

LANL Conduct of Engineering Scope and Major Activities



Governing Institutional Documents		LANS Contract								
		PD340, Conduct of Engineering								
		P342, Engineering Standards								
Type of Work		Facility Work				Programs/ Non-Facility Projects/ R&D Work				Nuclear Weapons Work
Engineering Standard Types and Major Topics	Subtopics LANL ESM, LLNL DSS, PRS DG Subject, etc.	Higher Hazard ⁽¹⁾	LANL ESM Section or other Document	Lower Hazard ⁽²⁾	LANL ESM Section or other Document	Higher Hazard ⁽¹⁾	LANL ESM Section or other Document	Lower Hazard ⁽²⁾	LANL ESM Section or other Document	Product Realization Stds and Tech. Bus. Practices
Design Criteria (by LANL Eng Standards Manual STD-342-100 Chapter/Discipline)										
1. General	General Requirements for All Disciplines (ESM)	M	Z10	M	Z10	M	Z10	M	Z10	Product Realization Stds http://prp.sandia.gov/
	Equipment and Component Numbering & Labeling (ESM Ch 1)	M	200-230	M	200-230	M	200-230	M	200-230	TBP-302, Product and Equipment Designations
2. Fire Protection	Fire Protection Ch	M	D40	M	D40	M	D40	M	D40	
3. Civil	General Civil Requirements	M	G10-30GEN	M	G10-30GEN					
	Site Preparations	M	G10	M	G10					
	Site Improvements	M	G20	M	G20					
	Site Civil / Mechanical Utilities	M	G30	M	G30					
4. Architectural	General Architectural Requirements	M	B-C GEN	M	B-C GEN					
	Building Shell	M	B Shell	M	B Shell					
	Building Interior	M	C Interior	M	C Interior					
5. Structural	General Criteria	M	Section I	M	Section I	M	Section I	G	Section I	
	PC-0, PC-1, and PC-2 Design & Analysis Reqrmts	M	Section II	M	Section II	M	Section II	G	Section II	
	PC-3 Design & Analysis Requirements	M	Section III			M	Section III			
	Geotechnical Investigations	M	Section IV	M	Section IV					
	Seismic Design and Evaluation Criteria (LLNL)	G	LLNL*	G	LLNL*	G	LLNL*	G	LLNL*	
	Safety Factors (LLNL)					G	LLNL*	G	LLNL*	
	Personnel and Equipment Shields (LLNL)	G	LLNL*			G	LLNL*			
6. Mechanical (and materials)	General Mechanical (D10-30GEN)	M	D10-30GEN	M	D10-30GEN	M	D10-30GEN	M	D10-30GEN	
	Fatigue Analysis of Metals—The Stress-Life Method (LLNL)					G	LLNL*	G	LLNL*	
	Fracture-Critical Metal Components (LLNL)					G	LLNL*	G	LLNL*	
	Friction, Wear, & Lubrication (LLNL) (ops & maint)	G	LLNL*	G	LLNL*	G	LLNL*	G	LLNL*	
	Conveying (D10+E10 re: cranes, elevators, lifts)	M; G	D10+E10; LLNL*	M; G	D10+E10; LLNL*	M; G	D10+E10; LLNL*	M; G	D10+E10; LLNL*	
	Cryogenic Systems (FermiLab/FNAL ESH 5030)	G	FermiLab ESH 5030*	G	FermiLab ESH 5030*	G	FermiLab ESH 5030*	G	FermiLab ESH 5030*	
	Gloveboxes (LANL D10+E10 ; LLNL*)	M; G	D10+E10; LLNL*	M; G	D10+E10; LLNL*	M; G	D10+E10; LLNL*	M; G	D10+E10; LLNL*	
	Hazardous Materials Shipping Containers (LLNL)					G	LLNL*			
	HVAC and nuc. air treatment systems D30HVAC	M	D30HVAC	M	D30HVAC	M	D30HVAC			
	Plumbing/Piping/Vessels (LANL D20)	M	D20	M	D20	M	D20	M	D20	

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LLNL* = LANL is currently reviewing a LLNL programmatic "Design Safety Standard" on this for usefulness and possible adoption as a LANL Design Guide.

Note 1: Higher Hazard facilities include nuclear hazard category 2 & 3 and high and moderate hazard non-nuclear facilities

Note 2: Lower Hazard facilities include radiological facilities, low hazard, and no hazard non-nuclear facilities T. H. Oruch, Eng Standards Program, 5-8475, oruch@lanl.gov

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	Stands, Dollies, Lifting, Handing, Fixtures					G	LLNL*; PRS DG10221, DG10240	G	LLNL*; PRS DG10221, DG10240	PRS DG10221, DG10240
	Threaded Fasteners (LLNL)	G	LLNL*	G	LLNL*	G	LLNL*	G	LLNL*	PRS Des Guide DG10080/B
	Vacuum Systems (LLNL)	G	LLNL*	G	LLNL*	G	LLNL*	G	LLNL*	
	Vessels, Explosion Containment (LLNL)					G	LLNL*			
7. Electrical	General Electrical Requirements (D5000)	M	D5000	M	D5000	M	D5000	M	D5000	
	Electrical Service & Distribution Systems (D5010)	M	D5010	M	D5010					
	Lighting & Branch Circuit Wiring (D5030)	M	D5020	M	D5020					
	Communications (D5030)	M	D5030	M	D5030					
	Other Electrical Systems (D5090)	M	D5090	M	D5090					
	Site Electrical Distribution (G4010)	M	G4010	M	G4010					
	Site Lighting (G4020)	M	G4020	M	G4020					
	Site Communication & Security (G4030)	M	G4030	M	G4030					
	Other Site Electrical Utilities (G4090)	M	G4090	M	G4090					
	Designing and Fabricating Safe Electrical Equipment (LLNL)					G	LLNL*	G	LLNL*	
	Rack Power Distribution and Enclosure Design					G	TBD	G	TBD	
	Spec for Electrical Equipment Fabrication (LLNL)					G	LLNL*	G	LLNL*	
	Acquiring Electrical Equipment and Components (LLNL)	G	LLNL*	G	LLNL*	G	LLNL*	G	LLNL*	
	High Energy Electrical System Design	G	TBD	G	TBD	G	TBD			
	Electrical Testers for Use with Nuclear Explosives					G	PRS DG10001			PRS Des Guide DG10001
8. Instrumentation & Control	Instrumentation & Control [LANL: process & HVAC]	M	D3060/F1050	M	D3060/F1050	M	D3060/F1050	M	D3060/F1050	
	Instrumented Systems used in SS & Hazardous Processes Design Guidance	G	Ch 8 App A			G	Ch 8 App A			
	Fail-Safe Design of Process Control Loops Guidance	G	Ch 8 App B			G	Ch 8 App B			
	I & C Design Review Guidance	G	Ch 8 App C	G	Ch 8 App C	G	Ch 8 App C	G	Ch 8 App C	
	Installation & Calibration of Instruments Guidance	G	Ch 8 App D	G	Ch 8 App D	G	Ch 8 App D	G	Ch 8 App D	
	Alarm Management Guidance	G	Ch 8 App E			G	Ch 8 App E			
	Instrument Loop Diagrams Guidance	G	Ch 8 App F	G	Ch 8 App F	G	Ch 8 App F	G	Ch 8 App F	
	Control Logic Diagrams Guidance	G	Ch 8 App G	G	Ch 8 App G	G	Ch 8 App G	G	Ch 8 App G	
	Schematic (Elementary) Diagrams Guidance	G	Ch 8 App H	G	Ch 8 App H	G	Ch 8 App H	G	Ch 8 App H	
	Hybrid microcircuits, printed wiring boards/assys, integr circuit pkg & dies, Li(Si)/FeS2 thermal batteries, leadless chips, solderability, unique signal					G	PRS Design Guides DG 10172, 10173, 10174, 10176, 10177, 10178, 10179, 10214	G	PRS Design Guides DG 10172, 10173, 10174, 10176, 10177, 10178, 10179, 10214	PRS Design Guides DG 10172, 10173, 10174, 10176, 10177, 10178, 10179, 10214
	Piping & Instrumentation Diagrams (D10-30PFD)	M	Ch 8 App I	M	Ch 8 App I	M	Ch 8 App I	G	Ch 8 App I	
9. Security	Facility Protection and Security (ESM Ch 9)	M	F1033	M	F1033	M	F1033	M	F1033	
10. Hazardous Process	Hazardous Process Requirements (LANL F1030/A)	M	F1030.1 and App A			M	F1030.1 and App A			
	Airborne Payloads; Aircraft Compatibility					G	LLNL*; PRSDG10222	G	LLNL*; PRSDG10222	PRS Design Guide 10222

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	Explosives Assemblies (LLNL)					G	LLNL*			
	Fracture-Critical Optical Components (LLNL)					G	LLNL*	G	LLNL*	
	Laser Systems -- Design Considerations, etc.					M; G	P101-24; TBD*	M; G	P101-24; TBD*	
11. Radiation Protection	Radiation Protection (LANL F1030.2 and App A)	M; G	F1030.2 and App A			M; G	F1030.2 and App A			
	Radiation Shields	G	TBD*			G	TBD*			
12. Nuclear	Nuclear (LANL F1030.3 and Att A)	M	F1030.3 and Att A			M	F1030.3			
13. Welding, Joining, NDE	Welding and Joining (LANL Welding Prgm Vol 1-6)	M	Volumes 1-6	M	Volumes 1-6	M	Volumes 1-6	M	Volumes 1-6	
	Welded Assemblies	G	LLNL*; DG10139/C	G	LLNL*; DG10139/C	G	LLNL*; DG10139/C	G	LLNL*; DG10139/C	PRS Des Guide DG10139/C
14. Sustainable Design	Sustainable Design Requirements for Facilities	M	Ch 14	M	Ch 14					
15. Commissioning	buildings and systems	M	Expect 2010	M	Expect 2010					
16. IBC Program	Plan review, inspection, special inspection per IBC, certificate of occupancy	M	IBC-GEN, IBC-IP, IBC-TIA, IBC-FAB	M	IBC-GEN, IBC-IP, IBC-TIA, IBC-FAB					
17. Pressure Safety	Design, fab, inspection, test, register, maintain	M; G	ESM Ch 17 Sect I	M; G	ESM Ch 17 Sect I	M; G	ESM Ch 17 Sect I	M; G	ESM Ch 17 Sect I	
	ASME B31.3 Process Piping Code	G	D20-B31.3-G	G	D20-B31.3-G	G	D20-B31.3-G	G	D20-B31.3-G	
	Pressure Vessel Test & Inspection	M	ITM-342-1701	M	ITM-342-1701	M	ITM-342-1701	M	ITM-342-1701	
18. Secure Communications	Protected Transmissions, COMSEC, TEMPEST	M	Ch 18	M	Ch 18	M	Ch 18	M	Ch 18	

Specifications Detailed fabrication or construction specs, normally in CSI 3-part format	Note: LANL Master Specifications Manual is applicable to programmatic when referring ESM Chapter's text is applicable.	M	LANL Master Specifications Manual	M	LANL Master Specifications Manual	M/G; see note to left	LANL Master Specifications Manual	M/G; see note to left	LANL Master Specifications Manual	TBP-303, Seven-Digit Material and Process specifications; various 7-digit spec under PRS
Standard Drawings, Example Drawings, and Repeatable Details	Notes: LANL Standard Drawings and Details is applicable to programmatic when noted by the referring ESM Chapter's text. TA-55 has repeatable details outside LANL Eng Stds Program	M	LANL Standard Drawings and Details	M	LANL Standard Drawings and Details	M/G; see note to left	LANL Standard Drawings and Details	M/G; see note to left	LANL Standard Drawings and Details	
Drafting Standards 2D or 3D representation requirements using CAD	NOTES: LANL Drafting Standards Manual (LDSM) exists. Pro-E drafting standards are in development (B. Baas/ Pro-E Working Group)	M	LDSM	M	LDSM	G	LDSM; former ESA and DX-5 Drafting Stds may also be adopted locally	G	LDSM; former ESA and DX-5 Drafting Stds may also be adopted locally	Various PRS and Drawing Stds

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Design Guides -- Misc	Accelerator design							G	TBD	
	High-reliability design (e.g., NASA)					G	TBD	G	TBD	
	Manufacturability Improvement					G	TBD	G	TBD	
	Physical, Mechanical, and Electrical Properties of Common Materials (LLNL)					G	LLNL*	G	LLNL*	

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