



# HELIPORT

USE AND MAINTENANCE MANUAL

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NAME OF RIDE (Nome Attrazione)

SERIAL NUMBER (Numero Serie)

MANUFACT. YEAR (Anno Costruzione)

BASE DIMENSIONS (Dimensioni di base)

OPERATING DIAMETER (Diametro di Base)

NR OF CARS (Nr vetture)

NR OF SEATS (Nr posti)

TOT WEIGHT (EMPTY) (Peso tot a vuoto)

TOT WEIGHT (LOADED) (Peso tot a pieno carico)

WEIGHT OF EACH PASSENGER (Peso max passegg.)

MOTIVE POWER (Forza motrice)

LIGHTING (illuminazione)

OPERATING TEMPERATURE (Temp. Funzionam.)

VOLTAGE  
Voltaggio

3 PHASE  
Trifase

SINGLE PHASE  
Monofase

Hz

50

60

STANDARDS DIN (Normative DIN)

INSPECTED (Ispezionato il)

NAME OF CUSTOMER (Nome cliente)

ORDER N. (N. ordine)

MAIN COMPONENT LIST: (Lista comp. princ.)

PUMP MOTOR (Motore pompa)

ROTATION MOTOR (Motore rotazione)

GEAR BOX (Riduttore)

CONTROL BOARD (Quadro comandi)

REF.

MODEL

ON TRAILER

(Modello)

(Su carro)

PARK

(Parco fisso)

ELECTRONIC CONTROLLER

(Scheda elettronica)

MODEL.

THIS RIDE HAS BEEN DESIGNED AND CONSTRUCTED FOR PASSENGERS AGED

(Questa giostra e' stata disegnata e costruita per passeggeri di eta')

YEARS (Anni)

WHEN ORDERING SPARE PARTS PLS ALWAYS REFER TO OUR ORDER N.

(Nell'ordinare pezzi di ricambio fare sempre riferimento al ns numero ordine)

NOTE

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## VERY IMPORTANT

Because safety rules can be different in different countries, operator of this ride must conform to safety rules in force in the country where this ride is operated and provide at his own cost for all modifications necessary to conform with said local safety rules including but not limited to fencing, gates, operator stand, special wiring, other safety features. This ride has been sold as it is and how inspected by buyer who knows that some changes could be necessary. Any change relating to parts that can effect structural integrity must approved by manufacturer.



### ***3.0 INTRODUCTION***

THIS OPERATION AND MAINTENANCE MANUAL HAS BEEN WRITTEN TO ALLOW OUR CUSTOMERS TO USE THE ATTRACTION IN THE BEST WAY.

**S.B.F. S.R.L. RECOMMENDS TO READ IT VERY CAREFULLY.**

THIS MANUAL HAS SEVERAL SAFETY RULES RELATED TO USE AND MAINTENANCE OF THE RIDE.

THESE RULES ARE OBLIGATORY FOR OWNERS AND OPERATORS OF THE ATTRACTION WHO MUST NOT DISREGARD THEM FOR ANY REASON.

NOTE THAT THESE RULES DO NOT SUBSTITUTE THOSE DISPOSED BY THE PUBLIC AUTHORITIES AND THE DUTY TO USE THE RIDE CAREFULLY AND PROPERLY, EITHER.

S.B.F. S.R.L. IS NOT RESPONSIBLE FOR THE DAMAGES CAUSED BY THE NON-OBSERVANCE OF THESE SAFETY RULES AND IT RESERVES THE RIGHT TO ACT BOTH AGAINST THE OWNER AND THE OPERATOR AND TO NOTIFY THE COMPETENT AUTHORITIES EVERY ABUSE.

### ***4.0 WARNINGS FOR THE MANUAL USE***

BEFORE STARTING ANY OPERATION CONCERNING USE, MAINTENANCE OR ASSEMBLING, READ CAREFULLY THE NOTES HEREAFTER.

**FOR ANY QUESTION, PLEASE CONTACT US DIRECTLY.**

S.B.F. S.R.L. RESERVES THE RIGHT TO INFORM THEIR CUSTOMERS ABOUT OTHER NECESSARY DETAILS FOR BETTER USE OF THE ATTRACTION.

SUCH INFORMATION, AS MODIFICATIONS, UPDATINGS, ADDITIONS, MUST BE CONSIDERED AS INTEGRAL PARTS OF THIS MANUAL.

THE CONTENT OF THIS MANUAL BELONGS EXCLUSIVELY TO S.B.F. S.R.L.

THE TECHNICAL DATA ARE RESERVED TO :

- CUSTOMERS, OWNERS AND OPERATORS;
- PERSONNEL IN CHARGE;
- TECHNICAL INSPECTORS ACTING UNDER PUBLIC AUTHORITY'S ORDER.

ANY OTHER PUBLICATION IS FORBIDDEN, EXCEPT FOR S.B.F. S.R.L. WRITTEN PERMISSION WHICH RESERVES THE RIGHT TO SAFEGUARD ITS INTERESTS AND RIGHTS.



## **4.1 VISUAL PLATES**

THE ATTRACTION IS DELIVERED WITH METAL PLATES AND SELF-STICKING LABELS REPORTING IMPORTANT INDICATIONS.

- SUCH INDICATIONS DO NOT SUBSTITUTE THE RULES INDICATED IN THIS MANUAL AND CANNOT BE CONSIDERED AS SOLE RULES TO OBSERVE, EITHER. THEY ARE AN IMPORTANT HELP FOR THE CUSTOMERS' BEST USE OF THE RIDE.
- DO NOT REMOVE OR DAMAGE THESE PLATES, BUT KEEP THEM ALWAYS READABLE.

IF THEIR REPLACEMENT IS NECESSARY, METAL PLATES AND SELF-STICKING LABELS SHOULD BE REQUIRED TO S.B.F. S.R.L., INDICATING THEIR CODE NUMBER.

SHOULD IT BE NECESSARY ANY UPDATINGS, MODIFICATIONS, ETC., S.B.F. S.R.L. RESERVES THE RIGHT TO INFORM THEIR CUSTOMERS PROPERLY AND TO INTRODUCE SUCH MODIFICATIONS AIMING AT A BETTER USE OF THE RIDE.

## **4.2 GENERAL RULES CONCERNING THE ATTRACTION USE**

THIS ATTRACTION HAS BEEN PLANNED TO PLEASE THE PUBLIC'S EXPECTATIONS OF AMUSEMENT. FOLLOW THESE FUNDAMENTAL RULES TO OBTAIN THE HIGHEST SAFETY CONDITIONS FOR THE PUBLIC.

- FOLLOW STRICTLY THE INSTRUCTIONS CONTAINED IN THIS MANUAL AND OTHERS THAT S.B.F. S.R.L. RESERVES TO SUPPLY.
- USE THE ATTRACTION FOR THE PURPOSE IT HAS BEEN PLANNED AND SUBMIT IT TO AN ACCURATE MAINTENANCE.
- OPERATE ACCORDING TO THE NATIONAL AND LOCAL AUTHORITIES' LAWS AND REGULATIONS.
- THE PERSONNEL MUST BE COMPETENT AND ACCURATELY TRAINED.
- IT IS FORBIDDEN TO MAKE ADDITIONS, MODIFICATIONS OR TAMPERINGS.
- REPARATIONS MUST BE DONE ONLY BY S.B.F. S.R.L. AUTHORISED PERSONNEL AND USING ONLY ORIGINAL SPARE PARTS.
- IF THE RIDE HAS NOT A GOOD AND SAFE OPERATION, THE CUSTOMER MUST STOP IMMEDIATELY THE ATTRACTION, UNTIL THE NECESSARY CONDITIONS FOR A GOOD USE HAVE BEEN ESTABLISHED.



### **4.3 PASSENGERS AND THEIR BEHAVIOUR**

THESE DISPOSITIONS, AS ALL THE OTHERS REGARDING THE PASSENGERS INSIDE THIS MANUAL, ARE VALID ALSO FOR THE SERVICE PERSONNEL, WHEN HE OCCUPIES PLACES USUALLY RESERVED TO THE PASSENGERS.

BECAUSE OF THE RIDE CHARACTERISTICS, IT MUST BE FORBIDDEN TO:

- CHILDREN UNDER 4-YEAR-OLD;
- CHILDREN BETWEEN 5-10 YEAR-OLD IF NOT TOGETHER WITH ADULTS;
- CHILDREN BEING VISIBLY UPSET;
- PEOPLE VISIBLY DRUNK OR UNDER THE EFFECT OF DRUGS;
- PREGNANT WOMEN;
- PEOPLE SUFFERING OF HEART DISEASES, BACKBONE DISEASES OR PHYSICALLY UNHEALTHY;
- PEOPLE WITH PHYSICAL HANDICAPS, WHO CANNOT BE SUFFICIENTLY HOLD INSIDE THE SHIP;

ADULTS, BEING WITH CHILDREN BETWEEN 5-10 YEAR-OLD, MUST BE SIT NEAR THEM AND SURVEY THEIR CORRECT BEHAVIOUR;

IT IS FORBIDDEN TO SMOKE AND TO TAKE ANIMALS, UMBRELLAS, STICKS, BULKY AND SHARPENED OBJECTS;

BEHAVE PROPERLY WITHOUT CAUSING THRONGS, LEANING OUT, RAISING UP FROM THE SEATS, ELUDING SAFETY DEVICES, ETC.;

SINCE THE REGULATIONS ARE DIRECTED TO CHILDREN, MESSAGES THROUGH LOUDSPEAKER AND SIGNALS SHOULD BE EASILY UNDERSTANDABLE.

FOR FOREIGN PEOPLE IT SHOULD BE USEFUL TO PUT PLURILANGUAGES SIGNALS.



#### ***4.4 WEATHER CONDITIONS LIMITING THE FUNCTIONING OF THE RIDE***

THE ATTRACTION HAS NOT BEEN PLANNED FOR THE SNOW CHARGE, BECAUSE THE SNOW MUST BE REMOVED.

ATTRACTION MUST NOT OPERATE UNDER THE FOLLOWING WEATHER CONDITIONS:

- RAIN, SNOW, HAIL

- THUNDERSTORM

- WITH WIND SPEED OVER 20m/s

AFTER RAINING AND SNOWING THE GROUND LOADING CAN VARY: CHECK VERY CAREFULLY THE ATTRACTION LEVELLING AND THE CONDITIONS OF THE WOODEN SUPPORTS AFTER THESE PHENOMENA.

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## 4.5 BEFORE OPERATING

MAKE CAREFULLY THE DAILY CHECKINGS PARTICULARLY WHAT FOLLOWS:

- CHECK THE GENERAL CONDITION OF THE RIDE AND THE PROPER TIGHTENING AND FASTENING OF ALL THE FASTENING AND SUPPORT COMPONENTS;
- CHECK THE PERFECT FASTENING OF ALL COMPONENTS OF THE MOTORIZATION (ENGINE, REDUCER, WHEEL, BRAKING SYSTEM, ETC.) AND OF THE MOVING PARTS (ARMS, PLUGS, ETC.) AND OF THE SHIP (SEATS, SAFETY HANDHOLDS, PLASTICS, FAIRINGS, FLANGING);
- CHECK THE PROPER EARTHING CONNECTION OF THE RIDE;
- CHECK THE EFFICIENCY OF THE DIFFERENT DEVICES OF THE GENERAL SWITCHES USING THE PROPER TEST BUTTON;
- CHECK THE ATTRACTION WHEN IT IS EMPTY, CHECKING ITS FUNCTIONALITY IN ALL CONDITIONS;
- CHECK THE PROPER EMERGENCY STOP OPERATION.

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#### **4.6 DURING THE OPERATION - SPECIAL NOTES**

KEEP THE COMPLETE CONTROL OF THE ATTRACTION, PAYING PARTICULAR ATTENTION TO THE PASSENGERS' AND PUBLIC'S BEHAVIOUR.

THE PUBLIC MUST BE OUTSIDE THE LOADING AND UNLOADING AREA, AND THIS AREA MUST BE PROPERLY MARKED.

IF THE PUBLIC SHOULD ENTER IT OR BEHAVE DANGEROUSLY, STOP IMMEDIATELY THE ATTRACTION, BEING SURE THAT THIS STOP DOES NOT CAUSE A GREATER DANGER.

IF SOME PASSENGERS SHOULD FEEL SICK OR BEHAVE DANGEROUSLY FOR THEIR OR OTHERS SAFETY, STOP IMMEDIATELY THE ATTRACTION BEING SURE THAT THIS STOP DOES NOT CAUSE A GREATER DANGER.

THE OPERATOR AND THE SERVICE PERSONNEL MUST BE READY TO FACE ANY EMERGENCY SITUATION, KNOWING ALL PROCEDURES AND HAVING AT THEIR DISPOSAL THE NECESSARY MEANS TO GRANT THE PUBLIC'S AND THE PASSENGERS' SAFETY AND A SWIFT AND ORDERED EXIT.

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#### **4.7 PASSENGERS UNLOADING**

- THE PASSENGERS UNLOADING MUST TAKE PLACE IN THE FORESEEN AREA AND WHEN THE ATTRACTION IS ABSOLUTELY STOPPED.
- THE SERVICE PERSONNEL OF THE AREA MUST BE SURE THAT THE PASSENGERS GO OUT QUICKLY; THE, HE WILL INFORM THE OPERATOR THAT THE AREA IS COMPLETELY FREE AND THE PASSENGERS CAN BE LOADED AGAIN.
- THE PASSENGERS CAN DESCEND FROM THE SHIP ONLY WHEN THE SHIP IS COMPLETELY STOPPED.

#### **4.8 LOADING AND UNLOADING PASSENGERS - PARTICULAR WARNINGS**

- THE LOADING AND UNLOADING PASSENGERS MUST HAPPEN IN THE PROPER AREA AND WHEN THE SHIP IS STOPPED AND BRAKED.
- THE PUBLIC MUST STAY OUTSIDE THE LOADING AND UNLOADING AREA AND THE PASSENGERS MUST ENTER THIS AREA IN A SAFE WAY. IF TUMULTUOUS THRONG SHOULD FEAR THE PUBLIC RUSH IN THIS AREA, STOP IMMEDIATELY ALL OPERATIONS.
- CHECK THAT THE LOADING AND UNLOADING AREA IS ACCESSIBLE TO THE PASSENGERS ONLY WHEN THE SHIP IS STOPPED AND BRAKED.
- ADVISE THE PASSENGERS PROPERLY, THROUGH LOUDSPEAKERS AND SIGNS, THAT IT IS FORBIDDEN TO LEAN OUT FROM THE SHIP, TO GET UP OR TO BEHAVE DANGEROUSLY.
- CHECK THAT THE PASSENGERS ARE PROPERLY SIT INSIDE THE SHIP THROUGH THE PROPER SAFETY HANDHOLDS, AND THAT THEY ARE PROPERLY CLOSED AND BLOCKED.
- CHECK THAT THE PASSENGERS ARE CORRECTLY ARRANGED IN THE SHIP TO AVOID UNBALANCES AND IRRÉGULAR MOVEMENTS.



## **5.0 CONDITIONS OF WARRANTY**

THE WARRANTY CONDITIONS ARE INDICATED IN THE CONTRACT OF PURCHASE, AND THE VALIDITY DEPENDS ON THE COMPLETE OBSERVANCE OF THE PROCEDURES AND WARNINGS STATED IN THIS MANUAL.

ANY TYPE OF WARRANTY OR LIABILITY SHALL BECOME VOID IN THE EVENT OF NON-COMPLIANT USE, OR DAMAGES AS A RESULT OF NEGLIGENCE OR MODIFICATIONS TO THE MACHINE WITHOUT THE WRITTEN AUTHORISATION OF SBF srl.

**CAUTION: UPON DELIVERY TO THE BUYER, MAKE SURE THAT THE ATTRACTION IS IN PERFECT CONDITION AND THAT NONE OF THE PARTS AND/OR UNITS REQUIRED FOR ITS PROPER OPERATION ARE MISSING.**

**N.B. : IN THE EVENT THE ATTRACTION IS SEEN TO BE DAMAGED, OR THERE ARE MISSING PARTS, ADVISE S.B.F. srl IMMEDIATELY.**

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## 6.0 DESCRIPTION OF THE ATTRACTION

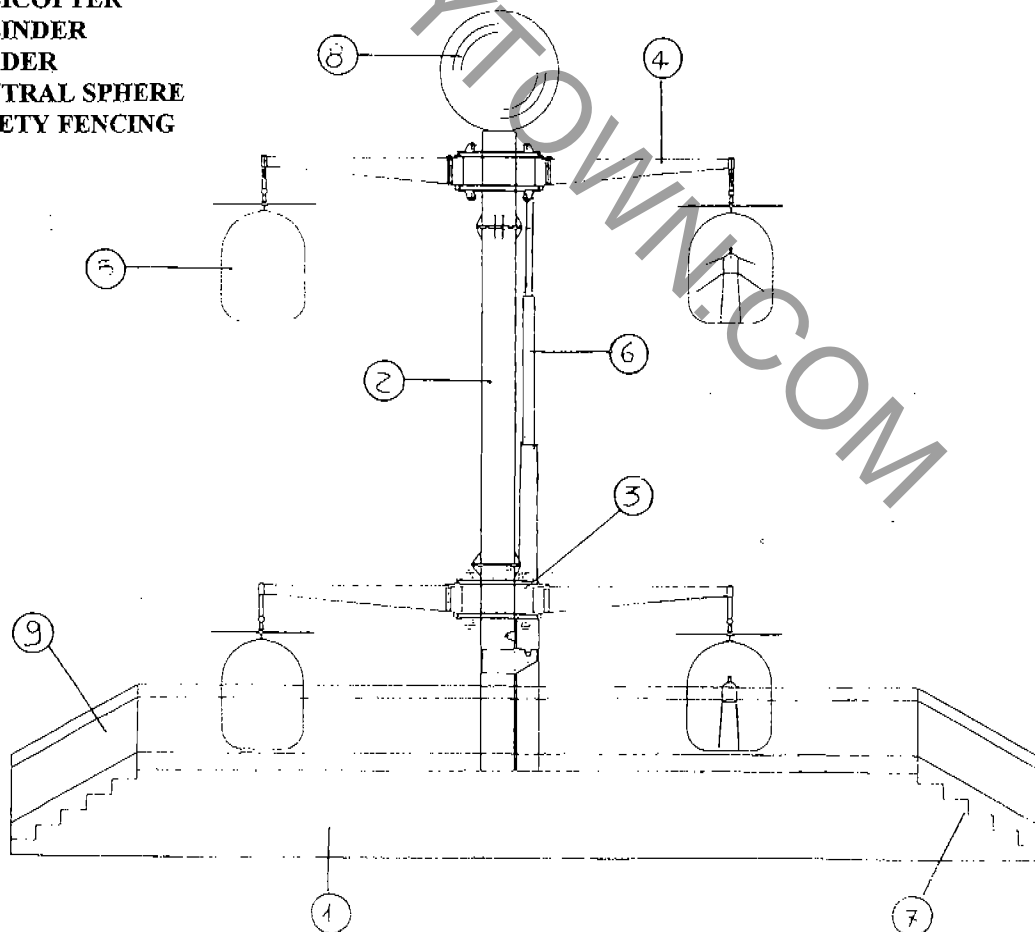
THE ATTRACTION CALLED HELIPORT HAS BEEN CREATED FOR FAMILY USE.  
THE RIDE IS MADE UP BY A BASEMENT TO WHICH IS WELDED A CENTRAL COLUMN WHICH IS 8,5 MT. HIGH. IN EACH ARM IS FIXED A HELICOPTER WITH 4 SEATS.

MOVEMENT IS PRODUCED BY A RATIOMOTOR WHICH PROVIDES MOTION, VIA A PINION GEAR, TO THE CROW GEAR (FIFTH WHEEL) WHICH IS ATTACHED.

THE MAIN OPERATOR CONTROLS ARE A PORTABLE CONSOLE, WHICH YOU CAN MOVE EVERY WHERE AROUND THE RIDE.

### MAIN PARTS

1. BASEMENT
2. COLUMN
3. ROTATION CENTRE
4. TRUSS
5. HELICOPTER
6. CYLINDER
7. LADDER
8. CENTRAL SPHERE
9. SAFETY FENCING





## **7.0 INSTALLATION**

### **POSITIONING**

THE ATTRACTION MUST BE PLACED ON FLAT, SOLID GROUND, ENSURING THE BASE IS DULY SUPPORTED.

<=> **THE ELECTRICAL CONNECTIONS, CONTROLS AND EMERGENCY PUSH-BUTTON MUST BE EASILY ACCESSIBLE, AND ACCESS TO THEM FREE OF OBSTACLES.**

IT'S NECESSARY TO CARRY OUT A LONGITUDINAL AND TRANSVERSAL LEVELLING CHECKING THE WATER LEVELS PLACED IN FRONT AND BEHIND OF THE BASEMENT. PLS ADJUST THE LEVEL USING THE PROPER FEETS AND CYLINDERS.

### **WIRING**

FIRST OF ALL, ENSURE THAT THE LINE VOLTAGE AND FREQUENCY CORRESPOND TO THOSE OF THE ATTRACTION.

IN ADDITION, MAKE SURE THAT THE ELECTRIC POWER SUPPLY IS GREATER THAN THE ATTRACTION'S MAXIMUM POWER ABSORPTION.

THE RIDE MUST BE CONNECTED TO AN EFFICIENT EARTHING GROUND.

<!> **ONLY SKILLED PERSONNEL MUST HAVE ACCESS TO THE PANELBOARD; DISCONNECT THE POWER SUPPLY BEFORE OPENING THE RECTIFIER DOOR.**



## 8.0 STARTING UP

### **! ATTENTION**

TO SET THE ATTRACTION UP:

- SUPPLY THE ATTRACTION FROM THE SWITCHBOARD WHICH IS SITUATED ON THE LEFT UNDER THE TRAILER;
- OPEN THE DOOR AND SWITCH THE GENERAL SWITCHBOARD;
- LIFT THE PISTON, TURN ROUND THE LIFTER BUTTON ON THE SWITCHBOARD AND THROUGH THE 3 LEVELS PLACED IN FRONT OF THE TRAILER, TO PULL DOWN THE PLATFORM.

IN ORDER TO DISCONNECT THE SUPPORTING FEET FROM THE PLATFORM, PULL DOWN THE PLATFORM.

IF THE PUMP DOESN'T WORK, TURN 2 OF THE 3 PHASES IN THE SWITCHBOARD UNDER THE TRAILER.

TO START THE ATTRACTION:

- LIFT THE GENERAL SWITCH;
- LIFT THE MOTIVE POWER SWITCH;
- LIFT THE LINE SWITCHES;
- LIFT THE CONTROL SWITCH;

- PUSH THE "START" BUTTON AND CHECK THAT THE GREEN LIGHT IS ON. IF THE LIGHT IS OFF TURN 2 OF THE 3 PHASES ON THE SWITCHBOARD.

BEFORE PRESSING THE BUTTON "START" LET THE PUMP OPERATE FOR FIVE MINUTES IN ORDER TO ALLOW THE OIL TO WARM UP. NOW THE RIDE IS READY TO OPERATE.

THE WORKING TIME OF THE ATTRACTION IS AUTOMATIC (SELECTOR IS ON THE AUTOMATIC CONTROL PANEL).

⇒ **THE SLIGHTEST RUNNING TIME MUST BE OF 1,30 MINUTES.**

WHEN TIME IS OVER, THE RIDE STOP IN THE LOADING/UNLOADING AREA.

WHEN THE ROTATION CENTRE IS IN THE HIGHEST POINT, IN ORDER TO STOP THE ATTRACTION, PUSH THE "STOP" BUTTON.

IN CASE OF SUDDEN DANGER IMMEDIATELY PUSH THE "EMERGENCY" BUTTON.

TO RESTART THE RIDE ROTATE ANTICLOCKWISE THE BUTTON AND REPEAT THE OPERATION DESCRIBED PREVIOUSLY.

PULL DOWN THE RED BUTTON "DOWN" UNTIL THE ROTATION CENTRE IS TOTALLY LOW.

BEFORE RE-START THE RIDE RE-SETTING THE SIDE SELECTOR ON THE CENTRAL POSITION.

IF THERE IS NO ELECTRIC TENSION, IN ORDER TO GET DOWN THE ROTATION CENTRE IN LOADING/UNLOADING AREA OPEN THE DOOR, FROM THE SIDE OF THE RESERVOIR ON THE VALVE THERE IS A LEVER, PLS ROTATE THIS LEVER OF 90°.

WHEN THE ROTATION CENTRE IS COME DOWN TAKE BACK THE LEVER IN THE ORIGINAL POSITION AND CLOSE THE DOOR.

! IF DURING THE OPERATION RIDE DOESN'T GO UP CHECK THE POSITION SWITCH NR. S23 SITUATED IN THE LOW PART OF THE COLUMN.



## **9.0 STEEL STRUCTURE**

ALL STEEL STRUCTURES HAVE BEEN PLANNED, CALCULATED AND BUILT TO CARRY OUT THEIR TASK FOR A LONG TIME AND WITHOUT PROBLEMS, BUT SOME FUNDAMENTAL RULES ARE TO BE OBSERVED AND RESPECTED.

### **9.1 USE AND MAINTENANCE**

DO NOT DAMAGE THESE STRUCTURES WITH AN IMPROPER USE, SUBMITTING THEM TO NOT EXPECTED LOADS, MAKING WRONG OPERATIONS OF ASSEMBLING, DISMANTLING AND TRANSPORT.

DO NOT CHANGE THE STRUCTURES FUNCTIONALITY, MAKING WELDINGS OF DIFFERENT KINDS, ADDING WELDED ELEMENTS EVEN OF LITTLE DIMENSIONS, MAKING HOLES, EVEN IF LITTLE ONES, STRUCTURAL CUTTINGS AND WHATEVER CAN ENDANGER ITS INTEGRITY.

SUBMIT THE STRUCTURE TO AN ACCURATE MAINTENANCE, AVOIDING THROUGH REGULAR RE-PAINTING THE RUST FORMATION.

BE SURE THAT THERE IS NO BACKWATERS KEEPING ALWAYS SEALED THE OPENINGS, AND FREE FROM OBSTRUCTION THE DRAINING HOLES.

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## 9.2 BREAKINGS

- THE FORMATION OF TINY CRACKS, WHICH UNDER VARIABLE LOADS DURING THE TIME BECOME BIGGER CAUSING SERIOUS DAMAGES, IS A RARE EVENT IF THERE IS A CORRECT PLANNING AND PROPER CONSTRUCTION.

HOWEVER, OPERATIVE CONDITIONS OF THE ATTRACTION, DIFFERENT FROM THOSE EXPECTED, JUST AS OTHER DIFFERENT REASONS, CAN CAUSE BREAKINGS.

- THE PERIODICAL VISUAL CHECK MUST BE EXTREMELY EFFICIENT TO FIND OUT PROBABLE BREAKINGS, TO AVOID THE DESTRUCTION OF THE STRUCTURE.

- CHECK CAREFULLY THE STRUCTURE, PARTICULARLY WHERE THERE ARE WELDINGS, JUNCTURES, LINKINGS, SECTIONS REPLACEMENTS, AND GENERAL DISCONTINUITIES (BEADS, HOLES, ATTACKS, GUSSETS, ETC.); IN THESE PLACES IT IS EASIER THE FORMATION OF CRICKS AND CONSEQUENTLY OF BREAKINGS.

- AN ACCURATE VISUAL CHECK, CARRIED OUT PERIODICALLY AS SUGGESTED IN THE GENERAL CHECKS TABLE, PERMITS TO FIND OUT THE CRICKS OR BREAKINGS BEFORE THE STRUCTURE IS SERIOUSLY AND DEFINITELY COMPROMISED.

BE CAREFUL TO THE PAINT OR GALVANIZING CONDITIONS: A PAINT CLEAVING, ABOVE ALL IF THERE IS ALSO A RUST ESCAPE, GENERALLY MEANS A CLEAVING INTO THE UNDERLYING MATERIAL.

- IF THERE IS ANY PROBLEM IN THE VISUAL CHECK (AND THE SUSPECT OF POSSIBLE CRICKS REMAINS), CONTACT SPECIALISED COMPANIES IN NOT DESTRUCTIVE CONTROLS AND S.B.F. SRL TO MAKE MORE DETAILED CHECKS.

IF THERE ARE CRICKS OR BREAKINGS IN PROGRESS, STOP IMMEDIATELY ALL OPERATIONS AND CONTACT S.B.F. SRL IMMEDIATELY.



### 9.3 CORROSION

- ON OPEN STEEL STRUCTURES A PERIODICAL REPAINT IS AN EFFICACIOUS PREVENTION AGAINST CORROSION.

- MORE DIFFICULT IS THE PREVENTION AND THE CONTROL OF THE CORROSION IN THE CLOSE STRUCTURES (BOX STRUCTURES, TUBULAR ELEMENTS, ETC.) ESPECIALLY IF THE ELEMENTS ARE OF LITTLE THICKNESS.

IN THIS CASE, IT IS POSSIBLE TO CHECK, IN PARTICULAR CONDITIONS, RELEVANT PHENOMENA OF CORROSION, WHICH AFTER SOME YEAR COULD REDUCE THE THICKNESS AND ENDANGER SERIOUSLY THE EXERCISE OF THE STRUCTURE.

IN ALL PARTS OF THE STEEL STRUCTURE SUSCEPTIBLE OF SUCH DANGER, MAKE NO MORE THAN THREE YEARS AFTER ITS CONSTRUCTION, PERIODICAL CONTROLS, EVERY YEAR, OR IF THERE ARE CORROSIVE PHENOMENA, EVERY SIX MONTHS.

SUCH CONTROLS MUST BE EFFECTED BY SPECIALIZED COMPANIES IN NOT DESTRUCTIVE CONTROLS, HAVING THE PERSONNEL AND THE MEANS TO MAKE THICKNESS MEASUREMENTS ON CLOSED STRUCTURES.

PARTICULARLY, SUBMIT TO CHECK THE FOLLOWING PARTS:

- IN THE TUBULAR STRUCTURES, UNDERPUTTING THEM TO A GENERAL CONTROL THAT HAS TO BE PARTICULARLY CAREFUL THAT, FOR THEIR POSITION OR STRUCTURE, PRESENT OFTEN BACKWATERS;

- SHIP'S FRAMES, GENERALLY MADE UP BY A SMALL THICKNESS AND SUBMITTED TO GREAT BACKWATERS; IF THE AREAS TO CHECK ARE COVERED BY FIBREGLASS FOR THE FRAME TIGHTENING TO THE METALLIC STRUCTURE, PROCEED TO A SMALL QUANTITY OF THE FIBREGLASS TO MAKE THE MEASUREMENTS OF THE THICKNESS AND SO, WITH THE HELP OF QUALIFIED PERSONNEL, TO RESTORE THE CONNECTION;

- THE STRUCTURES WHERE IT IS FIXED FRAME ELEMENTS, COVERINGS, DECORATIVE ELEMENTS OR LIGHTINGS;

- THE STRUCTURES CONSTANTLY UNDERGROUNDED OR, HOWEVER, DIFFICULT TO REACH.

IF THERE IS A REDUCTION OF THE THICKNESS MORE OF THE 15% THAN THE INITIAL ONE, STOP IMMEDIATELY ALL OPERATIONS AND CONTACT S.B.F. S.R.L.



## **10.0 CONNECTION THROUGH BOLTS AND PLUGS**

CONNECTIONS THROUGH DOWELS AND PLUGS FOR RIDES ARE:

- ♦ CONNECTIONS WHERE, ONCE THE CONNECTION IS EFFECTED, THERE IS NO RELATIVE MOVEMENT AMONG PARTS;
- ♦ CONNECTIONS WHERE THERE IS A RELATIVE OCCASIONAL MOVEMENT;
- ♦ CONNECTION WHERE THE RELATIVE MOVEMENT IS FREQUENT.

IN THE LAST TWO CASES, THERE IS THE INTERPOSITION AMONG DOWELS AND PISTON BEARINGS OR ANTI-FRICTION BALL BEARINGS PLACE.

## **10.1 USE AND MAINTENANCE**

DO NOT DAMAGE SUCH CONNECTIONS UNPROPERLY, SUBMITTING THEM TO UNEXPECTED LOADS, MAKING WRONG OPERATIONS OF ASSEMBLING, DISMANTLING AND TRANSPORT.

AFTER THE CONNECTION FUNCTIONALITY DO NOT MAKE ANY KIND OF WELDINGS, CHANGING OR MAKING INEFFICIENT THE SAFETY MECHANISMS OF CONNECTION, HEATING THE CONNECTION ELEMENTS, MAKING HOLES, STRUCTURAL CUTTINGS OR WHATEVER COULD COMPROMISE ITS INTEGRITY.

SUBMIT THE CONNECTION TO MAINTENANCE, IN ORDER TO AVOID BINDINGS AND CORROSIONS.



## 10.2 CHECKINGS

CHECK ALL PLUGS AND DOWELS CONNECTIONS ACCORDING TO THE PREVIOUS CHAPTERS AND THE GENERAL CHECKS TABLE.

### **WEARING, DEFORMATIONS, CORROSION**

THESE CONNECTIONS, WITH OR WITHOUT RELATIVE MOVEMENTS, ARE USUALLY SUBJECTED TO WEARING AND SELDOM TO DEFORMATIONS AND CORROSIVE PHENOMENA.

WEARINGS, AS FOR THE OTHER MENTIONED PHENOMENA, COULD OCCUR ON THE DOWEL, ON THE HOLES OR ON THE INTERPLACED BEARINGS, AND IF LIMITED WITHIN CERTAIN LIMITS, DO NOT COMPROMISE THE GOOD OPERATION OF CONNECTION.

TO DETERMINE THE MAXIMUM ADMISSIBLE PLAY LEVELS FOR THESE PHENOMENA IS DIFFICULT AND NOT PRACTICAL, FOR THE GREAT NUMBER OF CONNECTION ON THE ATTRACTION.

THIS IS A GENERAL INFORMATION, LEAVING MORE DETAILS ONLY TO CASES CONSIDERED INDISPENSABLE.

USUALLY, THE CONTROL CONNECTION MUST ASSURE THAT:

- THE PLAY AMONG DOWELS AND PLUGS HAS NOT BECOME TOO EXCESSIVE; WHERE THE VALUES OF THE MAXIMUM ADMISSIBLE PLAY ARE NOT INDICATED, IT IS MEANT A PLAY CONSIDERED ANOMALOUS BY COMPETENT PERSONNEL, WHO CONSIDERS WHAT KIND OF CONNECTION, ITS DIMENSIONS AND ITS FUNCTIONING.
- THE DOWEL HAS ALTERATIONS OF FORM OR DIMENSION: OVALISATIONS, UPSETTINGS, STEPS, SEIZINGS, PITTINGS AND OTHER CORROSIVE ATTACKS.
- THE HOLE, OR BEARING, DOES NOT PRESENT ANALOGOUS DEFECTS ON THE INNER SURFACE.

### **CRACKS**

CHECK CAREFULLY THE CONNECTION ELEMENTS (DOWELS), TO DISCOVER PROBABLE BREAKINGS, USUALLY CAUSED BY FATIGUE.

THIS IS A LITTLE DEFECT WHICH CAN BECOME BIGGER DURING THE TIME TILL THE COMPLETE DESTRUCTION OF THE ELEMENT.

THESE FATIGUE CRACKS HAVE GENERALLY THEIR ORIGIN NEAR DISCONTINUITIES SUCH AS DIAMETER CHANGES, SLOTS FOR SEEGER RINGS OR SPLINES, SLOTS FOR MECHANISMS WHICH HAVE TO PREVENT THE ROTATION AND THE ESCAPE OF THE DOWELS AND OTHERS. CHECK THESE PARTS AFTER HAVING TAKEN AWAY FILTHINESS, GREASE.

CHECK VERY CAREFULLY DOWEL, ACCURATELY UNGREASED AND WASHED, IN THE ALREADY MENTIONED ZONES: IF THERE IS ANY DOUBT CONTACT S.B.F. SRL FOR MORE DETAILED CONTROLS.

IF THERE IS ANY DOUBT OF THE GENERAL CONDITION OF DOWELS AND PLUGS CONNECTION, ON WHICH CAN DEPEND THE ATTRACTION SAFETY, STOP IMMEDIATELY ALL OPERATIONS AND CONTACT S.B.F. SRL.



## ***11.0 STEEL NUTS AND BOLTS***

CHECK VERY CAREFULLY ALL SCREW CONNECTIONS, BOTH THOSE MADE IN THE FACTORY AND NOT DISMANTLING (IF NOT FOR MAINTENANCE AND REPARATION) AND THOSE TO RESTORE AT EVERY RIDE ASSEMBLING, BECAUSE THEY ARE EXTREMELY IMPORTANT FOR SAFETY AND RELIABILITY OF THE RIDE.

### ***11.1 RESISTANCE CLASSES***

USUALLY ARE USED COMMERCIAL SCREWS AT HIGH RESISTANCE OF 8.8 AND 10.9 CLASSES (UNI 3740-DIN ISO 898).

SCREWS CLASS NR. 12.9 ARE NOT IN USE, BECAUSE, IN SPITE OF THEIR HIGH RESISTANCE, CAN GET FRAGILE BREAKINGS.

THE RESISTANCE CLASS OF SCREWS AND NUTS IS EASILY IDENTIFIABLE, BECAUSE MARKED OVER THEIR HEADS.

IN PARTICULAR CASES, SPECIAL SCREWS CAN BE USED, BUILT EXCLUSIVELY FOR S.B.F. S.R.L. IN SMALL STOCK: STAMPING OF RESISTANCE CLASS CAN BE MISSED, BUT IT IS INDICATED IN THIS MANUAL AND NEXT TO SCREWS.

#### **IN REPLACEMENT CASE:**

USE SCREWS AND NUTS OF THE SAME RESISTANCE OF THE ORIGINAL ONES; AS THERE IS NO CORRESPONDENCE BETWEEN THE RESISTANCE CLASS DIN OR UNI AND THAT OF OTHER RULES (SAE, ASTM, ETC.), IT IS ABSOLUTELY FORBIDDEN TO USE DIFFERENT NUTS AND BOLTS THAN THOSE INDICATED;

USE CLASS OF RESISTANCE NUTS COMPATIBLE TO THE SCREWS CLASS OF RESISTANCE (TO WHICH ARE COUPLED);

ORDER THE SPECIAL SCREWS DIRECTLY TO S.B.F. SRL;

WHEN EXPECTED, USE ONLY INSERTS FOR NUTS AND BOLTS OF HIGH RESISTANCE (UNI 5714-DIN 6916).



## 11.2 TIGHTENING

THE PROPER SCREWS TIGHTENING IS FUNDAMENTAL FOR A SAFE OPERATION OF THE CONNECTION.

A STRONG TIGHTENING (EXTRA-TIGHTENING) CAN PRODUCE PERMANENT PLASTIC DEFORMATIONS COMPROMISING THE CONNECTIONS TOUGHNESS.

ON THE OTHER HAND, A LOOSE TIGHTENING (UNDER-TIGHTENING) CAN PRODUCE:

- ① SUBSIDENCES FOR FATIGUE;
- ② LOOSENINGS;
- ③ SLIPPINGS OFF OF CONNECTED PARTS AND BOLT CUTTING.

FOR A CORRECT SCREW TIGHTENING OR FOR A PERIODIC CHECK, USE EXCLUSIVELY A DYNAMOMETRIC KEY OF PROPER DIMENSIONS, AFTER HAVING CAREFULLY READ INSTRUCTIONS FOR USE INCLUDED WITH THE SAME KEY.

TURN THE NUT FOR A CORRECT BOLTS TIGHTENING.

IN THE FOLLOWING TABLE ARE LISTED THE VALUES OF THE TIGHTENING MOMENTS FOR WIDE PITCH EXTERNAL THREADS ISO TYPE UNI 5931- DIN 912, UNI 5737- DIN 931, UNI 5739- DIN 933.

THESE VALUES ARE TAKEN BY THE MOST TRUSTWORTHY LITERATURE AND THEY ARE VALID FOR CONNECTION EFFECTED IN THE FACTORY NOT SUBMITTED TO REPEATED ASSEMBLINGS AND DISMANTLINGS.

IF THERE ARE CONNECTIONS SUBMITTED TO REPEATED ASSEMBLINGS AND DISMANTLINGS, IN ORDER NOT TO DAMAGE THE SCREWS, IT IS ADVISABLE TO APPLY A TIGHTENING MOMENT REDUCED OF 10%.

| <i>FREQUENT<br/>DISMANTLINGS</i> | <i>ASSEMBLINGS</i> | <i>AND</i> | <i>SELDOM<br/>DISMANTLINGS</i> | <i>ASSEMBLINGS</i> | <i>AND</i> |
|----------------------------------|--------------------|------------|--------------------------------|--------------------|------------|
|----------------------------------|--------------------|------------|--------------------------------|--------------------|------------|

| CLASS ⇒  | 8.8  | 10.9 | CLASS ⇒  | 8.8  | 10.9 |
|----------|------|------|----------|------|------|
| THREAD ↓ | NM   | NM   | THREAD ↓ | NM   | NM   |
| M8       | 22   | 32   | M8       | 25   | 35   |
| M10      | 44   | 62   | M10      | 48   | 69   |
| M12      | 76   | 110  | M12      | 84   | 120  |
| M14      | 120  | 170  | M14      | 130  | 190  |
| M16      | 220  | 315  | M16      | 245  | 350  |
| M18      | 265  | 380  | M18      | 295  | 420  |
| M20      | 380  | 540  | M20      | 420  | 600  |
| M22      | 565  | 810  | M22      | 630  | 900  |
| M24      | 690  | 990  | M24      | 770  | 1100 |
| M27      | 1040 | 1490 | M27      | 1160 | 1650 |
| M30      | 1390 | 1980 | M30      | 1540 | 2200 |
| M33      | 1730 | 2480 | M33      | 1930 | 2750 |
| M36      | 2390 | 3420 | M36      | 2660 | 3800 |



TAKE CARE OF NOT PAINTED PARTS AND EXPOSED TO ATMOSPHERIC PHENOMENA (ES. DOWELS, PLUGS, SCREWS, ETC.) USING ONE OF THE FOLLOWING PROTECTIVE GREASES:

| <i>TYPE</i> | <i>BRAND</i>         |
|-------------|----------------------|
| AGIP        | GR PV2               |
| MACH-BP     | GP 2                 |
| CHEVRON     | CUP GR 2             |
| ESSO        | ESTAN 2              |
| FINA        | MERKAN 2             |
| GULF        | CST 2                |
| MOBIL       | MOBIL GREASE A.AN.2. |
| SHELL       | UNEDO GR 2           |

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## ***12.0 ROUTINE MAINTENANCE***

### ***12.1 DAILY MAINTENANCE***

- CHECK THAT THE ELECTRICAL CONNECTIONS ARE CORRECTLY CONNECTED.
- BEFORE SETTING THE ATTRACTION IN MOTION, MAKE SURE THAT ALL THE CONTROL EQUIPMENT IS WORKING PROPERLY.

### ***12.2 WEEKLY MAINTENANCE***

GREASE THE ROLLERS WHICH ARE BOTH UP AND DOWN OF THE CENTRE THROUGH THE PROPER GREASER. GREASE THE ROLLER'S TRACKS FIXED ON THE COLUMN.

### ***12.3 15 DAYS MAINTENANCE***

GREASE THE BEARING THROUGH THE TWO GREASERS WHICH ARE DIAMETRICALLY OPPOSED EACH OTHER (TAB.2 RIF.A). MOREOVER GREASE THE EXTERNAL TOOTHING THROUGH THE PROPER OPENING (TAB. 2 RIF.B)

### ***12.4 MONTHLY MAINTENANCE***

- CHECK THE WEARING-OUT OF THE CONTACT BRUSHES OF THE ELECTRIC COLLECTOR.(THE BRUSHES ARE SITUATED ON THE ROTATION CENTRE).
- IF NECESSARY REPLACE THEM AFTER UNSCREWING THE BOLTS.

### ***12.5 GEAR BOX MAINTENANCE***

IT IS NECESSARY TO REPLACE THE OIL GEAR AFTER THE FIRST 150-200 HOURS OF OPERATION AND THEN EVERY 2500 HOURS OR 12 MONTHS.

IN ORDER TO FACILITATE THE ELIMINATION OF IMPURITIES, IT IS SUGGESTED TO REPLACE THE OIL WHEN THE GEAR BOX IS WARM.

IT IS ADVISABLE ALSO TO CHECK THE OIL LEVEL AT LEAST ONCE A MONTH ADDING SOME OIL IF NECESSARY.

PLEASE USE OIL TYPE AS PER TABLE 1.



## **12.6 HYDRAULIC SYSTEM MAINTENANCE**

### **1) FILTERS**

Replace the filters of the hydraulic tank after 50 operating hours for the first time. Then change them every 500 hours.

⇒ Before replacing the filter it's necessary to close the shutter.

N.B.: be sure to open the shutter after the filter's replacement. Just 15 second of operation without oil will break the pump.

### **2) HYDRAULIC OIL**

In normal conditions the oil must be changed as follows:

- First time after 1000 operating hours.
- Then every 2000 operating hours.
  
- Check regularly the seal of the entire transmission, tighten the connection and the coupling if there is oil leaks. These operation must be done in total absence of pressure in the system.
- Check everyday the level of the oil in the tank.
- For the oil choice look up schedule nr.3
- Avoid mixing different types of oil.
- The oil filling must be through the cap of the hydraulic tank, accessible from the trapdoor of the trailer platform.

Table 1

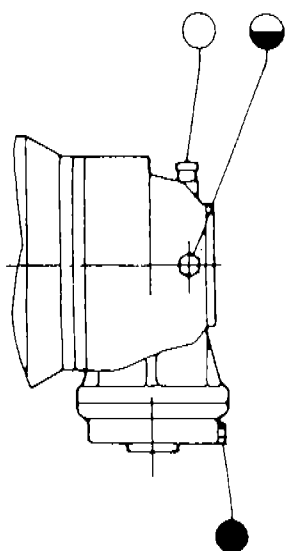
Tabella 1



SCELTA DEL LUBRIFICANTE  
IN FUNZIONE  
DELLA TEMPERATURA AMBIENTE

LUBRICANT SELECTION  
ACCORDING  
TO AMBIENT TEMPERATURE

| LUBRIFICANTE<br>LUBRICANT | -20°C/+5°C<br>IV 95 min      | +5°C/+30°C<br>IV 95 min      | +30°C/+50°C<br>IV 95 min     | -30°C/+65°C<br>IV 165 min               |
|---------------------------|------------------------------|------------------------------|------------------------------|---|
| ISO 3448                  | VG 100                       | VG 150                       | VG 320                       | VG 150-200                              |
| AGIP                      | Blasia 100                   | Blasia 150                   | Blasia 320                   | Blasia S 220                            |
| ARAL                      | Degol BG 100                 | Degol BG 150                 | Degol BG 320                 | Degol GS 220                            |
| BP MACH                   | GR XP 100                    | GR XP 150                    | GR XP 320                    | SGR XP 220                              |
| CASTROL                   | Alpha SP 100                 | Alpha SP 150                 | Alpha 320                    | Alpha SN 6                              |
| CHEVRON                   | non leaded gear compound 100 | non leaded gear compound 150 | non leaded gear compound 320 |   |
| ESSO                      | Spartan EP 100               | Spartan EP 150               | Spartan EP 320               | Compressor oil LG 150                   |
| GULF                      |                              | EP lubricant HD 150          | EP lubricant HD 320          |   |
| I.P.                      | Mellana 100                  | Mellana 150                  | Mellana 320                  | Telesia Oil 150                         |
| MOBIL                     |                              | Mobilgear 629                | Mobilgear 632                | Glygoyle 22<br>Glygoyle 30<br>SHC 630   |
| SHELL                     | Omala oil 100                | Omala oil 150                | Omala oil 320                | Tivela Oil SA                           |
| TOTAL                     | Carter EP 100 N              | Carter EP 150                | Carter EP 320 N              |   |
| KLUEBER                   | Lamora 100                   | Lamora 150                   | Lamora 320                   |   |
| ELF                       | Reductelf SP 100             | Reductelf SP 150             | Reductelf SP 320             | Elf ORITIS 125 MS<br>Elf Syntherma P 30 |



- TAPPO CARICO E SFIATO OLIO  
FILLING AND BREATHER PLUG
- ◐ TAPPO LIVELLO OLIO  
OIL LEVEL PLUG
- TAPPO SCARICO OLIO  
DRAIN PLUG



Table 2

Tabella 2

A

B















|   |                     |   |   |                     |   |
|---|---------------------|---|---|---------------------|---|
|    | Aralub<br>HLP 2     | da 248 K a 403 K<br>(da -25°C a +130°C) |    | Aralub<br>LFZ 1     | da 248 K a 523 K<br>(da -25°C a +250°C) |
|    | Grease<br>LTX-EP 2  | da 243 K a 403 K<br>(da -30°C a +130°C) |    | Energol<br>WRL      | da 253 K a 353 K<br>(da -20°C a +80°C)  |
|   | Spheerol<br>EPL 2   | da 253 K a 393 K<br>(da -20°C a +120°C) |   | Grippa<br>33 S      | da 253 K a 353 K<br>(da -20°C a +80°C)  |
|  | Epexa<br>2          | da 243 K a 393 K<br>(da 30°C a +120°C)  |  | Cardrexa<br>DC 1    | da 253 K a 393 K<br>(da -20°C a +120°C) |
|  | Beacon<br>EP 2      | da 248 K a 403 K<br>(da -25°C a +130°C) |  | Surett<br>Fluid 4 k | da 253 K a 373 K<br>(da -20°C a +100°C) |
|  | Mobilux<br>EP 2     | da 253 K a 393 K<br>(da -20°C a +120°C) |  | Mobiltac<br>81      | da 243 K a 393 K<br>(da -30°C a +120°C) |
|  | Alvania<br>Grease 2 | da 238 K a 403 K<br>(da -35°C a +130°C) |  | Malleus<br>Fluid C  | da 268 K a 298 K<br>(da -5°C a +25°C)   |

Table 3

Tabella 3



| OLIO IDRAULICO<br>HYDRAULIC OIL | SCELTA DELL'OLIO IDRAULICO IN FUNZIONE<br>DELLA TEMPERATURA AMBIENTE<br><br>HYDRAULIC OIL SELECTION ACCORDING TO<br>ENVIROMENTAL TEMPERATURE |                         |
|---------------------------------|--|-------------------------|
| TEMPERATURA<br>TEMPERATURE      | -15° C /+30 C  | -5° C /+40 C            |
| VISCOSITA' ISO<br>VISCOSITY ISO | VG 46 (DIN 51519)  | VG 68 (DIN 51519)       |
| AGIP                            | OSO 46   | OSO 68                  |
| BP MACH                         | ENERGOL HLP 46   | ENERGOL HLP 68          |
| CHEVRON                         | RPM EP HYDRAULIC OIL 46  | RPM EP HYDRAULIC OIL 68 |
| ESSO                            | NUTO H 46  | NUTO H 68               |
| IP                              | IP HYDRUS 46   | IP HYDRUS 68            |
| MOBIL                           | MOBIL D.T.E. 25  | MOBIL D.T.E. 26         |
| TOTAL                           | AZOLLA ZS 46   | AZOLLA ZS 68            |