetic particle examination (19.7) %	Soap bubble examination (19.8) %	Radiography (19.9) or Ultrasonic examination (19.10) %
Clean out door nozzle flush with bottom plate	Butt weld on bottom	100[i]					100
	Other than reinforcement	100[i]		100[i]	100[j]		
Nozzle in roof where design pressure ≤ 60 mbar	Longitudinal weld	100				100	
	Weld neck flange to pipe butt weld	100				100	
	Slip on flange to pipe fillet weld	100				100	
	Nozzle to roof fillet weld	100		100 or		100	
Temporary bracket	After removal of the bracket	100		100[k] or 100[k]			
Permanent bracket and pad plates	Fillet weld	100		100[k] or 100[k]			
Stiffening rings (Wind girders)	Main butt welds in stiffening rings	100					
	Fillet welds to shell	100		100[k] or 100[k]			

[i] After post-weld heat treatment of sub-assembly, if required.

[j] After first pass.

[k] For steel with yield strength ≥ 355 N/mm^2.