

M87 Pipe Shaver

for Taper/Taper, Quick-Lock® and Mechanical Pipe Joints in sizes 6 to 16 inch (150 - 400 mm)

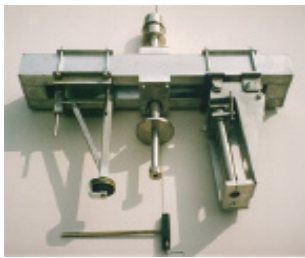
Introduction

The Bondstrand® M87 Pipe Shaver is designed to prepare a tapered or straight spigot on the cut end of a Bondstrand pipe in the size 6 inch to 16 inch (150 to 400 mm) size range, allowing 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. Arbors are available for each pipe size. The arbor slips into the pipe then expands to grip the inside of the pipe when the tensioning bolt is tightened. As the frame is rotated around the stationary center shaft, the cutting tool advances automatically. The shaver is 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 M87 Pipe Shaver is supplied in a case together with 10mm Hexagon spanner and a Torx® key for the cutting tool. The shaver is driven by a portable power drive type reg. Ridgid® 700. This power drive as well as the necessary arbors are not included and have to be ordered separately. A 24 mm spanner is required to tighten the clamping bolt. A pipe vise or suitable pipe clamp support is required to hold the pipe.

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



M87 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.



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 (GRE 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 is to be used, if the situation requires so;
- * A hair net must be worn, if applicable, when shaving, cutting, grinding, etc;
- * 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:

- Use left hand to hold the grip of powerdrive and the right hand to operate the power switch;
- Immediately release the power switch when the shaver seizes to avoid injury to self or damage to tooling;
- The optional power drive torque arm must never be used for safety reasons;
- Pipe-shaver assembly must be at ergonomic height to be able to work in the proper posture;
- Ample rest should be taken to avoid excess physical or mental stress;
- Only authorised persons are to be allowed in the shaving area;
- Before starting the powerdrive, ensure that the shaver will run free from pipe bench, table or support;
- Shaving area must be clearly marked as such;
- Shaving tool shall only be used to prepare spigots on Bondstrand pipe material;
- Pipe shaver shall only be operated by trained persons;
- No other type of power drive shall be used if that works at a higher speed than the Ridgid 700;
- Powerdrive and shaving tool must be kept in good working order to guarantee proper and safe operation. Defective parts must be exchanged, or repaired by qualified persons only.

Note:

1. On special order, instructions of this shaver are available on CD-Rom or DVD.
2. The noise level of the shaver and powerdrive is less than 70 dB (A).

Operating instructions

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



Photo 1

1. FITTING THE ARBOR

- a) The round nut (**part no. 96**) is removed from the central tensioning bolt (**part no. 124**).
- b) The correct size arbor is placed on the shaft (**part no. 101**).
- c) The nut is replaced, taking care that the protrusions on the nut and on the shaver shaft engage in the slots of the arbor (*Photo 1*). The nut and tensioning bolt are not tightened until the arbor has been fitted into the pipe to be shaved.

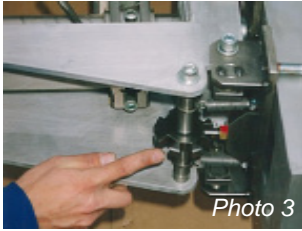
2. ADJUSTING THE M87 SHAVER

Select the correct dimensions and/or spigot angle for the pipe diameter and series being used. For shave dimension for the various types of taper spigots and Quick-Lock refer to tables 1 and 2. For setting the taper angle, loosen the taper locking bolts (**part no. 135**) shown in *Photo 2*. For dimensions of mechanical couplings consult supplier.

Pull the cutting head towards the centre shaft so that the slotted disk (indicated in *Photo 3*) is free to rotate and turn this so that the slot for the appropriate angle fits over the stud on the fixed frame (slots have the different angles marked).



Photo 2



While pulling the head of the shaver away from the center shaft, retighten the taper locking bolts (as in point b, *Photo 3*). The taper angle is now correctly set. For the shaving of parallel spigots as used in Quick-Lock joints or for use with mechanical couplings such as Helden, Viking Johnson, etc., the same procedures apply and the slot marked "O" is used. The taper locking bolts are then retightened. This sets the shaver correctly to cut a parallel spigot.



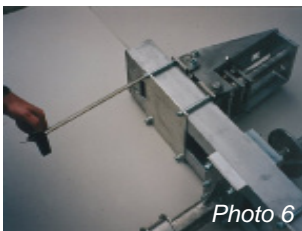
3. FIT THE SHAVER TO THE PIPE

The shaver fitted with the appropriate arbor is slid into the pipe so that the arbor is completely in and flush with the cut end of the pipe. The shaver is then lifted somewhat while the central tensioning bolt (**part no. 96**) is firmly tightened. This to ensure that the shaver is mounted as squarely as possible into the pipe.



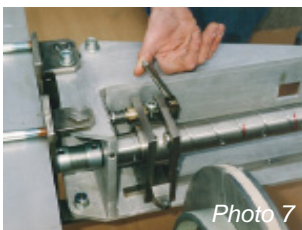
4. RETRACT THE CUTTING TOOL

Loosen the tool holder clamping bolt as shown in *Photo 4*. The bolt (**part no. 22**) should be left tight enough for the cutting tool to be moved reasonably easy but not so loose that it can move by itself. The tool is then turned back completely as far away from the pipe as possible by turning the adjusting bolt counterclockwise *Photo 5*.



5. ADJUST THE CUTTING HEAD

The bolts (**part no. 68**) holding the cutting head are loosened as shown in *Photo 6*. This allows the cutting head to be moved towards the pipe.



To allow the head to move freely, the drive should be disengaged i.e. the lever in *Photo 7* should be set pointing towards the main frame of the shaver and the sliding pin back towards the main frame. The tool holder can then also be moved as close as possible to the frame. Set the cutting head so, that the cutting tool is just free of the pipe. The bolts (**part no. 68**) are then retightened.



6. ADJUST THE SUPPORT ROLLER

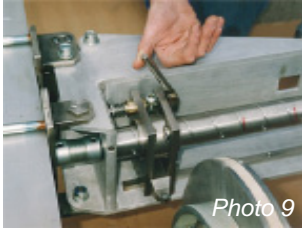
- a) The roller (**part no. 89**) is retracted away from the pipe by setting the handle (**part no. 142**) parallel with the main frame beams i.e. compressing the spring (*Photo 8*).
- b) The fixing bolts (**part no. 148**) are loosened and the support roll assembly moved so the roller has a clearance of ± 2 mm from the pipe wall.
- c) Retighten the fixing bolts.
- d) The handle indicated in *Photo 8* is set perpendicular to the main frame releasing the spring to force the roller on to the pipe.

7. ADJUST THE CUTTING TOOL

The cutting tool should be adjusted to give a cut of max. 2 mm depth. One full clockwise turn of the adjusting bolt on the back of the cutting tool changes the cutting depth by 1 mm. So, a maximum of 2 mm cutting depth by two full clockwise turns reduces the pipe spigot diameter by 4 mm.

8. FIT POWER DRIVE TO SHAVER

The power drive is fitted to the adapter on the shaft of the shaver. Make sure that the spring loaded key engages in the key-way.



9. ENGAGE THE CUTTING TOOL FEED

The feed is engaged by moving the lever, indicated in Photo 9, 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.

10. RETURN THE TOOL HOLDER

The feed is disengaged as described in the underlined part in point 5.

The tool holder can now be reset to its original position. As many cuts as required to give the correct spigot length and diameter can be made following the instructions in points 7, 9 and 10. Tables 1 and 2 give the correct dimensions for the various series and diameters of pipe. Allowance in the shaving length is to be made for the radius of the cutting tool. The M87 shaver automatically disengages the feed mechanism at the maximum limit of the tool holder travel.



11. RELEASE SUPPORT ROLLER

When the spigot has been completed, the support roller should be lifted off the pipe by moving the handle (Photo 10) parallel to the main frame.

12. RETRACT THE CUTTING TOOL

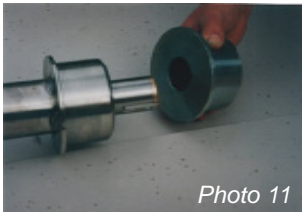
As in point 4.

13. REMOVE THE POWER DRIVE

14. RELEASE CENTRAL TENSIONING BOLT

The shaver can now be removed from the pipe. Care should be taken to pull the shaver straight out of the pipe in order not to damage the thin front edge of the spigot.

Making of short nipples



Pipe pieces and nipples so short that they cannot be held satisfactory to support the shaver can be made as follows:

- Place the shaver on a stable support with shaver resting on mainframe ends. Fix the shaver by means of band clamps or other suitable means.
- The central tensioning bolt (**part no. 124**) is removed from the shaft.
- The loose power drive adapter (**part no. 126**) is fitted to the shaft ensuring that the key is properly engaged as in *Photo 11*.
- The tensioning bolt is re-inserted and the nut refitted (do not tighten until the arbor is inserted in to the pipe nipple). Refit the powerdrive to the newly fitted adapter.
- The shaver can then be used with the pipe nipple rotating and the shaver stationary.

Note: The powerdriver must now rotate in the opposite direction.

The M87 Pipe Shaver is designed as a maintenance-free unit. The following measures should be followed:

- Clean the shaver on a regular basis**, paying special attention to the feed screw and its associated components. Keep threads of part No. 96 and 124 lubricated with a thread lubricant for smooth operation.
- Check cutting blades regularly**, a dull cutting edge places unnecessary strain on the automatic feed components. The cutting edge can be loosened using the Torx key provided and turned to provide a new sharp edge. This can be done until the complete blade is dull. Replacement cutting blades are available from NOV Fiber Glass Systems.

Shaving Joint Dimensions

Table 1a: For Taper/Taper joints Series 2400

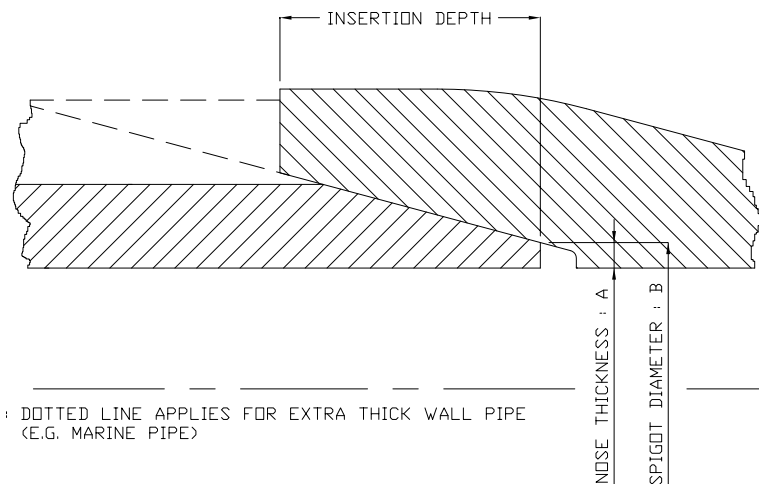
Nom. Pipe Size	Taper Angle	Nose Thickn.		Spigot Dia. at Nose		Nose Thickn.		Spigot Dia. at Nose	
		A	B	A	B	A	B	A	B
mm		degr.		2410		2412		2414	
150	2.5	1.0		161.0		1.0	161.0	1.0	161.0
200	2.5	1.0		210.8		1.0	210.8	1.0	210.8
250	2.5	1.0		264.9		1.0	264.9	1.0	264.9
300	2.5	1.0		315.7		1.0	315.7	1.0	315.7
350	2.5	1.5		347.4		1.5	347.4	1.5	347.4
400	2.5	1.5		396.7		1.5	396.7	1.5	396.7
mm		degr.		2416		2420*		2425	
150	2.5	1.0		161.0		1.0	161.0	1.0	161.0
200	2.5	1.0		210.8		1.0	210.8	1.0	210.8
250	2.5	1.0		264.8		1.0	264.9	1.5	265.9
300	2.5	1.0		315.7		1.0	315.7	1.5	316.7
350	2.5	1.5		347.4		1.5	347.4	2.0	348.4
400	2.5	1.5		396.7		1.5	396.7	2.5	396.7
mm		degr.		2432		2440		2450	
150	2.5	1.0		161.0		1.5	162.0	2.0	163.0
200	2.5	1.0		210.8		1.5	211.8	2.5	213.8
250	2.5	1.5		265.9		2.5	267.9	3.0	268.9
300	2.5	1.5		316.7		2.5	318.7	3.5	320.7
350	2.5	2.0		348.4		3.0	350.4		
400	2.5	2.5		398.7		3.5	400.7		

Note: Also applicable for PSX-JF and PSX-L3 Taper joint series from 6 to 16 inch.

Table 1b: For Taper/Taper joints Series 200M / 7000M

Nom. pipe size (mm)	Taper angle (deg)	Nose Thickness		Nom. Insert Depth B	Spigot Diameter at Nose C
		A			
200	2.5	3.1		65	215.2
250	2.5	4.1		80	271.2
300	2.5	4.6		95	323.2
350	2.5	5.2		100	348.2
400	2.5	6.1		110	398.2

TAPER - TAPER JOINT

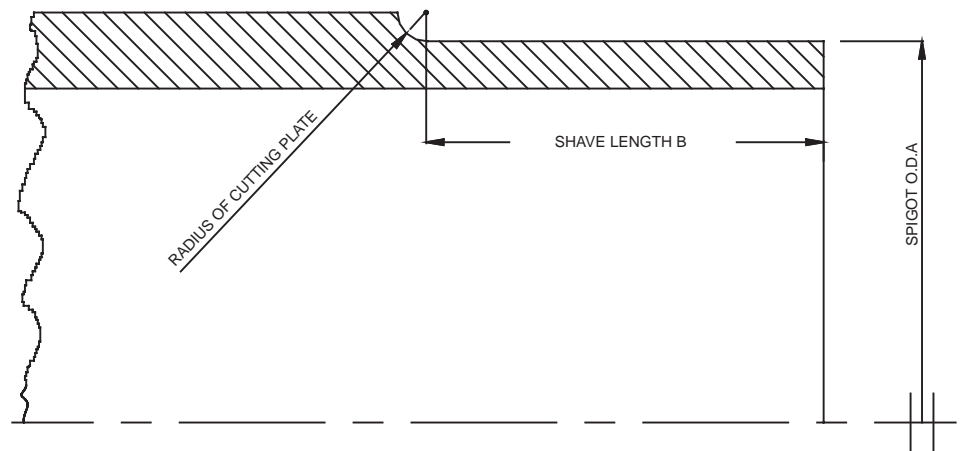


NOTE : DOTTED LINE APPLIES FOR EXTRA THICK WALL PIPE (E.G. MARINE PIPE)

Table 2: For Quick-Lock spigots

Nominal Pipe Size			Pipe ID	Quick-Lock Spigot OD	Tol.	Shaved Length
mm	inch	type			A	B
150	6	Industry	159	166.40	± 0.20	59-62
200	8	Industry	209	217.30	± 0.20	65-68
250	10	Industry	263	271.50	± 0.20	71-74
300	12	Industry	314	322.40	± 0.20	78-81
350	14	Industry	344	354.00	± 0.20	89-93
350	14	IPS	338	354.00	± 0.20	89-93
350	14	MCI	358	376.15	± 0.20	89-93
400	16	Industry	394	404.30	± 0.20	103-106
400	16	IPS	386	404.30	± 0.20	103-106
400	16	MCI	407	427.25	± 0.25	103-106

- Notes:
1. All dimensions are in mm.
 2. IPS = Iron Pipe Size / MCI = Metric Cast Iron



Part List for M87 Shaver

Drawing Reference: 5-CD-709

Part #	Qty	Description	Dimension	Standard	Material	Remark
1	1	Plate			Aluminium	
2	1	Plate			Aluminium	
3	1	Plate			Aluminium	
4	1	Plate			Aluminium	
5	1	Plate			Aluminium	
6	1	Plate			Aluminium	
7	1	Plate			Aluminium	
8	1	Plate			Aluminium	
9	1	Bearing	ø 35 x ø 17 x 10	6003-2RS1		S.K.F
10	1	Tube			Stainl. Steel	
11	1	Support			Akulon (PA)	
12	6	Hex. sock screw	M4 x 10	DIN 965		
13	1	Threaded rod			Steel, hardened	
14	1	Tube			Stainl. Steel	
15	1	Threaded rod			Steel, hardened	
16	1	Hex. cap. screw	M12 x 90	DIN 912		
17	2	Hex. count. screw	M6 x 25	DIN 965		
18	1	Plate			Bronze	
19	4	Hex. count. screw	M8 x 16			
20	1	Key	8 x 12 x 265		Stainl. Steel	
21	1	Key	8 x 12 x 365		Stainl. Steel	
22	1	Hex. sock screw	M12 x 50	DIN 912		
23	1	Washer	ø 13 x ø 24 x 2.5	DIN 125A		
24	1	Cutting plate		RCMT-1204	MO-H 13-A	Sandvink
25	1	Tool (complete)			230-594-012-N100	Sandvink
26	1	Insert			5512-090-01-N100	
27	1	Screw			5513-020-01	
28	1	Shaft			Stainl. Steel	
29	1	Block			Steel, hardened	
30	1	Spring tension			Spring Steel	
31	1	Pin			Stainl. Steel	
32	1	Block			Stainl. Steel	
33	1	Hex. count. screw	M3 x 20	DIN 965		
34	1	Handle			Stainl. Steel	
35	1	Fork			Stainl. Steel	
36	1	Pin	Ø 4 x 20	DIN1481	Stainl. Steel	
37	1	Strip			Stainl. Steel	
38	1	Plate			Stainl. Steel	
39	1	Tube			Stainl. Steel	
40	1	Plate			Stainl. Steel	
41	1	Hex. cap. screw	M10 x 70	DIN 91		
42	1	Bush			Bronze	
43	1	Compr. spring			Spring Steel	
44	1	Disc			Stainl. Steel	
45	1	Hex. cap. screw	M6 x 16	DIN 912		
46	1	Retaining ret. Ring	ø 17 x 1.0	DIN 471		
47	1	Bearing	ø 35 x ø 17 x 10	6003-2RS1		S.K.F.
48	2	Hex. set. screw	M8 x 10	DIN 916		
49	1	Coupling	ø 35 x 65	Nr. 602 020		Mädler
50	1	Shaft			Stainl. Steel	

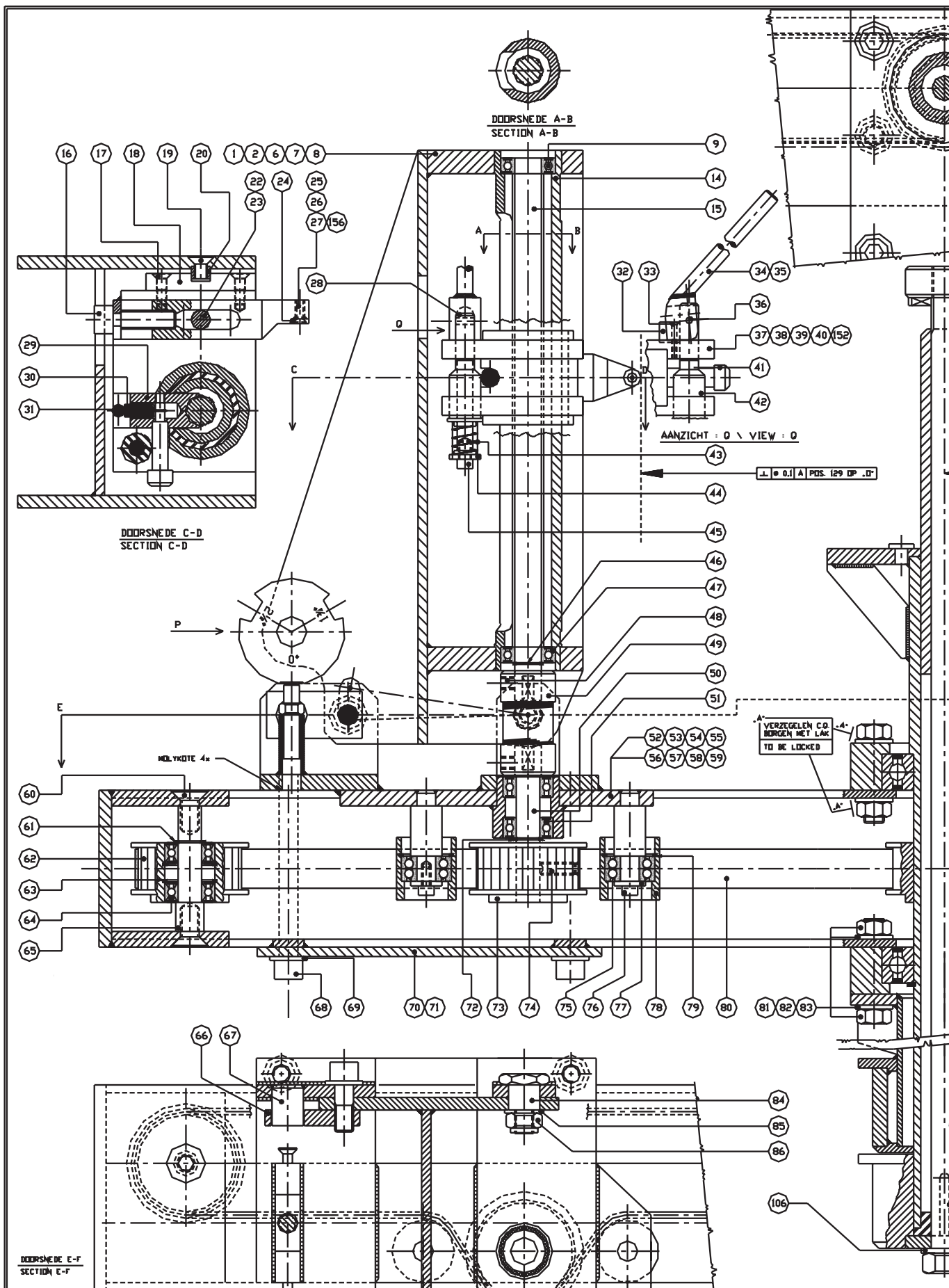
Part List for M87 Shaver (continued)

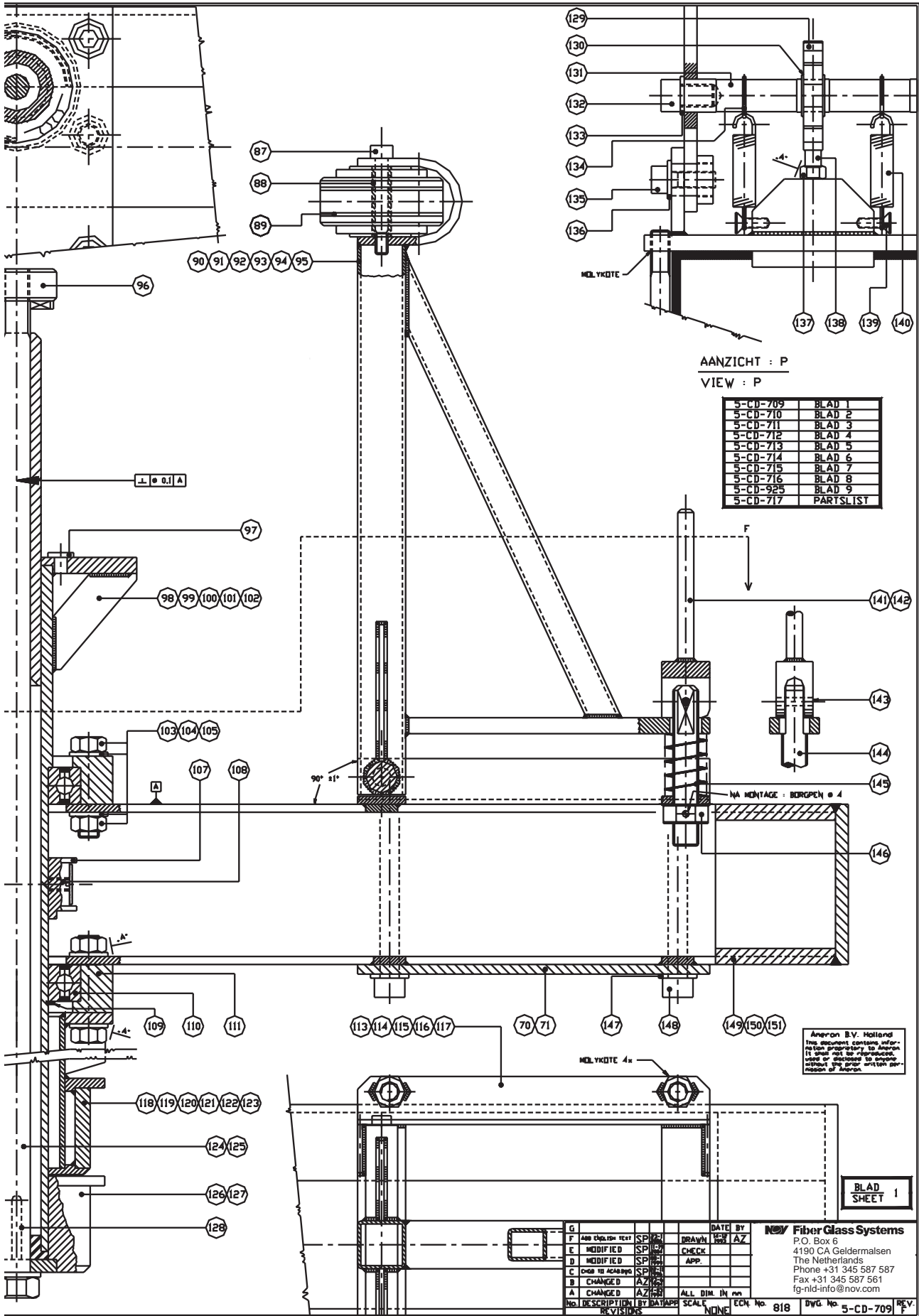
Part #	Qty	Description	Dimension	Standard	Material	Remark
51	2	Bearing	ø 32 x ø 15 x 13	63002-2RS1		SKF
52	1	Tube			Stainl. Steel	
53	1	Pin			Stainl. Steel	
54	1	Strip			Stainl. Steel	
55	1	Strip			Stainl. Steel	
56	1	Plate			Stainl. Steel	
57	1	Strip			Stainl. Steel	
58	2	Plate			Stainl. Steel	
59	2	Plate			Stainl. Steel	
60	2	Hex. count. screw	M12 x 20	DIN 965		
61	1	Retaining ring	ø 15 x 1.0	DIN 471		
62	1	Pulley	Z=22; 3/8"	22L 100		Jasper
63	2	Retaining ring	ø 32 x 1.2	DIN 472		
64	2	Bearing	ø 32 x ø 15 x 13	63002-2RS1		SKF
65	1	Shaft			Stainl. Steel	
66	2	Plate			Stainl. Steel	
67	2	Plug			Stainl. Steel	
68	4	Hex. cap. screw	M12 x 120	DIN 912		
69	4	Washer	ø 13 x ø 24 x 2.5	DIN 125 A		
70	1	Plate			Stainl. Steel	
71	2	Strip			Stainl. Steel	
72	1	Retaining ring	ø 15 x 1.0	DIN 471		
73	1	Pulley	Z=22; 3/8"	22 L 100		Jasper
74	1	Hex. set screw	M8 x 25	DIN 914		
75	2	Bearing	ø 32 x ø 12 x 16	3201A-2 RS1-TN9	SKF	
76	2	Hex. cap. screw	M6 x 16	DIN 912		
77	2	Disc			Stainl. Steel	
78	2	Pulley			Stainl. Steel	
79	2	Retaining ring	ø 32 x 1.2	DIN 472		
80	1	Geared belt	Width 25	480L/3/8"		Pirelly
81	2	Washer	ø 13 x ø 24 x 2.5	DIN 125 A		
82	6	Nut		DIN 934		
83	6	Hex. bolt	M12 x 60	DIN 931		
84	2	Bolt			Stainl. Steel	
85	2	Washer	ø 13 x ø 24 x 2.5	DIN 125 A		
86	2	Self locking nut	M12	DIN 985		
87	1	Hex. cap. screw	M8 x 60	DIN 912		
88	1	Distance bush.			Stainl. steel	
89	1	Wheel	ø 80	NR 202/12		SKF
90	1	Frame			Stainl. steel	
91	1	Support			Stainl. steel	
92	1	Plate			Stainl. steel	
93	1	Plate			Stainl. steel	
94	2	Plate			Stainl steel	
95	1	Shaft			Stainl. steel	
96	1	Nut	ø 50 x 25		Stainl. steel	
97	2	Pin	ø 16 x 13		Stainl. steel	
98	1	Shaft			Stainl. steel	
99	1	Disc			Stainl. steel	
100	4	Strip			Stainl. steel	

Part List for M87 Shaver (continued)

Part #	Qty	Description	Dimension	Standard	Material	Remark
101	1	Shaft			Stainl. steel	
102	1	Bushing			Bronze	
103	8	Washer		DIN 125 A		
104	4	Nut	M12	DIN 934		
105	1	Hex. bolt	M12 x 55	DIN 931		
106	1	Washer	ø 17 x ø 30 x 3	SIN 125 A		
107	1	Pulley	Z=22; 3/8"	22L 100		Jasper
108	1	Set screw	M8 x 16	DIN 914		
109	2	Retaining ring	ø 40 x 1.75	DIN 471		
110	2	Bearing	ø 80 x ø 40 x 23	62208-2RSI		S.K.F.
111	1	Plate			Aluminium	
112	4	Screw-driver	Hex 10	906Q46235		Fijnwerk
113	4	Nut	M12	DIN 934		
114	3	Plate			Stainl. steel	
115	2	Plate			Stainl. steel	
116	2	Plate			Stainl. steel	
117	1	Profile			Stainl. steel	
118	1	Plate			Stainl. steel	
119	1	Support			Stainl. steel	
120	1	Tube			Stainl. steel	
121	1	Disc			Stainl. steel	
122	1	Tube			Stainl. steel	
123	1	Disc			Stainl. steel	
124	1	Rod			Stainl. steel	
125	1	Nut	M16	DIN 934		
126	1	Pulley	ø 110 x 60		Stainl. steel	
127	1	Disc				
128	1	Key		DIN 6885A-A4		
129	1	Disc			Stainl. steel	
130	2	Retaining ring		DIN 471		
131	1	Shaft			Stainl. steel	
132	2	Hex. cap screw	M12 x 20	DIN 912		
133	2	Washer	ø 13 x ø 24 x 2.5	DIN 125 A		
134	2	Ring			Stainl. steel	
135	2	Hex. cap screw	M12 x 30	DIN 912		
136	2	Washer	ø 13 x ø 24 x 2.5	DIN 125 A		
137	1	Nut			Brass	
138	1	Screw			Stainl. steel	
139	2	Hex. count screw	M6 x 20	DIN 965		
140	2	Tension spring				
141	1	Fork			Stainl. steel	
142	1	Grip			Stainl. steel	
143	1	Tension shaft		DIN 1481		
144	1	Thread spindle			Stainl. steel	
145	1	Pressure spring				
146	1	Nut	M16	DIN 934		
147	4	Washer	ø 13 x ø 24 x 2.5	DIN 125 A		
148	4	Hex. cap screw	M12 x 130	DIN 912		
149	2	Plate			Aluminium	
150	2	Profile-U			Aluminium	
151	4	Strip			Aluminium	
152	1	Bearing		AMPCO 18	Al. bronze	
153	1	Support			Stainl. steel	
156	1	Key-Torx	NR 5680-016-01			Sandvik

Shaver & Assembly Drawing (Drawing no. 5-CD-709 Rev. F)





AANZICHT : P
VIEW : P

5-CD-709	BLAD 1
5-CD-710	BLAD 2
5-CD-711	BLAD 3
5-CD-712	BLAD 4
5-CD-713	BLAD 5
5-CD-714	BLAD 6
5-CD-715	BLAD 7
5-CD-716	BLAD 8
5-CD-925	BLAD 9
5-CD-717	PARTSLIST

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BLAD SHEET 1

REV	DESCRIPTION	DATE	BY
G	ADD CHG. LIST TEXT	SP	AZ
F	MODIFIED	SP	AZ
E	MODIFIED	SP	AZ
D	MODIFIED	SP	AZ
C	CHG TO ACAD	SP	AZ
B	CHANGED	AZ	SP
A	CHANGED	AZ	SP

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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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