

# M88 Pipe Shaver

for Taper/Taper, Quick-Lock® and Mechanical Pipe Joints in sizes 26 to 40 inch (650 - 1000 mm)

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## Introduction

Bondstrand® M88 Pipe Shaver is designed to prepare a tapered or straight spigot on the cut end of a Bondstrand pipe in the size range 26 inch (650 mm) to 40 inch (1000 mm) to fit a Bondstrand fitting with a matching tapered socket or Quick-Lock socket, as well as preparing ends for mechanical coupling e.g. Helden; Straub; Viking Johnson™; etc.

The shaver is centered and fixed on the end of the pipe by an expanding arbor set. Arbor set is available for each pipe size. The arbor slips into the pipe and expands to grip the inside of the pipe when the tensioning bolts (8 pieces) are tightened. As the frame is rotated around the stationary center shaft, the cutting tool advances automatically. The shaver is normally driven by a portable power-drive. A key in the portable power-drive engages in a matching slot on the power-drive seat to rotate the shaver.

Each M88 Pipe Shaver is supplied together with one long 10 mm Hexagon spanner and a Torx™ key for the cutting tool. The shaver is driven by a portable power-drive type Ridgid® 700. This power-drive as well as the necessary arbors are not included and have to be ordered separately. Two 24 mm spanners are required to tighten the clamping bolts (8 pieces). A pipe vice or suitable pipe clamp support is required to hold down the pipe when shaving with the shaver in motion or structural jig to hold down the main frame of the shaver when shaving with the pipe in motion.

**Note: The use of this shaving tool is restricted to Bondstrand pipe material.**



M88 Pipe Shaver

## EG-STATEMENT OF AGREEMENT

According to machinery directive 98/37/EG, appendix II, under a, this shaver

- \* complies with machinery directive 98/37/EG;
- \* complies with the following harmonised European Standards: NEN-EN 1050, NEN-EN 292-1 and NEN-EN 292-2.



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## Safety precautions

### Personal Protection and Safety

The following personal protection gear must be used when cutting, shaving, sanding and grinding Glassfiber Reinforced Epoxy (GRE) material:

- Safety shoes or boots.
- Work gloves (fiberglass material can be very sharp and may cause cuts or splinters).
- Proper fitting and buttoned up protective clothing must be worn when operating the shaver.
- A hard hat to be worn if the situation requires so.
- A hair net or tie-up hair when cutting, shaving and sanding.
- An appropriate dust mask is to be used when cutting, shaving, grinding and sanding.

### Operational Safety

For safe operation of the shaving tool, the following rules must be followed.

- Pipe-shaver assembly must be at ergonomic height to be able to work in the proper posture.
- Only use the shaving tool on a solid and leveled surface or floor.
- Ample rest should be taken to avoid excess physical or mental stress.
- Only authorized persons are to be allowed in the shaving area.
- Shaving area must be clearly marked as such.
- Shaving tool shall only be used to prepare spigots on Bondstrand pipe material.
- Pipe shaver shall be kept in good working order to guarantee proper and safe operation. Defective parts must be replaced or repaired by qualified personnel only.

Note: The noise level of the shaver and power drive is less than 80dB.

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## Operating instructions

The following procedure should be carefully followed to ensure satisfactory operation of the shaver and to give a correct spigot.

### **Adjusting the M88 Pipe Shaver**

Select the correct dimensions and spigot angle for the pipe diameter and series being used. Refer to tables 1 and 2 for shave dimensions of 'Taper' and 'Quick-lock' ends. For dimensions of mechanical couplings, consult supplier.

#### 1. Set the taper angle

For setting the taper angle, loosen the two locking bolts shown in photo 1. Pull the cutting head towards the center shaft so that the angle setter (slotted disk) is free to rotate and turn. The slot for the appropriate angle fixes over the stud on the frame (slots have the 8 different angles marked).

After setting the required angle, re-tighten the two locking bolts. For shaving of straight spigot, set the angle setter to '0' marking.



Photo 1

#### 2. Adjust the cutting head

Select the correct dimensions for the pipe diameter and series being used. Loosen the 4 stub bolts that hold the cutting head to the main frame as in photo 2. This allows the cutting head to be moved towards the pipe. Re-tighten the 4 bolts.



Photo 2

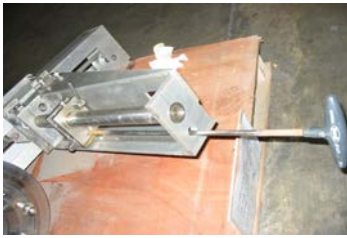


Photo 3

### 3. Retract the cutting tool

Loosen the tool holder clamping bolt as shown in photo 3.

The bolt should be left tight enough for the cutting tool to be moved reasonably easy but not so loose that it can move by itself.



Photo 4

Retract the cutting tool backward by turning the adjusting bolt counterclockwise as in photo 4.

### **!** CAUTION

**Due to the weight and bulk of the M88 shaver, a cut of maximum 1 mm depth must be strictly enforced. One full clockwise turn of the adjusting bolt will give a cut depth of 1 mm, this will reduce the diameter by 2 mm (photo 4).**



Photo 5

To allow the cutting head to move freely, the drive should be disengaged i.e., the lever in the photo 5 should be set pointing towards the main frame of the shaver and the sliding pin back towards the main frame.

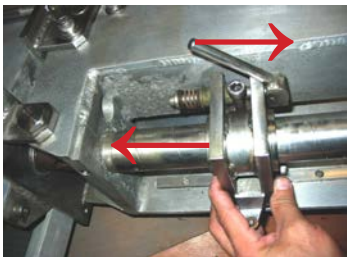


Photo 6

The tool holder can then be moved as close as possible to the main frame as in photo 6. Set the cutting head so that the cutting tool is just free of the pipe. The clamping bolt is then re-tightened as shown in photo 3.

### 4. Engage the cutting tool feed

The feed is engaged by moving the lever away from the main frame. The feed block may not engage the thread immediately, but will engage automatically as soon as turning commences. The first cut can then be made.



Photo 7

### **The arbor set**

The arbor sets come in each different size from 26 to 40 inch.

The 8 threaded holes part of the arbor will be bolted up tightly to the M88 pipe shaver as in photo 8A.

For site shaving, due to the combined weight of both the arbor and shaver, it will be appropriate to install and tighten the arbor first into the pipe before tightening the shaver onto the arbor.

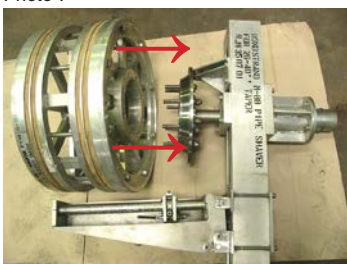


Photo 8A

To tighten the arbor set onto the inside of the pipe, simply use M24 spanner to tighten the 8 pieces of bolts located on the outer end of the arbor.

As the 8 bolts tighten, the 4 rubber seals will expand and hold the pipe shaver into position, thus enabling shaving of the pipe.

For shaving at pre-fabrication shop, the installed M88 pipe shaver along with its arbor can be held down at the main frame.



Photo 8B

The pipe end can then be shaved as the pipe sits and is supported on Y stands.

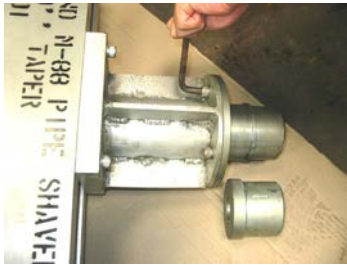


Photo 9

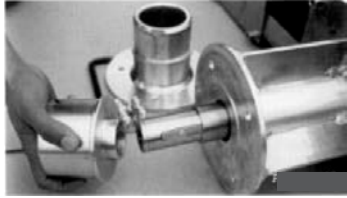


Photo 10

### **Holding down the shaver or shaving at site**

With reference to photos 9 & 10, the power drive adapter can be engaged so the pipe or the shaver unit rotates.

#### Holding down shaver - pipe turning

The power drive adapter is removed from the main frame by undoing the four bolts as shown in photo 9. A different (supplied loose) adaptor is then fitted to the main shaft of the shaver as in photo 10. The power drive can then be fitted to this new adaptor to rotate the pipe as it shaves. This method of shaving is also used for shaving of short pipe and nipple.

#### Shaving with M88 unit rotating

The M88 pipe shaver unit is supplied with an adaptor bolted to the main frame – this engagement rotates the shaver unit as it shaves.



The M88 pipe shaver is designed as a maintenance-free unit. The following measures should be followed:

1. Clean the shaver on a regular basis, paying special attention to the feed screw and it's associated components. Lubricate the threads of the cutting tool feed with WD-40™ for smooth operation;
2. Keep and store the shaver in box in a dry place to prevent oxidation built up on its parts.

Check the cutter insert regularly; a dull cutting edge places unnecessary strain on the automatic feed components. The cutting insert can be loosened with the 2 mm Torx™ key provided. Turning the insert will expose a new sharp edge. This can be done until the insert becomes dull. Replacement cutter insert is available from NOV Fiber Glass Systems.

### **! CAUTION**

**The M88 pipe shaver is a bulky machine and it is very important to restrict depth of each cut to a maximum of 1 mm/cut. 1 clock-wise turn affecting a 1 mm depth of cut, reduce the diameter of the spigot by 2 mm.**

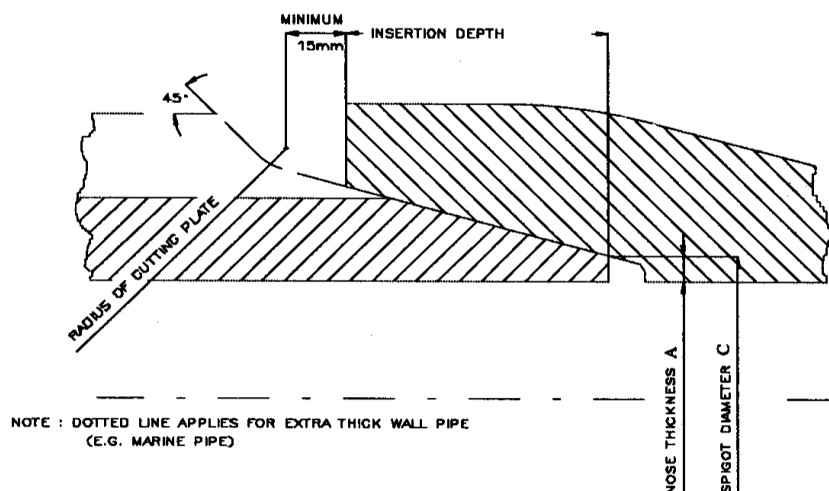
## IV Shaving/ Joint dimensions

TABLE 1a : Shaving dimensions for Bondstrand Series 2400 with Taper/Taper adhesive-bonded joints.

Nom. Pipe Size	Taper Angle	Nose thickn.	Spigot Dia. at Nose	Nose thickn.	Spigot Dia. at Nose	Nose thickn.	Spigot Dia. at Nose
		A	C	A	C	A	C
mm	degr.	30 bar		12 bar		14 bar	
650	1.75	4	658	4	658	4	658
700	1.75	4	708	4	708	4	708
750	1.75	4	758	4	758	4	758
800	1.75	4	808	4	808	5.5	811
900	1.75	4	908	4	908	6	912
1000	1.75	4.5	1009	4.5	1009	6.5	1013
mm	degr.	16 bar		20 bar		25 bar	
650	1.75	5	660	5	660	7	664
700	1.75	5.5	711	5.5	711	7	714
750	1.75	6	762	6	762	8	766
800	1.75	5.5	811	6.5	813	8.5	817
900	1.75	6	912	7.5	915	-	-
1000	1.75	8	1016	-	-	-	-

TABLE 1b : Shaving dimensions for Bondstrand Series 2000M/7000M with Taper/Taper adhesive-bonded joints

Nom. Pipe Size	Taper Angle	Nose Thickn.	Nom. Insert Depth	Spigot Dia. at Nose
		A	B	C
mm	degr.	mm	mm	mm
650	2.5	5.8	178	661.6
700	1.75	6.4	178	712.9
750	1.75	4.2	178	758.4
800	1.75	8.9	178	817.8
900	1.75	5.6	203	911.3
1000	1.75	10.5	320	1021.5



#### IV Shaving/ joint dimensions ctned.

TABLE 2 : For Quick-Lock spigots

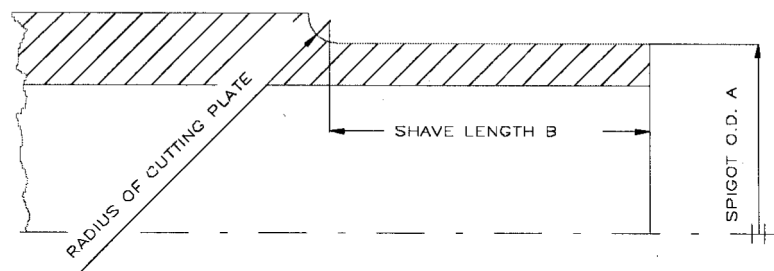
Nominal Pipe Size			Pipe ID	Quick-Lock Spigot OD	Tol.	Shaved Length
(mm)	(inch)	type		A		B
650	26	MCI	650	682.85	± 0.25	143 ± 3
700	28	MCI	700	736.05	± 0.25	156 ± 3
750	30	MCI	750	788.15	± 0.25	167 ± 3
800	32	MCI	800	840.25	± 0.25	181 ± 3
850	36	MCI	900	943.15	± 0.25	167 ± 3
1000	40	MCI	1000	1051.15	± 0.25	233 ± 3

TABLE 3 : For Mechanical coupling

Nominal Pipe Size			Spigot OD	HELDEN 129	
(mm)	(inch)	type	A	Tolerance on spigot diameter	Shaved Length B
650	26	MCI	686	+1.5 / -0.8	250
700	28	MCI	738	+1.5 / -0.8	250
750	30	MCI	790	+1.5 / -0.8	250
800	32	MCI	842	+1.5 / -0.8	250
900	36	MCI	945	+1.5 / -0.8	250

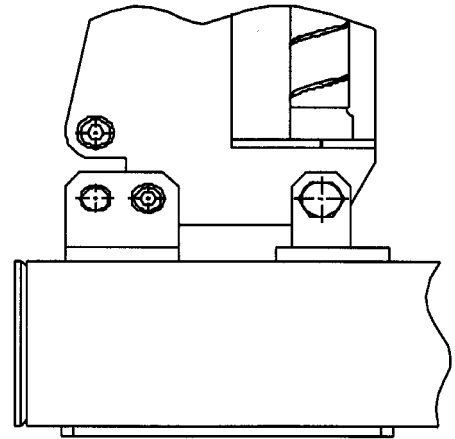
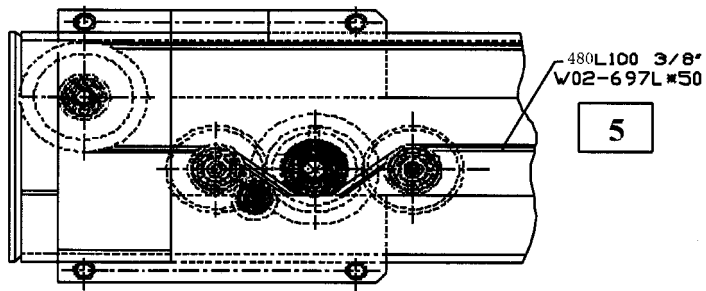
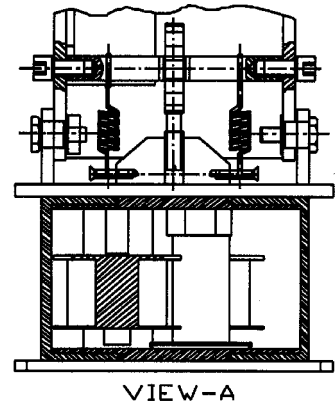
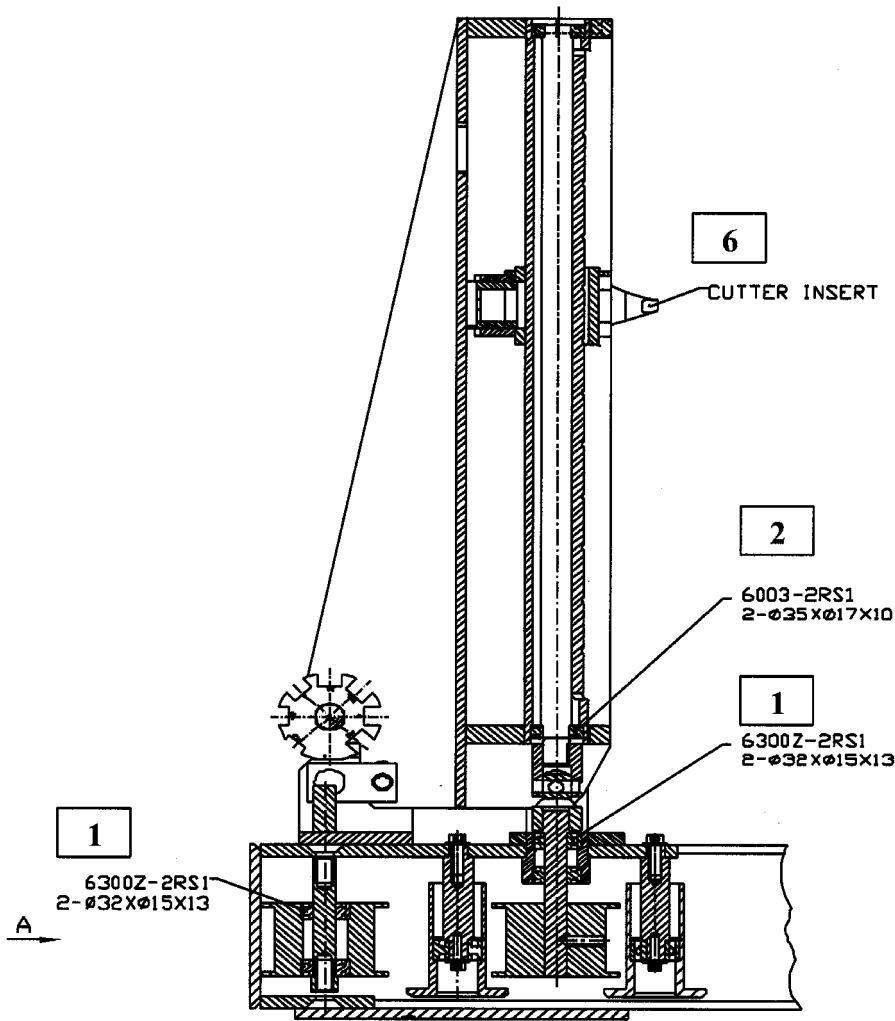
NOTES: All dimensions are in mm.

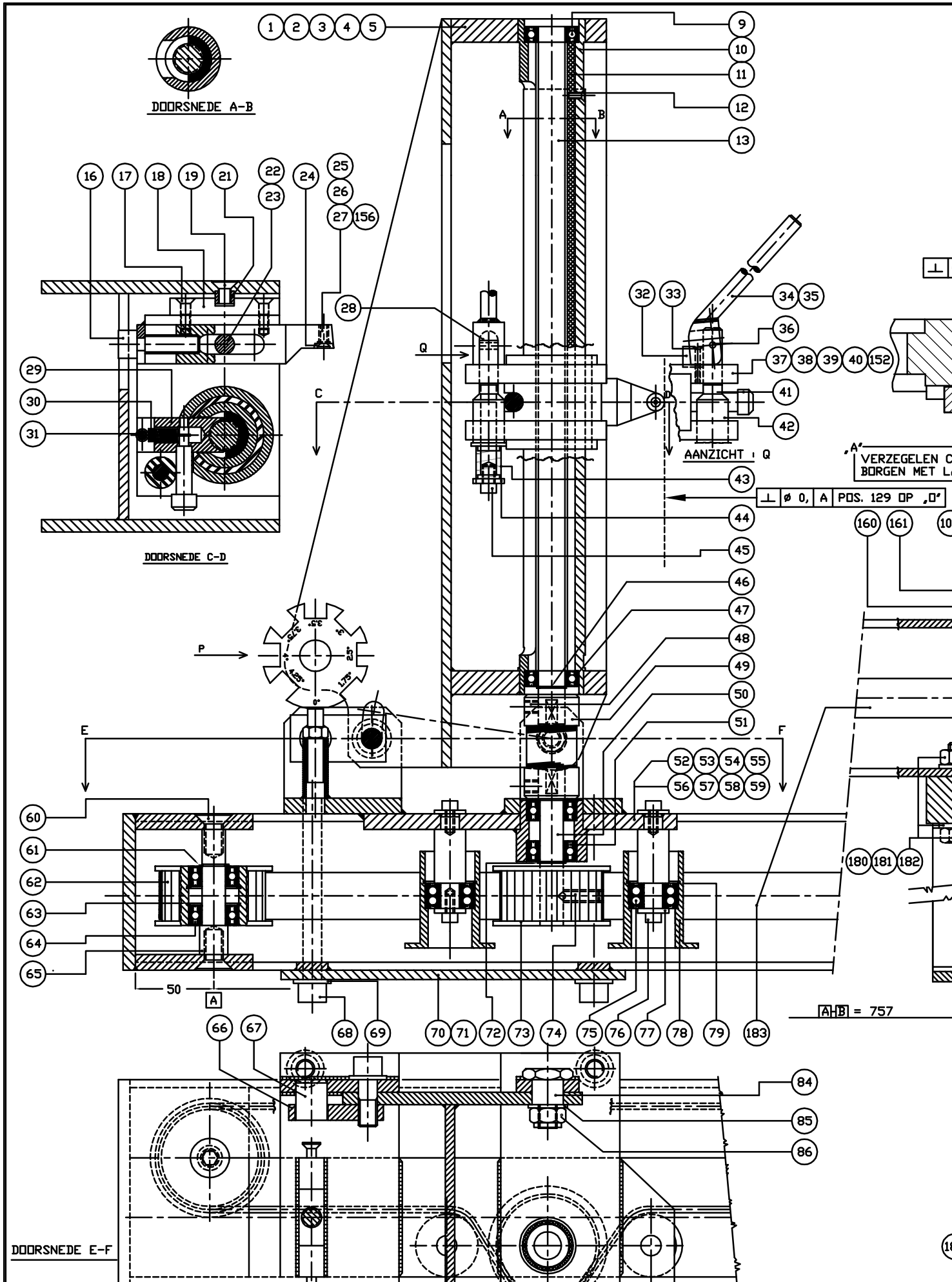
1. IPS = Iron Pipe Size / MCI = Metric Cast Iron
2. Shaved lengths (B) for mechanical couplings are to facilitate pipe removal by shifting coupling assembly on one spigot.
3. Above dimensions are recommended values only for Helden 129 expansion coupling.
4. For other type of coupling, consult coupling manufacturer.



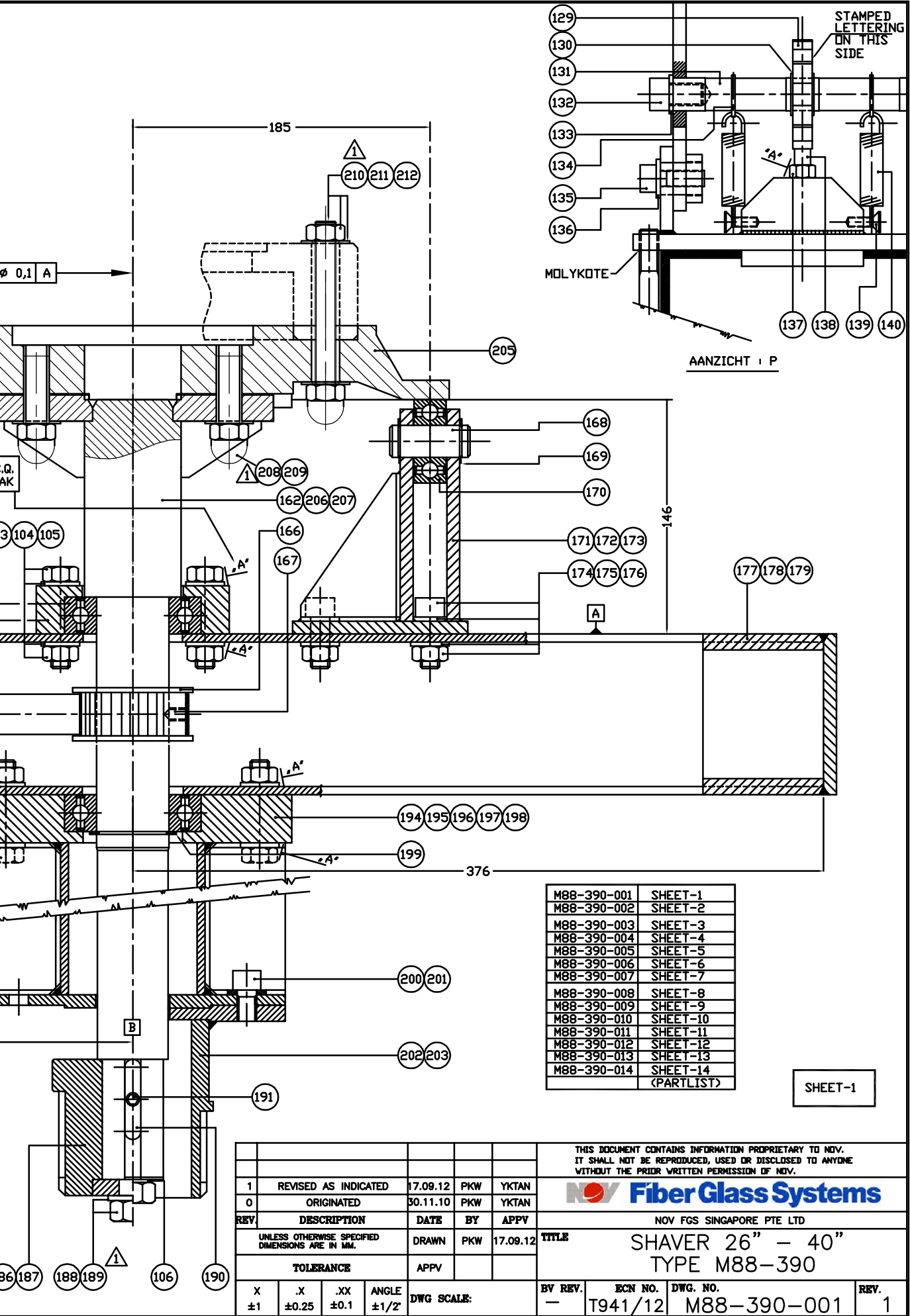
#### Wear part list for M88 Pipe Shaver

S/No	Description	Dimension	Standard	Material
1	6300Z-2RS1	Ø32 x Ø15 x 13		Bearing
2	6003-2RS1	Ø35 x Ø17 x 10		Bearing
3	62209-2RS1	62209-2RS1		Bearing
4	305704C-2C	305704C-2C		Bearing
5	W02-697L *50	480L100 3/8"		Mitsubishi™ in-phase belt
6	Cutter Insert			







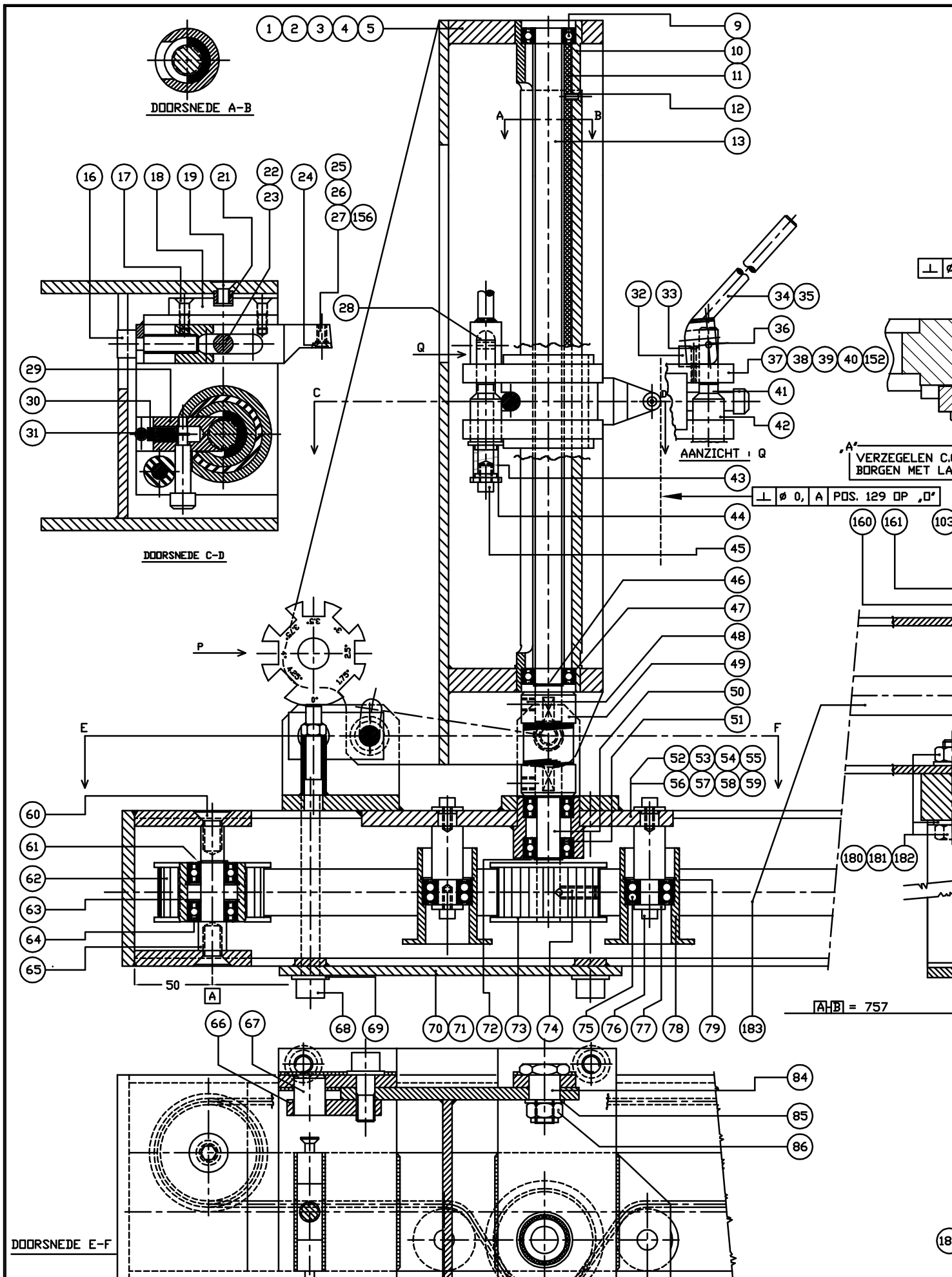


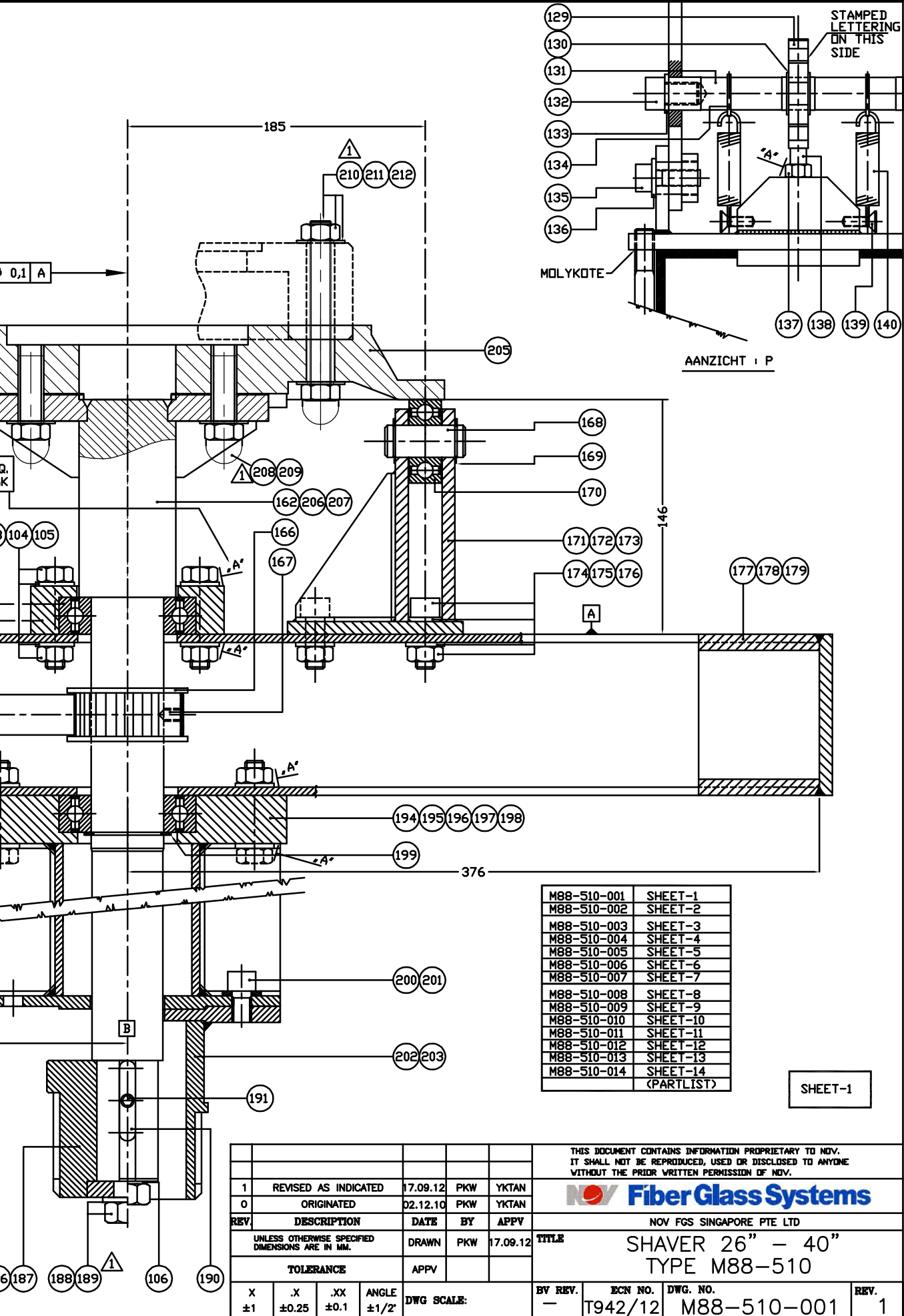
M88-390-001	SHEET-1
M88-390-002	SHEET-2
M88-390-003	SHEET-3
M88-390-004	SHEET-4
M88-390-005	SHEET-5
M88-390-006	SHEET-6
M88-390-007	SHEET-7
M88-390-008	SHEET-8
M88-390-009	SHEET-9
M88-390-010	SHEET-10
M88-390-011	SHEET-11
M88-390-012	SHEET-12
M88-390-013	SHEET-13
M88-390-014	SHEET-14
(PARTLIST)	

SHEET-1

1	REVISED AS INDICATED	17.09.12	PKW	YKTAN
0	ORIGINATED	30.11.10	PKW	YKTAN
REV	DESCRIPTION	DATE	BY	APPV
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM.		DRAWN	PKW	17.09.12
TOLERANCE		APPV		
X	.X	.XX	ANGLE	DWG SCALE:
±1	±0.25	±0.1	±1/2°	

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<b>Fiber Glass Systems</b>			
NOV FGS SINGAPORE PTE LTD			
TITLE		SHAVER 26" - 40" TYPE M88-390	
BV REV.	ECN NO.	DWG. NO.	REV.
-	T941/12	M88-390-001	1





M88-510-001	SHEET-1
M88-510-002	SHEET-2
M88-510-003	SHEET-3
M88-510-004	SHEET-4
M88-510-005	SHEET-5
M88-510-006	SHEET-6
M88-510-007	SHEET-7
M88-510-008	SHEET-8
M88-510-009	SHEET-9
M88-510-010	SHEET-10
M88-510-011	SHEET-11
M88-510-012	SHEET-12
M88-510-013	SHEET-13
M88-510-014	SHEET-14
(PARTLIST)	

SHEET-1

1	REVISED AS INDICATED	17.09.12	PKW	YKTAN
0	ORIGINATED	02.12.10	PKW	YKTAN
REV	DESCRIPTION	DATE	BY	APPV
	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM.	DRAWN	PKW	17.09.12
	TOLERANCE	APPV		
X	.X	.XX	ANGLE	DWG SCALE:
±1	±0.25	±0.1	±1/2°	

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NOV FGS SINGAPORE PTE LTD			
TITLE SHAVER 26" - 40" TYPE M88-510			
BY REV.	ECN NO.	DWG. NO.	REV.
-	T942/12	M88-510-001	1

## Part List for M88 Shaver

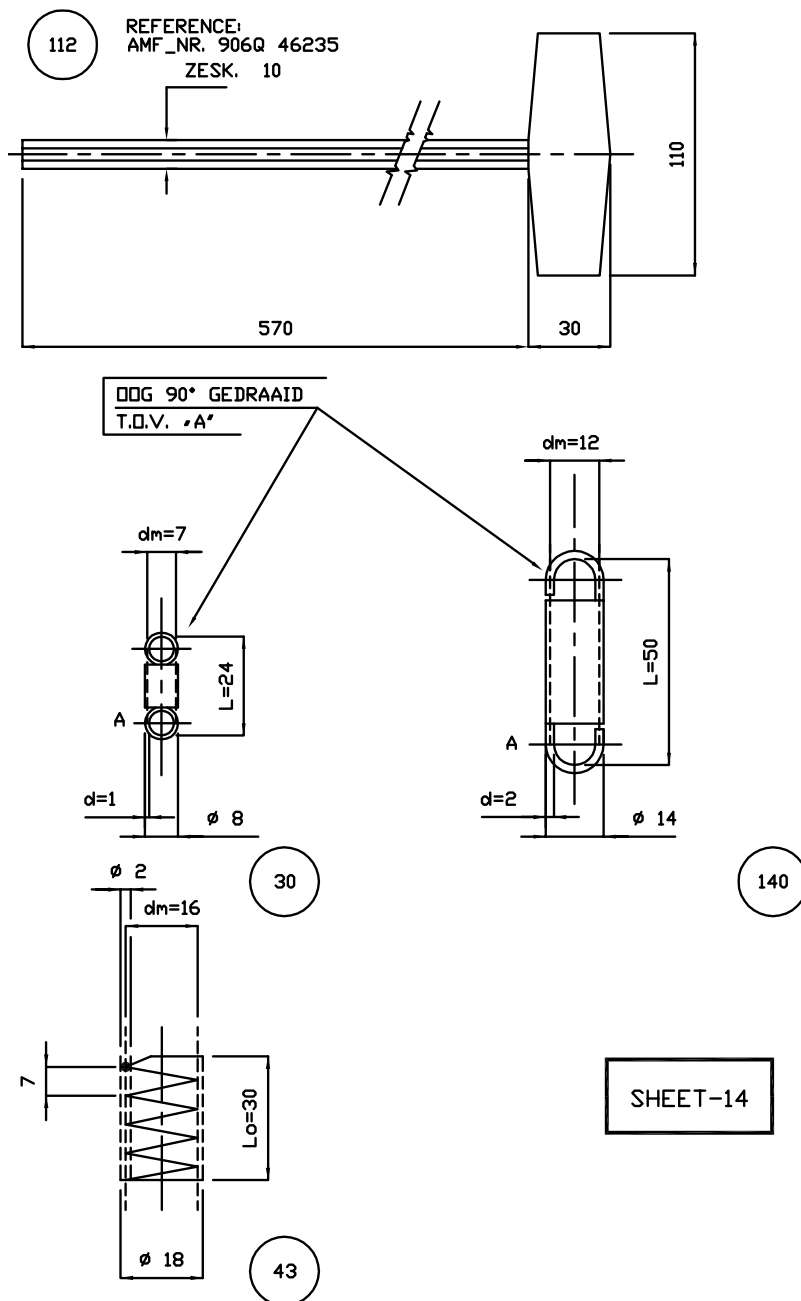
Part	Qty	Description	Dimension	Standard	Material
9	1	Bearing	ø 35 x ø 17 x 10	S.K.F	6003-2RS1
10	1	Tube	(ø 46 x ø 30) x 430	1. 4301	Stainless Steel
11	1	Support	ø 30 x 398	1.4301	
12	6	Countersink screw	M4 x 10	DIN 965	
13	1	Threaded rod	ø 20 x 440	1. 2379	Steel, hardened
16	1	Hex. cap. screw	M12 x 90	DIN 912	
17	2	Countersink screw	M6 x 25	DIN 965	Galvanised
18	1	Plate	11 x 30 x 70	AMPCO 18	Bronze
19	4	Countersink screw	M8 x 16 (3 or 4 pcs)	DIN 965	Galvanised
21	1	Key	8 x 12 x 365	1. 4301	Stainless Steel
22	1	Cil. Screw	M12 x 50	DIN 912	Galvanised
23	1	Washer	ø 13 x ø 24 x 2,5	DIN 125A	Galvanised
24	1	Toolbit	NR. RCMT 1204 MO-H13-A	RCMT-1204	Sandvik
25	1	Holder	NR 230-594-012-N100		Sandvik
26	1	Insert	NR 5512-090-01-N100		Sandvik
27	1	Screw	NR 5513-020-01		Sandvik
28	1	Shaft	ø 12 x 90	1. 4301	Stainless Steel
29	1	Block	22 x 36 x 44	1. 2842	HRD 56 - 58° Rc
30	1	Tension Spring	see drawing page 11	1. 1200	Stainless Steel
31	1	Pin	ø 5 x 48	1. 4301	Stainless Steel
32	1	Block	12 x 12 x 15	1. 4301	Stainless Steel
33	1	Countersink screw	M3 x 20	DIN 965	Galvanised
34	1	Handle	ø 10 x 85	1. 4301	Stainless Steel
35	1	Fork	20 x 20 x 28	1. 4301	Stainless Steel
36	1	Pin	ø 4 x 20	DIN1481	Stainless Steel
41	1	Screw	M10 x 70	1. 4301	Bronze
42	1	Tube	ø 24 x 42	AMPCO 18	Bronze
43	1	Compr. spring	see drawing page 11	1. 1200	Stainless Steel
44	1	Disc	ø 20 x 6	1. 4301	
45	1	Cil. screw	M6 x 16	DIN 912	Galvanised
46	1	Safety ring	ø 17 x 1,0	DIN 471	
47	1	Bearing	ø 35 x ø 17 x 10	S.K.F.	6003-2RS1
48	2	Adjusting screw	M6 x 10	DIN 916	
49	1	Coupling	ø 35 x 65	Madler	602 020 Galvanised
50	1	Shaft	ø 20 x 96,5	1. 2301	
Part	Qty	Description	Dimension	Standard	Material
51	2	Bearing	ø 32 x ø 15 x 13	SKF	63002-2RS1
60	2	Countersink screw	M12 x 20	DIN 965	Galvanised
61	1	Safety ring	ø 15 x 1,0	DIN 471	
62	1	Pulley	Jasper 22L100	z=22	Pitch 3/8" Galvanised
63	2	Safety ring	ø 32 x 1,2	DIN 472	
64	2	Bearing	ø 32 x ø 15 x 13	SKF	63002-2RS1
65	1	Shaft	ø 18 x 80	1. 4301	Stainless Steel
67	2	Plug	ø 20 x 26	1. 4301	Stainless Steel
68	4	Cil. Screw	M12 x 120	DIN 912	Galvanised
69	4	Washer	ø 13 x ø 24 x 2,5	DIN 125 A	Galvanised
72	1	Safety ring	ø 15 x 1,0	DIN 471	

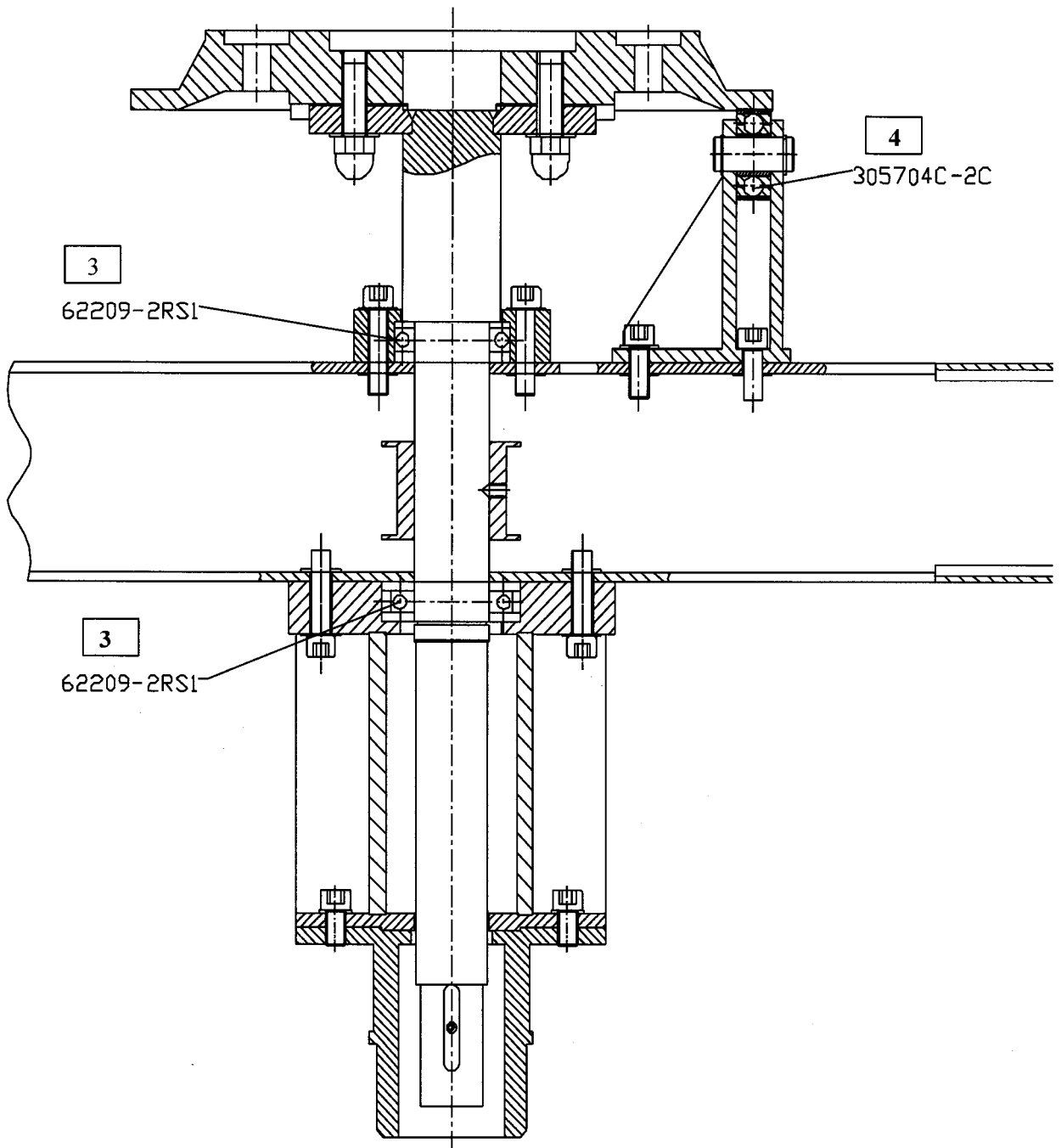
## Part List for M88 Shaver (continued)

Part	Qty	Description	Dimension	Standard	Material
73	1	Pulley	Jasper 22L100	z=22	Pitch 3/8" Galvanised
74	1	Adjusting screw	M18 x 25	DIN 914	
75	2	Bearing	ø 32 x ø 12 x 16	SKF	3201A-2 RS1-TN9
76	2	Cil. screw	M6 x 16	DIN 912	Galvanised
77	2	Disc	ø 20 x 3	1. 4301	
78	2	Cylinder	ø 38 x 40	1. 4301	
79	2	Safety ring	ø 32 x 1,2	DIN 472	Galvanised
84	2	Bolt	27 x 37,5	1. 4301	
85	2	Washer	ø 13 x ø 24 x 2,5	DIN 125 A	Galvanised
86	2	Self locking nut	M12	DIN 985	
103	8	Washer	ø 13 x ø 24 x 2,5	DIN 125 A	Galvanised
104	1	Nut	M12	DIN 934	
105	4	Hex. head bolt	M12 x 55	DIN 934	Galvanised
106	1	Washer	ø 17 x ø 30 x 3	DIN 125 A	Galvanised
112	1	Hex. head screw driver	see drawing page 11	46235	Fijnwerk B.V.
129	1	Disc	ø 68 x 12	1. 4301	
130	2	Safety ring	ø 20 x 1,2	DIN 471	
131	1	Axle	ø 20 x 160	1. 4301	
132	2	Cil. screw	M12 x 20	DIN 912	Galvanised
133	2	Washer	ø 13 x ø 24 x 2,5	DIN 125 A	Galvanised
134	2	Pipe ring	ø 25 x ø 21 x 2	1. 4301	
135	2	Cil. Screw	M12 x 30	DIN 912	Galvanised
136	2	Washer	ø 13 x ø 24 x 2,5	DIN 125 A	Galvanised
137	1	Nut	ø 18 x 8	2. 401	Brass
138	1	Screw	ø 12 x 45	1. 4301	
139	2	Countersink screw	M6 x 20	DIN 965	Galvanised
140	2	Tension spring	see drawing page 11	1. 1200	
152	1	Bearing bush	ø 50 x ø 42 x 60	AMPCO 18	Bronze
156	1	Key	NR 5680-016-01	POS 26-27	Sandvik
161	2	Bearing	ø 85 x ø 45 x 23	SKF	62209-2RS1
162	1	Pipe	ø 46 x ø 28 x 825	1. 4301	
163	1	Ring	ø 60 x 29	1. 4301	
164	1	Ring	ø 60 x 25	1. 4301	
165	1	Tube	ø 37.8 x 15	AMPCO 18	Bronze
166	1	Pully	Jasper 22L100	z=22	Pitch 3/8" Galvanised
167	1	Adjusting screw	M8 x 12	DIN 914	
168	1	Shaft	ø 20 x 50		
169	2	Safety ring	ø 20 x 1,2	DIN 471	
170	1	Roller	ø 20 x ø 52 x 20,5	SKF	305704 C-2Z
174	8	Washer	ø 13 x ø 24 x 2,5	DIN 125 A	Aluminium
175	4	Nut	M12	DIN 934	
176	4	Cil. screw	M12 x 30	DIN 912	Galvanised
180	8	Washer	ø 13 x ø 24 x 2,5	DIN 125 A	Galvanised
181	4	Nut	M12	DIN 934	
182	4	Hex. head bolt	M12 x 55	DIN 931	Galvanised
183	1	Geared Belt	25 mm	540 L"	Pitch 3/8" Galvanised

## Part List for M88 Shaver (continued)

Part	Qty	Description	Dimension	Standard	Material
186	1	Tube	∅ 100 x 85	1. 0110	Galvanised
187	1	Disc	∅ 50 x 8	1. 0110	Galvanised
188	1	Rod	∅ 16 x 898	1. 4301	
189	1	Nut	M16	DIN 934	
190	1	Key	7 x 10 x 50	1. 4301	
191	1	Countersink screw	M4 x 12	DIN 965	Galvanised
199	1	Safety ring	∅ 45 x 1,75	DIN 471	
198	1	Plate	∅ 190 x 8		Aluminium
199	1	Safety ring	∅ 45 x 1,75	DIN 471	
200	4	Washer	∅ 13 x ∅ 24 x 2,5	DIN 125 A	Galvanised
201	4	Cil. screw	M12 x 20	DIN 912	Galvanised





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North America

17115 San Pedro Ave. Suite 200  
San Antonio, TX 78232 USA  
Phone: +1 210 477 7500

South America

Estrada de Acesso à Zona  
Industrial Portuária de Suape, s/no.  
Recife, PE, Brazil 55.590-000  
Phone: +55 81 3501 0023

Europe

P.O. Box 6, 4190 CA  
Geldermalsen, The Netherlands  
Phone: +31 345 587 587

Asia Pacific

No. 7A, Tuas Avenue 3  
Jurong, Singapore 639407  
Phone: +65 6861 6118

Middle East

P.O. Box 17324  
Dubai, UAE  
Phone: +971 4881 3566

**[www.fgspipe.com](http://www.fgspipe.com) • [fgspipe@nov.com](mailto:fgspipe@nov.com)**

The logo for NOV Fiber Glass Systems features the letters 'NOV' in a stylized, bold font with a red and white circular graphic element to the left of the 'V'. To the right of 'NOV', the words 'Fiber Glass Systems' are written in a blue, sans-serif font.

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TLS 2006 supersedes FP 1022 - November 2012