

### 5.1.11.3 Noise control by information

The declared dual-number noise emission values shall be given in the information for use (see 7.3.2).

## 5.2 Performance requirements

### 5.2.1 General

#### 5.2.1.1 Hydraulic fluid

Hydraulic fluid shall maintain all its operational characteristic between a temperature of  $-20\text{ °C} \pm 1\text{ °C}$  and  $+80\text{ °C} \pm 1\text{ °C}$ .

#### 5.2.1.2 Operating temperatures

The opening and closing times of the tool[s] shall comply with the manufacturers published times  $\pm 10\%$  at  $-20\text{ °C} \pm 1\text{ °C}$  and  $+55\text{ °C} \pm 1\text{ °C}$ .

#### 5.2.1.3 Speeds

The duration of a opening or closing cycle over the full travel distance including reaching maximum system pressure of any hydraulic rescue tool for which this standard applies, shall not exceed 80 s when connected to a power pack designated by the manufacturer for use with that tool.

### 5.2.2 Spreaders

5.2.2.1 Spreaders shall be classified by the manufacturer according to Table 1 and marked according to Clause 8. Designation of a type shall be based on the lower of the force and distance measurements achieved by the tool.

EXAMPLE 1 A spreader with 35 kN min. force and 750 mm spreading distance shall be designated as a type AS35/750-X where X stands for the mass. These data are the nominal data for the tool.

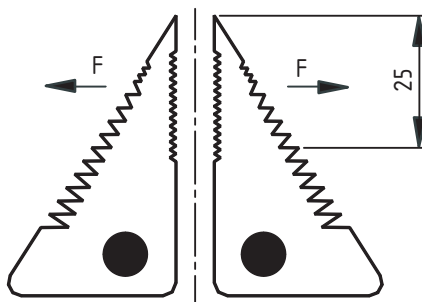
EXAMPLE 2 A spreader with 55 kN min. force and 810 mm spreading distance shall be designated as a type BS55/810-X where X stands for the mass. These data are the nominal data for the tool.

**Table 1 — Spreader classification**

Type	Minimum spreading force	Minimum spreading distance
	(kN)	(mm)
AS	20	600
BS	50	800
CS	80	500

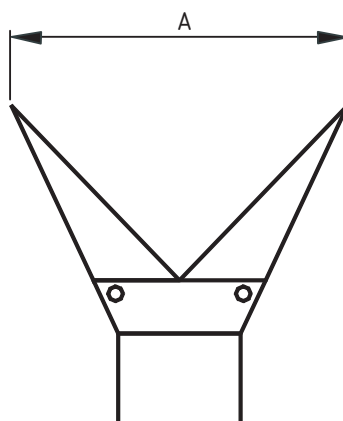
5.2.2.2 Spreaders shall have a minimum spreading force as shown in Table 1, measured within 25 mm of the end of the tip [Figure 7] over all the spreading distance at the allowable pressure.

Dimensions in millimetres



**Figure 7 — Location of force measurement**

**5.2.2.3** Spreaders shall have a minimum spreading distance "A" (see Figure 8) as shown in Table 1, measured at the end of the tips from the closed position to a full open position.



**Figure 8 — Spreading distance (A)**

**5.2.2.4** Spreaders shall have a minimum pulling force of at least 60 % of the nominal spreading force achieved. This pulling force is to be measured whilst using the pulling attachments.

**5.2.2.5** Spreaders shall have a minimum pulling distance of at least 60 % of the nominal spreading distance achieved. This pulling distance is to be measured from the full open to the fully closed position whilst using the pulling attachments.

### 5.2.3 Cutters

**5.2.3.1** Cutters shall be classified by the manufacturer according to Tables 2 and 3 and marked according to Clause 8. Designation of a type shall be based on the lower of the cutter opening or the cutter reach (see 5.2.3.3) measured at the tool, the fully achieved cutting category and the mass.

**EXAMPLE 1** A cutter with a cutter opening of 138 mm, a cutter reach of 105 mm and a cutting capacity category F, shall be designated as a type AC138F-X where X stands for the mass. These data are the nominal data for the tool.

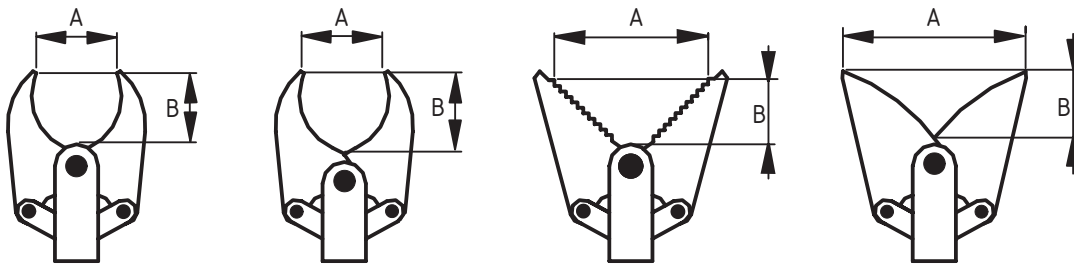
**EXAMPLE 2** A cutter with a cutter opening of 152 mm, a cutter reach of 95 mm and a cutting capacity category E, shall be designated as a type AC126E-X where X stands for the mass. The measured cutter reach lowers the nominal cutter opening, i.e. 100/75x95. These data are the nominal data for the tool.

EXAMPLE 3 A cutter with a cutter opening of 160 mm, a cutter reach of 140 mm and a cutting capacity category H, shall be designated as a type BC160H-X where X stands for the mass. These data are the nominal data for the tool.

Table 2 — Cutter classification

Type	Min. cutter opening (mm)	Cutting capacity achieved according to Table 3
AC	< 150	A - H
BC	150 to 199	A - H
CC	≥ 200	A - H

5.2.3.2 Cutters shall have a minimum nominal cutter opening as shown in Table 2, measured at dimension "A" (see Figure 9).



**Key**

A Cutter opening

B Cutter reach

Figure 9 — Cutter opening/reach, examples

NOTE The nominal cutter opening for cutters with blades of different configuration than the examples shown above, are to be measured at the tips of the cutting section of the blades at their maximum open position.

5.2.3.3 Cutters shall have a cutter reach of not less than 75 % of the nominal cutter opening. The measurement of the cutter reach shall be taken from the base of the cutting edge to the mid point between the tips of the cutting section of the blades whilst the blades are in an open position (Figure 9 shows examples only).

5.2.3.4 Cutters shall be capable of cutting a total of 60 pieces of steel profiles as stated in Table 3. The category letter shall indicate the result. Each cut shall be achieved in one cutting action. To achieve a category letter all the requirements of that category shall be satisfied.

EXAMPLE 1 Category A = 20 x no.1 and 20 x no.2 and 20 x no.3.

EXAMPLE 2 Category C = 15 x no.1 and 15 x no.2 and 15 x no.3 and 15 x no.4.

EXAMPLE 3 Category F = 12 x no.1 and 12 x no.2 and 12 x no.3 and 12 x no.4 and 12 x no.5.

**5.2.3.5** Manufacturers shall provide the test results of the cutting capacity of a cutter or combi tool including the measured hardness of the materials used for the tests.

**5.2.3.6** Cutters shall be able to make one cut through a 2 mm steel plate. The length of the cut shall not be less than 80 % of the cutter reach. The steel plate shall be at least 50 % greater than the cutter reach (see Figure 9). The steel plates shall conform to EN 10025-1:2004, Table 5, and type S235.

**Table 3 — Cutting capacity**

Category letter	Round hot rolled bar mm	Flat sheet metal mm	Tube mm	Square hollow tube mm	Rectangular hollow tube mm
<b>A</b>	14	30 x 5	21,3 x 2,3		
<b>B</b>	16	40 x 5	26,4 x 2,3		
<b>C</b>	18	50 x 5	33,7 x 2,6	35 x 4	
<b>D</b>	20	60 x 5	42,6 x 2,6	40 x 4	50 x 25 x 2,5
<b>E</b>	22	80 x 8	48,3 x 2,9	45 x 4	50 x 30 x 3,0
<b>F</b>	24	80 x 10	60,3 x 2,9	50 x 4	60 x 40 x 3,0
<b>G</b>	26	100 x 10	76,1 x 3,2	55 x 4	80 x 40 x 3,0
<b>H</b>	28	110 x 10	76,1 x 4,0	60 x 4	80 x 40 x 4,0

The steel profiles shall conform to EN 10025-1:2004, Table 5, type S235 and EN 10210-2 (dimensions).

#### 5.2.4 Combi tools

**5.2.4.1** Combi tools shall be classified by the manufacturer according to Tables 2 and 3 and marked according to Clause 8. Designation of a type shall be based on the lower of the spreading force, spreading distance, the cutting category and the mass. To achieve a category letter all the requirements of that category shall be satisfied.

EXAMPLE A combi tool with 27 kN min. force, 400 mm spreading distance and a cutting capacity category H, shall be designated as a type BK27/400-H-X where X stands for the mass. These data are the nominal data for the tool.

**Table 4 — Combi tool classification**

Type	Minimum spreading force (kN)	Minimum spreading distance (mm)	Cutting capacity achieved according to Table 3
<b>AK</b>	< 25	< 250	A - H
<b>BK</b>	25 – 35	250 - 350	A - H
<b>CK</b>	> 35	> 350	A - H

**5.2.4.2** Combi tools shall have a minimum spreading force as shown in Table 4, measured within 25 mm of the end of the jaws (see Figure7) over all the spreading distance at the allowable pressure.

**5.2.4.3** Combi tools shall have a minimum spreading distance "A" as shown in Table 4, measured at the end of the jaws from the closed position to an open position (see Figure 8).

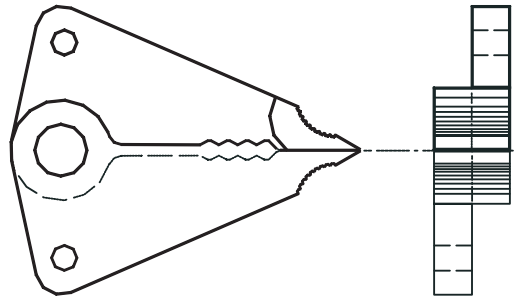
**5.2.4.4** Combi tools shall have a minimum pulling force of at least 60 % of the nominal spreading force achieved. This pulling force is to be measured whilst using the pulling attachments.

**5.2.4.5** Combi tools shall have a minimum pulling distance of at least 60 % of the nominal spreading distance achieved. This pulling distance is to be measured from the full open to the fully closed position whilst using the pulling attachments.

**5.2.4.6** Combi tools shall be capable of cutting a total of 60 pieces of steel profiles as stated in Table 3. The category letter shall indicate the result. Each cut shall be achieved in one cutting action.

#### **5.2.4.7 Jaws**

The squeezing section of the jaw(s) of a combi tool shall contact each other parallel and symmetrically when in the fully closed position (see Figure 10 which shows an example).



**Figure 10 — Squeezing section jaws**

#### **5.2.5 Rams**

**5.2.5.1** Rams shall be classified by the manufacturer and marked according to Clause 8. Designation of a type shall be based on the pushing force in kN, the stroke expressed in mm and the mass.

**EXAMPLE 1** A ram with a pushing force of 70 kN and a stroke of 150 mm, shall be designated as a type R70/150-X where X stands for the mass.

**EXAMPLE 2** A ram with a pushing force of 180 kN and a stroke of 950 mm, shall be designated as a type R180/950-X.

**NOTE** Where a ram has 2 pistons operating from each end of the main cylinder of the tool, the stroke is the sum of the full distances travelled by each piston.

**5.2.5.2** Telescopic rams shall be classified by the manufacturer and marked according to Clause 8. Designation of a type shall be based on the pushing force in kN, the stroke travelled by each of the telescopic extending pistons in mm and the mass.

**EXAMPLE** A telescopic ram with 2 telescopic extending pistons, the main piston exerting 180 kN force over a stroke of 300 mm and the second piston exerting 60 kN force over a stroke of 150 mm, shall be designated as a type TR180/300-60/150-X where X stands for the mass.

**5.2.5.3** The pushing force of rams at the centre  $\pm 10$  mm of the contact area of the feet over the stroke shall not be less than 60 kN.

### 5.2.5.4 Pushing feet

**5.2.5.4.1** The feet of the smallest piston of telescopic rams shall be large enough to cover the largest piston whilst in closed position.

### 5.2.6 Power pack

**5.2.6.1** Power packs shall be designated according to the operating mode:

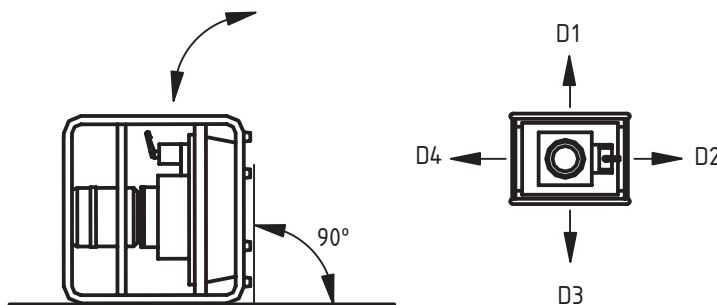
- a) STO for Single Tool Operation.
- b) ATO for Alternative Tool Operation (two or more).
- c) MTO for simultaneous Multiple Tool Operation.

**5.2.6.2** Prime movers shall start and provide the necessary power within 1 min to drive the hydraulic pump under the following conditions:

- a) (a) Altitude : 0 - 1 000 m
- b) (b) Humidity : 0 - 95 %

**5.2.6.3** The contents of the fuel tank [where fitted] of a prime mover shall allow the power pack to operate at maximum speed for at least one hour with a tool connected to each supply outlet whilst the manual control actuator of the tool[s] is/are in the neutral position.

**5.2.6.4** The prime mover of the power pack shall be restarted and run within 60 s after being tilted through  $90^\circ \pm 1^\circ$  for  $10\text{ s} \pm 1\text{ s}$ , in the positions (D1-D4) as shown in Figure 11 and repositioned.



**Figure 11 — Tilting to 90°**

**5.2.6.5** Power packs shall operate the number of tool[s] as designated by the manufacturer under the following conditions:

- a) conditions see 5.2.6.2 for prime movers;
- b) low temperature :  $-20\text{ }^\circ\text{C} \pm 1\text{ }^\circ\text{C}$ ;
- c) high temperature :  $+55\text{ }^\circ\text{C} \pm 1\text{ }^\circ\text{C}$ ;
- d) Inclined plane :  $20^\circ$  angle ( $\alpha$ )  $\pm 1^\circ$  and positioned as per Figure 12, (D1-D4).

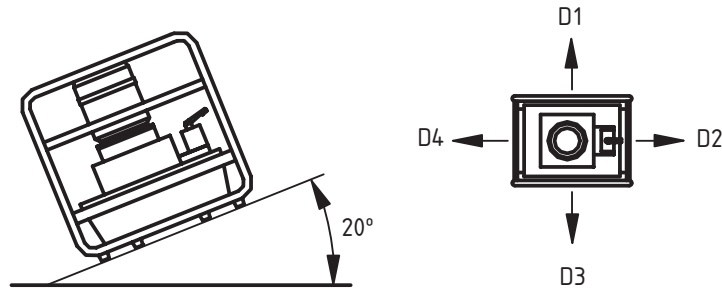


Figure 1 — Inclined plane

**5.2.6.6** Power packs shall maintain their allowable pressure during a continuous 30 min  $\pm$  3 s cycle of 120 s  $\pm$  2 s at no pressure and 60 s  $\pm$  1 s at allowable pressure whilst delivering hydraulic fluid to the rescue tool(s) specified by the manufacturer.

**5.2.6.7** Hydraulic fluid reservoirs shall be provided with a filling device.

**5.2.6.8** It shall be possible for one person to uncouple and re-couple a tool within 30 s  $\pm$  1 s, per hydraulic circuit, whilst the prime mover is running at maximum speed.

## 5.2.7 Manual pumps

The requirements as stated in item 5.2.6.5 (b, c and d) shall apply for the manual pumps.

## 5.2.8 Hoses assemblies and hose reels

**5.2.8.1** Hose reels shall have the capability to manually rewind the hoses.

**5.2.8.2** Hose reels shall be provided with a device to guide the hose.

**5.2.8.3** Hose reels shall allow transfer of hydraulic fluid at allowable pressure with any length of hose assembly wound-off.

## 5.2.9 Accessories

Pulling attachments shall have a minimum individual length of 1,5 m  $^{+10}_0$  cm and shall be provided with a device(s) to adjust the length.

# 6 Verification

## 6.1 General

For verification, the hydraulic rescue system shall be complete with all the necessary components and accessories such as chains and shackles or any test adapters necessary to conduct the appropriate test, and the power packs that is (are) designated by the manufacturer to operate with the tool.

Unless otherwise required for performance tests (see Introduction, negotiations), all tests shall be conducted at ambient temperature which for the purpose of these tests shall be defined as 25 °C  $\pm$  10 °C.

Unless otherwise required by this standard for specific tests the following conditions for testing shall apply for power packs: