



# RANDOM ORBITAL SANDER INSTRUCTIONS MANUAL

## 12,000 RPM 77 mm (3 in)

### Important Safety Information

Please read, understand and follow all safety information contained in these instructions prior to the use of this tool. Retain these instructions for future reference.

### Intended Use

This pneumatic tool is intended for use in industrial locations, and used only by skilled, trained professionals in accordance with the instructions in this manual. This pneumatic tool is designed to be used with a disc pad and appropriate abrasive for sanding metals, wood, stone, plastics and other materials. It should only be used for such sanding applications and within marked capacity and ratings. Only accessories specifically recommended by 3M should be used with this tool. Use in any other manner or with other accessories could lead to unsafe operating conditions.

Do not operate tool in water or in an excessively wet application.

Do not use disc pads that have a Max RPM less than the tool Max RPM rating. Never use disc pads that have a weight and/or size different than what the tool was specifically designed for.

### Explanation of Signal Word Consequences



**WARNING:**

Indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury and/or property damage.



**CAUTION:**

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and/or property damage.

Read the Material Safety Data Sheets (MSDS) before using any materials.



Contact the suppliers of the workpiece materials and abrasive materials for copies of the MSDS if one is not readily available.



**WARNING**

Exposure to **DUST** generated from workpiece and/or abrasive materials can result in lung damage and/or other physical injury.

Use dust capture or local exhaust as stated in the MSDS. Wear government-approved respiratory protection and eye and skin protection.

Failure to follow this warning can result in serious lung damage and/or physical injury.



**WARNING**

To reduce the risks associated with impact from abrasive product, disc pad, or tool breakup, sharp edges, hazardous pressure, rupture, vibration and noise:

- Read, understand and follow the safety information contained in these instructions prior to the use of this tool. Retain these instructions for future reference.
- Only personnel who are properly trained should be allowed to service this tool.
- Practice safety requirements. Work alert, have proper attire, and do not operate tools under the influence of alcohol or drugs.
- Operators and other personnel must always wear protection for eyes, ears, and respiratory protection when in the work area or while operating this product. Follow your employer's safety policy for PPE's and/or ANSI Z87.1 or local/national standards for eyewear and other personal protective equipment requirements.
- Wear protective apparel, taking into consideration the type of work being done.
- Never exceed marked maximum input pressure (90psi / .62Mpa / 6.2Bars).
- Proper eye protection must be worn at all times.
- Tool shall not be operated in the presence of bystanders.
- If you notice any abnormal noise or vibration when operating the tool, immediately discontinue its use and inspect for worn or damaged components. Correct or replace the suspect component. If abnormal noise or vibration still exists, return the tool to 3M for repair or replacement. Refer to warranty instructions.
- Never operate this tool without all safety features in place and in proper working order.
- Never over-ride or disable the safety features of the start-stop control such that it is in the on position.
- Make sure the tool is disconnected from its air source before servicing, inspecting, maintaining, cleaning, and before changing abrasive product.
- Prior to use, inspect abrasive product and accessories for possible damage. If damaged, replace with new abrasive product and accessories available from 3M.
- Only use accessories supplied or recommended by 3M.
- Never allow this tool to be used by children or other untrained people.
- Do not leave an unattended tool connected to air source.
- Immediately discontinue use of tool if its noise reduction muffler system has been damaged or is otherwise not functioning.

# ⚠ WARNING

**To reduce the risks associated with vibration:**

- If any physical hand/wrist discomfort is experienced, work should be stopped promptly to seek medical attention. Hand, wrist and arm injury may result from repetitive work, motion and overexposure to vibration.

**To reduce the risks associated with loud noise:**

- Always wear hearing protection while operating this tool. Follow your employer's safety policy or local/national standards for personal protective equipment requirements.

**To reduce the risks associated with fire or explosion:**

- Do not operate the tool in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust. The abrasives are able to create sparks when working material, resulting in the ignition of the flammable dust or fumes.
- Refer to MSDS of material being worked as to potential for creating fire or explosion hazard.

**To reduce the risks associated with hazardous dust ingestion or eye/skin exposure:**

- Use appropriate respiratory and skin protection, or local exhaust as stated in the MSDS of the material being worked on.

**To reduce the risks associated with hazardous voltage:**

- Do not allow this tool to come into contact with electrical power sources as the tool is not insulated against electrical shock.

# ⚠ CAUTION!

**To reduce the risks associated with skin abrasion, burns, cuts, or entrapment:**

- Keep hands, hair, and clothing away from the rotating part of the tool.
- Wear suitable protective gloves while operating tool.
- Do not touch the rotating parts during operation for any reason.
- Do not force tool or use excessive force when using tool.

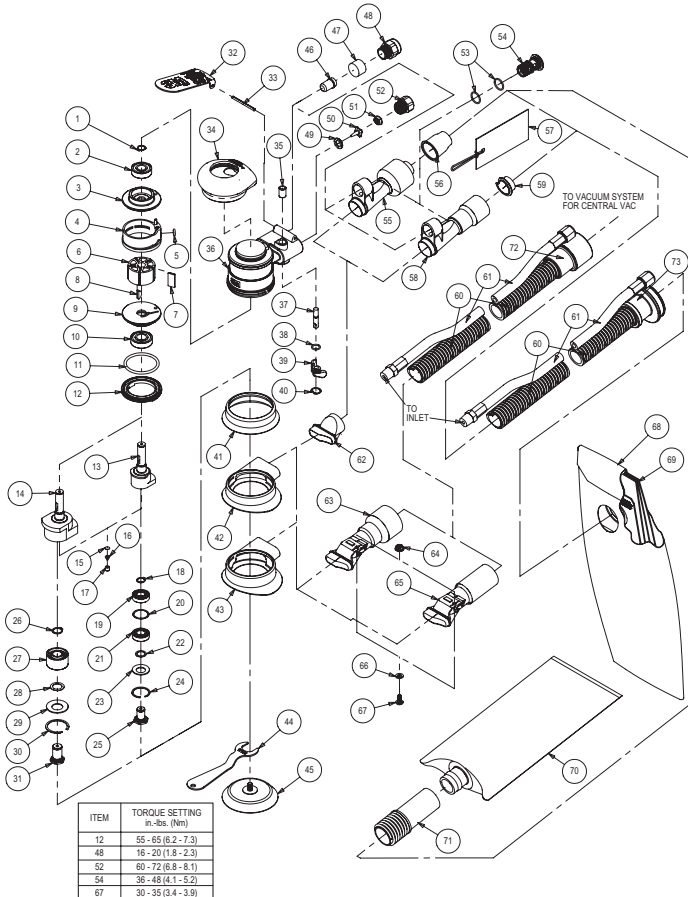
**To reduce the risks associated with whipping or hazardous pressure-rupture:**

- Ensure supply hose is oil resistant and is properly rated for required working pressure.
- Do not use tools with loose or damaged air hoses or fittings.
- Be aware that incorrectly installed hoses and fittings might unexpectedly come loose at any time and create a whipping/impact hazard.

**To reduce the risks associated with fly off of abrasive product or parts:**

- Use care in attaching abrasive product and disc pad; following the instructions to ensure that they are securely attached to the tool before use.
- Never free spin the tool or otherwise allow it to be started unintentionally.
- Never point this product in the direction of yourself or another person, or start tool unintentionally.
- Never over-tighten accessory fasteners.

## Parts Page



## Parts List

Item	Description	3M P/N	3M UPC	QTY
1	EXTERNAL RETAINING RING	A0040	28113	1
2	6000ZZ BEARING - 2 SHIELDS	A0021	28107	1
3	REAR ENDPLATE	B0017	28173	1
4	CYLINDER ASSEMBLY	A0005	28094	1
5	5 mm x 2 mm O-RING	A0042	28115	1
6	MACHINED ROTOR	B0005	28170	1
7	VANE	A0010	28099	5
8	WOODRUFF KEY	A0041	28114	1
9	FRONT ENDPLATE	B0016	28172	1
10	6001ZZ BEARING - 2 SHIELDS	A0019	28106	1
11	39.4 mm x 3.1 mm O-RING	A0045	28118	1
12	LOCK RING	A0001	28093	1
13	3 in x 3/32 in ORBIT SHAFT BALANCER	B0084	28176	1
14	3 in x 3/16 in ORBIT SHAFT BALANCER	B0309	28182	1
15	FILTER	A0122	28132	1
16	ONE WAY VALVE	A0121	28131	1
17	RETAINING SLEEVE	A0120	28130	1
18	RETAINING RING	A0107	28128	1
19	6900 BEARING - NO SEAL/SHIELDS	A0162	28136	1
20	SPACER	A0196	28140	1
21	6900 2RS BEARING - 1 SEAL	A0161	28135	1
22	SHIM 10.1 mm ID x 14.0 mm OD x 0.2 mm THK	A0108	28129	1
23	BELLEVILLE WASHER	A0126	28133	1
24	RETAINING RING	A0177	28139	1
25	SPINDLE	B0083	28175	1
26	11.9 mm (15/32 in) RETAINING RING	A0090	28127	1
27	DOUBLE ROW ANGULAR CONTACT BEARING - 1 SEAL	A0938	28148	1
28	SPACER 12.1 mm ID x 18.0 mm OD x 0.2 mm THK	A0016	28103	1
29	BELLEVILLE WASHER	A0017	28104	1
30	RETAINING RING	A0018	28105	1
31	SPINDLE	B0312	28183	1
32	LEVER FOR 12,000 RPM ROS 2.5 mm (3/32 in) ORBIT	A1351	28163	1
32	LEVER FOR 12,000 RPM ROS 5.0 mm (3/16 in) ORBIT	A1352	28164	1
32	LEVER FOR 3M 12,000 RPM ROS (5/16 in ORBIT)	A1447	28169	1
33	LEVER SPRING PIN	A0031	28109	1
34	GRIP 2 1/2 in	20342	20342	OPT
34	GRIP 2 3/4 in	20343	20343	1
34	GRIP 3 in	20344	20344	OPT
35	VALVE SLEEVE	A0015	28102	1
36	HOUSING (3 in. ROS)	A1332	28152	1
37	VALVE STEM ASSY	A0008	28097	1
38	9.0 mm x 1.5 mm O-RING	A0043	28116	1
39	SPEED CONTROL	B0014	28171	1
40	INTERNAL RETAINING RING	A0039	28112	1
41	3 in ROS NON-VAC SHROUD	A1334	28154	1
42	3 in ROS SKIRT/SHROUD (3/32 in Orbit)	A1335	28155	1
43	3 in ROS SHROUD (3/16 in Orbit)	A1230	28149	1
44	WRENCH (17 mm)	A0146	28134	1
45	1 BACK-UP PAD SUPPLIED WITH EACH TOOL	N/A	N/A	N/A
46	INTERNAL MUFFLER	A0062	28121	1
47	MUFFLER INSERT	A0068	28122	1
48	MUFFLER HOUSING	A0166	28138	1
49	VALVE SEAT	A0009	28098	1
50	VALVE	A0007	28096	1
51	VALVE SPRING	A0014	28101	1
52	INLET BUSHING ASSY	A0013	28100	1
53	14 mm x 1.5 mm O-RING	A0044	28117	2
54	SGV RETAINER	A0006	28095	1
55	1 in/28 mm HOSE SGV SWIVEL EXHAUST ASSEMBLY	A1338	28156	1
56	1 in/28 mm Hose Seal	A0778	28146	1
57	TAG WITH INSTRUCTION FOR 3M 1 in/28 mm HOSE SEAL	N/A	N/A	1
57	TAG WITH INSTRUCTION FOR 3M 3/4 in/19 mm HOSE SEAL	N/A	N/A	N/A
58	ASSEMBLY FOR 3/4 in/19 mm HOSE SGV SWIVEL EXHAUST FITTING	N/A	N/A	N/A
59	3/4 in/19 mm HOSE SEAL	N/A	N/A	N/A
60	VACUUM HOSE, 1 in ID x 6 ft	28301	28301	OPT
61	RANDOM ORBITAL SANDER AIR LINE EXTENSION, 3/8 in x 4 ft	20209	20209	OPT
62	SGV SKIRT/SHROUD ADAPTOR	A1333	28153	1
63	ROS CV SWIVEL EXHAUST ASSEMBLY	A1343	28157	OPT
64	M5 FLANGED NUT	A0048	28120	1
65	ASSEMBLY FOR ROS CV 3/4 in SWIVEL EXHAUST	A1345	28157	OPT
66	M5 WASHER	A0047	28119	1
67	SCREW	A0769	28145	1
68	VACUUM BAG COVER (CLOTH)	A1434	28303	OPT
69	VACUUM BAG INSERT (PAPER)	20338	20338	OPT
70	3M™ CLEAN SANDING FILTER BAG	20452	20452	1
71	3M™ FILTER BAG ADAPTOR	20453	20453	1
72	VACUUM HOSE FITTING ADAPTOR, 1 in Internal Hose Thread x 1 1/2 in OD Hose Adaptor	20341	20341	OPT
73	VACUUM HOSE ADAPTOR, 1 in Internal Hose Thread	28302	28302	OPT

# Product Configuration/Specifications: 12,000 RPM Random Orbital Sander

Note: All Vacuum machines use Ø 28 mm (1 in.) Vacuum Hose Fittings.

Orbit	Pad Face	Vacuum Type	Pad Type	Model Number	Pad Part Number	Product Net Wt kg (lb)	Height mm (in)	Length mm (in)	*Noise Level dBA Pressure (Power)	**Vibration Level m/s <sup>2</sup> (ft/s <sup>2</sup> )	**Uncertainty K m/s <sup>2</sup>						
2.5 mm (3/32 in)	Stikit™	Non Vacuum	Low Profile	20314/ †63371	20348	0.51 (1.12)	78.61 (3.10)	124.33 (4.90)	74 (83)	2.7 (8.85)	1.5						
		Non Vacuum		†63998								20350	0.51 (1.12)	78.61 (3.10)	124.33 (4.90)	74 (83)	2.7 (8.85)
	Hookit™	Central Vacuum		20315	0.57 (1.26)	78.61 (3.10)	186.17 (7.33)	76 (83)	2.7 (8.85)	1.5							
	Self-Gen Vacuum	20316		0.59 (1.30)	78.61 (3.10)	193.89 (7.66)	84 (93)	2.7 (8.85)	1.5								
5.0 mm (3/16 in)	Hookit™	Non Vacuum	Low Profile	20250/ †63375	20350	0.61 (1.34)	83.01 (3.26)	124.59 (4.90)	74 (83)	2.7 (8.85)	1.5						
		Central Vacuum		20251/ †63376								0.67 (1.48)	83.01 (3.26)	185.56 (7.30)	76 (83)	< 2.5 (< 8.2)	NA
		Self-Gen Vacuum		20252/ †63377								0.69 (1.52)	83.01 (3.26)	194.05 (7.64)	88(98)	2.8 (9.19)	1.5

† Available only in Europe.

\* Declared noise levels; measurements carried out in accordance with standard EN ISO 15744:2002.

\*\* Declared vibration levels in accordance with EN12096; measurements carried out in accordance with standard EN ISO 8662-8:1997 except that feed force was reduced to 15N +/- 5N due to the impracticality of operating this small tool at 30N +/- 5N as stated in the standard.

**IMPORTANT NOTE:** The noise and vibration values stated in the table are from laboratory testing in conformity with stated codes and standards and are not sufficient risk evaluation for all exposure scenarios. The actual exposure values and amount of risk or harm experienced to an individual is unique to each situation and depends upon the surrounding environment, the way in which the individual works, the particular material being worked, work station design, as well as upon the exposure time and the physical condition of the user. 3M™ cannot be held responsible for the consequences of using declared values instead of actual exposure values for any individual risk assessment.

## Operating Instructions

### PRIOR TO THE OPERATION

The tool is intended to be operated as a hand held tool. It is always recommended that while using the tool, operators stand on a solid floor, in a secure position with a firm grip and footing. Be aware that the sander can develop a torque reaction. See the section "SAFETY PRECAUTIONS".

Use a clean lubricated air supply that will give a measured air pressure at the tool of 6.2 bar (90 psig) when the tool is running with the lever fully depressed. It is recommended to use an approved 10 mm (3/8 in) x 8 m (25 ft) maximum length airline. Connect the tool to the air supply as shown in Figure 1. Do not connect the tool to the airline system without an easily accessible air shut off valve. It is strongly recommended that an air filter, regulator and lubricator (FRL) be used as shown in Figure 1 as this will supply clean, lubricated air at the correct pressure to the tool. In any case appropriate air pressure regulators shall be used at all times while operating this tool where the supply pressure exceeds the marked maximum of the tool. Details of such equipment can be obtained for your tool distributor. If such equipment is not used, the tool should be manually lubricated. To manually lubricate the tool, disconnect the airline and put 2 to 3 drops of suitable pneumatic motor lubricating oil such as 3M™ Air Tool Lubricant PN 20451, Fuji Kosan FK-20 or Mobil ALMO 525 into the hose end (inlet) of the tool. Reconnect tool to the air supply and run tool slowly for a few seconds to allow air to circulate the oil. If the tool is used frequently, lubricate it on a daily basis or lubricate it if the tool starts to slow or lose power. It is recommended that the air pressure at the tool be 6.2 bar (90 psig) while the tool is running so the maximum RPM is not exceeded. The tool can be run at lower pressures but should never be run higher than 6.2 bar (90 psig). If run at lower pressure the performance of the tool is reduced.

Recommended Airline Size - Minimum		Recommended Maximum Hose Length		Air Pressure		
10 mm	3/8 in	8 meters	25 feet	Maximum Working Pressure	6.2 bar	90 psig
				Recommended Minimum	NA	NA

## Safety Precautions

1. Read all instructions before using this tool. All operators must be fully trained in its use and aware of these safety rules.
2. The tool RPM should be checked on a regular basis to ensure proper operating speed.
3. Make sure the tool is disconnected from the air supply. Select a suitable abrasive and secure it to the disc pad. Be careful to center the abrasive on the disc pad.
4. Always wear required safety equipment when using this tool.
5. When sanding/buffing always start the tool on the workpiece. This will prevent gouging due to excess speed of the buff pad. Stop air flow to the tool as it is removed from the workpiece.
6. Always remove the air supply to the sander before fitting, adjusting or removing the abrasive or disc pad.
7. Always adopt a firm footing and grip and be aware of torque reaction developed by the sander.
8. Use only 3M approved spare parts.
9. Always ensure the material being sanded is firmly fixed to avoid movement.
10. Check hose and fittings regularly for wear. Do not carry the tool by its hose; always be careful to prevent the tool from being started when carrying the tool with the air supply connected.
11. Dust can be highly combustible.
12. If tool is serviced or rebuilt check to ensure that the maximum tool RPM is not exceeded and that there is no excessive tool vibration.
13. Do not exceed maximum recommended air pressure. Use safety equipment as recommended.
14. Prior to installing any sanding or polishing accessory, always check that its marked maximum operating speed is equal or higher than the rated speed of this tool.
15. The tool is not electrically insulated. Do not use where there is a possibility of contact with live electricity, gas pipes, and/or water pipes.
16. This tool is not protected against hazards inherent in grinding and cutting operations and no such accessories should ever be attached.
17. Take care to avoid entanglement with the moving parts of the tool with clothing, ties, hair, cleaning rags or loose hanging objects. If entangled, stop air supply immediately to avoid contact with moving tool parts.
18. Keep hands clear of the spinning pad during use.
19. If the tool appears to malfunction, remove from use immediately and arrange for service and repair.
20. Immediately release the start handle in the event of any disruption of pressure; do not attempt to re-start until the disruption has been corrected.
21. When tool is not in use, store in a clean dry environment free of debris.
22. Recycle or dispose of tool according to Local, State, and Federal Regulations.

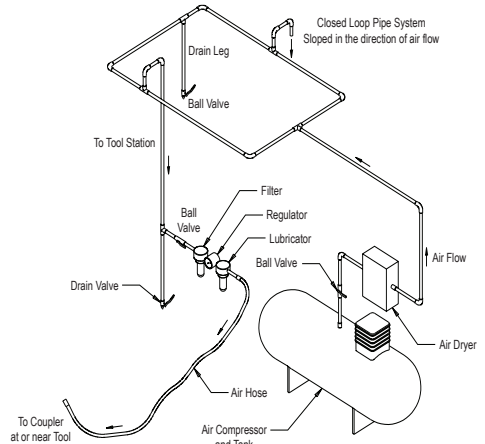


Figure 1

## 3M™ Disc Pads

3M Disc Pads are perfectly mated for use on the 3M Sander. Constructed from premium, industrial-quality materials and featuring a riveted fiberglass and steel hub with molded urethane, their durability and precise construction are the ideal complement to the performance of the 3M Sander. See Product Configuration/Specifications table for the correct replacement pad for a particular model. The following chart is a sample of products offered.

Description	Part Number
77 mm (3 in) Stikit™ Low Profile Disc Pad	20348
77 mm (3 in) Hookit™ Low Profile Disc Pad	20350

See 3M ASD Accessory catalog 61-5002-8098-9 for additional Accessories.

## Removing and Mounting Disc Pad to Random Orbital Sander

1. Disconnect air line from sander.
2. Remove old disc pad from sander by inserting the wrench, supplied with the tool, between the rubber shroud and the disc pad. Use the wrench to secure the sander spindle while turning the disc pad counter clockwise.
3. After the old disc has been removed from the sander, inspect the threaded hole in the spindle to ensure that the threads are free of debris and undamaged.
4. Ensure that the phenolic washer is in place around the threaded shaft of the new disc pad.
5. Secure the sander spindle with the wrench and tighten the new disc pad securely to the tool.

### WARNING!

An inadequately tightened disc pad could cause the threaded shaft to break causing damage to the tool and work piece and possible injury to the operator or bystanders.

**Product Use:** All statements, technical information and recommendations contained in this document are based up on tests or experience that 3M believes are reliable. However, many factors beyond 3M's control can affect the use and performance of a 3M product in a particular application, including the conditions under which the 3M product is used and the time and environmental conditions in which the product is expected to perform. Since these factors are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method of application.

**Warranty and Limited Remedy:** 3M warrants this tool against defects in workmanship and materials under normal operating conditions for one (1) year from the date of purchase. 3M MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. User is responsible for determining whether the 3M tool is fit for a particular purpose and suitable for user's application. User must operate the tool in accordance with all applicable operating instructions, safety precautions, and other procedures stated in the operating manual to be entitled to warranty coverage. 3M shall have no obligation to repair or replace any

tool or part that fails due to normal wear, inadequate or improper maintenance, inadequate cleaning, nonlubrication, improper operating environment, improper utilities, operator error or misuse, alteration or modification, mishandling lack of reasonable care, or due to any accidental cause. If a tool or any part thereof is defective within this warranty period, your exclusive remedy and 3M's sole obligation will be, at 3M's option, to repair or replace the tool or refund the purchase price.

**Limitation of Liability:** Except where prohibited by law, 3M and seller will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.

**Submitting a Warranty Claim:** Contact your dealer when submitting a warranty claim in accordance with the restrictions listed above. Please note that all warranty claims are subject to manufacturer's approval. Be sure to keep your sales receipt in a safe place. This must be submitted when filing a warranty claim, within 1 year from the date of purchase. For additional assistance call 1-800-362-3550.

### EC Declaration of Conformity



**Manufacturers Name:** 3M, Abrasive Systems Division  
**Manufacturers Address:** 3M Center, Building 223-6N-02  
 St Paul, MN USA 55144

Does hereby declare that the machinery described below complies with those applicable essential health and safety requirements of the Machinery Directive 2006/42/EC; together with all amendments to date.

**Description:** 3M Random Orbital Sanders, 77mm (3") x 2.5mm (3/32") orbit diameter  
 3M Random Orbital Sanders, 77mm (3") x 5mm (3/16") orbit diameter

**Model Numbers:** 20314, 20315, 20316, 20250, 20251, 20252, 63371, 63375, 63376, 63377, 63998

The following standards have either been referred to, or complied with, in full or in part as relevant:

EN ISO 12100-1:2003	Safety of machinery. Basic concepts, general principles for design – Basic terminology and Technical principals
EN ISO 12100-2:2003	
EN 792-8:2001 A1:2008	Hand-held non-electric power tools – Safety Requirements – Part 8: Sanders and Polishers
EN 983:1996	Safety of machinery. Safety requirements for fluid power systems and components - Pneumatics
EN ISO 14121-1:2007	Safety of machinery. Risk assessment principles
EN ISO 28662-1:1992	Hand-held portable power tools – Measurement of vibrations at the handle – Part 1: General
EN ISO 8662-8:1997	Hand-held portable power tools – Measurement of vibrations at the handle – Part 8: Polishers and rotary, orbital and random orbital sanders
EN ISO 15744:2008	Hand-held non-electric power tools. Noise measurement code. Engineering method (grade 2)

**Full Name of responsible person:**

Stefan A. Babirad

**Position:** Technical Director

**Signature:**

**Date:** 11/3/2009  
 St. Paul, Minnesota USA

**Full Name and address of individual responsible to compile technical file within the Community:**

Mr. Claus Geiger - Marketing Operations, Abras. Syst. Div., 3M Deutschland GmbH, Carl-Schurz-Strasse 1, D-41453 Neuss, Germany