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*for a sustainable future*

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**Contract 95/113**

Conversion of Damascus  
factory of Barada Co.  
to phase-out the use of CFC-11 and 12  
in the production of domestic appliances.

Messrs. **UNIDO**

Contracts Unit, P & C, OPD  
Kind attention  
**Mr V. Bysyuk**  
**Mr V. Koloskov**

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***Final report - completion of works - Acceptance of works statement  
by the Counterpart will follow shortly***

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Dear Sirs,

as You remember and as evidenced in our previous Reports, all the activities had proceeded smoothly until the shipping of the equipments, which took place in february/march '96 (test equipments and refrigeration service) and october '96 (foaming section). Unfortunately, these goods got stuck in the port of Lattakia until the spring of 1997, due to various reasons, most of them to be related to the Custom Authorities of Syria who were not prepared to deal with the Project which, in fact, was the first Project of this kind to be implemented in this Country. Once the goods got cleared, they were transferred to the two factories and stored, there, under the supervision of our Syrian Representative. Meanwhile, the Counterpart received a complete documentation on the tests and modifications that were effected on some samples of their models.

The main points that resulted from these tests were the following :

- Determination of the charging quantities of freon R 134a compared to the previous quantities of R 12. Surprisingly, such quantities could, actually, be decreased in their models, due to the excessive quantities, previously used.
- They were adviced on how to handle the capillar tubes, due to the high sensitivity of R 134a to moisture. They were adviced to use protections and not to leave them open at any time.
- Advice was given on a series of malpractices we noticed during our visits to the factories, regarding their previous methodology in the assembling, fixing and welding of the units.
- We gave them a list of suppliers of new components (filters, compressors etc..) that had to be changed.
- We gave them consultancy on the use of plastics suitable for 141b, which is the blowing agent they chose to replace R 11 and provided a list of possible suppliers of this material. As a part of the contract, we, then supplied a complete series of test materials for the prototypes, including plastic sheets suitable for the manufacture of their innerliners and compatible with 141b.
- We provided data sheets with the achieved results and instructions on how to keep having not only the same but radically improved performances.

Their staff was trained on how to use the test-room and its pertaining recorders and was given written instructions, accordingly.

The installation of the equipment in the PUR section began on 18.10.97.

At this point, we must remind You that, with an amendment to the Contract which

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UNIDO publ. (final report) on phasing out use of CFC-11 and 12 in the production of domestic appliances in Syria with special reference to refrigerators — gives too short account of concluding activities at factory level. Additional references: components, mototyper, equipment.

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was signed in september '95 by Unido, Barada and Riviera, in addition to the main points of such amendment, we had agreed that parts of the foaming line that could not be covered by the Contract budget, would have been purchased directly by Barada from us, on a bi-lateral basis.

Even though this should have not involved Unido and should have not, for any reason, delayed the execution of the Contract, it must be clearly stated that this parts of the plant, even if separated from the ones included in the Contract from a *financial* point of view, should have and must, still, be considered as integral parts of an undivisible line, from a *technical* point of view.

This means that the installation of such a foaming line could not be considered complete until all its parts were shipped, installed and tested.

During the installation of the foaming jigs and test-run of the plugs for their 14 cu.ft double-door, that were designed by Impianti OMS, sub-supplier for the foaming section, according to the drawings that were handed to us by Barada's technical staff, we found out that the above model had been, meanwhile, modified and that, therefore, the according plugs were not suitable. Also, some items were found defective.

Dry and wet test-runs of the high pressure foaming machine were done, however, and prototypes were manufactured by our staff, as mentioned above, together with the production of pilot series of units but, *only*, for the 13 cu.ft single door model, the according fittings being included in the Contract budget.

All items that had to be repaired or replaced were shipped back to us, in order to execute the needed modifications. We shipped them to Barada, this year and completed all installation and commissioning during november 1998.

Once this was done our technicians carried out test-runs of the converted plant and the prototype program, accordingly. Please find enclosed some pertaining data sheets of the tests carried out on the modified models, on site.

Barada, then, under the supervision of our technicians, produced some pilot series on industrial scale, in order to have further information and confirmation of the achieved results.

For this last part of the Project, please refer to our recent Progress Report 3.

**The whole plant is now fully converted and operating on a CFC-free technology basis.**

**Riviera S.r.l.**  
Antonio Forni  
Projects' coordinator



<b>Riviera srl</b>	<b>PERFORMANCE TEST ON EMPTY UNIT (I.S.O. 8187)</b>			
	<b>UNIT : BARADA DOUBLE DOOR 14 CU.FT. MODEL</b>			
Compressor			Charge	
1/4 HP O.C.			gr. 260	
kcal 180			R 134 a	
test room temp. °C	33	33	33	33
Freezer therm. pos.	min	continuous	max/max	med/med
Refr. therm. pos.	min	short circuit	max	med
Refr. high temp. °C	+6.6 +6	+1.5	+3.2 +0.5	+4.9 +5.1
Refr. med. temp. °C	+5.0 +4.8	-0.7	+2.1 -0.5	+3.0 +2.8
Refr. low temp. °C	+1.9 +1.2	-4.9	+0.7 -4.0	+1.6 +1.1
<b>Refr. average</b> °C	<b>+4.5</b>	<b>-1.4</b>	<b>+2</b>	<b>+3.2</b>
Freezer high temp °C				
Freezer med temp °C	-10.7 -14.1	-26.0	-12.3 -24.9	-10.9 -15.3
Freezer low temp °C				
<b>Freezer average</b> °C	<b>-12.4</b>	<b>-26.0</b>	<b>-18.6</b>	<b>-13.1</b>
Condensation temperature °C	+33	+38.8	+38.8	+38
Feedback tube temperature °C	+30	+32.4	+32.6	+32
Functioning percentage %	40.7	100	78	40.4
Suction pressure (kg/sq.cm)	+4.2 -21.2	-24	+4 -23.5	+4.4 -13.5

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Refr. low temp. °C	+1.9 +1.2	-4.9	+0.7 -4.0	+1.6 +1.1
<b>Refr. average °C</b>	<b>+4.5</b>	<b>-1.4</b>	<b>+2</b>	<b>+3.2</b>
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<b>Riviera srl</b>	<b>PERFORMANCE TEST ON EMPTY UNIT (I.S.O. 8187)</b>			
	<b>UNIT : BARADA SINGLE DOOR 13 CU.FT. MODEL</b>			
Compressor			Charge	
1/5 HP O.C.			gr. 231	
kcal 157			R 134 a	
test room temp. °C	34	34	34	34
Freezer therm. pos.	min	continuous	max/max	med/med
Refr. therm. pos.	min	short circuit	max	med
Refr. high temp. °C	+6.9 +5.9	+1.7	+3.3 +0.6	+5.0 +5.3
Refr. med. temp. °C	+5.0 +4.9	-0.3	+2 -0.4	+3.1 +2.7
Refr. low temp. °C	+2 +1.8	-3.8	+0.8 -3.8	+1.8 +1.2
<b>Refr. average °C</b>	<b>+4.6</b>	<b>-0.8</b>	<b>+2</b>	<b>+3.3</b>
Freezer high temp °C				
Freezer med temp °C				
Freezer low temp °C				
<b>Freezer average °C</b>				
Condensation temperature °C	+33.2	+39.1	+39.1	+38.7
Feedback tube temperature °C	+30.1	+32.5	+32.5	+32.1
Functioning percentage %	40.9	100	75	40.5
Suction pressure (kg/sq.cm)	N.C. N.C.	N.C. N.C.	N.C. N.C.	N.C. N.C.

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Freezer therm. pos.	min	continuous	max/max	med/med
Refr. therm. pos.	min	short circuit	max	med
Refr. high temp. °C	+6.9 +5.9	+1.7	+3.3 +0.6	+5.0 +5.3
Refr. med. temp. °C	+5.0 +4.9	-0.3	+2 -0.4	+3.1 +2.7
Refr. low temp. °C	+2 +1.8	-3.8	+0.8 -3.8	+1.8 +1.2
<b>Refr. average °C</b>	<b>+4.6</b>	<b>-0.8</b>	<b>+2</b>	<b>+3.3</b>
Freezer high temp °C				
Freezer med temp °C				
Freezer low temp °C				
<b>Freezer average °C</b>				
Condensation temperature °C	+33.2	+39.1	+39.1	+38.7
Feedback tube temperature °C	+30.1	+32.5	+32.5	+32.1
Functioning percentage %	40.9	100	75	40.5
Suction pressure (kg/sq.cm)	N.C. N.C.	N.C. N.C.	N.C. N.C.	N.C. N.C.