Rating of Truck Power Take-Offs — SAE J705b

SAE STANDARD

LAST REVISED JUNE 1975

SOCIETY OF AUTOMOTIVE ENGINEERS, INC.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

LAND
SEA
AIR
SPACE

RATING OF TRUCK POWER
TAKE-OFFS - SAE J705b

SAE Standard

Report of Transportation and Maintenance Technical Committee approved November 1948 and last revised June 1975.

1. SCOPE - The power take-offs included in this SAE Standard are those which are driven from the transmission, auxiliary transmission, or transfer case of the type used in trucks, and are attached as described under SAE J704; are top-mounted on the auxiliary transmission; or are the type directly incorporated in a gear train unit such as a transfer case or a split-shaft power take-off. Included are their use in construction equipment, and for similar purposes where truck-type transmission units are used for transmitting power to ancillary devices.

2. GENERAL SPECIFICATIONS

2.1 GRAPHS AND NOMOGRAMS - The power take-off manufacturer should make available a series of nomograms and graphs as indicated in Figs. 1 and 2 to cover his various PTO models. The graph is to show the approximate life expectancy, in hours, of the PTO within the recommended output rpm, relative to the "application factor." Life expectancy is to be based on all elements of the PTO, including gear tooth surface durability, bending fatigue, and bearing life.

The nomogram is for determining the "application factor" as related to the PTO torque capacity and as modified by the "shock load factor." The continuous duty torque capacity of the PTO with no shock loading (shock load factor = 1.0) should indicate an "application factor" of 10. When applied to the graph, an "application factor" of 10 should indicate the approximate maximum "service life expectancy" for the PTO at the output rpm indicated by the graph.

When a "shock load factor" greater than 1.0 is applied, the nomogram, together with the graph, should indicate the reduction in "service life" if the torque and rpm is kept constant, or the reduction in torque or rpm required to obtain the desired "service life."

The numerical values and scale shown for the nomogram and graph examples in Figs. 1 and 2 are arbitrary, not based on any calculations, and are shown for illustration only. However, for purposes of standardization, the "application factor" should be the range of 10-100 for all manufacturers. Curves should be shown for output speeds of 500 rpm and the maximum rpm recommended for the PTO, with intermediate curves in suitable increments; 500 rpm is suggested.

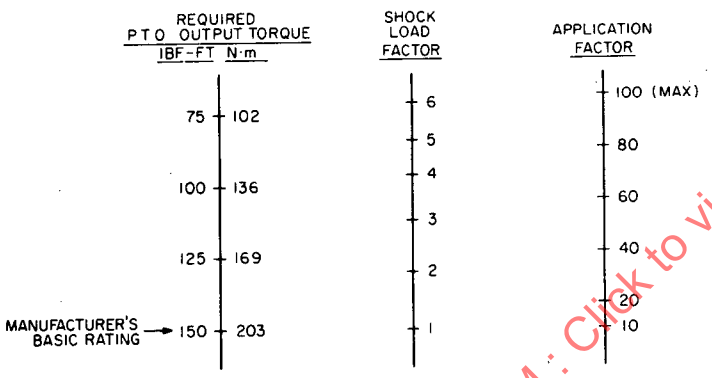

FIG. 1- EXAMPLE OF NOMOGRAM

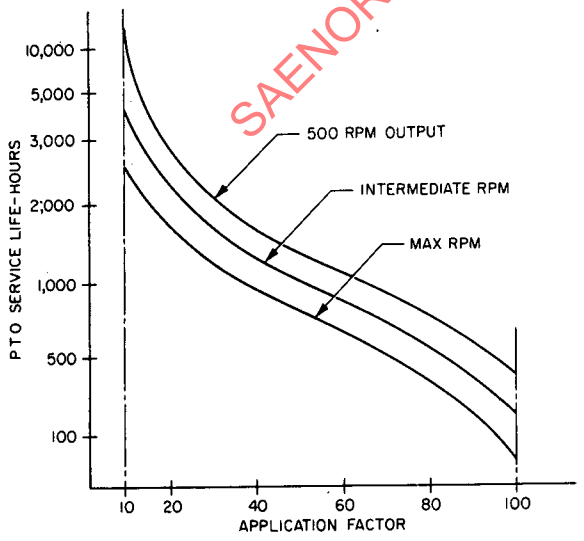

FIG. 2 - EXAMPLE OF GRAPH

2.2 LIMITATIONS - Where a PTO application requires operation at a high-shock load factor or at high torque or rpm, or requires adapters spacing the PTO a considerable distance from the transmission, the user should consult the PTO and transmission manufacturers. These conditions can seriously affect the service life of the PTO or transmission drive gear and may cause failure of the transmission case.

TABLE 1--SHOCK LOAD FACTOR GUIDELINES (EXAMPLE)

Category	Base Factor
1. Engine	
(a) Gasoline, 6 cyl	0.2
(b) Diesel, 6 cyl	0.5
2. Universal joints (each pair)	
(a) 0-5 deg alignment	0.1
(b) 5-10 deg alignment	0.8
(Note: Over 10 deg not recommended)	
3. Equipment	
(a) Hydraulic pumps	0.5
(b) Compressor, rotary	0.7
(c) Compressor, reciprocating	1.4
(d) Winch, worm geared	0.4
(e) Winch, spur geared	1.0
(f) Pump, oil well	2.0
(g) Earthboring auger, mechanical	2.0
(h) Earthboring auger, hydraulic	1.4
4. Torque Converter or Fluid Coupling	-0.5

EXAMPLE

To determine the "shock load factor," find the total of the base factors involved and add 1.0.

Engine: diesel, 6 cyl	= 0.5
Universal joints, two pair, 5-10 deg at 0.8 each pair	= 1.6
Earthboring auger, mechanical	= 2.0
Torque converter	= -0.5
Total base factor	= 3.6
Add	1.0
"Shock load factor"	= 4.6