



TRANSMISSION DATA

— 3000 PRODUCT FAMILY —

ALLISON ON-HIGHWAY TRANSMISSIONS

Contents:

- 1.0 Transmission Models and Ratings**
- 2.0 Power Take-Off Drive Gear Ratings**
 - 2.1 Side / Side PTO Drive Provision
 - 2.2 Top / Side PTO Drive Provision
- 3.0 Transmission Temperatures**
- 4.0 Installed Angles of Transmission in Chassis**
- 5.0 Transmission Operating Angles (Including Installed Angles)**
- 6.0 Torque Converter Data**
- 7.0 Transmission Main Pressure**
- 8.0 Dry Weights**
- 9.0 Center of Gravity**
- 10.0 Transmission Static Bending Moment Limit**
- 11.0 Mass Moments of Inertia**
- 12.0 Gear Ratios**
- 13.0 Oil Types and Oil Fill Information**
- 14.0 Retarder Performance**
- 15.0 Park Brake Performance**
- 16.0 Typical Cranking Torque Characteristics**
- 17.0 External Hydraulic Circuits**
 - 17.1 General
 - 17.2 Remote-Mounted Filters
 - 17.3 Cooler Circuit Flow and Restrictions
 - Non-Retarder, Power Take-Off, Converter Operation
 - Non-Retarder, Power Take-Off, Lockup Operation
 - Retarder Operation
- 18.0 Allison Oil-to-Water Cooler Characteristics**
 - 18.1 Coolant Fill Volume for Allison Coolers
 - 18.2 Remote Retarder / Sump Cooler
 - 18.3 Direct-Mount Retarder / Sump Cooler
 - 18.4 Direct-Mount Non-Retarder Standard-Capacity Cooler
 - 18.5 Direct-Mount Non-Retarder High-Capacity Cooler
 - 18.6 Direct-Mount Retarder Cooler

List of Referenced Documents

Revision History

Unless otherwise noted, all documents referenced in this document may be found in the Extranet channel of the Allison Transmission website, www.allisontransmission.com. To locate the referenced documents, which are identified by *italic* font, look for Tech Data under the Engineering heading on the Extranet home page. Contact your Allison Transmission representative if you do not have access to the Allison Transmission Extranet.

1.0 MODELS AND RATINGS: 3000 PRODUCT FAMILY

The following is a listing of the transmission models which comprise the Allison 3000 Product Family. Each may be classified according to three different product types, based as the model's gear scheme. For gear ratios of the individual gear schemes, refer to Table 12.0, Gear Ratios, in this document.

A comprehensive list of Input and Output Ratings for all models in the 3000 Product Family is available in a separate document entitled [*3000 Product Family Transmission Ratings*](#).

<u>Base Model</u>	<u>Gear Scheme</u>
3000	Close Ratio
3200	Close Ratio
3500	Wide Ratio
3700	7-Speed with Transfer Case
B295 / B300 / B400	Close Ratio
T200 / T300	Close Ratio

2.0 POWER TAKE-OFF DRIVE GEAR RATINGS

2.1 SIDE / SIDE POWER TAKE-OFF PROVISION

TRANSMISSION CONFIGURATION	VALUE	UNIT
Drive Gear Torque (Continuous Operation) With PTO on One Pad With PTO on Both Pads – Combined Total ⁽¹⁾	660 (485) Max. 930 (685) Max.	N•m (pound-foot) N•m (pound-foot)
Number of teeth on drive gear	68	—

2.2 TOP / SIDE POWER TAKE-OFF PROVISION

TRANSMISSION CONFIGURATION	VALUE	UNIT
For All Applications Except Fire and Emergency Drive Gear Torque (Continuous Operation) With PTO on One Pad With PTO on Both Pads – Combined Total ⁽¹⁾	660 (485) Max. 930 (685) Max.	N•m (pound-foot) N•m (pound-foot)
For Fire and Emergency Vehicle Applications Drive Gear Torque (Continuous Operation) With PTO on One Pad With PTO on Both Pads – Combined Total ⁽¹⁾	910 (670) Max. 930 (685) Max.	N•m (pound-foot) N•m (pound-foot)
Drive Gear Torque (Intermittent Operation) ⁽²⁾ With PTO on One Pad With PTO on Both Pads – Combined Total ⁽¹⁾	1068 (790) Max. ⁽³⁾ 1068 (790) Max. ⁽³⁾	N•m (pound-foot) N•m (pound-foot)
Number of teeth on drive gear	83	—

⁽¹⁾ Refer to [3000 Product Family Transmission Ratings](#) for minimum idle speed requirements when dual PTOs are used simultaneously.

⁽²⁾ For fire and emergency vehicles only. Intermittent Operation = not to exceed 2.5 hours over the life of the vehicle.

⁽³⁾ If the PTO is used in excess of 930 N•m (685 lb-ft), the following additional conditions apply:

- PTO operation is permitted only when the vehicle is stationary and the transmission is in Neutral, or
- PTO operation is permitted with the vehicle in motion only if all the following conditions are met:
 - PTO can be used only when the transmission controls are in Secondary Mode.
 - Shift calibration in Secondary Mode must limit transmission operation to first gear only.
 - Secondary Mode activation must be assigned to an input wire. Activation via the shift selector MODE button is not acceptable.

NOTE: Values in U.S. units shown in parenthesis () are for reference only. Conversions between metric and U.S. units are not necessarily exactly equivalent.

3.0 TRANSMISSION TEMPERATURES

PARAMETER	VALUE	UNIT
OPERATING TEMPERATURES		
Minimum Start-Up, TES-295 fluid	-35 (-31)	degrees C (degrees F)
Minimum Start-Up, DEXRON®-VI	-25 (-13)	degrees C (degrees F)
Minimum Start-Up, Schedule One TES-389	-25 (-13)	degrees C (degrees F)
Sump, Minimum Continuous	40 (100)	degrees C (degrees F)
Sump, Typical Continuous	93 (200)	degrees C (degrees F)
Sump, Maximum Intermittent	121 (250)	degrees C (degrees F)
Converter-Out, Maximum Intermittent	149 (300)	degrees C (degrees F)
Retarder-Out, Maximum Intermittent (General, Truck)	165 (330)	degrees C (degrees F)
Retarder-Out, Maximum Intermittent (Bus & Coach)	149 (300)	degrees C (degrees F)
MAXIMUM TEMPERATURE PERMITTED		
At Transmission External Surfaces	121 (250)	degrees C (degrees F)

4.0 INSTALLED ANGLES OF TRANSMISSION IN CHASSIS

PARAMETER	MAXIMUM VALUE	UNIT
Pitch — Minimum, Tail-Down	0	degrees
Pitch — Maximum, Tail-Down	7	degrees
Roll	0	degrees

5.0 TRANSMISSION OPERATING ANGLES (INCLUDING INSTALLED ANGLES)

PARAMETER	MAXIMUM VALUE			UNIT
	STANDARD SUMP	SHALLOW SUMP	SEVEN-SPEED MODELS	
Pitch	31	22	31	degrees
Roll	22	22	22	degrees

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6.0 TORQUE CONVERTER DATA

TORQUE CONVERTER	NOMINAL STALL TORQUE	NOMINAL K-FACTOR AT STALL	UNITS
TC-411	2.71	98.0 (114.1)	revs per minute / $\sqrt{N \cdot m}$ (revs per minute / $\sqrt{lb \cdot ft}$)
TC-413	2.44	73.3 (85.4)	revs per minute / $\sqrt{N \cdot m}$ (revs per minute / $\sqrt{lb \cdot ft}$)
TC-415	2.35	68.2 (79.4)	revs per minute / $\sqrt{N \cdot m}$ (revs per minute / $\sqrt{lb \cdot ft}$)
TC-417	2.20	60.5 (70.5)	revs per minute / $\sqrt{N \cdot m}$ (revs per minute / $\sqrt{lb \cdot ft}$)
TC-418	1.98	61.1 (71.2)	revs per minute / $\sqrt{N \cdot m}$ (revs per minute / $\sqrt{lb \cdot ft}$)
TC-419	2.02	54.9 (64.0)	revs per minute / $\sqrt{N \cdot m}$ (revs per minute / $\sqrt{lb \cdot ft}$)
TC-421	1.77	47.9 (55.8)	revs per minute / $\sqrt{N \cdot m}$ (revs per minute / $\sqrt{lb \cdot ft}$)

7.0 TRANSMISSION MAIN PRESSURE

Range	Main Pressure During Normal Operation			Units
	at 600 rpm		at 2100 rpm	
	PTO Request * On	PTO Request * Off	PTO Request * On or Off	
Reverse	1448–2034 (210–295)	1172–1586 (170–230)	1806–2206 (262–320)	kPa (psi)
Neutral	1517–2034 (220–295)	1172–1586 (170–230)	PTO Request On 1806–2206 (262–320) PTO Request Off 1310–1720 (190–250)	kPa (psi)
Forward Converter (All Gear Ranges)	1241–1724 (180–250)	869–1338 (126–194)	1551–1965 (225–285)	kPa (psi)
Forward Lockup				
All models except seven-speeds				
Ranges 1— 5	—	—	1082–1365 (157–198)	kPa (psi)
Range 6	—	—	1034–1413 (150–205)	kPa (psi)
Seven-speed models				
Ranges 1— 6	—	—	1082–1365 (157–198)	kPa (psi)
Range 7	—	—	1034–1413 (150–205)	kPa (psi)
* Allison 4th Generation Controls "PTO Request" input function				

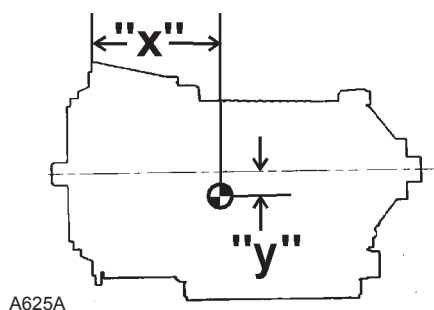
NOTE: Values in U.S. units shown in parenthesis () are for reference only. Conversions between metric and U.S. units are not necessarily exactly equivalent.

8.0 DRY WEIGHTS

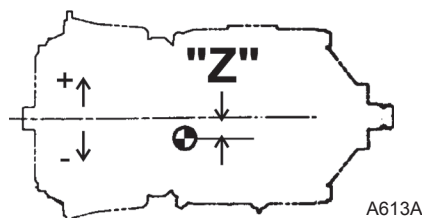
HARDWARE	NOMINAL VALUE	UNIT
Transmission Assembly		
Close Ratio and Wide Ratio Models (No PTO / No Retarder)	243 (535)	kg (pounds)
Seven-Speed (includes side/side PTO provision) Models	530 (1170)	kg (pounds)
Optional features / hardware have additional weight as shown below:		
Side / Side Power Take-Off Provision	18 (40)	kg (pounds)
Top / Side Power Take-Off Provision	27 (60)	kg (pounds)
Retarder Option	36 (80)	kg (pounds)
Direct-Mount Retarder / Sump Cooler	33 (72)	kg (pounds)
Remote Retarder / Sump Cooler	32 (70)	kg (pounds)
Direct-Mount Cooler (non-retarder, standard capacity)	16 (35)	kg (pounds)
Direct-Mount Cooler (non-retarder, high capacity)	23 (50)	kg (pounds)
Direct-Mount Cooler (retarder)	23 (50)	kg (pounds)
Park Brake Assembly	30 (65)	kg (pounds)
Retarder Accumulator Assembly without Solenoid	5.4 (12)	kg (pounds)
Solenoid used with the Retarder Accumulator	0.5 (1.1)	kg (pounds)
Output Flange or Yoke * varies by type. Refer to the following 3000 Product Family Installation Drawings : • AS66-441, Available Flanges • AS66-442, Available Yokes	3.5 – 7.5 * (8 – 17) *	kg (pounds)

NOTE: Values in U.S. units shown in parenthesis () are for reference only. Conversions between metric and U.S. units are not necessarily exactly equivalent.

9.0 CENTER OF GRAVITY



SIDE VIEW



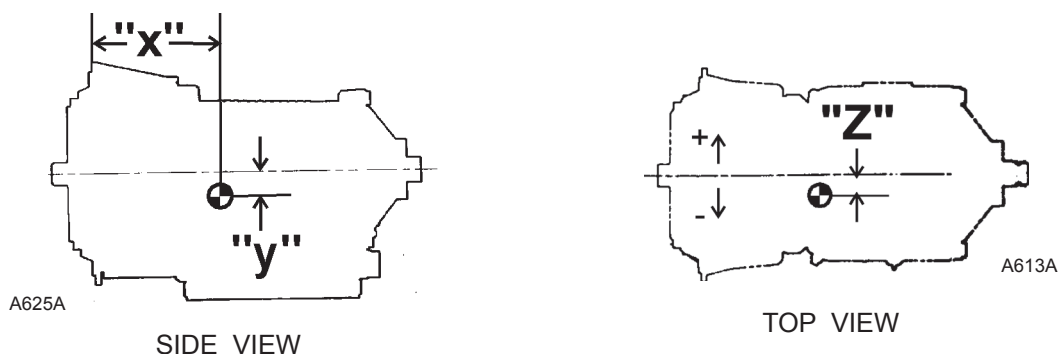
TOP VIEW

9.1 CENTER OF GRAVITY: Close Ratio and Wide Ratio Models

TRANSMISSION CONFIGURATION	NOMINAL VALUE			UNIT
	X	Y	Z	
No Retarder, No PTO Provision				
With remote cooler provision	292.6 (11.52)	43.9 (1.73)	0	mm (in.)
With direct-mount cooler, standard capacity	311.7 (12.27)	52.58 (2.07)	0	mm (in.)
With direct-mount cooler, high capacity	324.9 (12.79)	56.4 (2.22)	0	mm (in.)
With Retarder, No PTO Provision				
With remote cooler provision	331.7 (13.06)	42.4 (1.67)	-3.8 (-0.15)	mm (in.)
With direct-mount cooler	371.1 (14.61)	53.1 (2.09)	-3.8 (-0.15)	mm (in.)
With direct-mount retarder/sump cooler	393.7 (15.50)	54.4 (2.14)	1.0 (0.04)	mm (in.)
No Retarder, With Side/Side PTO Provision				
With remote cooler provision	359.4 (14.15)	43.9 (1.73)	0	mm (in.)
With direct-mount cooler, standard capacity	379.5 (14.94)	52.1 (2.05)	0	mm (in.)
With direct-mount cooler, high capacity	392.9 (15.47)	55.6 (2.19)	0	mm (in.)
No Retarder, With Top/Side PTO Provision				
With remote cooler provision	351.8 (13.84)	43.9 (1.73)	0	mm (in.)
With direct-mount cooler, standard capacity	371.6 (14.63)	52.1 (2.05)	0	mm (in.)
With direct-mount cooler, high capacity	384.6 (15.14)	55.6 (2.19)	0	mm (in.)
With Retarder & Side/Side PTO Provision				
With remote cooler provision	391.2 (15.40)	38.9 (1.53)	1.0 (0.04)	mm (in.)
With direct-mount cooler	431.8 (17.00)	49.3 (1.94)	1.0 (0.04)	mm (in.)
With direct-mount retarder/sump cooler	462.3 (18.20)	49.8 (1.96)	-1.3 (-0.05)	mm (in.)
With Retarder & Top/Side PTO Provision				
With remote cooler provision	381.7 (15.02)	38.9 (1.53)	1.0 (0.04)	mm (in.)
With direct-mount cooler	421.6 (16.6)	49.3 (1.94)	1.0 (0.04)	mm (in.)
With direct-mount retarder/sump cooler	448.9 (17.67)	49.8 (1.96)	-1.3 (-0.05)	mm (in.)

NOTE: Values in U.S. units shown in parenthesis () are for reference only. Conversions between metric and U.S. units are not necessarily exactly equivalent.

9.0 CENTER OF GRAVITY



9.2 CENTER OF GRAVITY: Seven-Speed Models

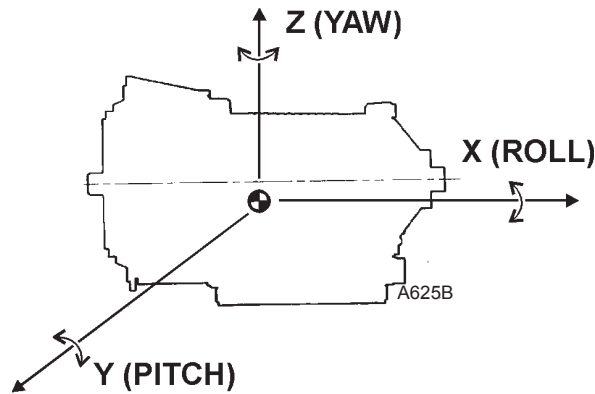
	NOMINAL VALUE			UNIT
	X	Y	Z	
All Seven-Speed Models	676.3 (26.63)	134.4 (5.29)	49.0 (1.92)	mm (in.)

10.0 TRANSMISSION STATIC BENDING MOMENT LIMIT AT ENGINE/TRANSMISSION INTERFACE

TRANSMISSION CONFIGURATION	MAXIMUM VALUE	UNIT
All Models	1708 (1260)	N•m (lb _F -ft)

NOTE: Values in U.S. units shown in parenthesis () are for reference only. Conversions between metric and U.S. units are not necessarily exactly equivalent.

11.0 MASS MOMENTS OF INERTIA



11.1 MOMENTS OF INERTIA - Close Ratio and Wide Ratio Models

TRANSMISSION CONFIGURATION	NOMINAL VALUE *			UNIT
	X (ROLL)	Y (PITCH)	Z (YAW)	
No Retarder, No PTO Provision	4.09 (3.02)	14.26 (10.52)	13.91 (10.26)	kg-m ² (lb _f -ft-sec ²)
With Retarder, No PTO Provision				
Without Direct-Mount Sump Cooler	4.64 (3.42)	21.00 (15.49)	20.64 (15.22)	kg-m ² (lb _f -ft-sec ²)
With Direct-Mount Sump Cooler	5.37 (3.69)	21.08 (15.55)	21.88 (16.14)	kg-m ² (lb _f -ft-sec ²)
No Retarder, With Side/Side PTO Provision	4.54 (3.35)	19.47 (14.36)	18.98 (14.00)	kg-m ² (lb _f -ft-sec ²)
No Retarder, With Top/Side PTO Provision	4.54 (3.35)	19.47 (14.36)	18.98 (14.00)	kg-m ² (lb _f -ft-sec ²)
With Retarder & Side/Side PTO Provision				
Without Direct-Mount Sump Cooler	5.08 (3.75)	27.31 (20.14)	27.79 (20.50)	kg-m ² (lb _f -ft-sec ²)
With Direct-Mount Sump Cooler	5.82 (4.29)	27.39 (20.20)	29.04 (21.42)	kg-m ² (lb _f -ft-sec ²)
With Retarder & Top/Side PTO Provision				
Without Direct-Mount Sump Cooler	5.08 (3.75)	27.31 (20.14)	27.79 (20.50)	kg-m ² (lb _f -ft-sec ²)
With Direct-Mount Sump Cooler	5.82 (4.29)	27.39 (20.20)	29.04 (21.42)	kg-m ² (lb _f -ft-sec ²)

11.2 MOMENTS OF INERTIA - Seven-Speed Models

	NOMINAL VALUE *			UNIT
	X (ROLL)	Y (PITCH)	Z (YAW)	
All Seven-Speed Models	17.33 (12.78)	104.09 (76.77)	114.12 (84.17)	kg-m ² (lb _f -ft-sec ²)

* Includes Output Flange

NOTE: Moment of inertia of those parts which always rotate with the engine can be found on [Installation Drawing AS66-420, Engine/Transmission Adaptation – General](#).

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12.0 GEAR RATIOS

GEAR RANGE	MODEL *		
	CLOSE-RATIO (CR) MODELS	WIDE-RATIO (WR) MODELS	SEVEN-SPEED MODELS
FORWARD			
First	3.49	4.59	6.93
Second	1.86	2.25	4.18
Third	1.41	1.54	2.24
Fourth	1.00	1.00	1.69
Fifth	0.75	0.75	1.20
Sixth	0.65	0.65	0.90
Seventh	—	—	0.78
REVERSE	– 5.03	– 5.00	– 6.03

* To determine the gear scheme of a specific transmission model, refer to Table 1.0.

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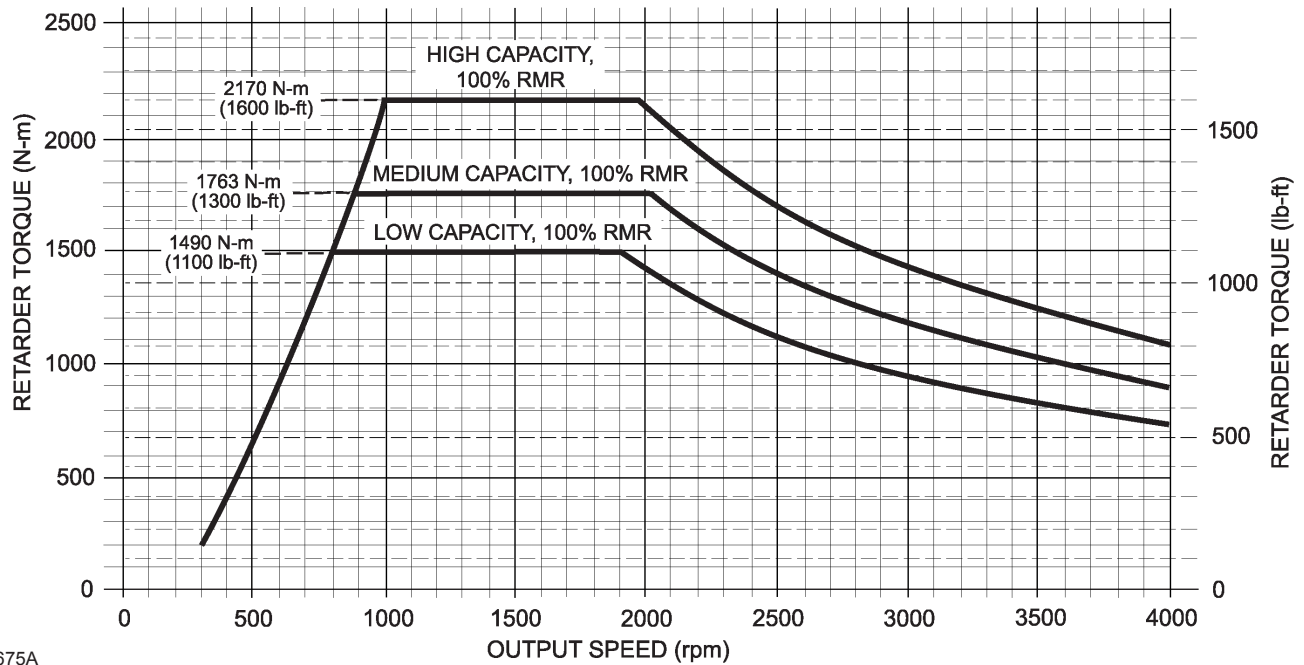
13.0 OIL TYPES AND OIL FILL INFORMATION

PARAMETER	VALUE	UNIT
INITIAL FILL VOLUME ¹		
Base Models – Transmission Only ²		
Deep Oil Sump, with PTO Provision	28.1 (29.75)	liters (quarts)
Deep Oil Sump, without PTO Provision	27.4 (29.00)	liters (quarts)
Shallow Oil Sump, with PTO Provision	25.3 (26.75)	liters (quarts)
Shallow Oil Sump, without PTO Provision	24.6 (26.00)	liters (quarts)
3700 Models – Transmission Only ²		
Deep Oil Sump, with PTO Provision	37.0 (39.0)	liters (quarts)
Additional Fill for Allison Coolers		
Direct-Mount, Non-Retarder, Standard Capacity	1.0 (1.1)	liters (quarts)
Direct-Mount, Non-Retarder, High Capacity	2.1 (2.2)	liters (quarts)
Direct-Mount, Retarder	2.1 (2.2)	liters (quarts)
Direct-Mount, Retarder/Sump Cooler	2.5 (2.6)	liters (quarts)
Remote, Retarder/Sump Cooler	2.5 (2.6)	liters (quarts)
Additional Fill for Retarder Accumulator	0.9 (0.95)	liters (quarts)
ACCEPTABLE FLUIDS:		
For off-highway, articulated rear dump truck applications	TES-295 licensed fluid, or fully-synthetic Schedule One TES-389 licensed fluid	
For all other applications:	TES-295 licensed fluid, or Schedule One TES-389 licensed fluid	
<u>Lists of fluids</u> approved for use with Allison transmissions can be found on the Allison Transmission web site at: www.allisontransmission.com .		
¹ Transmission or listed components only (transmission at 0° installed angle). Does not include external circuits or additional volume which may be required if installed angle of the transmission greater than 0°.		
² Amount to fill dry transmission after disassembly and rebuild. The initial fill for a transmission as received from the Allison factory will be less. Residual fluid remains in the transmission after acceptance testing.		

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14.0 RETARDER PERFORMANCE *

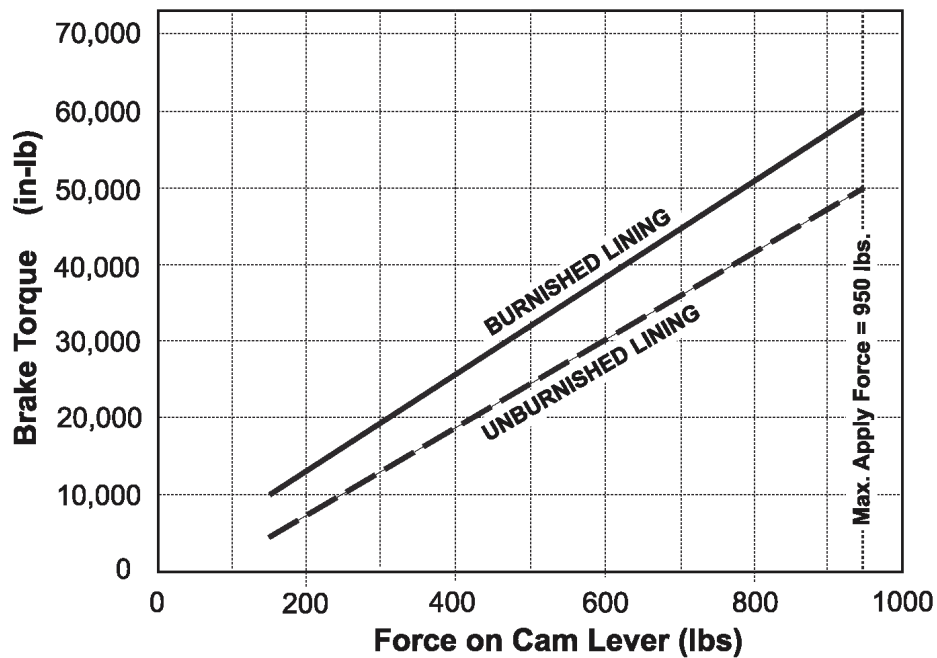
* At Command for 100% Apply



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15.0 PARK BRAKE PERFORMANCE

PARK BRAKE PERFORMANCE
Force on Cam Lever vs. Park Brake Torque
- Static Conditions -

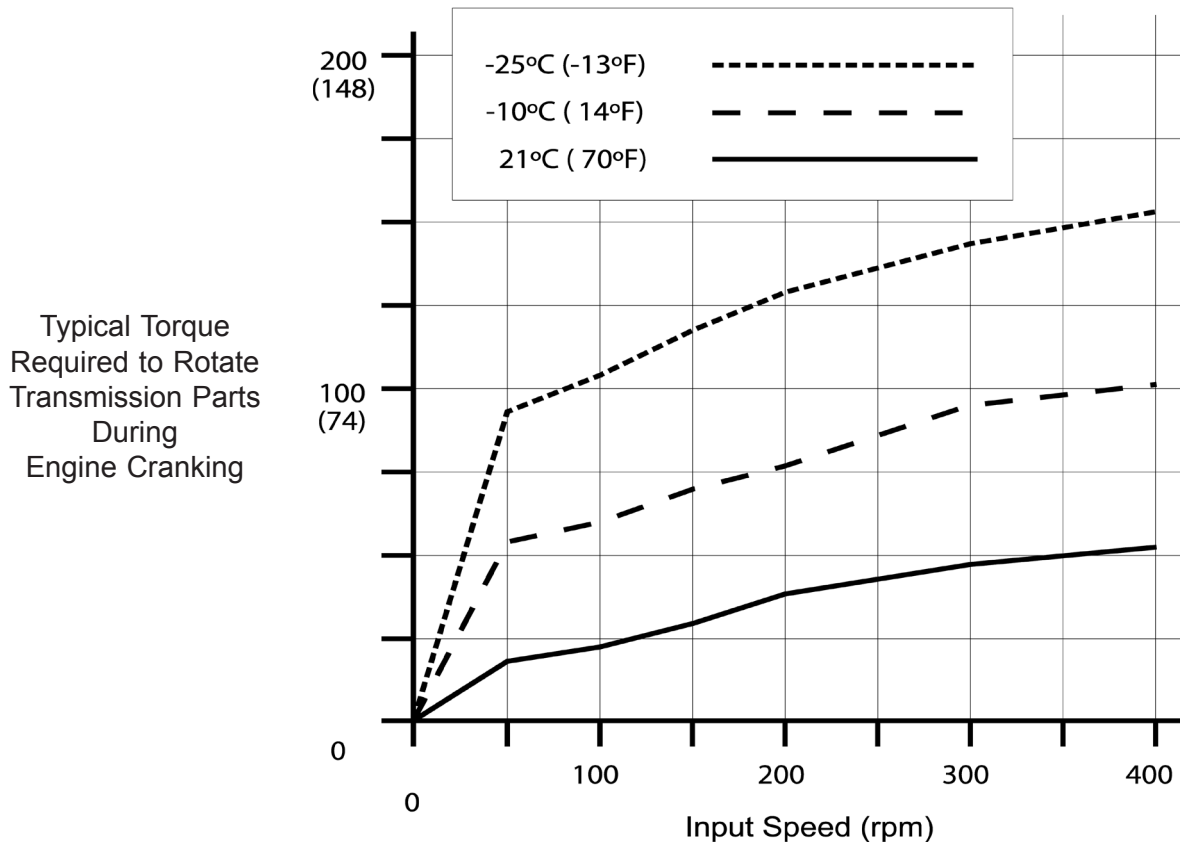


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16.0 TYPICAL CRANKING TORQUE CHARACTERISTICS

REVOLUTIONS PER MINUTE	VALUE			UNITS
	at – 25°C (– 13°F)	at – 10°C (14°F)	21°C (70°F)	
0	0 (0)	0 (0)	0 (0)	N•m (pound-foot)
50	95 (70)	53 (39)	18 (13)	N•m (pound-foot)
100	105 (77)	60 (44)	22 (16)	N•m (pound-foot)
150	118 (87)	70 (52)	29 (21)	N•m (pound-foot)
200	129 (95)	79 (58)	35 (26)	N•m (pound-foot)
300	142 (105)	89 (66)	44 (32)	N•m (pound-foot)
400	158 (117)	101 (74)	51 (38)	N•m (pound-foot)



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17.0 EXTERNAL HYDRAULIC CIRCUITS

17.1 GENERAL

Fluid Compatibility for Coolers and Hydraulic Lines

Must be compatible with acceptable fluids listed in Table 13.0, Oil Types and Oil Fill Information

Pressures for Coolers and Hydraulic Lines

Operating, Max:	896.4 kPa	(130 psi)
Spike, Max:	2068.5 kPa	(300 psi)
Gradient:	413.6 kPa within 1 sec.	(60 psi within 1 sec.)
Pulsation:	16 Hz at 413.6 +/- 103.4 kPa	(16 Hz at 60 +/- 15 psi)

Temperatures for Coolers and Hydraulic Lines

All components except retarder out (to cooler) line

Fluid temperature range:	38 to 121 °C	(100 to 250 °F)
With maximum intermittent excursions:	- 40 to 149 °C	(- 40 to 300 °F)

Retarder out (to cooler) line

Fluid temperature range:	38 to 121 °C	(100 to 250 °F)
With maximum intermittent excursions:	- 40 to 165 °C	(- 40 to 330 °F)

Gradient, initial:	28 °C per sec.	(50 °F per sec.)
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Hydraulic Line Size, Cooler Circuit

Circuit must meet pressure drop requirements (Refer to Tables 17.2 through 17.4)

Circuit must allow sufficient flow to meet cooling requirements

Recommended minimum inside diameter:

Non-retarder cooling circuit:	15.9 mm	(0.625 inch)
Retarder cooling circuit:	28.6 mm	(1.125 inch)
Retarder accumulator circuit:	28.6 mm	(1.125 inch)
Sump cooling circuit (retarder units):	15.9 mm	(0.625 inch)

Hydraulic Line Requirements, Cooler Circuit

Hydraulic lines must meet the above pressure and temperature requirements

Hydraulic lines must be compatible with oils listed in Table 13.0

In addition, Allison strongly recommends that hoses meet or exceed the tests described in Society of Automotive Engineers (SAE) J2545 and J1405, Option IV – High Temperature Circulation Test.

Metal tubing is acceptable; requires flexible section (e.g. hose) between powerpack and chassis

O-Ring Seal Requirements

Fluorocarbon elastomer, American Society of Testing and Materials (ASTM) D2000, material designation HK, recommended durometer hardness of 75. The material grade of the seal must be compatible with all acceptable fluids listed in Table 13.0.

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17.2 REMOTE-MOUNTED FILTERS

Fluid Compatibility for Filters and Hydraulic Lines

Must be compatible with acceptable fluids listed in Table 13.0, Oil Types and Oil Fill Information

Pressures for Filters and Hydraulic Lines

Operating, Max:	2069 kPa	(300 psi)
Spike, Max:	6895 kPa	(1000 psi)

Temperatures for Filters and Hydraulic Lines

Fluid temperature range:		
Normal operating range	38 to 121 °C	(100 to 250 °F)
Maximum intermittent excursions	– 40 to 165 °C	(– 40 to 300 °F)

Hydraulic Line Size

Circuits must meet pressure drop requirements:

Main circuit filter	207 kPa max. at 114 liters/sec (30 psi at 30 gpm)
Lube circuit filter	104 kPa max. at 83 liters/sec (15 psi at 22 gpm)

Recommended minimum inside diameter:	15.9 mm	(0.625 inch)
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Hydraulic Line Requirements

Hydraulic lines must meet the above pressure and temperature requirements

Hydraulic lines must be compatible with oils listed under Fluid Compatibility

In addition, Allison strongly recommends that hoses meet or exceed the tests described in Society of Automotive Engineers (SAE) J2545 and J1405, Option IV – High Temperature Circulation Test.

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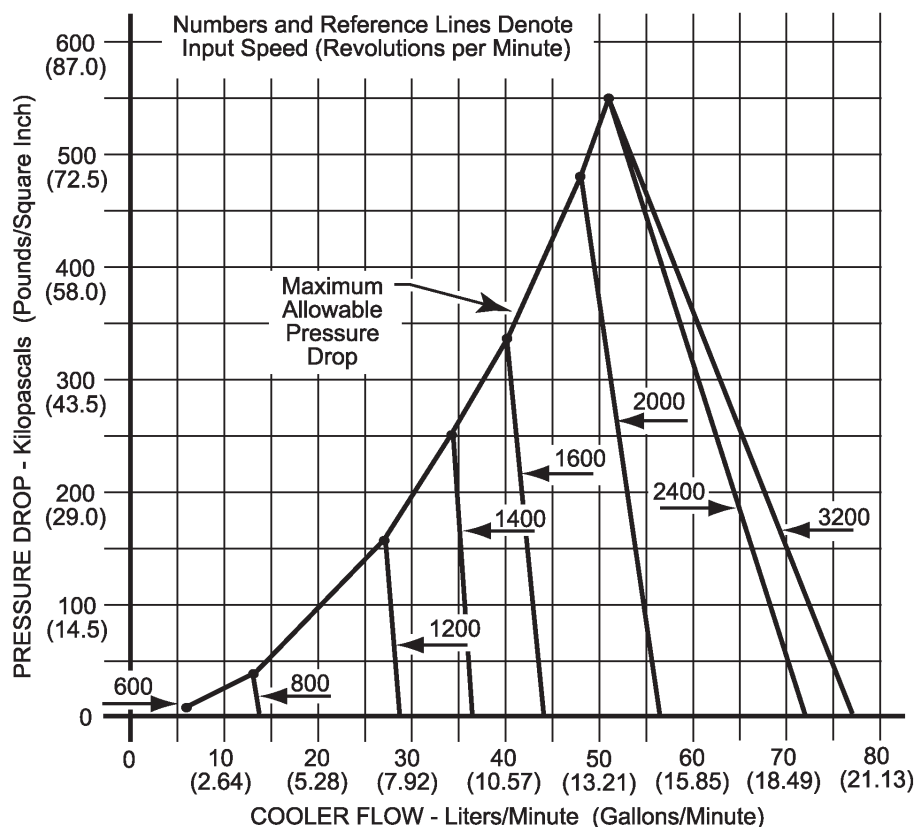
17.3 COOLER CIRCUIT FLOW AND RESTRICTIONS

NON-RETARDER, POWER TAKE-OFF – CONVERTER OPERATION *

MAXIMUM COOLER FLOW AT MINIMUM PRESSURE DROP	FLOW		PRESSURE DROP	
	INPUT REVOLUTIONS PER MINUTE	LITERS PER SECOND	GALLONS PER MINUTE	POUNDS PER SQUARE INCH
				kPa
	600	0.10	1.6	0
	800	0.23	3.7	0
	1200	0.47	7.4	0
	1400	0.61	9.7	0
	1600	0.74	11.7	0
	2000	0.94	14.9	0
	2400	1.19	18.9	0
	3200	1.28	20.3	0

COOLER FLOW AT MAXIMUM ALLOWABLE PRESSURE DROP	FLOW		PRESSURE DROP	
	INPUT REVOLUTIONS PER MINUTE	LITERS PER SECOND	GALLONS PER MINUTE	POUNDS PER SQUARE INCH
				kPa
	600	0.10	1.6	10
	800	0.22	3.5	40
	1200	0.45	7.1	159
	1400	0.57	9.0	252
	1600	0.67	10.6	338
	2000	0.80	12.7	481
	2400	0.85	13.5	549
	3200	0.85	13.5	549

*** 93°C (200°F)
SUMP TEMPERATURE**



NOTE: Values in U.S. units shown in parenthesis () are for reference only.
 Conversions between metric and U.S. units are not necessarily exactly equivalent.

A629A

17.3 COOLER CIRCUIT FLOW AND RESTRICTIONS

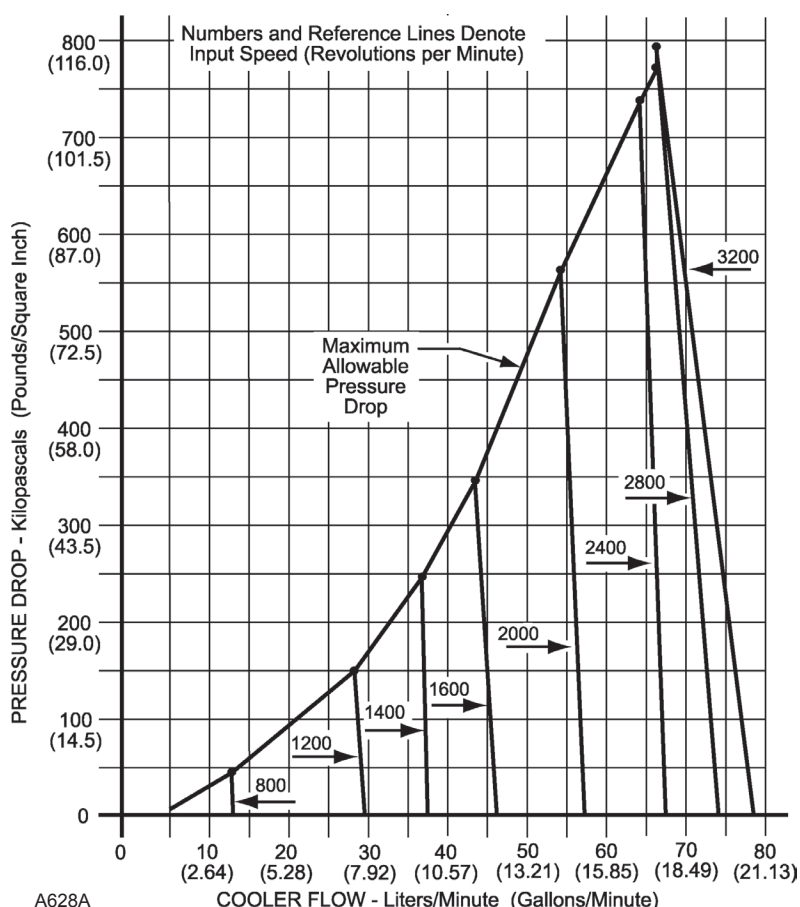
NON-RETARDER, POWER TAKE-OFF – LOCKUP OPERATION *

MAXIMUM COOLER FLOW AT MINIMUM PRESSURE DROP		FLOW		PRESSURE DROP	
	INPUT REVOLUTIONS PER MINUTE	LITERS PER SECOND	GALLONS PER MINUTE	kPa	POUNDS PER SQUARE INCH
	600	0.10	1.6	0	0
	800	0.23	3.7	0	0
	1200	0.50	7.9	0	0
	1400	0.63	10.0	0	0
	1600	0.77	12.2	0	0
	2000	0.95	15.1	0	0
	2400	1.12	17.8	0	0
	2800	1.22	19.3	0	0
	3200	1.28	20.3	0	0

COOLER FLOW AT MAXIMUM ALLOWABLE PRESSURE DROP		FLOW		PRESSURE DROP	
	INPUT REVOLUTIONS PER MINUTE	LITERS PER SECOND	GALLONS PER MINUTE	kPa	POUNDS PER SQUARE INCH
	600	0.10	1.6	5	0.7
	800	0.23	3.7	46	6.7
	1200	0.48	7.6	148	21.5
	1400	0.62	9.8	247	35.8
	1600	0.73	11.6	346	50.2
	2000	0.90	14.3	561	81.4
	2400	1.07	17.0	737	106.9
	2800	1.10	17.4	770	111.7
	3200	1.10	17.4	791	114.7

* 93°C (200°F)
SUMP TEMPERATURE

NOTE: Values in U.S. units shown in parenthesis () are for reference only. Conversions between metric and U.S. units are not necessarily exactly equivalent.



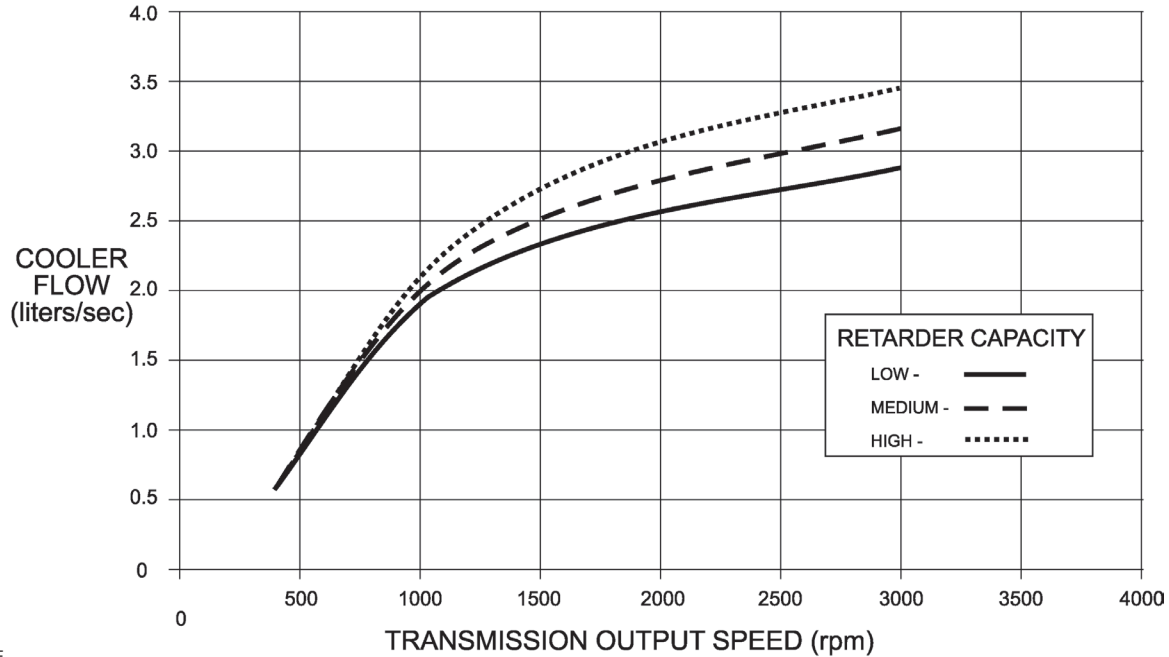
17.3 COOLER CIRCUIT FLOW AND RESTRICTIONS

RETARDER OPERATION

METRIC

Retarder circuit flow measured under the following test conditions:

- 149 °C fluid temperature
- circuit pressure drop (ΔP) set at 291 kPa for a flow of 3.8 liters/sec

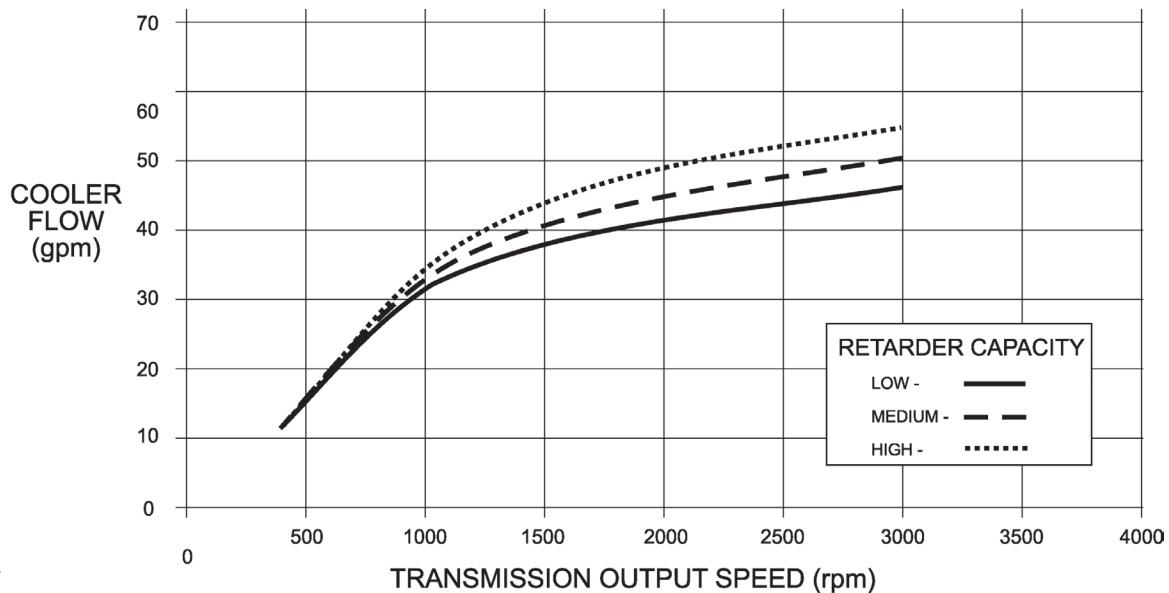


B009E

U. S.

Retarder circuit flow measured under the following test conditions:

- 300 °F fluid temperature
- circuit pressure drop (ΔP) set at 42 psi for a flow of 60 gallons/min



B009F

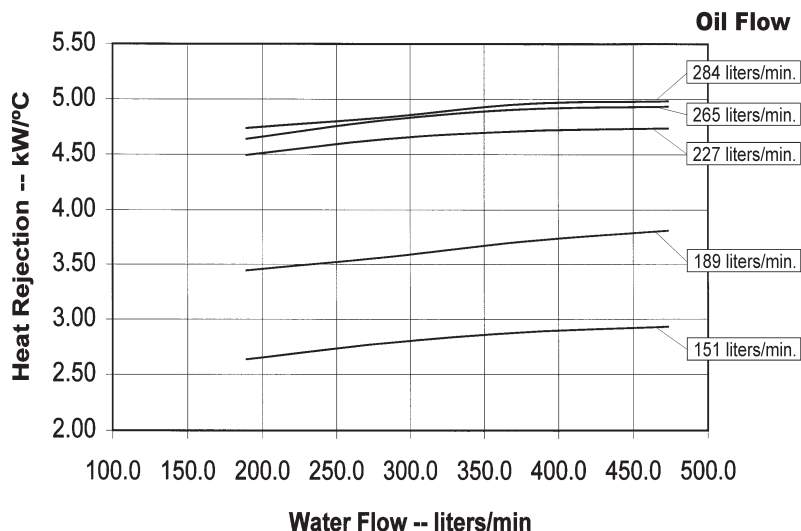
Note: Allison Transmission has specific pressure drop requirements for retarder installations that are integrated with Electronic Braking Systems (EBS). Refer to [Technical Document 182 \(TD-182\). Use of EBS with Allison Transmissions](#), for details.

18.0 ALLISON OIL-TO-WATER COOLER CHARACTERISTICS

18.1 COOLANT FILL VOLUME FOR ALLISON COOLERS

PARAMETER	VALUE	UNIT
Coolant Fill Volume for Allison Coolers		
Remote, Retarder / Sump Cooler	3.0 (3.2)	liters (quarts)
Direct-Mount, Retarder/Sump Cooler	3.0 (3.2)	liters (quarts)
Direct-Mount, Non-Retarder, Standard-Capacity Cooler	2.0 (2.1)	liters (quarts)
Direct-Mount, Non-Retarder, High-Capacity Cooler	3.5 (3.7)	liters (quarts)
Direct-Mount, Retarder Cooler	3.5 (3.7)	liters (quarts)

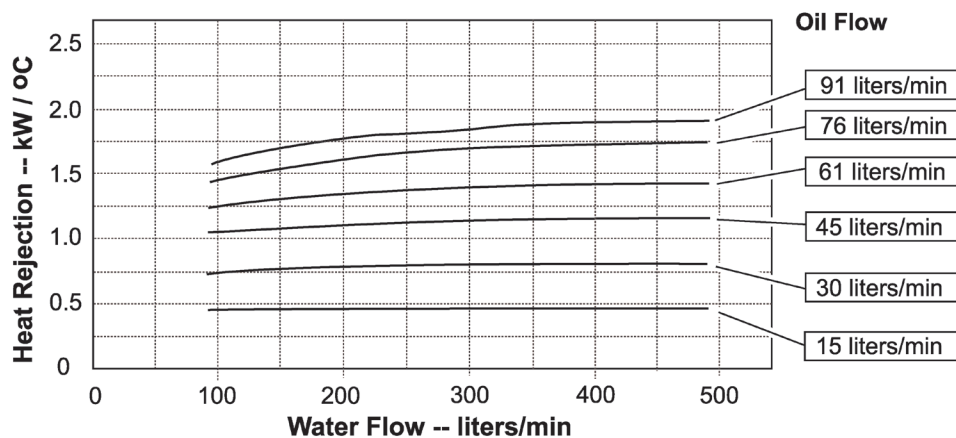
18.2 REMOTE RETARDER / SUMP COOLER CHARACTERISTICS (METRIC UNITS)



EM60-07

RETARDER-SIDE
HEAT
REJECTION

CONVERTER
MODE

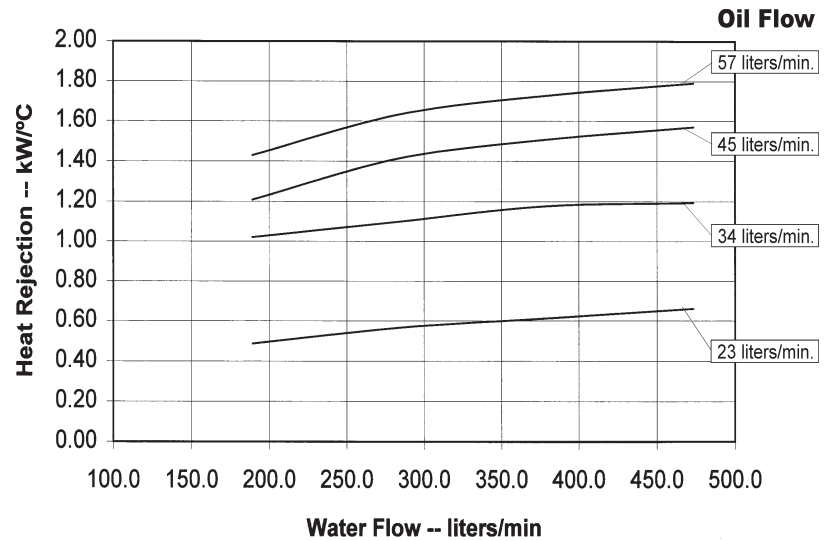


EM60-25

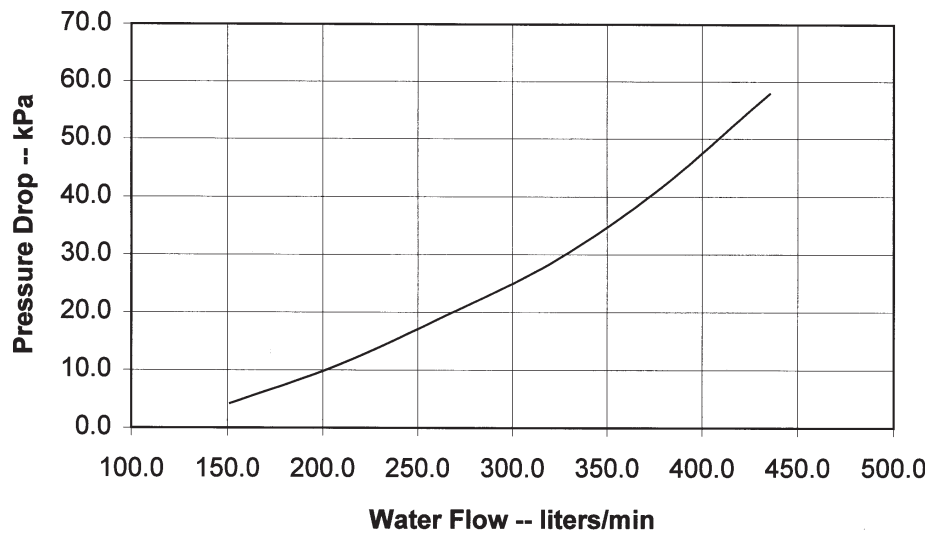
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18.2 REMOTE RETARDER / SUMP COOLER CHARACTERISTICS (METRIC UNITS — CONTINUED)

SUMP-SIDE HEAT REJECTION



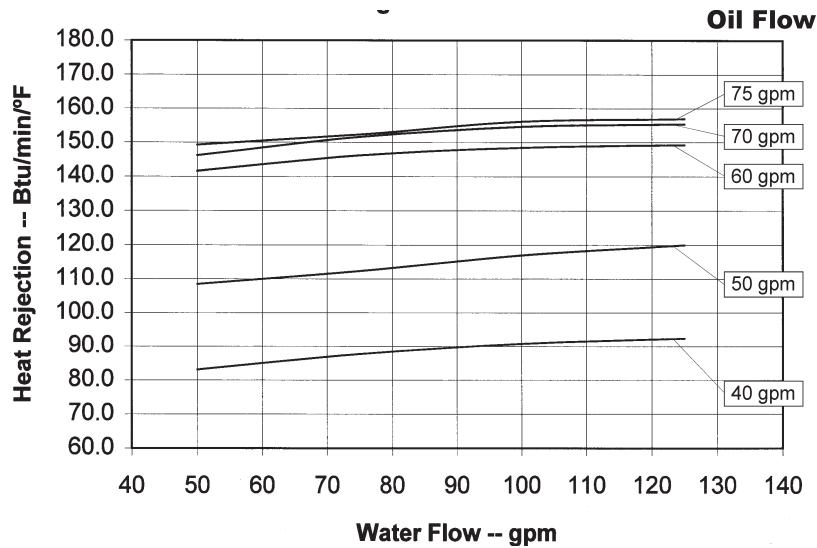
EM60-08



WATER-SIDE PRESSURE DROP

EM60-11

18.2 REMOTE RETARDER / SUMP COOLER CHARACTERISTICS (U.S. UNITS)



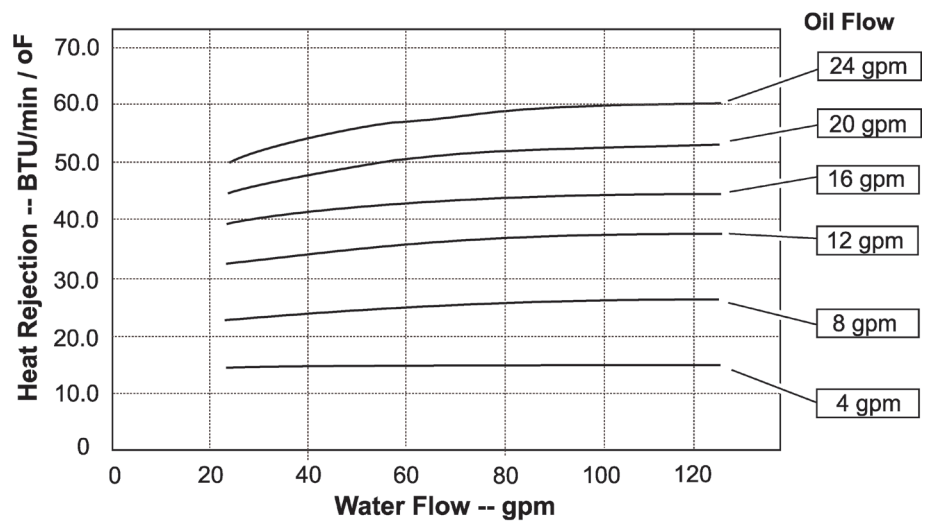
**RETARDER-SIDE
HEAT
REJECTION

RETARDER
MODE**

EM60-09

**RETARDER-SIDE
HEAT
REJECTION

CONVERTER
MODE**

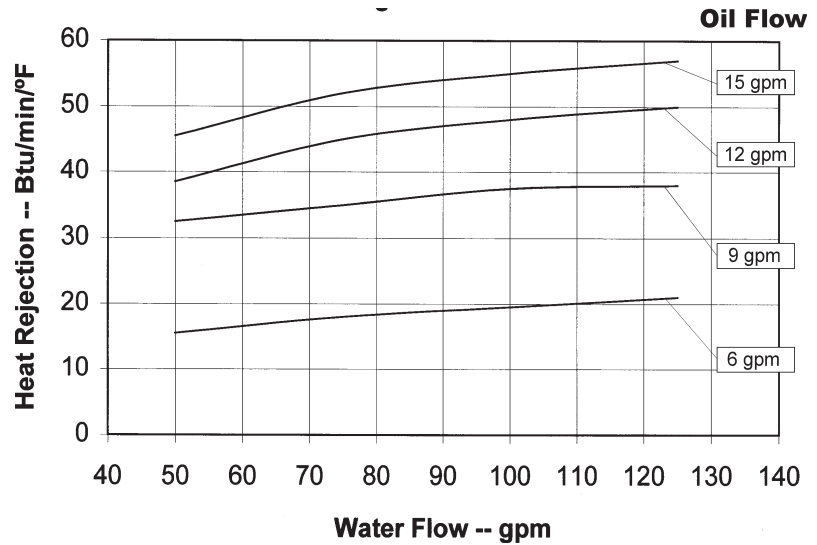


EM60-26

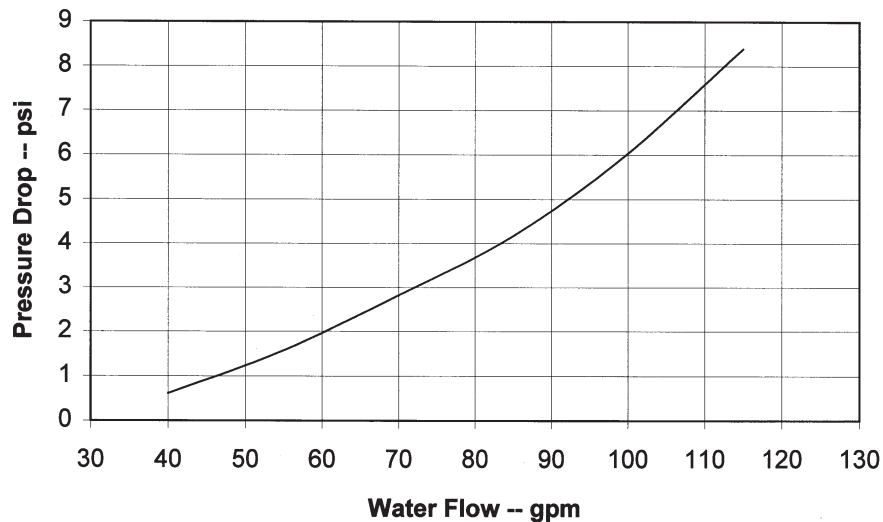
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18.2 REMOTE RETARDER / SUMP COOLER CHARACTERISTICS (U.S. UNITS — CONTINUED)

SUMP-SIDE HEAT REJECTION



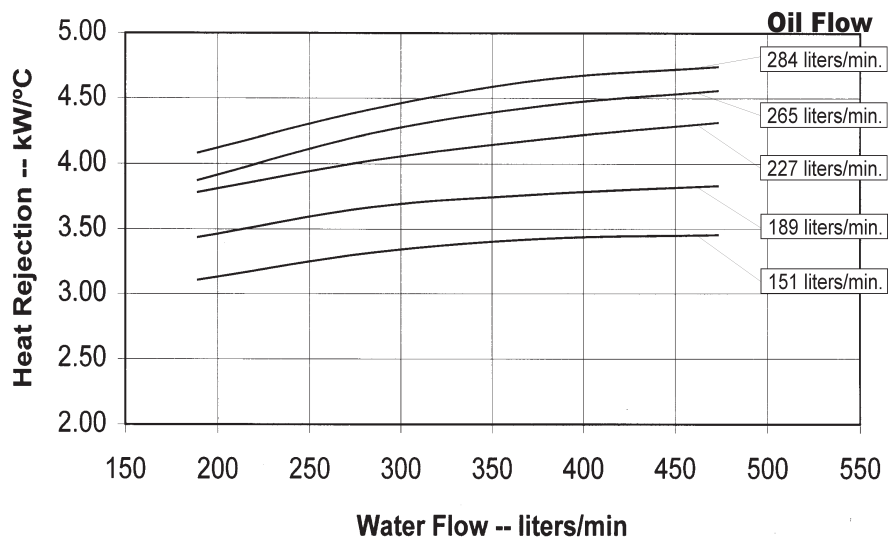
EM60-10



WATER-SIDE PRESSURE DROP

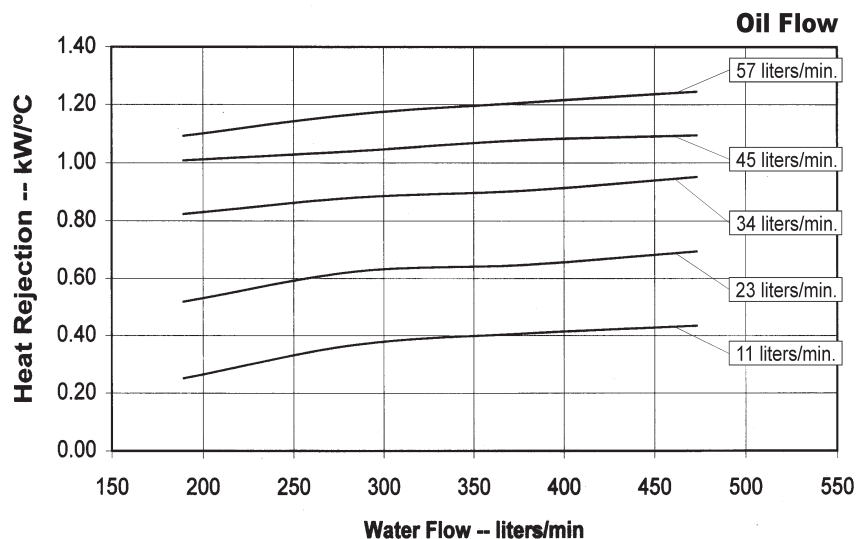
EM60-12

18.3 DIRECT-MOUNT RETARDER/SUMP COOLER CHARACTERISTICS (METRIC UNITS)

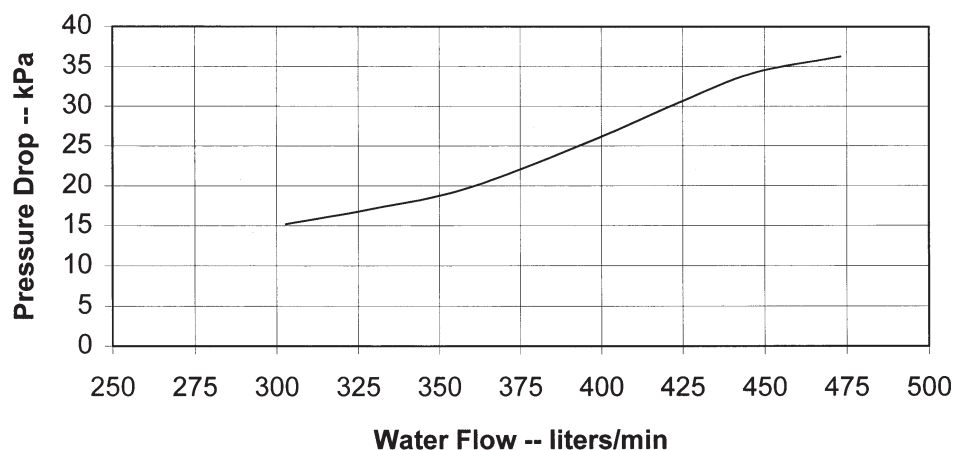


EM60-19

SUMP-SIDE HEAT REJECTION



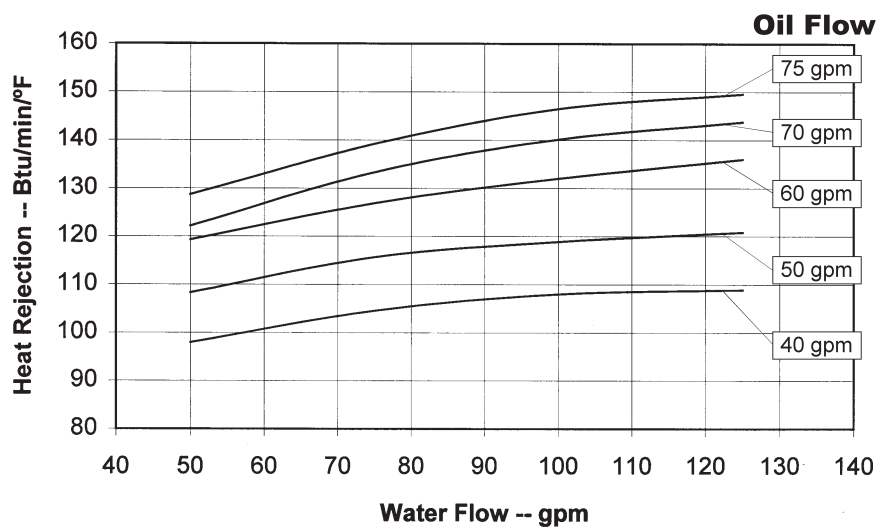
EM60-20



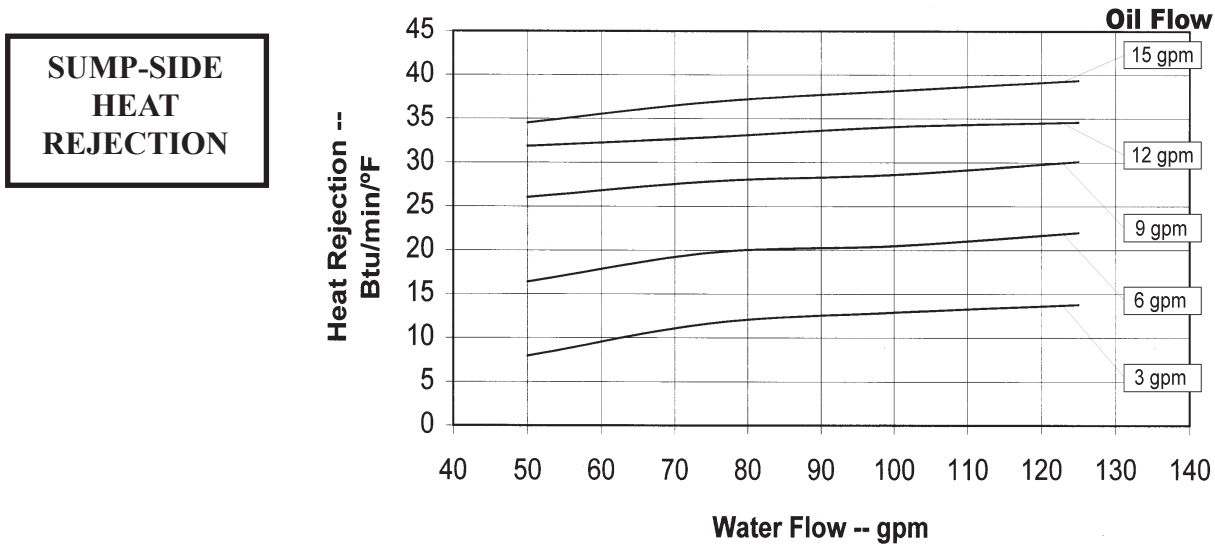
WATER-SIDE PRESSURE DROP

EM60-17

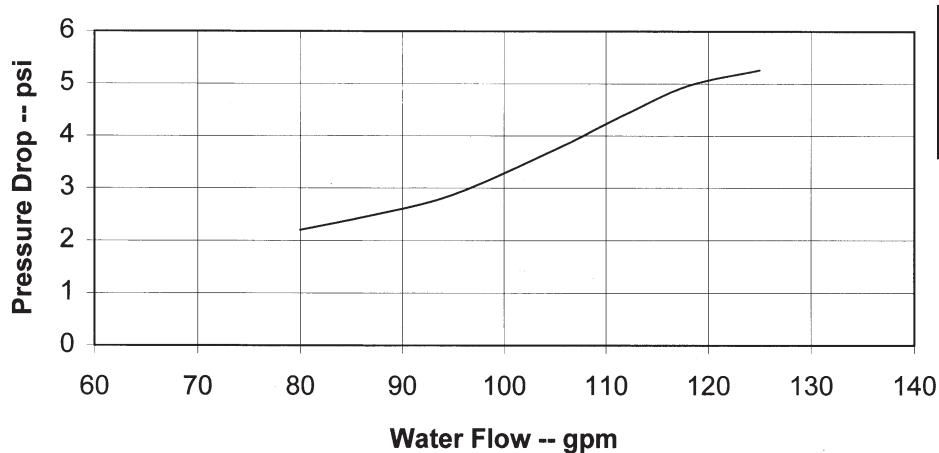
18.3 DIRECT-MOUNT RETARDER/SUMP COOLER CHARACTERISTICS (U.S. UNITS)



EM60-22



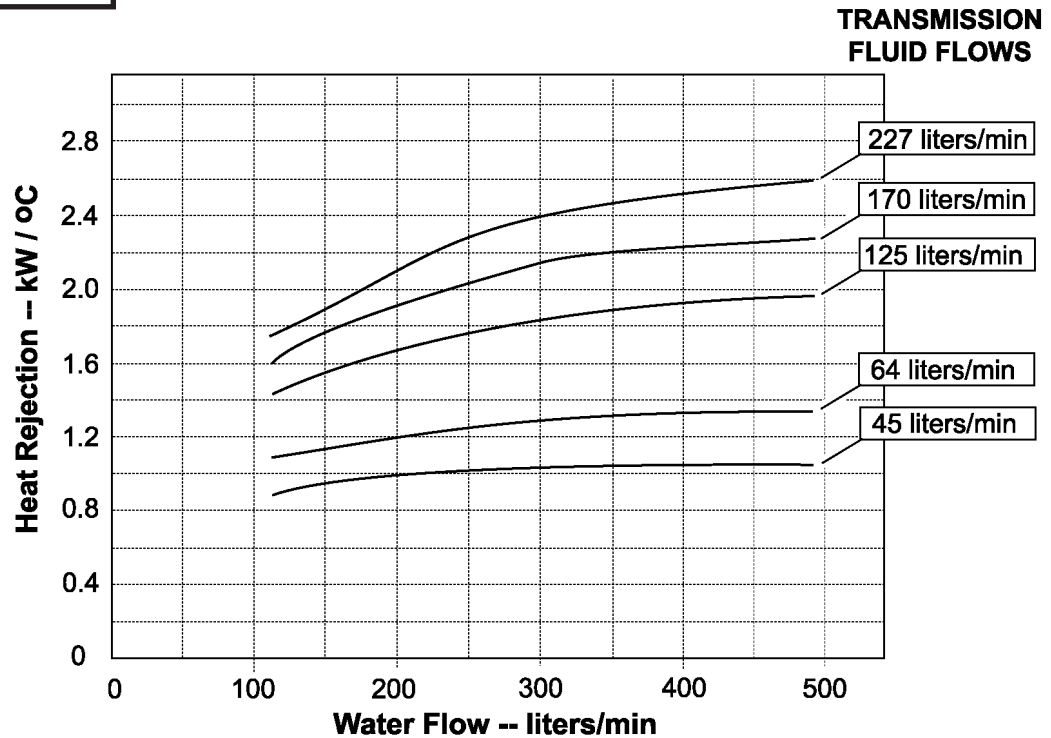
EM60-21



EM60-18

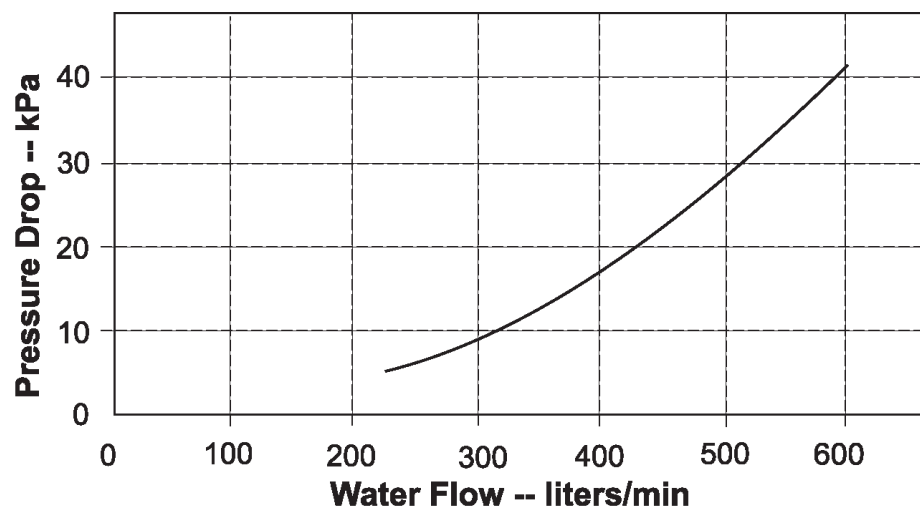
18.4 DIRECT-MOUNT NON-RETARDER STANDARD-CAPACITY COOLER CHARACTERISTICS (METRIC UNITS)

HEAT REJECTION



D003MET

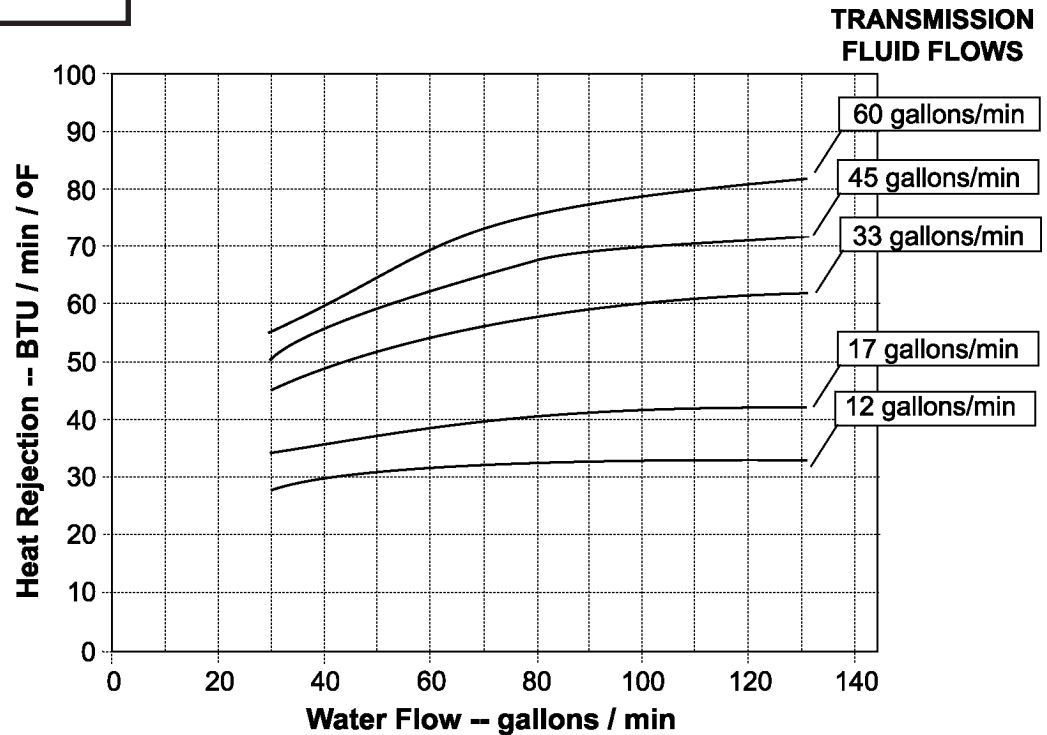
WATER-SIDE PRESSURE DROP



D002MET

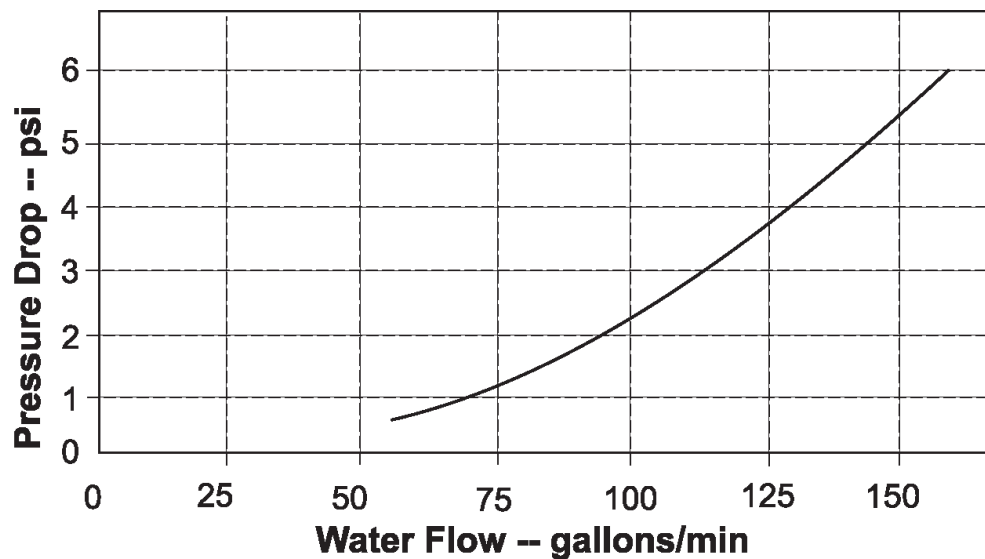
18.4 DIRECT-MOUNT NON-RETARDER STANDARD-CAPACITY COOLER CHARACTERISTICS (U.S. UNITS)

HEAT REJECTION



D003US

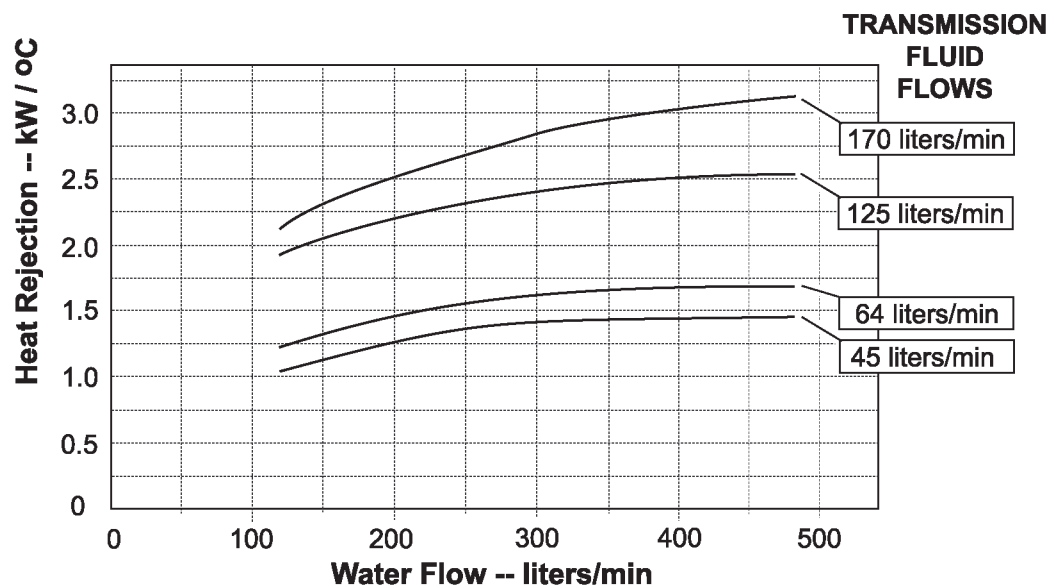
WATER-SIDE PRESSURE DROP



D002US

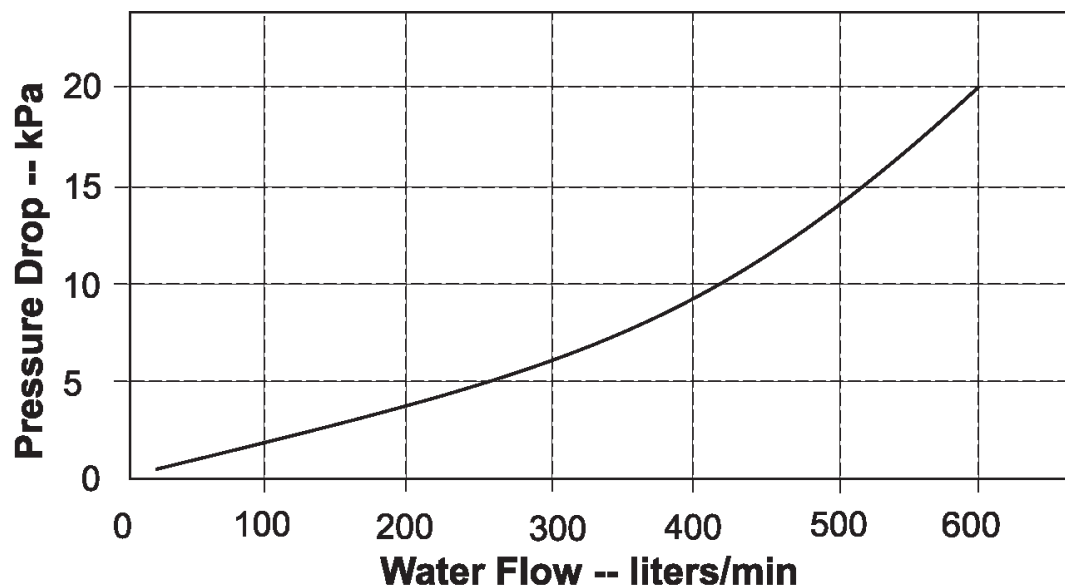
18.5 DIRECT-MOUNT NON-RETARDER HIGH-CAPACITY COOLER CHARACTERISTICS (METRIC UNITS)

HEAT REJECTION



C-291

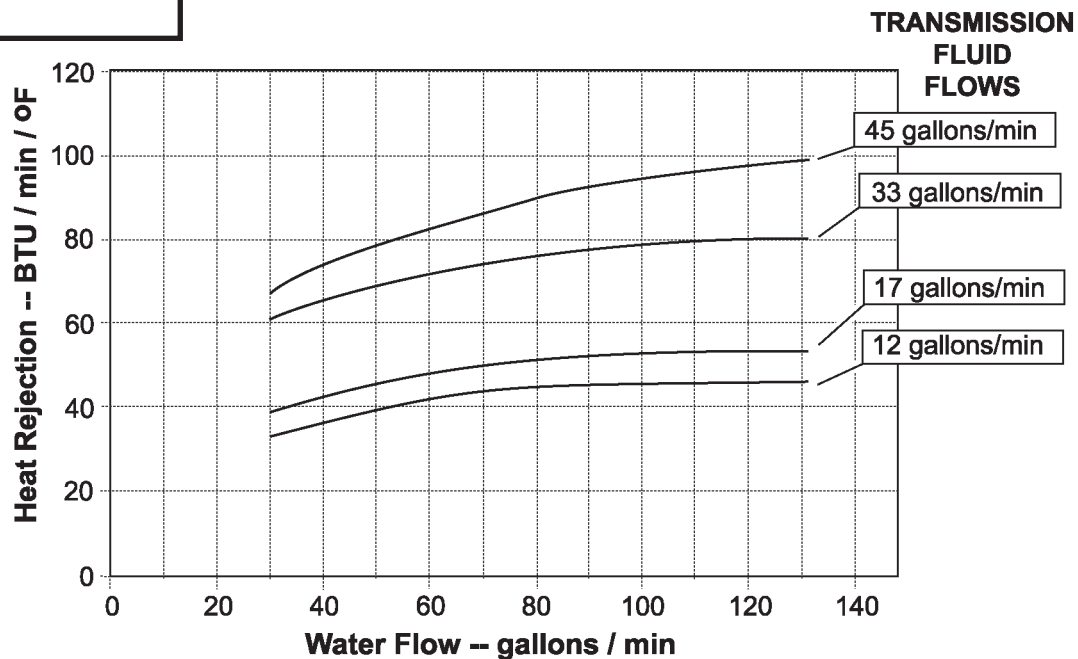
WATER-SIDE PRESSURE DROP



C-289

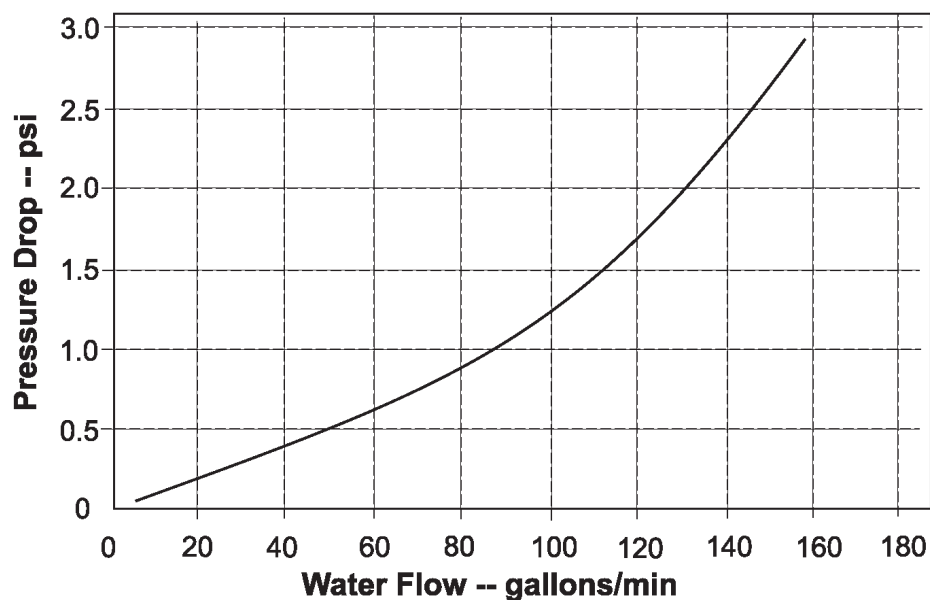
18.5 DIRECT-MOUNT NON-RETARDER HIGH-CAPACITY COOLER CHARACTERISTICS (U.S. UNITS)

HEAT REJECTION



C-290

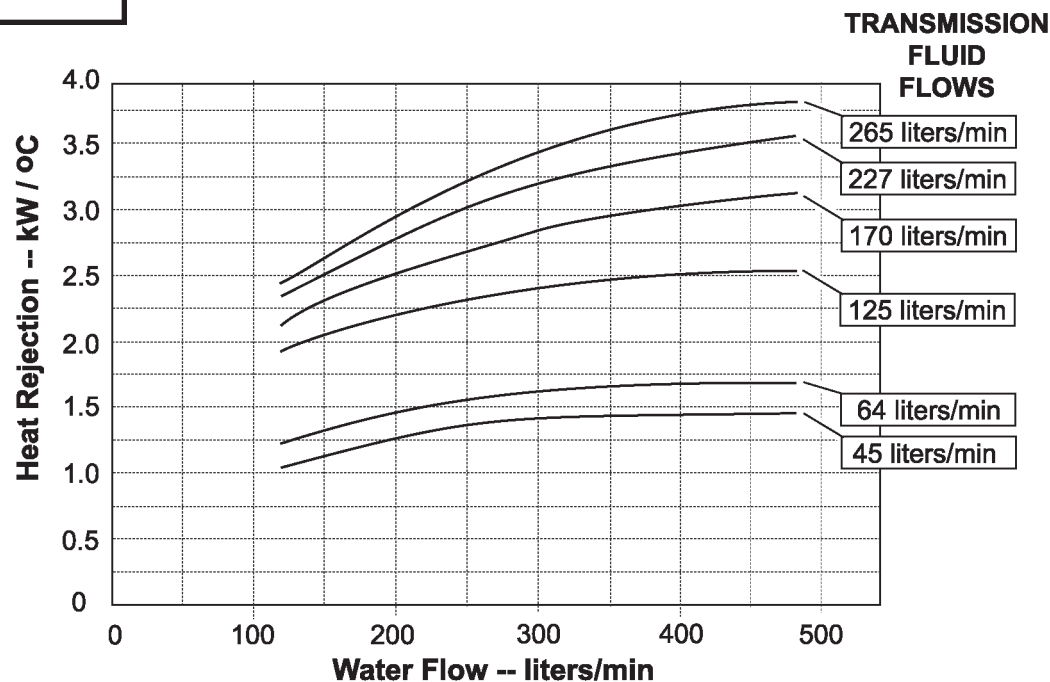
WATER-SIDE PRESSURE DROP



C-292

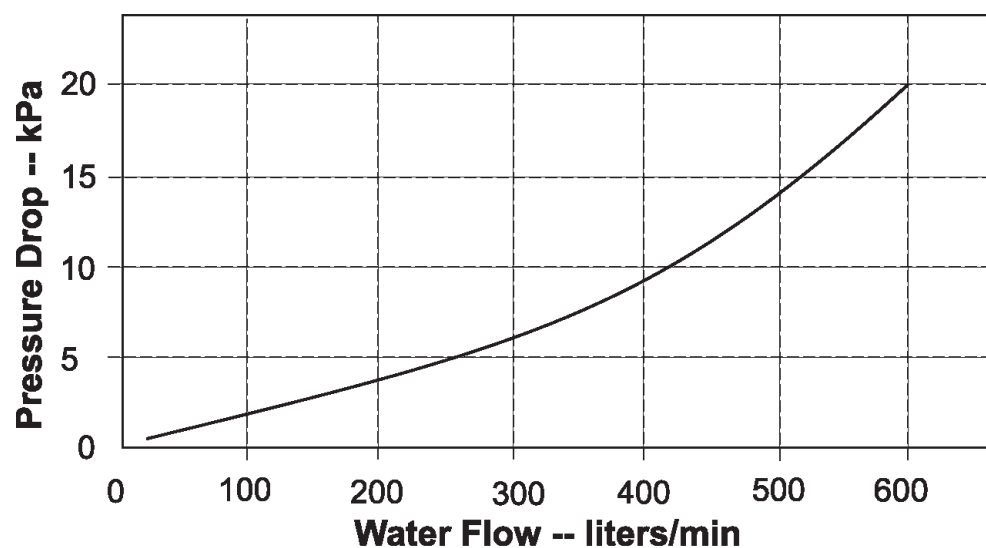
18.6 DIRECT-MOUNT RETARDER COOLER CHARACTERISTICS (METRIC UNITS)

HEAT REJECTION



C-287

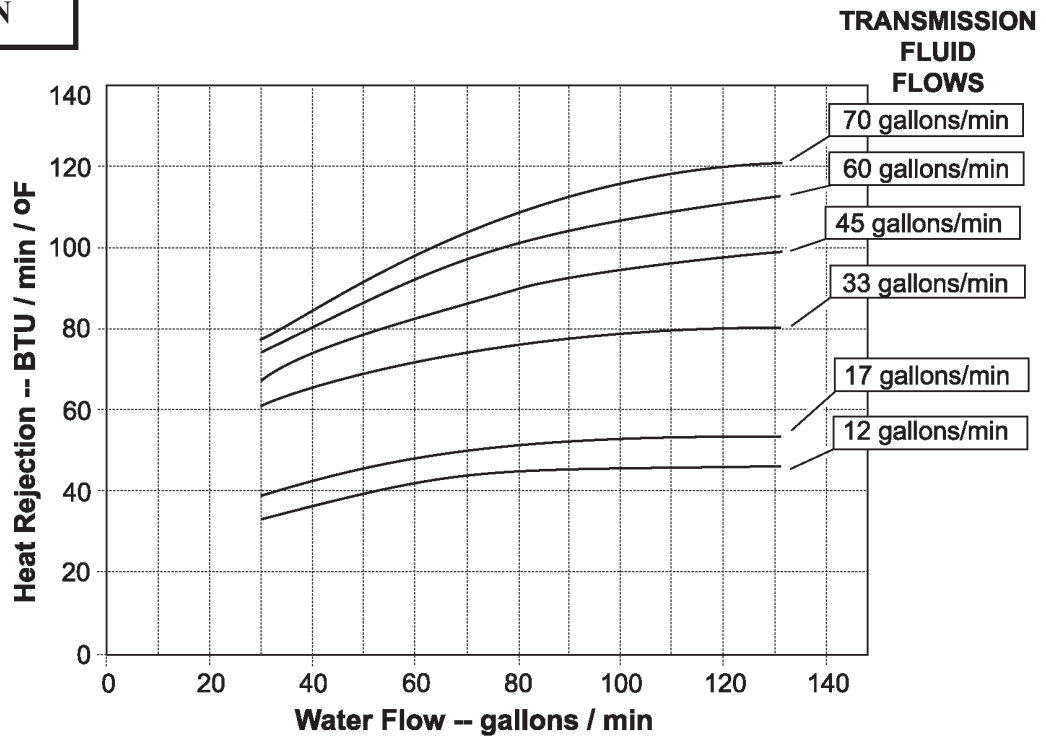
WATER-SIDE PRESSURE DROP



C-289

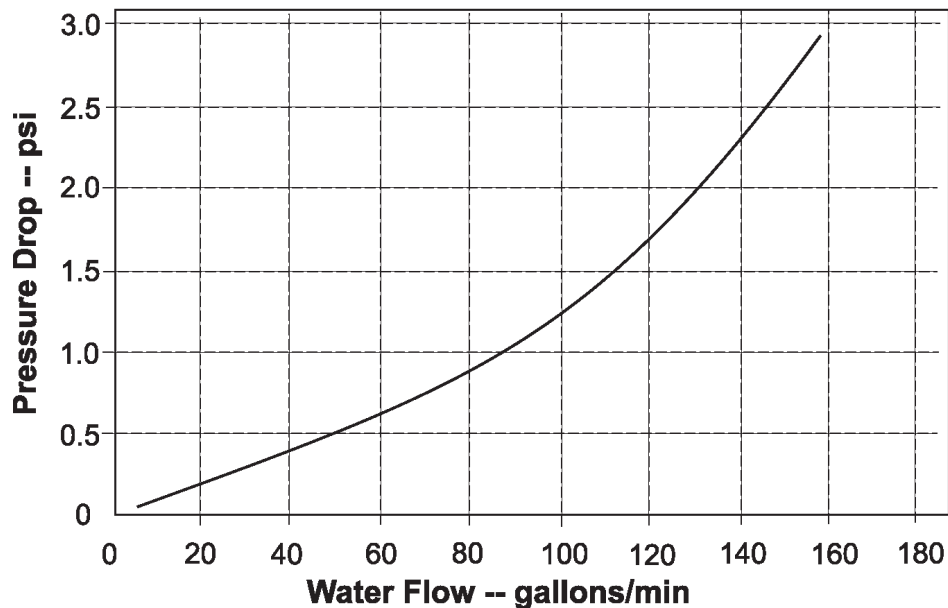
18.6 DIRECT-MOUNT RETARDER COOLER CHARACTERISTICS (U.S. UNITS)

HEAT REJECTION



C-288

WATER-SIDE PRESSURE DROP



C-292

LIST OF REFERENCED DOCUMENTS

- [3000 Product Family Transmission Ratings](#)
- [Fluids at \[www.allisontransmission.com\]\(http://www.allisontransmission.com\) \(<http://www.allisontransmission.com/service/autoapp/172/>\)](#)

3000 Product Family Installation Drawings

- [AS66-420, Engine/Transmission Adaptation – General](#)
- [AS66-441, Output Flange Information](#)
- [AS66-442, Output Yoke Information](#)

Technical Documents (TD's)

- [TD-182, Use of Electronic Braking Systems \(EBS\) with Allison Transmissions](#)

REVISION HISTORY

December 7, 2010

- Table 1.0, replaced list of individual models with list of base models.

January 26, 2010

- Table 1.0, added new 3000 ORS and T390 models.

October 13, 2009

- Table 13.0, removed DEXRON® VI as an acceptable fluid.
- Added coolant volume for Allison coolers to Table 18.0.

November 21, 2008

- Tables 9.1 and 11.1: completed data table for models with top/side PTO provision

September 24, 2008

- Table 1.0, added new B295 model.

September 12, 2008

- Table 1.0, removed canceled models, T250 and T265.

July 17, 2008

- Prepared for Extranet publication with updated cover page and List of Referenced Documents.

May 7, 2008

- Rename document: was "Transmission Specifications." Revise several section titles.

March 6, 2008

- Table 1.0: added T255 model
- Tables 17.1 and 17.2: revised O-ring seal specification to remove SAE J200, and to add recommended durometer hardness of 75
- Tables 17.1 and 17.2: replaced SAE J1019 and J517 hose specifications with SAE J2545 and SAE J1405, Option IV.

November 7, 2007

- Table 13.0: replaced "TranSynd® or TES-295 fluid" with the phrase "TES-295 licensed fluid".
- Table 4.0: added torque values to high, medium, and low retarder capacity lines.

September 14, 2007

- Table 1.0: added new transmission model, T-375
- Table 3.0: replaced TranSynd® with TES-295 fluid; removed minimum start-up temperatures for Type C-4 fluids
- Table 8.0: weight of retarder accumulator updated from 4.5 kg (10 lb) to 5.4 kg (12 lb), clarified that weight is without the solenoid; added weight of solenoid used with retarder accumulator

March 26, 2007

- Inserted Park Brake Performance as new Table 15.0 (previously published in *Park Brake Provision* section of 3000 Product Family Installation Manual). Subsequent tables renumbered accordingly.