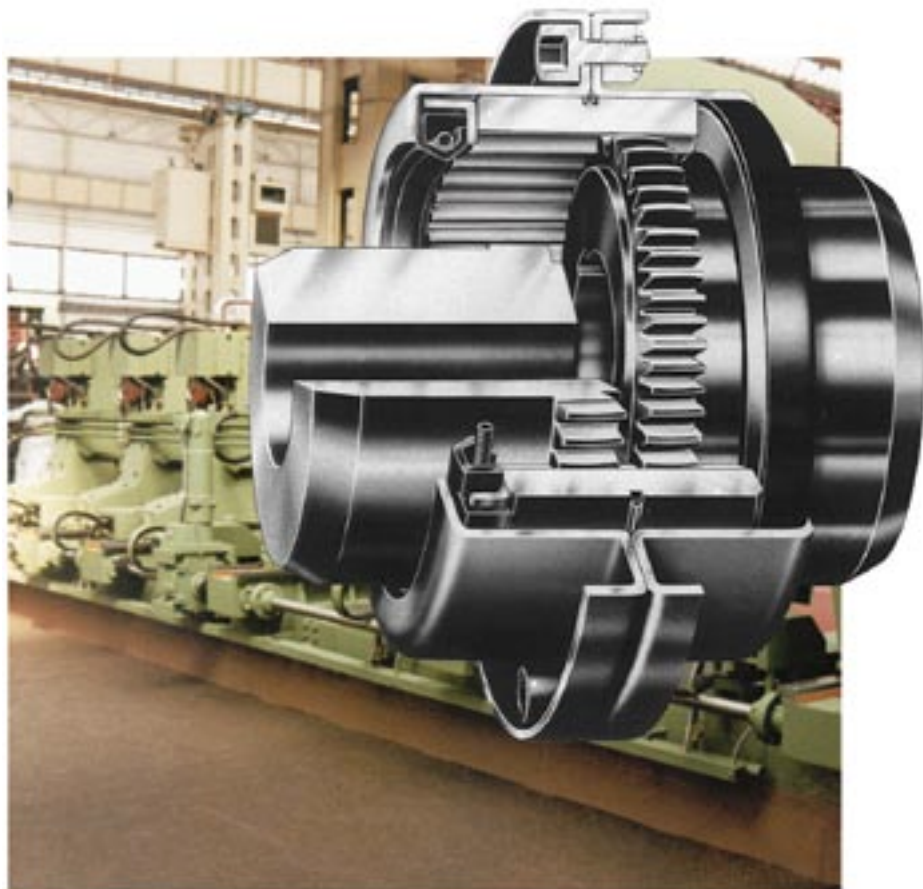




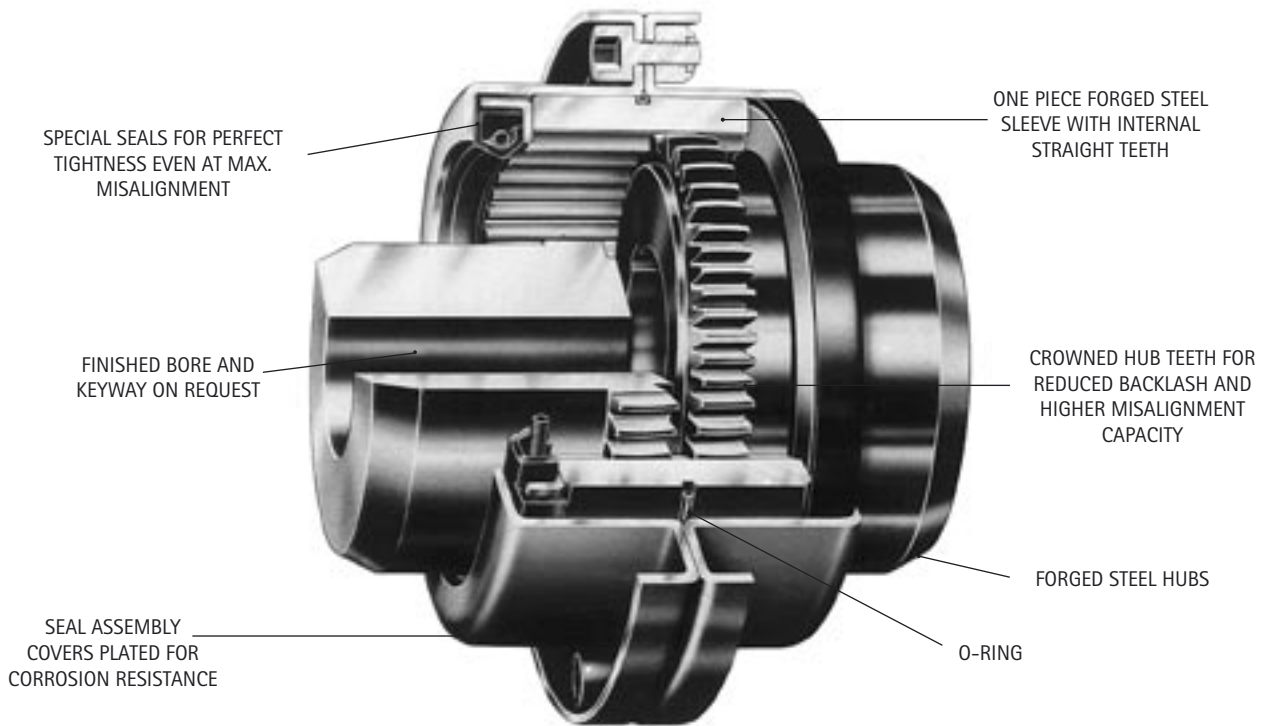
# NST





# SERIES N

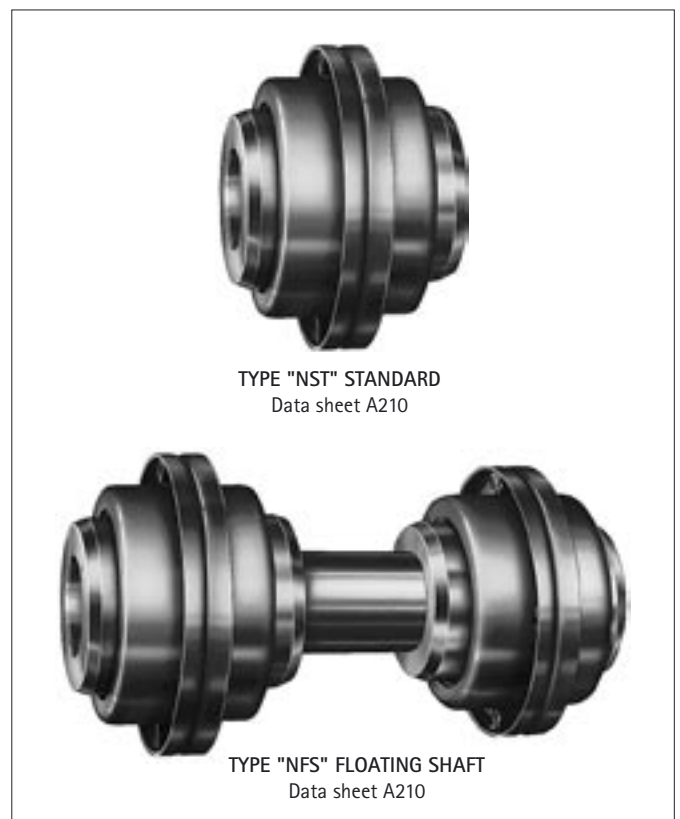
Maximum torque: up to 2 000 Nm – Bores: up to 65 mm

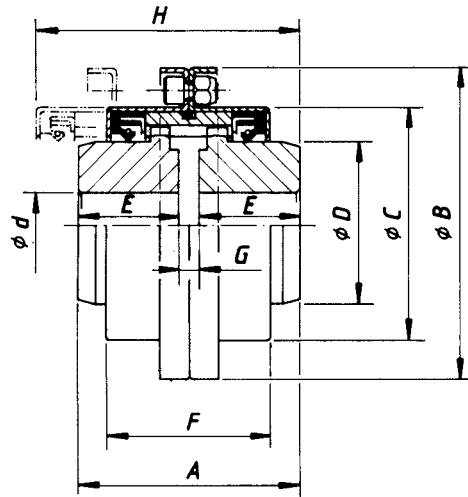


## FEATURES

The ESCOGEAR couplings of the series N distinguish themselves by:

- maximum bores defined in function of standardized shaft diameters according to ISO and IEC.
- reduced outside dimensions and weights from which result very small axial load and thrust on the connected shafts.
- a sufficiently balanced coupling for the maximum indicated speeds, all the components being machined.
- easy installation - no special tooling is required.
- an absolute reliability and minimum maintenance.
- a perfect homocinetic torque transmission.

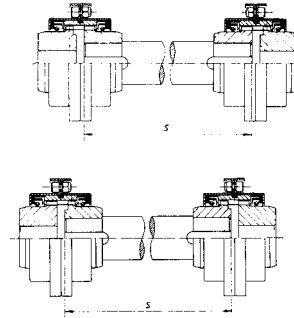
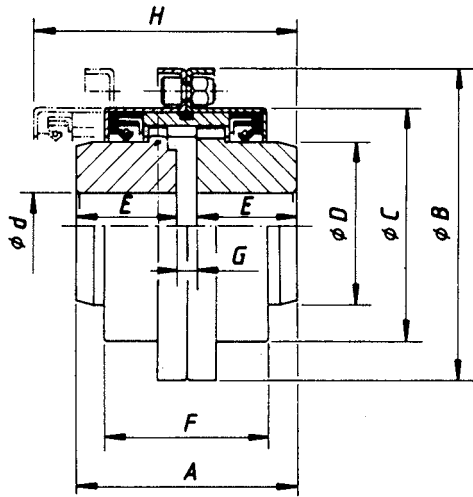




∠ max. 1,5°

←A150			Type NST			
			25	38	45	65
 Ø max. d Ø min.	1	mm	25	38	45	65
		mm	0	0	0	26
 1m Tn Tp	2	Nm	200	450	800	2000
			400	900	1600	4000
 /min.max.		tr/min omw/min rpm min <sup>-1</sup>	6300	4800	4100	3000
 α	–	degré graad degree grad	2x0,75	2x0,75	2x0,75	2x0,75
	–	mm	0,1	0,11	0,13	0,15
 J (WR <sup>2</sup> )	4	kgm <sup>2</sup>	0,0004	0,0013	0,0026	0,0102
	5	kg	0,85	1,81	2,97	7,23
 Grease	6	dm <sup>3</sup>	0,01	0,02	0,03	0,05
mm: ±	A	mm	58	75	95	135
	B	mm	76,5	94	109	134,5
	C	mm	57,5	74,5	86	111,5
	D	mm	40	54	64	89
	E	mm	27	35	45	65
	F	mm	42	48	55	63
	G	mm	4	5	5	5
	H	10	mm	70	85	105

NFS 25 ⇨ 65



max. 0,75°

←A150			Type NFS			
			25	38	45	65
$\phi$ max. $\phi$ min.	1	mm	25	38	45	65
		mm	0	0	0	26
1m Nm	2	Tn	200	450	800	2000
		Tp	400	900	1600	4000
/min,max.	3.3	tr/min omw/min rpm min <sup>-1</sup>				
$\alpha$	—	degré graad degree grad	0,75	0,75	0,75	0,75
J (WR <sup>2</sup> )	4	kgm <sup>2</sup>	0,0004	0,0013	0,0026	0,0102
	5	kg	0,85	1,81	2,97	7,23
Grease	6	dm <sup>3</sup>	0,01	0,02	0,03	0,05
mm: ±	A	mm	58	75	95	135
	B	mm	76,5	94	109	134,5
	C	mm	57,5	74,5	86	111,5
	D	mm	40	54	64	89
	E	mm	27	35	45	65
	F	mm	42	48	55	63
	G	mm	4	5	5	5
(min)	H	10 mm	70	85	105	135
	S	8 mm	60	70	90	130

# HOW TO SELECT THE RIGHT COUPLING SIZE

A. Select the size of ESCOGEAR coupling that will accommodate the largest shaft diameter.

B. Make sure this coupling has the required torque capacity according to following formula:  $\text{torque in Nm} = \frac{9550 \times P \times F_u \times F_{\epsilon_x}}{n}$

P = power in kW; n = speed in rpm;  $F_u$  = service factor according to tabulation 1.

$F_{\epsilon_x} = 2$  in case of use in potentially explosive atmospheres  $\epsilon_x$ , European Directive 94/9/EC. In normal atmospheres,  $F_{\epsilon_x} = 1$ .

The coupling selected per (A) must have an equal or greater torque capacity than the result of the formula (B). If not select a larger size coupling. Check if application peak torque does not exceed tabulated peak torque  $T_p$  indicated planographs A210 and A211.

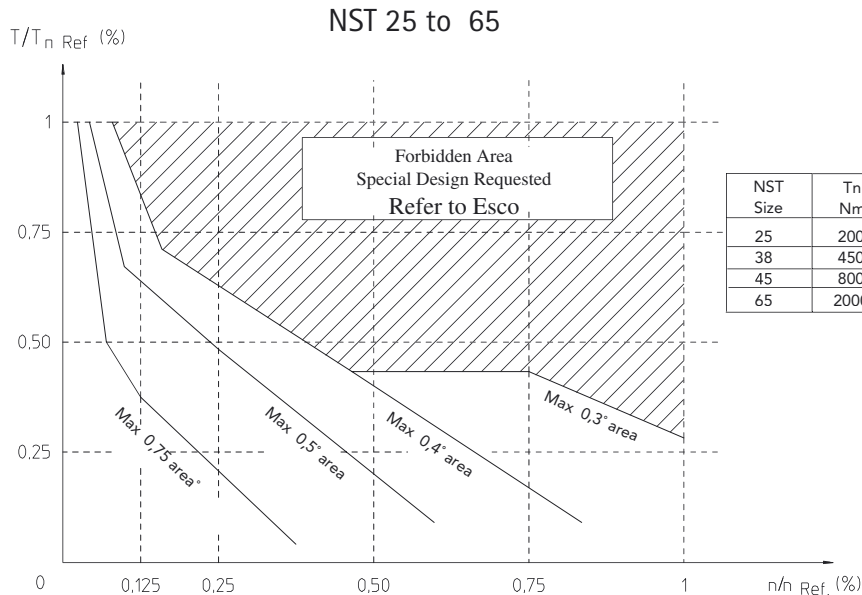
Check also max. allowable misalignment using the graph of tabulation 2.

C. Check if shaft/hub connection will transmit the torque. If necessary, select a longer hub.

D. Read carefully assembly and maintenance instructions IM.

TABULATION 1		APPLICATIONS	DRIVER MACHINE		
			Electric motors Turbines	Hydraulic motors Gears drivers	Reciprocating engine Electric motors frequent starts
DRIVEN MACHINE	UNIFORM	Generators - Blowers: centrifugal vane, fans - Centrifugal pumps and compressors - Machine tools: auxiliary drives - Conveyors: belt and chain, uniformly loaded, escalators - Can filling machines and bottling machinery - Agitators: pure liquids.	0,8 to 1,25	1 to 1,5	1,25 to 1,75
		Propeller - Waterjet pumps	1,25	1,5	1,75
	MODERATE SHOCKS	Blowers: lobe - Pumps: gear and lobe types - Vane compressors - Machine tools: main drives - Conveyors: belt and chain not uniformly fed bucket and screw - Elevators, cranes, tackles and winches - Wire winding machines, reels, winders (paper industry) - Agitators liquids and solids, liquids variable density.	1,25 to 1,5	1,5 to 1,75	1,75 to 2
	HEAVY SHOCKS	Generators (welding) - Reciprocating pumps and compressors - Laundry washers - Bending roll, punch press, tapping machines - Barkers, calanders, paper presses - Briquetter machines, cement furnace - Crushers: ore and stone, hammer mill, rubber mill - Metal mills: forming machines, table conveyors - Draw Bench, wire drawing and flattening machines - Road & railroad equipment.	1,5 to 2	1,75 to 2,25	2 to 2,5

TABULATION 2




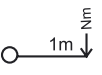


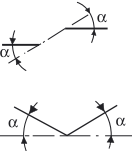





HOW TO USE THE GRAPH ?

Maximum torque, maximum speed and maximum misalignment may not occur simultaneously.

Graph must be used as follows:

1. Calculate  $T_n$  and  $T_p$  and select coupling size as usual.  $T_n$  = nominal torque;  $T_p$  = peak torque
2. Calculate  $T_n/T_n\text{Ref}$  and  $n/n\text{Ref}$  and plot the resulting point in the graph.
3. If the resulting point is located in the white area, a standard coupling may be used as far as maximum misalignment doesn't exceed the maximum misalignment indicated in the graph.
4. If the resulting point is located in the shaded area, refer to ESCO
5. In case of use in potentially explosive atmospheres  $\epsilon_x$ , proceed the same way but using  $T_n\text{Ref}(\epsilon_x)$  for the calculation. Max misalignment may not exceed 0,5° per gear mesh.

LEGEND OF USED PICTOGRAMS		Notes for series N
	d Ø nominal max.	MAXIMUM NOMINAL BORE (mm)
	d Ø min.	MINIMUM BORE (mm)
	d Ø max.	MAXIMUM BORE (mm)
	Tn	MAXIMUM NOMINAL TORQUE (Nm)
	Tp	MAXIMUM PEAK TORQUE (Nm)
	/min.max.	MAXIMUM SPEED (rpm)
		MAXIMUM OFFSET (mm)
		MAXIMUM ANGULAR MISALIGNMENT (degree)
	J (WR <sup>2</sup> )	INERTIA (kgm <sup>2</sup> )
		WEIGHT (kg)
	Grease	GREASE QUANTITY (dm <sup>3</sup> )

- 1 For key according to ISO R 773.
- 2 Gear maximum continuous transmissible torque for the tabulated misalignment. The effective transmissible torque depends on the bore and shaft/hub connection.
- 3 Higher speed on special request.
- 3.1 For grease withstanding centrifugal acceleration of 1.000g. See installation and maintenance manual IM.
- 3.2 For grease withstanding centrifugal acceleration of 2.000g. See installation and maintenance manual IM.
- 3.3 Depends on S.
- 3.4 For long operation in disconnected position contact us.
- 4 For solid bore.
- 4.1 Depends on S.
- 4.2 For solid bore and S minimum.
- 4.3 Per 100 mm spacer length.
- 4.4 Depends on L and R.
- 5 For pilot bored hubs.
- 5.1 Depends on S.
- 5.2 For pilot bored hubs and S minimum.
- 5.3 Per 100 mm spacer length.
- 5.4 Depends on L and R.
- 6 See installation and maintenance manual IM.
- 6.1 Depends on S. Values given for S maximum.
- 7 On request. For larger S contact us.
- 8 Values for S minimum. S maximum depends on torque and speed.
- 9 G must remain constant during operation.
- 10 Needed to control the alignment and inspect the gears.

\* Max. torque, speed and misalignment tabulated values may not be cumulated. See IM/A200.



# Attachment : Specific Protective Measures Taken for ESCOGEAR Couplings in case of use in explosive atmospheres.

## 0 Introduction - English

General assembly and maintenance instructions (called IM in this attachment), are established for standard ESCOGEAR couplings according to the following list:


IM/A200 for ESCOGEAR NST couplings - IM/A300 for ESCOGEAR CST couplings

IM/B300 for ESCOGEAR CST-M couplings - IM/B400 for ESCOGEAR FST couplings

In case of use in potentially explosive atmospheres, further to the general assembly and maintenance instructions (IM/...), the specific measures described in this attachment must be taken.

## 1 Coupling Selection

The coupling must be selected according to the general assembly and maintenance instructions IM/...

In explosive atmosphere , the following specific rules must apply:

- A Service Factor of 2 must be applied on the max torque values given in the charts in catalogue (see Selection chart A 150).
- A Service Factor of 2 must be applied on the reference torque values given on the selection chart A150 for the calculation of max misalignment in operation.
- Max misalignment (combination of angular and offset) may not exceed 0.5° per gear mesh.

## 2. Use of the coupling

The coupling is dedicated for use in potentially explosive atmospheres according to European Directive 94/9/EC (Atex 100A). Coupling is classified in equipment group II, equipment category 2 and 3, intended for use in areas in which explosive atmospheres caused by gases, vapours, mists of air/dust mixtures are likely to occur. In function of the ambient temperature in the coupling proximity (65, 55, 40°C), the temperature classes have been defined (T4, T5, T6). This is based on a temperature increase of the machine shafts (in regard of the ambient temperature) that will not exceed 40°C in operation.

The coupling is marked as follows: CE  II 2 G T4/T5/T6 D 105°C -20°C ≤ Ta ≤ 65°C / 55°C / 40°C

This marking covers the T3 temperature category.

This marking covers all gas categories: G IIA, G IIB and G IIC

## 3. Warnings

The warnings mentioned in the general assembly and maintenance instructions IM/... must apply in any case.

In explosive atmosphere, the following specific warnings must apply:

- Complete machining of the coupling parts (bores, keyways, spacers, floating shafts etc...) must be performed by ESCO Couplings N.V. No modification shall be made on the supplied and marked product without the agreement of ESCO Couplings N.V.
- In case of supply by ESCO Couplings of couplings with a rough bore or a solid bore, the sole allowed operation that may be performed by the customer is the boring and keywaying of the coupling hubs. When machining the bore and the keyway, the following instructions must be followed:
  - This job must be performed by an authorised and adequately trained and informed operator.
  - The bore and keyway tolerances must be selected to insure the proper fit between shaft and bore. In case of loose fit, a set screw must be foreseen to locate the hub axially.
  - The max bore may not exceed the value stated in the catalogue. The tabulated values in the catalogue are based on key dimensions according to ISO R 773.
  - The reference used to centre the piece when boring, is the one referenced D in the figures of the catalogue.
- Before proceeding with any assembly, operation or maintenance operation on the coupling, make sure that the necessary measures have been taken to ensure safety, such as but not limited to:
  - Proper ventilation of the area
  - Proper lightening and electrical tools.
- If hub must be heated for assembly on the shaft, make sure heating source and surface temperature will not affect the safety of the working area.
- It is recommended to have a strong coupling guard, preferably in stainless steel with openings (if any) smaller than the smallest centrifugable part (plug is 6 mm dia). The coupling guard is intended to protect the environment from the centrifugation of any rotating part and the rotating coupling from any falling part. To limit ventilation effects, distance between cover and coupling outside surface should be at least 10 mm.

## 4. Assembly

The general assembly and maintenance instructions IM/... must apply in any case.

In explosive atmosphere, the following specific instructions must apply:

- Alignment of the machine in cold condition must take into account the possible heat expansion to make sure that in continuous running conditions, max misalignment calculated in point 1 will not be exceeded.
- Max misalignment may never exceed 0.5° per gear mesh.
- To improve the coefficient of friction and the leakage resistance, use following lubricants dedicated for gear couplings:
  - TEXACO Coupling Grease
  - CALTEX Coupling Grease
  - KLÜBER Klüberplex GE 11-680
  - SHELL Albida GC1

## 5. Operation


The general assembly and maintenance instructions IM/... must apply in any case.

In explosive atmosphere, the following specific instructions must apply:

- Before Start-up
  - Make sure coupling is perfectly aligned and clean.
  - Make sure, screws, nuts and plugs are properly tightened.
  - Coupling guard must be properly installed and fixed.
  - Monitoring system, if any, must be tested to verify its effectiveness.
- During start up
  - Check for any leakage. In case of abnormal leakage, immediate stop is recommended.
  - Check for any abnormal noise and/or vibration. If any, immediate stop is recommended.
- Checking intervals during operation
  - After the first 2000 hours or 6 months: check
    - for leakage, noise, vibration and loss of parts.
    - for free axial movement of the sleeves in regard of the hubs.
  - After 4000 hours or one year
    - for leakage, noise, vibration and loss of parts.
    - for free axial movement of the sleeves in regard of the hubs.
- Continuous checking
  - Immediately stop the machine if noise, vibrations or other abnormal phenomena are detected during operation.
  - Further more, if direct check is not possible for access or safety reasons, proper monitoring system has to be installed to follow up couplings behaviour

## 6. Maintenance

The general assembly and maintenance instructions IM/... must apply in any case.

In explosive atmosphere , the following specific instructions must apply:

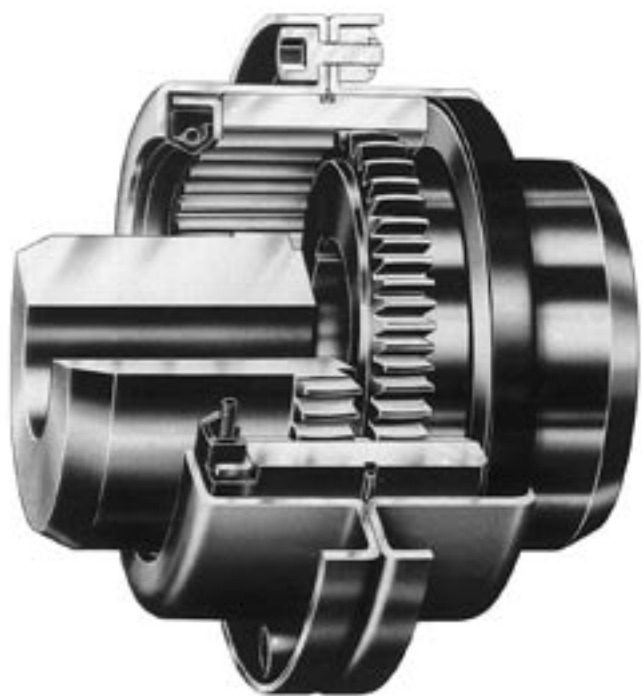
- Every 6.000 hours or 1.5 year:
  - Dismount the coupling and inspect.
  - Proceed as indicated in point 4.



# SERIE N

## TABLE OF CONTENTS

1. Introduction
2. Preparation
3. Warnings
4. Assembly
5. Inspection and maintenance



INSTALLATION & MAINTENANCE



## 1. INTRODUCTION

Coupling must be selected properly according to selection chart A 150 and corresponding charts. These documents are available in coupling catalogue ESCOGEAR NST or on our web site « [www.escocoupling.com](http://www.escocoupling.com) ». Maximum misalignment figures at assembly are given in this document (see point 4: assembly). Max misalignment figures in operation are given in ESCOGEAR NST catalogue. Max misalignment, max speed and max torque may not be applied simultaneously as mentioned in selection chart A 150. In case of any change or adaptation not performed by ESCO on the coupling, it is customer responsibility to size and manufacture it properly to guarantee safe torque transmission and absence of unbalance that could affect the life of the coupling and the connected machines. It is customer responsibility to make sure that shaft and key material, size and tolerance suit the application. Maximum bore capacity is given in the catalogue. If key assembly is not calculated and machined by ESCO, it is customer responsibility to make sure that hub length, bore size and machining tolerances will transmit the torque. If interference fit is not calculated and machined by ESCO, it is customer responsibility to make sure that interference and machining tolerances will transmit the torque and not exceed hub material permissible stress. The hubs must be axially secured on the shaft by means of a setscrew, an end plate or a sufficient interference. In case of spacer or floating shaft not supplied by ESCO, it is customer responsibility to size and manufacture it properly to guarantee safe torque transmission and absence of unbalance that could affect the life of the gearing. It is customer responsibility to protect the coupling by p.ex. a coupling guard and to comply with the local safety rules regarding the protection of rotating parts.

## 2. PREPARATION

Ensure the conformity of the supplied equipment:

--- Verify coupling size and conformity (see catalogue or web site).

--- Identify any damaged and/or missing parts.

--- Verify conformity of the coupling/machine interfaces.

Coupling original protection allows for storage indoors dry 18 months, indoors humid 12 months, outdoors covered: 9 months and outdoors open: 3 months. For longer periods, it is customer responsibility to protect the parts properly. Instructions are a part of the supply of the coupling. Be sure valid and complete assembly, operation and maintenance instructions are available. Make sure they are well understood. In case of doubt, refer to ESCO. Assembly, disassembly and maintenance must be performed by qualified, trained and competent fitters. Before starting with assembly, disassembly and maintenance, verify the availability of the tooling necessary

--- To manipulate the parts    --- To assemble the interfaces    --- To align the coupling    --- To tighten the screws and nuts.

## 3. WARNINGS

Before removing the coupling guard and proceeding with any assembly, operation or maintenance operation of the coupling, make sure the complete system is completely shut down and definitively disengaged from any possible source of rotation, such as, for example:

--- Electrical power supply.    --- Any loss of braking effect.

Make sure everyone attending the equipment area will be properly informed (for example by means of warnings properly located) about the maintenance or assembly situation.

In case of use in explosive atmospheres  $\text{Ex}$ , specific protective measures must be considered. They are described in an extra attachment (IM/A200-Ex) to the actual instructions with the couplings marked  $\text{Ex}$ .

## 4. ASSEMBLY

4.1 Ensure all parts are clean.

4.2 Apply a light coat of grease to the seals B already mounted in covers A and to O-Ring H and slide the O-Ring H over sleeve F.

4.3 Place covers A with their seals B over shaft ends. Care should be taken not to damage seals B.

4.4 Install hubs C on their respective shafts. If needed, for keyway assembly, uniformly heat hubs C (max 120°C) to install them easily on the shaft, in this case, avoid any contact between the hub C and seal B. Hub faces have to be flush with shaft end. In case of doubt, please consult us. Introduce setscrew on key with Loctite and tighten properly. In case of interference fit, refer to ESCO for proper instructions. For the assembly of the type NFS, see fig. 1 or 2.

4.5 Engage sleeve F on the longest shaft end.

4.6 Install units to be connected in place and check with a gauge of thickness D if the spacing G between the two machines is the same as mentioned in tabulation 1 or in the approved drawing. In case of doubt, please consult us.

4.7 Align the two shafts, check alignment using an indicator. Alignment precision depends on running speed (see tabulation 2).

4.8 Coat hub and sleeve gearings with grease and fill up completely with grease space K between hubs. For quantity and quality of grease, see tabulation 3.

4.9 Engage sleeve F with its O-Ring H over the hubs. Slide covers A with their seals B over sleeve F. Bolt covers A together. See tabulation 1 for tightening torque T and key size s.

## 5. INSPECTION and MAINTENANCE

5.1 Inspection

Regular inspection (audio-visual) must occur for leakage, noise, vibration and loss of parts.

5.2 Maintenance

5.2.1 Every 4.000 hours or every year

--- Remove bolts from covers A    --- Slide covers A and sleeve F from the hubs C

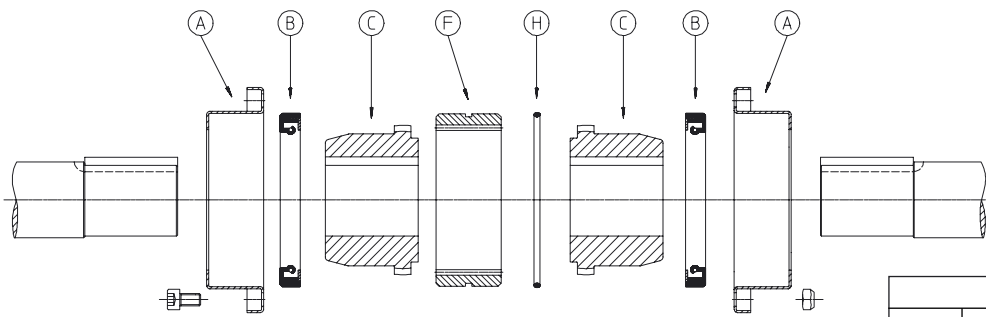
--- Completely refill up with grease gear teeth and space K between hubs: Proceed as mentioned under 4.9.

--- Reassemble sleeve F and covers A.

5.2.2 Every 8.000 hours or every 2 years.

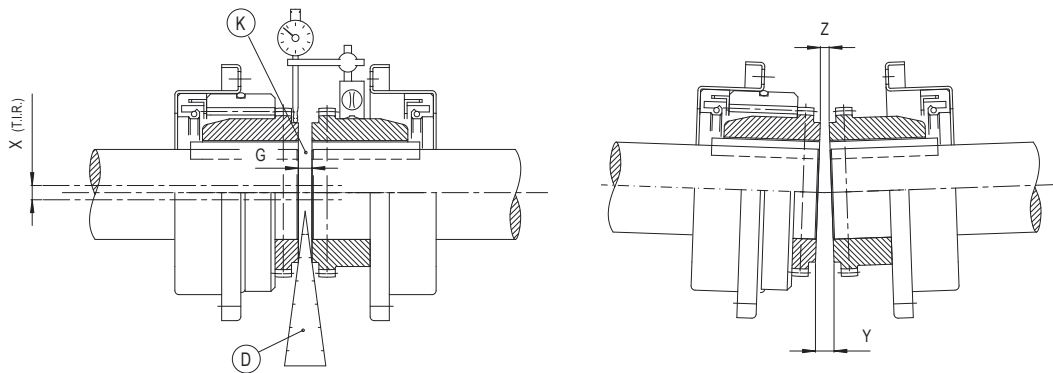
--- Remove bolts from covers A.    --- Control gearing and sealing.

--- Control alignment. See Point 4.6.    --- Reassemble coupling as per Point 4.



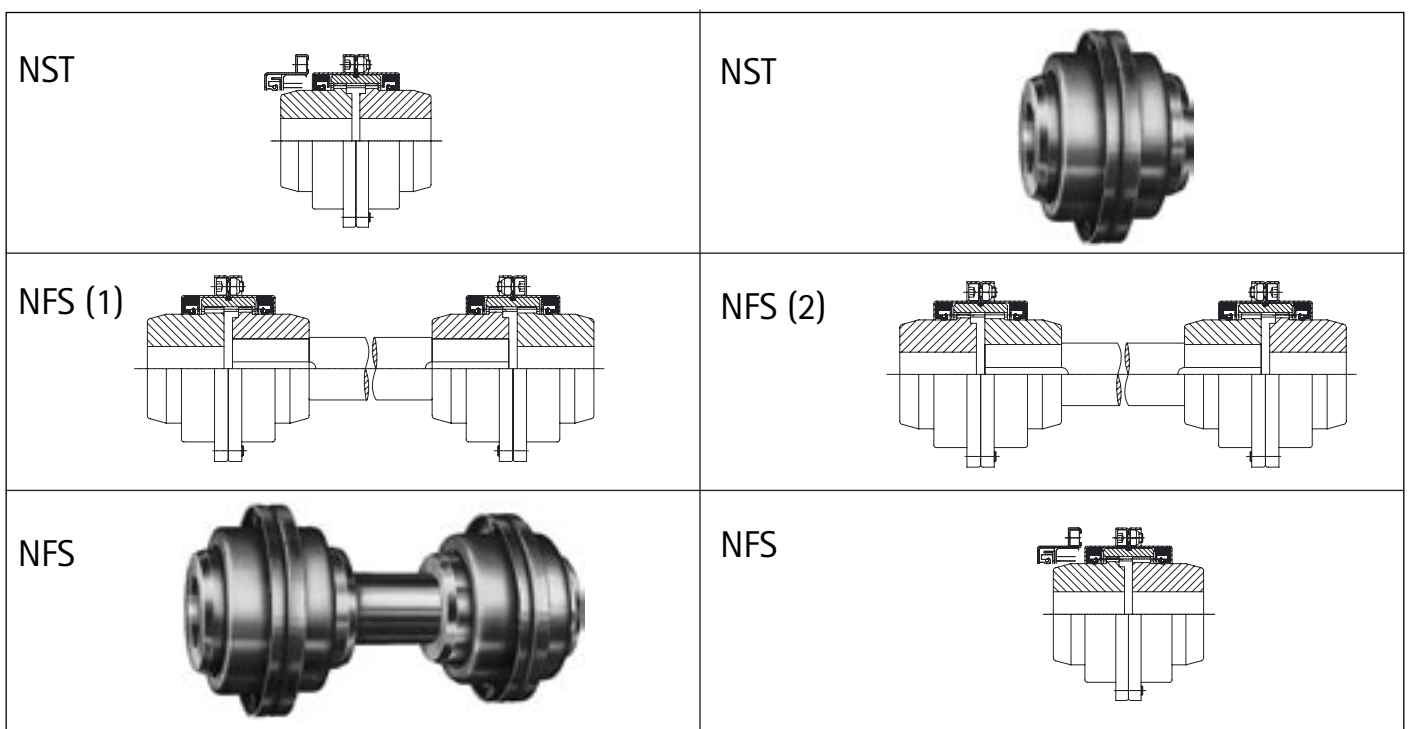
TABULATION 1				
Size	G	T	Hexagonal socket head screw	
	mm	Nm	M	s
25	4	8	5	4
38	5	8	5	4
45	5	13	6	5
65	5	13	6	5

TABULATION 2 - SPEED rpm										
NST Size	N=250		N=500		N=1000		N=2000		N=4000	
	X	Y-Z	X	Y-Z	Y-Z	X	Y-Z	X	Y-Z	
25 to 65	0,100	0,25	0,075	0,20	0,15	0,040	0,15	0,025	0,15	



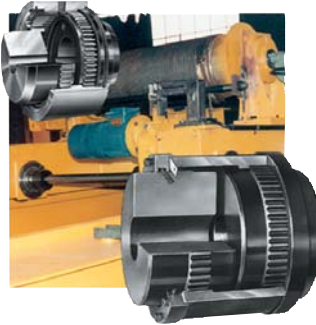
TABULATION 3 - RECOMMENDED LUBRICANTS AND QUANTITY

NORMAL SPEED AND DUTY		HEAVY DUTY AND ATEX		Type	NST dm <sup>3</sup>	NFS dm <sup>3</sup>
Molykote	Molykote BR 2	Caltex	Coupling Grease	25	0,01	2 x 0,01
Molyduval	Molyduval "S"	Klüber	Klüberplex GE 11-680	38	0,02	2 x 0,02
Molub-Alloy	Molub-Alloy HD 777	Mobil	Mobilgrease XTC	45	0,03	2 x 0,03
Caltex	Coupling Grease	Shell	Albida GC1	65	0,05	2 x 0,05
Klüber	Structovis P00	Klüberplex GE 11-680	Texaco	Coupling Grease		
Mobil	Mobilgrease XTC					
Shell	Albida GC1					
Texaco	Coupling Grease					



# Other coupling types available

Escogear CST / CST...M



Escogear FST



Escodisc DLC / DMU / DPU



Escogear NST



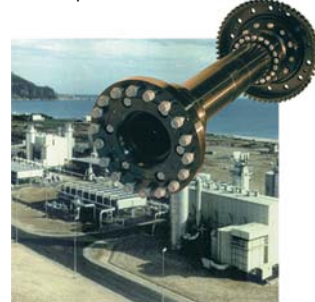
Escoflex A-R-S-T  
Esconyl A-B-C



Escorail FTRN / FTRNO



Escospeed DHSU - GHS



## Esco Couplings N.V.

Kouterveld - Culliganlaan, 3  
B - 1831 Diegem (Brussels)  
(tel) + 32 02 715 65 60  
(fax) + 32 02 720 83 62 - 02 721 28 27  
e-mail: [info@esco-couplings.be](mailto:info@esco-couplings.be)  
web site: [www.escocoupling.com](http://www.escocoupling.com)

## Esco Aandrijvingen B.V.

Ondernemingsweg, 19 - P.B. 349  
NL - 2404 HM Alphen A/D Rijn  
(tel) + 31 (0) 172 / 42 33 33  
(fax) + 31 (0) 172 / 42 33 42  
e-mail: [info@esco-aandrijvingen.nl](mailto:info@esco-aandrijvingen.nl)  
web site: [www.esco-aandrijvingen.nl](http://www.esco-aandrijvingen.nl)

## Eugen Schmidt und Co Getriebe und Antriebs Elemente GmbH

Biberweg 10  
D - 53842 Troisdorf  
(tel) + 49 (02241) 48070  
(fax) + 49 (02241) 480710  
e-mail: [esco-antriebstechnik@t-online.de](mailto:esco-antriebstechnik@t-online.de)  
web site: [www.esco-antriebstechnik.de](http://www.esco-antriebstechnik.de)

## Esco Transmissions S.A

Z.I. 34, rue Ferme Saint-Ladre  
Saint Witz  
F - 95471 Fosses Cedex  
(tel) + 33 (1) 34 31 95 95  
(fax) + 33 (1) 34 31 95 99  
e-mail: [info@esco-transmissions.fr](mailto:info@esco-transmissions.fr)  
web site: [www.esco-transmissions.fr](http://www.esco-transmissions.fr)

## Esco Couplings & Transmissions Pvt. Ltd.

Shed No. B-325, 1st Stage, 3rd Main Road  
Peenya Industrial Estate  
Bangalore 560 058 INDIA  
(tel) + 91 80 4167 4858  
(fax) + 91 80 4155 8494  
e-mail: [info@esco-couplings.co.in](mailto:info@esco-couplings.co.in)