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**CLEMCO®**  
INTERNATIONAL

# **OWNER'S MANUAL**

**BIG CLEM**

***for several operators with***

***Pneumatic Stop Valve for air control and***

***Abrasive Metering Valve***

***300-1800 CFM***

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# 1 Scope of manual

This manual covers the operation and maintenance of the bulk blaster BIG CLEM, incorporating the following features:

- During blast operation the tank (volume >500 litre) is not pressurized or depressurized. It is permanently under pressure.
- Air for blasting is controlled by air stop valves (for example PVR-A or RMS 1500)
- Abrasive metering through pneumatically controlled abrasive metering valves (for example PVR-G or PT-valve)
- The blast machine is either portable (chassis) or stationary (runner or module C).

Additionally the following owner's manuals and regulations should be considered:

- Owner's manual for pneumatic Air Stop Valves and abrasive metering valves
- Owner's Manual for PT-Valve
- Trailer certificate, test book and customer information No.81001 and 81002 from "Lang-Fahrzeugbau" (only for towable version)

# 2 Application and restrictions

The "BIG CLEM" is especially designed for blast operations which require high production rates with up to 4 operators and mobility.

## 2.1 Maximum working pressure

The **maximum working pressure** is **10 or 12 bar** (option). It is indicated on the type plate and in the TÜV - certificate.

To prevent overpressure, the user has to install an **overpressure relief valve** between the compressor and the BIG CLEM, which is adjusted to the rating of the compressor (air volume) and the size of the air line.

## 2.2 Abrasive

The "BIG CLEM" can be used for all types of abrasive, whereby the following should be considered:

- A BIG CLEM with a 60 - degree conical bottom has the advantage, that when blasting, the tank can be completely emptied of abrasive (option).
- The maximum particle size of the abrasive depends on the nozzle size.
- The formula maximum particle size =  $\frac{1}{4} * \text{nozzle size}$  can be applied.
- If steel grit is used, the gross vehicle weight rating (GVW) has to be considered (towable model or stationary model with runners).

### 3 General description

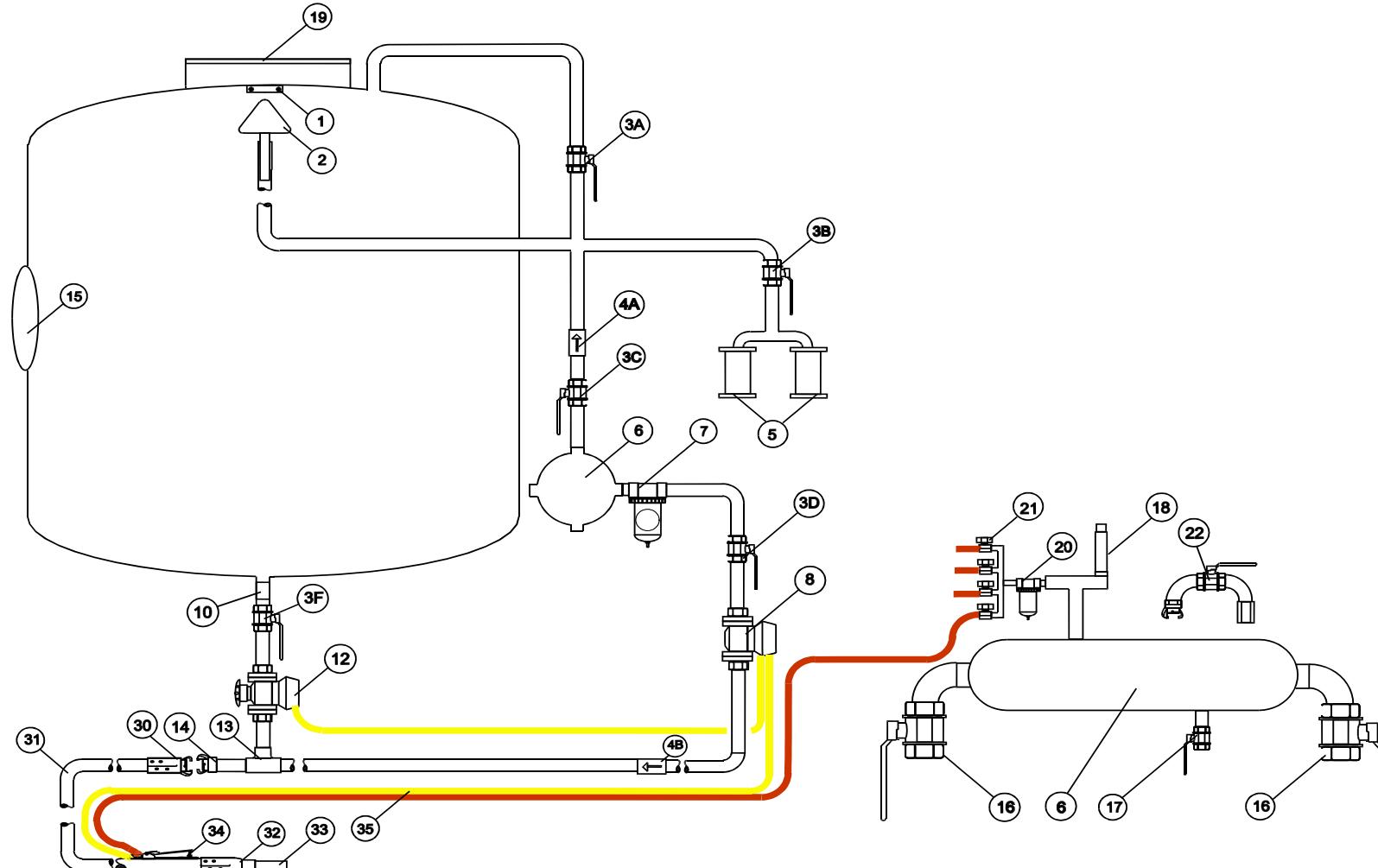


Figure 1 BIG CLEM with pneumatic remote controls.

Figure 1 shows the major components of the BIG CLEM bulk blaster:

- *Tank (volume between 500-600 litre) with*
  - ⇒ *Air manifold (item 6).*
  - ⇒ *1 moisture separator HMS (item 7) per operator.*
  - ⇒ *1 air Stop Valve (item 8) per operator (shut on / off of the air flow for the blast process).*
  - ⇒ *1 pneumatically controlled abrasive metering valve (item 12) per operator.*
  - ⇒ *1 abrasive shut-off valve (item 3F) per operator to shut-off the flow of abrasive during maintenance of the abrasive metering valve (option).*
  - ⇒ *2 muffler (item5)*
- *1 deadman handle per operator (item 34) with*
  - *twinline remote control hose (item 35)*
  - *electric panel RME-1 and electric cord (item 36 and 37, figure 2) or electric panel RME-2 and electric cord (item 38 and 39, figure 3, not included in the basic configuration)*
- *1 blast hose per operator (item 31) with nozzle holder (item 32) and nozzle (item 33) (not included in the basic configuration).*

### **3.1 How the BIG CLEM works**

When the BIG CLEM is connected (connections see figure 1, item 16) to an air supply (compressor), the pop-up valve (item 2) seals off the filling port with the pop-up gasket (item 1) and the tank filled with abrasive is pressurized. During the working session the tank remains pressurized. It is only depressurized when it is filled with abrasive or after the end of the work period.

When the operator depresses the deadman handle (item 34), the blast process starts (for a more detailed description of the remote controls see section 3.2). The air stop valve respectively the abrasive metering valve open, and with the blast hose (item 31), the abrasive is guided to the nozzle (item 33).

As soon as the operator releases the deadman handle, the blast process stops.

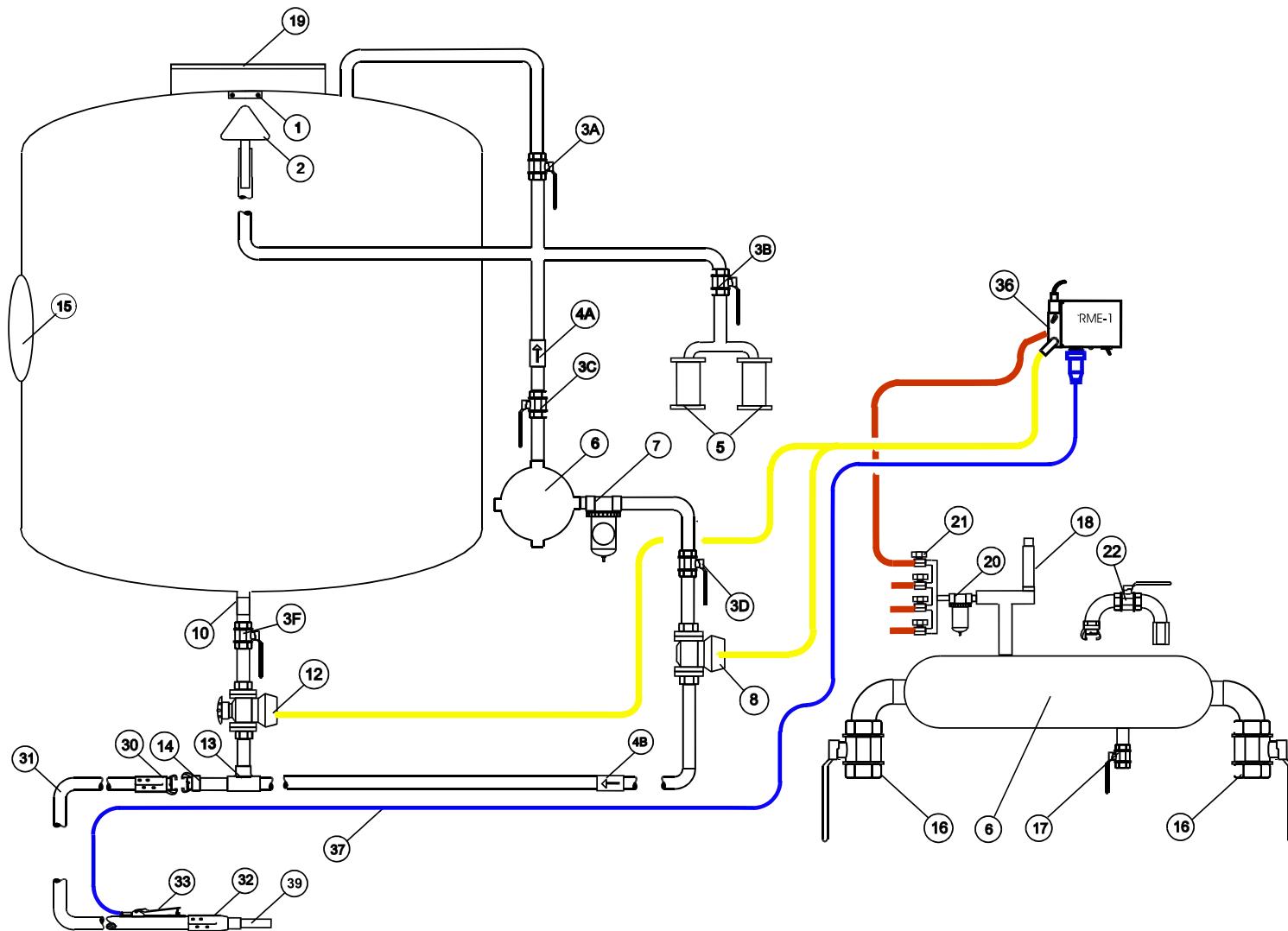
## **3.2 How the remote controls work**

### **3.2.1 Pneumatic remote controls (see figure 1)**

The air for the remote controls is permanently drawn off from the air manifold (connections item 21). After passing through the moisture separator MM-HMS (item 20), the brown remote control hose (item 35) guides the compressed air to the deadman handle (item 34). When the deadman handle is depressed, the air passes from the brown to the yellow hose and is guided back to the air stop valve (item 8) and the abrasive metering valve (item 12), which will both open (for a more detailed description of both valves see special owner's manual). When the deadman handle is released, both valves close and interrupt the flow of abrasive and air.

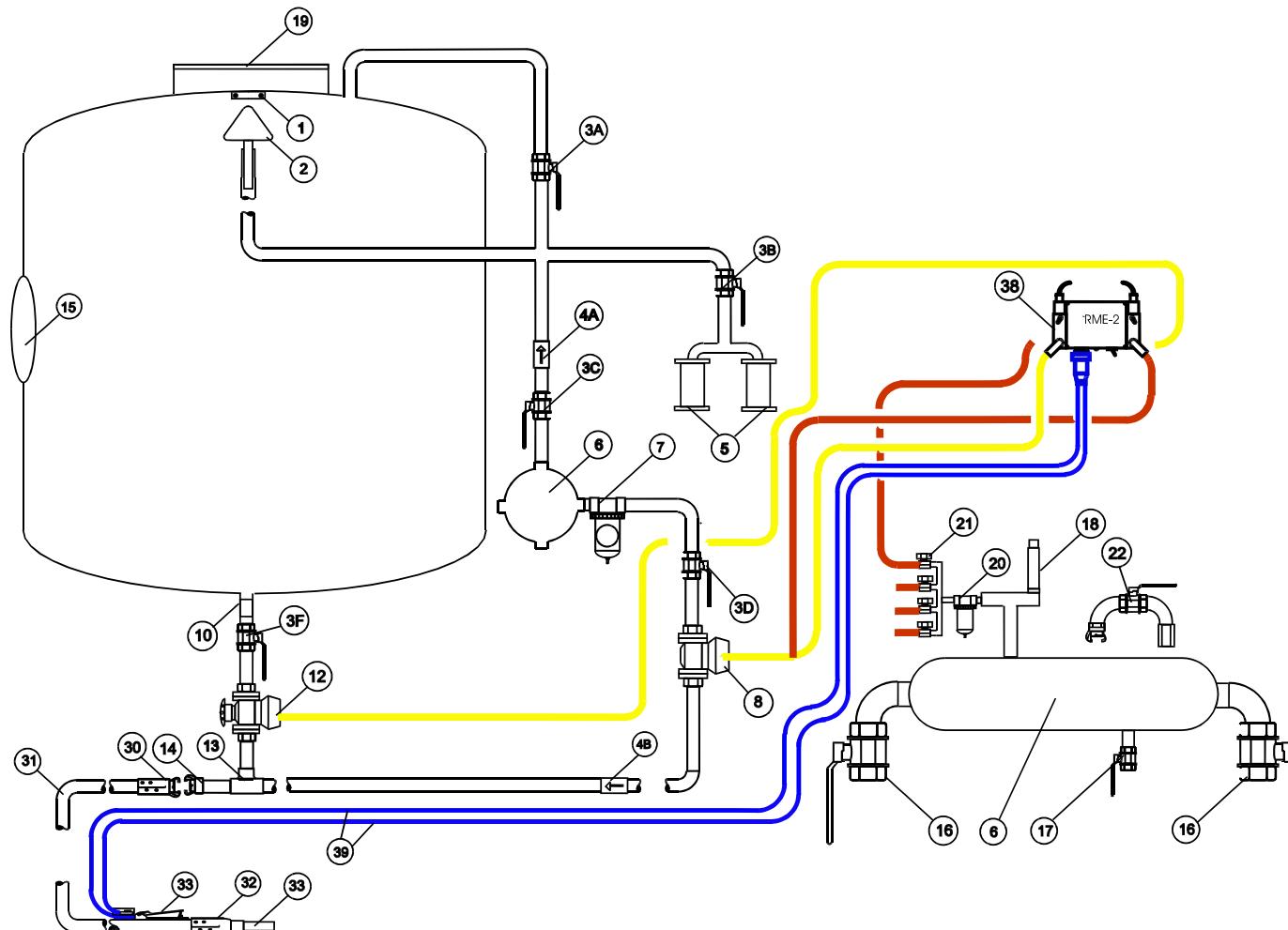
### **3.2.2 Electro-pneumatic remote controls (see figure 2)**

In order to reduce the switching time, the twinline remote controls between the deadman handle and the connection on the air manifold (item 21) is replaced by an electric cord (item 37) and the electric panel RME-1 (item 36). The magnetic valve converts the electric signal into a pneumatic signal.



**FIGURE 2 BIG CLEM with electro-pneumatic remote controls**

### **3.3 Double function with electro – pneumatic remote controls**



**FIGURE 3 – BIG CLEM with electro-pneumatic double function.**

The double function (see figure 3) enables the operator – through an additional electrical switch on the deadman handle – to open or close the pneumatically controlled abrasive metering valve during blasting (deadman handle depressed). When the deadman handle is released, the abrasive metering valve closes automatically (blast stop). The double function is recommended for very long blast hoses and for surface cleaning after blasting with compressed air (to remove debris).

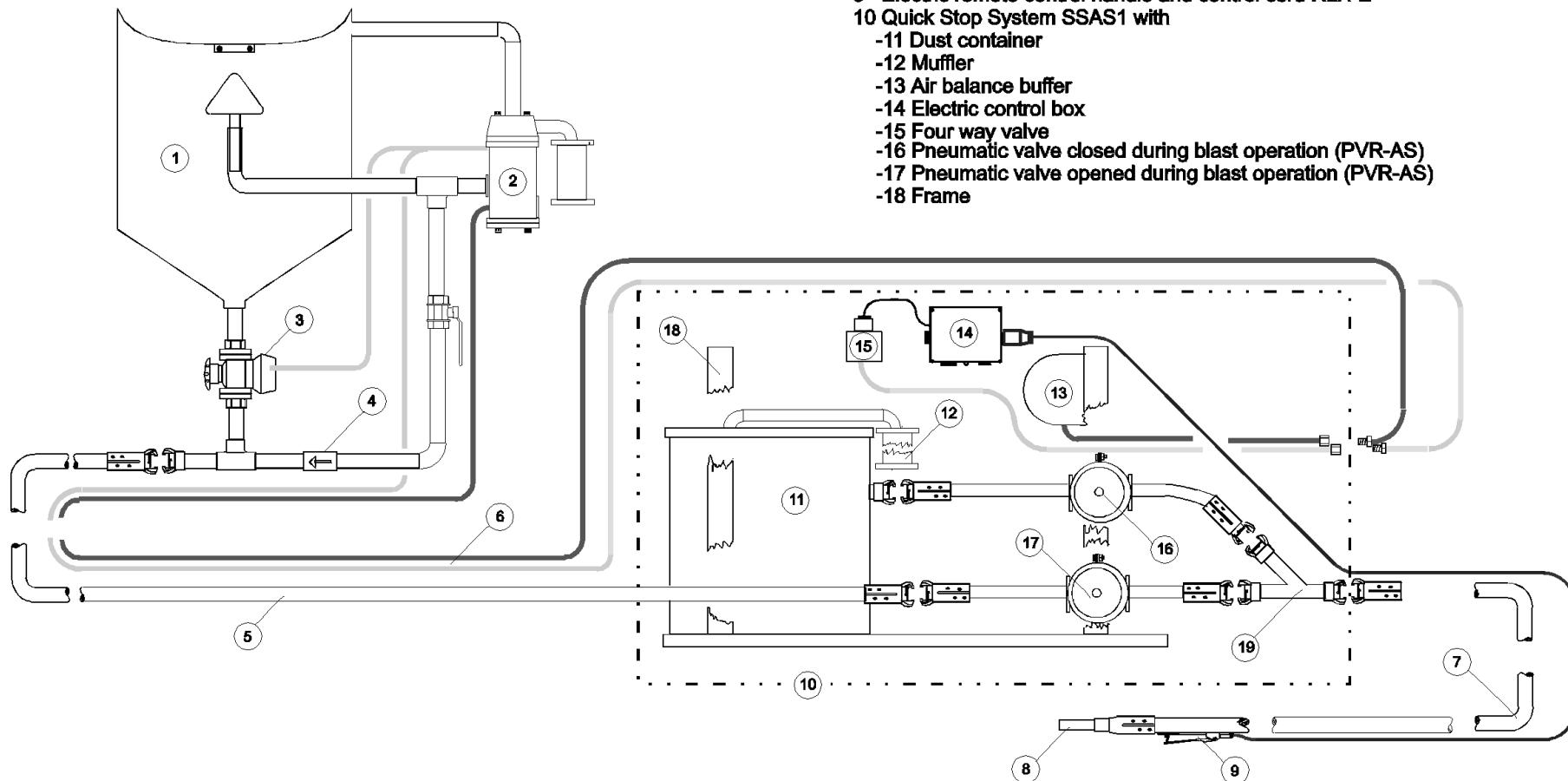
### **3.4 Quick Stop System**

Normally, a conventional blast machine needs between **2 and 15 seconds**, in extreme cases **more than 30 seconds** to stop blasting (depending on hose dimensions and nozzle size). **This is a potential danger for the operator of the blast equipment!** The reason for delayed interruption can be found in expanding air volume still present in the system after releasing the deadman handle. The Quick Stop System reduces the time for blast stop to **less than 1 second** and thus increases the safety of the operator.

German law demands this equipment. CLEMCO recommends to use a Quick Stop System for the following applications in other countries:

- Blast pressure  $\geq$  5 bar
- Length of blast hose  $\geq$  20 m
- Hard structure abrasive like steel grit

**STOCK Nr. 90777D → Quick Stop System SSAS 1**



- 1 Pot with
  - 2 remote control (RMS-2000A)
  - 3 abrasive metering valve (PVR-G)
  - 4 non return valve (Accessories)
- 5 Abrasive hose between pot and SSAS1
- 6 Control hose
- 7 Abrasive hose between SSAS1 and nozzle (max. 10 m)
- 8 Nozzle holder with nozzle
- 9 Electric remote control handle and control cord RLX-E
- 10 Quick Stop System SSAS1 with
  - 11 Dust container
  - 12 Muffler
  - 13 Air balance buffer
  - 14 Electric control box
  - 15 Four way valve
  - 16 Pneumatic valve closed during blast operation (PVR-AS)
  - 17 Pneumatic valve opened during blast operation (PVR-AS)
  - 18 Frame

## 4 Set-up and operation

### 4.1 Requirements

- The BIG CLEM should only be placed on a flat and firm surface. It must be ensured that it cannot slide away or move because of extreme slope (towable version).
- When steel grit is used with a stationary BIG CLEM with runners, it must be ensured that it does not overturn (firm underground through usage of a floor plate)
- A sufficient air supply is necessary (see figure 5):

Nozzle size [mm]	Air consumption per nozzle [m <sup>3</sup> /min.]				Air consumption for 4 nozzles [m <sup>3</sup> /min.]			
	Pressure at the nozzle [bar]				Pressure at the nozzle [bar]			
	<u>6</u>	<u>8</u>	<u>10</u>	<u>12</u>	<u>6</u>	<u>8</u>	<u>10</u>	<u>12</u>
6,5	2,0	2,6	3,2	4,7	8,0	10,4	12,8	18,8
8	3,4	4,8	5,4	6,4	13,6	19,2	21,6	25,6
9,5	4,8	6,2	7,6	9,0	19,2	24,8	30,4	36,0
11	6,4	8,3	10,1	12,0	25,6	33,2	40,4	48,0
12,5	8,4	10,7	13,1	15,4	33,6	42,8	52,4	61,6

Figure 5 Air consumption

- The user has to make sure, that an **overpressure relief valve** is installed between the BIG CLEM and the compressor, because the safety valve of the BIG CLEM is only a warning device.
- It has to be ensured, that there is sufficient space between the operators to prevent danger. If a spatial separation is not possible, a **safety distance of minimum 20m** between each of the operators should be ensured.

#### **WARNING!**

**Non-compliance with this measure can result in death to the operator!**

## 4.2 Set-up for initial installation or reinstallation

(1) Place "BIG CLEM".	<ul style="list-style-type: none"> <li>⇒ Safe underground.</li> <li>⇒ Engage breaks and if necessary secure against moving (towable version)</li> </ul>
(2) Install air supply for working pressure indicated on tank.	<ul style="list-style-type: none"> <li>⇒ Place compressor upwind near blast machine (no contaminated air should enter compressor).</li> <li>⇒ Start compressor and bring it up to operating temperature (5 to 10min.). <b>Only use compressors whose rating do not exceed the maximum working pressure of the pot!</b></li> <li>⇒ Attach air line (appropriate dimension) with all necessary gaskets in place to air outlet of compressor and safety lock couplings together. <b>Escaping air is dangerous and lowers efficiency!</b></li> <li>⇒ Fix loose end of attached air hose and carefully open air valve of compressor to blow out debris and moisture. <b>WARNING! Not fixing loose end can result in deadly injuries!</b></li> <li>⇒ Close air valve.</li> <li>⇒ Install appropriate couplings to air inlet (item 16) of BIG CLEM (safety coupling).</li> <li>⇒ Connect air line to BIG CLEM and safety lock it.</li> <li>⇒ For trouble free blasting we recommend an air supply free of oil and water (air cooler with cyclone and automatic drain).</li> </ul>
(3) Attach blast hose and nozzle.	<ul style="list-style-type: none"> <li>⇒ Place blast hoses (item 31) in a straight line.</li> <li>⇒ Check gasket of couplings (item 14) for wear.</li> </ul>

	<p>⇒ Connect blast hoses to length needed (<b>All gaskets must be in place!</b>), attach them to couplings (item 14) of BIG CLEM and safety lock them.</p> <p>⇒ Choose an appropriate nozzle and attach it to nozzle holder (with a gasket).</p>
(4) <i>Install deadman handle and remote control hoses (pneumatic controls) or electric cord and electric panel RME (electro-pneumatic controls)</i>	<p>⇒ Pneumatic remote controls (see figure 1):</p> <p>⇒ <b>Connect twinline remote control hose (yellow/brown) to corresponding twinline hose (yellow/brown)</b> coming from abrasive metering valves and air couplings of BIG CLEM.</p> <p>⇒ <b>Connect yellow and brown remote control hose to corresponding yellow and brown nipples</b> of deadman handle RLX</p> <p><b>WARNING! A reversed connection of remote control hoses causes malfunction and danger of injuries!</b></p> <ul style="list-style-type: none"> <li>- Electro-pneumatic remote controls without double function (see figure 2 and 3) <ul style="list-style-type: none"> <li>- Connect electric cord (item 36) to plugs on deadman handle and electric panel RME-1 (item 36)</li> <li>- Connect electric panel RME to remote control hoses (<b>brown/yellow</b>) coming from air stop valve or abrasive metering valve (corresponding colours <b>brown</b> and <b>yellow</b> of nipple)</li> </ul> </li> </ul> <p>⇒ With two nylon ties band deadman handle (item 34) to blast hose just behind nozzle holder.</p> <p>⇒ Every 1,5m band twinline hose or electric cord to blast hose (<b>Sufficient freedom of movement, because under pressure blast hose expands!</b>).</p>

<p>(5) Bring abrasive metering valves (item 12) and air stop valves (item 8) into operation</p>	<p><b>Read attached owner's manual if function of abrasive metering valve and air stop valve is unknown!</b></p>
<p>(6) Put on protective equipment.</p>	<p>⇒ Abrasive-resistant clothing. ⇒ Aired helmet with connection to breathing air supply (air filter) and adjustment of air volume with an air control valve attached to belt. ⇒ Leather gloves and safety shoes. ⇒ Ear protection.</p>
<p>(7) Remove moisture from tank and check moisture separator and remote controls.</p>	<p>This action requires an empty tank (no abrasive)</p> <ul style="list-style-type: none"> <li>- Check and correct the following adjustments:           <ul style="list-style-type: none"> <li>- Ball valve (<b>item 3A and 3C</b>) <b>opened</b></li> <li>- Ball valve (<b>item 17</b>) <b>closed</b></li> <li>- Ball valve (<b>item 3B</b>) for depressurization <b>closed</b></li> <li>- Ball valve (<b>item 3D</b>) <b>opened</b></li> <li>- Ball valve (<b>item 3F</b>) for abrasive <b>opened</b></li> </ul> </li> <li>- Open air valve on compressor.</li> <li>- <b>Open</b> ball valve (<b>item 16</b>) for air supply of air manifold to pressurize the tank</li> <li>- <b>Open</b> ball valve (<b>item 22</b>) for breathing air supply of helmet</li> </ul> <p>⇒ Check remote controls <b>for each operator</b>.</p> <p>⇒ Depress deadman handle (item 34). Air or air and abrasive must come out of nozzle. <b>Point nozzle to a surface to prevent injuries from debris left in tank!</b></p>

	<p>⇒ Release deadman handle after a few seconds. Blasting must stop within a few seconds.</p> <p>⇒ Removal of moisture.</p> <p>⇒ Depress one deadman handle (item 34) for minimum 5 minutes.</p> <p>⇒ Depress other deadman handles for 1 minute (removal of moisture from blast hoses).</p> <p>⇒ Adjust drains of moisture separators (item 7 and 20), so that a constant stream of liquid and air is expelled under pressure.</p>
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#### **4.3 Daily set-up**

Not necessary if an initial installation or reinstallation was performed (see section 4.2).

(1) Air supply.	<ul style="list-style-type: none"> <li>- Start compressor and bring it up to operating temperature (5 to 10 minutes).</li> </ul>
(2) Put on protective equipment.	<p>⇒ Abrasive-resistant clothing.</p> <p>⇒ Airfed helmet with connection to breathing air supply (air filter) and adjustment of air volume with an air control valve attached to belt.</p> <p>⇒ Leather gloves and safety shoes.</p> <p>⇒ Ear protection.</p>
(3) Remove moisture from tank and check moisture separator and remote controls.	<p>This action requires an empty tank (no abrasive).</p> <p>⇒ Check and correct the following adjustments:</p> <p>    ⇒ Ball valve (<b>item 3A and 3C</b>) <b>opened</b>.</p> <p>    ⇒ Ball valve (<b>item 17</b>) <b>closed</b>.</p> <p>    ⇒ Ball valve (<b>item 3B</b>) for depressurization <b>closed</b>.</p>

	<p>⇒ Ball valve (<b>item 3D</b>) <b>opened</b>.</p> <p>⇒ Ball valve (<b>item 3F</b>) for abrasive <b>opened</b>.</p> <p>⇒ Open the air valve on compressor.</p> <p>⇒ <b>Open</b> ball valve (<b>item 16</b>) for air supply of air manifold to pressurize tank</p> <p>⇒ <b>Open</b> ball valve (<b>item 22</b>) for breathing air supply of helmet</p> <p>⇒ Check remote controls <b>for each operator</b>.</p> <p>⇒ Depress deadman handle (item 34). Air or a blend of air and abrasive must come out of nozzle. <b>Point nozzle to a surface to prevent injuries from debris left in tank!</b></p> <p>⇒ Release deadman handle after a few seconds. Blasting must stop within a few seconds.</p> <p>⇒ Removal of moisture.</p> <p>⇒ Depress one deadman handle (item 34) for minimum 5 minutes.</p> <p>⇒ Depress other deadman handles for 1 minute (removal of moisture from blast hoses).</p> <p>⇒ Adjust drains of moisture separators (item 7 and 20), so that a constant stream of liquid and air is expelled under pressure.</p>
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#### 4.4 Operation

(1) Load abrasive into B/G <i>CLEM.</i>	<ul style="list-style-type: none"> <li>- Depressurize tank <ul style="list-style-type: none"> <li>▪ <b>Close</b> ball valve (<b>item 16</b>)</li> <li>▪ <b>Open</b> ball valve (<b>item 3B</b>)</li> </ul> </li> </ul>
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	<p>During depressurization noise level is above 85dB. <b>Wear ear protection!</b></p> <ul style="list-style-type: none"> <li>- Open cover (item 19) of filling port.</li> <li>- Load abrasive into tank.           <ul style="list-style-type: none"> <li>⇒ Silo.</li> <li>⇒ Conveyor.</li> </ul> </li> <li>- Close cover (item 19) if necessary.</li> </ul>
(2) <i>Blasting.</i>	<ul style="list-style-type: none"> <li>- Pressurize tank.           <ul style="list-style-type: none"> <li>▪ <b>Close</b> ball valve (<b>item 3B</b>)</li> <li>▪ <b>Open</b> ball valve (<b>item 16</b>)</li> </ul> </li> </ul> <p>⇒ Adjustment of abrasive metering valve (2 persons are necessary).</p> <p>⇒ Operator depresses deadman handle.</p> <p>⇒ Second person closes abrasive metering valve (Abrasive metering knob turned to right).</p> <p>⇒ Slowly open metering valve until flow of abrasive is sufficient (optimum blend of abrasive and air when abrasive barely discolours air when it comes out of nozzle).</p> <p>⇒ Blast operation until tank is nearly empty (do not completely empty tank because of higher wear).</p> <p>⇒ Proceed with (1).</p>

#### 4.5 Shut down

This section only refers to a maximum 1 day interruption of work without moving equipment.

(1) <i>Depressurization of tank.</i>	<ul style="list-style-type: none"> <li>- <b>Close</b> ball valve (<b>item 16</b>)</li> <li>- <b>Open</b> ball valve (<b>item 3B</b>)</li> </ul>
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(2) Remove air line.	Connections on air manifold (item 16).
(3) Remove and roll up blast hoses.	<ul style="list-style-type: none"> <li>- No danger of stumbling.</li> <li>- No damage through over-passing vehicles.</li> </ul>
(4) Close cover (item 19).	Abrasive could get moisture.

#### 4.6 Shut down for a longer period of time

(1) Empty tank of all abrasive.	To prevent problems with moist abrasive.
(2) Depressurize tank	<ul style="list-style-type: none"> <li>- <b>Close</b> ball valve (<b>item 16</b>)</li> <li>- <b>Open</b> ball valve (<b>item 3B</b>)</li> </ul>
(3) Remove air line	Connections on air manifold (item 16).
(4) Reinstall lock studs of abrasive metering valves (item 12) and air stop valves (item 8)	<p>To avoid pinch tube deformation at PVR-valves</p> <ul style="list-style-type: none"> <li>• Turn abrasive metering knob to left</li> <li>• Remove plastic cap from lock stud port</li> <li>• Remove lock from storage tube</li> <li>• Install lock stud (put it into lock stud port and turn it 90° to right)</li> <li>• Tighten spring through turning nut (wrench 19mm)</li> </ul> <p>Maximum torque is 68Nm</p> <ul style="list-style-type: none"> <li>- Put plastic cap into opening of storage tube.</li> </ul>
(5) Remove and roll up blast hoses	<ul style="list-style-type: none"> <li>- No danger of stumbling</li> <li>- No damage through over-passing vehicles.</li> </ul>
(6) Close cover (item 19)	Abrasives could get moisture.

## 5 Maintenance

### 5.1 General

During operation blast machines are exposed to wear. In order to ensure safe operation and high efficiency the blast machines should be maintained according to the following check lists.

**Prior to maintenance, make sure that the air valve of the compressor is closed and the whole system is depressurized!**

### 5.2 Daily check list

(1) <i>Tank.</i>	⇒ Check gasket of filling port (item 1) and replace it when wear is detected (possible from the outside). ⇒ Check pop-up valve of filling port (item 2) and replace it when it is worn.
(2) <i>Air hose and blast hose.</i>	Check hoses for sharp bends, causing high loss of energy and rapid wear. <b>No vehicles should pass over hoses!</b>
(3) <i>Nozzle and nozzle holder.</i>	Check gaskets of nozzle holders and replace them when wear is detected.
(4) <i>Abrasive metering PVR-G, air valves PVR-A and deadman handle</i>	⇒ Check by hand if air escapes from small hole in valve body of PVR valves. When air escapes replace pinch tube because it is damaged. ⇒ Check rubber button of deadman handle (item 34) for tight fit and replace it when it is worn.

### 5.3 Weekly check list

(1) <i>Moisture separator HMS and HMM (item 7 and 20).</i>	Remove and check filter element. If necessary clean filter and sight glass with soap and warm water and dry it with compressed air. <b>A dirty filter causes loss of pressure in system!</b>
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(2) Muffler (item 5).	Check for wear or blockage and clean or replace the interior body.
(3) Air hoses and blast hoses.	<p>⇒ Check all couplings and screws for wear or breakage and replace them if necessary.</p> <p>⇒ Check whole blast hose by hand for soft spots (reduced wall thickness) and replace it <b>immediately</b> when soft spots are detected.</p> <p>⇒ Check air line (air supply) and replace it when it is worn.</p> <p>⇒ Check gaskets of couplings for wear and replace them if necessary.</p>

#### 5.4 Monthly check list

(1) Remote controls.	<p>⇒ Check all pneumatic connections for leakage.</p> <p>⇒ Check plugs of electrical cords for tight fit (electro pneumatic remote controls)</p>
(2) Muffler.	Check condition of muffler and corresponding piping.

## 6 Trouble-shooting

Problems of the external electrical box are not included.

<b>Problem</b>	<b>Probable cause</b>	<b>Remedy</b>
(1) Neither abrasive nor air comes out of nozzle.	Air valve of compressor is closed.	Open air valve.
	Blocked moisture separator HMS (item 7) or HMM (item 20).	Check and clean moisture separator.

	Air stop valve (item 8) does not work.	<p>⇒ Check if air comes out of small hole in valve body when valve is in operation. If this occurs pinch tube or diaphragm is damaged.</p> <p>⇒ Repair or replace air stop valve. Read owner's manual Air stop valves.</p>
	Pneumatic remote controls: Deadman handle (item 34) or remote control hose leaky.	Check and replace remote control hose or rubber button of deadman handle if necessary.
	Electric pneumatic remote controls (with or without double function); Magnetic valve(s) of electric panel RME (Item 38) are blocked	Disassemble and clean them
(2) <i>Air but no abrasive comes out of nozzle.</i>	Abrasive metering valve (item 12) is closed.	Open metering valve (turn metering knob to left). See owner's manual
	Defective abrasive metering valve (item 12).	⇒ Read owner's manual
	Ball valve (item 3F) closed	Open ball valve.
	Moist abrasive prevents flow of abrasive in bottom of tank.	<p>⇒ Open inspection plate (item 15) and clean tank.</p> <p>⇒ Install an after-cooler for air supply.</p> <p>⇒ If moist abrasive is used, do not open choke valve (item 3D) completely.</p>

<i>(3) Irregular flow of abrasive comes out of nozzle.</i>	Incorrectly adjusted abrasive metering valve	Check adjustment and open it completely if necessary.
	Clogging.	Check nozzle and gasket of nozzle for wear and replace them if necessary.
	Choke valve (item 3D or 3 E) incorrectly adjusted.	Adjust choke valve correctly.
<i>(4) Too much abrasive comes out of nozzle.</i>	Abrasive metering valve PVR-G (item 12) opened too much.	Check and correct adjustments (metering knob).
	Choke valve (item 3D or 3 E) not completely opened.	Check and open completely.
<i>(5) Pop-up valve does not remain closed.</i>	Insufficient air volume or pressure.	Check air pressure of compressor with needle gauge.
<i>(6) Pop-up valve does not seal off filling port after depressurization.</i>	Worn pop-up valve and / or gasket.	Replace pop-up valve and / or gasket.
	Blocked guide for the pop-up valve.	Open the inspection plate, remove pop-up valve and clean guide.
<i>(7) Blast process does not stop when deadman handle is released.</i>	Deadman handle is clogged (item 34).	Clean it.
	Remote control hoses incorrectly connected.	Exchange connections.

	<p>Electro-pneumatic remote controls (with or without double function):</p> <p>Switch on magnetic valve in “position 1” (manual control)</p>	<p>Put switch in Position “0” (automatic control)</p>
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## 7 Replacement parts

See figure 1 to 3

No	Stock No	Description
(1)	5641I	O-Ring 8" for BIG CLEM
(2)	5643I	Pop-up valve 8" for BIG CLEM
(3)	02397D	Ball valve 11/4" with handle
(4)	99633D	Non return valve 11/4"
(5)	90743D	Muffler RMS-110 without fitting
(7)	90545D	Moisture separator 11/2" HMS
(8)	See owner´s manual	Air stop valve
(10)	90551D	P-31 nipple rubbered 11/4"
(12)	See owner´s manual	Abrasive metering valve
(14)	24232D	CFT – coupling 1 ½"
(16)	99598D	2 ½" ball valve
(17)	1241D	½" ball valve for depressurization
(18)		Safety valve 1", 10bar
		Safety valve 1", 8bar (Option)
	90023D	Safety valve 1", 12bar (Option)
(20)	90256D	½" moisture separator MM-HMS
(22)	02396D	Ball valve 1" with handle
Option		
(30)	08413D	Nylon-coupling CQP-2 for blast hose 32x8
	08414D	Nylon-coupling CQP-3 for blast hose 32x9
	07714D	Nylon-coupling CQP-4 for blast hose 42x9
(31)	04256D	Blast hose 32x8 SM-1
	99853D	Blast hose 38x9 SM-1
	90402D	Blast hose 42x9 SM-1
(32)	04127D	Nylon nozzle holder NHP-2 for blast hose 32x8
	04128D	Nylon nozzle holder NHP-3 for blast hose 38x9
(33)		Nozzle
(34)	100707	Deadman handle RLX-III
(35)	90081D	Twinline remote control hose 20m
(-)	90005D	KAG-1" air coupling