

	Maximum	Minimum
Force	20-30 lb (situation, duration dependent)	≈ 0.6 lb
Torque	11 ft-lb	≈ 0.1 ft-lb
Sources: [4, 5]		

Controlled, Directed Loads Applied During EVA

Table 4-1

Load Description, Restrained Crewmember Actuators	Load Limit
• Gloved hand, steady-state force application	* 25 lb
• Gloved hand, instantaneous or breakaway force	36 lb
• Gloved hand torque, wing tab connector	** 50 in-lb
• Gloved hand, single cycle hand squeeze	30 lb
• Gloved finger, toggle switch actuation	** 0.63 to 6.25 lb
• Booted foot, toe-button detent (one foot restrained)	** 4.0 to 20.0 lb
Notes: * The useful work involves a 10-Btu work output for a 5-min duration, interspersed with a rest period between applications. ** Force range includes a minimum value to ensure a resistance level for tactile feedback.	

Maximum Work Force Applications, EV Crewmembers
(Data reproduced from reference [5])

Table 4-2

The need for compliance combined with the need to perform precise manipulative functions suggests the further requirement that the end effector system possess variable, active compliance. The human operator could potentially directly control the degree of compliance.

Load Description	Load Limit (lb)
• Hand/arm forces on translation handholds, handrails, equipment tethers, and foot restraint attach points	* 100
• Safety tethers, personnel	300
• Exposed electrical harnesses -- gloved hand contact	20
• Hand loading on wing tab connector/connector shells, inadvertent hand torque application of force to wing tabs	** 50
• Multilayered insulation (MLI):	
- Push and impact (normal to covered surfaces)	100
- Tension	20
Notes: * Surfaces and structures within the normal EV crewmember access planes shall be constrained by this limit load. ** Assumes a shell diameter greater than 1 inch plus two 1-inch wing tabs.	

Maximum Loads Inadvertently Imposed by Crewmember
(Data reproduced from reference [5])

Table 4-4