NOTES ON LUBRICATION

The lubrication of a single power transmission part is almost important as its design and construction….

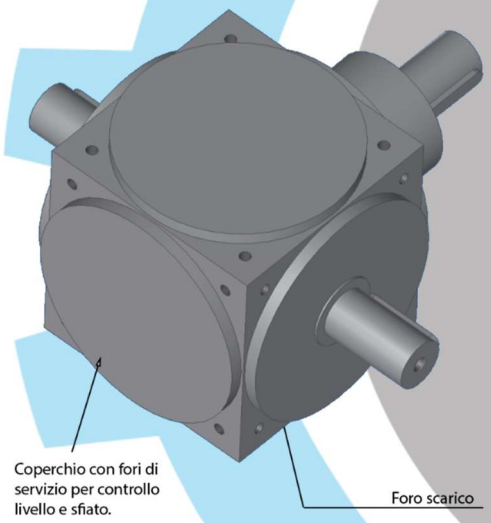
MAIN NOTE: *Every information about lubrication should not be disconnected from the application and the real operating condition. Therefore, all the following suggestions come from our experience concerning standard gearboxes. For any special application or doubts do not hesitate to contact Carini Industria directly.*

Note: it is necessary to check regularly for any leakage to maintain the correct gearbox functioning.

To guarantee the proper functioning and to avoid leaks gearbox must be regularly inspected.

Every gearbox must be filled during installation with a correct lubricant, in regard to its application (temperature, speed, reduction ratio, size, duty cycle, …).

The fluid level must be reckoned accordingly to its size. Our gearboxes are supplied with a drain hole on the lower body surface (F side), and with a cover with holes for oil level inspection and plug breather (D side).



OIL VOLUMES AND WEIGHT			
TYPE	WEIGHTH	OIL VOLUMES	GREASE WEIGHT
	kg	lt	kg
27	2	0,10	0,12
45	6,5	0,20	0,33
55	11	0,35	0,47
70	22	0,45	0,69
85	34	1,20	1,40
105	65	2,00	2,40
120	80	2,60	2,90
140	120	3,20	4,00
180	245	13,00	15,00
200	245	13,00	15,00
225	420	22,00	30,00
250	630	35,00	40,00

In the above tab. oil and grease to be filled in, depending on the gearbox size.

First lubricant replacement must be carried out:

- After 300/500 hours of operation, if mineral oil;
- After 300/500 hour of operation, if synthetic oil;

Next lubricant replacement must be made:

- Every 3000/5000 hours of operation, if mineral oil;
- Every 10.000 hours of operation, if synthetic oil;
- Every 10.000 hours of operation, if with grease;

ATTENTION: do not change lubricant type or mix synthetic and mineral oils during gearbox lifetime!

ATTENTION: NBR rubber oil seals are not compatible with synthetic oils, based on PolyGlycol, while acceptable with oil based on PolyAlphaOlefin (PAO).

CONSIDERATIONS

Mineral oil is normally used because it is cheaper, nevertheless it is also sensitive to temperature variations, or humidity, and its lifetime is very short in case of high temperature operations.

Mineral oil is not recommended in case of:

- Use with wide temperature range;
- Use in high temperature operations (heavy duty cycle);
- Use in very low temperature operations (heavy duty cycle);
- Wide lubrication interval;

In the above cases, it is recommended to use a synthetic based oil (Polyglycols or PAO) for greater stability.

Note: since there is a large quantity and types of additives (if used) designed to improve oil performances, these must be evaluated by sector specialist accordingly to the application.

Generally, when the above information/operating conditions are verified, it is recommended to use oil classified as DIN 51502 CLP, or DIN 51517 – 3, or ISO 6743 CKC.

Note on Temperature: in any case, lubricant slamming generates heat. In case of lubrication without a cooling system, it is necessary to consider this parameter too.

LUBRICANT TABLE

	VISCOSITY INDEX	Fuchs	Castrol	Kluber	Shell
MINERAL OIL	VG 68	Renolin CLP 68		Klüberoil GEM 1 - 68 N	Omala S2 G 68
	VG 100	Renolin CLP 100		Klüberoil GEM 1 - 100 N	Omala S2 G 100
	VG 150	Renolin CLP 150		Klüberoil GEM 1 - 150 N	Omala S2 G 150
	VG 220	Renolin CLP 220		Klüberoil GEM 1 - 220 N	Omala S2 G 220
	VG 320	Renolin CLP 320		Klüberoil GEM 1 - 320 N	Omala S2 G 320
SYNTHETIC OIL	VG 68	Renolin Unisyn CLP 68	Alphasyn HTX 68	Klübersynth GEM 4 - 68 N	Omala S4 GX 68
	VG 100	Renolin Unisyn CLP 100	Optygear Synthetic 1710/100	Klübersynth GEM 4 - 100 N	
	VG 150	Renolin Unisyn CLP 150	Optygear Synthetic 1710/150	Klübersynth GEM 4 - 150 N	Omala S4 GX 150
	VG 220	Renolin Unisyn CLP 220	Optygear Synthetic 1710/220	Klübersynth GEM 4 - 220 N	Omala S4 GX 220
	VG 320	Renolin Unisyn CLP 320	Optygear Synthetic 1710/320	Klübersynth GEM 4 - 320 N	Omala S4 GX 320

Here below it is possible to find some suggestions referred to the gearbox CORRECT LUBRICATION.

a) Bevel gearbox lubrication can be achieved by oil bath (slamming) or by oil force feed.

Oil bath lubrication requires the correct choice of oil (or grease) and the right filling measure, depending on the application and the gearbox size itself (pls refer to the annexed diagrams).

Force feed lubrication is needed when the application speed (too high or low), or the temperature could make ineffective the slamming movement. In this case it is necessary an external hydraulic circuit, with its cooling system, that allows a supply of pressurized lubricant (max 4-5 bars).

In some cases, force feed lubrication can also operate as per thermal exchange, but it is better to realize a stand-alone cooling system when necessary for the gearbox.

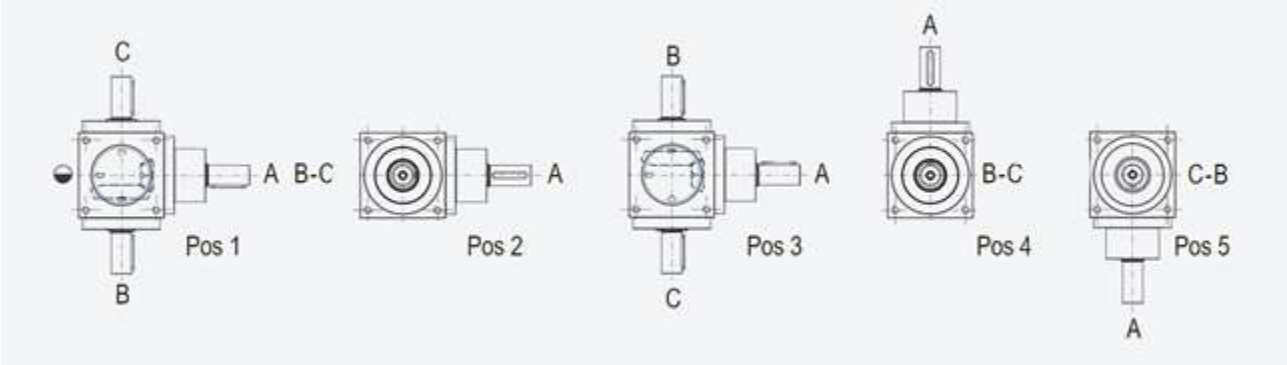
In case of doubts, we suggest to contact us and notify info/application when ordering.

b) Lubrication depends on gearbox mounting position.

When all shafts-axes are in horizontal position, it is possible to refers to the annexed diagrams, depending on gearbox size and application type.

When shafts-axes are not all in horizontal position, or the gearbox mounting is tilted, pls contact Carini Industria for application info.

Below some examples referred only to the mounting position, not considering speed, or temperature or aggressive atmosphere:



Pos. 2 and 5: does not require any particular attention, if not present any other special operating condition. In those cases, if oil level and type are correct, all the shafts, gears and bearings are correctly lubricated;

Pos. 1 shaft bearing C needs protection because it is NOT properly lubricated with oil bath lubrication;

Pos. 3 shaft bearing B needs protection because it is NOT properly lubricated with oil bath lubrication; the coupling may NOT be correctly lubricated with simple oil bath lubrication. This application must be carefully evaluated;

Pos. 4 shaft bearing A needs protection because it is NOT properly lubricated with oil bath lubrication; the coupling may NOT be correctly lubricated with simple oil bath lubrication. This application must be carefully evaluated; if shaft A speed is lower than 100 rpm it is possible to consider bearing with double seals.

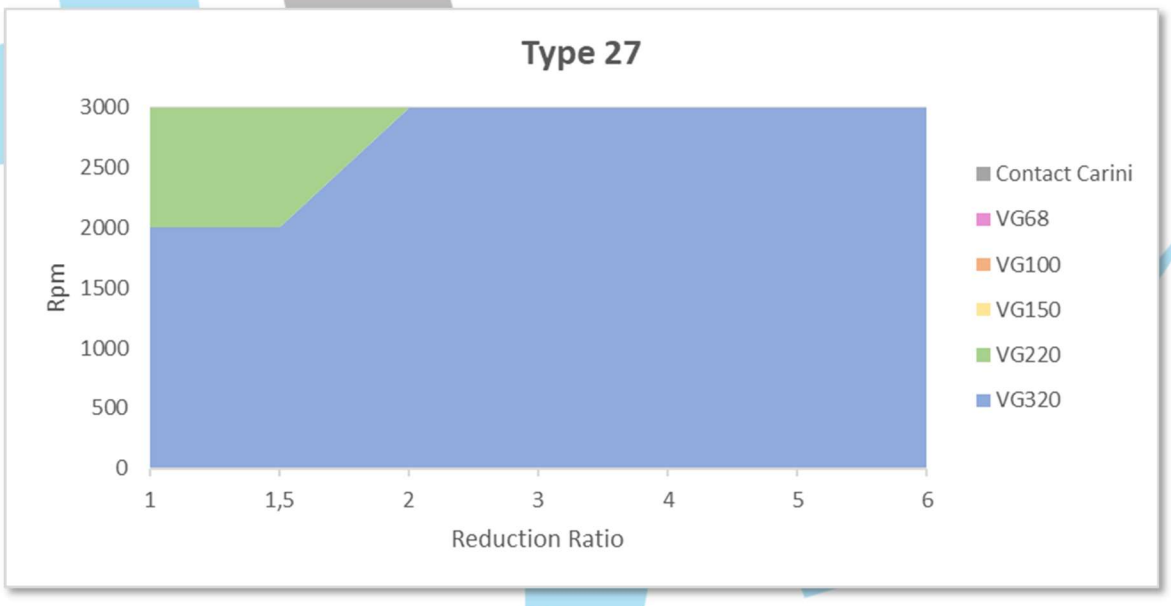
Depending on speed, it may be necessary to install a breather plug, or, while increasing more speed, an external cooling system for the gearbox.

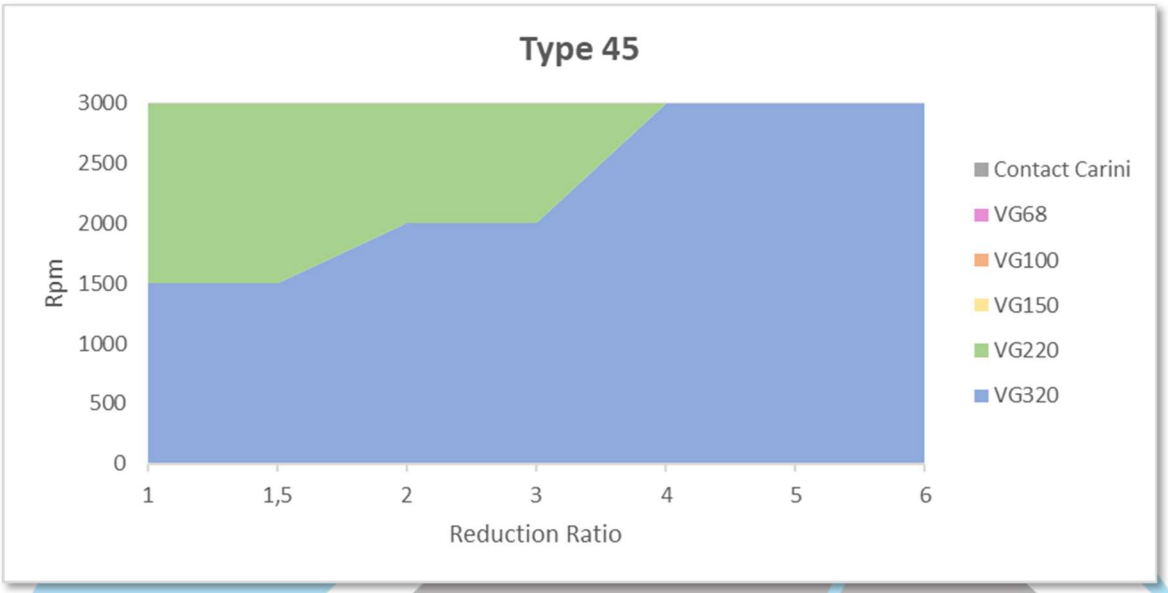
Below diagrams show suggested viscosity index, depending on speed gearbox size, referring on mineral oil and basic operating conditions such as:

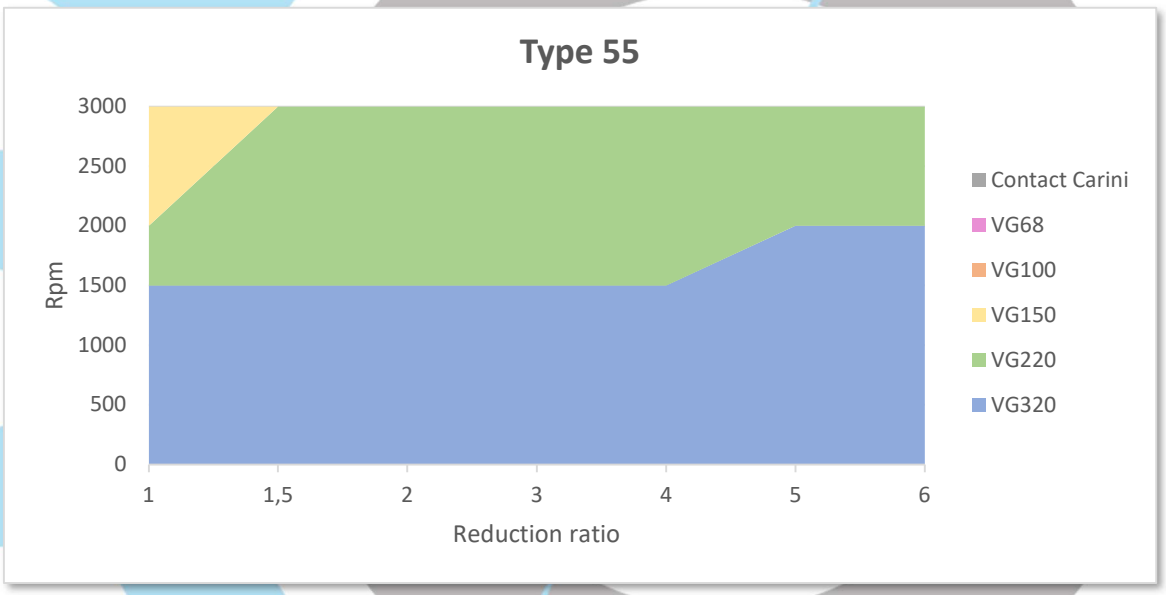
- Ambient temperature 20/30° C;
- Aerated gearbox body (not in closed box);
- Operation 6 h/day;
- Smooth and shock-free duty cycle;
- Start-ups <10/h;
- Gearbox protected from aggressive atmosphere, humidity or water;
- Internal Oil temperature max 55/60°C;
- Mounting position with all shaft-axes horizontal.

Notes

1) these diagrams are purely indicative: different conditions can completely change lubrication observations. Please contact Carini Industria.
2) In general, it is possible to use a synthetic oil of a lower class compared to the necessary mineral one, but only for not-heavy applications: please contact Carini Industria.




Type 45
3000
2500
2000
1500
1000
500
0
Rpm
1
1,5
2
3
4
5
6
Reduction Ratio
Contact Carini
VG68
VG100
VG150
VG220
VG320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2500
2000
1500
1000
500
0
Rpm
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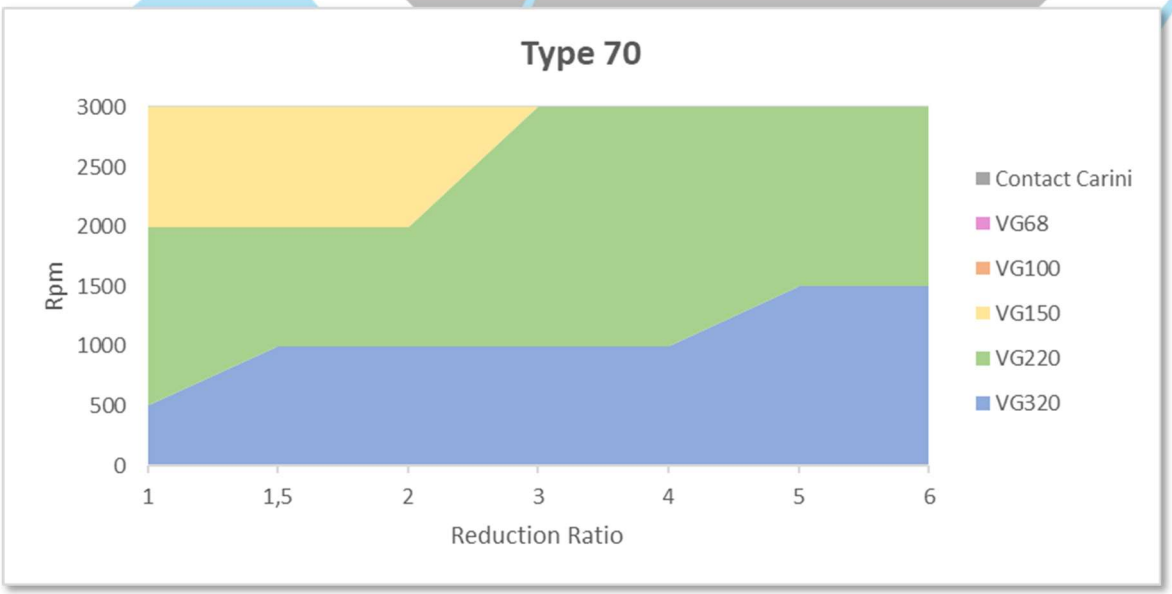
1,5
2
3
4
5
6
Reduction ratio
Contact Carini
VG68
VG100
VG150
VG220
VG320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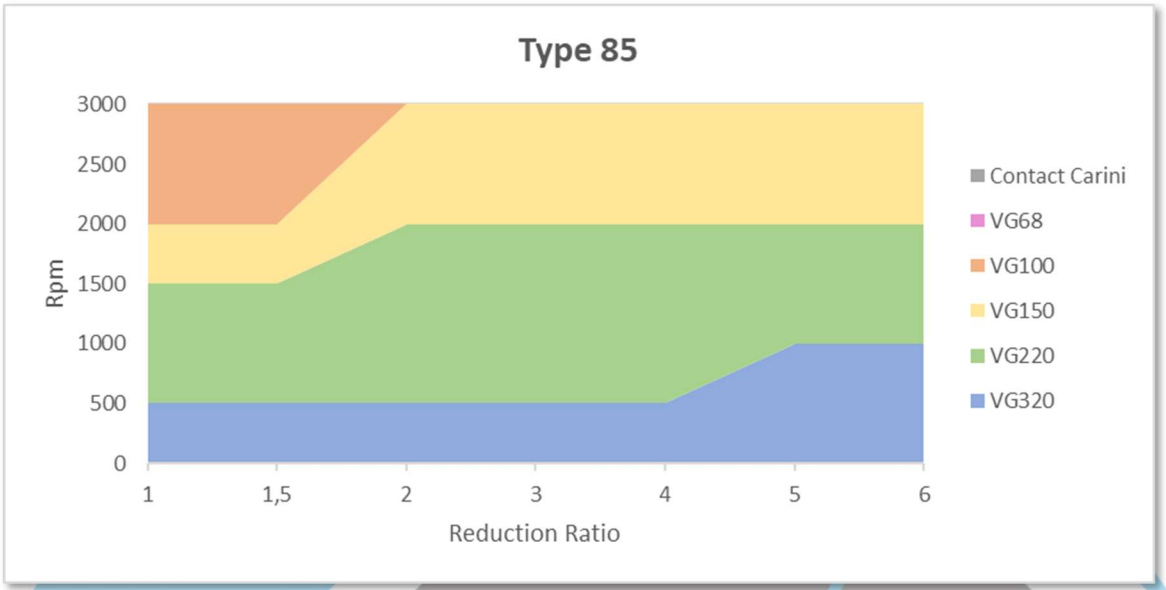
2500
2000
1500
1000
500
0
Rpm
1
1,5
2
3
4
5
6
Reduction Ratio
Contact Carini
VG68
VG100
VG150
VG220
VG320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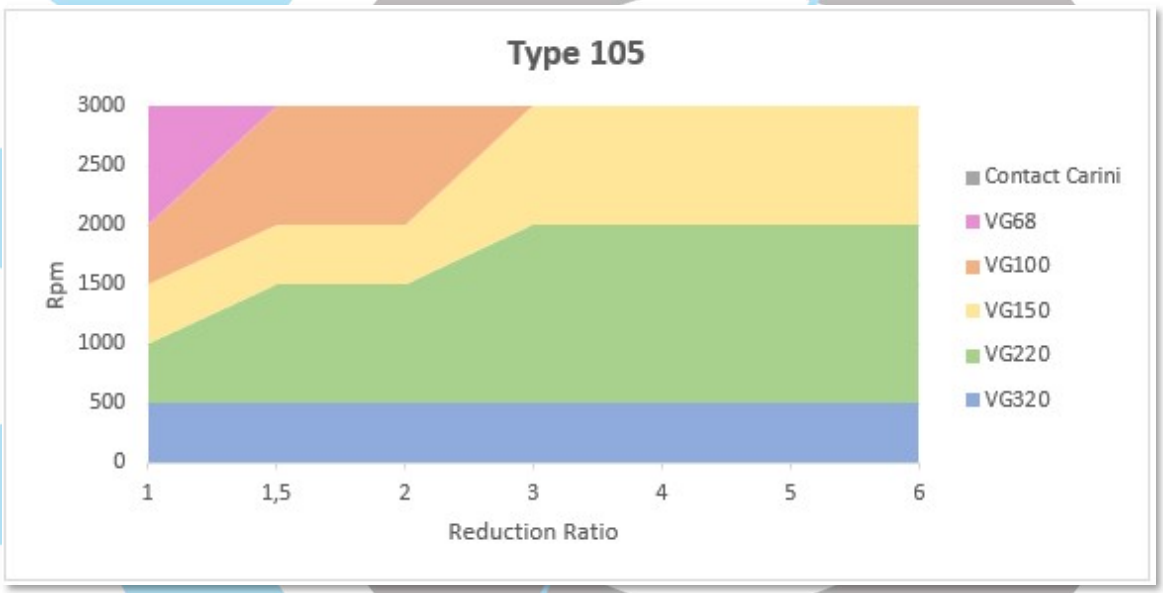
2500
2000
1500
1000
500
0
Rpm
1
1,5
2
3
4
5
6
Reduction Ratio
Contact Carini
VG68
VG100
VG150
VG220
VG320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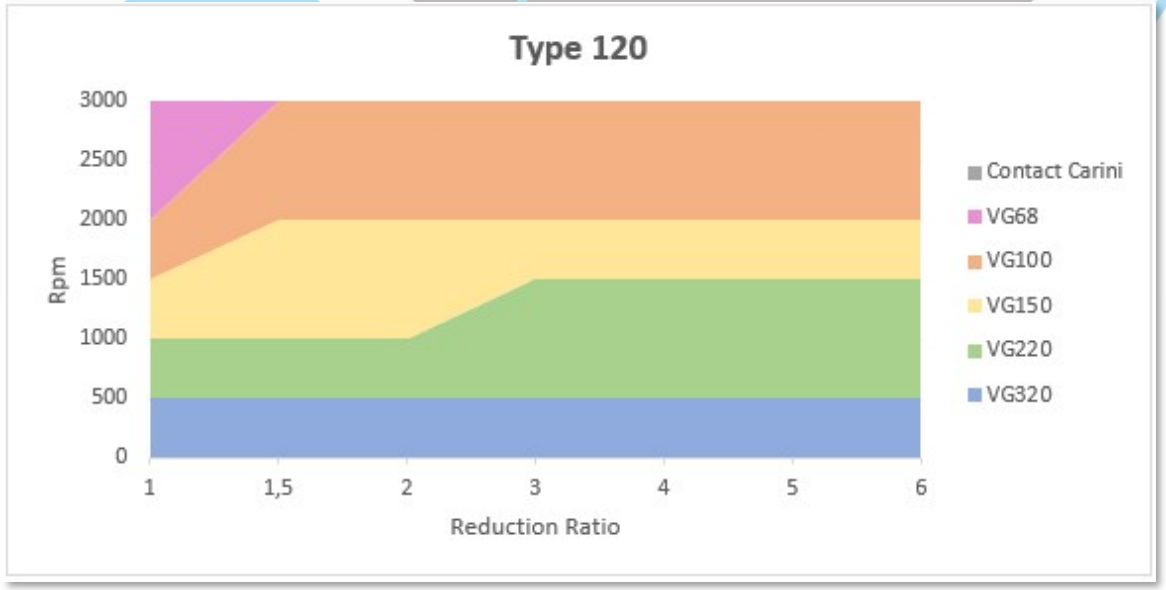
3000
2500
2000
1500
1000
500
0
Rpm
1
1,5
2
3
4
5
6
Reduction Ratio
Contact Carini
VG68
VG100
VG150
VG220
VG320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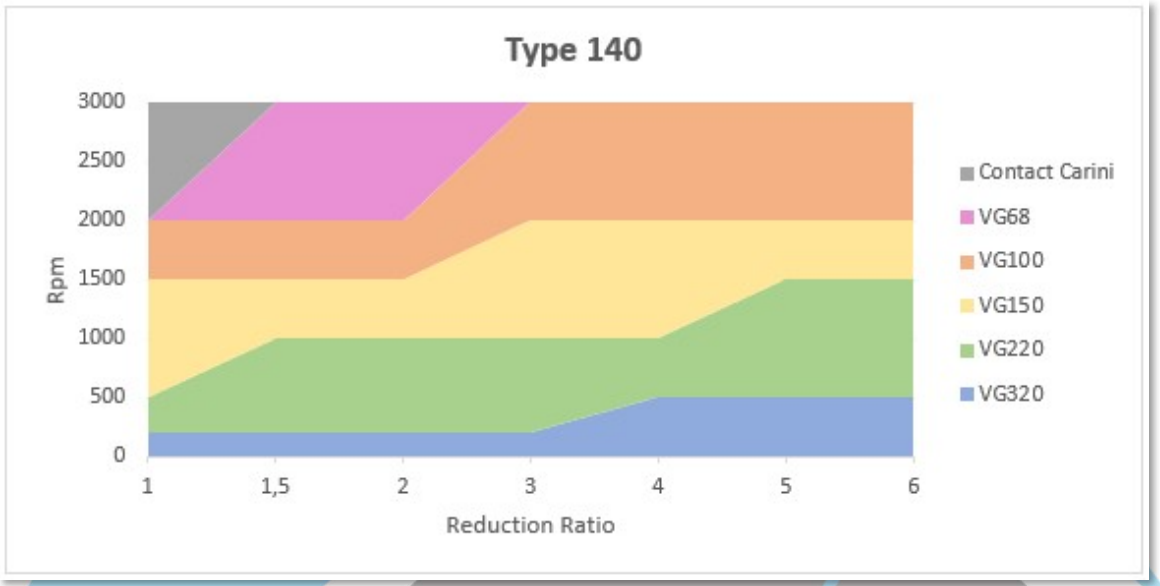
3000
2500
2000
1500
1000
500
0
Rpm
1
1,5
2
3
4
5
6
Reduction Ratio
Contact Carini
VG68
VG100
VG150
VG220
VG320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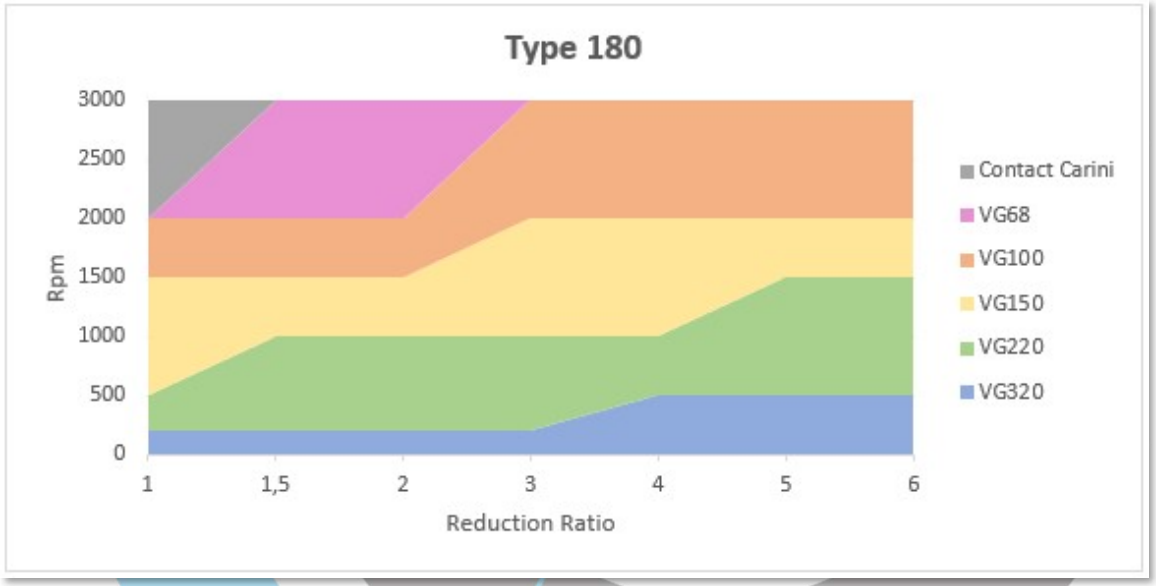
3000
2500
2000
1500
1000
500
0
Rpm
1
1,5
2
3
4
5
6
Reduction Ratio
Contact Carini
VG68
VG100
VG150
VG220
VG320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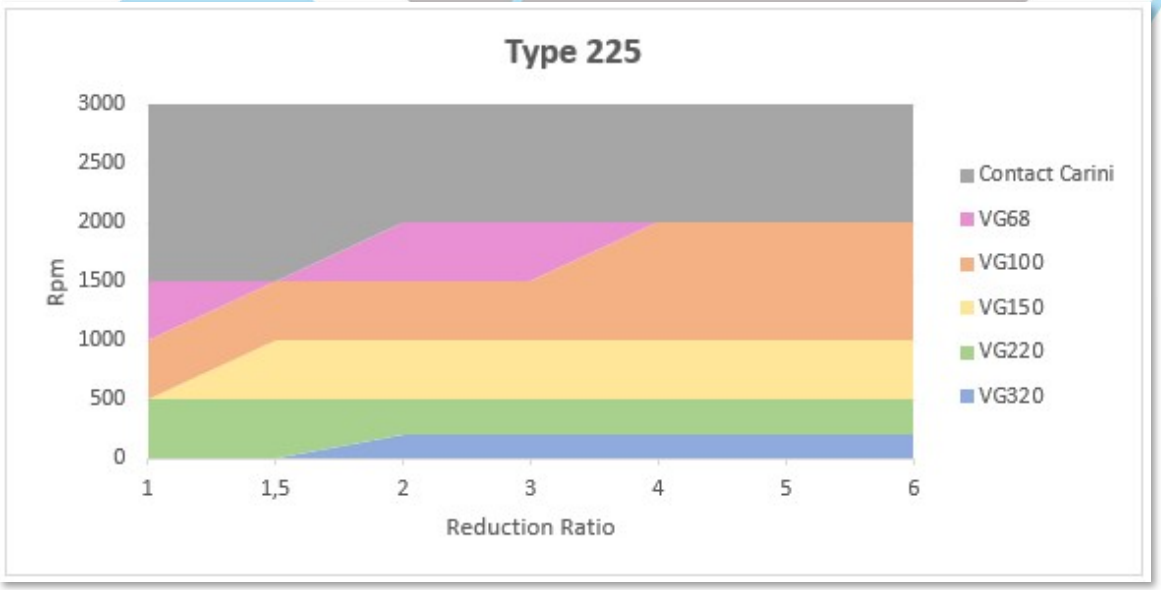
3000
2500
2000
1500
1000
500
0
Rpm
1
1,5
2
3
4
5
6
Reduction Ratio
Contact Carini
VG68
VG100
VG150
VG220
VG320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2500
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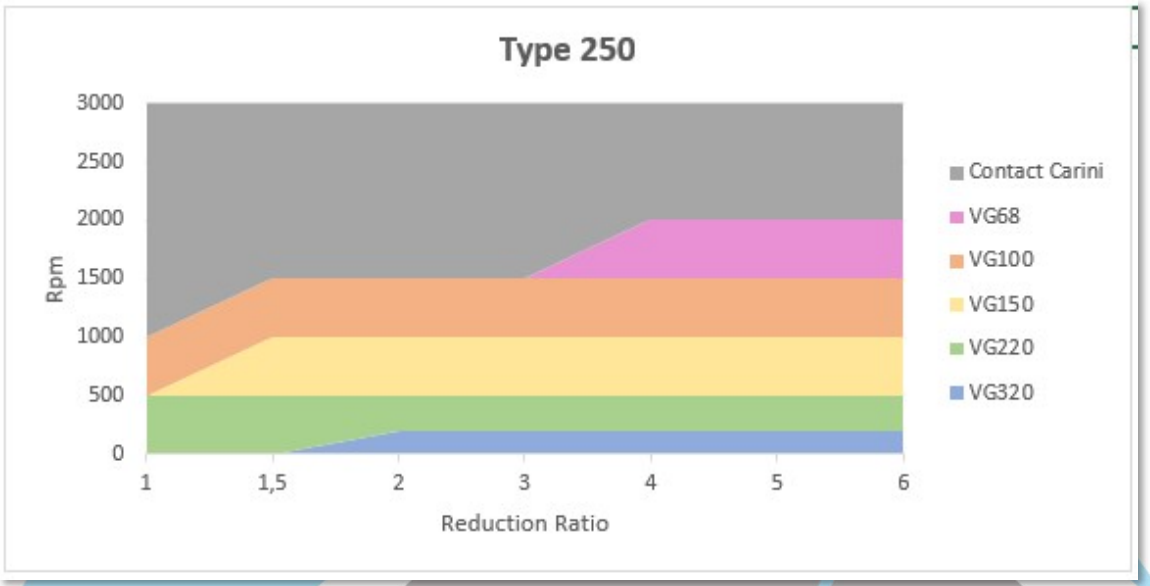
500
0
Rpm
1
1,5
2
3
4
5
6
Reduction Ratio
Contact Carini
VG68
VG100
VG150
VG220
VG320


Type 250
3000
2500
2000
1500
1000
500
0
Rpm
1
1,5
2
3
4
5
6
Reduction Ratio
Contact Carini
VG68
VG100
VG150
VG220
VG320