Allowable Forces and Moments at Compressor Flanges RG Model Compressors

This reference defines maximum permissible individual and combined forces and moments acting on on Ariel screw compressor flanges. The guidelines are in accordance with API 619.

Definitions

Figure 1 shows force and moment definitions for each individual flange. These definitions also apply to combined forces and moments. Follow the sign notation indicated in Figure 1. For example, if the individual suction and discharge forces parallel to the rotor axis act in opposite directions, then only the difference between these forces must satisfy Limit 3 in the appropriate compressor Work Sheet. If the resultant value of a force or moment is negative, compare its absolute value against its limit.

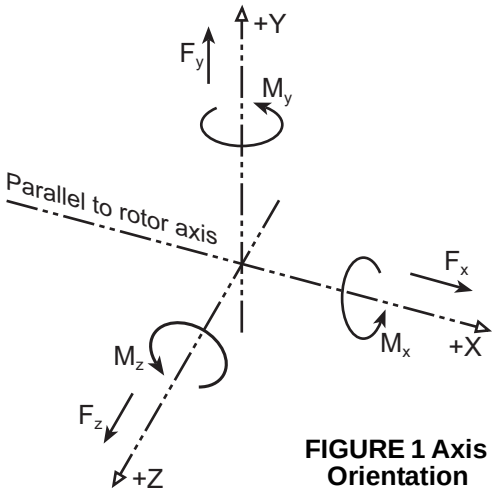

FIGURE 1 Axis Orientation

Application of Load Limits

Hold compressor flange forces and moments as low as possible by suitable compensation of piping forces. Maximum force and moment limits depend on compressor size. Each Work Sheet applies to a specific Ariel screw compressor size. Design forces and moments must in the worst case satisfy all Work Sheet limits.

Where compressor flanges are pre-loaded cold to minimize loads after thermal expansion to operating conditions, both cold and operating conditions must satisfy Work Sheet limits.

Metric Units

If design forces and moments are measured in metric units (N and N-m respectively), then multiply forces by 0.2248 and moments by 0.7376 before entry and calculation of intermediate variables and comparison with appropriate Work Sheet limits.

Nomenclature

Subscripts

- s = Suction flange component
- d = Discharge flange component
- t = Total component
- c = Combined component
- x,y,z = Direction coordinates

Variables

F = Force [lbf]

M = Moment [lbf-ft]

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Compressor Model: _____

TABLE 1 RG Model Force and Moment Limits

Description	Component	Value
Suction Flange		
Flange Forces [lb_f]	$F_{s,x}$	**Enter (lb_f):**
	$F_{s,y}$	**Enter (lb_f):**
	$F_{s,z}$	**Enter (lb_f):**
	$F_{s,t} = [F_{s,x}^2 + F_{s,y}^2 + F_{s,z}^2]^{1/2}$	
Flange Moments [lb_f-ft]	$M_{s,x}$	**Enter (lb_f-ft):**
	$M_{s,y}$	**Enter (lb_f-ft):**
	$M_{s,z}$	**Enter (lb_f-ft):**
	$M_{s,t} = [M_{s,x}^2 + M_{s,y}^2 + M_{s,z}^2]^{1/2}$	
Limit 1	**$3F_{s,t} + M_{s,t} \leq$ RG282/282M: 8,633 RG357M: 9,867**	
Discharge Flange		
Flange Forces [lb_f]	$F_{d,x}$	**Enter (lb_f):**
	$F_{d,y}$	**Enter (lb_f):**
	$F_{d,z}$	**Enter (lb_f):**
	$F_{d,t} = [F_{d,x}^2 + F_{d,y}^2 + F_{d,z}^2]^{1/2}$	
Flange Moments [lb_f-ft]	$M_{d,x}$	**Enter (lb_f-ft):**
	$M_{d,y}$	**Enter (lb_f-ft):**
	$M_{d,z}$	**Enter (lb_f-ft):**
	$M_{d,t} = [M_{d,x}^2 + M_{d,y}^2 + M_{d,z}^2]^{1/2}$	
Limit 2	**$3F_{d,t} + M_{d,t} \leq$ RG282/282M: 7,400 RG357M: 8,017**	
Combined Components		
Limit 3	**$F_{s,x} + F_{d,x} \leq$ RG282/282M: 1,000 RG357M: 1,137**	
Limit 4	**$F_{s,y} + F_{d,y} \leq$ RG282/282M: 2,499 RG357M: 2,842**	
Limit 5	**$F_{s,z} + F_{d,z} \leq$ RG282/282M: 1,999 RG357M: 2,274**	
Limit 6	**$M_{s,x} + M_{d,x} \leq$ RG282/282M: 4,998 RG357M: 5,684**	
Limit 7	**$M_{s,y} + M_{d,y} \leq$ RG282/282M: 2,499 RG357M: 2,842**	
Limit 8	**$M_{s,z} + M_{d,z} \leq$ RG282/282M: 2,499 RG357M: 2,842**	
Limit 9	$F_c = [(F_{s,x} + F_{d,x})^2 + (F_{s,y} + F_{d,y})^2 + (F_{s,z} + F_{d,z})^2]^{1/2}$	
	$M_c = [(M_{s,x} + M_{d,x})^2 + (M_{s,y} + M_{d,y})^2 + (M_{s,z} + M_{d,z})^2]^{1/2}$	
	$2F_c + M_c \leq$ RG282/282M: 4,998 RG357M: 5,684	