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Reference No.

7/10

UNITED STATES OF AMERICA

(1) HOT POWDER METAL FORMING AND CONVENTIONAL POWDER METAL [illegible] ELECTRODE.

(2) HOEGANAES CORPORATION, River Road and Taylors Lane, Riverton, New [illegible] States of America; Cable: HOEGANAES, Riverton, N.J.; [illegible] Phone: (609) [illegible]; Contact: Mr. G. Braithwaite [illegible]

(3) Private; Sales: Approx. $US [illegible],000,000; [illegible] business: Production of iron, steel and ferrous alloy powders.

(4) Knowhow covering all aspects of production of metal powders at normal and elevated temperature [illegible] the coatings required for welding electrodes.

(5) Will sell knowhow under appropriate conditions.

Reference No.

7/11

JAPAN

(1) PRODUCTION OF REDUCED IRON POWDER

(2) KAWASAKI STEEL CORPORATION, New Yurakucho Bld., [illegible] Yurakucho [illegible], Chiyoda-ku, Tokyo, Japan; Cable: Riversteelcorp Tokyo; Phone: [illegible]; Telex: [illegible] "RIVERSTCORP TOK"; Contact: Mr. Minoru Ikeda (General Manager).

(3) Private; Capital: $US [illegible]; Net sales: $US [illegible]; No. of employees: [illegible],000; Main nature of business: Iron and Steel Manufacturer.

(4) Technology covering the solid pulverization process which uses pulverized low-carbon steel [illegible] and filings and also the melting process in which steel is atomized and drippings are solidified and finally the electrolytic process, all of which produce iron powders, are offered.

(5) We are ready to negotiate for detailed conditions as mentioned above depending upon specific interest of inquirers, taking into consideration type, scale and characteristics of their proposals.

Reference No.

10/8

UNITED STATES OF AMERICA

(1) [illegible] STEEL

(2) [illegible] STEEL COMPANY, [illegible] Telex: [illegible] [illegible] International Manager).

(3) Private; [illegible] $ [illegible] Specialty [illegible]

(4) Modern [illegible] steels were developed to provide the [illegible] resistance and [illegible] by solid high-alloy metals at lower cost. [illegible] material (nickel, stainless steel, Inconel, Monel, copper, etc.) [illegible] carbon or low-alloy steel.

[illegible] Steel [illegible] of clad steels, and [illegible] transfer [illegible]

In addition [illegible] heating, detailing, fabrication, welding, etc.

(5) Nuclear reactor vessels, [illegible] supply pipelines, [illegible]

(6) 1. [illegible] Steel [illegible] can transfer [illegible] export [illegible] form of [illegible], [illegible] instructions, [illegible] operational data, [illegible] training [illegible] questions.

- The following [illegible] arrangements [illegible]:
  a. Lump-sum payment in advance [illegible] estimate of [illegible]
  b. [illegible] arrangements. The recipient [illegible] more than ten years, [illegible] agreement.
  c. All payments in US currency to a New York bank, without any deduction of taxes.

Reference No.

10/9

[illegible]

(1) ELECTROLYTIC COLOURING OF ALUMINIUM AND ITS ALLOYS

(2) MONTEDISON [illegible] S.p.A., [illegible], Milano, Italy; Cable: [illegible]; Telex: [illegible]; [illegible] Manager, [illegible] Milano.

(3) Private; Capital: [illegible] [illegible]

(4) The 'ANOLOK'* [illegible] of electro [illegible] coating with [illegible].

The stages in the process are as follows:

- Surface cleaning and [illegible]
- Anodising and colouring
- Washing and finishing

*Registered Trade Mark.

(5) Decorative finishes on construction [illegible], etc.

(6) <u>Licensing arrangements</u> against payment of lump sum covering [illegible] with transfer of [illegible] plus annual royalty - to be negotiated with recipients. <u>Training</u> of technical personnel [illegible] charge of plant operation. <u>Technical assistance</u> for technology transfer and start-up of plant.

Reference No.

10/10

ITALY

(1) SELF-[illegible] ANODIZING [illegible]

(2) MONTEDISON [illegible] S.p.A., [illegible], Milano, Italy; Cable: Montedison; Telex: [illegible] (Manager, [illegible]), [illegible] Milano.

(3) Private; Capital: [illegible] employees: [illegible]; Main sector of [illegible]: Manufacture [illegible] ferroalloys.

11/7

(1) VACUUM HEAT TREATMENT AND SINTERING [illegible]

(2) METALLURGY INC., P.O. Box [illegible], [illegible], Pa. [illegible], United States of America; Phone: [illegible]; Contact: Mr. Richard M. [illegible].

(3) Private; Capital: $US [illegible]; Sales: $US [illegible]; [illegible] Main nature of business: Metallurgical processing.

(4) Complete capabilities for designing, building and installing vacuum heat treating [illegible] furnaces. Complete technology [illegible] equipment [illegible].

(5) Will sell equipment and operating knowledge; expert assistance [illegible] technology on application of this equipment to [illegible] metals [illegible].

11/8

(1) HEAT TREATMENT AND HARDENING MACHINERY

(2) [illegible], [illegible], Federal Republic of Germany; Cable: [illegible]; Telex: [illegible]; Phone: [illegible]; Contact: Mr. F. [illegible].

(3) Private; Turnover: DM [illegible] per year; No. of employees: [illegible]; Main nature of business: Manufacture of heat treating and foundry equipment.

(4) The necessary knowhow to manufacture heat treating and hardening installations will [illegible] licence agreement. Knowhow for the manufacture of automatic [illegible] and [illegible] the various parts of the processing furnaces or plants will also be made available.

(5) A licence agreement will be negotiated which will cover all drawings for [illegible] the necessary knowhow for the erection of the plant and its [illegible] operation. [illegible] provision for training.

[illegible] can also act as consultants for the installation of the plant [illegible] the value and volume of products to be manufactured [illegible].

11/9

(1) [illegible] LINE FOR THE [illegible]

(2) NIPPON KOKAN K.K., [illegible], Tokyo, Japan; [illegible]; Telex: [illegible]; Phone: [illegible]; Contact: Mr. [illegible].

(3) Private; Capital: $US [illegible] million; Sales: $US [illegible]; No. of employees: [illegible] 40,000; Main nature of business: [illegible] Annual [illegible] ,000 [illegible]; Steelmaking: Annual crude steel capacity: [illegible] million metric tons; [illegible] Annual capacity new building - 1.[illegible] million metric tons.

(4)
1. As compared with the mill [illegible] produced by the conventional [illegible], the manufacturing process is shorter by [illegible]. This is very advantageous in [illegible] the period before delivery.
2. Defects in products are reduced.
3. This line requires only a very small [illegible] and reduced total construction costs and permits labour saving.

(5) Patent; Knowhow; Licensing policy.

11/10

(1) TECHNIQUES FOR MANUFACTURING RAILS BY THE HIGH-FREQUENCY HARDENING METHOD

(2) NIPPON STEEL CORPORATION, [illegible] Ote-machi, [illegible] chome, Chiyoda-ku, Tokyo, Japan; Cable: NIPPON STEEL TOKYO; Telex: [illegible]; Phone: [illegible]; Contact: Mr. Makoto Okubo (Director).

(3) Private; Capital: $US [illegible] million; Sales: $US [illegible] million; No. of employees: 80,[illegible]; Main nature of business: Manufacture and sale of iron and steel [illegible] chemical products and business incidental thereto.

(4) The equipment [illegible] (…+… mm), [illegible] input of the [illegible] welding [illegible].

The machine is available in two [illegible]:

[illegible] W… [illegible],000 [illegible] capacitor, [illegible] KVA input
[illegible] W… [illegible],000 [illegible] capacitor, [illegible] KVA input

(5) Electronics, telecommunications, [illegible].

(6) Process knowhow and/or plant [illegible] against [illegible] equipment.

Reference No.

12/20

HUNGARY

(1) [illegible] OF METAL PARTS

(2) [illegible] (Machine Industry Technological [illegible]), [illegible], Hungary; Telex: [illegible]; Phone: [illegible].

(3) [illegible]; State industrial research institute, [illegible] [illegible] million [illegible]. of employees: [illegible] machinery research and development.

(4) [illegible] technological [illegible] plastics. [illegible] mechanization.

(5) Electronics, telecommunications, etc.

(6) Process knowhow and/or plant [illegible] against [illegible] equipment.

Reference No.

12/21

UNITED KINGDOM

(1) SETTING UP OF A WELDING LABORATORY

(2) THE WELDING INSTITUTE, Abington Hall, Abington, Cambridge [illegible], [illegible]; Mr. A.F.M. Braithwaite – Manager Industry Services.

(3) Mixed; Budget: £1,500,000 per annum; [illegible] 800; [illegible] Welding technology, research, development and [illegible].

(4) Advice and practical help in setting up a welding laboratory [illegible]:

- Assessment of requirements.
- Design and layout of facilities.
- Recommendations on equipment needs.
- Recommendations for staffing.
- Training of staff.

The above will include all aspects as appropriate such as, metallurgy, engineering, [illegible], application of welding processes, training of welding engineers and operators, non-destructive testing, inspection and qualification.

(5) Welding is the most important way of assembling metal parts into structures, plant or [illegible]. [illegible] must be monitored and controlled and this requires an organization run by the [illegible].

(6) Initial assessment, preparation of plans and help in implementation would be on a consultancy [illegible]. After the welding laboratory is set up continuing advice and assistance can be obtained through [illegible] Membership of the Welding Institute.

Reference No.

12/22

UNITED STATES OF AMERICA

(1) WELDING AND WELDING METALLURGY ENGINEERING

(2) WELDING TECHNOLOGY INC., 51[illegible] SW Chestnut, Beaverton, Oregon, [illegible]; Contact: Mr. Don D. Price ([illegible]), [illegible], Redmond, Washington 9805[illegible], USA (phone: [illegible]).

(3) Private; Adequate capital, incorporated two years; No. of employees: [illegible] ([illegible] sub.); Three branch offices on West Coast of USA; Main nature of activity: [illegible] latest "State-of-the-Art" and technical information on cutting and welding of ferrous and non-ferrous metals.

(d) Knowhow [illegible]: Analysis of the [illegible]; choice of processes and equipment, [illegible] of tenders, [illegible]; [illegible] start-up of the new plant.

[illegible] rolling [illegible] steel types [illegible]: tool steels of all kinds, constructional [illegible] and high tensile [illegible] for [illegible].

(e) The preferred payment policy is: [illegible] payment [illegible] but a royalty may [illegible], provided that [illegible].

Reference No.

5/14

CANADA

(a) KNOWHOW [illegible]

(b) ATLAS STEELS COMPANY, [illegible] Street, Welland, [illegible]
Telex: 0 1-[illegible] or 0 1-[illegible]; Then: [illegible]; [illegible]
(Senior [illegible]).

(c) Private; Sales: $ [illegible]
business: Manufacturer of tool steels, stainless [illegible]

(d) Complete set of processing standards, training of personnel [illegible]. would include both theoretical and practical instruction. [illegible] the start-up of operations in the developing country.

(e) Royalty policy; training of recipients; availability for contact with [illegible]; [illegible] provided or available.

Reference No.

5/15

FRANCE

(a) [illegible] ROLLING OF RINGS AND FLANGES

(b) [illegible], French [illegible] 75008 Paris, France; [illegible]
[illegible]; Contact: [illegible]

(c) Private; Major producers of rings and [illegible]; [illegible]
Sales: [illegible]
Main nature of business: [illegible]

(d) - Complete knowhow for the planning and layout of the [illegible] of rings and flanges in all steel qualities (forging press, [illegible], machining; finishing, quality control and plant's services).
- Complete knowhow for the production of rings and flanges [illegible] mills in carbon and alloy constructional steels, [illegible] chromium [illegible], supplied in the as rolled condition, rough machined, [illegible] machined according to drawings.

(e) Rings for mechanical engineering workshops and boiler works. Flanges [illegible] industries.

(f) Conclusion of an engineering agreement for a specified period covering all [illegible] new plant or for expansion of an existing plant.

Conclusion of knowhow and technical assistance agreements for specified periods with [illegible] technological documents, training of personnel in Creusot-Loire's works, [illegible] technicians for commissioning of the plant and for initial production [illegible].

Conditions:

Engineering fee.
- Technology and know-how normally supplied against [illegible] payment [illegible]

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5/17

Conclusion of knowhow and technical assistance agreements for specified periods with supply of [illegible] documents, training of personnel in Creusot-Loire's works, [illegible] ing of the plant and for initial production period [illegible] existing plants.

Conditions:

- Engineering fee.
- [illegible] and knowhow normally supplied against such payment [illegible].

Reference No.

5/18

Finland

(1) COLD ROLLING OF SILICON STEEL SHEETS (CRGO-CRNGO)

(2) CREUSOT-LOIRE, Branche Métallurgie, Département Assistance Technique, 15, rue de Presles, 75000 Paris, France; Cable: "FORGAMICRE - PARIS"; Telex: [illegible]; Phone: [illegible].05.40; Contact: Mr. J. Bouchaud (Head, Technical [illegible]).

(3) Private; Major producers of alloy and special steels; Capital: [illegible]; Sales: [illegible]; No. of employees: [illegible]; Year established: [illegible]; Main nature of business: Special Steels and Mechanical Engineering.

(4) Complete knowhow for the production of cold rolled silicon steel sheets (in coils, in strips or in sheets) in grades or transformer grades.

(5) Magnetic circuits, laminations for motors, transformers, contactors, electric meters, etc.

(6) Conclusion of an engineering agreement for a specified period covering all engineering studies either for a new plant or for expansion of an existing plant.

Conclusion of knowhow and technical assistance agreements for specified periods with supply of [illegible] technological documents, training of personnel in Creusot-Loire's works, [illegible] Creusot-Loire's [illegible] for commissioning of the plant and for initial production period.

Conditions:

- Engineering fee.
- [illegible] and knowhow normally supplied against such payment (lump-sum) plus royalties.

Reference No.

5/19

Finland

(1) COLD ROLLING OF CRYSTAL STEEL SHEETS

(2) CREUSOT-LOIRE, Branche Métallurgie, Département Assistance Technique, 15, rue de Presles, 75000 Paris, France; Cable: "FORGAMICRE - PARIS"; Telex: [illegible]; Phone: [illegible].05.40; Contact: Mr. J. Bouchaud (Head, Technical [illegible]).

(3) Private; Major producers of alloy and special steels; Capital: [illegible]; Sales: [illegible]; No. of employees: [illegible]; Year established: [illegible]; Main nature of business: Special Steels and Mechanical Engineering.

(4) Complete knowhow for the planning and layout of the plants and machinery required for the production of cold rolled steel strips in special steels (rolling mills, heat treatment, finishing, specific control and plant services).

Complete knowhow for the production of cold rolled steel strips in the following grades:

- Mild and extra-mild steels for deep drawing.
- Hardened and hardenable carbon steels.
- Constructional alloy steels.
- Stainless and heat resisting steels.
- Special stainless steels and stainless spring steels.

In coils or in straight lengths.

(5) Kitchen appliances, washing machines, automobile accessories, tubes, forms, springs, flexible tubes, welded tubes, springs, hardware, tools, etc.

(6) Conclusion of an engineering agreement for a specified period covering all engineering studies either for a new plant or for expansion of an existing plant.

Conclusion of knowhow and technical assistance agreements for specified periods with supply of [illegible] technological documents, training of personnel in Creusot-Loire's works, [illegible] Creusot-Loire's [illegible] for commissioning of the plant and for initial production period.

Conditions:

- Engineering fee.
- Technology and knowhow normally supplied against such payment (lump-sum) [illegible].

Reference No.

5/20

SALES

Reference No.

5/21

SALES

Reference No.

5/22

SALES

Reference No.

5/23

SALES

1 OF 3

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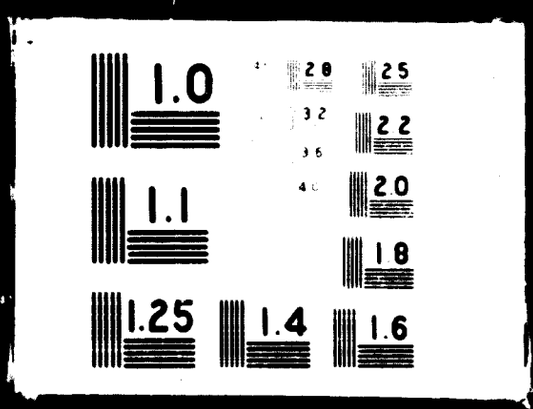
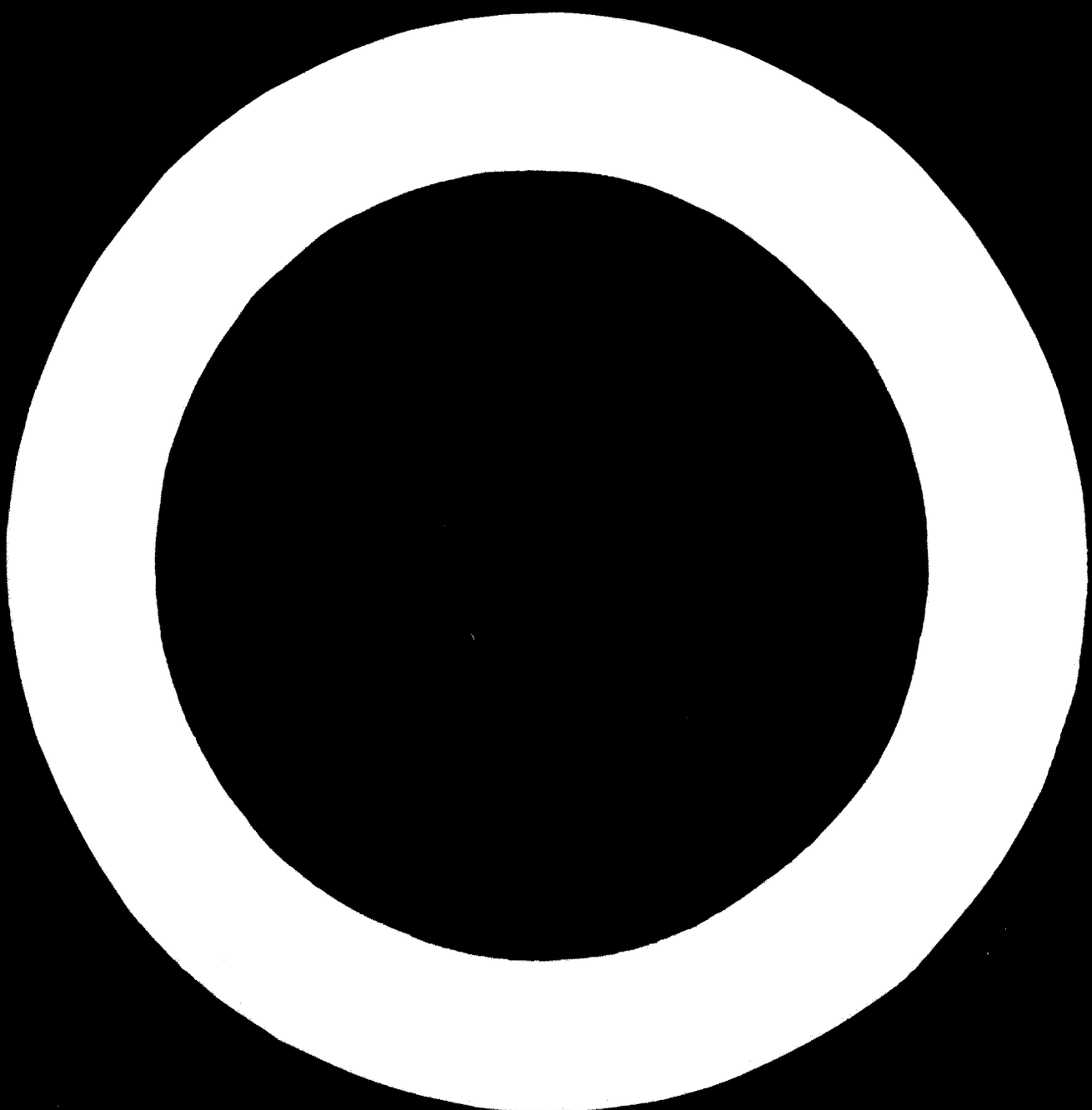


UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

PORTFOLIO OF SELECTED METAL-TRANSFORMING TECHNOLOGIES



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
VIENNA

PORTFOLIO OF SELECTED METAL-TRANSFORMING TECHNOLOGIES

ID/110

July 1973

PREFACE

The establishment of an efficient, modern metal-transforming industry is a vital [illegible] tion of a developing country. The wide range of processes that are used to transform [illegible] steel and non-ferrous metals - such as rolling, forging, casting, drawing, [illegible] essential to the manufacture of plant and equipment for other industries, for [illegible] tion, for medical services.

Technologies in the metal-transforming industries are developing and changing rapidly: new processes, improved materials, and more efficient operational practices are being introduced continually. The industrialized countries possess a wealth of knowhow in these areas, the potential value of which to the developing countries is immense. However, lack of information has all too often prevented the industries of the developing countries from making advantage of this knowhow.

One of the main roles of the United Nations Industrial Development Organization (UNIDO), as stated in General Assembly resolution 1940 (XXI) that set it up, is to assist in the dissemination of information on technological innovations and knowhow and in the adaptation and application of existing technology to the needs of developing countries. In pursuing its objectives, UNIDO recognizes the need for the active participation of the private sector in the transfer of knowhow to the developing countries. Accordingly, it initiated a project aimed specifically at the metal-transforming industries of Latin America. As a first step, UNIDO approached the metals industries of the developed countries for information about knowhow available for transfer. A preliminary long-list of companies, organizations and institutions responded to the appeal and thereby made the portfolio possible.

A broad range of technologies, covering technological innovations and improvements in the application of established technologies, and consulting services are offered [illegible], in the fields of castings, the knowhow offered embraces new types of alloys for castings and the techniques involved. These range from relatively simple basic processes to intricate and complex investment casting techniques. Consulting services in foundry planning, layout, organization and management are also available. The methods by which the knowhow and services may be obtained are also varied, ranging from lump sum payments through licensing and royalty agreements to joint ventures.

The aim of UNIDO in undertaking this project is to promote direct contact between industries [illegible] of the technology and the organizations that are making it available. However, it would be easy to provide information and advice to the metal-transforming industries.

The portfolio describes the knowhow that is available in the industrialized countries at the present time. This material will be kept up to date and added to as new technologies and improvements in existing ones and equipment become available.

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HOW TO USE THE PORTFOLIO

The items of technology or knowhow included in the portfolio have been classified by group. Each group has been given a number as follows:

1. Casting
2. Forging
3. Drawing, stranding etc.
4. Extrusion
5. Rolling
6. Tubemaking
7. Powder metallurgy
8. Sheet-metal forming
9. Miscellaneous methods of forming
10. Coating and protection
11. Heat treatment
12. Welding, brazing and soldering
13. Miscellaneous finishing processes
14. Miscellaneous metalworking processes

[illegible], [illegible] of the [illegible].

A [illegible] prepared for each item [illegible] the portfolio. [illegible] the second [illegible] with [illegible].

[illegible] consists of [illegible] items. [illegible], are listed below [illegible].

(1) Statement of the technology offered.

(2) Name, [illegible] organization offering the technology.

(3) Size, form and main activities of the [illegible] technology.

(4) Description of the technology offered.

(5) Possible applications of the technology.

(6) Proposed manner and conditions for supplying the technology.

HOW TO OBTAIN THE TECHNOLOGY

When a company or organization, after studying the [illegible] of the portfolio, wishes to obtain more information or to explore the possibilities of [illegible] technology described in the portfolio, [illegible] UNIDO or the local [illegible] UNIDO in carrying out this programme, [illegible]. [illegible] should be addressed to:

[illegible]

[illegible] the [illegible], although UNIDO [illegible].

[illegible] company or organization [illegible] additional information [illegible] in the portfolio [illegible] to specific industrial conditions — it may contact the [illegible] Industries Section of UNIDO.

Preámbulo

El establecimiento de una eficiente y moderna industria de transformación de metales [illegible] para la industrialización de un país en desarrollo. Los muy variados procesos que se emplean para fundir y elaborar el hierro primario, el acero y los metales no ferrosos —tales como el forjado, la fundición, el estirado, la extrusión, el recocido y la soldadura— son necesarios para la fabricación de [illegible] para otras industrias, para la agricultura, para la construcción de edificios, para los transportes, etc.

En las industrias de transformación de metales, la tecnología se desarrolla y cambia [illegible] constantemente con la introducción de innovaciones [illegible], y mejores procedimientos de trabajo [illegible]. En estas esferas, los países industrializados poseen un acervo de conocimientos [illegible] los países en desarrollo. Sin embargo, la falta de información ha impedido con harta frecuencia que las industrias de los países en desarrollo saquen partido de tales conocimientos técnicos.

Uno de los puntos principales de la Organización de las Naciones Unidas para el Desarrollo Industrial (ONUDI) —según se definió en la resolución 2152 (XXI) de la Asamblea General de las Naciones Unidas, por la que fue creada— es el de contribuir a la difusión de información sobre innovaciones y conocimientos técnicos, así como a la adaptación y aplicación de la tecnología existente a las necesidades de los países en desarrollo. La ONUDI echó de ver que, para alcanzar esos objetivos, tenía que participar activamente en la transmisión de conocimientos técnicos a los países en desarrollo. Por consiguiente, inició un proyecto [illegible] específicamente a las industrias de transformación de metales de América Latina. Como primer paso, dirigió a las industrias de transformación de metales de los países desarrollados un llamamiento en el que solicitaba información sobre los conocimientos técnicos disponibles para su transmisión. Como satisfactoria reacción a esta iniciativa, se recibió un crecido número de respuestas de firmas, organizaciones e instituciones, [illegible] preparar el Repertorio.

La gama de tecnologías ofrecidas es amplia, y comprende innovaciones tecnológicas, perfeccionamientos en la aplicación de tecnologías conocidas, y servicios de consulta. Por ejemplo, [illegible], los conocimientos técnicos ofrecidos abarcan nuevos tipos de aleaciones de moldeo y las técnicas correspondientes. Estas varían desde procesos básicos relativamente sencillos hasta intrincadas y complejas técnicas [illegible] la computadora. También se dispone de servicios de consultoría en materia de planificación, distribución del equipo, organización y gestión de talleres de fundición. Los procedimientos mediante los cuales pueden ofrecerse estos servicios y conocimientos técnicos son también variados, y van desde los pagos globales, [illegible], acuerdos de licencia y sobre pago de cánones, hasta la constitución de empresas mixtas.

La ONUDI emprendió este proyecto con la intención de promover el contacto directo entre los usuarios potenciales de la tecnología y las organizaciones que la facilitan. Con todo, está dispuesta a brindar [illegible] información y asesoramiento a las industrias de transformación de metales.

El Repertorio describe los conocimientos técnicos que se hallan actualmente disponibles en los países industrializados. Este material se mantendrá al día y se aumentará a medida que se [illegible] nuevas tecnologías y perfeccionamientos de los procesos y del equipo existentes.

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Manera de utilizar el Repertorio

Los puntos de tecnología o conocimientos técnicos incluidos en el Repertorio se han clasificado por grupos. A cada uno de estos grupos se le ha asignado un número, conforme al detalle siguiente:

1. Fundición
2. Forja
3. Estirado, fabricación de cables, etc.
4. Extrusión
5. Laminado
6. Fabricación de tubos
7. Pulvimetalurgia
8. Conformación de chapa
9. Otros métodos de conformación
10. Revestimiento y otros métodos de protección
11. Tratamientos térmicos
12. Diversas modalidades de soldadura y unión de metales
13. Procesos varios de acabado
14. Procesos varios de transformación de metales

Al principio del Repertorio hay un índice en que se clasifica su contenido y se describe brevemente la clase de tecnología de que se trata, indicando el número.

Se ha preparado una hoja de especificación para cada punto de tecnología que figura en el Repertorio. Esta hoja de especificación lleva —en el ángulo superior derecho e izquierdo— un número de referencia cuyo primer número corresponde al grupo; el segundo elemento del número de serie corresponde a la hoja de especificación dentro de cada grupo (por ejemplo: 1/1 es la primera especificación que se refiere a procesos de fundición).

Cada hoja de especificación contiene diversos apartados numerados. Para facilitar la consulta, indicamos a continuación qué datos corresponden a cada uno de los números, que se indican entre paréntesis.

(1) Presentación de la tecnología ofrecida
(2) Nombre, dirección postal, dirección cablegráfica y números de télex y de teléfono de la firma u organización que ofrece la tecnología
(3) Tamaño, características y principales actividades de la firma u organización que ofrece la tecnología
(4) Descripción de la tecnología ofrecida
(5) Posibles aplicaciones de la tecnología
(6) Forma y condiciones propuestas para proporcionar la tecnología

Cómo obtener la tecnología

Cuando una firma u organización que ya haya estudiado la sección o secciones pertinentes del Repertorio desee obtener más información o explorar las posibilidades de utilizar un proceso o tecnología descritos en el Repertorio, deberá ponerse en contacto con la ONUDI o con la organización local que coopere con la ONUDI en la ejecución de este programa, según proceda. Los posibles usuarios deberán citar la fuente de información sobre la que basan su consulta, es decir, el Repertorio de tecnologías para la transformación de metales (Portfolio of Metal-Transforming Technologies). La correspondencia con destino a la ONUDI deberá dirigirse a:

Sección de Industrias Metalúrgicas
División de Tecnología Industrial
ONUDI
P.O. Box [illegible]
A-1400 Viena
Austria

La ONUDI pedirá a la firma u organización incluida en el Repertorio que se ponga en contacto con la firma que haya formulado la consulta. Las negociaciones subsiguientes serán de la incumbencia de las dos partes interesadas, si bien la ONUDI está dispuesta a coadyuvar a dichas negociaciones en caso de ser preciso.

Si una firma u organización de América Latina desea solicitar información adicional sobre una tecnología de transformación de metales que no figuren en el Repertorio, o sobre la posible aplicación de determinada tecnología en determinadas condiciones industriales, podrá dirigirse a la Sección de Información Técnica de la ONUDI.

Portfolio number	Subject	[illegible]
1/36	Continuous casting of thin [illegible]	[illegible]
1/37	Gravity casting of [illegible] resistant alloy	[illegible]
1/38	Casting of steel	[illegible]
1/39	Sand casting of hard-facing alloy, welding [illegible]	[illegible]
1/40	Special steel castings	[illegible]
1/41	[illegible]	[illegible]
1/42	Iron castings	[illegible]
1/43	Malleable iron castings and fittings	[illegible]
1/44	[illegible] furnace operation to produce stainless steel and alloy steel castings	[illegible]
1/45	Casting and engineering of magnesium and [illegible] alloys	[illegible]
1/50	Production of rolls for steel rolling	NIHON [illegible] – JAPAN
1/5[illegible]	Manufacture of gas turbine airfoil shapes by investment casting	[illegible]
1/5[illegible]	Shellvert [illegible] system	[illegible]
1/5[illegible]	Centrifugal [illegible] casting process	[illegible]
1/5[illegible]	Spin [illegible] casting	[illegible]
1/5[illegible]	Production technology of steel [illegible] by [illegible] casting	[illegible] – JAPAN
1/5[illegible]	Production of malleable, pearlitic malleable, nodular and grey cast iron	F.W. [illegible]

Group 2 – FORGING

2/1	Production of bits for rock drills	[illegible] – SWEDEN
2/2	Die forging of engine pistons from hypereutectic Al-Si alloys	[illegible]
	Production of [illegible] aluminium alloys [illegible] forging	[illegible]
2/4	Forging of alloy and special steels	[illegible]
2/5	Process technology in hot steel forging	[illegible]
2/6	Manufacture of steel forgings	[illegible]
2/7	Hot forging of carbon and alloy steels	[illegible]
2/8	Production of heavy steel forgings	[illegible]
2/9	Forging of [illegible] alloy bars	[illegible]
2/10	Production of axles and brakes for trailers and semi-trailers	[illegible]
2/11	Production of grinding media	[illegible]
2/12	Drop forging of steel with hammers or mechanical presses	[illegible] – SWEDEN
2/13	Flat die forging of steel with hammers and hydraulic presses	[illegible] – SWEDEN
2/14	Know-how covering the forging of stainless and alloy steels	ATLAS STEELS – CANADA
2/15	Hot pressings (forging) of aluminium with parallel forms (internal and external)	BRASS AND ALLOY FORGINGS ([illegible]) – UK
2/16	Hot pressings (forging) of synchronizing cones for automotive gearboxes	BRASS AND ALLOY FORGINGS ([illegible]) – UK
2/17	Manufacture of vehicle leaf springs	[illegible]
2/18	Forging of special steels	[illegible]
2/19	Drop and die forging of special steels	[illegible]
2/20	Forged rolls for cold rolling mills	[illegible]
2/21	Forged and rolled wheels and axles for railways	[illegible]
2/22	Production technology of die forgings	[illegible] – JAPAN

Group 3 – DRAWING, STRANDING, ETC.

3/1	Tungsten filament wire production	[illegible]

Licence number	Subject	Licensor or organization
	[illegible]	[illegible] - AUSTRIA
	[illegible]	[illegible]-FRANCHIMEX - FRANCE
3	[illegible]	[illegible]-FRANCHIMEX - FRANCE
4	[illegible]	[illegible] - USA
5	[illegible]	[illegible] - USA
6	Production of [illegible]	[illegible] - USA
7	[illegible]	[illegible] - ITALY
8	[illegible]	[illegible] - USA
9/10	[illegible]	[illegible] - USA
9/11	[illegible]	[illegible] - SWEDEN
12	[illegible]	[illegible]
13/1	Wire drawing [illegible]	[illegible] - USA
13/2	Cold drawing of special steel [illegible]	[illegible]-LOIRE - FRANCE

Group 4 - Aluminium

4/1	Extrusion of aluminium and its alloys	[illegible] - ITALY
4/2	Extrusion and cold drawing of quality steel sections	[illegible] - UK
4/3	Production of dies for extrusion of aluminium	[illegible] - AUSTRIA
4/4	Know-how on conventional and hydrostatic extrusion	METAALINSTITUUT - NETHERLANDS
4/5	Extrusion of nickel-base alloys, rods and bars	[illegible] - CANADA
4/6	Light-alloy sections for metal structures (window-frames) mainly	[illegible]-FRANCE
4/7	Fabrication of tubes by extrusion and cold drawing	[illegible], S.A. for [illegible] - SPAIN

Group 5 - Rolling

5/1	Rolling of alloy and special steels	[illegible] - AUSTRIA
5/2	Cold rolling of metal sections	[illegible] - UK
5/3	Manufacture of light-alloy roll products	[illegible]-FRANCE
5/4	Hot rolling of steel	[illegible] - USA
5/5	Rolling of aluminium and its alloys	[illegible] - ITALY
5/6	Manufacture of high-alloy steel bars	[illegible] - UK
5/7	Hot rolling of steel	[illegible] - SWEDEN
5/8	Hot and cold rolling of high-grade steel strip	[illegible] - SWEDEN
5/9	Blooming and slabbing mills of 1 million tons capacity	[illegible] - HUNGARY
5/10	Reheating furnaces for rolling mills	[illegible] - HUNGARY
5/11	Production of soft iron semiproducts as basic magnetic material	[illegible] IRON AND METALWORKS - HUNGARY
5/12	Design and supply of rolling mill equipment	[illegible] - UK
5/13	Hot rolling of steel bars and wire rod	[illegible] - SWEDEN
5/14	Knowhow covering the rolling of stainless and alloy steels	ATLAS STEEL - CANADA
5/15	Circular rolling of rings and flanges	[illegible]-LOIRE - FRANCE
5/16	Rolling of special steel bars	[illegible]-LOIRE - FRANCE
5/17	Rolling of special steel plates	[illegible]-LOIRE - FRANCE
5/18	Cold rolling of silicon steel sheets (non oriented)	[illegible]-LOIRE - FRANCE
5/19	Cold rolling of special steel strips	[illegible]-LOIRE - FRANCE
5/20	Cold rolling and finishing of stainless steels	KAWASAKI STEEL - JAPAN
5/21	Application of roll [illegible] bearings	[illegible] - UK
5/22	Fully continuous roll forming mill	NIPPON KOKAN - JAPAN
5/23	Electric-resistance-welded (ERW) tube	NIPPON STEEL - JAPAN
5/24	Spiral line pipe	NIPPON STEEL - JAPAN
5/25	Advanced [illegible] equipment	NIPPON STEEL - JAPAN

Portfolio number	Subject	
5/6	Light gauge coil roll former	[illegible]
5/7	Continuous pipe mill line and hot strip rolling technology	[illegible]
5/8	Techniques for manufacturing rails	[illegible]
5/9	Production technology of rolling stock parts (wheel, axle), and trucks	[illegible] - JAPAN

Group 6 - [illegible]

6/1	Manufacture of steel tubes	DAIDO [illegible]
6/2	Fabrication of aluminium alloy tubes	[illegible]
6/3	Production of thin-walled copper and aluminium tubes by pilger rolling or drawing in coils	[illegible] - AUSTRIA
6/4	Manufacture of rollable/coilable aluminium tubes	[illegible] - AUSTRALIA
6/5	Production of steel tubes	[illegible] - SWEDEN
6/6	Cold-drawing of tubes	[illegible] - BELGIUM
6/7	Continuous manual cooling device for use in pilger rolling of chamber tubes	[illegible] - FRANCE
6/8	Extrusion of copper tubes with closed ends	[illegible] - BELGIUM
6/9	"Bundy Weld" tubing	[illegible]
6/10	Tubes produced by centrifugal casting	[illegible] - FRANCE
6/11	Electric resistance welded tubes	KAWASAKI [illegible] - JAPAN
6/12	Manufacture of tapered poles	NITTAN [illegible] - JAPAN
6/13	Production technology of straight seam welded pipe by roll bending	[illegible] - JAPAN
6/14	Production technology of spiral welded pipe	[illegible] - JAPAN
6/15	Production technology of electric welded steel pipe	[illegible] - JAPAN

Group 7 - POWDER METALLURGY

7/1	Production of hardmetal by powder metallurgy	SUMI - PUBLIC
7/2	Parts fabrication by powder metallurgy	[illegible] - U.K.
7/3	Powder metallurgy parts production	DIXON [illegible] - U.K.
7/4	Manufacture by powder metallurgy of hardmetal carbide tips and tools	KAWASAKI METAL - U.
7/5	Powder metallurgy technology	NEW [illegible] - U.K.
7/6	Production of improved grades of mixed ferrites for use in powder metallurgy	[illegible] - HUNGARY
7/7	Tooling for sub-miniature powder metallurgy	[illegible] - HUNGARY
7/8	Cemented carbide products	ADAMAS CARBIDE - U.S.A.
7/9	High purity powder production	METALLURGY - U.S.A.
7/10	Hot powder metal forming and conventional powder metal forming also coating of welding electrodes	HOEGANAES - U.S.A.
7/11	Production of reduced iron powder	KAWASAKI STEEL - JAPAN

Group 8 - SHEET METAL FORMING

8/1	Manufacture of precision products and welded tubes in light alloys	[illegible] - FRANCE
8/2	Equipment for determining deep drawing qualities of sheet metal	[illegible] - HUNGARY
8/3	Training courses in sheet metal forming	METALFORMING [illegible]
8/4	Cold roll forming of steel sheet	[illegible] - HUNGARY

Particulars	Class	
10/	[illegible]	[illegible]
10/	[illegible]	[illegible]
10/	Corrosion prevention [illegible]	[illegible]
10/	Protection of metallic materials [illegible] diffusion	[illegible]
10/	Protection [illegible]	[illegible]

Group 11 - HEAT TREATMENT

11/1	Control of furnace [illegible] of [illegible]	[illegible]
11/	[illegible]	[illegible]
11/	[illegible]	[illegible]
11/	[illegible]	[illegible]
11/	Salt-bath nitriding heat treatment [illegible]	[illegible]
11/	[illegible]	[illegible]
11/	Vacuum heat treatment [illegible]	[illegible]
11/	Heat treatment furnaces, [illegible]	[illegible]
11/	Controlled cooling [illegible]	[illegible]
11/	[illegible]	[illegible]
11/	[illegible]	[illegible]
11/	[illegible]	[illegible]
11/	[illegible]	[illegible]

Group 12 - WELDING, CUTTING AND SOLDERING

12/	Preparation of welding [illegible]	[illegible]
12/	Protective [illegible]	[illegible]
12/	[illegible]	[illegible]
12/	Apparatus for [illegible]	[illegible]
12/	Semi-automatic [illegible]	[illegible]
12/	Transformers for manual [illegible]	[illegible]
12/	Rectifiers for manual [illegible]	[illegible]
12/	Explosive welding	[illegible]
12/	Joining by high-temperature [illegible]	[illegible]
12/10	Plasma welding	[illegible]
12/11	Welded steel fabrication	[illegible]
12/	Improvement of weldability of metallic materials [illegible]	[illegible]
12/	Material for [illegible]	[illegible]
12/14	Number of magnetic sheet [illegible]	[illegible]
12/15	Thermal [illegible]	[illegible]

Portfolio number	List of	Company or organization
1/1	Production of welding rods and wires for hardfacing	APEX - USA
1/2	Welding of [illegible] pipe walls	HEPTECHINT - HUNGARY
1/3	Friction welding of high-speed steel cutting tools	HEPTECHINT - HUNGARY
1/4	Percussive spot welding	HEPTECHINT - HUNGARY
1/5	Cementing of metal parts	HEPTECHINT - HUNGARY
1/6	Setting up of a welding laboratory	THE WELDING INSTITUTE - UK
1/7	Welding and welding metallurgy characteristics	WELDING TECHNOLOGY - USA
1/8	Annealing in a theoretical or [illegible] protective atmosphere	OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES - FRANCE

Group 2 - ELECTROLYTIC FINISHING PROCESSES

2/1	Manufacture of cold-headed bolts	SVENSK-KANTHAL - SWEDEN
2/2	Manufacture of welded steel tubes	ITALSIDER - ITALY
2/3	Surface removal on steel bars or tubes	LA SALLE STEEL - USA
2/4	Bright temperature drawing of steel bars	LA SALLE STEEL - USA
2/5	Heat treating of metals	LUKENS STEEL - USA
2/6	Hydrochloric acid pickling process for steel strip	MIDLAND INDUSTRIAL - USA
2/7	Process for pickling bundled steel wire and other materials	STAHLWERKE RÖCHLING-BURBACH - FEDERAL REPUBLIC OF GERMANY
2/8	Smoothing of internal surfaces of hollow vessels before enamelling	KOMTI - HUNGARY
2/9	Finishing of metal components	ROYAL SMALL ARMS FACTORY - UK
2/10	Finishing of rolled and/or forged steel bars and wire rod	SOPORS - SWEDEN
2/11	Deformation-free cooling of steel products	NIPPON KOKAN - JAPAN

Group 3 - [illegible]

3/1	Fabrication of [illegible] tool rods	AUSTRIA - HUNGARY
3/2	[illegible] information, storage and retrieval service	AMERICAN SOCIETY FOR METALS - USA
3/3	Manufacture of hardmetal tools for cutting and forming	DANSK HAARDMETAL - DENMARK
3/4	Manufacture of metal equipment	DEUTSCHE EDELSTAHL - AUSTRIA
3/5	Manufacture of tungsten carbide tips and tipped tools	HOY CARBIDES - UK
3/6	Manufacture of conveyor-belt rollers	ITALSIDER - ITALY
3/7	Production of precision roller chains	PLANSEE KOHLE - AUSTRIA
3/8	Manufacture of brass castings, fittings and valves	LOHJAN PRON - FINLAND
3/9	Fabrication of aluminium alloy doors and windows	MONTECATINI EDISON - ITALY
3/10	Fabrication welding, and hot-dip galvanizing of lattice-type structures	PAINTER BROS. - UK
3/11	Manufacture of finished products in aluminium	VAN SHOPEN-BURNSDORF - AUSTRIA
3/12	Quality control for ball-bearing steels	RESEARCH INSTITUTE FOR FERROUS METALLURGY - HUNGARY
3/13	Manufacture of rolls for cold-rolling mills	STAHLWERKE RÖCHLING BURBACH - FEDERAL REPUBLIC OF GERMANY
3/14	Fabrication of structural steelwork	SANDBERG AND FOSTER - UK
3/15	General [illegible] assistance in metal transformation technology	METAALINSTITUUT TNO - NETHERLANDS
3/16	Manufacture of steel and aluminium tools	FELIX WALDNER - AUSTRIA
3/17	Technical information on tin and tin-ware	TIN RESEARCH INSTITUTE - UK
3/18	Production of steel shot and grit/production of cast iron shot and grit	FONDERIE ET GRENAILLES METALLIQUES (FGM) - FRANCE
3/19	Manufacture of locks for doors and furniture	GRUNDMANN - AUSTRIA
3/20	Carbide-tool cutting tool manufacture	SAMUEL OSBORN - UK
3/21	Production technology of [illegible] rolls	SUMITOMO METAL INDUSTRIES - JAPAN

GROUP 1 – CASTING

1/1

(1) PRESSURE DIE CASTING OF CORROSION-RESISTANT ALLOY

(2) A.H. ANDERSSON and Co., AB, Viskastramsvägen 1, Box 140, S-01 [illegible] Sweden; [illegible]; Phone: 0 [illegible]/10 0[illegible] 40; Contact: Mr. Arne Eriksson, Incentive Research and Development AB, Box 11074, S-11 11 Fromma 11, Sweden.

(3) Private; A member of the Swedish Incentive Group; Main nature of business: [illegible] fittings and valves for sanitary purposes.

(4) The A.H. Andersson Company has developed a corrosion-resistant alloy [illegible] tube fittings and valves. This alloy, known as AMETAL, has the same [illegible] gunmetal, but can be produced more economically (at about the cost of [illegible]). [illegible] die-cast and machined without difficulty.

The company has considerable experience and knowhow in the fields of [illegible], the design of tools and dies for casting, and the determination of suitable [illegible].

The use of AMETAL and the Andersson technique results in low material costs [illegible] the use of pressure die casting. The quality of the finished product is high.

(5) Water tube fittings and valves for sanitary and other purposes.

(6) A non-exclusive licence covering manufacture, use, and sales will be offered. Extensive licensee. Written information and technical information will be made available; this will include not only the present technique, but also future developments. Technical assistance can be provided either at the Andersson works in Sweden or at the licensee's works. Licence conditions: Skr [illegible] Ametal used, together with a payment of about Skr 50,000. Minimum annual [illegible] between the licensor and licensee.

1/2

(1) INVESTMENT CASTING OF SPECIAL STEELS

(2) Gebr. BÖHLER and Co. AG, Postfach [illegible], A-1011 Vienna, Austria; Cable: Stahlfabrik Wien; Telex: 11[illegible]; Phone: [illegible]; Contact: Mr. W. Kramer, Ac[illegible]
Perm CA, L. Centro Peruvian[illegible], Apartado [illegible], Lima, Peru.

(3) Governmental; Major producer of special and alloy steels; No. of employees: [illegible]; Capital: S[illegible] million; Main nature of business: Production of [illegible] special steels in various forms and finishes.

(4) Complete knowhow for planning and layout of investment casting plants. Complete [illegible] operations relating to investment casting. Training of personnel in [illegible] personnel for technical assistance in recipient's works.

(5) Conclusion of knowhow agreement for specified period. Technology and knowhow to [illegible] basis, with additional cash payments. Licensing arrangements also [illegible]. [illegible] assistance can also be supplied, subject to agreement on terms.

1/3

(1) IRON CASTINGS

(2) BRITISH CAST IRON RESEARCH ASSOCIATION, Alvechurch, Birmingham B[illegible], England; Cable: Cirn Birmingham; Phone: Redditch [illegible]; Contact: Mr. H. Morrogh (Director).

(3) Mixed; Co-operative research, development, and consulting organization, with [illegible] by government and private and nationalised industries; No. of employees: [illegible]; Main nature of business: Consulting, research and development for the iron founding industries.

(4) Services available include: Assistance in all matters relating to the production [illegible] performance in service, including melting, moulding, coremaking, metallurgical [illegible], properties, and non-destructive testing. Assistance in work study, [illegible] commissioning of new foundries. Financial analysis of new foundry investment. [illegible] computers to production control and on quality control.

(5) Expert consultancy available on fee-paying basis. Facilities available for [illegible] work.

1/4

(a) [illegible] ALUMINIUM ALLOYS USING A HORIZONTAL [illegible]

(b) [illegible] "[illegible]", [illegible], Bulgaria; [illegible] and [illegible]; Phone: [illegible]-71; Contact: [illegible], Department for Scientific and Technical Progress, Ministry of Machine Building, [illegible], Sofia, Bulgaria.

(c) Governmental; [illegible] state-owned corporation for the design and construction of foundry equipment; Main nature of business: Research, design, manufacture of foundry equipment, production of non-ferrous castings.

(d) The [illegible] - [illegible] and [illegible]-400 are fully automatic machines designed for pressure die casting using a horizontal [illegible]. Some technical data on the machines are given below:

		t	[illegible]30
Locking force		[illegible]	[illegible]
Opening stroke	mm	[illegible]	[illegible]
Die height	mm		[illegible]
	H		[illegible].48
External platen [illegible]	V	[illegible]	[illegible]
			[illegible]1.65
	H		
Space between the [illegible]		[illegible]	[illegible]
		t	11
Central ejection force		[illegible]	[illegible]
Ejector stroke		atm	10
Max. counter-pressure		t	1.[illegible]
Injection force		kg Al	[illegible]
Max. shot weight		kW	17
Motor power		[illegible]	[illegible]
Cycle time		kg	10000
Weight	Length	mm	[illegible]300
Overall dimensions	Height	mm	1400
	Width	mm	1[illegible]0

(e) The technology can be supplied under licence, in the form of individual machines or complete mechanized production lines.

1/5

(a) [illegible] ALLOYS WITH [illegible]

(b) [illegible] "[illegible]", [illegible], Bulgaria; [illegible] and [illegible]; Phone: [illegible]; Contact: [illegible], Department of Scientific and Technical Progress, Ministry of Machine Building, [illegible], Sofia, Bulgaria.

(c) Governmental; [illegible] state-owned corporation for the design and construction of foundry equipment; Main nature of business: Research, design, manufacture of foundry equipment, production of non-ferrous castings.

(d) [illegible] casting with counter-pressure is a patented Bulgarian technique. Casting (which is vertical) [illegible] fully or semi-automatic, and uses a [illegible] chamber.

The process permits the production of castings weighing up to 200 kg. with wall thickness of [illegible] mm, [illegible] of [illegible]/10 [illegible] and [illegible] mm, and [illegible] of over 300 atm.

Casting is carried out under a pressure of [illegible] atm, with a counter pressure equivalent to one third of the [illegible] pressure. Feeding is by means of a vertical pipe from a [illegible] furnace.

This technique produces castings free from faults and voids, with high strength and density.

It is an entirely new process, and a complete range of machines and equipment (VP400 and VP630) have been developed, to provide a mechanized production line for aluminium alloy castings.

(e) The technology can be supplied under licence, in the form of individual machines or complete mechanized production lines.

1/6

(1) MASS PRODUCTION OF NODULAR CAST IRON

(2) NIILD, DSO "Metalolene", Totleben 51, Sofia, Bulgaria; Phone: [illegible]; Contact: Dipl.ing. D. Nanev, Ministry of Machine Building, Slavyanska [illegible], Sofia, Bulgaria.

(3) Governmental; Central research and development organization of the State foundry industry corporation; Main nature of business: Research, design, and development for the foundry industry.

(4) Complete knowhow on the production of pearlitic and nodular cast iron.

1/7

(1) PRODUCTION OF HIGH-QUALITY GREY IRON CASTINGS USING COMPLEX INOCULANTS

(2) NIILD, DSO "Metalolene", Totleben 51, Sofia, Bulgaria; Phone: [illegible]; Contact: Dipl.ing. D. Nanev, Ministry of Machine Building, Slavyanska [illegible], Sofia, Bulgaria.

(3) Governmental; Central research and development organization of the State foundry industry corporation; Main nature of business: Research, design, and development for the foundry industry.

(4) Complete technological knowhow for production of grey inoculated cast iron.

The advantages of the material are as follows:

1. Homogeneous casting structure.
2. Good mechanical properties ([illegible] kg tensile strength, [illegible] hardness).
3. Good wear resistance.
4. Good machinability.

The technique is based on the use of complex inoculants developed by the organization for treating the liquid iron. The knowhow available also covers the design and construction of the [illegible] for inoculants.

1/8

(1) DESIGN OF HOT-BLAST CUPOLA FOR FOUNDRY USE

(2) NIILD, DSO "Metalolene", Totleben 51, Sofia, Bulgaria; Phone: [illegible]; Contact: Dipl.ing. D. Nanev, Ministry of Machine Building, Slavyanska [illegible], Sofia, Bulgaria.

(3) Governmental; Central research and development organization of the State foundry industry corporation; Main nature of business: Research, design, and development for the foundry industry.

(4) An original design of hot blast cupola, with diameters of [illegible]00-900 mm. [illegible] with a feeder for inoculants. It ensures a high standard of metal quality. [illegible] coke, and can utilize low-grade coke.

1/9

(1) CONTINUOUS CASTING OF ALUMINIUM BILLETS FOR SUBSEQUENT EXTRUSION OR FORGING

(2) CEGEDUR-PECHINEY, [illegible] avenue Marceau, Paris [illegible], France; Cable: [illegible]; Telex: [illegible]; Phone: 7.0 [illegible]; Contact: A. Crevat (Head, Technical Assistance Department).

(3) Private; Major French non-ferrous metals producer; Capital: [illegible]; Sales: [illegible], 00 million; No. of employees: [illegible],000; Main nature of business: Primary transformation of aluminium: rolling, drawing and extrusion of all wrought aluminium alloys.

(4) The technology available covers the continuous casting of billets for subsequent extrusion [illegible] operations. It is applicable to all aluminium alloys and to all [illegible] required for [illegible] operations.

The products can be either solid or hollow (for the manufacture of drawn [illegible] rolling, for example).

The knowhow covers all or part of the following:

Melting, refining, with treatment (alloying, degassing, etc.)
Design and realisation of various equipments, especially those for multiple slab casting
Casting techniques
Heat treatments
Subsequent mechanical treatment (machining)
Quality control
Total recovery from casting process.

The experience of Creusot-Loire is derived not only from its major French plants, but also from smaller operations in foreign subsidiaries, and means that the company is equipped to provide the best solution for each local situation.

(*) Creusot-Loire can offer the following assistance and knowhow, in part or complete:

- Basic technological documentation
- Assistance in setting up realistic manufacturing programmes
- Selection of basic equipment
- Specification of equipment and issuing invitations to tender
- Preliminary evaluation of tenders
- Assistance in selection of suppliers
- Planning and layout of plants
- Advice on ancillary equipment
- Supervision of installation of equipment
- In-plant training
- Commissioning
- Operational planning
- Advice on expansion of existing plant
- Knowhow on new products

Interview No.

1/10

BRANDS

(1) CONTINUOUS CASTING OF SLABS FOR SUBSEQUENT ROLLING AND FORGING

( ) CREUSOT-LOIRE, 42, Avenue Montaigne, Paris 8e, France; Cable: Creusotloire; Telex: [illegible]; Phone: [illegible]; Contact: A. Crevet (Brand, Technical Assistance Department.

( ) Private; Major French non-ferrous metals producer; Capital: [illegible]; Sales: [illegible]; No. of employees: [illegible]; Main activities: Primary transformation of aluminium: rolling, drawing and extrusion of all wrought aluminium alloys.

(2) The techniques available concern the continuous casting of slabs for subsequent rolling and forging. The slabs can be cast to the limits of the capacities of the hot-capacity mills. All alloys can be cast, processing the parameters needed to generate the correct properties in the final rolled product; for example, the cast metal characteristics needed for forging, for aircraft use, for subsequent machining, painting, deep drawing, etc.

The knowhow covers all or part of the following:

- Melting, refining, with treatment (alloying, degassing, etc.)
- Design and realisation of various equipments, especially those for multiple slab casting
- Continuous casting techniques
- Heat treatments
- Subsequent mechanical operations (drawing, scarfing)
- Exploitation of materials
- Quality control
- Recovery of metal from casting process.

The experience of Creusot-Loire is derived not only from its major French plants, but also from smaller operations in foreign subsidiaries, and means that the company is equipped to provide the best solution for each local situation.

(*) Creusot-Loire can offer the following assistance and knowhow, in part or complete:

- Basic technological documentation
- Assistance in setting up realistic manufacturing programmes
- Selection of basic equipment
- Specification of equipment and issuing invitations to tender
- Preliminary evaluation of tenders
- Assistance in selection of suppliers
- Planning and layout of plants
- Advice on ancillary equipment
- Supervision of installation of equipment
- In-plant training
- Commissioning
- Operational planning
- Advice on expansion of existing plant
- Knowhow on new products.

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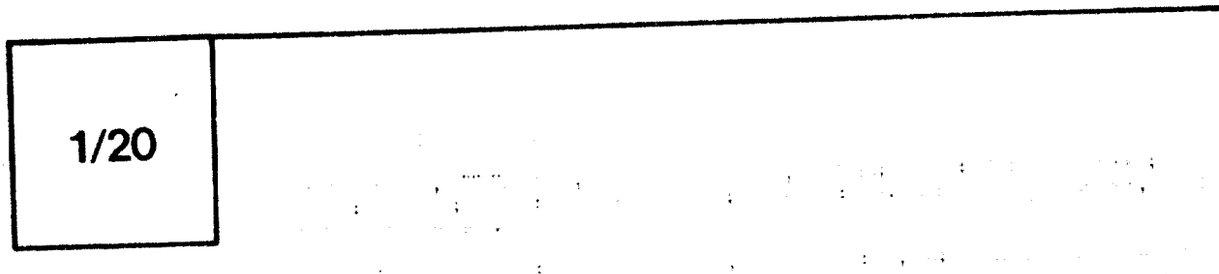
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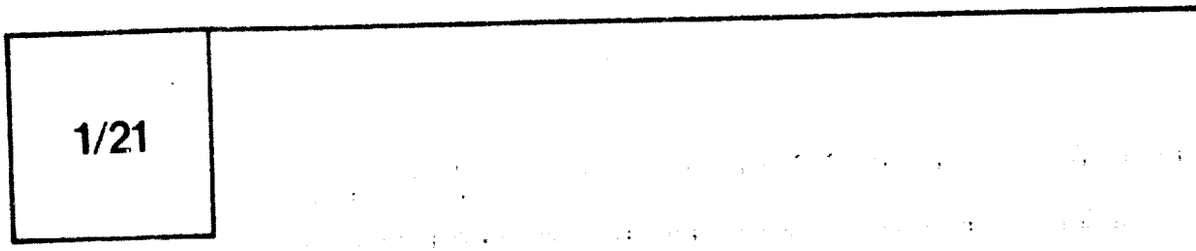
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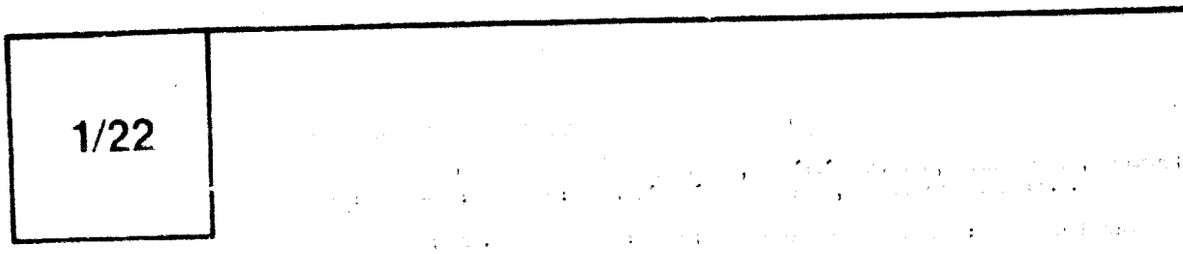
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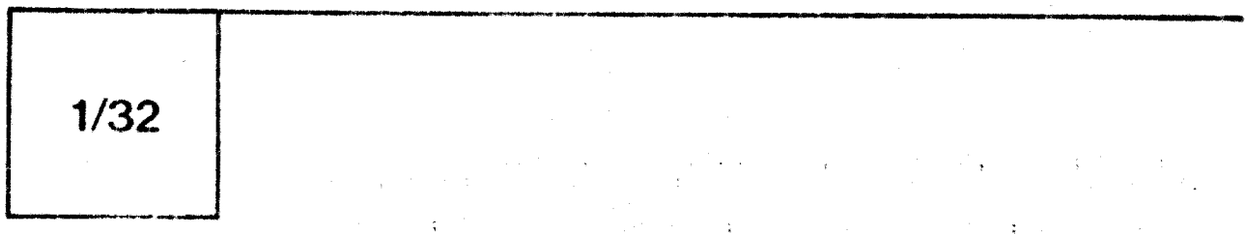
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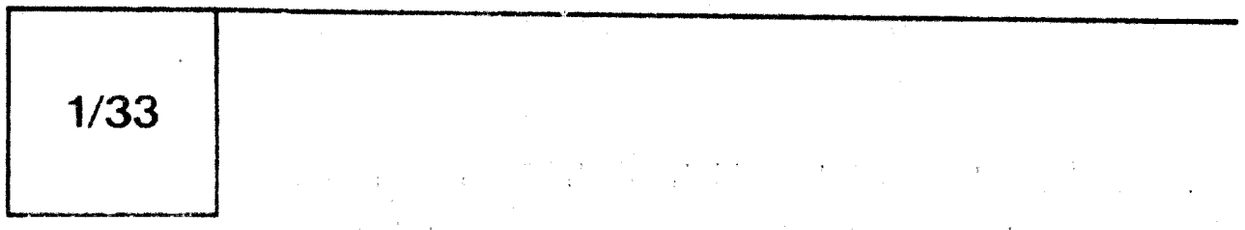
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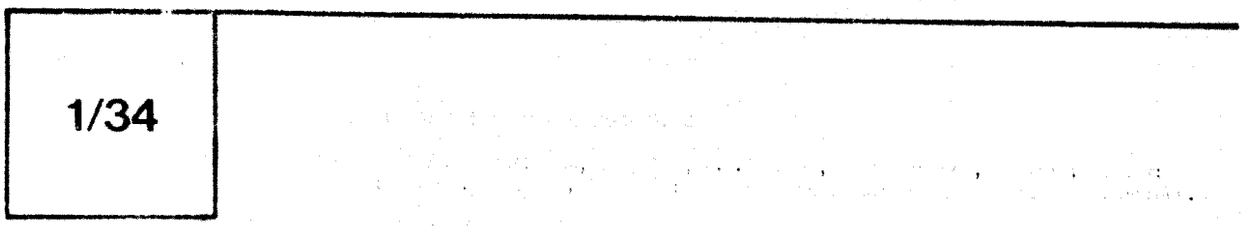
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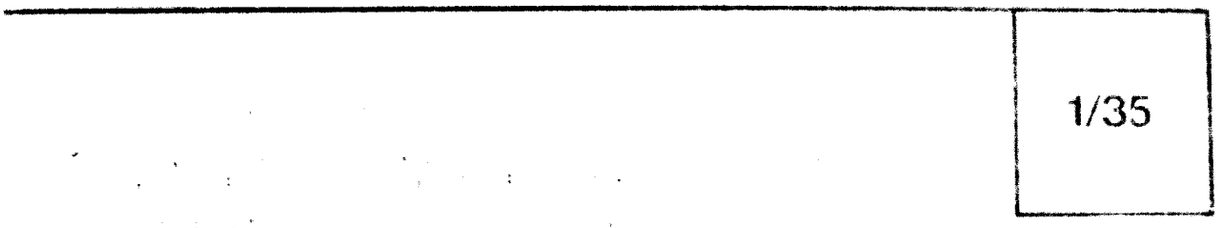
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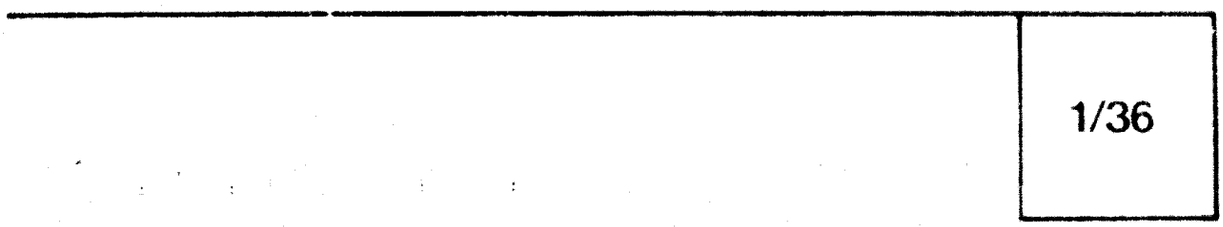
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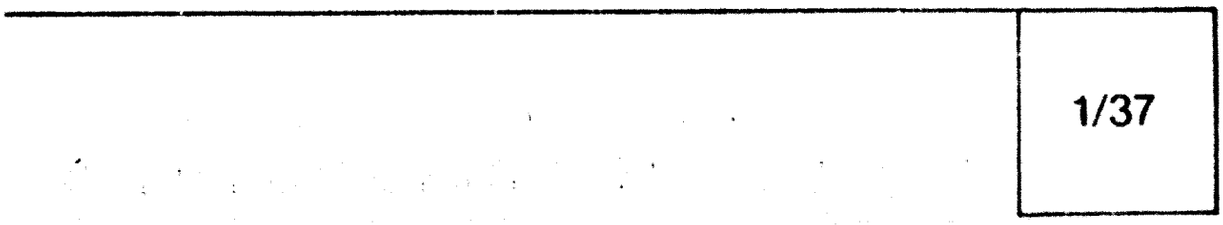
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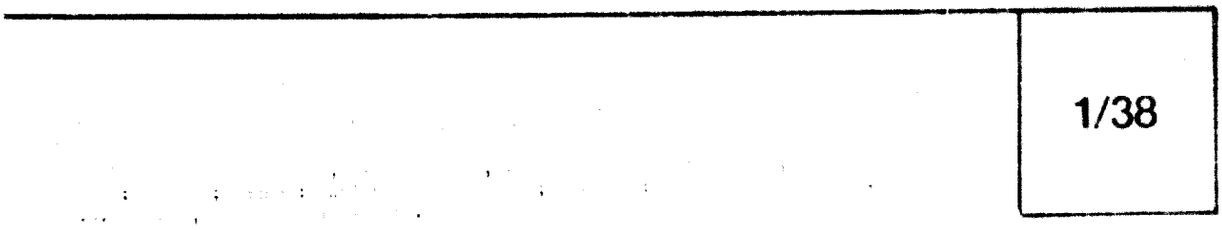
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[illegible] manufacture of [illegible], hollow and [illegible] [illegible] [illegible] with internal finishes. In addition, these techniques are [illegible] [illegible] Technicians would be [illegible] to produce [illegible]

(c) A. Subject to negotiation, but thoughts are:

a. [illegible]
b. [illegible]
c. [illegible]

[illegible]

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[illegible]

(a) [illegible]

(b) Private; [illegible] [illegible] million; [illegible]; nature of business: Manufacture of castings.

(c) [illegible] System is an integrated series of [illegible] [illegible]. The most recent [illegible] of this system [illegible].

This system is a major advancement over the previous "[illegible]" [illegible] Precision Castings. This system is capable of producing castings in most of the [illegible] ferrous alloys, in a weight range of [illegible] grams to [illegible] kilograms. [illegible] the application for producing either small or large [illegible] quantities for [illegible] different equipment [illegible] for each of the above-mentioned requirements. [illegible] not limited to, the following techniques and information:

1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]
6. [illegible]
7. [illegible]
8. Foundry [illegible].
9. Quality control [illegible].

(d) [illegible] technology and knowhow is available [illegible] under a licence agreement. [illegible] the financial arrangements are:

1. An initial fee.
2. A running royalty [illegible].
3. A training fee [illegible].

The exact amount of money for items 1, 2 and 3 above will vary depending upon the requirements of the [illegible] for:

1. An exclusive or non-exclusive licence.
2. Castings to be sold on the general [illegible].
3. The extent of the exclusive territory, if exclusive.

Under the proper circumstances a joint venture may be considered. However, [illegible] would [illegible] only [illegible] how. On the other hand, we would expect the other venturer to invest sufficient capital for a viable operation and the adequate management personnel.

Under this licence agreement [illegible] guarantees in addition to the knowhow described in item 4, the following:

1. [illegible], initially, and for as long as required, all [illegible].
2. All training required for [illegible] item 4. [illegible] training in such management [illegible] marketing [illegible] both at the licensee's facilities and at [illegible].
3. [illegible]

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(a) [illegible]

(b) [illegible] Paris, France; Phone: [illegible]; Contact: Mr. [illegible]

(c) Private; [illegible] company [illegible] and [illegible] of YALIO [illegible] business: [illegible] of the centrifugal continuous [illegible].

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(1) THE PRODUCTION OF RAILROAD, TROLLEY OR RAILWAY, AND MINE CAR AXLES

(2) F.B. ROTH METALLURGICAL SERVICES, INC., [illegible]; Contact: Mr. F.[illegible]

( ) Private; Principal and five highly qualified [illegible]; [illegible]:
Technical assistance to metallurgical and foundry industries.

(4) F.B. Roth Metallurgical Services, Inc., provides a complete [illegible] construction, to the foundry industry.

The Company offers:

1. Assistance to existing foundry operations in all phases of [illegible] and control. Expert analysis and help in process [illegible] and innovation. The staff is experienced in both [illegible] in all processes utilized in the production of iron castings.
2. Assistance in planning new installations. [illegible] of products, [illegible], by [illegible] of [illegible].
3. [illegible]
4. [illegible]
5. U.S. [illegible]

(5) Services are varied from short term contract or [illegible] short-term assignments to assist in specific plant problems, or will [illegible] arrangements in any part, from planning to [illegible].

The Company does not participate in joint ventures or require royalty arrangements. Engineering [illegible] client becomes [illegible], for [illegible].

Company personnel are available for assignment to the client facility [illegible] complete a project. The entire F.B. staff is available for [illegible], upon his or client request.

All activities are carried out in cooperation with client personnel, [illegible] process or new technology. Formal training courses are conducted, if [illegible] and on-the-job training.

Reference No.
2/1
FINLAND

(1) PRODUCTION OF BITS FOR ROCK DRILLS

( ) Oy AIRAM Ab, Puusepänkatu [illegible], 00810 Helsinki 81, Finland; Cable: AIRAM; Telex: [illegible]; Phone: [illegible]; Contact: Mr. Mark HAMDAN (Export Sales Engineer).

( ) Private; No. of employees: [illegible]; Approx. annual turnover: [illegible] million. Main products or interests: Manufacture of lamps, dry cell batteries, nonmetal products.

(2) Production of tungsten steel bits with cutting tungsten carbide tips for use on rock drills.

Reference No.
2/2
HUNGARY

(1) DIE FORGING OF ENGINE PISTONS FROM HYPEREUTECTIC Al-Si ALLOYS

( ) ALUTERV, Fortuna ut 5, Budapest XIII, Hungary; Telex: [illegible] MARAL; Phone: [illegible]; Contact: Mr. P. Kőber (Head of Design Bureau).

( ) Governmental; Design and consulting division of the Hungarian Aluminium Corporation; No. of employees: [illegible].

(3) Pistons for high-power diesel and petrol engines are usually produced by die casting. The Aluterv process uses instead a process of die forging, which results in longer life, greater reliability, better resistance to overload and wear, and low thermal expansion.

A special hypereutectic Al-Si alloy has been developed for this purpose, which has adequate ductility to permit plastic forming, forging, suitable heat treatment, and machining on automatic production lines.

(4) Production of pistons for high-power diesel and petrol engines and similar high-duty applications.

(5) Aluterv can offer the following:

1. Design of die-forged piston blank, to user's specifications
2. Engineering for the manufacturing process
3. Design of tools (and, where necessary, their manufacture) and transfer of complete know-how
4. Advice on selection of equipment
5. Supervision of construction and installation of equipment on site
6. Training of personnel at Hungarian works
7. Commissioning and start-up of plant, organization of production, and on-plant training.

Reference No.
2/3
HUNGARY

(1) PRODUCTION OF WORKPIECES WITH UNDERCUT SURFACE FROM ALUMINIUM ALLOYS BY DIE FORGING

( ) ALUTERV, Fortuna ut 5, Budapest XIII, Hungary; Telex: [illegible] MARAL; Phone: [illegible]; Contact: Mr. P. Kőber (Head of Design Bureau).

( ) Governmental; Design and consulting division of the Hungarian Aluminium Corporation; No. of employees: [illegible].

(4) In many workpieces produced by die forging, an inner cavity or an undercut surface is created, perpendicular to the direction of forging. From the point of view of strength and performance, the machining of such workpieces has disadvantages, but not from the design and technological. By means of the Aluterv process, using suitably designed dies, workpieces of this type can be die-forged from aluminium alloys.

(5) Aluterv can offer the following:

1. Transfer of manufacturing rights and know-how, by licence agreements
2. Design of all tools and transfer of relevant knowhow
3. Supply of process equipment
4. Complete engineering for plant
5. Supervision of construction and installation of equipment on site
6. Training of personnel at Hungarian works
7. Commissioning and start-up of plant, organization of production, and on-plant training.

Reference No.

2/4

AUSTRIA

(1) FORGING OF ALLOY AND SPECIAL STEELS

(2) Gebr. BOHLER and Co. AG, Postfach [illegible], A-[illegible] Vienna, Austria; Cable: [illegible] Wien; Telex: 1109, 1[illegible]; Phone: [illegible]; Contact: Mr. W. [illegible], Acero Boehler del Peru SA, L. Castro [illegible], Apartado [illegible], Lima, Peru.

(3) Governmental; Major producer of special and alloy steels; No. of employees: [illegible]; Capital: [illegible] million; Main nature of business: [illegible] and special steels in various forms and [illegible].

(4) Complete knowhow for <u>planning and layout</u> of hammer and die forges for special steels of all grades.

Complete knowhow for <u>manufacturing operations</u>, covering [illegible] forging, die forging, heat treatment, and finishing.

<u>Training</u> of personnel in Böhler Works.

Provision of Böhler experts for <u>technical assistance</u> in [illegible] work, e.g. supervision of production start-up, trouble-shooting in production operations, etc.

(5) Conclusion of knowhow agreement [illegible] terms.

Technology and knowhow normally supplied on <u>royalty</u> basis, with additional [illegible] payments.

<u>Licensing arrangements</u> can also be negotiated.

Training and expert assistance can also be supplied, subject to [illegible] terms.

Reference No.

2/5

UNITED KINGDOM

(1) PROCESS TECHNOLOGY IN HOT STEEL FORGING

(2) GKN FORGINGS LTD., P.O. Box No. 4, Bromsgrove, Worcs, United Kingdom; Telex: [illegible] Garringtons Brom; Phone: Bromsgrove 74[illegible]; Contact: Mr. Victor [illegible] (Overseas Engineering Executive).

(3) Private; Member of Guest Keen and Nettlefolds Group; Sales: [illegible] tons per year; No. of employees: 10,000; Main nature of business: Production of forged parts for the automotive and other industries.

(4) The Overseas Engineering Division of GKN Forgings Ltd. can offer the following range of services in the field of hammer and press forging of steel:

a. <u>Direct Consultancy Service</u>, adapted to meet the requirements of an existing forging concern wishing to improve output and utilization of existing plant with minimum capital expenditure.

b. <u>Specific process consultancy</u>, to meet the needs of a client wishing to start production of a type of forging where proven modern knowhow and/or process technology are vital (e.g. crankshafts, connecting rods), either in an existing forge or a new facility.

c. <u>Turn-key forge projects</u> for clients wishing to set up a new forge with modern technology and to achieve optimum production in minimum time.

(6) For <u>direct consultancy assistance</u>, payment on an instalment basis remitted to UK account.

For <u>major new forge projects</u> payment is normally associated with plant procurement and installation charges.

Under a GKN Forgings consultancy, <u>training</u> is given to client's personnel to ensure that appropriate skills, procedures, and techniques are acquired and applied.

Other services include on-site surveys, on-site consultants [illegible] support services from [illegible]

Projects can be adapted to meet client's requirements for special needs, such as minimum capital outlay, minimum personnel complement and optimum mechanical handling.

Reference No.

2/6

ITALY

(1) MANUFACTURE OF STEEL FORGINGS

(2) ITALSIDER S.p.A., via Corsica 4, [illegible] Genova, Italy; Cable: [illegible] Telex: [illegible] Ital. [illegible]; Phone: [illegible] Genova; Contact: [illegible] ATI.

(3) Major Italian iron and steel producer; Capital: Lit [illegible] [illegible] employees: 44,0[illegible]; Main nature of business: Production of iron and steel.

(4) Italsider offers complete knowhow in the manufacture of large forgings in carbon and alloy steels. The knowhow covers steel specification, ingot casting, forging, heat treatment, and [illegible].

( ) Many [illegible] in the [illegible], such as crankshafts for large diesel engines, shafts for marine engines, etc.

( ) Integrated assistance programmes, implemented by Italsider staff in recipient's works and training of recipient's personnel in Italsider works.

The various possible conditions for transfer of the knowhow will be discussed on application from potential recipients.

Reference No.

2/7

UNITED STATES OF AMERICA

(1) HOT FORGING OF CARBON AND ALLOY STEEL

( ) LUKENS STEEL COMPANY, [illegible] Avenue, Coatesville, Pa. [illegible], United States of America; Telex: [illegible]; Phone: ([illegible]) [illegible], ([illegible]) [illegible]; Contact: Mr. Leonard Ford (International Manager).

( ) Private; Sales ([illegible]): $[illegible]; No. of employees: [illegible]; Main nature of business: Speciality plate steels producer and fabricator.

(4) Lukens Steel Company has for many years been [illegible] industries with [illegible] components, using various methods of hot forming. One of the [illegible] is that of forging. In [illegible], the design and production of special [illegible] tools [illegible].

As a result of this long background of training, development, and experience, Lukens specialists are ready and able to transfer their specialized technological knowhow in the field of forging to interested recipients.

( ) 1. Lukens [illegible] can transfer [illegible] via [illegible] of recipient's plants, in the form of lectures, individual instruction, [illegible] data, analysis of [illegible], etc., designed to [illegible] personnel [illegible] of the speciality [illegible].

2. The following financial arrangements are proposed:

a. [illegible] (per diem rates) [illegible] prevailing rates).

b. Contract [illegible] etc. [illegible] Lukens [illegible] and [illegible], with [illegible] date of the agreement.

c. [illegible].

Reference No.

2/8

[illegible]

(1) [illegible]

( ) [illegible] AB, [illegible], Sweden; [illegible]

( ) Private; [illegible]; No. of employees: [illegible]; Main nature of business: Manufacture of high-grade carbon, alloy and stainless steels.

(4) Full knowhow on forging steel ingots of all grades to rounds, square or flat sections in ingot weights up to 45 tons; also on heating, heat treatment, and handling.

( ) Expert advice on selection of equipment and operation; royalty payable in form of down-payment plus percentage of produced value or quantity.

Training of recipient's personnel at [illegible] works in Sweden subject to special agreement.

Expert technical assistance available subject to special agreement.

Reference No.

2/9

CANADA

( ) [illegible]

( ) [illegible] LTD., [illegible] Road, [illegible], Ontario, Canada; Telex: [illegible]; Phone: ([illegible]) [illegible]; Contact: Mr. [illegible] (Manager, New Metal Products Sales).

( ) Private; Major world [illegible] and refining company; Sales: [illegible]; No. of employees: [illegible]; Main nature of business: [illegible] lead mining, refining and [illegible].

(4) Zinc alloy forgings (closed die) or hot pressings have been developed by [illegible] are comparable to and competitive with brass forgings. Standard technology [illegible] and die practice is easily adaptable to Korloy*. Lower forging temperature ([illegible]) [illegible] die life, better finishes, and cooler working conditions.

Cominco offers Korloy* zinc alloy extruded bar stock (3/8 - [illegible] in. dia.) from Cominco production, [illegible] technology for forging and finishing of these alloys.

Korloy alloy	Density lb/cu in	Tensile lb/sq in	Yield lb/sq in	Elongation % on 2 in.
[illegible]	[illegible]	[illegible],000	[illegible],000	30
[illegible]	[illegible]	4[illegible],000	[illegible],000	[illegible]
2570	[illegible]	50,000	45,000	1[illegible]
[illegible]	0.[illegible]	50,000	45,000	[illegible]

*Registered Trade Mark, Cominco Ltd.

(5) Appropriate terms will be developed to assist interested parties in taking advantage of Cominco metalworking and processing knowhow, patents, sales, and application engineering skill.

Possibilities are work on a consulting fee basis, production licenses, or flat fee structures, depending on specific situations. Financial arrangements could be concluded for a term of credit, depending on [illegible], via letters of credit.

Expert assistance and operator training (in English) is also available.

Reference No.

2/10

FRANCE

(1) PRODUCTION OF AXLES AND BRAKES FOR TRAILERS AND SEMI-TRAILERS

(2) SOCIETE AGRICULTURE [illegible], [illegible] Rue A. de Vigny, [illegible] Paris, France; Contact: Mr. J. Thore.

(3) Private; [illegible] workers (a subsidiary of AGRICULTURE THORE COMPANY) [illegible] workers; Main nature of business: AXLES, Material for agricultural [illegible] highway trailers.

(4) - Detailed drawings of axles.
- Best manufacturing procedures.
- Range of production.
- Choice of the more suitable material.

(5) - Axles for agricultural use.
- Axles for highway trailers and semi-trailers.

(6) - Commercial and technical assistance.
- Payment cash for the knowhow.
- Royalties on the turnover with a minimum amount guaranteed.

Reference No.

2/11

FRANCE

(1) PRODUCTION OF GRINDING MEDIA

(2) FORGES THORE, [illegible], Rue A. de Vigny, [illegible] Paris, France; Contact: Mr. J. Thore.

(3) Private; [illegible] workers (a subsidiary of AGRICULTURE THORE COMPANY) [illegible] workers; Main nature of business: Forging - Stamping - Production of grinding [illegible].

(4) - Choice of the metal suited to the material to be ground.
- Forging and subsequent heat treatment.

(5) GRINDING MEDIA for

- Clinkers for cement industries.
- Various ores.

(6) - Commercial and technical assistance.
- Payment cash for the knowhow.
- Royalties on the turnover with a minimum amount guaranteed.

Reference No.

2/12

SWEDEN

(1) DROP FORGING OF STEEL WITH HAMMERS OR MECHANICAL PRESSES

(2) AB BOFORS, S-690 80 Bofors, Sweden; Cable: Bofornes, Bofors, Sweden; Telex: [illegible]; Phone: 0586/[illegible] 00; Contact: Mr. Alex. Blomgren (Chief Engineer).

(3) Private; Share capital: Skr [illegible] million; Sales: Skr 400 million; No. of employees: [illegible],500; Main nature of business: Steel, ordnance material, civil engineering products and chemicals.

(4) Know-how activities relate to new production departments or the modernization of existing installations and cover: Analysis of the project; Inspection of existing facilities; Basic engineering; Choice of processes and equipment, including main data specifications; Suggestions of suppliers; Analysis of tenders, technically and economically; Participation in the negotiations with the suppliers; Supply of process manuals; Training of the client's personnel in the Bofors' works; Assistance of our experts at the start-up of the new plant.

(5) Drop forged products, such as crank shafts, connecting rods and other automotive parts as well as forgings for aircraft and other industries. The steel types are from plain carbon steels to high alloyed special steels including stainless and heat resisting alloys.

(6) The preferred payment policy is: Periodic cash rates proceeded by an initial down-payment. The periods and rates are to be agreed upon. Payment shall be in Swedish or other transferable currency. A payment policy based on royalty may be considered, provided that satisfactory conditions can be agreed upon.

Reference No.

2/13

SWEDEN

(1) FLAT DIE FORGING OF STEEL WITH HAMMERS AND HYDRAULIC PRESSES

(2) AB BOFORS, S-690 80 Bofors, Sweden; Cable: Bofornes, Bofors, Sweden; Telex: [illegible]; Phone: 0586/[illegible] 00; Contact: Mr. Alex Blomgren (Chief Engineer).

(3) Private; Share capital: Skr [illegible] million; Sales: Skr 400 million; No. of employees: [illegible],500; Main nature of business: Steel, ordnance material, civil engineering products and chemicals.

(4) Know-how activities relate to new production departments or modernization of existing installations and cover: Analysis of the project; Inspection of existing facilities; Basic engineering; Choice of processes and equipment, including main data specifications; Suggestions of suppliers; Analysis of tenders, technically and economically; Participation in the negotiations with the suppliers; Supply of process manuals; Training of the client's personnel in the Bofors' works; Assistance of our experts at the start-up of the new plant.

(5) A great variety of flat die forged products with piece weights of 5 to 30 metric tons when forged, such as: rolls for hot and cold rolling mills, dies blocks for press forging and plastics forming, shafts and discs for water gas and steam turbines, etc., as well as forged bars with different cross-sections. The steel types are from plain carbon steels to high alloyed special steels including stainless and heat resisting alloys.

(6) The preferred payment policy is: Periodic cash rates proceeded by an initial down-payment. The periods and rates are to be agreed upon. Payment shall be in Swedish or other transferable currency. A payment policy based on royalty may be considered, provided that satisfactory conditions can be agreed upon.

Reference No.

2/14

CANADA

(1) KNOW-HOW COVERING THE FORGING OF STAINLESS AND ALLOY STEELS

(2) ATLAS STEELS COMPANY, Centre Street, Welland, Ontario, Canada; Cable: Atlas Welland; Telex: 061-5114 or 061-[illegible]; Phone: (416) [illegible]-4601; Contact: Mr. William A. Thomas (Senior Vice-President).

(3) Private; Sales: $[illegible] million (world-wide); No. of employees: [illegible],500; Main nature of business: Manufacture of tool steels, stainless steels, and mining steels.

(4) Complete set of processing standards, training of personnel on all equipment pertinent to contract. This would include both theoretical and practical instruction. Dispatch of Atlas technical people to aid in the start-up of operations in the developing country.

(5) Royalty policy; Training of recipients; Availability for contract with recipients; Expert assistance provided or available.

Reference No.

2/15

UNITED KINGDOM

(1) HOT PRESSING (FORGING) OF ALUMINIUM WITH PARALLEL [illegible]

(2) BRASS AND ALLOY PRESSINGS (BERITEND) LIMITED, Liverpool Street, [illegible], United Kingdom; Cable: Bralloy, Birmingham; Telex: [illegible]; Phone: 021 772 4515; Contact: Mr. A.E. Clarke (Director).

(3) Private; Annual sales: £[illegible],000; Issued capital: £[illegible],000; No. of employees: [illegible]; Main nature of business: Manufacturers of hot non-ferrous forgings.

(4) Tooling design and manufacturing methods have been developed for [illegible] Aluminium forgings with [illegible] cores and outside forms at economical costs. Components are processed using specially designed tooling on standard presses. The process is not suitable for projections and is best suited to the simple type of press. Internal forms can be provided in the shape of hexagons, squares, splines etc., as well as to cylindrical forms. Where required, tolerances of plus and minus [illegible] can be achieved.

(5) Where required, we will provide assistance with purchase and installation of plant and equipment, [illegible] manufacture of tooling, details of manufacture of components and inspection methods. Would consider [illegible] at cost followed by royalty terms based on component production. Expenses to be negotiated.

Reference No.

2/16

UNITED KINGDOM

(1) HOT PRESSING (FORGING) OF [illegible] SUCH AS AUTOMOTIVE GEARWHEELS

(2) BRASS AND ALLOY PRESSINGS (BERITEND) LIMITED, Liverpool Street, [illegible], United Kingdom; Cable: Bralloy, Birmingham; Telex: [illegible]; Phone: 021 772 4515; Contact: Mr. A.E. Clarke (Director).

(3) Private; Annual sales: £[illegible],000; Issued capital: £[illegible],000; No. of employees: [illegible]; Main nature of business: Manufacturer of hot non-ferrous pressings and forgings.

(4) Production of synchronising cones for automotive gearboxes by hot pressing [illegible] to finished dimensions and do not require subsequent machining. We offer details of complete production cycle from raw material to finished [illegible].

(5) Will provide, where required, assistance with purchase and installation of plant and equipment, training for raw material, design and manufacture of tooling, manufacture of components and inspection. Would consider above at cost followed by royalty terms based on component production. Expenses to be negotiated.

Reference No.

2/17

UNITED KINGDOM

(1) MANUFACTURE OF VEHICLE LEAF SPRINGS

(2) BROCKHOUSE EXPORT LIMITED, Birmingham Road, West Bromwich, Staffs., [illegible], Telex: Brockex West Bromwich [illegible]; Phone: 021-553 4541; Contact: Mr. B. Garside (General Manager).

(3) Private; Capital: £10 million; Sales: £20 million; No. of employees: 4,500; Main nature of business: Engineering.

(4) Manufacture of vehicle leaf springs for cars and commercial vehicles, etc. The springs are made from steel strip which is forged, assembled and then heat treated.

(5) Fee for setting-up complete plant, including training of personnel. Joint ventures also considered.

Reference No.

2/18

FRANCE

(1) FORGING OF SPECIAL STEELS

(2) CREUSOT-LOIRE, Branche Métallurgie, Département Assistance Technique, 34, Rue de Londres, 75008, Paris, France. Cable: "FORGALOIRE - PARIS"; Telex: [illegible]; Phone: 292.05.80; Contact: Mr. J. Noudhom (Head, Technical Cooperation Department).

(3) Private; Major producers of alloy and special steels; Capital: F [illegible],000,000; Sales: F [illegible] million (1970); No. of employees: 40,000; No. of plants: 35; Main nature of business: Steel and Mechanical Engineering.

Tender No.

2/19

Tender No.

2/20

(4) - Complete know-how for the [illegible] and layout of the [illegible] forged rolls for cold rolling mills with [illegible] steel melting shop, [illegible] shop, induction hardening and [illegible] equipment and plant's services.
- Supply of the induction hardening and tempering installations.
- Complete know-how and technical assistance for the project [illegible].

N.B. This type of service is usually provided [illegible].

(5) All types of cold rolling mills.

(6) - Conclusion of an engineering agreement for a specified period [illegible] to undertake production of forged rolls for cold rolling mills [illegible] procurement of new equipment and machinery, etc.
- Conclusion of know-how and technical assistance agreements for specified [illegible] technological documents, training of personnel in [illegible] works, [illegible] technicians for commissioning of the installation and for [illegible].
- Supply of the induction hardening and tempering installations.

Conditions:

- Engineering fee.
- Technology and know-how normally supplied against [illegible].
- Equipment supplied at [illegible].

Reference No.

2/21

FRANCE

(1) FORGED AND ROLLED WHEELS AND AXLES [illegible]

(2) CREUSOT-LOIRE, [illegible], Département [illegible] Londres, [illegible] Paris, [illegible] Telex: [illegible] Telephone: [illegible] Contact: [illegible] Department)

(3) Private; Major producers of alloy and special steels; Capital: [illegible] million (19[illegible]); No. of employees: 40,[illegible]; No. of plants: [illegible] and Mechanical Engineering.

(4) - Complete know-how for the planning and layout of the plant [illegible] wheels and axles for railways, as well as for rollers.
- Complete know-how and technical assistance for the production of [illegible]:

SOLID WHEELS: All types of forged and rolled wheels [illegible]
WHEEL AXLES: For locomotives or rolling stock.
MOUNTED SETS: For locomotives or rolling stock.
ROLLERS: In forged steel (closed [illegible]) for overhead cranes, [illegible] etc.

(5) Locomotives and waggons, industrial equipment.

(6) - Conclusion of an engineering agreement for a specified period covering all [illegible] a new plant or for expansion of an existing plant.
- Conclusion of know-how and technical assistance agreements for specified [illegible] technological documents, training of personnel [illegible] works, [illegible] technicians for commissioning of the plant and for initial production period.

Conditions:

- Engineering fee.
- Technology and know-how normally supplied against [illegible].

Reference No.

2/22

JAPAN

(1) PRODUCTION TECHNOLOGY OF DIE FORGINGS

(2) SUMITOMO METAL INDUSTRIES, LTD., 15 Kitahama [illegible] Cable: SUMITOMOMETAL OSAKA; Telex: [illegible]; Phone: [illegible].

(3) Private; Capital: [illegible]; No. of employees: [illegible]; nature of business: Production and sales of carbon [illegible] steel rolled products, forging, casting, rolling stock [illegible].

(4) Production technology of crank shaft, front axle and etc. including die [illegible].

(5) 1. Engineering service at the construction of production facilities [illegible].
2. Technical assistance of operation and quality control.
3. Training at our plant in Japan.

3/1

FINLAND

3/2

AUSTRIA

3/3

3/4

[illegible] The technology available [illegible]:

- Extrusion of [illegible] bars, tubes, and sections [illegible]
- [illegible]
- [illegible] by [illegible] and [illegible]

[illegible] the following [illegible]:

- Billet casting
- Extrusion technology, [illegible]
- Drawing and wire-drawing technology
- Heat treatment and [illegible]
- [illegible] of materials
- Quality control

The experience of [illegible] is derived not only from [illegible], and [illegible] local [illegible].

[illegible]:

Bars: [illegible]
Tubes: Structural [illegible]
[illegible]: [illegible] structures, frames, aircraft industry and [illegible]

[illegible] the following [illegible]:

- [illegible]
- Assistance in [illegible]
- [illegible]
- Specification of equipment and [illegible]
- Preliminary evaluation of tenders
- Assistance in selection of suppliers
- Planning and layout of plants
- [illegible] equipment
- Supervision of installation of equipment
- In-plant training
- Commissioning
- Operational planning
- Advice on expansion of existing plant
- [illegible] products

Reference No.

3/5

UNITED STATES OF AMERICA

[illegible]

[illegible] United States of America; [illegible]
[illegible]: Mr. [illegible]

Private; [illegible]; [illegible]: $[illegible]
No. of employees: [illegible]; Main nature of business: [illegible]

[illegible] Manufacture of high-speed wire and rod [illegible]
The process involves [illegible], hot drawing, [illegible], straightening and [illegible].

[illegible] Twist drills, reamers and other cutting tools.

[illegible] Combination of royalty and joint venture, [illegible].

Reference No.

3/6

UNITED STATES OF AMERICA

(1) HOT DRAWING OF STEEL

(2) [illegible] STEEL COMPANY, [illegible] Avenue, Coatesville, Pa. [illegible], United States of America; Telex: [illegible]; Phone: [illegible] 383-2000; Contact: Mr. [illegible] (International Manager)

(3) Private; Sales [illegible]: $[illegible],000; No. of employees: [illegible]; Main nature of business: Specialty plate steels producer and fabricator

(4) [illegible] Steel Company has for many years served the metal-[illegible] industries with [illegible] various methods of hot forming. One of the processes used is that of drawing. [illegible] and production of special equipment and tools have been necessary.

As a result of this long background of training, development, and experience, [illegible] and able to transfer their specialized technological know-how in the field of drawing [illegible].

3/7

3/8

3/9

3/10

3/11

3/12

(4) Manufacture of steel-cored aluminium cables, covering rod and wire drawing, annealing, [illegible], and stranding. The process consists of wire drawing machines with continuous electric annealing in-line between benches. After drawing, the wires are coiled automatically. Basket-type rigid stranding equipment is used; this is adaptable to the production of aluminium and copper conductors and wire ropes.

(5) The cheapest process for the quantity production of conducting cables for HV overhead transmission lines.

(6) Available according to conditions and payment fixed in individual contract, to be negotiated. Technical and manufacturing process documentation, training of recipient's personnel in Hungarian plants, and technical assistance provided under separate agreement.

Reference No.

3/13

UNITED STATES OF AMERICA

(1) WIRE DRAWING ULTRA HIGH STRENGTH ALLOYS

(2) METALLURGY INC., P.O. Box [illegible], [illegible], Pa. [illegible], United States of America;
Phone: [illegible]; Contact: Mr. [illegible] (President)

(3) Private; Capital: \$US 100,000; Sales: \$US 1.5 million; No. of employees: [illegible];
Main nature of business: Metallurgical [illegible].

(4) Design, build and operate plants for producing fine wire of ultra high strength [illegible] in the USA. Example [illegible].

(6) Will sell designs for equipment. Will sell equipment and process used for producing fine wire of [illegible] high temperature alloy.

Reference No.

3/14

FRANCE

(1) COLD DRAWING OF SPECIAL STEEL WIRES AND BARS

(2) CREUSOT-LOIRE, French Metallurgy, Department Assistance Techniques, [illegible], [illegible] PARIS, France; Cable: "[illegible] - PARIS"; Telex: [illegible];
Phone: [illegible]; Contact: Mr. [illegible] (Head, Technical [illegible] Department).

(3) Private; Main [illegible] of [illegible] and special steels; Capital: [illegible];
Sales: [illegible] million (1980); No. of employees: 30,000; Number of plants: [illegible];
Main nature of business: Special Steels and Mechanical Engineering.

(4) Complete knowhow for the planning and layout of the plants and machinery required for the production of cold drawn steel wires and bars (drawing benches, wire drawing machines, heat treatment, finishing, quality control and plant's services).

Complete knowhow for the production of cold drawn steel wires and bars in the following grades: [illegible]

- Carbon and alloy constructional steels (including cold heading qualities)
- Stainless and heat resisting steels
- Stainless steels for cold heading
- Stainless steels for welding electrodes
- Free cutting carbon and alloy constructional steels
- Free cutting stainless steels
- Carbon and stainless steels for springs in coils, reels or straight lengths.

(5) Various mechanical engineering applications, bolts, nuts and screws, rivets, welding electrodes, springs, stationary items, kitchen appliances, wire mesh, etc.

(6)
- Conclusion of an engineering agreement for a specified period covering all engineering studies either for a new plant or for expansion of an existing plant.
- Conclusion of knowhow and technical assistance agreements for specified periods with supply of basic technological documents, training of personnel in Creusot-Loire's works, deputation of Creusot-Loire's technicians for commissioning of the plant and for initial production period.

Conditions:

- Engineering fee
- Technical and knowhow: [illegible] (lump-sum) plus royalties.

GROUP 4 — EXTRUSION

4/1

(1) EXTRUSION OF ALUMINIUM AND ITS ALLOYS

(2) MONTEDISON MECCANICA S.p.A., Via Pisanello 31, P.O. Box [illegible], Milano, Italy; Cable: Montedis; Telex: [illegible]; Phone: [illegible]; Contact: Dr. Robert [illegible] (Manager, Process and Product Development - DIMM), Montedison Meccanica S.p.A. Foro Buonaparte 31, Milano

(3) Private; Capital: Lit. 34 billion; Sales (1970): Lit. [illegible] billion; No. of employees: [illegible]; Main nature of business: Manufacture of chemicals, metals and ferroalloys.

(4) Know-how in hot extrusion (by means of electrically heated) of aluminium billets, in the form of various configurations, tubes, and bars of various diameters and shapes, comprising the following services:

- Cutting and scaling of billets
- Billet extrusion, with possibility of continuous hardening in-line
- Cutting to and finishing
- Annealing

(5) Licensing arrangements against payment of lump-sum covering expenses connected with transfer of know-how plus annual royalty - to be negotiated with recipients. Training of technical personnel who will be in charge of plant operation. General assistance for technical transfer and start-up of plant.

4/2

(1) EXTRUSION AND COLD DRAWING OF QUALITY STEEL SECTIONS

(2) SANDEN GROUP LTD., Tinsley Steel Works, P.O. Box No.1, Sheffield S [illegible], United Kingdom; Cable: Osborn, Sheffield; Telex: [illegible]; Phone: (0742) [illegible]; Contact: Mr. E.W. Foster (Group Project Manager)

(3) Private; An international group of companies founded 1[illegible]; Capital: £1 million; Sales: £20 million; Employees: [illegible],000; Main nature of business: Manufacture of high-quality steel bars, extruded steel sections, rolled sheets, cutting tools, etc.

(4) A comprehensive package covering the current process, product, equipment and operating techniques and know-how for extrusion, cold drawing, and finishing of carbon steels, low-alloy steels, stainless steels, and certain super-alloys and exotic metals from prepared billet. Conventional hot extrusion presses are used with a nominal output capacity of 5,000 tons per annum of current range value of approximately £4 million at an average of £800 per ton requiring capital expenditure in the order of £1.5 million.

Finished products are solid and hollow sections with the variety of section shape to requirement of profile cut from extrusion up to 8 metres in length. Maximum inscribed circle within hollow section is [illegible] mm. Maximum cross-sectional extruded area is some 5,000 sq. mm. within a diameter of 254 mm. Extrusions are held to tolerances as to section, section change over length, and section twist over length. Cold drawing with straightening is applied as may be required to improve tolerances, surface finish and mechanical properties of the product.

Manufacturing techniques include billet preparation, billet heating via electric induction heating, process lubrication, extrusion, heat treatment, [illegible] straightening, descaling, cold drawing, finishing procedures and all materials-handling equipment.

Back-up know-how is offered covering project management requirements and procedures from a green field site to a fully operational unit including drawings, layouts, brochures, planning, cost and progress control techniques. Technological and operational guidance and information are available in respect of product and material mixes, product manufacturing routes, quality standards and control, production planning and control, cost control manpower requirements and management organization and staffing.

(5) Implementation sequence

Step 1. Preliminary exchanges between Osborn and recipient to establish mutual interest.
2. Preliminary survey visit to establish specific parameters of requirements.
3. Preparation and submission of written survey report and proposals.
4. Negotiation and finalization of proposals, financial, commercial and contractual terms.
5. Invitation for recipient to visit Osborn to see and discuss the participant's unique and proprietary [illegible].
6. Osborn to supply reports, documentation, manual instructions, instruments.
7. Osborn to provide and/or arrange for expert assistance.
8. Osborn to train recipient personnel in work techniques, procedures and systems.
9. Osborn to supervise project operation on a contractual basis.

Commercial terms

Step 1 will involve no expense to the recipient.

Steps 2, 3, 4 and 5 will be carried out on an individual fee plus expenses basis or possibly with requirements.

Steps 6, 7, 8 and 9 will be carried out on an individual fee plus expenses basis or possibly with requirements and in addition will be open to participation by royalty or joint-venture arrangements.

4/3

[illegible] ALUMINIUM

[illegible] Metallwerk, [illegible] AG, A-[illegible], Austria; [illegible]; Dr. Mario Panetti (Sales Manager)

[illegible] manufacturer of aluminium and aluminium products and semi-finished copper and copper alloy products in Austria; Capital: A 410 [illegible]; [illegible] million; No. of employees: 4,[illegible]; Main nature of business: Production of [illegible], bar and sections in copper, aluminium, and its alloys.

[illegible] manufacture of extruded metal [illegible], and sections, the die quality is of great importance. [illegible] are not always satisfactory and [illegible] desirable for an aluminium extrusion plant to have its own die-making facility.

[illegible] training of personnel in die making, design and erection of modern die-making [illegible], advice on manufacturing methods and on tool design, assistance in plant layout, advice on die materials, etc.

[illegible]

4/4

[illegible]

METAALINSTITUUT [illegible], Netherlands; Telex: [illegible]; [illegible] Mr. [illegible] (Director of [illegible] Engineering [illegible])

Mixed; Part of Organisatie voor Natuurwetenschappelijk Onderzoek TNO, (Central Organization for Applied Scientific Research); Annual [illegible]: $[illegible] million [illegible]; No. of employees: [illegible]. Main nature of business: Research and development.

[illegible] pressures up to [illegible] kbar, computation of [illegible] considerations, design of [illegible] equipment.

a. [illegible] Metal Research Institute [illegible] $[illegible] per person [illegible].

b. [illegible] $[illegible] - $[illegible] per person [illegible] allowances.

c. [illegible] in the countries [illegible] range of about $[illegible],000 [illegible].

4/5

CANADA

[illegible]

[illegible] Oakville, Ontario, Canada; Telex: Sheridan Park [illegible]; Phone: [illegible]; Contact: Mr. [illegible] (Manager, New Metal Products Sales).

Private; [illegible]; Sales: Over $Can. 250 million; No. of employees: [illegible]; Main nature of business: [illegible] and lead mining, refining and working.

[illegible] extrusion of [illegible] and other [illegible] have been established [illegible] commercial and economical.

[illegible] a potential [illegible].

[illegible] available for alloy preparation, billet production, extrusion, [illegible] and die preparation.

[illegible]	Density [illegible]	[illegible]	[illegible]	Elongation [illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Registered Trade Mark, [illegible].

(c) Appropriate terms will be [illegible] interested parties [illegible]
and processing know-how, patents, sales, and arbitration [illegible].

Possibilities are [illegible] specific situations. Financial arrangements [illegible] size, via letters of credit.

Expert assistance and operator training in Europe is also available.

Reference No.

4/6

(1) LIGHT-ALLOY SECTIONS FOR METAL STRUCTURES (WINDOW FRAMES) MAINS

(2) CORDIER-FONDERIES, [illegible] Marceau, Paris 8e, France; Telex: [illegible]; Telex: [illegible]; Phone: [illegible]; Contact: A. Prevot (Head, Technical Assistance Department).

(3) Private; Major French non-ferrous metals producer; Capital: F 1 [illegible]; Sales: 1,100 million; No. of employees: [illegible]; Main nature of business: [illegible] transformation of aluminium: rolling, drawing and extrusion of all wrought aluminium [illegible].

(4) The technology available concerns the production by extrusion of sections [illegible] in aluminium and alloys such as Al-Mg-Si.

The know-how covers all or part of the following:

- Design of appropriate billets
- Design of sections
- Extrusion techniques
- Exploitation of materials (economic productivity)
- Heat treatment
- Quality control
- Design and production of dies (Plain, porthole, mandrilco, spider dies)

The experience of Cordier-Fonderies is derived not only from its major French plants, but also from smaller operations in foreign subsidiaries, and means that the company is equipped to provide the best solution for each local situation.

(5) The projects of this technology are most commonly used in metal structures: Partitions, [illegible] of windows, [illegible] movable partitions, claiming elements, curtain walls, etc. They are also used for decorative purposes, in transport [illegible] etc.

(6) Cordier-Fonderies can offer the following assistance and know-how, in part or complete:

- Basic technological investigation
- Assistance in setting up realistic manufacturing programmes
- Selection of basic equipment
- Specification of equipment and tender invitations to tender
- Preliminary evaluation of tenders
- Assistance in selection of supplier
- Planning and layout of plants
- Advice on ancillary equipment
- Supervision of installation of equipment
- In-plant training
- Commissioning
- Operational planning
- Advice on expansion of existing plant
- Know-how on new products

Reference No.

4/7

(1) FABRICATION OF TUBES BY EXTRUSION AND COLD DRAWING

(2) TUBACEX, C.E. de TUBOS por EXTRUSION Sivil. Anon., Barrio Carlos e/n. Llodio (Alava), Spain; Telex: [illegible] TUBEX-E; Phone: [illegible]; Contact: Mr. [illegible] (Director General).

(3) Private; Capital: Ptas [illegible] million; No. of employees: [illegible]; [illegible] business: Fabrication of tubes without welding.

(4) Fabrication of steel tubes without welding of carbon and alloy steels, by means of the [illegible] from conventional and continuous cast billets. The production comprises a range of [illegible] mil. metres of outer diameter, with a great variety of thicknesses.

(5) Carbons and alloy cold-drawn types are used in the production of boiler tubes and heat exchangers.

(6) Normally we follow the royalty policy, but we can also apply other conditions. Subject to [illegible] financial agreements.

GROUP 5 – ROLLING

Reference No. **5/1** AUSTRIA

(1) ROLLING OF ALLOY AND SPECIAL STEELS

(2) Gebr. BÖHLER and Co. AG, Postfach [illegible], A-1011 Vienna, Austria; Cable: Stahlböhler Wien; Telex: [illegible]; Phone: [illegible]; Contact: Mr. W. [illegible], Acero Boehler del Peru SA, [illegible], Apartado [illegible], Lima, Peru.

(3) Governmental; Major producer of special and alloy steels; No. of employees: [illegible],500; Capital: [illegible] million; Main nature of business: Production of alloy and special steels in various forms and finishes.

(4) Complete knowhow for planning and layout of rolling mills (blooming and roughing mills, rod and bar mills, sheet and strip mills) for special steels of all grades.

Complete knowhow for manufacturing operations, covering control operations, heat treatment, conditioning and sorting, etc.

Training of personnel in Böhler works.

Provision of Böhler experts for technical assistance in licensee's works, e.g. supervision of production start-up, trouble-shooting in production operations, etc.

(5) Conclusion of knowhow agreement for [illegible] period. Technology and knowhow normally supplied on royalty basis, with additional cash payments. Licensing arrangement can also be supplied, subject to [illegible].

Reference No. **5/2** UNITED KINGDOM

(1) COLD ROLLING OF METAL SECTIONS

(2) BROCKHOUSE EXPORT Ltd., (The Brockhouse Organisation), Birmingham Road, West Bromwich, Staffs., United Kingdom; Telex: Brock [illegible] West Bromwich [illegible]; Phone: [illegible]; Contact: Mr. [illegible] (General Manager).

(3) Private; Member of group of companies producing rolled, forged, and cast products in iron, steel, and non-ferrous metals, together with a range of engineering products, including [illegible], tools, [illegible], transmission components, constructional elements, etc.; No. of employees: [illegible],000 (Group); Capital: £10 million; Sales: £ [illegible] million; Main nature of business: [illegible].

[illegible] Company more than thirty years ago.

[illegible] of forming rolls until the final shape is achieved.

[illegible] electro-zinc, [illegible] from material [illegible] wide.

They can be supplied [illegible] in which punching, notching, embossing, joggling, welding [illegible]. They can also be supplied curved, coiled and in [illegible] welded rings.

(4) Cold rolled sections have a very wide field of application for wherever a product incorporating the use of sheet metal is being made it is quite possible that a cold rolled section can fulfil a requirement. It is [illegible], resulting in lightness with strength at a low cost.

(5) The Company offers the following:

1. Licensed manufacture.
2. Training (on a fee basis).
3. A joint venture.

Reference No. **5/3** FRANCE

(1) [illegible]

(2) [illegible], Paris [illegible], France; Cable: [illegible]; Telex: [illegible]; Phone: [illegible]; Contact: [illegible], Technical [illegible] (Department [illegible]).

(3) Private; Major French non-ferrous metals producer; Capital: [illegible]; [illegible],000 [illegible]; No. of employees: [illegible],000; Main nature of business: Primary transformation of aluminium: rolling, drawing, and [illegible] of all wrought-aluminium [illegible].

(4) The technology available applies to all or part of the following:

- The manufacture of hot-rolled products, flat or coiled, for subsequent cold-rolling, [illegible] finished plates, up to 1[illegible]0 mm thick.
- The cold-rolling of sheet or strip of 0.[illegible] mm thickness and [illegible].

These operations can be carried out in reversing or non-reversing mills, in tandem trains, [illegible] etc. Width can be up to [illegible].50 mm.

The experience of Cegedur-Pechiney is derived not only from its major French plants, but [illegible] operations in foreign subsidiaries, and means that the company is equipped to [illegible] each local situation.

(5) There are many applications for these products:

- Medium and heavy gauge sheet for the aircraft industry.
- Coiled strip as raw material for foil production.
- Coiled strip as raw material for the production of coated containers for the food industry, [illegible], etc.
- Special quality strip for stamping and [illegible].
- Plates, discs, blanks for stamping and [illegible].

(6) Cegedur-Pechiney can offer the following assistance and knowhow, in part or completely:

- Basic technological documentation.
- Assistance in setting up realistic manufacturing programmes.
- Selection of basic equipment.
- Specification of equipment and issuing invitations to tender.
- Preliminary evaluation of tenders.
- Assistance in selection of suppliers.
- Planning and layout of plants.
- Advice on ancillary equipment.
- Supervision of installation of equipment.
- In-plant training.
- Commissioning.
- Operational planning.
- Advice on expansion of existing plant.
- Knowhow on new products.

Reference No.

5/4

UNITED STATES OF AMERICA

(1) HOT ROLLING OF STEEL

(2) LUKENS STEEL COMPANY, Strode Avenue, Coatesville, Pa. [illegible]0, United States of America; Telex: [illegible]; Phone: (21[illegible]) [illegible]-[illegible]000; Contact: Mr. [illegible] (International Manager).

(3) Private; Sales (1971): $US 1[illegible],1[illegible]7,000; No. of employees: [illegible]; Main nature of business: Speciality plate steels producer and fabricator.

(4) Lukens Steel Company has for many years served the metal-user industries with fabricated components, [illegible]. In many cases, the [illegible] various methods of hot forming. One of the processes used is that of rolling. [illegible] and production of special equipment and tools have been necessary.

As a result of this long background of training, development and experience, Lukens specialists are [illegible] and able to transfer their specialized technological knowhow in the field of rolling to interested [illegible].

(5) 1. Lukens Steel Company can transfer the technology via expert technicians at [illegible] plants, in the form of lectures, individual instruction, use of operational data, analysis of [illegible], etc., designed to develop personnel in the techniques of engineering and the [illegible] of the speciality in question.

2. The following financial arrangements are possible:

a. Lump-sum payment in advance (based on estimate of time and/or man-hours [illegible] prevailing rates).
b. Contractual arrangements. The recipient pays Lukens an agreed sum for not [illegible] and not more than ten years, with payments in quarterly instalments starting [illegible] the effective date of the agreement.
c. All payments in US currency to a New York bank, without any deduction of taxes.

Reference No.

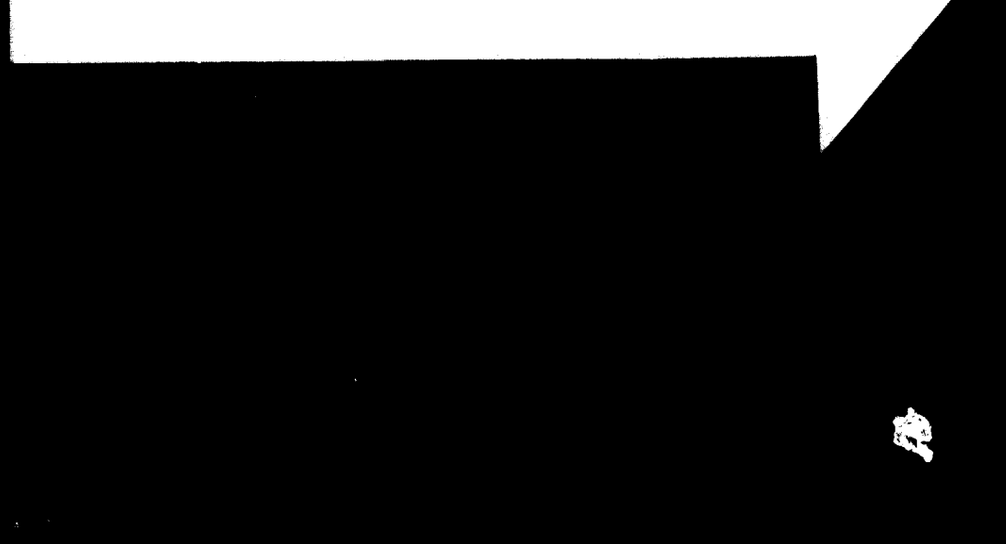
5/5

ITALY

(1) ROLLING OF ALUMINIUM AND ITS ALLOYS

(2) MONTECATINI EDISON S.p.A., [illegible]; Telex: [illegible]; Phone: [illegible]; Contact: [illegible] Montedison; Telex: [illegible]; Phone: [illegible] Process and Product Development - DIPS), Montecatini Edison S.p.A., [illegible] Milano.

(3) Private; Capital: Lit [illegible] billion; Sales [illegible]; No. of employees: 5[illegible],[illegible]78; Main nature of business: Manufacture of [illegible] ferroalloys.



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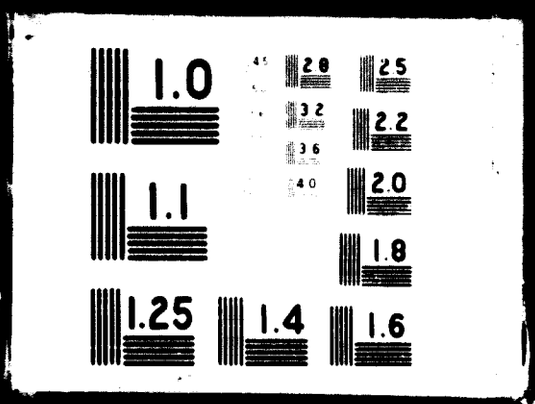

5/1

5/2

5/3

(4) Nippon Steel starts the commercial production of new [illegible]
to render the following technical assistance :

1. [illegible]
2. [illegible]
   (a) Operating technique.
   (b) Roll design.
   (c) Improving of [illegible]
   (d) Quality control and [illegible]

Reference No.

5/24

JAPAN

(1) SPIRAL LINE PIPE

(2) NIPPON STEEL CORPORATION, [illegible] Otemachi, [illegible], Chiyoda-ku, [illegible] :
NIPPON STEEL TOKYO; Telex: [illegible]; Phone: [illegible]; Cable: [illegible]
(Director).

(3) Private; Capital: $[illegible] million; Sales: $[illegible]; Employees: [illegible]
%; Main nature of business: Manufacture and sale of [illegible]
products and incidental thereto.

(4) Nippon Steel's equipment capable of fabricating spiral line pipe [illegible] with
wall thickness of 0.[illegible] to [illegible] [illegible]

Nippon Steel is ready to render the technical assistance in connection with the [illegible]
operation of the equipment for furnishing spiral line pipe.

Reference No.

5/25

JAPAN

(1) AUTOMATIC MARKING EQUIPMENT

(2) NIPPON STEEL CORPORATION, [illegible] Otemachi, [illegible], Chiyoda-ku, [illegible] :
NIPPON STEEL TOKYO; Telex: [illegible]; Phone: [illegible]; Cable: [illegible]
(Director).

(3) Private; Capital: $[illegible] million; Sales: $[illegible]; Employees: [illegible]
%; Main nature of business: Manufacture and sale of [illegible]
products and incidental thereto.

(4) Nippon Steel has various types of marking equipment:

1. Sheet Printer - This equipment can print [illegible] continuously with high speed of 400 m/min.
2. Mark Selecting Type Sheet Printer - This equipment is [illegible] of several marks can be printed by pushing [illegible].
3. Coil Printer - This can be used for the various coil strip. [illegible] changed easily.
4. Printer for Pipes or Round Shape Materials.
5. Numbering Printer.

Reference No.

5/26

JAPAN

(1) LIGHT GAUGE COLD ROLL FORMER

(2) NIPPON STEEL CORPORATION, [illegible] Otemachi, [illegible], Chiyoda-ku, [illegible] :
NIPPON STEEL TOKYO; Telex: [illegible]; Phone: [illegible]; Cable: [illegible]
(Director).

(3) Private; Capital: $[illegible] million; Sales: $[illegible]; Employees: [illegible]
%; Main nature of business: Manufacture and sale of [illegible]
products and incidental thereto.

(4) In accordance with rapid increase of light gauge structural [illegible], Nippon Steel has [illegible] accurate cold roll forming and cutting line.

1. Forming speed: [illegible] m/min.
2. Accuracy of cutting length: ±[illegible]
3. Exchanging time of forming mold or [illegible] [illegible]

Reference No. **5/27** JAPAN

(1) [illegible] PLANETARY [illegible]

(2) [illegible] Naka-ku, Nagoya, Japan; [illegible]; Phone: Nagoya (052) [illegible]; Contact: Mr. [illegible] [illegible].

(3) Private; Capital: [illegible]; [illegible] employees: [illegible]; Main nature of business: Production and sales of special steel (bar, wire, narrow strip, forgings, castings).

(4) [illegible] of the Single Planetary Mill. [illegible] rolling mills of conventional type [illegible] rolls of planetary design. [illegible] planetary roll [illegible] with [illegible] roll.

[illegible] of the Single Planetary Mill [illegible]:

1. [illegible] with a small installation, which makes the machine particularly amenable to automation of [illegible] aspects of operation.
2. Amenability to [illegible] control of work-piece temperature on account of compact design.
3. [illegible] reduction with [illegible], with accompanying economy in number of mill stands.
4. [illegible] in reduction and temperature conditions permits production of steel of extremely uniform fine metallic [illegible] structure.

(5) 1. [illegible] or both of them.
2. [illegible] training at our plants.

Reference No. **5/28** JAPAN

(1) [illegible] RAILS

(2) NIPPON STEEL CORPORATION, [illegible] Chiyoda-ku, Tokyo, Japan; Cable: NIPPON STEEL TOKYO; Telex: [illegible]; Phone: [illegible]; Contact: Mr. [illegible] Okaki (Director).

(3) Private; Capital: $ [illegible] million; Sales: $ [illegible] million; No. of employees: [illegible]; Main nature of business: Manufacture and sale of iron and steel and of chemical products and [illegible] thereto.

(4) Nippon Steel's technique permit the manufacture of [illegible]. Nippon Steel [illegible] as well as current transmission rails, [illegible].

[illegible] Nippon Steel.

Reference No. **5/29** JAPAN

(1) PRODUCTION TECHNOLOGY OF [illegible] WHEEL, AXLE), AND [illegible]

(2) SUMITOMO METAL INDUSTRIES LTD., 15 Kitahama [illegible], Higashi-ku, Osaka, Japan; Cable: SUMITOMOMETAL OSAKA; Telex: [illegible]; Phone: [illegible].

(3) Private; Capital: [illegible]; [illegible] March 197[illegible]); No. of employees: [illegible] (as of end of 19[illegible]); Main nature of business: Production and sales of [illegible] steel rolled products, alloy steel rolled products, forging, casting, rolling [illegible] parts and [illegible].

(4) 1. Production technology of wheel and axle, including hot working, heat treatment and machining.
2. Production of parts of trucks and fabrication of trucks.

(5) 1. Engineering service at the construction of production facilities (including design and construction).
2. Technical assistance of operation and quality control.
3. Training at our plant in Japan.

GROUP 6 – TUBEMAKING

Reference No. **6/1** [illegible]

(1) MANUFACTURE OF STEEL TUBES

(2) DALMINE S.p.A., Via [illegible], Milano, Italy; Cable: [illegible]; Telex: [illegible]; Phone: [illegible]; Contact: Ing. Raffaele [illegible] (Capo Servizio [illegible]).

(3) Mixed; Major tube-making company; Capital: Lit [illegible] million; [illegible] billion; No. of employees: [illegible],000; Main nature of business: Manufacture of welded and seamless tubes.

(4) 1. Bottom-pouring of tube ingots
2. Manufacture of electric resistance-welded (ERW) and continuous butt-welded [illegible]
3. Cold drawing
4. Manufacture of seamless conical and tapering poles
5. Manufacture of gas cylinders
6. Bitumen coating and cathodic protection of tubes

(5) Design of equipment, training for administrators and personnel and other aspects [illegible]. The specific terms and conditions involved will depend on the particular application.

Reference No. **6/2** ITALY

(1) FABRICATION OF ALUMINIUM ALLOY TUBES

(2) MONTECATINI EDISON S.p.A., Foro Buonaparte [illegible], P.O. Box [illegible], Milano, Italy; Cable: Montedison; Telex: [illegible]; Phone: [illegible]; Contact: Dr. Robert [illegible] (Manager, [illegible] and Product Development - DIMM), Montecatini Edison S.p.A. Foro Buonaparte [illegible], Milano.

(3) Private; Capital: Lit [illegible] billion; Sales (1970): [illegible] billion; No. of employees: [illegible]; Main nature of business: Manufacture of chemicals, metals and ferroalloys.

(4) Fabrication of aluminium alloy tubes, pipes, etc. by seam-welding process. The weld is [illegible] subsequently to restore the original properties of the alloy.

(5) Irrigation tubes, pipelines for water, oil, etc.

(6) Licensing arrangements against payment of lump sum covering expenses connected with transfer of [illegible], plus annual royalty - to be negotiated with recipients. Training of technical personnel who will be in charge of plant operation. Technical assistance for technology transfer and starting [illegible] plant.

Reference No. **6/3** AUSTRIA

(1) PRODUCTION OF THIN-WALLED COPPER AND ALUMINIUM TUBES BY PILGER ROLLING AND DRAWING IN COILS

(2) Vereinigte Metallwerke RANSHOFEN-BERNDORF [illegible], Fabrikstrasse [illegible], A-[illegible] Amstetten, Austria; Cable: VMW Amstetten; Telex: [illegible]; Phone: [illegible]; Contact: Dr. Mario Panetti (Sales Manager), VM Ranshofen-Berndorf AG, A-[illegible] Braunau/Ranshofen, Austria.

(3) Governmental; Leading producer and manufacturer of aluminium and aluminium products and semi-finished copper and copper alloy products in Austria; Capital: [illegible] million; [illegible]: $ [illegible] million; No. of employees: [illegible]; Main nature of business: Production of tube, bar, and sections in copper, aluminium, and its alloys.

(4) Cold pilger rolling

Based on rolling of bloom between calibrated rolls, stretching material lengthwise along a fixed conical arbor.

Max. dia. of billet:	76 mm
Wall thickness:	[illegible] mm for copper
	[illegible] mm copper alloys
Finished sizes:	40 mm dia., 1.[illegible] mm wall
	6 mm dia., 1.[illegible] mm wall
Feed motion:	[illegible] - 1[illegible] mm (depending on alloy)
No. of strokes per min:	14[illegible]
Coolant/lubricant:	Emulsion 1:[illegible]

Drawing of tubes in coils

The tube discharged from the pilger mill is further reduced on the bull block using a [illegible]. Resulting product has accurate size and good inner surface quality.

Tube can be produced with finished diameters of [illegible] mm and [illegible] mm wall [illegible].

Knowhow available covers drawing sequences, die layout, heat treatment, [illegible].

6/4

(a) [illegible]

(b) [illegible]

(c) [illegible]

(d) [illegible]

(e) [illegible]

(f) [illegible]

(g) [illegible]

(h) [illegible]

(i) [illegible]

(j) [illegible]

6/5

(a) [illegible]

(b) [illegible]

(c) [illegible]

(d) [illegible]

(e) [illegible]

(f) [illegible]

(g) [illegible]

(h) [illegible]

(i) [illegible]

(j) [illegible]

6/6

(a) [illegible]

(b) [illegible]

(c) [illegible]

(d) [illegible]

(e) [illegible]

(f) [illegible]

(g) [illegible]

(h) [illegible]

(i) [illegible]

(j) [illegible]

6/7

[illegible]

[illegible] [illegible] [illegible] WWI, [illegible]; [illegible]

[illegible]

[illegible]

6/8

(1) [illegible] WITH [illegible]

(2) [illegible] AND METALWORKS, [illegible], P.O. [illegible], Budapest XXI, Hungary; Telex: [illegible]; Phone: [illegible]; Contact: International [illegible] Department.

(3) [illegible]; Major engineering complex; Main nature of business: [illegible] engineering products.

(4) [illegible] the conventional horizontal extrusion [illegible] to extrude tubes with both ends closed. This means that there is no oxidation of the inner surface of the tube, [illegible] directly for further drawing [illegible] cooling [illegible].

(5) [illegible]

6/9

(1) "[illegible] WELD" TUBING

(2) [illegible], Baltimore, Md. [illegible], United States of America; Phone: [illegible]; Contact: Mr. [illegible] (President)

(3) Private; Capital: $ [illegible],000; Sales: $ [illegible]; [illegible]; Main nature of business: [illegible]

(4) Complete technology for producing [illegible] welded tubing commonly known as "[illegible] Weld" tubing. [illegible] plant and start plant into operation.

(5) Will sell knowledge and help establish plant with expert assistance.

6/10

FRANCE

(1) TUBES PRODUCED BY CENTRIFUGAL CASTING

(2) CREUSOT-LOIRE, Branche Métallurgie, Département Assistance Technique, [illegible] rue de Londres, 75008 Paris, France; Cable: "FORGALOIRE - PARIS"; Telex: CLMIL [illegible]; Phone: [illegible].[illegible].[illegible]; Contact: Mr. [illegible] (Head, [illegible] Co-operation Department).

(3) Private; Major producers of alloy and special steels; Capital: [illegible]; [illegible] million ([illegible]); No. of employees: [illegible],000; No. of plants: [illegible]; Main nature of business: [illegible] and Mechanical Engineering.

(4) Complete knowhow for the planning and layout of the facilities required for the production of [illegible] centrifugal casting (melting, moulding, heat treatment, machining and finishing).

Complete knowhow and technical assistance for the production of large size [illegible] centrifugal [illegible] carbon and alloy constructional steels, stainless steels, NC[illegible] alloys, etc.

(3) Paper-making industry, rollers for rolling mills, hydraulic [illegible], various castings for the mechanical engineering industries, etc.

(4) - [illegible] engineering agreement for a specified period covering all engineering studies for the extension of an existing plant.

- [illegible] knowhow and technical assistance agreements for specified periods with supply of basic technical documents, training of personnel in Creusot-Loire's works, deputation of Creusot-Loire's technicians [illegible] of the installations and for initial production period.

Conditions:

- [illegible]
- Technology and knowhow normally supplied against cash payment (lump-sum) plus royalties.

Reference No.

6/11

JAPAN

(1) ELECTRIC RESISTANCE WELDED PIPES

(2) KAWASAKI STEEL CORPORATION, New Yurakucho Bldg., 11 Yuraku-cho 1-chome, Chiyoda-ku, Tokyo, Japan; Cable: [illegible]; Phone: Tokyo [illegible]; Telex: [illegible] "[illegible]"; Contact: Mr. [illegible] (General Manager)

(3) Private; Capital: $ [illegible]; Net sales: $ [illegible]; No. of employees: [illegible],000; Main nature of business: Iron and Steel Manufacturer.

(4) Technology covering the various stages involved from the receipt of hot-rolled coils to the final delivery of medium diameter electric resistance welded pipes is offered.

(5) We are ready to negotiate for detailed conditions as mentioned above depending upon specific interest of inquirers, taking into consideration type, scale and characteristics of their projects.

Reference No.

6/12

JAPAN

(1) MANUFACTURE OF TAPERED POLES

(2) NIPPON KOKAN K.K., [illegible], Minamiwatarida-cho, Kawasaki, Japan; Cable: STEELTUBE TOKYO; Telex: [illegible]; Phone: [illegible]; Contact: Mr. [illegible] Yamada (General Manager)

(3) Private; Capital: $ [illegible] million; Sales: $ [illegible],000 million; No. of employees: over [illegible],000; Main nature of business: Fabricating: Annual capacity - 1[illegible]0,000 metric tons. Steelmaking: Annual crude steel capacity - 1[illegible] million metric tons. Shipbuilding: Annual capacity new building - 1.[illegible] million metric tons.

(4) Tapered poles used as lighting poles have posed various difficulties in the manufacture because of the unique tapering shape. Nippon Kokan has developed its original knowhow for the processes from a special cutting method of material plates up to the products. This permits successful manufacture of satisfactory tapered poles at a high efficiency. All the manufacturing technologies and facilities for this purpose including the above-mentioned knowhow can be provided.

(5) Supplying knowhow (patent pending). Training of recipients.

Reference No.

6/13

JAPAN

(1) PRODUCTION TECHNOLOGY OF STRAIGHT SEAM WELDED PIPE BY ROLL BENDING

(2) SUMITOMO METAL INDUSTRIES LTD., [illegible] Kitahama 5-chome, Higashi-ku Osaka, Japan; Cable: SUMITOMOMETAL OSAKA; Telex: [illegible]; Phone: 06 - 220 - 5111

(3) Private; Capital: [illegible]; Sales: [illegible],005 (between 1 October 1[illegible] and [illegible] March 1[illegible]). No. of employees: [illegible] as of end of 1[illegible]; Main nature of business: Production and sales of carbon steel rolled products, alloy steel rolled products, forgings, castings, rolling stock parts and fabrications.

(4) 1. Production technology of high test line pipe (API Standard [illegible] X), covering roll forming of steel plate by edge bending press and pyramid roll bender, and submerged arc welding of both inner and outer faces of seam.
2. Inspection technology of spiral welded pipe at the production line.

(5) 1. Engineering service and construction of plant
2. Instruction of operation and quality control
3. Training at our plant in Japan.

6/14

(1) PRODUCTION TECHNOLOGY OF SPIRAL WELDED PIPE

(2) SUMITOMO METAL INDUSTRIES LTD., [illegible]
Cable: SUMITOMOMETAL OSAKA; Telex: [illegible]

(3) Private; Capital: [illegible]; Sales: [illegible]
[illegible]); No. of employees: [illegible]; Main
business: Production and sales of carbon steel [illegible]
forging, casting, rolling stock parts and fabrications.

(4) 1. Production technology of high test line pipe (API 5L grades X60, [illegible]
continuous spiral forming of hot rolled strip and submerged arc welding
of seam.
• Inspection technology of spiral welded pipe by [illegible]

(5) 1. Engineering service and construction of plant
2. Instruction of operation and quality control
3. Training at our plant in Japan.

6/15

(1) PRODUCTION TECHNOLOGY OF ELECTRIC WELDED STEEL PIPE

(2) SUMITOMO METAL INDUSTRIES LTD., [illegible]
Cable: SUMITOMOMETAL OSAKA; Telex: [illegible]

(3) Private; Capital: [illegible]; Sales: [illegible]
[illegible]); No. of employees: [illegible]; Main
business: Production and sales of carbon steel rolled products, alloy steel
products, forging, casting, rolling stock parts and fabrications.

(4) 1. High-efficiency production process for electric welded steel pipe
2. Production technology of high-grade steel tube, such as mechanical [illegible]

(5) 1. Engineering service and construction of plant
2. Instruction of operation and quality control
3. Training at our plants in Japan.

Reference No.

7/1

Reference No.

7/2

Reference No.

7/3

Reference No.

7/4

UNITED KINGDOM

(1) MANUFACTURE BY POWDER METALLURGY OF HARDMETAL CARBIDE TIPS AND TOOLS

(2) MAXICARB METALS LTD., [illegible] Road, [illegible]
Telex: [illegible]; Phone: [illegible]; [illegible]
Director).

(3) Private; Capital: £ [illegible]; Sales: £ [illegible]; [illegible]
business: Manufacture of hardmetal tips and tools of all sizes.

(4) Complete manufacturing process, including:

Formulae
Mixing
Pressing
Pre-sintering
Shaping
High-vacuum sintering
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

Also advice on plant and space requirements.

(6) Expert assistance and personnel training at every stage [illegible]. [illegible]
payment and restricted period of royalties (to be agreed). [illegible]
required. Recipients to pay all reasonable expenses (travel, [illegible], etc.)

Reference No.

7/5

UNITED STATES
OF AMERICA

(1) POWDER METALLURGY TECHNOLOGY

(2) NEW INDUSTRIAL TECHNIQUES INC., [illegible] West [illegible] Road, [illegible],
Florida [illegible], United States of America; Phone: [illegible]; Contact: Mr. [illegible]
Andreotti (President)

(3) Private; Sales: $[illegible] million; No. of employees: [illegible]; [illegible]:
Compacting presses, custom powder metallurgy parts, and tooling.

(4) Complete knowhow on the manufacture of powder metallurgy (PM) parts:

Economic analysis: Conventional vs PM part cost
Cost of starting up PM operation

Design of parts: Design for most economical production
Materials selection
Prototype parts

Equipment recommendation, selection, and procurement ([illegible])

Tooling: Tool design, manufacture, and testing

Production: Location of equipment
Materials flow

(5) New Industrial Techniques Inc. propose the following:

Equipment: Compacting presses at cost through affiliate, remainder at cost plus [illegible]

Tooling: Design at 10% and procure/manufacture at cost plus 10%

Training: All key personnel to be trained at NIT plant, plus expert assistance at recipient's
plant for annual consulting fee of $US [illegible],000 for one year, $US [illegible],000 for each of the
next two years, plus travelling [illegible] (renewable [illegible]
agreement).

Reference No.

7/6

HUNGARY

(1) PRODUCTION OF IMPROVED GRADES OF MIXED FERRITES FOR USE IN POWDER METALLURGY

(2) RESEARCH INSTITUTE FOR FERROUS METALLURGY, Fehérvári út [illegible], Budapest [illegible], Hungary.
Phone: [illegible].

(3) Governmental; No. of employees: [illegible]; Main nature of business: Research and
development in ferrous metallurgy.

(3) Ferrite plants are at present using [illegible], MnO [illegible] containing substantial amounts of [illegible] which adversely affect the magnetic properties of ferrites.

[illegible] offered [illegible] powder, electrolytic Mn [illegible] free from contaminants. [illegible] the fact that the components are not [illegible] at the same time in mixed (Mn-Zn, Ni-Zn) ferrites and so the mixing ratio can be varied. The process [illegible] FeMn, FeNi) by [illegible] oxidation.

[illegible], the [illegible] raw material produced by this process.

A [illegible] difference [illegible] compared with conventional raw materials of about $US 70-100 per ton can result from the use of this process.

(4) Powder metallurgy production of magnetic components for [illegible], electronics, etc. industries.

(5) [illegible].

Reference No. 7/7

HUNGARY

(1) [illegible] FOR SUB-MINIATURE POWDER METALLURGY

(2) [illegible], [illegible] Technological Institute), [illegible] 11, Budapest XIV, Hungary; Telex: [illegible]; Cable: [illegible].

(3) Governmental; State industrial research institute, [illegible]; [illegible] and [illegible] research and development.

(4) The manufacture of very small [illegible] for powder metallurgy component production produces special problems. [illegible] has done considerable development work in this field. [illegible] covers the selection of the elements, technological sequence of joining, etc., on the basis of which [illegible] can be made for sub-miniature components without the use of special equipment.

(5) [illegible], electronics, telecommunications, etc.

(6) [illegible] and [illegible] plant supplied against [illegible] payment.

Reference No. 7/8

UNITED STATES OF AMERICA

(1) [illegible] CARBIDE PRODUCTS

(2) [illegible], Kenilworth, New Jersey [illegible], United States of America; Phone: [illegible]; Telex: [illegible]; Cable: [illegible], Kenilworth(N.J.); Contact: Mr. [illegible] (President)

(3) Private; [illegible]; Main nature of business: [illegible] carbide products.

(4) The [illegible] offered [illegible] assistance in the following areas:

1. [illegible] of required equipment and recommending domestic and foreign sources.
2. Training of licensee personnel at Kenilworth, N.J. and/or [illegible], Weert, The Netherlands.
3. Metallurgical consulting services.
4. Exchange of new developments in carbide grades, methods of manufacture, equipment, carbide use etc.

(5) Tungsten and titanium carbide products are used for cutting tools, mining tools and wearing parts. Also other specialized applications where high strength and resistance to wear are required.

(6) The knowhow is available in various forms of licensing agreements.

Reference No. 7/9

UNITED STATES OF AMERICA

(1) HIGH PURITY POWDER PRODUCTION

(2) METALLURGY INC., P.O. Box [illegible], [illegible], United States of America, Phone: [illegible]; Contact: [illegible] (President)

(3) Private; Capital: $ [illegible]; [illegible]: $ [illegible]; [illegible]; Main activity: [illegible].

(4) Will design, build and operate high purity powder producing units for the production of powder from molten [illegible]. [illegible] melted metal or unit can have [illegible]. Powder formed [illegible] in a high purity gas. Particularly useful for [illegible] temperature alloys.

(5) Will sell equipment and [illegible] equipment. Will [illegible] and provide expert assistance in starting and operating equipment.

GROUP 8 – SHEET METAL FORMING

Reference No.

8/1

FRANCE

(1) MANUFACTURE OF PRESSED PRODUCTS AND WELDED TUBES IN LIGHT ALLOYS

(2) CEGEDUR-PECHINEY, [illegible] avenue Marceau, Paris [illegible], France; Cable: [illegible]; Telex: [illegible]; Phone: [illegible]; Contact: A. Crevet (Mr), Technical Assistance Department.

(3) Private; Major French non-ferrous metals producer; [illegible]; Sales: [illegible] million; No. of employees: [illegible]; Main nature of business: Primary transformation of aluminium: rolling, drawing and extrusion of all wrought aluminium alloys.

(4) The technology available concerns:

- Manufacture from cold-rolled strip of pressed sheets (e.g. corrugated sheets, trapezoids).
- Manufacture from strip of pressed sections.
- Manufacture from strip of welded tubes.

The knowhow covers principally the following:

- Definition of suitable strip qualities (alloys, metallurgical treatment, etc.).
- Design of press tools.
- Manufacturing techniques.
- Operation of plant.
- Quality control.

The experience of Cegedur-Pechiney is derived not only from its major French plants, but also from smaller operations in foreign subsidiaries, and means that the company is equipped to provide the best solution for each local situation.

(5) Pressed sheets are used principally in the constructional industry, for roofs, ceilings, etc.

Welded tubes are used for metal furniture (smaller diameters) and in irrigation (larger diameters).

(6) Cegedur-Pechiney can offer the following assistance and knowhow, in part or complete:

- Basic technological documentation.
- Assistance in setting up realistic manufacturing programmes.
- Selection of basic equipment.
- Specification of equipment and issuing invitations to tender.
- Preliminary evaluation of tenders.
- Assistance in selection of suppliers.
- Planning and layout of plants.
- Advice on ancillary equipment.
- Supervision of installation of equipment.
- In-plant training.
- Commissioning.
- Operational planning.
- Advice on expansion of existing plant.
- Knowhow on new products.

Reference No.

8/2

HUNGARY

(1) EQUIPMENT FOR DETERMINING DEEP-DRAWING QUALITIES OF SHEET METAL

(2) [illegible] INSTITUTE FOR FERROUS METALLURGY, Fehérvári út. [illegible], Budapest 11, Hungary; Phone: [illegible]50-0[illegible]0; Contact: Dr. John Toth (Vice-Director).

(3) Governmental; No. of employees: [illegible]00; Main nature of business: Research and development in ferrous metallurgy.

(4) A technique and apparatus have been evolved for evaluating the deep-drawing and stretch-forming properties of sheet metal. This is based on measurement of the formability parameters: plastic anisotropy (r) and strain-hardening (n).

The apparatus determines r and n values simultaneously and accurately from tensile tests.

(5) Sheet metal industries (pressing, stamping, etc.), such as automobiles, domestic apparatus, etc., and basic steel producing industry (for determination of optimum parameters).

(6) Knowhow and equipment available, subject to negotiation. The equipment can also be studied in Hungary.

Reference No.

8/3

UNDISCLOSED

(a) [illegible]

(b) [illegible]

(c) [illegible]:

1. [illegible]:
   - [illegible]:
   - [illegible]:
2. [illegible]:

(d) [illegible]:

i. [illegible]
ii. [illegible]
iii. [illegible]

Reference No.

8/4

PROPOSAL NOT YET OFFERED

(a) COLD ROLL FORMING OF STEEL SHEET

(b) [illegible]

(c) [illegible]

(d) [illegible]:

(e) [illegible]

(f) [illegible]:

1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]
6. [illegible]

Reference No.

8/5

UNITED KINGDOM

(a) SUPERPLASTIC NICKEL ALLOYS - CASTING PROCESS, EQUIPMENT

(b) ISC ALLOYS LTD., [illegible]

(c) [illegible]

(3) SMC [illegible] a metal with the [illegible] of forming [illegible] plastic. [illegible] aluminium. When heated to [illegible] SMC [illegible], [illegible] simple, low-cost [illegible].

[illegible] covers, [illegible].

The [illegible] SMC [illegible] finish, strength, [illegible].

[illegible] instruments; lighting; [illegible].

(4) Knowhow [illegible] components from SMC sheet [illegible]. The knowhow will include:

- a. [illegible] of SMC technical information [illegible] of the material, data for [illegible] of moulds, forming [illegible], post forming fabrication techniques, manufacturing costs and marketing data.
- b. An engineering specification for the necessary forming machinery.
- c. A machine operating manual.
- d. Up to five [illegible] technical, and marketing specialists.*
- e. Demonstration [illegible] of the forming [illegible] aspect of the knowhow.

For these services and the exclusive use of our patents and knowhow, we charge £[illegible],000 initial fee and a royalty of [illegible] value [illegible] product.

The [illegible] to licence shortly is either - an existing plastics vacuum former who [illegible] to extend the range of material in which he can offer his products or - an [illegible] in the quantity [illegible],000 per year, or a manufacturer who [illegible] in this quantity range.

Availability of SMC sheet: We [illegible] SMC sheet [illegible] imported from the [illegible]. Knowhow [illegible] for the local [illegible] of SMC sheet will also be available from [illegible] Alloys Ltd. [illegible].

Reference No.

8/6

SPAIN

(1) DRAWINGS AND CONTAINERS FABRICATION TECHNOLOGY, [illegible] INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

[illegible] S.A., The Metal Working Division, [illegible] Metal Working Division.

(2) [illegible] Metal Working.

(3) [illegible]:

- [illegible] economies [illegible].
- An improvement of [illegible], [illegible] of maintenance, repairs and so on).
- Maintenance economies.

(4) [illegible] of the manufacturing [illegible] (total or partial).

Reference No.

8/7

JAPAN

(1) COLD FORMING

(2) NIPPON KOKAN K.K., [illegible] Minamiwatarida-cho, Kawasaki, Japan; Cable: [illegible] TOKYO; Telex: [illegible]; Phone: [illegible]; Contact: Mr. [illegible] (General Manager).

(3) Private; Capital: $[illegible]; Sales: $[illegible]; [illegible] 40,000; Main nature of business: Fabrication: Annual capacity - [illegible] metric tons; Steelmaking: Annual crude steel capacity - 1[illegible] million metric tons; Shipbuilding: Annual capacity new building - [illegible] million metric tons.

(4) Manufacture of light steel sections for building and structural [illegible], but in order to produce satisfactory products at a high efficiency, it is particularly necessary to design an excellent roll caliber, and facilities [illegible] very accurately.

We can supply knowhow of roll calibre for the [illegible], recommend optimum facilities and conduct operational guidance for this purpose.

(5) Supplying knowhow (patent policy): [illegible] expected; Expert assistance provided.

GROUP 9 – MISCELLANEOUS METHODS OF FORMING

9/1

(1) EXPLOSIVE FORMING

(2) DENVER RESEARCH INSTITUTE, University of Denver, Denver, [illegible] of America; Phone: ([illegible]) [illegible]; Contact: Dr. [illegible] Dept. of Mechanical Sciences and Environmental [illegible].

(3) Private; University-based non-profit research institute; $[illegible] research and development contracts; Main nature of business: [illegible].

(4) Explosive forming uses the energy of high explosives in a controlled manner to form metal parts. [illegible] female die is needed, the explosive shock wave acting as a [illegible]. [illegible] very low, since only a pool of water of sufficient [illegible], a [illegible] working area, and the usual hand tools are necessary. [illegible] make it possible to locate the facilities within 100 [illegible] of other occupied buildings [illegible].

(5) Explosive forming of domes for storage or pressure [illegible].

(6) The Denver Research Institute will design the facility, train the personnel to operate it, and [illegible] conducting a market survey, preparing an economic analysis, and a [illegible] plan.

Institute personnel will provide expert assistance in putting the facility into production and will be available for subsequent consultation and guidance.

These services are offered by the Institute at cost plus a [illegible] two years after the facility goes into production. The royalty may be paid in [illegible] currency. All [illegible] incurred must, however, be paid in US dollars.

9/2

(1) SUPERPLASTICITY IN MASS-PRODUCTION METAL FORMING

(2) FULMER RESEARCH INSTITUTE LTD., Stoke Poges, Slough, Bucks SL2 [illegible], United Kingdom; Cable: Research Slough; Telex: [illegible] Fulmer; Phone: Fulmer [illegible]; Contact: J.A. [illegible] (Information and Development Manager).

(3) Private; Independent research institute specializing in materials technology; No. of employees: 130; Main nature of business: Research and development.

(4) Certain metals and alloys, when heated to temperatures [illegible] "superplasticity". [illegible] in a single operation, such as vacuum forming. [illegible] search for cheaper and better ways of making components, namely, "metals that can be formed like plastics".

Engineering components made by superplastic forming [illegible], but the potential of superplasticity is not yet fully [illegible]. Fulmer, with [illegible] the factors relating mechanical properties and structure, [illegible], with a market research firm, a group-sponsored [illegible] industry by superplastic metals.

(6) Fulmer is prepared to grant licences and train [illegible] personnel. [illegible] provided on a contract basis.

9/3

(1) MANUFACTURE OF SEAMLESS STEEL CYLINDERS

(2) CSEPEL IRON AND METALWORKS, [illegible], P.O. Box [illegible], Budapest XXI, Hungary; Telex: 22-5663; Phone: [illegible]-703; Contact: International Commercial Relations Department.

(3) Governmental; Major engineering complex; Main nature of business: [illegible] and engineering products.

(4) The process covered in the knowhow available begins with a [illegible] steel billet. A [illegible] formed in the end of the billet, and a thin-walled cylinder is then drawn on a horizontal drawbench.

The throat is formed by heating the open end and then drawing it together [illegible]. The [illegible] shape of the throat is formed with a mandrel and press.

(5) Medium and large-pressure cylinders ([illegible]-50 litres capacity).

(6) A lump-sum payment plus an agreed royalty per cylinder manufactured. [illegible] personnel is possible, under a separate agreement.

Reference No.

9/4

HUNGARY

(1) ELECTROMAGNETIC FORMING OF THIN PLATES AND TOOLING FOR [illegible] FORMING

(2) GEPTECHNIKA (Machine Industry Technological Institute), [illegible], Budapest XIV, Hungary; Telex: Chemima [illegible]; Phone: [illegible].

(3) Governmental; State industrial research institute, working on contract basis; Budget: [illegible]; No. of employees: [illegible]; Main nature of business: [illegible] and machinery research and development.

(4) Electromagnetic forming is used for reducing or expanding hollow starting materials in order to form a surface pattern or to make joints with other components.

Knowhow is available on the formation of thin plates, forming of pipe ends, joining of flexible pipe ends, etc. in aluminium and copper: the knowhow covers process and equipment.

(6) Process knowhow and/or plant supplied against lump-sum payment.

Reference No.

9/5

HUNGARY

(1) EXPLOSIVE FORMING-PROCESS, EQUIPMENT, PLANTS

(2) GEPTECHNIKA (Machine Industry Technological Institute), [illegible], Budapest XIV, Hungary; Telex: Chemima [illegible]; Phone: [illegible].

(3) Governmental; State industrial research institute, working on contract basis; Budget: [illegible]; No. of employees: [illegible]; Main nature of business: [illegible] and machinery research and development.

(4) In explosive forming, the energy resulting from the controlled detonation of an explosive material is used to deform plate materials in prepared formers. It can be used with corrosion-resistant materials that are difficult to form conventionally. It has advantages over conventional press forming in that expensive presses are not needed, but merely a die in normal deep-drawing tool material. High-strength materials can be subjected to cold forming, [illegible] much subsequent heat treatment, and a greater degree of deformation can be achieved in a single operation.

(5) Pressure vessel manufacture.

(6) Process knowhow and/or plant supplied against lump-sum payment.

Reference No.

9/6

UNITED KINGDOM

(1) COLD SWAGING

(2) ROYAL SMALL ARMS FACTORY, Enfield Lock, Enfield, Middlesex EN3 6JL, United Kingdom; Telex: [illegible]; Phone: Waltham Cross [illegible]; Contact: The Director (attn. K.D. Finney, Chief Metallurgist).

(3) Governmental; Main nature of business: Manufacture of ordnance.

(4) Knowhow on rotary cold swaging of rifled and plain bore tubes in steel.

(5) Engineering components, ordnance, etc.

(6) Knowhow fee.

Reference No.

9/7

JAPAN

(1) CORRUGATED PIPE AND LINER-PLATE

(2) KAWASAKI STEEL CORPORATION, New Yurakucho Bldg., 11, Yuraku-cho 1-chome, Chiyoda-ku, Tokyo, Japan; Cable: Riversteelcorp Tokyo; Telex: [illegible] "RIVERSTCORP TOK"; Phone: Tokyo [illegible]-4511; Contact: Mr. Minoru Ikeda (General Manager).

(3) Private; Capital: $[illegible]; Net sales: $[illegible],000; No. of employees: 38,000; Main nature of business: Iron and steel manufacturer.

(4) Technology relating to all aspects of the forming of corrugated pipe and liner plates are offered.

(6) We are ready to negotiate for detailed conditions as mentioned above depending upon specific interest of inquirers, taking into consideration type, scale and characteristics of their proposals.

9/8

(1) PREFABRICATED PLANTS

(2) KAWASAKI STEEL CORPORATION, New Yurakucho Bldg., 11, Yurakucho 1-chome, Chiyoda-ku, Tokyo, Japan; Cable: Riverstcorp Tokyo; Telex: [illegible]; Phone: Tokyo [illegible]; Contact: Mr. Minoru Ikeda, General Manager.

(3) Private; Capital: $ [illegible]; Sales: $ [illegible]; No. of employees: 46,000; Main nature of business: Iron and steel manufacturers.

(4) Technology relating to the various fabrication techniques which are used in steel [illegible] steel frames are offered.

(5) We are ready to negotiate for detailed conditions as mentioned above depending upon the [illegible] inquirers, taking into consideration type, scale and characteristics of their project.

9/9

(1) STEEL SHEETS AND PLASTIC FASTENING SYSTEM FOR READY-MIX CONCRETE

(2) KAWASAKI STEEL CORPORATION, New Yurakucho Bldg., 11, Yurakucho 1-chome, Chiyoda-ku, Tokyo, Japan; Cable: Riverstcorp Tokyo; Telex: [illegible] "Kawasteel Tok"; Phone: Tokyo [illegible]; Contact: Mr. Minoru Ikeda (General Manager).

(3) Private; Capital: $ [illegible]; Sales: $ [illegible]; No. of employees: 46,000; Main nature of business: Iron and steel manufacturers.

(4) Kawasaki Steel has developed a new [illegible] for ready-mix concrete. Knowhow relating to this new process is offered.

(5) We are ready to negotiate for detailed conditions as mentioned above depending upon the [illegible] inquirers, taking into consideration type, scale and characteristics of their project.

9/10

(1) PRODUCTION TECHNOLOGY OF GAS CYLINDER FROM SEAMLESS STEEL [illegible]

(2) SUMITOMO METAL INDUSTRIES, LTD., 15 Kitahama 5-chome, Higashi-ku, Osaka, Japan; Cable: SUMITOMOMETAL OSAKA; Telex: [illegible]; Phone: [illegible].

(3) Private; Capital: [illegible]; Sales: [illegible] and 1 March 1976); No. of employees: [illegible]; Main nature of business: Production and sales of various steel pipes and tubes, [illegible] products, forging, casting, rolling stock parts and [illegible].

(4)
1. Bottom forming equipment and [illegible] from both ends of cylinder.
2. Top forming equipment and [illegible] and finishing.
3. Hydraulic stretch testing equipment, including [illegible] system.
4. Automatic die stamping device.
5. Automatic paint coating equipment.

(5)
1. Engineering service at the construction of equipment [illegible].
2. Technical assistance of operation and quality control.
3. Training at our plant in Japan.

Reference No.

10/1

FRANCE

(1) VARNISH AND PAINT COATINGS FOR LIGHT-ALLOY PLATES AND SHEETS

(2) CHEMO-PEINTURES, 17 avenue Marceau, Paris 8e, France; Telex: [illegible]
Telex: [illegible]; Phone: [illegible]; Contact: A. Chevet Gérant, Technical Assistance Department

(3) Private; Major French non-ferrous metals producer; Capital: F [illegible];
Sales: F [illegible]; No. employed: [illegible]; Main nature of business: Primary transformation of aluminium: rolling, drawing and extrusion of all wrought aluminium alloys.

(4) The technology available relates to:

- Manufacture of varnished sheets or strip
- Manufacture of painted sheets or strip

The know-how covers all or part of the following:

- Selection of suitable grades of sheets and strip (alloy, metallurgical treatment, surface quality, etc.)
- Manufacturing techniques: degreasing, coating and curing
- Exploitation of materials
- Quality control
- Study and control of paint and varnish coatings in the context of their applications.

The experience of Coredur-Peinture is derived not only from its own French plants, but also from smaller operations in foreign subsidiaries, and means that the Group is equipped to provide the best solution for each local situation.

(5) Varnished products have applications in the food processing industries, in the manufacture of aerosols, bottle-caps, etc.

The painted products can be used in building fronts, roofings, panels, etc., in the construction of caravans, for refrigerators, and for electric equipment.

(6) Coredur-Peinture can, after the following assistance and know-how, in part or complete:

- Basic technological documentation
- Assistance in setting up realistic manufacturing programmes
- Selection of basic equipment
- Specification of equipment and erection supervision to order
- Preliminary evaluation of tenders
- Assistance in selection of supplier
- Planning and layout of plants
- Advice on ancillary equipment
- Supervision of installation of equipment
- Start-up training
- Commissioning
- Operational planning
- Advice on expansion of existing plant
- Research on new products

Reference No.

10/2

FRANCE

(1) ANODIZING OF LIGHT ALLOYS

(2) CHEMO-PEINTURES, 17 avenue Marceau, Paris 8e, France; Telex: [illegible] Paris
Telex: [illegible]; Phone: [illegible]; Contact: A. Chevet Gérant, Technical Assistance Department

(3) Private; Major French non-ferrous metals producer; Capital: F [illegible] million;
Sales: F 1,000 million; No. employed: [illegible]; Main nature of business: Primary transformation of aluminium: rolling, drawing and extrusion of all wrought aluminium alloys.

(4) The technology available relates to:

- Traditional anodizing (coloured or plain) of light-alloy products, principally of extruded sections and sheets
- Colouring of anodized films by electrolytic means
- Self-colouring anodizing of the above products

The know-how covers principally:

- Properties needed in products for anodizing
- Anodizing technology
- Exploitation of materials
- Quality control

The experience of Coredur-Peinture is derived not only from its own French plants, but also from smaller operations in foreign subsidiaries, and means that the Group is equipped to provide the best solution for each local situation.

(c) Anodizing [illegible] windows, domestic electrical [illegible], etc.

(d) Consultancy services on offer [illegible]

- Basic technological recommendations
- Assistance in drafting of technical specifications
- Selection of basic equipment
- Specifications of equipment and [illegible]
- Preliminary evaluation of tenders
- Assistance in selection of suppliers
- Planning and layout of plants
- Advice on ancillary equipment
- Supervision of installation of equipment
- In-plant training
- Commissioning
- Operational planning
- Advice on expansion of existing plant
- Know-how on new products

Reference No.

10/3

FINLAND

(a) CORROSION PREVENTION

(b) KEMIMET Oy, P.O. Box [illegible], [illegible], Finland; Telex: [illegible]; Phone: [illegible]

(c) Private; A small group of experts in corrosion [illegible] treatment, and metallurgy; Main nature of business: Consulting engineers.

(d) General and organizational consulting services in problems connected with corrosion in [illegible] industries

Consulting on specific corrosion problems

Supervision of corrosion prevention jobs

Laboratory and on-site corrosion research

Planning of corrosion research laboratories, including training of personnel and planning and initiation of research programmes.

(e) Expert assistance available

Training of recipient's personnel

Financial arrangements to be agreed in individual cases.

Reference No.

10/4

UNITED KINGDOM

(a) HIGH-SPEED ELECTRO-DEPOSITION

(b) FULMER RESEARCH INSTITUTE LTD., Stoke Poges, Slough, [illegible]; Cable: Research Slough; Telex: [illegible]; Phone: [illegible]; Mr. J.A. Bailey (Information and Development Manager).

(c) Private; Independent research institute specializing in materials technology; No. of employees: 140; Main nature of business: Research and development.

(d) The development of methods for achieving high-rate electrodeposition, especially of copper and nickel, at current densities up to 2,000 amp/sq ft has been achieved.

Copper and nickel can be electro-deposited at rates of 0.001 - 0.002 in/min from simple solutions without significant deterioration in mechanical properties. The techniques involved do not require [illegible] filtration and purification of the bath and brightening or levelling agents are not necessary. The [illegible] of high-rate deposition can probably be applied to metals other than copper or nickel.

Schemes both for continuous forming of strip or sheet and for batch-wise forming of [illegible] are outlined.

(e) Fulmer is prepared to grant licences and train recipient's personnel. Consultancy expert assistance could be provided on a contract basis.

Reference No. **10/5** UNITED KINGDOM

(1) METAL [illegible] NON-METAL [illegible]

(2) [illegible] RESEARCH INSTITUTE [illegible] [illegible]; Cable: Research [illegible]; Telex: [illegible]; Phone: [illegible]; Contact: Mr. [illegible].A. [illegible] (Information and Development Manager)

(3) Private; Independent research institute [illegible] materials [illegible]; No. of employees: [illegible]; Main nature of business: Research and Development.

(4) A process has been developed [illegible] metallic [illegible] materials such as paper, [illegible], [illegible], wood, [illegible] boards, plastics, etc.

[illegible] standard [illegible] or [illegible] frequencies.

Concrete can be [illegible] power [illegible], etc.

Paper [illegible] can be [illegible].

Plastics can be [illegible] static charges.

The process can replace mechanical fixing of metals [illegible] non-metals; thus electrical circuitry is easily fixed [illegible].

(5) Palmer is prepared to grant licences and train [illegible]. [illegible] expert assistance can be provided on a contract basis.

Reference No. **10/6** UNITED KINGDOM

(1) POLISHES FOR PRODUCING [illegible] CORROSION-RESISTANT FINISHES ON METALS

(2) PALMER RESEARCH INSTITUTE LTD., [illegible], United Kingdom; Cable: Research [illegible]; Telex: [illegible] Palmer; Phone: [illegible]; Contact: Mr. [illegible].A. [illegible] (Information and Development Manager)

(3) Private; Independent research institute [illegible]; No. of employees: 120; Main nature of business: Research and Development.

(4) Metal polishes that [illegible].

[illegible] investigations have shown that [illegible] an effective [illegible] barrier layer.

(5) Palmer is prepared to grant licences and train [illegible]. [illegible] assistance can be provided [illegible] basis.

Reference No. **10/7** ITALY

(1) AIR KNIFE SYSTEM FOR CONTINUOUS GALVANIZING

(2) ITALSIDER S.p.A., via [illegible], [illegible] Genova, Italy; Cable: Italsider Genova; Telex: [illegible] Italsid; Phone: [illegible] Genova; Contact: [illegible] ATI.

(3) Mixed; Major Italian iron and steel producer; Capital: Lit [illegible],000 million; No. of employees: 44,0[illegible]; Main nature of business: Production of iron and steel.

(4) The air knife system is an alternative to the conventional galvanizing plant, which uses two powered coating rolls immersed in the bath of molten zinc, to adjust the thickness of the coating applied to the strip.

The air knife system is based on the potential energy of a low-pressure liquid, which is converted to kinetic energy when the fluid is forced through a narrow slot.

Adjustment of the coating as the strip emerges from the zinc bath is determined by the following parameters:

1. Fluid pressure
2. Positioning of the air knife - distance above bath, distance from strip, angle of inclination to strip.
3. Knife geometry (i.e. gap profile)
4. Knife thickness

This system offers excellent economic advantages over the conventional roll system, because of its low manufacturing cost, its [illegible] maintenance cost, its ease of operation, [illegible] in coating weight adjustment, and the fact that there is no mechanical contact with the strip.

(5) Integrated assistance programmes, implemented by Italsider staff in recipient's works and training of recipient's personnel in Italsider works.

The various possible conditions for transferring the knowhow will be [illegible] from potential recipients.

(4) Knowhow [illegible] and [illegible], and [illegible] procedures [illegible] sheet and strip [illegible] the following [illegible]:

- [illegible]
- [illegible]
- [illegible] rolling into [illegible].
- [illegible], finishing, [illegible] treatment.

[illegible] uniform thickness.

(5) [illegible] arrangements [illegible] payment of [illegible] connected with transfer of technology [illegible] with recipients. Training of [illegible] personnel who will [illegible] [illegible] and start-up of plant.

Reference No.

5/6

UNITED KINGDOM

(1) [illegible] OF HIGH-ALLOY STEEL BARS

(2) [illegible] and CO. LTD., Clyde Steel Works, [illegible] Box No. 1, Sheffield [illegible], [illegible]; Cable: Osborn Sheffield; Telex: [illegible]; Phone: (074) [illegible]; Contact: Mr. [illegible] (Group Project Manager).

(3) Private; An international group of companies [illegible]; Capital: £1 million; [illegible]: £[illegible] million; No. of employees: [illegible],000; Main nature of business: Manufacture of [illegible] quality [illegible], [illegible] steel [illegible], [illegible], cutting tools, etc.

(4) A [illegible] package covering [illegible], equipment and operating technology and knowhow for the manufacture of high-alloy multiple quality steel [illegible] from ingot and billet, including building construction and [illegible] requirements, based on a nominal output capacity of [illegible],000 tons per annum of current [illegible] value of an average of £[illegible] per ton, [illegible] £[illegible] million and capital expenditure in the order of £10 million.

Finished [illegible] in the range of [illegible] ins. to [illegible] ins. section in rounds, hexagons, octagons, ovals, squares, flats [illegible] width all of [illegible] ft to [illegible] ft length.

Manufacturing techniques including billet cutting and grinding, billet heating furnacing including electrical [illegible] heating, bar rolling, bar heat treatment furnacing, bar finishing procedures including straightening, [illegible], turning, surface treatment, crack detection, and all related materials handling and weighing equipments.

[illegible] knowhow is offered covering project management requirements and procedures from a green field start to a fully operational unit including drawings, layouts, programmes, planning, cost, and progress control techniques. Technical and operational guidance and information is available in respect of product and [illegible], product manufacturing routes, quality standards and control production planning and control, [illegible] manpower requirements and management organisation and staffing.

[illegible] to start with. Ultimately, however, to ensure [illegible] of quality and workability particularly in production of high-speed and alloy tool and valve steels, it is necessary to install melting facilities to produce billets as an integral part of the process. Such melting facilities require additional capital expenditure to that previously indicated.

(5) [illegible]

Step 1. Preliminary exchange between Osborn and recipient to establish mutual interest.

2\. Preliminary survey visit to establish specific parameters of requirements.

3\. Preparation and submission of written survey report and proposals.

4\. Negotiation and finalisation of proposals, financial, commercial and contractual terms.

5\. Invitation for recipient to visit Osborn to see and discuss the pertinent techniques and procedures.

6\. Osborn to supply reports, documentation, manual instructions, photographs.

7\. Osborn to provide and/or arrange for expert assistance.

8\. Osborn to train recipient personnel in such techniques, procedures and practices.

9\. Osborn to service project operation on contractual basis.

Commercial policy

Step 1 will involve no expense to the recipient.

Steps [illegible] individual [illegible] in accordance with requirements.

Steps [illegible] individual [illegible] in accordance with [illegible] royalty under joint-venture arrangements.

Reference No.

5/7

SWEDEN

(1) HOT ROLLING OF STEEL

(2) UDDEHOLMS AB, [illegible] Hagfors, Sweden; Contact: Mr. [illegible] (Director-Licensing, Steel Division), Uddeholms AB, [illegible] Hagfors, Sweden; Phone: (0563) [illegible].

(3) Private; Share capital: Skr [illegible]; [illegible]: Skr [illegible]; No. of employees: 1[illegible],000; Main nature of business: Manufacture of high-speed, carbon, alloy and stainless steels.

(3) [illegible] ANACAL* [illegible] certain [illegible].

[illegible]

- Surface cleaning and pretreat[illegible]
- Washing and drying

[illegible] ANACAL* [illegible].

*Registered Trade Mark

(5) [illegible].

(6) Licensing arrangements against payment [illegible] with transfer of technology [illegible] royalty [illegible] to be negotiated with recipients. Training of technical personnel who will be in charge of plant operation. Technical assistance for technology transfer and start-up of plant.

Reference No.

10/11

ITALY

(1) CONVENTIONAL AND [illegible] ANODIZING [illegible]

(2) [illegible] S.p.A., [illegible], Milano, Italy; Cable: [illegible]; Telex: [illegible]; Phone: [illegible]; Contact: Dr. [illegible] (Manager, Process and Product Development - [illegible]), [illegible] S.p.A. [illegible], Milan.

(3) Private; Capital: [illegible]; Number of employees: [illegible]; Main nature of business: Manufacture of [illegible] and ferroalloys.

(4) Conventional and hard-grade anodizing of aluminium and its alloys, comprising the following operations:

- Surface cleaning and pretreating
- Anodizing
- Washing and drying

(5) Civil and industrial building components and decorative items.

(6) Licensing arrangements against payment of [illegible] expenses connected with transfer of technology plus annual royalty - to be negotiated with recipients. Training of technical personnel who will be in charge of plant operation. Technical assistance for technology transfer and start-up of plant.

Reference No.

10/12

UNITED STATES OF AMERICA

(1) [illegible]

(2) FERRO[illegible] METALS INC., [illegible] Consulting Division, [illegible], [illegible], United States of America; [illegible]; Telex: [illegible]; Phone: [illegible]; Contact: Mr. [illegible] (Executive Vice-President).

(3) Private; No. of employees: [illegible]; Main nature of business: [illegible] manufacturers.

(4) Complete range of knowhow, technology, and other services in the field of [illegible] (anodizing, painting, laminating, etc.)

a. appraisal of anticipated manufacturing programme and [illegible] market
b. appraisal of domestic raw materials and [illegible], and product requirements, raw materials, etc.
c. appraisal of site considerations
d. development of equipment specification and production flow
e. advice on selection of contractors
f. development of equipment design detail
g. supervision of construction, equipment, and commissioning
h. training of all grades of personnel
i. provision of sample material and development of tooling
j. assist domestic manufacturers in development of systems
k. establishment of development and control laboratories, equipment, and [illegible]
l. testing of domestic raw materials in client's and FFM laboratories and on FFM production lines
m. supply of US raw materials as reference standards
n. development of markets
o. training on client's equipment after start-up

(5) Construction, domestic appliances, packaging, automobiles, etc.

(6) Knowhow transmitted under sale of knowhow contracts. [illegible] fees [illegible] as percentage of total equipment cost; remainder made [illegible] for [illegible] client's result.

Alternatively, royalty or licensing arrangement [illegible] negotiated.

Reference No.

10/13

[illegible]

[illegible]

[illegible]

(4) [illegible]

[illegible]

(5) [illegible]

(6) [illegible]

Reference No.

10/14

[illegible]

(1) [illegible]

(2) [illegible]

(3) [illegible] Manufacture [illegible]

(4) [illegible]

The process that is available can also be used for [illegible] surfaces.

(5) Food and chemical industries.

(6) [illegible]

Reference No.

10/15

[illegible]

(1) [illegible]

(2) XALOY, S.A., [illegible] Belgium; Phone: [illegible]; Telex: [illegible] Contact: [illegible], Sales Manager.

(3) Private; Medium-sized company; World's largest manufacturer of bimetallic cylinders. Subsidiary of Xaloy Incorporated, New Brunswick N.J., USA; [illegible] Manufacture of bimetallic cylinders.

(4) A boron iron based material which is highly abrasion resistant is centrifugally cast against the inside diameter of a wrought seamless cylinder. The [illegible] 100% [illegible] strongest known to man. It gives a lining which is resistant to thermal shock, chipping and cracking. These properties are retained throughout the life of a lining.

The strict metallurgical balance of borides and carbides in the lining result in hardness in the range of [illegible] to 64 Rockwell C.

A further group of alloys is highly corrosion resistant in addition to the abrasion resistance. They are used for processing plastics which would develop chemical attack during [illegible].

(5) Bimetallic cylinders are used in extrusion and injection equipment. In particular, plastic processing machinery for injecting and extracting rubber and plastic substances.

(6) Depending on tariff and payment conditions this firm is willing to [illegible] a Latin American country.

10/16

10/17

10/18

10/19

Reference No.

10/20

JAPAN

(1) [illegible]

[illegible] KOKAN K.K., [illegible]
Telex: [illegible]

[illegible]

(2) [illegible]

(3) [illegible]

Reference No.

10/21

JAPAN

(1) [illegible] SHEET

NIPPON STEEL CORPORATION, [illegible]
Telex: [illegible]; Cable: NIPPON STEEL [illegible]
Ohashi (Director).

Private; Capital: $[illegible]
Main nature of business: [illegible]
products and [illegible].

(2) [illegible] manufacturing technique
a. Prevention of enamel coat failure (e.g., [illegible])
b. Prevention of [illegible]
c. Improvement of adhesion
d. Retention of [illegible]
e. Retention of product strength after [illegible]
f. Improvement of weldability
Manufacturing technique and [illegible].

Reference No.

10/22

JAPAN

(1) [illegible] GALVANIZED [illegible]

NIPPON STEEL CORPORATION, [illegible]
Telex: [illegible]; Cable: NIPPON STEEL [illegible]
Ohashi (Director).

Private; Capital: $[illegible]
Main nature of business: [illegible]
products and [illegible].

(2) Ordinarily, chromate treatment is performed on galvanized sheet to prevent white rust. [illegible] rust has been known to [illegible] has developed special surface treatment techniques [illegible] preventing white-rusting without impairing the appearance of the product surface.

The new development can prevent the white rust for a long time, [illegible]
Generally speaking, anti-corrosivity is better when the chrome coating weight is [illegible] method, even the sheet with low chrome coating weight will have the similar [illegible] with usual high chrome coating weight.

Attractive surfaces with less coloring can be obtained by [illegible].

Reference No.

10/23

JAPAN

(1) PRE-COATED SHEET

NIPPON STEEL CORPORATION, [illegible]
Telex: [illegible]; Cable: NIPPON STEEL [illegible]
Ohashi (Director).

Private; Capital: $[illegible]
Main nature of business: Manufacture [illegible]
products and [illegible].

[illegible] manufacture [illegible] followed by certain heat treatment. [illegible] and in running expenses [illegible] two-coat one-bake [illegible].

Reference No.

10/24

FRANCE

(1) METALS, CERAMICS AND PLASTICS POWDERS [illegible] COATINGS WITH [illegible]

(2) [illegible], France.

(3) Private; [illegible]

(4) [illegible] molybdenum) ceramic material [illegible] thermo-plastic and thermo-hardening powders [illegible] resin epoxy) [illegible] calcium-[illegible]).

[illegible] thermal spraying, erosion, [illegible] protection, [illegible].

Improvement of [illegible].

[illegible].

The use of [illegible] the heating of the piece to be treated.

(5) [illegible] metallurgy, [illegible] (sugar tower for example), printing-plants, textile industries, [illegible].

(6) [illegible] studied and tested in our plants in Paris.

Our company [illegible] participation [illegible].

[illegible]

[illegible]: [illegible]

[illegible]: [illegible]

[illegible]: [illegible] first-class bank of Paris.

Reference No.

10/25

JAPAN

(1) PRODUCTION TECHNOLOGY OF PLASTIC COATED STEEL PIPE

(2) SUMITOMO METAL INDUSTRIES LTD., [illegible] Kitahama [illegible], Osaka, Japan; Cable: SUMITOMOMETAL OSAKA; Telex: [illegible]; Phone: [illegible].

(3) Private; Capital: [illegible]; Sales: [illegible] (between [illegible] and 31 March [illegible]); No. of employees: [illegible] as of end of [illegible]; Main nature of company: Production and sales of carbon steel rolled products, alloy steel rolled products, forging, casting, rolling stock parts and machineries.

(4) Production technology of [illegible] plastic [illegible] pipe.

(5) 1. Engineering services at the construction of facilities
2. Technical assistance of operation and quality control
3. Training at our plant in Japan.

Reference No.

10/26

JAPAN

(1) [illegible] TECHNOLOGY OF [illegible] COATED STEEL [illegible]

(2) SUMITOMO METAL INDUSTRIES LTD., [illegible] Kitahama [illegible], [illegible] Japan; Cable: SUMITOMOMETAL OSAKA; Telex: [illegible]; [illegible].

(3) Private; Capital: [illegible]; [illegible] (as of [illegible] March 19[illegible]); No. of employees: [illegible] (as of end [illegible]); Main nature of business: Production and sales of [illegible] steel, [illegible] products, forging, casting, rolling [illegible] parts and fabrication.

(4) Production technology [illegible] steel sheet, [illegible] annealing [illegible] full [illegible] rolled [illegible] materials, [illegible] by chromate treatment and etc.

(5) Know-how
1. Engineering service at the [illegible]
2. Technical assistance of operation and quality control
3. Training at our plants in Japan

Reference No.

10/27

JAPAN

(1) PRODUCTION [illegible] OF [illegible] STEEL [illegible]

(2) SUMITOMO METAL INDUSTRIES LTD., [illegible] Kitahama [illegible], [illegible], Osaka, Japan; Cable: SUMITOMOMETAL OSAKA; Telex: [illegible]; [illegible].

(3) Private; Capital: [illegible]; [illegible] and [illegible] March 19[illegible]; No. of employees: [illegible]; Main nature of business: Production and sales of [illegible] steel [illegible] products, forging, casting, rolling [illegible] parts and fabrication.

(4) 1. Production technology of [illegible] steel [illegible], sheet, [illegible] pretreatment [illegible], coating, [illegible].
2. Production technology of [illegible].

(5) 1. Engineering service at the [illegible].
2. Technical assistance of operation and quality control.
3. Training at our plants in Japan.

Reference No.

10/28

UNITED KINGDOM

(1) CORROSION PREVENTION AND PROTECTION

(2) U.M.I.S.T. CORROSION AND PROTECTION CENTRE, [illegible] of [illegible] Science and Technology, Sackville Street, Manchester, [illegible]; Contact: Dr. R. P. M. Procter [illegible].

(3) Mixed; A [illegible] academic, research, [illegible] students are associated with the Centre; Main nature of [illegible] advice and assistance to industry, [illegible] corrosion and protection.

(4) A recent British Department of Trade and Industry report [illegible] Kingdom £1,360 million annually, of which £300 million [illegible] knowledge and techniques. There is evidence which suggests that [illegible] and that in all cases very substantial sums of money [illegible]. [illegible] U.M.I.S.T. [illegible] Centre was established, from an existing nucleus, [illegible] of activity of the Centre in the field of corrosion prevention and [illegible] postgraduate teaching; (ii) fundamental and applied research; [illegible] including independent information, testing, materials selection, [illegible]. The Centre has experience, expertise and "know-how", [illegible] also in the problems associated with [illegible] of contacts with local industry, [illegible].

(5) The U.M.I.S.T. Corrosion and Protection Centre [illegible] assistance, on a consultancy basis, in the [illegible] Latin America. Staff of the Centre are available [illegible] and industries in Latin America. The U.M.I.S.T. [illegible] applications for postgraduate training [illegible] staffing of any new establishment. The Centre would [illegible] assistance which seemed appropriate.

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10/30

11/1

11/2

11/3

11/4

11/5

11/6

(4) Full knowhow on hot rolling of all types of steel/carbon, alloy, and stainless ... of ingots into blooms, slabs, and billets, and seamless hot rolled ... wide, and plates up to ... wide. It also relates to ... and ...

(5) Expert advice on selection of equipment and operation; royalty payable in form of down ... percentage of invoiced value or quantity. Training of recipient's personnel at ... subject to special agreement. Expert technical assistance available ...

Reference No.

5/8

SWEDEN

(1) HOT AND COLD ROLLING OF HIGH-GRADE STEEL PRODUCTS

(2) ... AB, S-... Hagfors, Sweden; Contact: Mr. ... Licensing, Steel Division), ... AB, ... Fors, Sweden; ...

(3) Private; Share capital: Sk. ...; Total ... Kr. ...; No. of employees: 1,...; Main nature of business: ... and stainless steels.

(4) Full knowhow on the hot and cold rolling of high-grade carbon, alloy, and stainless steel strip ... wide and in thicknesses down to 0.05 mm; also ancillary operations, such as pickling, slitting and heat treatment.

(5) Expert advice on selection of equipment and operation; royalty payable in form of down ... percentage of invoiced value or quantity. Training of recipient's personnel at ... subject to special agreement. Expert technical assistance available subject to special agreement.

Reference No.

5/9

HUNGARY

(1) BLOOMING AND SLABBING MILLS OF 1 MILLION TONS CAPACITY

(2) KGMTI, Planning Institute of the Ministry for Metallurgical and Machine Industries, Post Box No. 4, Budapest 1, Hungary; Cable: KOHI Budapest; Telex: ... Phone: ...-150; Contact: Mr. László Takáts (Chief Engineer, Member of Board of Directors).

(3) Governmental; Planning institute; No. of employees: 1300; Main nature of business: Development projects for metallurgical industry, technology and machine engineering.

(4) Ingot-handling mill with 850-1000 mm roll diameter, for annual production of ... to produce semi-finished square and flat products of 250-400 mm and 400-700 mm ... equipped with ... for and (if required) automatic control.

Two-high reversing ... annual production of 300,000-350,000 tons of carbon and ... :

from max. 4-ton ingots: 650-1150 mm square billets;
from max. 4-ton ingots: 650-1150 mm square or rectangular slabs.

Equipped with heat-treatment plant, cooling bed for slow cooling of high-alloy steels, ... required) automatic control.

(5) Manufacture of steel ... for finish-rolling, forging, trimming, etc.

(6) Available according to conditions and payment fixed ... private contract, both ... and manufacturing process documentation, training of recipient's personnel in ... and technical assistance provided under separate agreement.

Reference No.

5/10

HUNGARY

(1) [illegible] OF SLABS FOR SHEET MILLS

(2) KGMTI, Planning Institute of the Ministry for Metallurgical and Machine Industries, Post Box No. 4, Budapest 1, Hungary; Cable: KOHI Budapest; Telex: ... Phone: ...-150; Contact: Mr. László Takáts (Chief Engineer, Member of Board of Directors).

(3) Governmental; Planning institute; No. of employees: ...; Main nature of business: Development projects for metallurgical industry, ... engineering.

[illegible]

Fuels [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

11/11

[illegible]

[illegible]

[illegible]

11/12

[illegible]

[illegible]

The Company [illegible]:

a. [illegible] Guidance in [illegible]
- [illegible] for new products.
- [illegible] technical organization.
- [illegible]

(c) Services [illegible]. The Company will accept [illegible] undertake [illegible]

[illegible] to the client [illegible]

Company personnel [illegible], upon his or client request.

All activities [illegible] in all phases of [illegible] technology. [illegible] for technical [illegible]

11/13

HEAT TREATMENT [illegible]

( ) [illegible], [illegible], Sweden; [illegible]
Phone: [illegible]; Contact: Mr. [illegible]

( ) Private; [illegible]
[illegible] steel, [illegible] material, [illegible]

(4) Knowhow activities [illegible] to new [illegible] of the [illegible]; [illegible] equipment, including [illegible] specifications; [illegible] and commissioning; [illegible] training of the [illegible] personnel [illegible] works; [illegible] new plant.

(5) All types of heat treatment of [illegible], [illegible] annealing, normalising, hardening, tempering, [illegible] of various [illegible] [illegible]

( ) The [illegible] payment policy [illegible] rates are to be agreed upon. Payment [illegible] Swedish [illegible] [illegible] royalty may be considered, provided that satisfactory conditions [illegible]

11/14

(1) CONTROL OF SURFACE HEAT TREATMENT

( ) JOSEPH LUCAS (INDUSTRIES) LTD., Group Research Centre, [illegible] Lane, [illegible], Shirley, Solihull, Warwickshire, United Kingdom.

(3) Private; 1973 Turnover: £ [illegible]
Light engineering, transport, electrical equipment, fuel control and combustion systems.

( ) Control of [illegible], [illegible] with [illegible] [illegible] been [illegible] together with [illegible] been developed for this purpose together with special [illegible] techniques.

( ) [illegible] and knowhow agreement; consultancy.

GROUP 12 — WELDING, BRAZING AND JOINING

Reference No. **12/1** AUSTRIA

(1) PRODUCTION OF WELDING [illegible]

(2) [illegible] BÖHLER und CO. AG, [illegible], A-1011 [illegible], Austria; Cable: [illegible] Wien; Telex: [illegible]; Phone: [illegible]; Contact: Mr. W. [illegible], [illegible] [illegible] SA, [illegible] [illegible], [illegible], [illegible].

(3) Governmental; Major producer of special and alloy steels; No. of employees: [illegible],500; Capital: [illegible]; [illegible] alloy and special steels in various forms and finishes.

(4) Complete knowhow for planning and layout of electrode plants.

Supply of main manufacturing units.

Complete knowhow for manufacturing operations.

Supply of ready-mixed flux (thereby transferring the results of continuous product improvement and development).

Training of personnel in Böhler works.

Provision of Böhler personnel for technical assistance in recipient's works.

(5) Conclusion of knowhow agreement for specified period. Technology and knowhow normally supplied on royalty basis, with additional cash payments. Licensing arrangements can also be negotiated. Training and expert assistance can also be supplied, subject to mutually acceptable terms being agreed.

Reference No. **12/2** BULGARIA

(1) PRODUCTION LINES FOR WELDING PLANTS

(2) [illegible], Welding Division, [illegible], Sofia [illegible], Bulgaria; Phone: [illegible]; Contact: [illegible] D. [illegible], Department for Scientific and Technical Progress, Ministry of Machine Building, Slavyanska [illegible], Sofia, Bulgaria.

(3) Governmental; State-owned corporation for the design and construction of welding equipment. Main nature of business: Research, development, design and construction for special welding equipment.

(4) [illegible]

Reference No. **12/3** BULGARIA

(1) WIRE FEED DEVICES FOR SEMI-AUTOMATIC AND AUTOMATIC [illegible] ARC WELDING

(2) [illegible], Welding Division, [illegible], Sofia [illegible], Bulgaria; Phone: [illegible]; Contact: [illegible] D. [illegible], Department for Scientific and Technical Progress, Ministry of Machine Building, Slavyanska [illegible], Sofia, Bulgaria.

(3) Governmental; State-owned corporation for the design and construction of welding equipment. Main nature of business: research, development, design, and construction for special welding equipment.

(4) Feeding of welding electrode wire using the MAG and MIG techniques.

Data on the [illegible] type planetary wire-feed device:

Overall dimensions	Length	[illegible] mm		
	Height	[illegible] mm		
	Width	[illegible] mm		
Wire diameter		0.[illegible] - [illegible].0 mm		
Min. speed with 0.[illegible] mm wire		[illegible] m/min		
Max. speed with [illegible].0 mm wire		[illegible] m/min		
[illegible] force of wire	0.[illegible] mm	[illegible].0 kg	1.[illegible] mm	1[illegible] kg
	1.0 mm	[illegible].0 kg	[illegible].0 mm	15 kg
	[illegible] mm	1[illegible].0 kg		
Control of revolutions:	[illegible]			
Weight	[illegible] kg			

(5) Licensing arrangement, [illegible] complete equipment for production of planetary wire feed device.

Reference No.

12/4

BULGARIA

(a) APPARATUS FOR MICRO-PLASMA ARC WELDING

(b) MIPETIZLEC, Welding Division, Ex. [illegible], Sofia, [illegible]; Telex: [illegible], Contact: M.Eng. D. Ivanov, [illegible], Ministry of Machine Building, Chaykovski [illegible], Sofia, Bulgaria.

(c) Government; State-owned corporation for the research and construction of welding equipment; Main nature of business: Research, development, design and construction for special welding equipment.

(d) The **IZA-04** micro-plasma arc welding apparatus comprises a power supply unit, a torch, and accessories.

The power supply unit provides d.c. and a.c. for welding steel and non-ferrous metal (including aluminium and Al alloys). It has a built-in high-frequency oscillator for arc striking. Control devices are on the front of the unit, together with the control lamps.

The micro-plasma arc torch can be used for either manual or automatic operation. It is supplied with an on-off switch.

Technical data are as follows:

Over-all dimensions of power supply unit	[illegible]
Weight of power supply unit	[illegible] Kg
Weight of welding torch	[illegible] Kg
Supply voltage	[illegible], 50 Hz
Max. welding current	[illegible] A
Rated welding current	[illegible] A/IP = [illegible]%
No-load voltage	[illegible] V
Output	[illegible]
Working gases: plasma argon	[illegible]
protective argon and hydrogen	[illegible]
Water for torch cooling	[illegible]
Automatic arc striking using high-frequ. osc. oscillator	[illegible]

(e) Licensing arrangements negotiable.

Reference No.

12/5

BULGARIA

(a) SEMI-AUTOMATIC EQUIPMENT FOR CO2 WELDING

(b) MIPETIZLEC, Welding Division, Ex. [illegible], Sofia, [illegible]; Telex: [illegible], Contact: M.Eng. D. Ivanov, [illegible], Ministry of Machine Building, Chaykovski [illegible], Sofia, Bulgaria.

(c) Governmental; State-owned corporation for the research and construction of welding equipment; Main nature of business: Research, development, design and construction for special welding equipment.

(d) The semi-automatic equipment for CO_2 shielded arc welding comprises a power supply unit, a wire feed device and a torch. The I2a plan device (see reference no. 11/5) is [illegible].

Technical data on the equipment are as follows:

Supply voltage	[illegible] at 50 Hz
Primary current	[illegible] A
Output	[illegible] KVA
Rated current	500 A
Duration of operation	[illegible]%
Gas flowrate	[illegible] litre/min.
No-load voltage	[illegible] V
No. of control steps	[illegible]
Diameter of electrode wire	[illegible] mm
Wire feed speed	[illegible] m/min
Length of flexible welding tube	[illegible] m
Max. weight of wire load	[illegible] Kg
Over-all weight	[illegible] Kg

(e) Licensing agreements may be negotiated, or complete plants for the production of the equipment may be purchased.

Reference No.

12/6

BULGARIA

[illegible]

[illegible], Welding [illegible]; Contact: [illegible], Department for [illegible] and [illegible], [illegible], Sofia, [illegible].

[illegible] – [illegible] for the design and construction of welding equipment; [illegible]: Research, development, design and construction [illegible] equipment.

(4) Knowhow on the [illegible] of the following range of transformers [illegible] as power sources for manual arc welding:

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]0	[illegible]0	[illegible]0	[illegible]0	[illegible]0
[illegible]	[illegible]0	[illegible]0	[illegible]0	[illegible]0	[illegible]0
[illegible] current – A	[illegible]	[illegible]00	[illegible]	[illegible]00	[illegible]00
[illegible]	[illegible]	[illegible]0	[illegible]0	[illegible]0	[illegible]0
[illegible] current – A	[illegible]	[illegible]	[illegible]	115–450	130–5[illegible]0
[illegible]	[illegible]		[illegible]		[illegible]
Primary [illegible] current – A		[illegible]	[illegible]	[illegible]	[illegible]
[illegible] kVA	[illegible]	[illegible]	[illegible]	[illegible].5	[illegible]
[illegible]				[illegible]0.5	[illegible]
[illegible] – mm	[illegible]	[illegible]	[illegible]	[illegible]10+	[illegible]
[illegible] welding [illegible]	[illegible]		[illegible]	[illegible]0	[illegible]
[illegible]					
width – mm	[illegible]0	[illegible]	[illegible]	[illegible]	5[illegible]0
length – mm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]0
height – mm	[illegible]0	[illegible]	[illegible]	[illegible]	[illegible]
Weight – kg		[illegible]	[illegible]	[illegible]	[illegible]

(5) Licensing agreements may be negotiated, or complete plants for the production of the apparatus can be purchased.

Reference No.

12/7

BULGARIA

[illegible] welding [illegible]

[illegible], Welding [illegible]; Contact: [illegible], Department for [illegible], [illegible], Sofia, [illegible].

[illegible] for the design and construction of welding equipment; [illegible]: Research, development, design and construction for electric welding equipment.

(4) Knowhow on the construction of the following range of rectifiers is available for manual arc welding:

	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]0	[illegible]0	[illegible]0	[illegible]0
Primary coil current A	[illegible]	[illegible]0	[illegible]	[illegible]0
No-load voltage V	70	70	[illegible]0	70
Nominal welding current A	[illegible]00	[illegible]	[illegible]00	500
Duration of operations [illegible]	[illegible]0	[illegible]0	[illegible]0	[illegible]
Range of controlled welding current A	25–2[illegible]0	[illegible]	45–4[illegible]0	[illegible]–5[illegible]0
Overall dimensions:				
height mm	930	[illegible]0	1000	1000
width mm	[illegible]00	[illegible]00	[illegible]	675
depth mm	[illegible]00	[illegible]00	[illegible]10	[illegible]10
Weight kg	[illegible]00	[illegible]0	[illegible]10	500

(5) Licensing agreements may be negotiated, or complete plants for the production of the apparatus can be purchased.

Reference No.

12/8

UNITED STATES OF AMERICA

(1) EXPLOSIVE WELDING

(2) DENVER RESEARCH INSTITUTE, [illegible] of America; Phone: [illegible] Dept. of Mechanical [illegible].

(3) Private; University-[illegible] research and development [illegible]; Main [illegible].

(4) Explosive welding or cladding [illegible] the [illegible] dissimilar metals. [illegible] greater than parent metal strength. The capital investment [illegible] automated [illegible], the facility should [illegible] away from [illegible].

(5) Explosively [illegible] steel [illegible] been found to show [illegible].

(6) The Denver Research Institute will design the facility, [illegible] conducting a market survey, [illegible] and [illegible].

Institute personnel will provide [illegible] available for subsequent consultation and [illegible].

[illegible] services are offered by the Institute [illegible] facility [illegible]. The [illegible] incurred must, however, be paid [illegible] dollars.

Reference No.

12/9

UNITED KINGDOM

(1) JOINING BY HIGH-TEMPERATURE VACUUM BRAZING

(2) EDWARDS HIGH VACUUM (IMAC), [illegible] Electrical Crawley; Telex: [illegible] Mr. A.L. Walker (Product Manager, Metallurgy [illegible]).

(3) Private; Part of [illegible] BOC International [illegible] £ [illegible] million; Main [illegible] instruments, including [illegible].

(4) Joints are made at temperatures [illegible] and [illegible], with [illegible] and [illegible] strengths are comparable with those of [illegible].

The process has the following advantages:

1. Assembly work and process control [illegible].
2. The process is flux-free.
3. Joints and joined parts are [illegible].
4. Rejects are eliminated, [illegible].
5. The process is carried [illegible].
6. After joining, the products [illegible].

The knowhow offered covers the [illegible] for brazing, selection of construction materials, [illegible] production inspection.

The basic process has been in use for ten years [illegible] been carried out by the company.

(5) The advantages listed in (4) above mean that the [illegible] aerospace and general engineering industries.

(6) 1. Outright sale of "package" of plant and [illegible].
2. Establishment of local vacuum brazing [illegible] member with a negotiated investment.

In either of these cases, expert advice and assistance [illegible].

Reference No.

12/10

SWEDEN

(1) ELECTRIC WELDING

(2) ESAB, P.O. Box [illegible], [illegible] Phone: [illegible]; Contact: [illegible].

(3) Private; Share capital: [illegible] employees: [illegible].

(6) Manufacture of:

[illegible]

Conveyor systems, painting, and treatment lines.

Reference No.

12/11

[illegible]

(1) [illegible]

(2) [illegible] Phone: [illegible]; Contact: [illegible] (International Manager).

(3) Private; [illegible]

[illegible]

[illegible] Steel Company has the full [illegible] welding of static and dynamic loaded structures [illegible] of all types.

The company can offer knowhow on the whole [illegible] of fabrication, from the [illegible] to detailed development and analysis, welding, [illegible] and post-weld treatment, and final testing. It can also provide assistance in the field of weld planning and the establishment of procedure and personnel qualification procedures.

(4) All types of fabrication, including [illegible] engine crankcases, paper drying cylinders, pressure vessels, [illegible] cylinders, reactor vessels, frames for large-capacity presses, [illegible] and columns, stainless steel tanks, etc.

(5) 1. [illegible]

2. [illegible]

a. [illegible]

b. [illegible] and not more than [illegible] the effective date of the agreement.

c. All payments [illegible].

Reference No.

12/12

HUNGARY

(1) IMPROVEMENT OF WELDABILITY OF [illegible] STEELS SHOWING NO ALLOTROPIC TRANSFORMATION

(2) RESEARCH INSTITUTE FOR FERROUS METALLURGY, Fehérvári út 130, Budapest 11, Hungary; Phone: [illegible]50-020.

(3) Governmental; No. of employees: 200; Main nature of business: Research and development in ferrous metallurgy.

(4) Certain steels showing no allotropic transformation, such as austenitic manganese (Hadfield) and ferritic chromium steels, are difficult to weld.

Knowhow is available on a procedure designed to permit welding where previously only mechanical joining methods could be used. In ferritic steels, it prevents grain-coarsening in the heat-affected zone of the weld.

(5) Welding of cast manganese steel railway points (switches) and [illegible] rails.

(6) Knowhow and training of recipient's personnel available; conditions subject to negotiation.

12/13

12/14

12/15

Reference No.

12/16

UNITED STATES OF AMERICA

Reference No.

12/17

Reference No.

12/18

Reference No.

12/19

HUNGARY

Reference No.

5/11

(illegible)

(illegible)

(illegible)

Reference No.

5/12

(illegible)

(illegible)

(illegible)

Reference No.

5/13

(illegible)

(illegible)

(illegible)

13/1

13/2

13/3

13/4

[illegible]

LA SALLE STEEL COMPANY, [illegible], United States of America; [illegible]; Contact: Mr. [illegible] ([illegible]), La Salle Steel Co., [illegible], Canada, [illegible].

[illegible] Private; No. of employees: [illegible]; Main nature of business: Manufacturer of cold-finished steel bars.

[illegible] [illegible] temperature drawing [illegible] to take advantage of the [illegible] fact that [illegible] temperatures above [illegible] and below [illegible] can significantly influence the [illegible] properties of steel. [illegible], major improvements in [illegible].

[illegible] through a combination of quality control, [illegible] drawing, special [illegible] and controlled [illegible].

[illegible] Production of [illegible], [illegible], etc. for [illegible] ([illegible], [illegible], [illegible], screws, [illegible], etc.).

[illegible] The [illegible] would [illegible] La Salle [illegible]. The [illegible] would send personnel to the La Salle plant [illegible]. Additional [illegible].

13/5

(1) [illegible]

(2) [illegible], [illegible], United States of America; [illegible]; Contact: Mr. [illegible] ([illegible]).

(3) Private; Sales (1971): $ [illegible]; No. of employees: [illegible]; Main nature of business: [illegible] producer and fabricator.

(4) Until late in the [illegible] century, when [illegible] introduced the hot [illegible] process, heads for [illegible] vessels, boilers, etc., were formed by "[illegible]". [illegible] is recognized as the world leader in this field of metal forming; [illegible] ferrous and non-ferrous metals.

[illegible] in the [illegible] of [illegible] - [illegible].

[illegible] [illegible] techniques, [illegible] and ASME [illegible].

(5) [illegible], power plants, chemical [illegible], [illegible], tanks, etc.

(6) 1. [illegible] Steel Company [illegible], in the form of lectures, individual instruction, [illegible] of applicability, etc., designed to develop personnel in the techniques of [illegible] and the production of the speciality in question.
2. The following financial arrangements are possible:
   a. Lump-sum payment in advance (based on estimate of time and/or [illegible] at prevailing rates).
   b. Contractual arrangements. The recipient pays [illegible] for not less than five and not more than ten years, with payments in quarterly instalments starting on the effective date of the agreement.
   c. All payments in US currency to a New York bank, without any deduction of taxes.

Reference No.

13/6

[illegible]

(1) [illegible] ACID [illegible] FOR [illegible]

(2) MIDLAND INDUSTRIAL, [illegible] High Avenue S.W., Canton, Ohio [illegible], United States of America; Phone: [illegible]; Contact: Mr. [illegible] ([illegible]) or Mr. [illegible], [illegible], Buenos Aires, Argentina.

(3) Private; Division of Northwestern Inc.; Sales: $ [illegible]; No. of employees: 700-800; Main nature of business: Innovative engineering and sales of metal processing equipment.

(4) Most commercially available [illegible] milling, [illegible] high [illegible] 300-1[illegible] ft/min. [illegible] for smaller enterprises.

There is a need for a smaller [illegible] Midland Industrial have [illegible] the current specification [illegible]:

Gauge range	[illegible]
Coil width	[illegible] ins. inclusive
Coil inner dia.	[illegible] ins. [illegible]
	[illegible] ins. [illegible]
Coil outer dia.	[illegible] ins. [illegible]
Line speed	200-300 ft/min
Power supply	[illegible]

(6) Midland Industrial [illegible] alone, with start-up [illegible].

13/7

(1) [illegible]

(2) [illegible], [illegible] Republic of Germany; [illegible]

(3) Private; Capital: [illegible] ,000; Main nature of business: [illegible].

(4) A process based on the principle of vibration for [illegible] rolled metal products (wire, wire rod, bars, tubes).

Applicable to pickling, rinsing, [illegible], and [illegible].

Results in more thorough and even treatment of [illegible].

(5) Finishing processes of finished and semi-finished [illegible].

(6) A contract will be negotiated to cover each individual [illegible].

13/8

(1) MACHINING OF INTERNAL SURFACES OF HOLLOW [illegible]

(2) [illegible], Planning Institute of the [illegible] Post Box No.4, [illegible], Hungary; [illegible] Phone: [illegible]; Contact: [illegible] Directors).

(3) Governmental; Planning institute; [illegible]: Development projects for metallurgical industry; [illegible] engineers.

(4) A single-purpose grinder has been designed [illegible] hollow (e.g. hemispherical) vessels prior to enamelling.

The main data of the equipment are as follows:

Permissible diameter of workpiece	[illegible]00-2000 mm inclusive
" height " "	max. [illegible]00 mm
" weight " "	max. 5000 kg

The grinding slide has three different feedrates, with [illegible]. The bench has a separate drive with six different speeds. Movement of the workpiece [illegible] wheel is automatic.

(5) Autoclaves for use in chemical industry processes.

(6) Available according to conditions and payment fixed in the [illegible] contract, [illegible] manufacturing [illegible] documentation, training [illegible] assistance provided under separate agreement.

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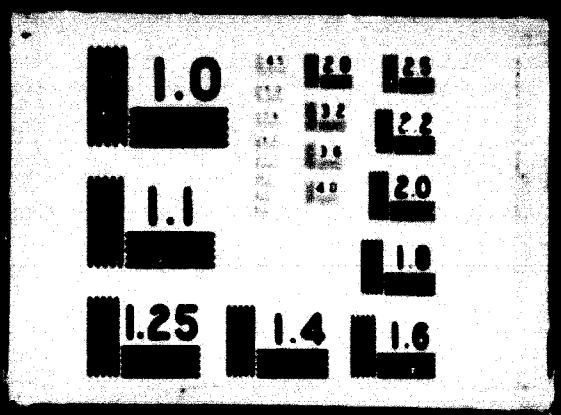
17.7.74



Reference No.

14/4

AUSTRIA

(1) MANUFACTURE OF DENTAL [illegible]

(2) [illegible] GmbH, A-[illegible] [illegible] bei Salzburg, Austria; Cable: Dentalwerk [illegible]; Telex: [illegible]; Phone: [illegible]

(3) Private; Capital: [illegible] million; Sales: [illegible]; No. of employees: 190; Main nature of business: Manufacture of dental equipment.

(4) Full process for production of dental [illegible], small units, air-driven instruments, dental technical equipment.

(5) Various possibilities, subject to individual negotiations.

Reference No.

14/5

UNITED KINGDOM

(1) MANUFACTURE OF TUNGSTEN CARBIDE TIPS AND TIPPED TOOLS

(2) [illegible] Ltd., [illegible], [illegible], Nr. [illegible], [illegible], United Kingdom; [illegible]; Phone: [illegible]; Contact: Mr. [illegible] [illegible] or Mr. [illegible] (Technical Director).

(3) Private; Subsidiary of [illegible] Ltd. ([illegible],000 employees, Capital: £[illegible] million, Sales: £[illegible] million); No. of employees: [illegible]00; Main nature of business: Manufacture of tungsten carbide [illegible] tools for mining and engineering industries.

(4) a. Layout and requirements of factory.
b. Advice on, and obtaining the necessary plant and equipment.
c. Manufacturing knowledge from raw material to finished product (sintered tungsten carbide hard-metal).

Raw materials include:

[illegible] tungsten, cobalt powder, [illegible] mixed-crystal heavy metal carbides, steel bar and forgings. Manipulating these raw materials into sintered carbide tips and the manufacture thereafter into mining tools and cutting tools which use tungsten carbide tips.

(5) [illegible] cutting and drilling tools (especially for mining).

(6) a. Consultancy [illegible]
b. Royalty on articles produced.
c. Training of [illegible] in our own Works.

[illegible] would be given on request, and when the potential [illegible] requirements are known after discussion.

It is strongly recommended that, because tungsten carbide tips are the raw material for tools of all kinds, manufacture should start first on the tools, importing the carbide from us. Only when the knowhow on toolmaking has been assimilated should the manufacture of carbide be [illegible]. This process (carbide manufacture) is more demanding of personnel, and is more likely to cause delay in achievement than the toolmaking process. [illegible], this would be the proper way.

Reference No.

14/6

ITALY

(1) MANUFACTURE OF CONVEYOR-BELT ROLLERS

(2) ITALSIDER S.p.A., via Corsica 4, [illegible] Genova, Italy; Cable: Italsider Genova; Telex: [illegible] Italsid; Phone: [illegible] Genova; Contact: Ufficio [illegible].

(3) Mixed; Major Italian iron and steel producer; Capital: Lit [illegible],000 million; No. of employees: [illegible]; Main nature of business: Production of iron and steel.

(4) Knowhow on the manufacture of [illegible] types of roller for use on conveyor belts:

<u>Normal service rollers</u>: special Italsider system, with high efficiency and reliability.

<u>Special service rollers</u>: suitable for extremes of climate (from -40°C to + [illegible]°C), for highly corrosive atmosphere (e.g. in chemical plants), for the transport of sensitive material in the presence of strong magnetic fields, or for transport of extra large and/or heavy materials.

The rollers are assembled in [illegible] appropriate to customer requirements.

The rollers are fabricated from galvanized steel tube; a special feature is the use of sealed non-lubricated bearings.

(5) Integrated assistance programmes, implemented by Italsider staff in recipient's works and training of recipient's personnel in Italsider works. The various possible conditions [illegible] transferring the knowhow will be furnished on application from potential recipients.

14/7

(1) PRODUCTION OF PRECISION ROLLER CHAINS

(2) FRANZ FOHRAIER GmbH, Siebenbrunnengasse [illegible], A-10[illegible] Vienna, Austria.

(3) Private; Capital: $[illegible] million; Sales: $[illegible] million; No. of employees: [illegible]00; Main nature of business: Production of precision roller chains.

14/8

FINLAND

(1) MANUFACTURE OF BRASS SANITARY FITTINGS AND VALVES

(2) LÖNNSTRÖM Oy, 26100 Rauma 10, Finland; Cable: Armat; Telex: [illegible] armat sf; Phone: 938-11970.

(3) Private; No. of employees: 1000; Main nature of business: Manufacture of taps and valves.

(4) Complete knowhow for manufacture of sanitary fittings and valves:
<u>Product planning</u>: product development; making and testing of prototypes; preparation of complete operational plans.
<u>Operations planning</u>: Construction; materials handling; coremaking; melting; gravity die casting; pressure die casting; cleaning; machining; grinding; buffing; plating; assembly; storage.

(6) Lump-sum payment 1/3 when ordering, 2/3 for delivery of final documents.

14/9

ITALY

(1) FABRICATION OF ALUMINIUM ALLOY DOORS AND WINDOWS

(2) MONTECATINI EDISON S.p.A., Foro Buonaparte 31, P.O. Box [illegible], Milano, Italy; Cable: Montedis; Telex: 31[illegible]9; Phone: [illegible]; Contact: Dr. Roberto [illegible] (Manager, Process and Product Development - DIEN), Montecatini Edison S.p.A. Foro Buonaparte 31, Milano.

(3) Private; Capital: Lit [illegible] billion; Sales (1970): Lit [illegible] billion; No. of employees: 52,[illegible]78; Main nature of business: Manufacture of chemicals, metals and ferroalloys.

(4) Fabrication of windows, doors, sections, and panels in aluminium and its alloys, including the following:

- Engineering and design of sections and panels.
- Fabricating techniques for windows and doors from **sections** and laminates.
- Manufacture of sections and laminates.
- Finishing techniques (anodizing, painting, etc.).
- Assembly techniques.

(6) <u>Licensing arrangements</u> against payment of lump sum covering expenses connected with transfer of technology plus annual royalty - to be negotiated with recipients. <u>Training</u> of technical personnel who will be in charge of plant operation. <u>Technical assistance</u> for technology transfer and start-up of plant.

Reference No.

14/10

UNITED KINGDOM

(1) FABRICATION, WELDING, AND HOT-DIP GALVANIZING OF LATTICE-TYPE STRUCTURES

(2) PAINTER BROS. LTD., Mortimer Road, Hereford, United Kingdom; Telex: 35[illegible]; Phone: Hereford 3101; Contact: Mr. H. Weatherall (Director and General Manager).

(3) Private; Capital: £2 million; Sales: £4 million; No. of employees: [illegible]00; Main nature of business: Structional engineers specializing in design, testing and fabrication of lattice-type structures.

(4) Knowhow in metallurgical processes - fabrication, welding, and hot-dip galvanizing - of lattice-type structures.

(5) Electrical transmission towers, television and radio masts, bridges, etc.

(6) Knowhow or technique agreement based on negotiated:

- initial "goodwill" payment.
- consultancy fee.
- annual royalty.

A patented light distribution pole is also available for licensing, either separately or in conjunction with a general agreement. Expert assistance and/or advice in design of layout, selection and design of specialized plant, jig and tool requirements, planning and control can be given and on-plant training offered, followed by consultancy role for advice on specific problems that may arise.

Reference No.

14/11

AUSTRIA

(1) MANUFACTURE OF FINISHED PRODUCTS IN ALUMINIUM

(2) Vereinigte Metallwerke, RANSHOFEN-BERNDORF AG, A-5282 Ranshofen-Braunau/Inn., Austria; Cable: [illegible]; Telex: 27 1 46 (ranshw a), 27 1 45 (mwkt a); Phone: (07722) [illegible] 410; Contact: Dr. [illegible] (Sales Manager).

(3) Governmental; Leading producer and manufacturer of aluminium and aluminium products and semi-finished copper and copper alloy products in Austria; Capital: S 410 million; [illegible]: $[illegible] million; No. of employees: [illegible]; Main nature of business: Production of tube, bar and sections in copper, aluminium, and its alloys.

(4) Knowhow available in the fabrication of window and door assemblies in extruded aluminium sections.

The types of fabrication available cover a wide range of styles and applications. A number of patented techniques for corner joining, hinge fixing, glazing and sealing are also offered.

The knowhow would include fabrication techniques, drawings, models, technical assistance, and training.

(5) The window models have applications in residential, hotel, industrial, business, hospital, etc. buildings in temperate and tropical climates.

(6) Subject to individual negotiation.

Reference No.

14/12

HUNGARY

(1) QUALITY CONTROL FOR BALL-BEARING STEELS

(2) RESEARCH INSTITUTE FOR FERROUS METALLURGY, Fehérvári ut. 1[illegible]0, Budapest 11, Hungary; Phone: [illegible]50-0[illegible]0; Contact: Mr. Paul [illegible].

(3) Governmental; No. of employees: [illegible]00; Main nature of business: Research and development on ferrous metallurgy.

(4) The quality control of ball-bearing steels is based on the determination of the cleanness of the steel (i.e. its freedom from non-metallic inclusion). However, this is not easy to accomplish.

A new apparatus has been developed by means of which the tendency to [illegible] can be measured and used as a criterion for the cleanness of ball-bearing steel, in the form of hot- [illegible] bars.

(5) Manufacture of ball-bearings and other steel products in which cleanness is important.

(6) Knowhow and equipment available, subject to negotiation. The equipment can also be tested in Hungary.

Reference No.

14/13

FEDERAL REPUBLIC OF GERMANY

(1) MANUFACTURE OF ROLLS FOR COLD-ROLLING MILLS

(2) STAHLWERKE RÖCHLING-BURBACH GmbH, Post Box 1[illegible]0, D-[illegible] Völklingen-Saar, Federal Republic of Germany; Telex: 4 4[illegible] [illegible]; Phone: 06898/101.

(3) Private; Capital: [illegible] million; Sales [illegible] million; No. of employees: [illegible],000; Main nature of business: Iron and steel products.

(4) Complete knowhow, comprising: Steel melting; forging; heat treatment; machining; testing.

(5) Forged steel rolls for cold rolling mills.

(6) An agreement will be negotiated which will cover the installation of equipment and its operation including quality control and various finishing techniques. The scope and terms of the contracts will be negotiated for each particular case.

Reference No.

14/14

UNITED KINGDOM

(1) FABRICATION OF STRUCTURAL STEELWORK

(2) DAWSON AND FRASER (INTERNATIONAL) LTD., [illegible] Palace [illegible], London S.W.1., United Kingdom; Cable: [illegible] London; Telex: [illegible]; [illegible]; Contact: Mr. [illegible] (Licence Manager).

(3) Private; Member of Chamberlain Group of Companies; Main nature of business: Structural steelwork engineers and fabricators.

(4) 1. General technology in manufacture of structural steelwork, including cutting, welding, finishing (shot-blasting, spraying) and material handling.
2. Design, manufacture, and erection of single-storey framed structures including clear portal, tied portal, and crane building type.
3. Manufacture of steelwork components and design data for MULA construction system: structure up to 6-8 storeys, suitable for building schools, offices, hospitals, laboratories, etc.
4. Design, manufacture, and erection of composite concrete/steel frame for high-storey building projects, known as MULTIBUILD.

(5) Structural steelwork industry.

(6) By licensing arrangements basically covering:

a. (i) Single once-for-all payment (in lieu of royalty, fixed, and fixed) on alternative;
b. (i) A down payment to cover initial costs in preparing technical know-how data to be supplied.
(ii) An annual royalty at an agreed percentage on the net contract value.
(iii) A minimum annual royalty (payable in advance).
(iv) An agreed period of years.
(v) Training in UK factories of licensee's personnel.
(vi) Visits of UK technicians to overseas licensees.
(vii) Maintenance of technical support and knowhow during licence period.

Reference No.

14/15

Netherlands

(1) GENERAL TECHNICAL ASSISTANCE IN METAL TRANSFORMING TECHNOLOGIES

(2) METAALINSTITUUT TNO, Post Box 541, Delft, Netherlands; Telex: [illegible]; Phone: (015) 1914; Contact: Mr. J.L. Bonnewaal (Director of Production Engineering Research).

(3) Mixed; Part of Organisatie voor Natuurwetenschappelijk Onderzoek TNO (Central Organization for Applied Scientific Research.); Annual budget: $38.75 million (1971); No. of employees: 4,000; Main nature of business: Research and development.

(4) Metaalinstituut TNO has experience, and can offer expert technical assistance in the following areas:

	Research and Development	Industrial Applications	Training
Cold working	X	X	X
Hot working	X	X	X
Explosive forming	X	X	X
Forming	X	X	
Sheet metal working	X	X	X
Extrusion	X	X	X
Casting	X	X	X
Heat treatment	X	X	X
Welding	X	X	X
Finishing	X	X	X

(6) a. The fee for stagiaires for training in the Metal Research Institute TNO will be about $[illegible] per person per month.
b. The charges for advisers sent out by the Organization will be in the range of $[illegible] per day, exclusive of travelling expenses and daily subsistence allowances.
c. Auxiliary educational materials and/or learning devices for courses that might also be in the countries where the pertinent knowhow is to be transferred eventually, may be in the range of about $5,000 per set.

Reference No.

14/16

Austria

(1) MANUFACTURE OF STEEL AND ALUMINIUM DOORS

(2) FELIX WALDNER, Kappaineretrasse 76, A-4020 Linz, Austria; Telex: [illegible]; Phone: (0722) 37073/ 893.

(3) Private; No. of employees: 130; Main nature of business: Production and sale of steel doors, garage doors.

(4) Knowhow on manufacture of new types of gates and doors in steel and aluminium.

Manufacturing techniques are used which enable high rates of production to be attained. Specially designed jigs, welding techniques and materials have been developed for fabricating the steel and aluminium.

(5) Manufacture of aluminium and steel doors and gates.

(6) Licensing arrangements for production of complete door and gate assemblies.

Reference No.

14/17

UNITED KINGDOM

(1) TECHNICAL INFORMATION ON TIN AND ITS USES

(2) TIN RESEARCH INSTITUTE, Fraser Road, Perivale, Greenford, Middlesex, United Kingdom; Phone: 01 997 4.54; Cable: Tinsearch, Greenford; Contact: Mr. D.A. Robins, Assistant Director, Tin Research Institute, Fraser Road, Perivale, Greenford, Middlesex, United Kingdom.

(3) International; Headquarter staff: [illegible]; Offices in Brussels, Ohio, Düsseldorf, The Hague, Milan, Rio de Janeiro and Tokyo; Main nature of business: Developing the uses of tin.

(4) The work of the Tin Research Institute is directed to develop the use of tin and is based on scientific and technical study of the metal, its alloys and compounds, and of industrial processes which use tin or may create future markets.

The whole group of organizations controlled by the Council is engaged in spreading knowledge of tin throughout the world. This is effected by publishing the results of research, by contributing to the technical and trade press, by issuing practical handbooks, by giving lectures, by participating in exhibitions and trade fairs, by practical demonstrations of tin-using processes, and by consultations at users' works.

The Institute publishes a wide range of technical literature relating to the uses of tin and also produces a quarterly journal "Tin and its Uses" in six languages.

(5) Technical help and advice relating to the uses of tin is given free of charge.

Reference No.

14/18

FRANCE

(1) PRODUCTION OF STEEL SHOT AND GRIT; PRODUCTION OF CAST IRON SHOT AND GRIT

(2) POUDRES ET GRENAILLES METALLIQUES (PGM), [illegible], rue A. de Vigny, 75008 Paris, France; Contact: Mr. J. Thome.

(3) One of the most prominent European companies to specialize in the production of cast iron and steel shot and grit; 40% of the production is sent for export; Main nature of business: Production and sales of shot and grit.

(4) The main processes of the production are as follow:

- Pouring liquid metal on to water jets.
- Drying and screening.
- Grinding.
- Heat treatment.

The PGM company could also supply specific machines such as:

- Water jets.
- Sieves and grinding mills.
- Heat treating furnaces.

(5) Cleaning of foundry parts (removing sand and carbonaceous material) and forged parts; cleaning the metallic surfaces before painting, enamelling coating.

(6) Commercial and technical assistance; payment [illegible] for knowhow; royalties on the turnover with a minimum amount guaranteed.

Reference No.

14/19

AUSTRIA

(1) MANUFACTURE OF LOCKS FOR DOORS AND FURNITURE

(2) HERM. GRUNDMANN, GmbH, P.O. Box 17, A-3100 Herzogenburg, Austria; Cable: GRUNDMANN, Herzogenburg; Telex: 015-[illegible]; Phone: (02782) [illegible]; Contact: Dkfm. Erich Buxbaum (Director).

(3) Private; Oldest and biggest lock manufacturer in Austria; No. of employees: approx. 1,100; Main nature of business: Manufacture of locks and foundry for cast iron and light metal.

(4) Technology and know-how for manufacturing all sorts of locks and similar articles. Planning of complete lock factories, assembling work or parts of such; elaboration of all designs or drawings; supply of raw material, unfinished, half-finished and finished parts for assembling; fabrication and supply of special tools and machines. Special section: technology and knowhow for cylinder locks and master-key installations.

(5) Conditions depend on the required technology and/or know-how. For example, technology and knowhow for a simple lock factory are supplied against L/C - payment with facilities (certain advance plus acceptance letter of credit) depending on the volume of the project. Technology and knowhow for cylinders and master-key system are supplied on a royalty basis plus fixed payment.

Reference No.
14/20

(1) ENGINEERS' CUTTING TOOL MANUFACTURE

(2) SAMUEL OSBORN AND CO. LTD., Clyde Steel Works, P.O. Box No. 1, Sheffield, S9 1RS, United Kingdom; Cable: Osborn Sheffield; Telex: 54385; Phone: (0742) 43561; Contact: Mr. E.W. Foster (Group Project Manager).

(3) Private; An international group of companies founded 1856; Capital employed: £15 million; Sales: £70 million; No. of employees: 7,000; Main fields of business: Manufacture of high-quality steel bars, extruded steel sections, rolled sheets, cutting tools, etc.

(4) A comprehensive package covering current all current process, product, equipment and operating technology and knowhow for high volume flow line manufacture of superior quality, high speed steel twist drills, reamers, threaded cutters, chucks, toolholder bits and lathe tools from bar and coil materials. Osborn will consider separation of any part of the product knowhow and technology offered to meet particular needs.

Construction, layout, equipment and services are based upon a nominal output capacity of some 6 million pieces per annum of current sales value of approximately £7 million, requiring capital expenditure in the order of £3 million, and some 1,400 tons of bar and coil materials per annum. This material is available from the steel producing companies within the Osborn organisation.

Main finished products are straight and taper shank twist drills in a comprehensive variety of common fractional and metric sizes and types, and parallel and tapered reamers for hand and machine application. The range of threaded shank cutters includes end mills, slot drills, dovetail cutters, woodruff cutters and ripping cutters. Face mills and side and face cutters are manufactured with plain and threaded bores. The Osborn-Mushet range of Titanic Chucks and chuck accessories are designed with many special features to accommodate a wide range of milling cutters, and to give fast cutting and long life. Toolholder bits are produced in square, rectangular, round, bevel, and double bevel sections in lengths to suit all standard toolholders. Special purpose cutting tools are manufactured to specified requirements.

Manufacturing techniques and facilities include sawing, abrasive cutting, turning, friction welding, milling, broaching, grinding, straightening, heat treatment, finishing processes, jigs, fixtures, devices and all materials handling equipment.

Back-up knowhow is offered covering project management requirements and procedures from a green field start to a fully operational unit including drawings, layouts, diagrams, planning, cost and progress control techniques. Technological and operational guidance and information is available in respect of plant selection, product and material range, product manufacturing routes, product performance, quality standards and control, servicing requirements, production planning and control, cost control, manpower requirements and management organization and staffing.

The processes and technology offered are established and operated by Samuel Osborn's subsidiary company, Osborn-Mushet Tools Limited at Sheffield, England.

(6) Proposed manner and conditions for supplying the technology and/or knowhow:

Implementation sequence

Step 1. Preliminary exchanges between Osborn and recipient to establish mutual interest.
2. Preliminary survey visit to establish specific parameters of requirements.
3. Preparation and submission of written survey report and proposals.
4. Negotiation and finalization of proposals, financial, commercial and contractual terms.
5. Invitation for recipient to visit Osborn to see and discuss the pertinent techniques and procedures.
6. Osborn to supply reports, documentation, manual instructions, photographs as may be agreed.
7. Osborn to provide and/or arrange for expert assistance as may be agreed.
8. Osborn to train recipient personnel in such techniques.
9. Osborn to service project operation on contractual basis as may be agreed.

Commercial Policy

Step 1 will involve no expense to the recipient.
Steps 2, 3, 4 and 5 will be carried out on an individual fee plus expenses basis paid by the recipient in accordance with requirements.
Steps 6, 7, 8 and 9 will be carried out on an individual fee plus expenses basis paid by the recipient in accordance with requirements and all charges will be open to consideration of royalty and/or joint-venture arrangements.

Reference No.
14/21

(1) PRODUCTION TECHNOLOGY OF TAPERED POLE

(2) SUMITOMO METAL INDUSTRIES LTD., 15 Kitahama 5-chome, Higashi-ku Osaka, Japan; Cable: SUMITOMETAL OSAKA; Telex: 63490; Phone: 06-226-5111.

(3) Private; Capital: ¥ [illegible],000,444,400; Sales: [illegible] (fiscal years ended 31 March 1977 and 31 March 1978); No. of employees: [illegible] as at end of 1978; Main fields of business: Production and sales of carbon steel rolled products, alloy steel rolled products, forging, casting, rolling stock parts and fabricating.

(4) Production technology of tapered pole, covering U - O forming, edge beveling, automatic welding, bending, special joint, form of base plate, stress relieving at expansion part and swing type expander.

(6) 1. Engineering service at the construction of facilities.
2. Technical assistance of operation and quality control.
3. Training at our plant in Japan.

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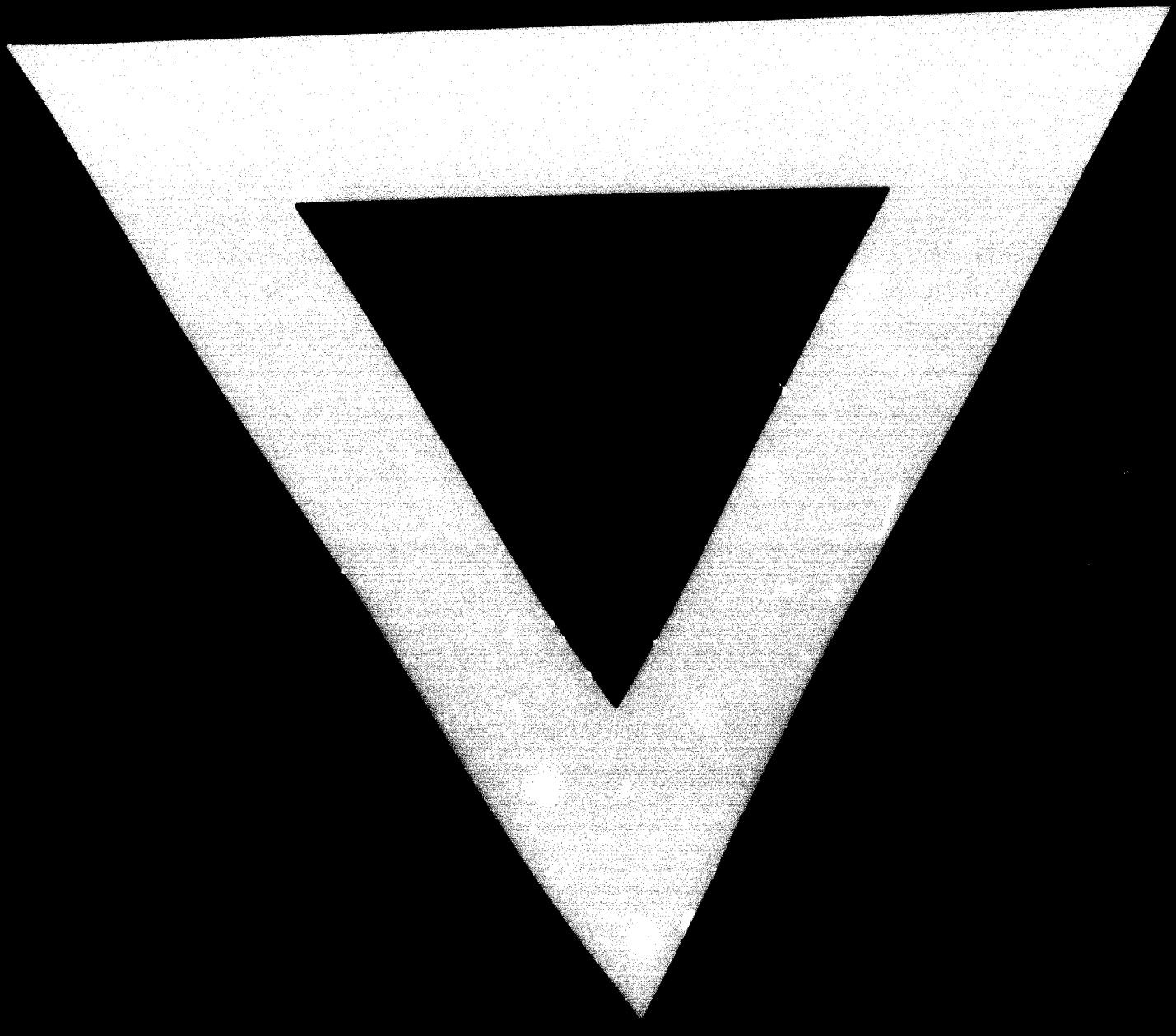

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